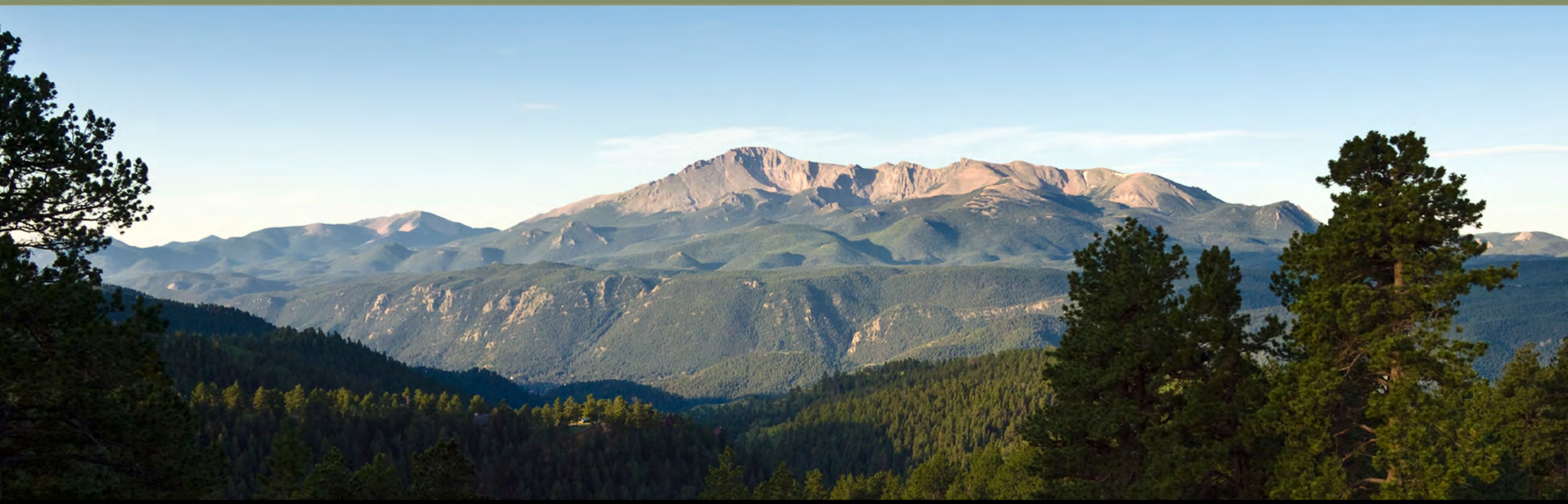
City of Woodland Park
Stormwater Master Plan



PREPARED FOR:

City of Woodland Park

PREPARED BY:

Enginuity Engineering Solutions
10106 W. San Juan Way, Ste 215
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November, 2015

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COVER LETTER

Mr. William (Bill) Alspach
Director of Enginering / City Engineer
City of Woodland Park
220 W South Ave
P.O. Box 9007
Woodland Park, CO 80866

Dear Mr. Alspach,

Enginuity Engineering Solutions, LLC, is pleased to submit this City Wide Stormwater Master Plan (SWMP) and Capital Improvement Plan (CIP) for the City of Woodland Park, Colorado. Enclosed is the comprehensive report that covers the 2014 and 2015 efforts that include,

1. Data Collection and Field Assessment of Existing Stormwater Systems,
2. City wide Hydrologic Update,
3. Identification of Problem Areas,
4. and the City Wide Capital Improvement Plan.

Additionally, all our digital content that support the findings of this SWMP are submitted to the City on flash drives for reference. All our staff have sincerely enjoyed working with the City and we want to express our gratitude for the opportunity to work side by side with yourself and all the staff who have been involved with this project. We hope the City finds this SWMP and CIP helpful for your long term planning of Woodland Park's Stormwater System.

Sincerely,

Gerald Blackler, PE, PhD
Project Manager
Enginuity Engineering Solutions

Jeff Sickles, PE, CFM
Principal in Charge
Enginuity Engineering Solutions

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CHAPTER 1: INTRODUCTION

1.0 INTRODUCTION

1.1 Project Background and Description

Woodland Park is known as the "City above the Clouds" and sits around 8,465 feet in elevation. The City is surrounded by the Pike National Forest with views of Pikes Peak easily seen from most locations within Woodland Park. The City is located in the central eastern portion of Teller County on the eastern range of the Rocky Mountains northwest of Colorado Springs, Colorado. Woodland Park is the most populated city in Teller County and is the headwaters for two major drainages, Fountain and Trout Creek. Fountain Creek drains south out of Woodland Park and then east to Colorado Springs and Trout Creek drains northward out of Woodland Park and then towards Deckers, Colorado.



Figure 1-1: Woodland Park Location Map

Geology around and within Woodland Park is primarily defined by the Fountain Formation, which consists of reddish brown cross-bedded conglomerate, course grained sandstone, and thin layers of reddish brown stiltstone and shale that were laid down during the Permian and Pennsylvanian periods. This geology contributes to the beauty and appeal of Woodland Park's location and also contains erosional properties that contribute to sedimentation and erosion within the streambeds that drain from Woodland Park. Hydrologic soils that affect infiltration and runoff rates within Woodland Park consist mostly of Hydrologic Groupings B - Moderate to High Infiltration with Moderate to Low Runoff Potential. In the surrounding mountains there are locations with bedrock outcrops and hydrologic soil groupings classified as D - Low Infiltration High Runoff Potential. These two soil groupings are overlaid by general land use classifications of low to medium development, evergreen forests, and some agricultural lands.

The last time a comprehensive stormwater master plan was performed for Woodland Park was in 1996. The Woodland Park Stormwater Master Plan performed by URS Corporation conducted small and large scale hydrology in addition to a condition assessment of the stormwater infrastructure within the City. Since then, Woodland Park has made substantial efforts to increase water quality from site drainage, retain and reduce peak runoff rates from the City, and to be a good steward of the headwaters in which Woodland Park resides. All of this is evident by the many water quality and stormwater detention ponds throughout the City and also by an emphasis for any new developments to capture and treat stormwater runoff.

1.2 Project Objectives

This project is a multi-year project and is generally comprised of three main objectives,

- Develop a comprehensive Stormwater Master Plan (SWMP) and a Stormwater Capital Improvement Plan (CIP) for the City of Woodland Park. This involves substantial data collection, problem identification, CIP development, and a financial review.
- Conduct a stream stability and assessment for Fountain Creek through the City. Identify problem areas, propose solutions and integrate solutions into the Stormwater CIP.
- Update select Flood Insurance Rate Maps (FIRM) within the City using the existing Federal Emergency Management Agency (FEMA) effective hydrology.

The above objectives were separated into two years of work for the years 2014 and 2015. This report is the final deliverable for 2015 and contains the entire scope of work that also includes,

- Data Collection of the existing Stormwater System.
- Identification of Problem Areas and Key Issues for the Stormwater System.
- City wide Hydrologic Update for major and minor drainages within the City Limits.
- Recommendations and Enhancements for Stormwater System upgrades.
- A long term CIP and Financial Review of the existing Stormwater Fee and Rate Structures.

1.3 Previous Investigations

The last detailed analysis of Woodland Park's Stormwater System was performed in 1996 by the URS Corporation. The 1996 Study looked at the existing Stormwater System and Drainage Policy, catalogued the existing conditions of infrastructure, reviewed large and small scale hydrology and hydrologic practices, and assessed existing funding levels versus the stormwater infrastructure need. As with most financial reviews of stormwater systems, it was found that the level of funding in 1996 was not sufficient for the amount of repairs and deficiencies that were identified. Additional recommendations from the study focused on erosion control practices, which were not as common in that time, recommended use of the rational method for most development submittals within the City, require the routing of the 100 year storm safely for all system designs (even if the system is designed for a 5 year event), and to require the discussion of downstream facility needs in each drainage report. The City has diligently followed through with major recommendations taken from the 1996 report and have a significant erosion control and best management program, have updated the Storm Drainage Criteria Manual to reflect appropriate procedures for the rational method, and also to identify criteria for drainage reports submitted to the City for review. The City has approximately 74 master drainage plans and drainage development reports that have been submitted as part of continuous development within the watersheds. These reports range from transportation upgrades, major development areas like the new Walmart in the south part of the City, and residential filings.

1.4 Information Procurement

Information that was procured as part of this project ranges from data collection of existing Geographic Information Systems (GIS) layers, field observations, discussions with City personnel, and reviewing drainage reports and filings for the City. A substantial data collection task was undertaken in the summer of 2014 that included collecting and cataloging the entire stormwater system into a GIS database to identify the type and condition of major and minor stormwater infrastructure for the entire City. All of this information is submitted electronically and summarized in the appendix of this report. In addition to field collection, an aerial survey was conducted for the entire City limits that includes 5 foot contours and break lines.

1.5 Public Outreach

Public outreach was handled by collecting a list of issues or concerns from citizens and known issues from employees within the City. A public outreach flyer was developed and sent to each citizen as a method for feedback on known drainage issues around each residence. Additionally, site visits were conducted and residences were engaged by many staff while observing and documenting known issues. Staff followed up with citizens who had submitted complaints or concerns and documented the items within this Stormwater Master Plan.

1.6 *Design Criteria*

Analysis of the existing conditions and subsequent tasks for the SWMP and CIP are performed using the following criteria,

- City of Woodland Park Drainage Criteria Manual (Adopted 2014).
- Natural Resources Conservation Service (NRCS) Unit Hydrograph Methodology (Known as the SCS Procedure) also referenced within the Technical Reference Manual 55 (TR-55)
- Federal Emergency Management Agency (FEMA) Floodplain Criteria found in the 44th Chapter of the Code of Federal Regulations (CFR)
- US Army Corps of Engineers (USACE) Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS).

1.7 *Acknowledgements*

This report was prepared with cooperation from the local officials as well as public and private interests. In particular, we would like to acknowledge the assistance received from William (Bill) Alspach at the City of Woodland Park. A list of project participants is provided in Table 1-1.

Table 1-1: Project Participants

Participant Name	Organization
William (Bill) Alspach, PE	Director of Public Works and City Engineer at the City of Woodland Park
Jeff Moreland	Streets Crew Chief at the City of Woodland Park
Jeff Sickles, PE, CFM	Principal in Charge at Enginuity
Gerald Blackler, PE, PhD	Project Manager at Enginuity
Dave Dubler, PE	Project Engineer at Enginuity
Colin Barry	Staff Engineer at Enginuity

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CHAPTER 2: DATA COLLECTION AND FIELD ASSESSMENT

2.0 DATA COLLECTION AND FIELD ASSESSMENT

2.1 Data Collection and Field Assessment Approach

An extensive data collection and field assessment was conducted for the entire City of Woodland Park. As part of this collection, GPS loggers were used to collect information, such as size, condition, and problems of minor and major drainage structures and drainageways within the City. The general approach taken included the following components:

- Investigating previous studies, existing drainage infrastructure, and other pertinent data provided by the City of Woodland Park.
- Interviewing key City staff and personnel to assist in defining flooding and maintenance issues.
- Sent public notification of the study and collected feed back from local Woodland Park's Citizens on problem areas.
- Creating a grid system for the study area utilizing GIS-based methodology to aid in the organization, identification, and logging of drainage infrastructure and problem areas in the field.
- Developing a field assessment book. The City of Woodland Park - Stormwater Master Plan Infrastructure Assessment Map Book was created from a project area grid system. Contained within the document is each grid area overlying the aerial imagery, roadways, major flowlines and limited existing stormwater infrastructure data.
- Conducting field investigations and assessments, utilizing GPS camera equipment to log and photograph the location of existing drainage infrastructure and identified problem areas.
- Identifying key drainage deficiency conditions based on data collected in the field.
- Creating and populating a geo-database containing drainage deficiency locations.
- Conducting site specific field investigations to gather additional information on known or high priority problem areas.
- Collection of aerial survey for the entire city limits.



Image of Post Card Sent to Citizens of Woodland Park to collect local knowledge of stormwater infrastructure performance

The above investigations were carried out for the entire City of Woodland Park. Any problem areas inside of the City limits were logged and identified regardless of the entity (City, County, CDOT, or landowner) responsible for maintenance and/or improvements.

2.2 Data Collection Results

Field investigation site visits were conducted over the months of June, July, and August of 2014 and consisted of covering the entire City of Woodland Park on foot to ensure a thorough collection of data and evaluation. Two days were also spent in City Hall perusing numerous drainage reports to ascertain relevant data. Additionally, multi-day site visits in September and October were carried out to garner additional information on major drainageways and previously identified problem areas. Over 2,000 field photographs were collected using GPS camera equipment and an additional 600+ using standard digital camera equipment to document infrastructure and drainage problems. Handwritten notes, mark-ups and relevant information were logged in the City of Woodland Park - Storm Water Plan Infrastructure Assessment Map Book. Also, most of the detention ponds within the City's limits were inventoried using GPS equipment. Additionally, inspections were made of 30 detention facilities, noting the layout, inlets and outlet structures. Notes and sketches for individual detention ponds were recorded on separate review forms.

Table 2-1: Summary of Culvert Inventory

Culvert Size	Number Inventoried or Counted
Smaller than 18 Inches	114
18 Inch	1142
24 Inch	148
36 Inch	49
48 Inch	8
Greater than 48 Inches	17
Total	1478

2.2A Existing Culverts Condition Assessment

Almost 1,500 culverts were inventoried as part of the extensive data collection effort. Most of the culverts are small, with over 75 percent of the culverts inventoried being 18 inches in diameter and serving as side drainage and cross drainage around roadways. Only 17 of all the culverts inventoried (1 percent) were greater than 48 inches in diameter. Most of the culverts (almost 70 percent) were considered to be in good condition, 6 percent in poor condition, and the remaining 26 percent were considered to be in fair condition. Table 2-1 summarizes the numbers of culverts inventoried while Figure 2-1 presents the inventory by condition rating of good, fair, or poor condition. It's important to note that the conditions ratings for culverts was primarily based on the culvert's ability to properly convey water and to a lesser degree, its structural integrity. Of all the culverts inventoried, approximately 21 percent are blocked to such an extent that they can no longer drain. The most common problem noted was sediment reducing the capacity of the culvert followed by vegetation blocking the inlets or outlets reducing the culvert's capacity. Figure 2-1 above presents a break down of the drainage problems identified for each culvert. Presented on the next page are the condition ratings for each culvert size that were assessed during the 2014 field and data collection tasks.

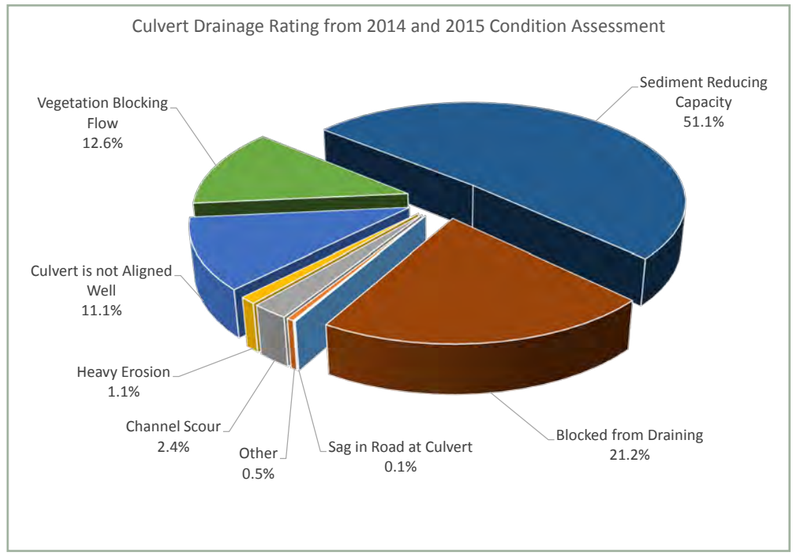


Figure 2-1: Drainage Problems by Type for Culverts Inventoried for Woodland Park

2.2B Assessment of Major Drainages and Channels in Woodland Park

The two major drainageways through the City are Fountain Creek and Trout Creek. Fountain Creek is famous for its ability to carry large amounts of sediment, flow quickly and with large volumes of water, and also is in need for major stream stability projects throughout the Creek's path. Trout Creek is a much larger drainage; however, it is mostly stable with fewer problems than seen on Fountain Creek. The largest tributary to Trout Creek within the City, Loy Gulch, is experiencing headcutting and degradation near the confluence with Trout Creek. The following discussion highlights the stream stability assessments conducted during the 2014 field assessment work.


Picture of Fountain Creek during a Flood in the late Summer of 2014 (Courtesy of William Alspach)

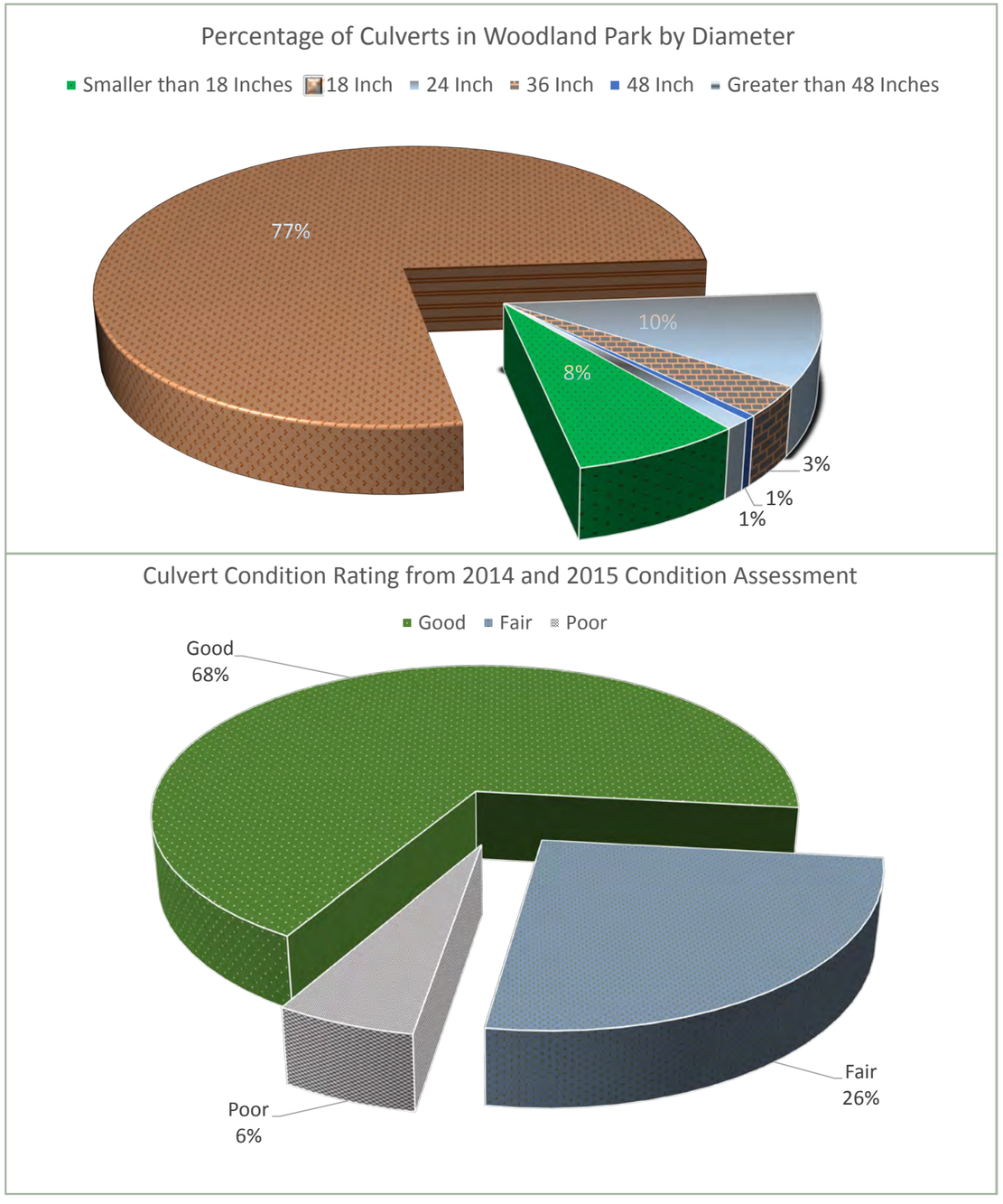
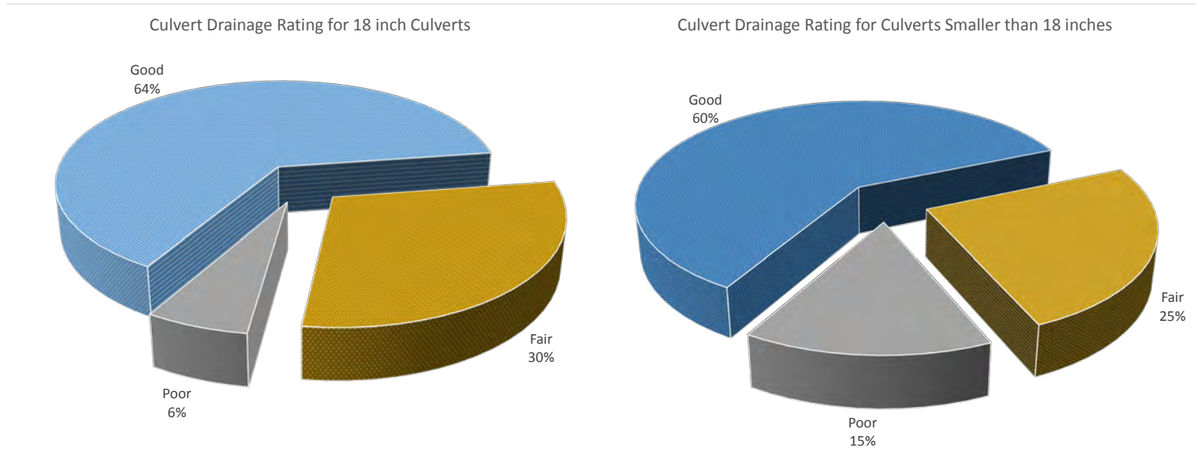
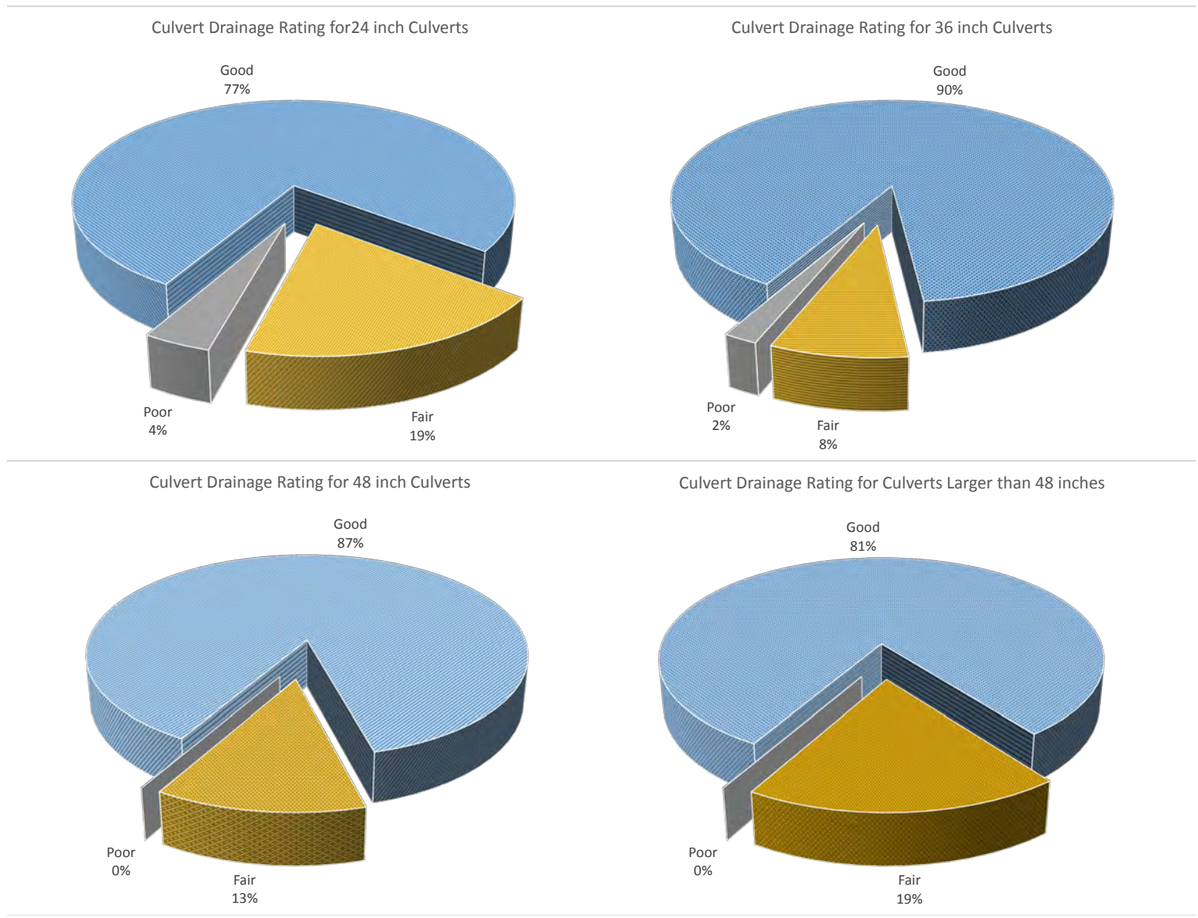


Figure 2-2: Condition Assessment Results for Culverts in Woodland Park





2.2c Fountain Creek Stream Field Assessment

The mainstem of Fountain Creek was evaluated on foot from Highway 24 within the main portion of the City down to the lower limits of the study area just past the current Walmart in the south portion of the City. A comprehensive stream stability and geomorphological analysis of Fountain Creek was performed and the detailed report is included within the appendix of this report. Findings from the field assessment of Fountain Creek are discussed below starting from the top of the reach at Highway 24 in the center of the City to the reach below the Walmart south of the City.

- The top of Fountain Creek experiences headcuts from concentrated flows around culverts or near drainages that are concentrated from curb and gutter. The photo to the right is a typical example of a 6-8 foot headcut right next to the highway that is caused by a 36 inch storm-sewer draining the roadway and upstream developed areas.
- As Fountain Creek traverses south of the City there are portions that are collected in large and long concrete box culverts. Sections of the reach, such as the one shown in the photo to the right just north of Sheridan Ave, have been stabilized with stepped banks and rock toes. These particular designs have performed very well over the almost 20 years since they were constructed.
- As Fountain Creek passes the East Fork confluence, headcutting and bank erosion is noted. As shown in the photo below, many of the banks have erosion and cuts that are 6 to 10 feet in depth with some areas being greater than 15 feet.
- Behind the Safeway Shopping Center on Highway 24 stabilization measures are planned and under design to bring the stream bed to a stable slope and reduce bank erosion.
- Downstream of the stabilized reaches are some of the most unstable and actively cutting portions of the reach. Headcuts are 8 to 15 feet high, tree roots are exposed through the banks and the trees are dying, falling into the creek, and cause a potential clogging hazard to downstream crossings.
- Two locations are particularly concerning: the reach near the concrete plant and the section near the Saddle Club Property. Both reaches have debris, dumped concrete, and experience heavy erosion.
- Near the Walmart Store there are many bank protection measures and a few new treatments that appear to be holding well since they were installed.



Headcut at Top of Fountain Creek from Culvert under Highway 24



Stabilized Reach through the City just North of Sheridan Ave.



Bank near abandoned waste water lagoons



Bank section at concrete plant



Bank erosion downstream of Sheridan Ave.

2.2d Trout Creek Stream Field Assessment

Most of Trout Creek drainages are west of the City limits. The field assessment focused on the furthest downstream limits within the City and then up to the major tributaries of Trout Creek. From the downstream limits of Trout Creek up to the residential neighborhoods at the top of the watershed, the following assessment items were noted.

- At the downstream City limits of Trout Creek and its confluences the stream drains through a wide open golf course. Typical crossings are 6 to 8 foot CMPs that are mitered to embankment slopes where golf carts cross the creek. These sections consist of sandy bottom channels with well vegetated banks. Some locations have small bank cuts ranging from 1 to 2 feet in height.
- Further up the branches of Trout Creek that eventually lead to the confluence with Loy Gulch, which is the largest tributary in the City limits, there are more prominent signs of stream instability. Head cuts range from 6-12 feet and many locations have end culverts hanging vertically from the banks as they drain into the main drainageway.
- Some areas are protected with dumped concrete as a measure to protect properties that are close to the drainageway and also to protect culverts on major roads with migrating headcuts that threaten the safety of the road.
- At the confluence with Loy Gulch there are large vertical, un-stable banks that are a result of the degrading channel elevation in the main channel.
- Further upstream on the tributaries, stabilization begins as the drainages get higher in the watershed and are protected by roadway crossings and established vegetation holding the banks.
- Minor headcuts exist throughout all the tributaries. Some are protected by conventional designs and some have remained untouched until they threaten property or infrastructure.

In general, Trout Creek could use large projects that would stabilize long portions of the reaches similar to the needs at Fountain Creek. Based on the field assessment, much of the tributaries and Trout Creek are not as critical as some of the portions of Fountain Creek. However, if they are ignored, the need for larger and longer repairs will develop over time.



Typical Culvert Section at the Golf Course where Trout Creek exits the City Limits



Headcut where the largest Tributary from Woodland Park (Loy Gulch) confluences with Trout Creek



Typical section through golf course



Photo of abandoned Water line with Joint Exposed



Photo Showing Dumped Concrete to prevent a 6-8 foot head cut protecting a culvert on Research Drive

2.2E *Detention Ponds Field Assessment*

The City of Woodland Park has made long term efforts to establish stormwater detention along with some stormwater quality treatment from all new and existing developments. The City prioritizes being good stewards of the headwaters to both the Trout Creek and Fountain Creek watersheds by providing stormwater quality and detention despite there not being a mandated requirement from Municipal Separate Stormsewer System (MS4) or National Pollutant Discharge Elimination System (NPDES) permits. This is evident from a quick look at the first pass rain-on-grid analysis. The many water quality and stormwater detention ponds are easily identifiable from a surface flow analysis. As shown in Figure 2-3 below, almost any development area has both stormwater detention and water quality capture ponds to help alleviate flooding from intense storms and to increase the water quality of drainage from frequent events.

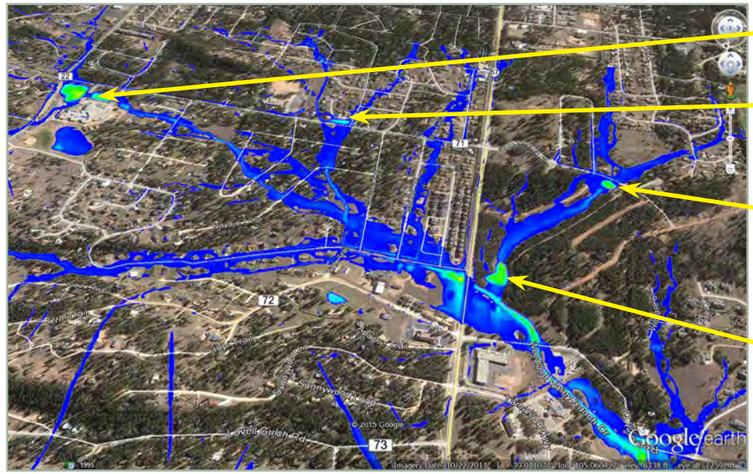


Figure 2-3: Graphic of first pass rain-on-grid analysis for Woodland Park's North Drainages



Figure 2-4: Photo of typical Detention Pond Outlet Structure (modified with open cut bottom)

Woodland Park mostly consists of medium to low development with some areas of dense development within the City's center. Most water quality basins are designed to capture the sediment load that drains from the surrounding course grained sandstone that contributes to the beauty and appeal of the community. This same sandstone also contributes to a complicated balance of stream stability that requires necessary sediment loading to prevent long reaches of channel degradation and erosion. One of the most common detention facility outlets for water quality and flood control within Woodland Park is presented in Figure 2-4. It appears that this particular outlet structure was cut to remove, what is assumed to be, the original low flow and water quality control outlet structure. Unfortunately, removal of the water quality control may have contributed to stream erosion downstream of the structure since all frequent storms are passed quickly through the structure, resulting in no real benefit for low flows. Many ponds were assessed as part of this scope of work and the following items were noted:

- The City has performed an excellent job at requiring on-site and regional detention and water quality controls. These controls are implemented with new development and re-development even though there are no mandated requirements. The City requires water quality and detention as good stewards of the watershed headwaters.
- Several of the outlet structures no longer have water quality controls or were originally designed without these controls that are usually installed to reduce the sediment and pollutant loading from frequent storm events. This may have been from changes to eliminate perpetual maintenance problems or also they may not have been constructed as permanent water quality structures in the event of a later development in the area.
- There may be opportunities to enhance the standard detail for water quality and detention outlets that are more suitable to the needs of Woodland Park's drainage characteristics.

During the data collection and field assessment of detention facilities, a few items were noted for further investigation:

- The detention pond between Regent Drive and Fairfield has sedimentation problems and a downstream channel has formed a head cut that is causing problems around the golf course parking lot. It was noted that this structure drains to a smaller pipe under the Centennial Trail downstream, and also that the culvert under Highway 67 drains in conjunction with three other cross culverts to a channel that is experiencing channel erosion near the main parking lot for the Shining Mountain Golf Club.
- There is a large detention facility on S. Park Street just south of Highway 24 at Woodland Station that has slope erosion on the banks. This facility is a temporary facility and there needs to be a long term stormwater detention and management plan for this area.

Figures 2-5 and 2-6 summarize the condition of stormwater detention ponds observed as part of this project. Table 2-2 at the end of this section elaborates on the observed conditions for each pond.

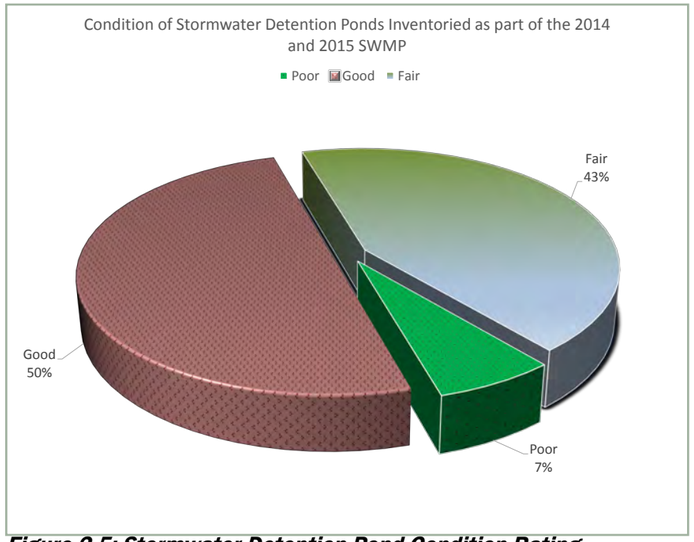


Figure 2-5: Stormwater Detention Pond Condition Rating

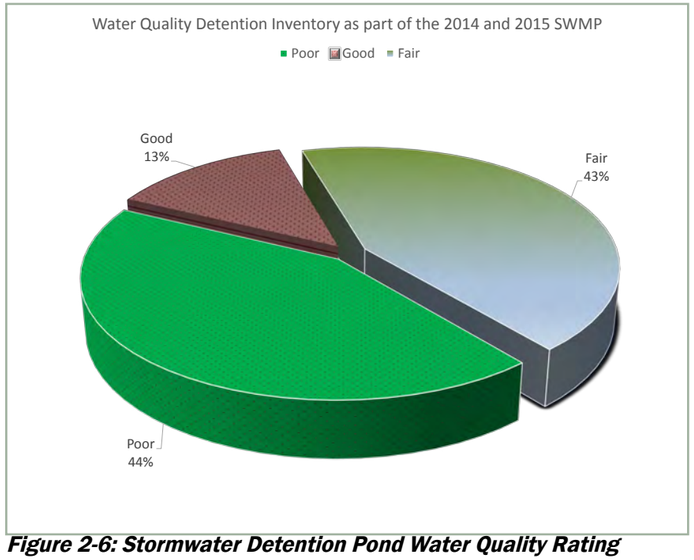


Figure 2-6: Stormwater Detention Pond Water Quality Rating

2.2F *Urban Drainage Assessment*

As it has been mentioned many times throughout this report, Woodland Park is located at the headwaters of two main watersheds. When this situation occurs and an urban drainage assessment is conducted, it is often nuisance drainage that causes many of the reported problems. However, that does not make those problems insignificant. On the first field assessment a few drainage problems were noted and they are listed below:

- On Timber Lane upstream of S. West Street there is an on-site drainage problem that results from concentrated flow and development higher on the hillside that naturally directs flow into a sag in the roadway. Water from the roadway sag is directed into a concrete channel and then released onto two private properties that do not have any sort of drainage easement or proper flow path for the water to travel downstream. This causes the water to go back and forth between the two properties causing erosion and maintenance problems to the homeowners before traveling downstream through a third property prior to reaching S. West Street.

- On the East side of S. Park St. just south of Highway 24 there are a series of deep trapezoidal channels to handle storm water runoff. The concrete channels are in good condition and appear to be functioning well for stormwater runoff. From a different perspective, the abrupt steepness of these channels could be a hazard to pedestrians and motorists during icy and bad weather. It may be reasonable to install a safety rail to separate the road and drainage channel at this location or consider having this drainage placed into a piped or closed conveyance to eliminate the risk of sliding into the channel all together.
- On the north side of the City some of the upper drainages traverse through owner's property without a formal channel to drain the water. It's very important to note that it is not always the City's responsibility to re-direct or detain water that is draining onto private property. Generally, a property owner has the responsibility to manage upstream drainage onto their property.
- Near S. Baldwin Street and Short Ave., street runoff isn't being collected by the existing inlets due to the inlet placement, street layout and the existing grade. As a consequence some flooding and road damage occurs.
- General ponding in residential areas is also evident throughout the City. One example is on W. Gunnison immediately east of State Highway 67. Due to a lack of street side conveyance and flat topography, runoff ponds along the street creating a nuisance.
- Occasionally, runoff from an adjacent jurisdiction creates an issue within the City. A property owner at Sunnywood Ave. and Ironwood Drive experiences runoff through their property creating a nuisance primarily in the form of sediment deposition that is from a dirt road maintained by the County.

2.3 *Data Collection and Field Assessment Summary*

In summary, Woodland Park is a unique drainage system that is located high in the top of two major watersheds, is beautiful and unique with geological strata and erodible sandstone that contribute to beauty along with sediment deposition and highly mobile channels. A few points summarizing the field assessment are:

- Drainage and storm water infrastructure for the City of Woodland Park is largely characterized by open channels and culverts, with limited curb, gutter, inlets, and below grade conveyance. Much of the underground storm sewer is located near the City center and in newer developments within the City.
- Many culverts within the City have some degree of sedimentation and conveyance blockage. Most culverts are 18 inches in diameter and the majority of culverts of all sizes are in good condition; however, over half have some sort of capacity reduction due to sediment.
- Main channels that drain to Trout and Fountain Creek will require continuous maintenance and capital improvement projects to balance the mix between the natural sediment load and meandering that would exist without development.
- Woodland Park has done an excellent job at requiring stormwater detention and water quality, especially considering that the City is not an MS-4 jurisdiction and water quality is not mandated. There may be opportunities to adopt different standard details for outlet structures that would provide consistency in construction around the City.

Table 2-2: Condition Assessment of Stormwater Detention Ponds

Object ID	Grid ID	Location	Condition Classification	Comments
1	C2	SH 67 north of Lucky Lady Drive	Poor	Makeshift pond, high sedimentation, low WQ capability, no emergency spillway
2	C2	SH 67 and Lucky Lady Drive	Good	Vegetated, available storage, appears to be operating as intended
3	D2	SH 67 and Luck Lady Drive	Good	Vegetated, available storage, appears to be operating as intended
4	D2	SH 67 south of Lucky Lady Drive	Poor	Makeshift pond, high sedimentation, steep un-vegetated banks, no emergency spillway, risk of failure
5	E2	Masters Drive	Fair	Heavily vegetated, limited WQ,
6	F3	Wildrose Court	Fair	Some sedimentation and heavy vegetation
7	F3	SH 67 and Valley View Drive	Fair	Low flow outlet isn't draining pond, no defined spillway
8	F3	SH 67 and Valley View Drive	Poor	Rundown to forebay eroding, high sedimentation, flared end section no longer attached
9	F2	Mountain Meadows Drive and Windflower Lane	Fair	Areas of heavy vegetation, some sedimentation, some erosion near the outlet structure
10	F4	Valley View Drive	Fair	Some sedimentation, channel to pond eroding, no emergency spillway
11	F5	Kelley's Road and Rampart Range Road	Good	Some sedimentation and heavy vegetation in areas, but overall appears to be performing well
12	F5	Kelley's Road and Rampart Range Road	Good	Retention pond, appears to be performing as intended
14	H3	Log Haven Drive	Fair	Heavy vegetation, poor outlet works
15	G4	Kelley' Road at Columbine Elementary	Fair	Sedimentation and poor WQ
16	G4	Kelley's Road and Center Street	Good	Limited WQ, but in good condition and operating okay
17	I5	Pikes Peak Avenue and Baldwin Street	Good	No issues, seems to perform as intended
18	I4	Park Street	Fair	Eroding banks, low WQ potential, no emergency spillway
19	I4	West Street	Good	No major issues

Table 2-2 Continued: Condition Assessment of Stormwater Detention Ponds

Object ID	Grid ID	Location	Condition Classification	Comments
20	K4	Gray Horse Circle and Black Bear Trail	Fair	No water quality, heavy sedimentation
21	H3	Karen Lane	Good	Poor water quality, but no major issues
22	J5	Owl Court and Skyline Drive	Fair	Erosion and sedimentation issues
23	I5	Panther Court	Good	No major issues
24	J5	Skyline Court and Skyline Drive	Fair	Erosion issues
25	K5	Paradise Lodge Lane	Good	No major issues
26	I6	Majestic Parkway and Spacious Skies Road	Good	No major issues
27	N6	US 24 behind Walmart	Good	No major issues
28	K2	Trout Creek Road and Innovation Way	Good	No major issues
N/A	D3	SH 67 between Fairfield Lane and Regent Drive	Poor	Sedimentation, outlet works releasing water at a rate damaging downstream infrastructure, no WQ
N/A	F5	Kelley's Road and Rampart Range Road	Fair	Culvert into pond damaged, bank erosion and sedimentation at outlets
N/A	F3	Stone Ridge Drive and Ptarmigan Drive	Fair	Pond sedimentation and erosion at riprap rundown
N/A	G3	Red Feather Lane behind storage facility	Fair	Sedimentation, debris, no water quality

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CHAPTER 3: HYDROLOGY

3. HYDROLOGIC ANALYSIS

3.1 Overview

This chapter discusses the hydrologic analysis for the City of Woodland Park and surrounding basins that was performed as part of the larger scope of work for the Stormwater and Capital Improvement Plan for the City. Peak flow rates for the 2-, 5-, 10-, 25-, 50-, and 100-year storm events were estimated under the existing conditions, which are mostly low to medium density developments within the City Limits. The peak flow estimates developed in this study were used to evaluate the existing drainage facilities, determine potential drainage problems, and evaluate alternative drainage improvements discussed later in this report.

Peak flow estimates were developed using the Soils Conservation Service (SCS) Unit Hydrograph method. Within the SCS method, 24 hour rainfall distributions and depths are coupled with Curve Number (CN) loss methods that weight the land use and soils to apply a CN value that is between 0 and 100. This CN value is then used to develop storage and initial abstraction losses to the 24 hour rainfall depths. After these losses are subtracted from the rainfall, the excess runoff is transformed using the SCS Unit Hydrograph method to compute a runoff hydrograph for each basin. These hydrographs are then routed through channel elements connecting each sub basin from the top of the drainage area to the lowest limit of the study. Peak flow estimates and channel routing was developed within the Hydrologic Engineering Center Hydrologic Modeling System (HEC-HMS V. 4.0). The HEC-HMS model computes and routes each hydrograph through an open channel system that drains to the north and south areas of Town, which are also known as part of the Trout Creek and Fountain Creek drainages, respectively.

Hydrology performed for this study is compared to three different previous studies,

- A 1985 study by Greenhorne and O'mara (G&O),
- The most current flood insurance study (FIS),
- The 1996 hydrologic results from the last Stormwater Master Plan hydrologic analysis.

This hydrologic analysis updates hydrology within and around Woodland Park by incorporating updated 24 hour rainfall depth values from the most current precipitation data server published by the National Oceanic and Atmospheric Administration (NOAA), applying updated CN values for the developed condition within the City, and modifying the rainfall distribution for the Fountain Creek Watershed according to recent drainage criteria manual recommendations for Colorado Springs and the recently adopted Drainage Criteria Manual for Woodland Park (Adopted 2014). With these changes, the hydrologic analysis resulted in approximately 10 percent lower flows for the Fountain Creek watershed and approximately 17 percent higher flows for the Trout Creek watershed.

3.2 Design Rainfall

Design rainfall depths were taken from the National Oceanic and Atmospheric Administration (NOAA) Precipitation Frequency Server for Colorado. Table 3-1 includes the 24 hour rainfall depths that were used for latitude 38.9968° N and longitude 105.0573° W at Elevation 8501, which is the location of Woodland Park, Colorado. The 24 hour rainfall depths presented in Table 3-1 are approximately 25 percent higher than values used in the 1996 Hydrology Study and consequently produce different runoff rates than the last hydrologic analysis.

Table 3-1: One-Hour Rainfall Depths

Storm Frequency	24 Hour Rainfall Depths (inches)
2-YEAR	1.92
5-YEAR	2.38
10-YEAR	2.84
25-YEAR	3.56
50-YEAR	4.19
100-YEAR	4.89

The 24 hour rainfall depths presented in Table 3-1 were distributed with the Type II SCS storm distribution that is recommended for most of the Central United States. It's important to note that previous studies applied the SCS Type IIA distribution for all basins within the Fountain Creek Watershed. Originally, the Type IIA distribution was developed for the Front Range of New Mexico and in the past has been applied to parts of Front Range locations in the southern parts of Colorado, such as Colorado Springs. Since the Fountain Creek watershed drains to Colorado Springs, previous studies also applied the Type IIA distribution to the entire Fountain Creek watershed. Within current drainage criteria manual for Woodland Park and also within Colorado Springs most recent drainage manual, the Type IIA distribution has been abandoned and the more common Type II distribution is now being recommended for Fountain Creek. This was a result of studying Fountain Creek and Jimmy Camp Creek watersheds for long duration storms and watershed response. For more information visit Section 2.2 of Chapter 6 within the most recent Colorado Springs Drainage Criteria Manual. Additionally, the Colorado Water Conservation Board (CWCB) Floodplain and Criteria Manual, Section 4.6, pg CH9-407 specifies a Type II distribution be used for the area. As such, within this study, the Type II SCS storm distribution is applied for both Fountain and Trout Creek.

3.3 Sub-watershed Characteristics

Sections 3.3A through 3.3D of this report give a brief summary of steps taken to calculate the required parameters for the SCS procedure, while explaining some of the methodology behind the calculations. Peak parameters for the SCS procedure require an estimate of the watershed lag time, which is estimated by the watershed's CN value, slope, and main channel length. Volumetric losses that account for infiltration and depression losses are estimated from the watershed's CN value, which directly relates to the watershed's storage and initial abstraction values. The CN values for Land Use and Hydrologic Soil Groupings presented in Table 3-2 were used to develop a weighted CN values for each sub-basin. Initial losses, referred to as the *initial abstraction* values are estimated to be 20 percent of the total storage, which is the most common ratio for the SCS procedure.

3.3A Basin Delineation and Drainage Patterns

Initial watershed and sub-watershed boundaries were developed using the Watershed Modeling System (WMS) that is published by Aquaveo. Survey information that was collected at the inception of this project was used to delineate basins within the survey and City limits, while USGS Digital Elevation Models (DEMs) were downloaded and merged with the survey information to establish basin boundaries for watershed's that exceed the survey limits. Over 100 sub-basins were delineated within and around the City limits, totaling over 35 square miles of drainage area accounted for in this baseline hydrologic assessment.

3.3B Time to Peak Approximations

An accurate approximation of peaking parameters is important due to the significant effect it has on the surface runoff reaching a watershed, or sub-watershed outlet. This timing, in turn, directly influences peak flow rates for all the storms modeled. After careful consideration, the SCS lag time equation was chosen as the method for estimating time to peak for each watershed. The equation is a function of the watershed slope, channel length, and the CN value for the watershed. Since the equation considers the CN value, it is also accounting for land use configurations. For example, a high CN value that represents a more developed watershed will produce a lower time to peak and a higher peak flow rate. This would be expected since developed areas typically have lower overland flow roughness values and also have channelized storm sewers and channels that convey water more quickly than an undeveloped natural watershed. The equation used to estimate lag time for each sub basin is presented below, where L = watershed length, CN = the weighted curve number value, and S = the watershed slope.

$$t_{lag} = \frac{L^{0.8} * \left[\left(\frac{1000}{CN} - 10\right) + 1\right]^{0.7}}{1900 * \sqrt{S}}$$

3.3C Weighted Curve Number Calculations

CN values for each drainage were estimated by overlaying the USDA hydrologic soil grouping file with the national land use data set for all the drainage areas in and around the City. Curve number values for each soil grouping and land use classification are presented in Table 3-2. A detailed printout of the weighted CN computations are included in the appendix.

After the automated computation of the weighted CN values was complete, a thorough review was conducted to check and ensure that the values are representative of the land use and current land use conditions. In addition to CN values, an estimate of Directly Connected Impervious Area (DCIA) is added within the HEC-HMS model as a impervious percentage. When HEC-HMS applies the SCS Procedure, the option of inputting a percent impervious value is located within the sub-basin loss routine. Any impervious fraction within the model is considered to have zero hydrologic losses and behaves as a DCIA portion of the sub-basin.

Table 3-2: SCS Curve Number Values used for Woodland Park, Colorado

Hydrologic Soil Grouping	A	B	C	D
Land Use Classification	Curve Number Value			
Developed, Open Space	57	72	81	86
Developed, Low Intensity	63	77	85	88
Developed, Medium Intensity	81	88	91	93
Developed High Intensity	89	92	94	95
Barren Land (Rock/Sand/Clay)	77	86	91	94
Deciduous Forest	36	60	73	79
Evergreen Forest	36	60	73	79
Mixed Forest	36	60	73	79
Dwarf Scrub	35	56	70	77
Shrub/Scrub	35	56	70	77
Grassland/Herbaceous	49	69	79	84
Sedge/Herbaceous	35	56	70	77
Lichens	77	86	91	94
Moss	68	79	86	89
Pasture/Hay	49	69	79	84
Cultivated Crops	49	69	79	84
Woody Wetlands	30	55	70	77
Emergent Herbaceous Wetlands	30	58	71	78

3.4 *Hydrograph Routing*

Within HEC-HMS each hydrograph was routed between flow junctions using the Muskingum-Cunge routing option that includes the 8-point cross section input. This requires input for cross sectional geometry, roughness, slope, and channel lengths.

3.4A *Conveyance Elements*

Conveyance elements within the HEC-HMS model were separated into six (6) separate geometries that represent different channel conditions within the City. Cross sections were cut across the survey terrain model and then an 8 point approximation was made to represent the following channel cross sections:

- Urban Street Sections: These sections include two channels on the side and then an approximate street section in the model. Roughness values for the sides are n=0.055 while the street was set to n=0.025.
- Urban Incised Sections: These sections are an incised channel section with channel roughness values of n=0.045 and overbank roughness values of n=0.055.
- Urban Channel Sections: These sections represent channels that are defined through the City. They are a trapezoidal shape channel with a channel roughness of n=0.045 and over bank roughness values of n=0.055.
- Mountain Channel Sections: These sections are used for Mountain Drainage reaches and have a channel roughness of n=0.045 and over bank roughness values of n=0.065.
- Fountain Creek Sections: Channel portions down the main stem of Fountain Creek are applied this section and include a channel roughness of n=0.045 and over bank roughness values of n=0.065.
- Golf Course Sections: Channel portions down the Golf Course are applied this section and include a channel roughness of n=0.045 and over bank roughness values of n=0.065.

Cross sections on the next page present the 8 point section that is used within HEC-HMS for each reach and were approximated from the locations where sections were cut across the survey terrain model.

3.4B *Storage Elements*

A careful review of stormwater detention facilities found that many are privately owned and operated with some being temporary ponds that are expected to change or move when future development occurs. Localized private detention facilities were not included in the hydrologic model. This is common for planning level studies because firm maintenance agreements that guarantee performance are usually not in place. In this analysis, the major detention facility by Woodland Park Middle School and the minor detention facility upstream of Kelly Road near Center Street were included in the model. These ponds were included in the hydrologic model since they are regularly maintained and they have a dramatic effect on flows near the Paint Pony and Loy Gulch Confluence, which is a mapped floodplain.

Results of Analysis

As previously discussed, updates within this analysis have resulted in a change of the flood flows from previous studies at certain locations within the City of Woodland Park. These updates include:

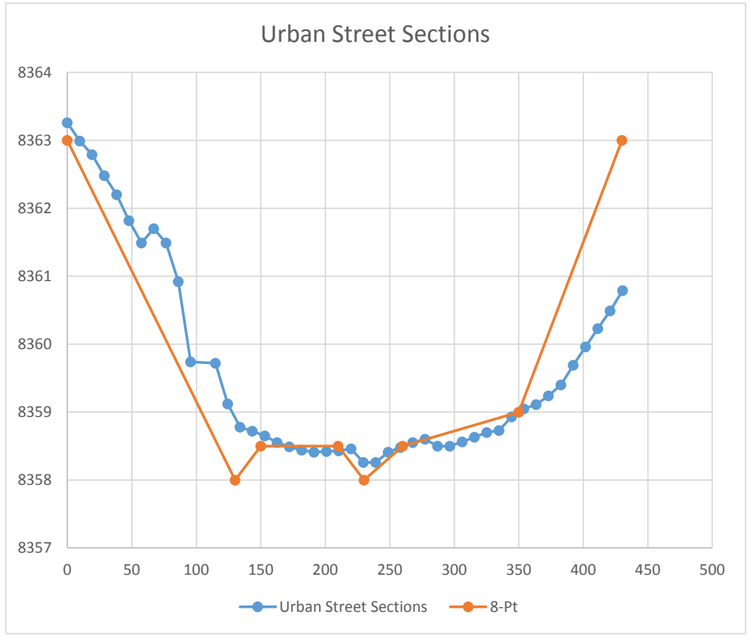
- Using the SCS Type II instead of the Type IIA storm for the Fountain Creek Watershed. The Type II storm is now recommended within the most recent version of the Colorado Springs Drainage Criteria Manual dated May 2014 and is consistent with the guidance provided in the Woodland Park Drainage Criteria Manual.
- Applying 24 hour rainfall depths from the NOAA Atlas 14 available on the NOAA Precipitation Data Frequency Server are on average 25 percent greater than the 24 hour precipitation depths used in the 1996 Stormwater Master Plan Hydrologic Analysis.
- The most recent national land use data set and hydrologic soil groupings were applied in this analysis to update CN and percent impervious values for sub-basins in Fountain and Trout Creek.

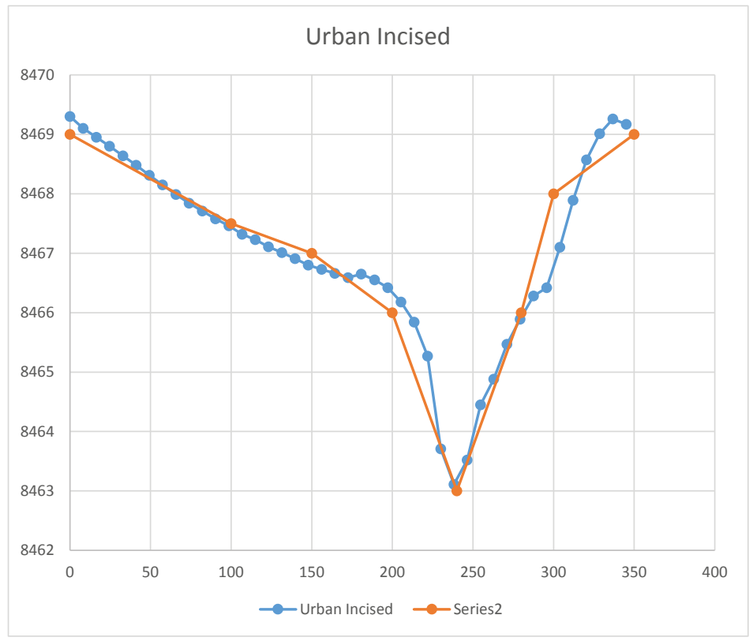
3.4C *Previous Studies*

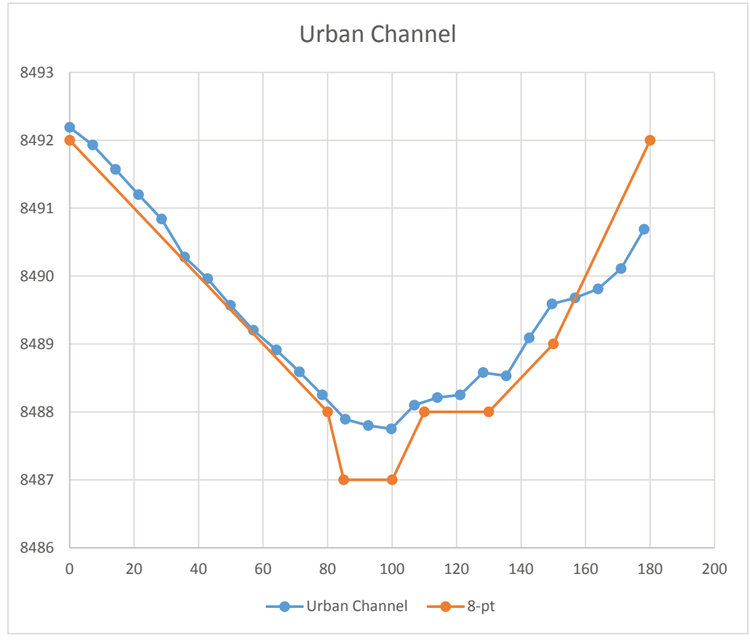
There are three previous studies that were reviewed for comparison of peak flow rates and hydrologic parameters, the 1985 study by G&O, the FIS study, and the 1996 Stormwater Master Plan Hydrology. In general, the G&O hydrology tends to report higher results at locations further up in the watershed and slightly lower results at locations further down in the watershed. The 1996 study generally trends with the FIS peak flow profiles, however, it produces higher flow rates when compared to the FIS data.

3.4D *Results of Analysis and Comparison to Previous Studies*

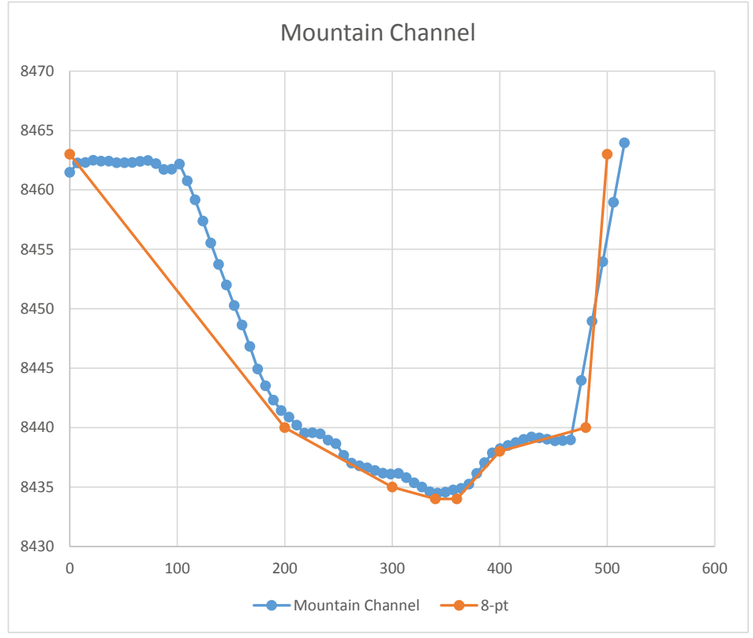
On average, the unit flow rates are 1.3 cfs per acre with a maximum unit discharge rates upwards 4.0 cfs per acre in developed areas. Included in this appendix are the complete discharge and basin summary tables. When the results from this study are compared with the 1996 future conditions, 100 year analysis, the results were lower in the Fountain Creek watershed and trend close in the Trout Creek watershed. In the Fountain Creek drainage, the peak flows in this study are lower than the 1996 study and the FIS. This is because the 1996 study and the FIS used the Type IIA distribution. The Type IIA has greater intensity earlier in the storm and explains why this study produces lower peak flow rates than the 1996 study, even though the rainfall depth is 25 percent higher. When the 5-year peak flow rates from this study are compared with the 5- year peak flow rates from the G&O and 1996 studies, greater percentage of differences between each study are prevalent. As with the 100 year peak flows, the flows are higher in the Trout Creek and lower in the Fountain Creek watersheds. Table 3-4 below presents the 5- year peak flow rate comparison between the 1996 (HEC 1, Future Conditions) and 1985 studies.











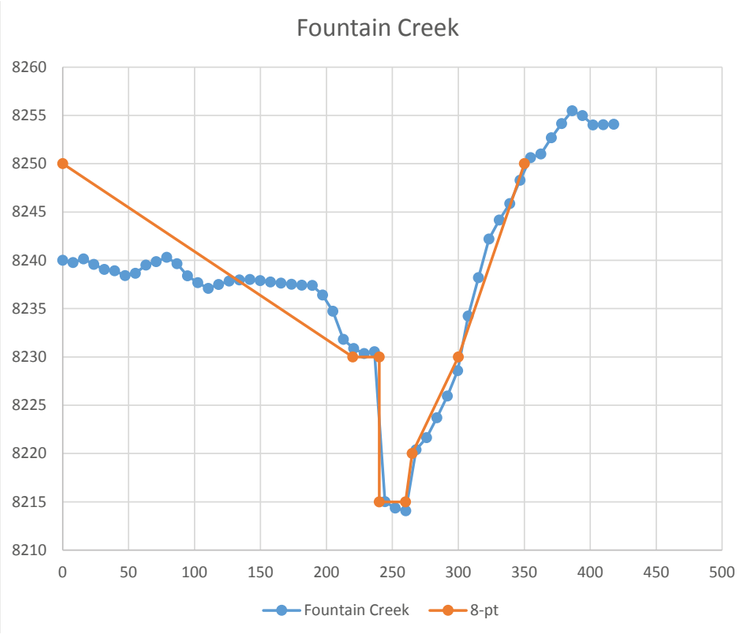


Figure 3-1: Graphical Depiction of 8 Point Cross Sections used for the Muskingum-Cunge Routing in HEC-HMS

Table 3-3: 100 Year Peak Flow Rates on Fountain Creek Compared with Previous Studies

Location	HEC-HMS Junction ID (This Study)	Hydrology 100 Year Flow (cfs) (This Study)	Flood Insurance Study 100 year Flow (cfs)	1996 Master Plan 100 year flow (cfs)	G&O Study (1985) 100 Year Flow (cfs)
E Fountain Creek	C22	342	440	560	428
Fountain U/S of E. Fountain Creek	C66	666	800	819	1044
D/S Confluence with E. Fountain	C69	1505	1520	1899	1469
U/S of Woodland Ave	C72	2959	3606	4355	3495
U/S Confluence with Crystola Creek	C61	3865	5175	5096	3871

Table 3-4: 5 Year Peak Flow Rates on Fountain Creek Compared with Previous Studies

Location	HEC-HMS Junction ID (This Study)	Hydrology 5 Year Flow (cfs) (This Study)	1996 Master Plan 100 year flow (cfs)	G&O Study (1985) 100 Year Flow (cfs)
E Fountain Creek	C22	48	145	84
Fountain U/S of E. Fountain Creek	C66	173	224	270
D/S Confluence with E. Fountain	C69	315	480	300
U/S of Woodland Ave	C72	519	990	600
U/S Confluence with Crystola Creek	C61	619	1022	540

Table 3-5: 100 Year Peak Flow Rates on Trout Creek Compared with Previous Studies

Location	HEC-HMS Junction ID (This Study)	Hydrology 100 Year Flow (cfs) (This Study)	Flood Insurance Study 100 year Flow (cfs)	1996 Master Plan 100 year flow (cfs)	G&O Study (1985) 100 Year Flow (cfs)
Lovell Gulch	C80	420	198	390	172
Loy Gulch u/s of Paint Pony	C37	645	500	555	694
Paint Pony and E. Paint Pony	PaintPonyConf	531	410	541	196
Loy Gulch W of Hwy 67	C79	1250	1040	1196	1832
Loy and Lovelll Gulch	C101	1649	1128	1571	1903
Trout Creek u/s of Loy Gulch	R38	3211	2314	3270	2897

Table 3-6: 5 Year Peak Flow Rates on Trout Creek Compared with Previous Studies

Location	HEC-HMS Junction ID (This Study)	Hydrology 100 Year Flow (cfs) (This Study)	1996 Master Plan 100 year flow (cfs)	G&O Study (1985) 100 Year Flow (cfs)
Lovell Gulch	C80	25	35	13
Loy Gulch u/s of Paint Pony	C37	59	21	28
Paint Pony and E. Paint Pony	PaintPonyConf	95.2	83	105
Loy Gulch W of Hwy 67	C79	172	134	195
Loy and Lovell Gulch	C101	195	167	205
Trout Creek u/s of Loy Gulch	R38	243	158	300

This study shows peak flow rates vary by an average of 5 percent in Trout Creek and 27 percent in Fountain Creek when compared to the 1996 study. As with the Fountain Creek watershed, the flow profiles from this study trend closer to the 1996 study but are closer in value to the 1985 G&O study. Since all the studies for the Trout Creek basin also utilized the Type II storm distribution, the slight increase in flows from the 1996 study is primarily due to the higher rainfall depths taken from the most recent NOAA Atlas 14. This study uses 4.89 inches for the 24 hour storm depth while the 1996 study used 3.60 inches for the 24 hour rainfall depth.

3.4E *Additional Analysis with GSSHA*

In addition to the HEC-HMS model, a rain-on-grid model was developed and executed using the Gridded Surface and Sub-surface Hydrological Analysis (GSSHA) model developed by the US Army Corps of Engineers. A semi-detailed model was developed with recently gathered survey data and assumed uniform rainfall distribution over certain basins. The rainfall distributions were designed to represent a 100 year burst of rainfall and did not apply the common SCS Type II distribution. Short intense rainfall was used to investigate the drainage systems response to thunderstorm developments over the City. The GSSHA models developed do not include stormwater pipe systems and are based on topographic delineation and open channel routing. From this analysis, it appears that most flooding occurs when tributaries that originate higher in mountain basins combine at locations within the

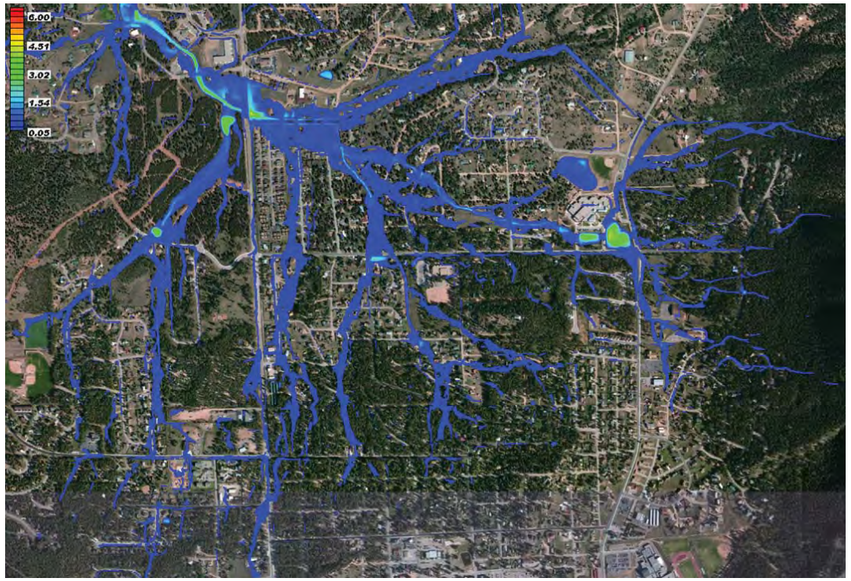
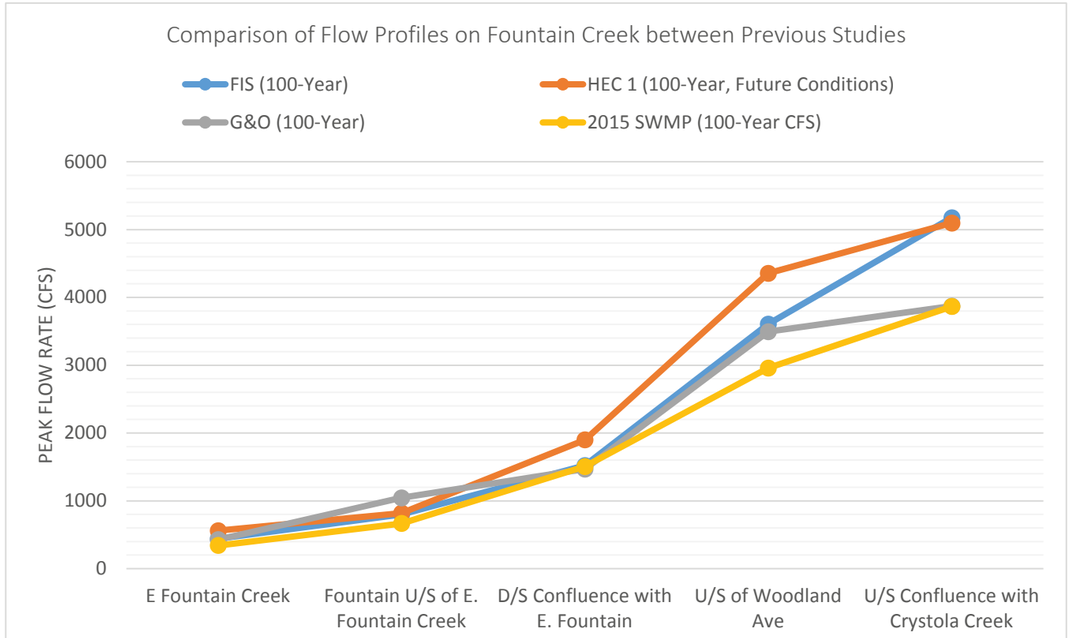
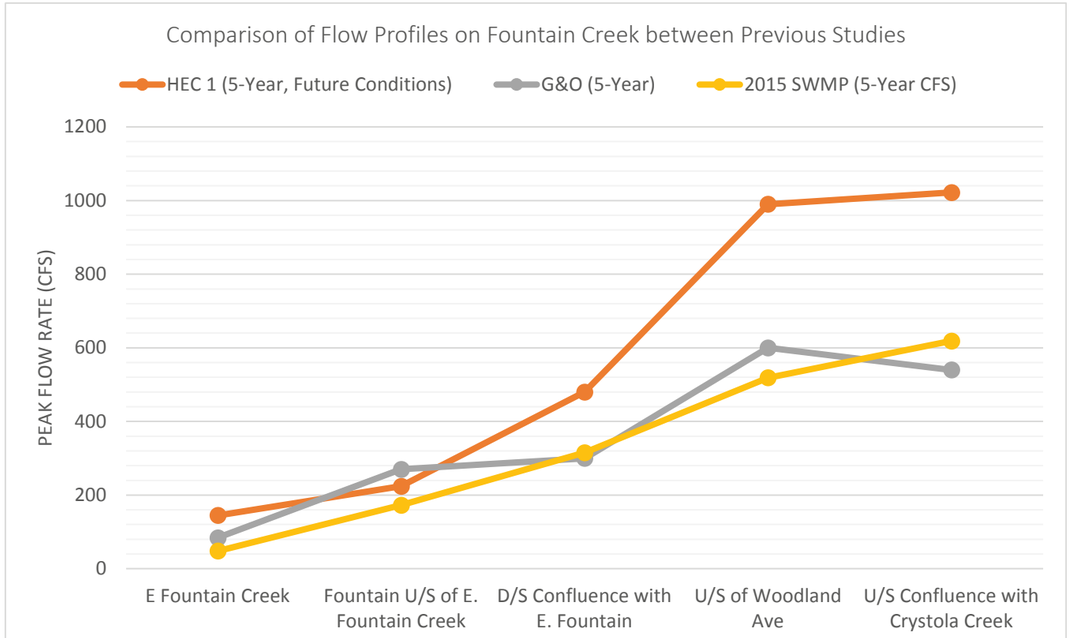
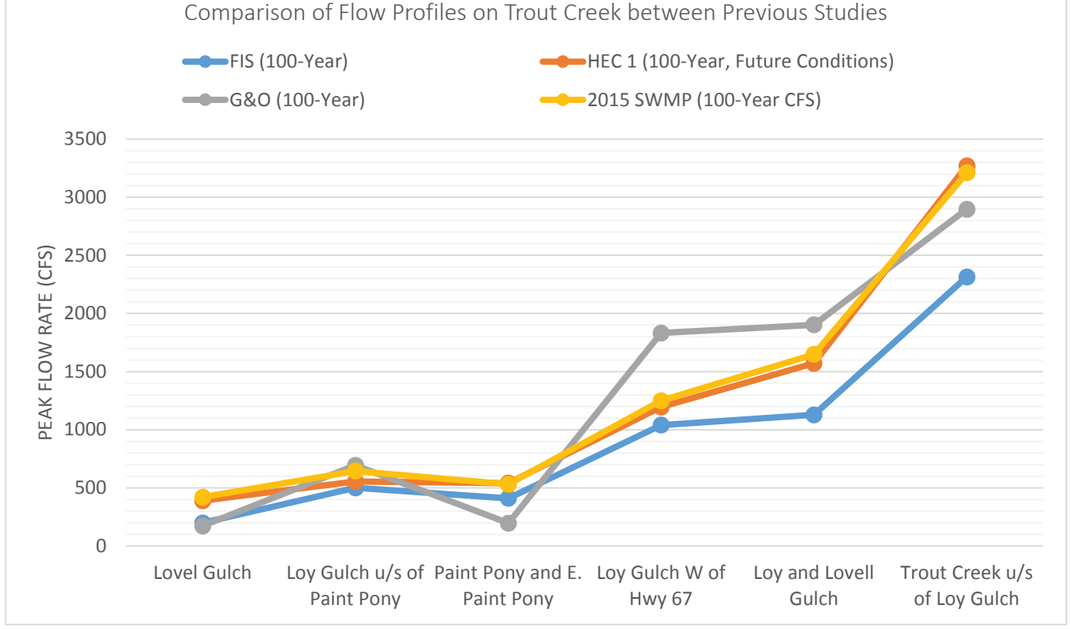


Figure 3-2: Graphical Depiction GSSHA Results on Trout Creek







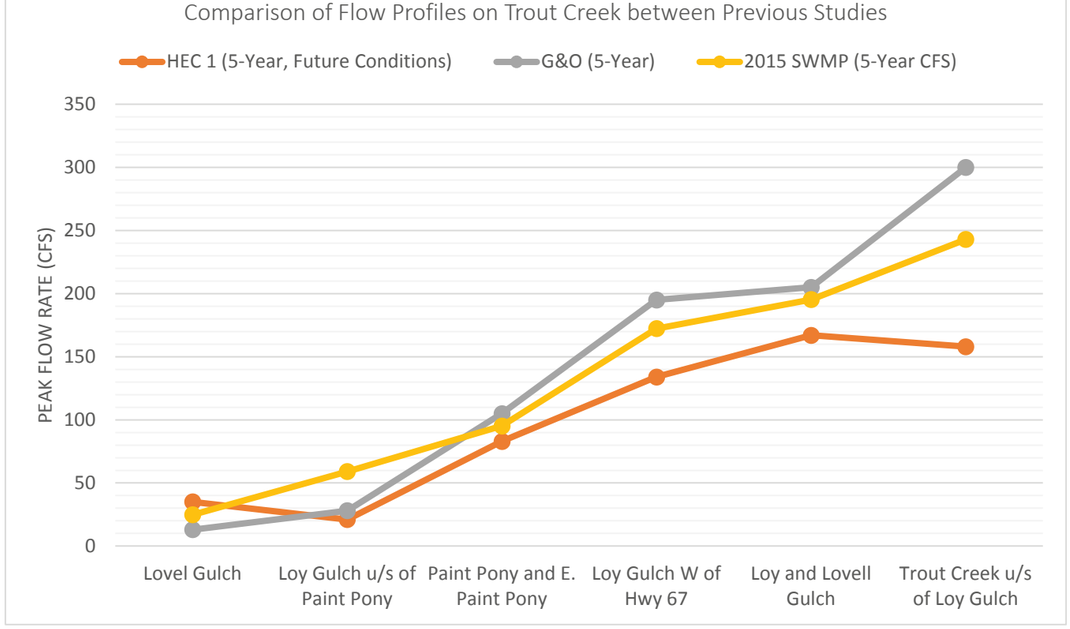


Figure 3-3: 100 and 5-Year Peak Comparison on Fountain Creek and Trout Creek Watersheds

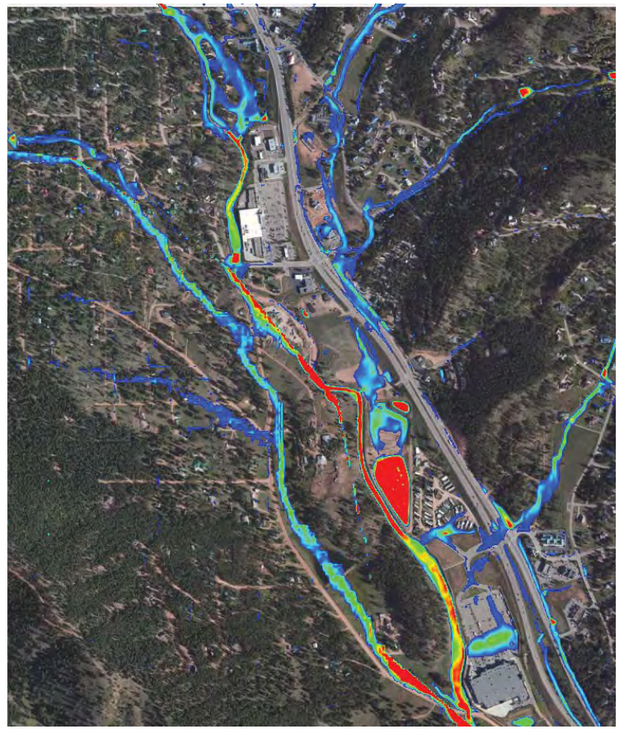


Figure 3-4: Graphical Depiction GSSHA Results on Fountain Creek

City. Locations near the upper portions of watersheds in City limits drain relatively small areas and do not indicate signs of flooding. Figure 3-4 presents an image capture of flood depths computed using Rain on Grid methods with a 13 foot (4 meter) grid spacing. For a more detailed look, a digital Google Earth file is included as part of the electronic submittal along with large maps for the Fountain and Trout Creek Watersheds that are included in the hydrologic appendix. The following general observations resulted from the GSSHA analysis,

» The neighborhood south of Sheridan St. and west of Rosemont Road appears to have potential flooding from a short intense storm.

» The location at Highway 24 and Paradise Circle shows ponding up to the buildings in the parking lot on the south side of Paradise Road.

» Fountain Creek near the Saddle Club Property appears channelized with higher velocities and depths than in other locations along the reach.

» There's some potential for flooding of structures on Woodland Valley Ranch Drive just east of Research Drive.

» At the confluence of Paint Pony and Loy Gulch there appears to be potential for flooding in the area.

3.4F *Peak Flow Rates at High Priority Capital Improvement Locations*

As part of the overall scope of work for the Stormwater and Capital Improvement Plans for Woodland Park, a series of priority items have been identified. These items result from field assessments, discussions with the City, and also citizen reporting of flooding problems. Table 3-7 presents the design flow rates and descriptions for these locations.

3.5 *Hydrologic Summary*

The largest difference noted in this study when compared to previous studies is the difference in design storm distribution. In general, using the Type II over the Type IIA storm distribution results in lower peak flow rates on Fountain Creek when compared to previous studies. This lower flow rate is mostly a result of the distribution and the increased 24 hour rainfall depths did not bring the peak flow rates up to previous studies. In the Trout Creek watershed, the increased rainfall depths produces higher peak flows for some basins, however, formal detention facilities attenuate those peaks and the estimated flows from this study match closely to those in the FIS.

Table 3-7: 100 Year Peak Flow Rates for certain CIP Locations

Location	Problem Description	HEC-HMS Junction ID	5 Year (cfs)	10 Year (cfs)	50 Year (cfs)	100 Year (cfs)
Detention Pond Near Highway 67 S. of Fairfield Ln.	Sedimentation and Downstream Channel Cutting	C81	39	60	144	195
Tamarac Parkway west of Highway 67	Incised channel that needs stabilization	R80	25	63	269	418
Between Tamarac and Research Dr.	Stream stability and channel incising problems	R94	195	349	1113	1647
Trout Creek Tributary Crossing on Research Dr.	Outlet head cutting	R79	171	296	859	1246
Short and Baldwin	Road damage and icing from poor drainage	B29	3	6	17	24
Fountain Creek upstream of Aspen Garden to new development	Bank Stability for Long Reaches	C69	315	474	1105	1505
Paradise Cir and US 24	Flooding of nearby business	C70	27	45	129	183
Fountain Creek near the Saddle Club Property	Major stream stability and bank erosion problems	96C	342	517	1237	1681
Outfall near Willow and US 24	Channel cutting	C19	25	33	59	73
Majestic Parkway Channel ID 199	Incised channel that needs stabilization	C21	39	64	192	284
Trout Creek at Highway 67 and Valley View	Stream stability and channel incising problems	C79	172	297	861	1250
Channel ID 104	Channel cutting	B68 / 2	16	26	65	89
Entering Parking Lot at Wallgreens Store	Downstream flooding	C25	25	42	122	176
FC Upstream of C1715	Stream stability and bank erosion	C69	315	474	1105	1505
Flow Downstream of Culvert 189	Channel cutting	R79	171	296	859	1246
Flow at Mouth of Lovell Gulch	Stream stability and bank erosion problems	R80	25	63	269	418

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CHAPTER 4: IDENTIFICATION OF PROBLEM AREAS

4.0 IDENTIFICATION OF PROBLEM AREAS

4.1 Identification

Problem areas within the City of Woodland Park were identified by analyzing all the information gathered from the field assessment, discussing known issues with the City, and by gathering feedback from local residents. The approach aimed to identify areas where there was an apparent or potential drainage problem based on a known condition, field assessment, and the condition assessment discussed in Chapter 2. Woodland Park provided resident complaints and discussions to further identify locations that need attention.

The following are key factors considered while identifying problem locations:

1. Is there an existing drainage system in place? If so, does it function properly?
2. Is there a drainage complaint logged with the City?
3. Is there evidence of an existing drainage issue based on signs of erosion, sediment aggradation or degradation, debris, standing water, or other types of damage?
4. Is there a potential for street/City drainage to enter private property resulting in a negative impact to the property owner?
5. Do the hydrologic models indicate areas of flooding?

4.2 Problem Areas and Key Issues

This section details the primary existing drainage conditions identified during the field investigation. Although multiple different drainage conditions exist with various nuances, six (6) main drainage deficiency conditions are detailed further. All identified drainage issues are categorized in a GIS database and also presented in the CIP Appendix (Appendix A). The following table lists the conditions that were used to categorize problem areas identified as part of this project.

Table 4-1: Identified Drainage Conditions

Condition	Description
Condition 1	Blocked or Plugged Culverts.
Condition 2	Detention with Variable Water Quality.
Condition 3	Limited Street-Side Conveyance.
Condition 4	Problematic Flows
Condition 5	Localized Ponding or Flooding.
Condition 6	Stream and Bank Instability.

4.2A Blocked or Plugged Culverts

Blocked or plugged culverts are simply defined as those culverts that are blocked by sediment or vegetation. Sediment sources include the creeks, gulches, and ditches where the culverts reside as well as sediment received from overland flow. This condition varies in severity from mild sedimentation (≈10% of the cross sectional area blocked) to severe (a section of the culvert 100% blocked). Nearly 1,500 culverts were surveyed and inventoried in the field. Over half of these experience some range of sedimentation problem. However, it should be noted, that many of these culverts are crossings for homeowner driveways or other private property. Locations identified under this condition experience flooding due to decreased conveyance or in severe cases, no conveyance. During storms, ponding may occur behind the culvert and may result in overflow onto streets and property.

4.2B Detention With Variable Water Quality

Detention facilities within the City of Woodland Park generally consist of three main components: (1) one or more inlets or outfalls into the pond, (2) an outlet structure(s) and (3) an emergency spillway. The existing outlet structures for each detention pond vary significantly in terms of size, materials and design. Many of these outlet structures are unique to the pond it serves. Due to the varying nature of the outlet structures, water quality detention can vary depending on the outlet configuration.

The existing outlet structures can be categorized into one of four general configurations:

1) A modified concrete box inlet.

2) A flow through structure.

3) Duel combination outlet structures.

4) A pond bottom outlet.

The first configuration, is a modified concrete box inlet (typically precast) similar to CDOT's Type C or Type D inlets with either the standard inlet grate or a closed mesh grate. In some instances, custom grates were utilized. Orifices of various size, number and location were added to the box inlet. These orifice openings are above grade or below grade or a combination of both.

The second type of configuration is an inlet that provides direct passage of low flows. This may be a pre-cast type inlet or simply some type of conduit. Storm events that surpass the pipe capacity cause ponding and then attenuation of the storm hydrograph. These types of outlet structures provide little or no water quality detention.

The third type of configuration is a duel combination of two outlet structures is used to release detention pond flows. The first outlet structure is positioned at the pond bottom and is usually a vertical pipe approximately 12 inches in diameter with a retrofitted trash rack. A second outlet structure is placed at a higher elevation and can vary in size and material. The second outlet may be a CDOT type inlet or a plastic pipe overflow or some combination in between.

The fourth most common type of detention outlet is one that is positioned at or near the pond bottom. Generally, this type of outlet structure is the same configuration as the pond bottom structure for the duel combination option, consisting of a vertical pipe with a modified trash track mounted over the opening.

4.2C Limited Street Side Conveyance

Limited or no street side conveyance is a common drainage issue within the City of Woodland Park. Many streets within city limits have a roadside ditch (paved or unpaved) or curb and gutter. However, some areas and streets do not have a well defined pathway to convey runoff. It's these areas that define this specific drainage deficiency. The absence of street side conveyance contributes to several issues including ponding, erosion, street damage, and flows onto private property.

4.2D Flow Directed onto or Through Private Property

Throughout the City there are areas where runoff is directed onto or is conveyed through private property, often times these drainages are following the historic drainage path. This condition is at minimum a nuisance for the property owner. Additionally, there's a question of access and easements for any type of improvement. If an easement does exist, it was evaluated to ensure the water is being conveyed in an efficient and non-damaging manner. If an easement does not exist, options were evaluated in order to best mitigate the problem.

4.2E Localized Ponding or Flooding

Areas of local ponding or flooding exist throughout the City in varying degrees. Ponding or flooding may occur due to the lack of a drainage system, undersized channels or culverts, clogging and debris, or storm events larger than what the system was designed to convey. All four of these situations are evident as reasons for ponding and flooding in Woodland Park.

4.2F *Stream and Bank Instability*

Stream and bank instability are major issues in the City of Woodland Park. Major drainageways like Fountain Creek and Trout Creek experience both aggradation and degradation as well as differing degrees of bank erosion. Erosion and sedimentation problems are also evident in small to mid-sized drainages like Lovell Gulch and Loy Gulch. This is an ongoing problem that will require funding and long term mitigation plans.

4.3 *High Priority Drainage Problem Areas*

Identification of problem areas are separated into four priority levels for developing the CIP discussed in the next chapter. Those priority levels are:

1. High Priority Items: These items have known problems of flooding, have a high risk of damaging infrastructure, or are a needed capital improvement identified by the City for future development.
2. Medium Priority: Medium priority items are items that were observed to currently have drainage problems but are not immediately threatening infrastructure or the safety of citizens.
3. Low Priority: These items are known drainage problems but are not near infrastructure or houses and are recommended to be watched over time to see if any further issues progress.
4. Maintenance Items: These are ongoing items that will continuously be required to maintain the stormwater system in Woodland Park.

High priority items that have been identified from the problem area assessment work are listed below and potential solutions to be brought forward into the CIP are presented in Table 4-2 to the right.

- » Between Fairfield Lane and Regent Drive on Highway 67 there is a detention pond that has sedimentation problems and no longer provides water quality detention. Downstream there are channel degradation problems as the drainage flows into the golf course.
- » At Tamarac Parkway west of Highway 67, where Lovell Gulch confluences with Trout Creek there is a 10 to 15 foot headcut at the confluence. There are exposed culvert outlets and if the head cut persists it could cut back into adjacent properties.
- » Between Tamarac and Research Drive there is headcutting and channel stability issues that are causing problems to small drainages and culverts that drain to this area.
- » On the Trout Creek Crossing at Research Drive there is a major headcut that threatens the stability of the crossing. The headcut has been stabilized with old concrete pieces dumped into the stream. Proper stream stabilization and culvert outlet protection is recommended.
- » Road drainage along Baldwin Street does not always get into the street inlet structures and causes on-site ponding and icing during the winter.
- » Fountain Creek upstream of Aspen Garden has major stream and bank erosion. This area is currently under design for improvements.
- » Bank stability along Fountain Creek near CR-21.



Channel cutting downstream of pond between Regent Drive and Fairfield Lane.



Lovelll Gulch near Tamarac Drive at confluence with Trout Creek



Photo of Trout Creek between Tamarac and Research Drive



Photograph of dumped concrete protection outlet at Research Drive

- » At Highway 24 and Paradise Circle there is a business that gets flooded. At this location, there have been two new developments upstream (Walgreens Store and a bank) that both provide on-site detention to detain flows. However, all the flows that are released from the on-site detention are pushed through dual 24 inch RCP storm sewers to an older 3x4 foot CBC that conveys the flows under the highway. At the downstream end, there is also drainage problems near the outlet of the culvert before it drains to Fountain Creek, which is currently being addressed by CDOT. Because the undersized culvert is CDOT property this drainage problem is the responsibility of CDOT.

Table 4-2: Discussion of High Priority Problem Areas

Location	Problem Description	Category Condition	Potential Solutions
Detention Pond Near Highway 67 S. of Fairfield Ln.	Sedimentation and downstream channel cutting	Condition 2 and 6	It appears that the WQ outlet has been removed or modified at this location. This location needs small check structures and stream stabilization measures on the west side of the highway. Adding a WQ plate to the outlet will reduce nuisance flows from further eroding the banks downstream. The culvert under the Centennial Path should be up-sized to the equal size of the pond outlet.
Tamarac Parkway west of Highway 67	Incised channel that needs stabilization	Condition 1 & 6	There are some drainage issues and an incised channel that needs to be stabilized with a few drop structures.
Between Tamarac and Research Dr.	Stream stability and channel incising problems	Condition 6	This is the downstream location where major stream stability is noted as the tributary approaches the mainstem of Trout Creek. There is head cutting, bank erosion, and also major headcutting where Lovell Gulch enters Trout Creek
Trout Creek Tributary Crossing on Research Dr.	Outlet head cutting	Condition 6	There is a major headcut downstream of the culvert crossing under Research Drive. It has been shored up over time with dumped and broken concrete sections. Proper stabilization and protection is recommended here.
Short and Baldwin	Road damage and icing from poor drainage	Condition 3	Runoff isn't being captured as it comes down Baldwin St. and turns around the corners where there are existing inlets to capture drainage. This problem may require additional inlets before the turn in the roadway to help capture more of the drainage coming down the hill. There may be an opportunity to re-direct some of the flows before they get to the intersection of Baldwin and Highway 24 .
Fountain Creek upstream of Aspen Garden to new development	Bank Stability for Long Reaches	Condition 6	There are stream stability and channel cutting concerns at this location. Currently the City has a design underway to solve this problem.
Paradise Cir and US 24	Flooding of nearby business	Conditions 1, 5, and 6	This problem can be solved a few ways. The most straight forward solution is to up-size the culvert under the highway. This will push more flow to another problem downstream. Channel grading and capacity increases downstream will also be necessary to solve both drainage problems at this location.
Fountain Creek near the Saddle Club Property	Major stream stability and bank erosion problems	Condition 6	This may be one of the largest Capital Improvement Items the City will continuously have to fund. A stream stability Capital Improvement Plan for this reach is proposed in the next chapter.



Photo 1: CMP that drains under Highway 24



Photo 2: CMP at West Kelley's Road and Blackfoot Trail

CONDITION 1
REPRESENTATIVE PHOTOS OF BLOCKED OR PLUGGED CULVERTS



Photo 3: CMP at South Baldwin Street and Short Avenue



Photo 4: CMP with stone headwall under Highway 67, North of Lucky Lady Drive



Photo 1: Outlet for Detention Pond near Majestic Parkway and Spacious Skies Road (Example of a Modified Concrete Box Inlet)

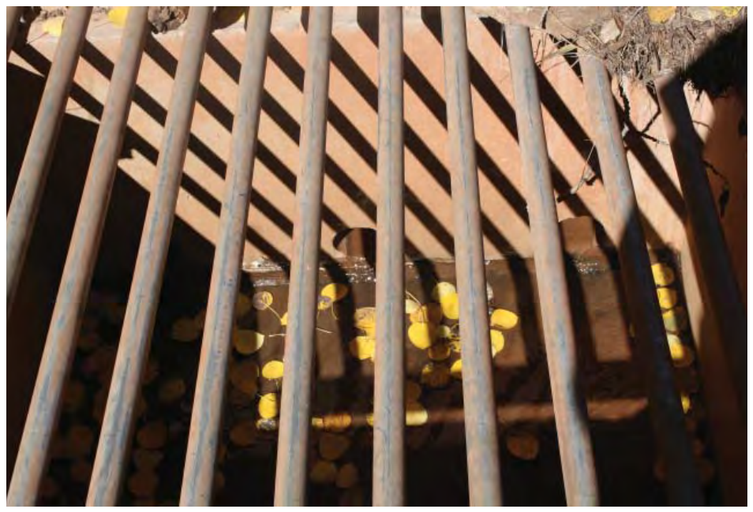


Photo 2: Same outlet as Photo 1, showing three, 4 inch below grade openings to the box (Example of a Modified Concrete Box Inlet)

CONDITION 2
REPRESENTATIVE PHOTOS OF DETENTION AND VARIABLE WATER QUALITY



Photo 3: Outlet for Detention Pond west of Highway 67 and Valley View Drive (Example of a Modified Concrete Box Inlet)



Photo 4: Outlet for Detention Pond near South Park Street and Bergstrom Alley (Example of a Modified Concrete Box Inlet)



Photo 1: Outlet for Detention Pond near Karen Lane (Example of a Flow Through Structure)



Photo 2: Outlet for Detention Pond near West Kelley's Road (Example of a Flow Through Structure)

CONDITION 2
REPRESENTATIVE PHOTOS OF DETENTION AND VARIABLE WATER QUALITY (CONTINUED)



Photo 3: Detention Facility at Skyline Drive and Owl Court (Example of Dual Combination Outlet Structures)



Photo 4: Detention Facility in Photo 3, showing pond bottom outlet (Example of Dual Combination Outlet Structures)



Photo 5: Detention Facility in Photo 3, showing upper pond outlet (Example of Dual Combination Outlet Structures)



Photo 1: South Walnut Street immediately south of West Midland Avenue



Photo 2: Steep trapezoidal section on Park Street that is dangerous for vehicles during winter months

CONDITION 3
REPRESENTATIVE PHOTOS OF
STREET DRAINAGE IMPROVEMENTS



Photo 3: Blue Spruce Street, West of South Park Street



Photo 4: State Highway 67 and Research Drive



Photo 1: Drainage from Woodland Valley Ranch that flows west through private property South of Masters Drive



Photo 2: Immediately north of County Road and North Maple Street

CONDITION 4
REPRESENTATIVE PHOTOS OF PROBLEMATIC FLOWS



Photo 3: Sag in East South Street between North Baldwin Street and North Boundary Road



Photo 4: Flow from Timber Lane just north of Shady Lane, proceeds through private lots east to South West Street



Photos 1: Location of Ponding on West Gunnison Avenue Between SH 67 and North Walnut Street



Photo 2: Location of Ponding on Timber Land North of Shady Lane

CONDITION 5
REPRESENTATIVE PHOTOS OF PONDING OR FLOODING



Photo 3: Location of Ponding at Box Culvert near Paradise Circle and Highway 24



Photo 4: Location of Ponding at a roadway sag at Vista Glenn Court



Photos 1: Right bank of Trout Creek downstream of Research Drive



Photo 2: Headcut in channel located between Majestic Parkway and Greenway Court

CONDITION 6
REPRESENTATIVE PHOTOS OF STREAM AND BANK INSTABILITY



Photo 3: Left bank of Fountain Creek approximately 1500 feet downstream of East Sheridan Avenue



Photo 4: Lovell Gulch near Tamarac Drive showing a large headcut exposing a culvert outlet

CHAPTER 5: STORMWATER CAPITAL IMPROVEMENT PLAN

5.0 CAPITAL IMPROVEMENT PLAN

5.1 *Introduction*

The Stormwater Capital Improvement Plan (CIP) for Woodland Park considers low, medium, and high priority projects identified through this SWMP. The CIP proposes that high priority and large CIP items be addressed first, followed by medium and low priorities. Obviously, if items arise from flooding or erosion zones that are not identified within this SWMP, they should be dealt with as needed to ensure the safety and function of Woodland Park's stormwater system.

As presented in Table 5-1, this project identified approximately 15.2 million dollars in Capital Improvement needs. 46 percent of the total dollars identified are considered a "Low" priority, with 48 percent being a "high" priority and the lowest amount of identified needs falling into the "Medium" category with 6 percent of the total improvement dollars. As such, much of the improvements can be considered simply as high versus low priority.

The low priority items identified as part of this SWMP consist primarily of stabilizing localized channel erosion, replacement of culverts 24 inches and less, and mitigating minor drainage issues. Many of the low priority items also fell into a category that is the responsibility of a land owner and not the City's responsibility. Although many of the items are low priority, the total dollar amount found through this plan indicates that constant maintenance and mitigation of small drainage problems may consume much of the City's stormwater program on an annual basis compared to large capital improvements projects done every 2-3 years.

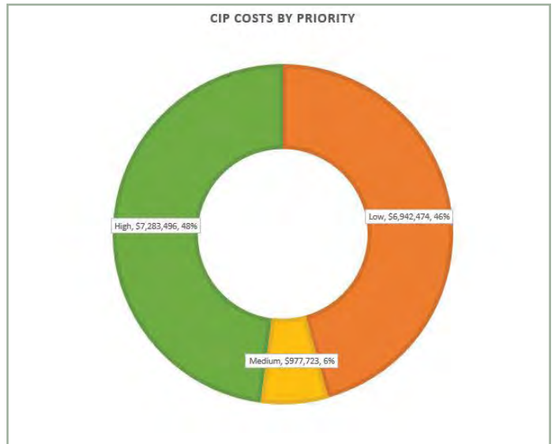


Figure 5-1: Breakdown of CIP Costs and Priority

5.2 *Financial Review of Woodland Park's Stormwater Program*

A financial review of Woodland Park's Stormwater Program found that the City allows for annual increases to the City's Stormwater Capital Fees based on the Denver Boulder Consumer Price Index (CPI). This allows for inflationary increases to cover the general rising costs of materials and construction. When it comes to stormwater capital construction, the Construction Cost Index (CCI) is more commonly referenced for construction estimates.

At the time of this study, the City of Woodland Park has allocated approximately $300,000 per year for construction of major stormwater capital improvements. Each year, a 1.6 percent inflationary adjustment is made to the construction total. An additional 10 percent of the construction amount is set aside for design. Over the next 10 years, this would result in a total of 3.93 million dollars that the City will invest for stormwater capital improvement needs. At this rate of funding, the high priority items recommended in this CIP could be completed by 2035, assuming the annual CCI is approximately equal to the annual inflationary adjustment.

At the time this SWMP was prepared, the CCI reported by the Colorado Department of Transportation have experienced large swings up and down for the past 2 years. First Quarter CCI value change from previous years were reviewed for years 2006 to 2015 and it was

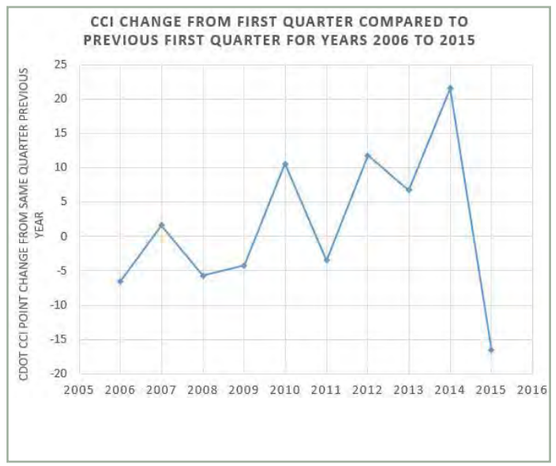


Figure 5-2: CCI First Quarter Change from Previous Year as Reported by CDOT for Years 2006 to 2015

Table 5-1: CIP Costs by Priority and Grid ID

CIP Priority	*Low*		*Medium*		*High*		*Maintenance*
Grid ID	Cost	O&M	Cost	O&M	Cost	O&M	Annual Cost
B2	$11,935	$120	-	-	-	-	$68
C2	$81,614	$2,266	-	-	-	-	$711
C3	$10,230	$339	$10,011	$40	-	-	$627
C4	-	-	$18,755	$126	-	-	$766
D2	$94,195	$6,149			-	-	$536
D3	$145,825	$654	$129,846	$400	$34,250	$685	$695
D4	-	-	-	-	-	-	$299
E2	$24,533	$426	$10,230	$571	-	-	$588
E3	$68,888	$487	-	-	$1,083,954	$3,650	$746
E4	$4,730,270	$49	-	-		-	$568
F2	$3,410	$49	$10,230	$343	-	-	$569
F3	$50,915	$1,549	$38,632	$1,180	-	-	$895
F4	$81,398	$1,050	$23,381	$152	-	-	$884
F5	$47,316	$1,237	$37,758	$1,713	-	-	$730
G2	-	-	-	-	-	-	$107
G3	$454,110	$4,685	$13,640	$95	-	-	$1,675
G4	$60,360	$1,182	$27,854	$253	-	-	$2,265
G5	$36,490	$1,094	-	-	-	-	$3,092
H3	$78,352	$4,736	$12,789	$95	-	-	$2,180
H4	$128,997	$2,709	$37,510	-	-	-	$7,133
H5	$108,697	$520	-	-	-	-	$2,672
I3	$19,063	$792	$16,199	-	-	-	$1,240
I4	$77,059	$1,167	$302,331	$400	$404,138	-	$2,900
I5	$105,530	$1,154	$25,635	$126	-	-	$805
I6	$13,640	$1,256	-	-	-	-	$-
J3	$13,263	-	-	-	-	-	$-
J4	$173,101	$2,051	$74,651	$350	-	-	$1,608
J5	$20,460	$228	$123,683	$828	$44,493	$126	$2,892
K4	$6,115	-	$30,690	$533	-	-	$67
K5	$24,552	$900	$26,243	$450	$277,416	$4,110	$419
K6	-	-	-	-	-	-	$1,212
L5	-	-	-	-	$5,430,674	$-	-
L6	$9,379	$42	-	-	-	-	$851
M5	$184,140	$1,500	-	-	-	-	-
M6	$32,994	$2,100	-	-	-	-	$932
N6	$5,115	$37	-	-	-	-	$39
Total	***$6,901,946***	***$40,528***	***$970,068***	***$7,655***	***$7,274,925***	***$8,571***	***$40,771***

found that the average CCI over those years was +1.6 percent, with the highest increase and decrease occurring in 2014 and 2015, respectively. When the most recent CCI from first quarter 2015 is removed from the data set, the average CCI increase is 3.6 percent. Because of Woodland Park's location away from the broader Front Range, the City may not see the volatility in prices that have been driving costs near the larger Cities of Colorado Springs, Denver, and Boulder.

This study assumed a linear approach to completing the CIP by assuming high priority items will be invested in before low priority items. In reality, localized flooding and maintenance needs may create a mixture of means applied to address stormwater issues. However, that mixture is difficult to predict and assuming high priority items are addressed before low priority items is acceptable at a planning level. To estimate the time of CIP completion the annual funding and CIP costs were compared to each other by year. Each year, the remaining balance in the CIP was also multiplied by the assumed inflationary rates to account for inflation in the cost model. When the high priority items were completed, the total cost for the low and medium priority items was then adjusted to the future cost at that year based on the following economic equation:

$$FC = PC(1+i)^{t-t_0}$$

Where, FC = Future Cost, PC = Present Cost, i = annual rate of inflation, and t-to = the number of years that has past. Two analysis were performed, the first applied the CCI average of 1.58%, which is the average CCI from 2006 to 2015 and the second computed a value of i where the current rate of funding would not catch up to the CIP costs. For this study, it was found that a value of 3.15% is the breaking point at which the costs associated with low priority items would have such a large future cost and annual inflation, that the current funding increases would not keep pace with inflation. The average CCI of +1.58% accounts for a dramatic drop in CCI indexes in the first quarter of 2015. Without this drop, the average CCI was approximately +3.6%, which would be beyond the breaking point CCI of +3.15% found using the CIP costs from this SWMP.

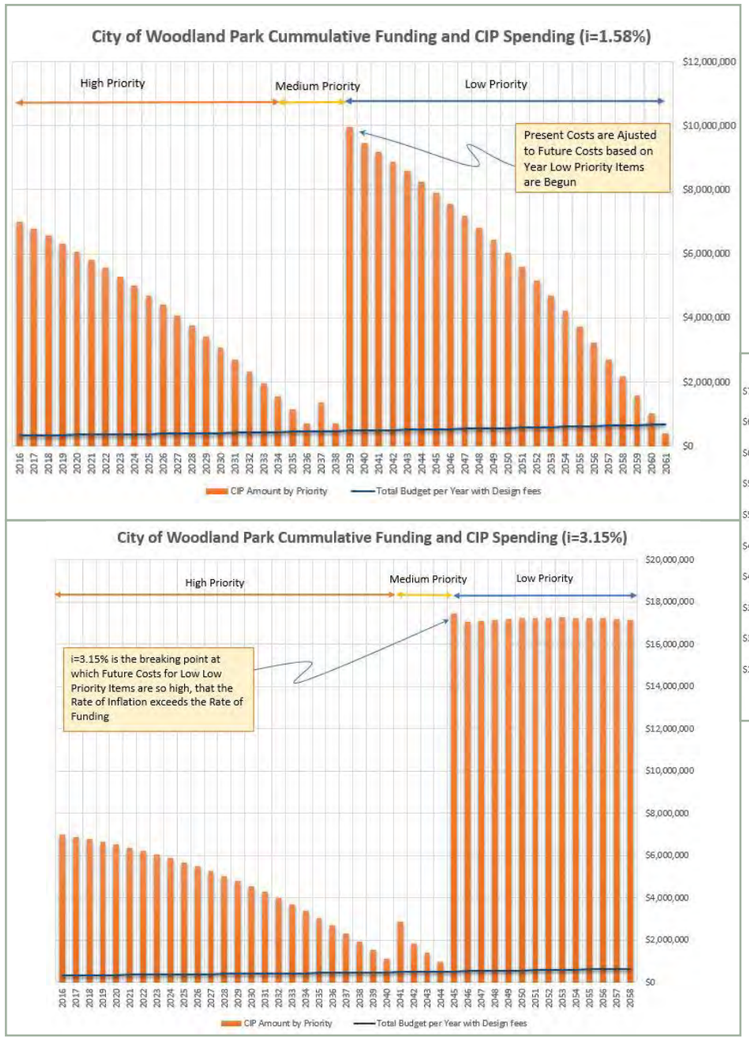


Figure 5-3: (Left) Annualized Funding and CIP Remaining based on assumptions of (Top) Annual CCI Increases are Equal to the Average CCI from 2006 to 2015 and (Bottom Left) breaking point CCI of 3.15 percent for annual CCI increases. (Top) Funding level by year for construction and design assuming design is 10 percent of construction cost and the construction funding increased by 1.6 percent per year

The findings from this analysis indicate that the City would be better prepared to manage stormwater capital improvements and maintenance if all the stormwater charges and fees are allowed to fluctuate with the CPI or CCI. An analysis of stormwater monthly user charges finds that allowing the monthly charges to adjust annually could produce enough stormwater funds to account for most of the annual O&M costs identified in this CIP. This analysis assumed a CCI or CPI inflation of 3.5% along with a population growth of 0.1% per year based on census data from 2000 to 2010. By 2026 this would increase the stormwater revenue by $38,700 per year and would provide an additional $200,000 of revenue over the 10 year period. These results are presented graphically in Figure 5-4 on the right.

It is important to note that this financial review analysis comes with many assumptions. It assumes:

- That high and low priority items are dealt with in a linear fashion, when in reality they may be more mixed based on need and recent flooding events.
- That no emergency projects or repairs not identified in this CIP occur.
- And also that the City would be fully responsible for all stormwater improvements, when likely some costs of the improvements will be shared by companies wishing to develop portions of the City and private land owners making improvements on their own property.

Under the current funding levels all high priority CIP items could be completed within the next 20 to 25 years. Over that time period many of the medium to low priority items may switch priority, be completed by private developers, or may be completed by adjacent work, for example a new street alignment or paving project may also fix nuisance drainage issues without requiring funding from the stormwater capital fund.

The following recommendations are considered sound financial considerations that will help the City be prepared for any capital improvement projects associated with changing legal frameworks from federal and state agencies, be prepared with extra funds for emergency repairs needed in the instance of a flood, and also to prepare the City for large material cost fluctuations during a volatile economic market.

- Consider Adjusting the Stormwater Monthly Charges in Section 13.50.060 of the Stormwater Management Section to allow for annual adjustments based on the CPI.
- Encourage secondary funding mechanisms where possible to fund major CIP projects.

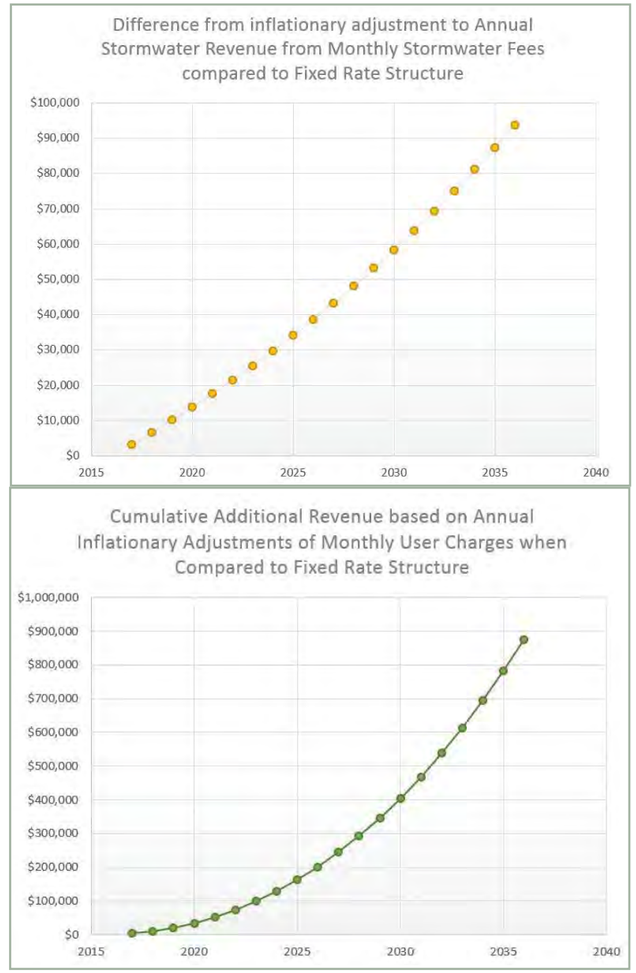


Figure 5-4: (Top) Difference in Annual Revenue from Stormwater User Charges when compared to the current Fixed Rate Structure (bottom) Cumulative Additional Revenue over 20 years if the User Charges were Adjusted Annually for Inflation.

5.3 *Conceptual Design of High Priority Major CIP Items*

This section presents the conceptual lay out and alternative assessment for the two largest and high priority CIP items recommended within this SWMP,

1.) Stream and Bank Stability on Fountain Creek

2.) Stream Stability and Channel Incision on Trout Creek

Additionally, a discussion and lay out of options for the Detention Pond near Fairfield lane is discussed since this pond has been experiencing maintenance and operational complications. Costs and discussions for all low, medium and high priority items are presented in the sheets and maps in Appendix A.

5.3A *Fountain Creek Stream Stability (High Priority)*

A comprehensive stream stability and geomorphology analysis was performed from Aspen Garden Road to Crystola Road as part of this study. Details of the methodology, findings, and analysis are provided in the Appendix of this SWMP. The analysis resulted in three alternatives for bank and stream stability at for this stretch of Fountain Creek and they are,

- Alternative 1: Widening of the existing channel at its current gradient and including engineered bank protection.
- Alternative 2: Raising the channel with drop structures.
- Alternative 3: Controlling the channel incision with grade control structures.

All three of the above findings are viable from a stream stabilization perspective and combinations of each could be considered in the final implementation and design. Alternative 1 is viable only if a large amount of land is acquired by the City to lay back the channel and banks to a geometry that will produce a stable meandering sandy bed channel. Alternatives 2 and 3 have been successful in other reaches, particularly the reach upstream of Aspen Garden Road that has been stabilized by a series of drop structures. The recommended alternative to move forward is a combination of Alternative 2 combined with bank riprap bank revetment protection.

The recommended plan is to construct five 8 foot grouted sloping boulder (GSB) drop structures across the Saddle Club Property portion of Fountain Creek. Bends should be stabilized with bendway weirs (commonly called rock dikes or spurs) and riprap revetment. Stabilization with softer, bio-technical engineering methods were considered, however, with the semi-arid environment and course bank material consisting of decomposed granite and igneous rock make it unlikely that a successful vegetation program could be established. As such, traditional drop structures with riprap revetment stabilization methods are proposed. See Figure 5-6 for a schematic of the proposed improvements.

Table 5-2: Fountain Creek Stream Stability Recommended Plan Cost Estimate

Item	Quantity	Unit	Unit Costs ($)	Total Costs ($)
8' GSBs	5	EA	$308,229.30	$1,541,147
Riprap (Including Bend Weirs)	12000	CY	$114.00	$1,368,000
Remove Debris	600	Tons	$50.00	$30,000
Excavation	8200	CY	$30.00	$246,000
			Total Material Costs	$3,185,147
Mobilization, Dewatering, and other items			10.00%	$318,515
			Total Construction Costs	$3,503,661
Engineering			15.00%	$525,549
Administrative			5.00%	$175,183
Contract Admin and Construction Management			10.00%	$350,366
Contingency for Planning Level Estimate			25.00%	$875,915
			Total Capital Improvement Cost	$5,430,675

A cost comparison between 10, 4 foot GSBs and five 8 foot GSBs was conducted and it was found that the cost of more small drops would be about 1.5 times the cost of the five, 8 foot GSBs. If during the design phase it is decided to reduce the height and placement of drops to smaller more frequent locations, multiply the cost for the GSBs by 1.5, resulting in a total Capital Improvement Cost of 6.2 million dollars versus 5.4 million dollars.

5.3B *Trout Creek near Research Drive and Lovell Gulch (High Priority)*

Downstream of Trout Creek a large headcut has been stabilized with dumped concrete and debris. It is recommended to properly stabilize this section with a drop structure or a sloping boulder apron. Just downstream at the confluence with Lovell Gulch a large headcut in Lovell Gulch is moving upstream and beginning to take bank material from nearby property. During field visits, exposed stormsewers were noted hanging 5-6 feet above the channel invert. The crossing on research drive is also undersized and appears to need repair. It is recommended to stabilize this location with a GSB drops and riprap bank protection. As with Fountain Creek, bio-technical engineering stabilization methods were considered and are not recommended as a reliable method of stabilization due to the environment and underlying bank and channel material.

Analysis of the crossing at research drive finds that dual 6'x6' CBCs or equivalent are required to pass the 50 year flood event of 860 cfs and dual 8'x8' CBCs would be require for the 100 year flood event of 1,245 cfs. This plan proposes replacing the culverts with dual 6'x6' CBCs complete with headwalls and wingwalls in addition to the outlet protection discussed above. Table 5-3 presents a cost summary break down for this plan and Figure 5-7 presents the schematic of recommended improvements at this location.

5.3C *Detention Pond Near Highway 67(High Priority)*

The detention pond near Fairfield lane has experienced frequent sedimentation problems. Downstream of the pond, there is a head cut near Highway 67 and the private property owned by the golf course. It is recommended to install a water quality plate to control frequent flows. This may reduce the downstream erosion as the channel will see fewer flow events. However, if the water quality plate does not reduce the downstream erosion then riprap rock check structures may be required to stabilize the small reach, which also sees flows from the highway and upstream cross culverts. However, it's not clear wether this would be the responsibility of the City or the responsibility of CDOT and the local land owner.



Figure 5-5: (Top Left) Outlet of Lovell Gulch to Trout Creek, note the headcutting and exposed RCP end section. (Above) Outlet at Trout Creek downstream of Research Drive. (Left Culverts at Research Drive and Trout Creek. Note the sluffing on top of the VL riprap that indicates overtopping or inadequate protection.

Table 5-3: Trout Creek and Lovell Gulch Stream Stability Recommended Plan Cost Estimate				
Item	**Quantity**	**Unit**	**Unit Costs ($)**	**Total Costs ($)**
Dual 6'x6' CBCs with Wingwalls and Headwalls	2	EA	$55,044.50	$110,089
Outlet Protection	1	EA	$103,549.00	$103,549
Drop Structures (Lovel)	3	EA	$65,626.00	$196,878
Optional Riprap Protection	2690	CY	$80.00	$215,200
Traffic Control	1	LS	$10,000.00	$10,000.00
Total Material Costs				$635,716
Mobilization, Dewatering, and other items			10.00%	$63,572
Total Construction Costs				$699,288
Engineering			15.00%	$104,893
Administrative			5.00%	$34,964
Contract Admin and Construction Management			10.00%	$69,929
Contingency for Planning Level Estimate			25.00%	$174,822
Total Capital Improvement Cost				$1,083,896

Installing a water quality plate will increase the amount of sediment that falls out in the pond. This will also increase maintenance requirements to keep the pond cleaned. If the water quality outlet results in cumbersome maintenance activities a sediment trap consisting of a lowered portion of ground or a more formal forebay that is easily accessed and cleaned is recommended as a next step. Additionally, it is recommended to stabilize the tributary upstream of the pond for 200 feet with riprap check structures. This will reduce sediment loading into the pond and reduce maintenance requirements. See Figure 5-8 for a schematic of the proposed improvements.

5.3D *Road Drainage and Icing Problems at Short and Baldwin (High Priority)*

At the intersection of Short and Baldwin Street frequent problems of icing and nuisance drainage have been reported. The drainage area for this location is relatively small, however, the roadway at this location is steep as it approaches Highway 24. The recommended plan at this location is to install a better drainage system that can either capture more flow via additional inlets or to find a way to get the water off of the road, into a drainage way and collect it in the existing swales south of the intersection.

5.3E *Flooding at Paradise Circle and Highway 24 (High Priority)*

Drainage from the north side of Paradise Circle is captured into a underground stormwater vault and then conveyed via pipe to an old concrete box culvert underneath Highway 24. This culvert is under sized for the developed flows and causes ponding near the business property on the south side. The solution will be to up-size this culvert location. This culvert is fully within CDOTs Right of Way (ROW) and may be the responsibility of CDOT. If the culvert is up-sized to handle the developed flows then the reaches on the west side of Highway 24 will need to be stabilized so that the culvert improvements aren't pushing a problem downstream. The stabilization will need to continue until the drainage confluences with Fountain Creek.

5.3F *Trapezoidal Channel on S Park St. (High Priority)*

There is a deep trapezoidal channel on South Park Street between Pikes Peak Avenue and the highway. The channel is dangerous during icy conditions and has caused accidents as motorists have drifted into the channel during snow storms. The recommended solutions is two fold, first the risk of motorists traveling into the channel can be mitigated with a guard rail. Second, the final and more complete solution is to place a stormwater conveyance pipe at this location that can handle the incoming flows. The flow rate estimated from this study is predominately from Basin B89, which has a 100 year estimated flow of approximately 50 cfs. Given the right of way and existing drainage easement it should be possible to design a piped system to convey the 100 year flow and eliminate the deep trapezoidal channel.

5.4 *Conceptual Design of High Cost Low Priority Items*

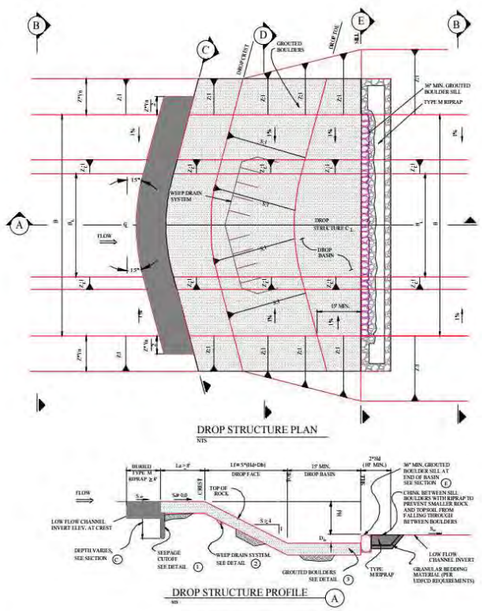
As part of this study, a low priority concept plan was developed for the Loy Gulch and Paint Pony Confluence near Columbine Village. This plan remains a low priority as no previous flooding events have been noted in the past. However, if the City was to consider removing or reducing the floodplain in these locations, the below analysis has been performed to present alternatives for the City to consider if they wish to investigate this low priority alternative.

- Alternative 1 - Loy Gulch Pond and Valley View Drive Outfall: This alternative considers a stormwater detention pond upstream of Valley View Drive. The discharge from the pond will be conveyed via a new outfall pipe that carries the 100 year stormwater discharge down Valley View Drive and then discharges just upstream of Highway 67.
- Alternative 2 - Paint Pony Chippewa Pond and Valley View Drive Outfall: This alternative builds on Alternative 1 and includes an additional 9 acre-ft pond in an open parcel at the confluence of Paint Pony and East Fork Paint Pony. The original FIS flow rates estimated 410 cfs and this study estimates 530 cfs at this location during the 100 year flood event. This alternative would require enlarging the lower portions of the Valley View Drive Outfall in Alternative 1 to accommodate the additional discharge from the Chippewa Pond.

As shown in Table 5-2, these two alternatives are a major CIP investments for a community that has little to no flood experiences or history. Additionally, both properties with the optional detention facilities are owned by the City's Parks Department. A value assessment and public notice period would be required to ensure the communities near the open space locations would agree with modifying the open space to mixed use facilities. Figures 5-9 and 5-10 present schematic of these two low priority options.

Table 5-4: Loy Gulch and Paint Pony Gulch Alternative Summary					
Alternative	**Capital Improvement Costs ($)**	**Peak Inflow (cfs)**	**Peak Outflow (cfs)**	**Required Storage (acre-ft)**	**Overflow (cfs)**
Alternative 1	$2,546,785.00	645.29	549.58	11.3	0
Alternative 2	$4,730,270.00	530.88	510.68	8.7	337.4
Existing at Paint Pony and Loy Gulch Confluence	$0.00	1176.17	0	0	1176.17

The recommended plan to stabilize this reach of Fountain Creek is to construct a series of Grouted Boulder Sloping Drops (GSBs). Softer, bio-technical measures were considered, however, due to the semi-arid environment establishment of bio-technical engineering measures has proven difficult in the past. Other locations on Fountain Creek have had success with hardened stream stabilization measures. Banks will need to be protected with rock spurs and revetment to prevent the liklihood of the GSBs being flanked by flood flows that are relatively common on Fountain Creek.



Stabilize Outfalls and Tribs with Vertical Checks

Riprap Revetment

Rock Spurs

Grouted Sloping Boulder Drop (GSB) (Typical)

Protect Bends with Rock Spurs/Dikes (Locations May Vary for Design)

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=250

Vertical Checks
GSB Drops
Rock Spurs
Rock Revetment
Parcels
5 foot contours
Roads

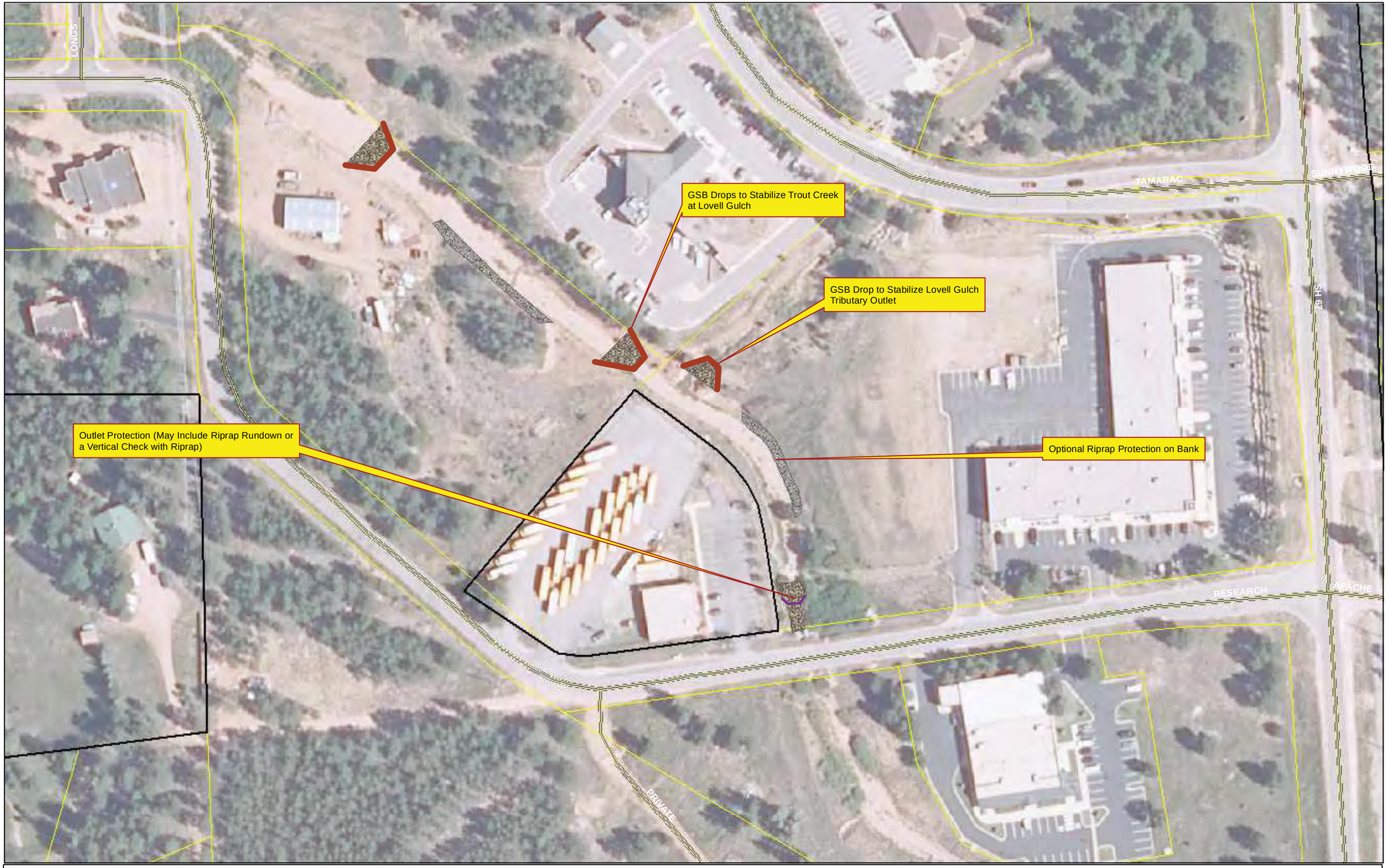
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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

Figure 5-6
Fountain Creek
Stability Plan

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1'=100'

GSB Drops
Optional Riprap Bank Protection
Parcels
5 foot contours
Roads

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

Figure 5-7
Research Drive
Lovell Gulch Stabilization

Stabilize Swale with Small Riprap Check Dams Installed by Maintenance Crews

Optional Forebay for Sediment Capture (Maintenance Access Must be Considered before Installation)

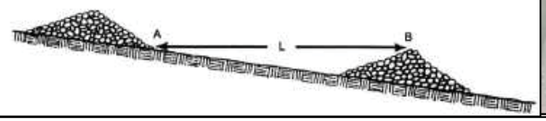
StabilizeTributary with Small (1'-2') Riprap Check Dams that could be Installed by Maintenance Crews

Increase Capacity (Not City Responsiblity)

Add Water Quality Orifice Plate to Outlet Structure

To reduce sedimentation at the Detention Pond, a phased approach is recommended. First, stabilize the gulch with low maintenance, easy to install check structures consisting of riprap. If sedimentation problems persist, consider a forbay or sediment trap at the inlet to the pond. Below are images of easy to install riprap check structures that help reduce channel cutting and sediment loading into the pond.





WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1'=100'

Riprap Checks
Optional Forebay
Parcels
5 foot contours
Roads

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

Figure 5-8
Detention Pond
Recommended Plan

Proposed Loy Gulch Detention Facility
(Total Volume Approximately 11.5 ac-ft)

Proposed Valley View Outfall
(Segment 1 - 60 inch RCP)

100 Year Floodplain Mapped
as Part of this Study
(Does NOT Include Improvements Shown)

Proposed Valley View Outfall
(Segment 2 - 66 inch RCP)

Proposed Valley View Outfall

Proposed Maholes (Typical)

100 Year Floodplain (FEMA)

SUNNYWOOD
HOPI
UTE
SIOUX
COMMANCHE
APACHE
VALLEY VIEW
SH 67
CO. IMPERIAL VILLAGE
BLACKFOOT
CHIPPEWA
NAVAJO
SUNSHINE
KIOWA
CREST
APPALOOSA
MAIN
DEERWOOD

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=250

Proposed Manholes
Loy Gulch Pond
Valley View Outfall
Roads
Parcels
5 foot contours
100 Yr Floodplain (FEMA)
100 Yr Floodplain (This Study)

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

Figure 5-9
Valley View Flood
Mitigation Alternative 1

Proposed Loy Gulch Detention Facility
(Total Volume Approximately 11.5 ac-ft)

Proposed Valley View Outfall
(Segment 1 - 60 inch RCP)

100 Year Floodplain Mapped
as Part of this Study
(Does NOT Include Improvements Shown)

Proposed Valley View Outfall
(Segment 2 - 78 inch RCP)

Proposed Valley View Outfall

Proposed Maholes (Typical)

Optional 48 inch RCP

Optional Chippewa Pond
(Approximate Volume 12 ac-ft)

Specialized Spillway Design
for inflow and outflow

100 Year Floodplain (FEMA)

SUNNYWOOD
HOPI
UTE
SIOUX
COMMANCHE
APACHE
VALLEY VIEW
CREST
APPLE SUN
KIOWA
MAIN
NAVAJO
SUNSHINE
CHIPPEWA
BLACKFOOT
COLUMBINE VILLAGE

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=250

Proposed Manholes
Loy Gulch Pond
Valley View Outfall
Roads
Parcels
5 foot contours
100 Yr Floodplain (FEMA)
100 Yr Floodplain (This Study)

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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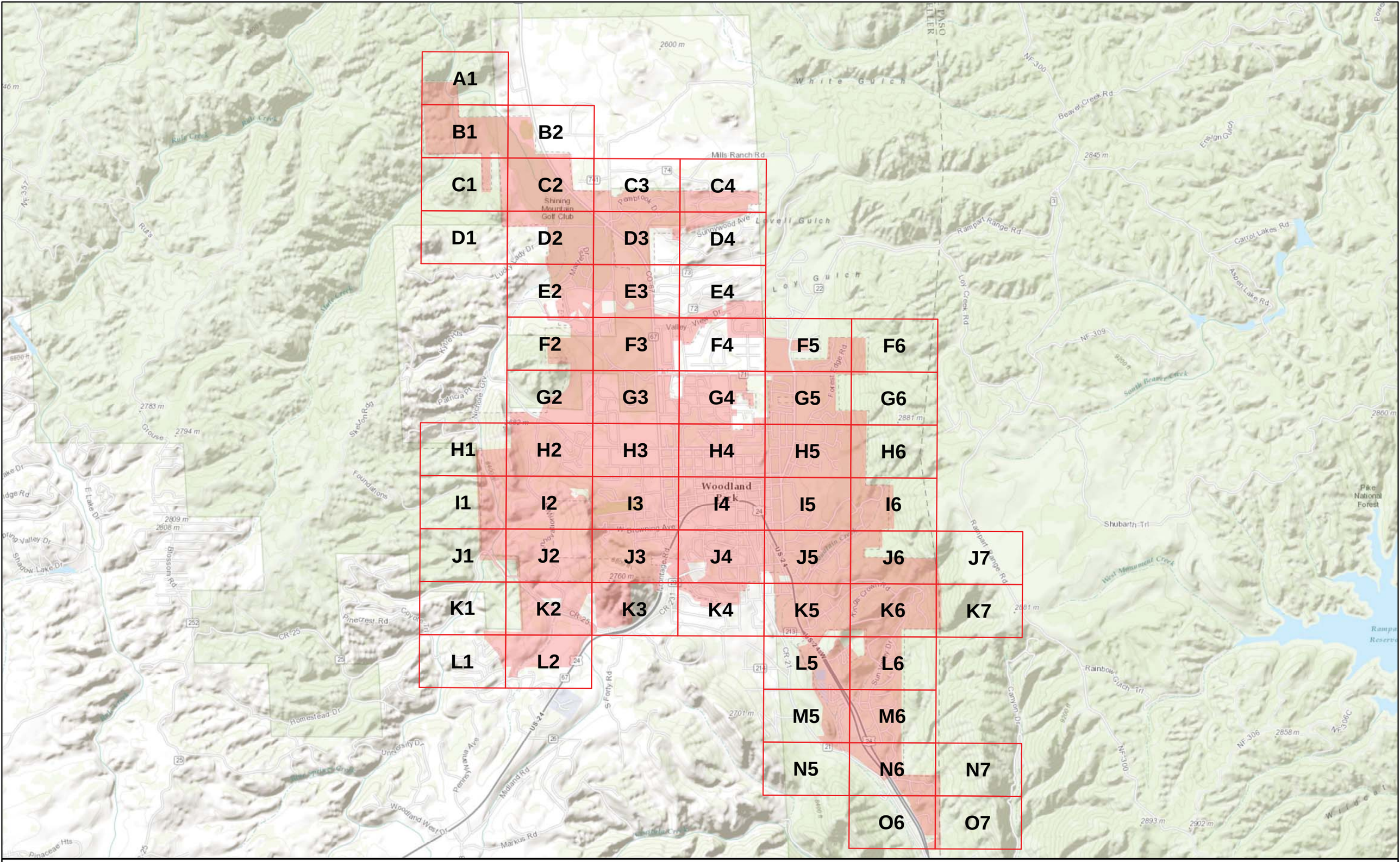
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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

Figure 5-10
Valley View Flood
Mitigation Alternative 2

APPENDIX A - CIP SHEETS

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WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1:50,000

0 0.25 0.5 1 1.5 2 Miles

N

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CITY OF WOODLAND PARK
STORMWATER MASTER PLAN
INFRASTRUCTURE ASSESSMENT LOCATOR MAP

CIP PRIORITIES - GRID ID B1

HIGH:	None
MEDIUM:	None
LOW:	None

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID B1

Object ID	Maintenance	Annual Cost
Culvert ID 66*	Culvert Cleaning	$41
Culvert ID 65*	Culvert Cleaning	$14
Culvert ID 43*	Culvert Cleaning	$48

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 2
GRID ID: B1

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID B2

HIGH: None

MEDIUM: None

LOW:

Object ID: Culvert ID 73
Issue(s): damaged headwall
Possible Solution: repair or replace stone headwall
Total Capital Improvement Cost: $6,820
Annual Operation and Maintenance Cost: $57

Object ID: Grate Inlet ID 16
Issue(s): debris and sediment
Possible Solution: apron around inlet
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $63

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID B2

Object ID	Maintenance	Annual Cost
Culvert ID 75*	Culvert Cleaning	$55
Culvert ID 74	Culvert Cleaning	$13

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 3
GRID ID: B2

CIP PRIORITIES - GRID ID C2

HIGH: None

MEDIUM: None

LOW:

Object ID: Channel ID 34
Issue(s): channel instability
Possible Solution: riprap stabilization
Total Capital Improvement Cost: $12,958
Annual Operation and Maintenance Cost: $816

Object ID: Grate Inlet ID 18
Issue(s): debris and sediment
Possible Solution: concrete apron
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $63

Object ID: Channel ID 36
Issue(s): cracked concrete
Possible Solution: repair concrete pan
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $14

Object ID: Culvert ID 64
Issue(s): damaged box culvert
Possible Solution: culvert repairs
Total Capital Improvement Cost: $13,640
Annual Operation and Maintenance Cost: $45

Object ID: Channel ID 32
Issue(s): channel instability
Possible Solution: riprap stabilization
Total Capital Improvement Cost: $18,789
Annual Operation and Maintenance Cost: $672

Object ID: Channel ID 31
Issue(s): channel instability
Possible Solution: riprap stabilization
Total Capital Improvement Cost: $6,219
Annual Operation and Maintenance Cost: $561

Object ID: Detention Pond ID 1
Issue(s): sedimentation and limited water quality
Possible Solution: add/improve outlet works
Total Capital Improvement Cost: $19,778
Annual Operation and Maintenance Cost: $95

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

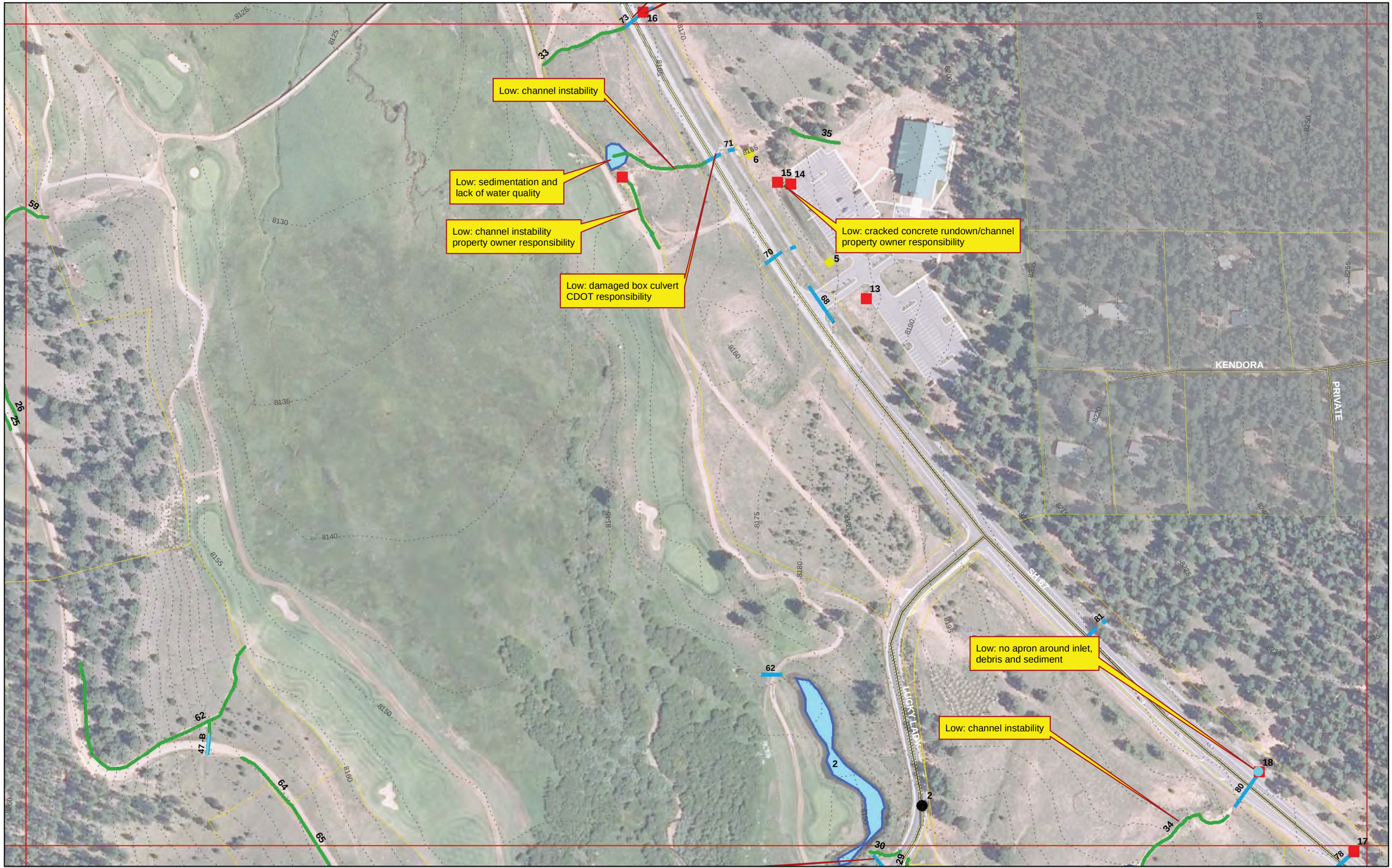
MAINTENANCE ONLY - GRID ID C2

Object ID	Maintenance	Annual Cost
Culvert ID 47*	Culvert Cleaning	$46
Grate Inlet ID 18*	Clean as Needed	$63
Culvert ID 82*	Culvert Cleaning	$96
Culvert ID 68*	Culvert Cleaning	$103
Grate Inlet ID 13*	Clean as Needed	$63
Outlet Strctr. ID 5*	Culvert Cleaning	$63
Culvert ID 70*	Culvert Cleaning	$48
Culvert ID 69	Culvert Cleaning	$14
Culvert ID 64*	Clean as Needed	$45
Culvert ID 63*	Culvert Cleaning	$13
Grate Inlet ID 11*	Clean as Needed	$63
Detention P. ID 1*	Clean Pond	$94

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Inlet Cleaning: $63/each
Detention Pond Cleaning: $1903/acre

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 5
GRID ID: C2

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID C3

HIGH: None

MEDIUM:

Object ID: Culvert ID 84
Issue(s): damaged culvert
Possible Solution: replace culvert
Total Capital Improvement Cost: $10,011
Annual Operation and Maintenance Cost: $40

LOW:

Object ID: Channel ID 38
Issue(s): channel sedimentation
Possible Solution: channel grading
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $339

Object ID: Road Damage ID 9
Issue(s): damaged concrete pan
Possible Solution: replace concrete pan
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $0

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID C3

Object ID	Maintenance	Annual Cost
Culvert ID 83	Culvert Cleaning	$49
Channel ID 38	Culvert Cleaning	$339
Culvert ID 84	Culvert Cleaning	$40
Grate Inlet ID 19*	Clear Sediment	$63
Culvert ID 86*	Culvert Cleaning	$23
Culvert ID 90*	Culvert Cleaning	$20
Culvert ID 91	Culvert Cleaning	$72
Culvert ID 93*	Culvert Cleaning	$21

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Inlet Cleaning: $63/each
Channel Cleaning: $3/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 6
GRID ID: C3

CIP PRIORITIES - GRID ID C4

HIGH: None

MEDIUM:

Object ID: No survey, Sunnywood & Ironwood
Issue(s): erosion and sedimentation
Possible Solution: curb, gutter and inlet improvements
Total Capital Improvement Cost: $18,755
Annual Operation and Maintenance Cost: $126

LOW: None

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID C4

Object ID	Maintenance	Annual Cost
Culvert ID 139*	Culvert Cleaning	$17
Culvert ID 138*	Culvert Cleaning	$23
Culvert ID 135*	Culvert Cleaning	$20
Culvert ID 137*	Culvert Cleaning	$39
Culvert ID 136*	Culvert Cleaning	$16
Culvert ID 133	Culvert Cleaning	$51
Culvert ID 131*	Culvert Cleaning	$21
Culvert ID 130*	Culvert Cleaning	$23
Culvert ID 127*	Culvert Cleaning	$19
Culvert ID 125*	Culvert Cleaning	$19
Culvert ID 122*	Culvert Cleaning	$17
Culvert ID 120*	Culvert Cleaning	$17
Culvert ID 115*	Culvert Cleaning	$12
Culvert ID 113*	Culvert Cleaning	$21
Culvert ID 112*	Culvert Cleaning	$19
Culvert ID 111*	Culvert Cleaning	$46
Road Dmg ID 11*	Grading	$250
Culvert ID 110*	Culvert Cleaning	$25
Culvert ID 109*	Culvert Cleaning	$20
Culvert ID 108*	Culvert Cleaning	$24
Culvert ID 105*	Culvert Cleaning	$20
Culvert ID 106*	Culvert Cleaning	$27
Culvert ID 107*	Culvert Cleaning	$20

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Road Grading: $125/hr

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1'=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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LITTLETON, CO 80127

CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 7
GRID ID: C4

CIP PRIORITIES - GRID ID D2

HIGH: None

MEDIUM: None

LOW:

Object ID: Culvert ID 61
Issue(s): scour
Possible Solution: riprap
Total Capital Improvement Cost: $1,296
Annual Operation and Maintenance Cost: $138

Object ID: Detention Pond ID 4
Issue(s): sedimentation, limited water quality
Possible Solution: new outlet works, improvements
Total Capital Improvement Cost: $37,646
Annual Operation and Maintenance Cost: $114

Object ID: Channel ID 27
Issue(s): channel and bank instability
Possible Solution: general improvements
Total Capital Improvement Cost: $34,100
Annual Operation and Maintenance Cost: $3,897

Object ID: Channel ID 28
Issue(s): scour
Possible Solution: general improvements
Total Capital Improvement Cost: $17,050
Annual Operation and Maintenance Cost: $1,818

Object ID: Culvert ID 55
Issue(s): channel incision
Possible Solution: riprap
Total Capital Improvement Cost: $1,519
Annual Operation and Maintenance Cost: $165

Object ID: Culvert ID 58
Issue(s): scour
Possible Solution: riprap
Total Capital Improvement Cost: $2,584
Annual Operation and Maintenance Cost: $17

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID D2

Object ID	Maintenance	Annual Cost
Road Dmg ID 8*	Grading	$250
Culvert ID 50	Culvert Cleaning	$58
Culvert ID 51*	Culvert Cleaning	$21
Culvert ID 187*	Culvert Cleaning	$14
Detention P. ID 4*	Clean Pond	$112
Culvert ID 54*	Culvert Cleaning	$18
Outlet Stctr. ID 7*	Culvert Cleaning	$63

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Outlet Structure Cleaning: $63/each
Detention Pond Cleaning: $1903/acre
Road Grading: $125/hr

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 9
GRID ID: D2

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID D3

HIGH:

Object ID: No survey, detention pond, Culvert ID 180
Issue(s): Sedimentation and Erosion
Possible Solution: retro fit outlet works+checks
Total Capital Improvement Cost: $34,250
Annual Operation and Maintenance Cost: $685

MEDIUM:

Object ID: Culvert ID 173, 174
Issue(s): intersection/conveyance improvements
Possible Solution: new culvert, improve conveyance
Total Capital Improvement Cost: $129,846
Annual Operation and Maintenance Cost: $400

LOW:

Object ID: Culvert ID 60
Issue(s): scour
Possible Solution: riprap
Total Capital Improvement Cost: $3,444
Annual Operation and Maintenance Cost: $50

Object ID: Channel ID 75
Issue(s): channel incision
Possible Solution: general channel improvements
Total Capital Improvement Cost: $11,935
Annual Operation and Maintenance Cost: $1,563

Object ID: Channel ID 76
Issue(s): channel incision
Possible Solution: general channel improvements
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $54

Object ID: Culvert ID 56
Issue(s): undersized culvert
Possible Solution: new culverts
Total Capital Improvement Cost: $27,051
Annual Operation and Maintenance Cost: $86

Object ID: Curb Inlet ID 2
Issue(s): undersized and deteriorating curb inlet
Possible Solution: new inlet
Total Capital Improvement Cost: $9,950
Annual Operation and Maintenance Cost: $63

Object ID: Culvert ID 57
Issue(s): undersized culvert
Possible Solution: new culvert
Total Capital Improvement Cost: $78,951
Annual Operation and Maintenance Cost: $338

Object ID: Grate Inlet ID 20
Issue(s): inlet sedimentation
Possible Solution: concrete apron
Total Capital Improvement Cost: 5115
Annual Operation and Maintenance Cost: $63

Object ID: Road Damage ID 10
Issue(s): road damage
Possible Solution: general repair
Total Capital Improvement Cost: $4,264
Annual Operation and Maintenance Cost: $0

CIP PRIORITIES - continued...

Object ID: No survey, near Pembrook and Parkway
Issue(s): headcut incised channel
Possible Solution: check structures
Total Capital Improvement Cost: $34,987
Annual Operation and Maintenance Cost: $2,400

Note: Additional information on Object IDs and Costs can be found in the appendices.

MAINTENANCE ONLY - GRID ID D3

Object ID	Maintenance	Annual Cost
Culvert ID 184*	Culvert Cleaning	$55
Culvert ID 60*	Culvert Cleaning	$25
Culvert ID 181	Culvert Cleaning	$56
Culvert ID 176	Culvert Cleaning	$62
Culvert ID 172	Culvert Cleaning	$55
Culvert ID 170	Culvert Cleaning	$68
Culvert ID 171	Culvert Cleaning	$17
Grate Inlet ID 21	Inlet Cleaning	$63
Pipes ID 1 (clvrt.)	Culvert Cleaning	$39
Culvert ID 103*	Culvert Cleaning	$65
Culvert ID 89*	Culvert Cleaning	$32
Culvert ID 88*	Culvert Cleaning	$21
Culvert ID 87	Culvert Cleaning	$54
Culvert ID 96*	Culvert Cleaning	$20
Culvert ID 98*	Culvert Cleaning	$14
Culvert ID 99	Culvert Cleaning	$49

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Inlet Cleaning: $63/each

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet · Grate Inlet · Outfall · Road Damage · Culvert · Storm Drain (CDOT) · Roads
Curb Inlet · Manhole · Outlet Structure · Channel · Detention Pond · Sheet Grid · Parcels

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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 10
GRID ID: D3

CIP PRIORITIES - GRID ID D4

HIGH:	None
MEDIUM:	None
LOW:	None

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID D4

Object ID	Maintenance	Annual Cost
Culvert ID 144*	Clean Culvert	$21
Culvert ID 146*	Clean Culvert	$33
Culvert ID 147*	Clean Culvert	$33
Culvert ID 149*	Clean Culvert	$28
Culvert ID 150*	Clean Culvert	$30
Culvert ID 151*	Clean Culvert	$18
Culvert ID 152*	Clean Culvert	$21
Culvert ID 153*	Clean Culvert	$32
Culvert ID 155*	Clean Culvert	$20
Culvert ID 157*	Clean Culvert	$20
Culvert ID 158*	Clean Culvert	$23
Culvert ID 160*	Clean Culvert	$20

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 11
GRID ID: D4

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID E2

HIGH: None

MEDIUM:

Object ID: Detention Pond ID 5
Issue(s): limited water quality
Possible Solution: water quality upgrades
Total Capital Improvement Cost: $10,230
Annual Operation and Maintenance Cost: $571

LOW:

Object ID: Curb Inlet ID 18
Issue(s): deteriorating inlet
Possible Solution: new inlet
Total Capital Improvement Cost: $9,950
Annual Operation and Maintenance Cost: $63

Object ID: Grate Inlet ID 29
Issue(s): inlet erosion
Possible Solution: riprap
Total Capital Improvement Cost: $1,808
Annual Operation and Maintenance Cost: $63

Object ID: Channel ID 97
Issue(s): incised channel
Possible Solution: riprap/easement
Total Capital Improvement Cost: $12,775
Annual Operation and Maintenance Cost: $300

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

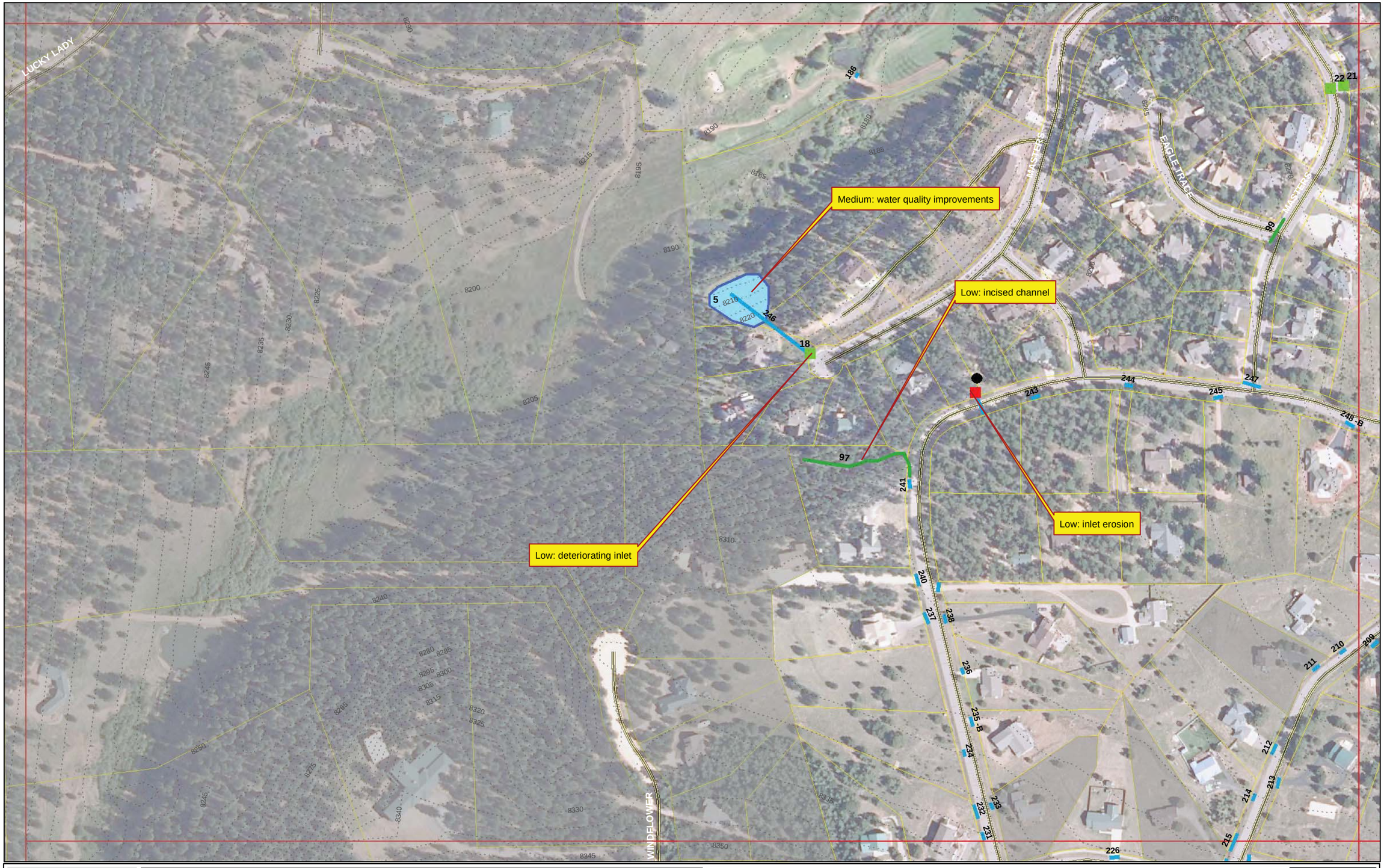
MAINTENANCE ONLY - GRID ID E2

Object ID	Maintenance	Annual Cost
Culvert ID 246	Culvert Cleaning	$236
Culvert ID 248*	Culvert Cleaning	$24
Culvert ID 247	Culvert Cleaning	$45
Culvert ID 245*	Culvert Cleaning	$23
Culvert ID 244*	Culvert Cleaning	$20
Culvert ID 243*	Culvert Cleaning	$23
Culvert ID 240*	Culvert Cleaning	$30
Culvert ID 237*	Culvert Cleaning	$29
Culvert ID 238*	Culvert Cleaning	$22
Culvert ID 239*	Culvert Cleaning	$22
Culvert ID 236*	Culvert Cleaning	$16
Culvert ID 235*	Culvert Cleaning	$24
Culvert ID 233*	Culvert Cleaning	$18
Culvert ID 231*	Culvert Cleaning	$19
Culvert ID 210*	Culvert Cleaning	$19
Culvert ID 214*	Culvert Cleaning	$18

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 12
GRID ID: E2

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID E3

HIGH:

Object ID: No survey, downstream of Culvert ID 182
Issue(s): incised channel/headcut
Possible Solution: drop structures
Total Capital Improvement Cost: $335,681
Annual Operation and Maintenance Cost: $1,500

Object ID: No survey, TC btw Tamarac & Research
Issue(s): channel instability
Possible Solution: check structure, riprap
Total Capital Improvement Cost: $160,101
Annual Operation and Maintenance Cost: $2,100

Object ID: Culvert ID 189
Issue(s): crossing improvements needed
Possible Solution: new box culvert, downstream drop
Total Capital Improvement Cost: $588,172
Annual Operation and Maintenance Cost: $50

MEDIUM: None

LOW:

Object ID: Channel ID 90
Issue(s): channel instability
Possible Solution: riprap
Total Capital Improvement Cost: $1,815
Annual Operation and Maintenance Cost: $138

Object ID: Channel ID 77
Issue(s): undermined rundown
Possible Solution: replace rundown
Total Capital Improvement Cost: $11,935
Annual Operation and Maintenance Cost: $0

Object ID: Culvert ID 190, Channel ID 89
Issue(s): channel & culvert improvements needed
Possible Solution: replace culvert
Total Capital Improvement Cost: $3,647
Annual Operation and Maintenance Cost: $23

Object ID: Channel ID 84
Issue(s): channel instability
Possible Solution: convey in a culvert
Total Capital Improvement Cost: $51,491
Annual Operation and Maintenance Cost: $326

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

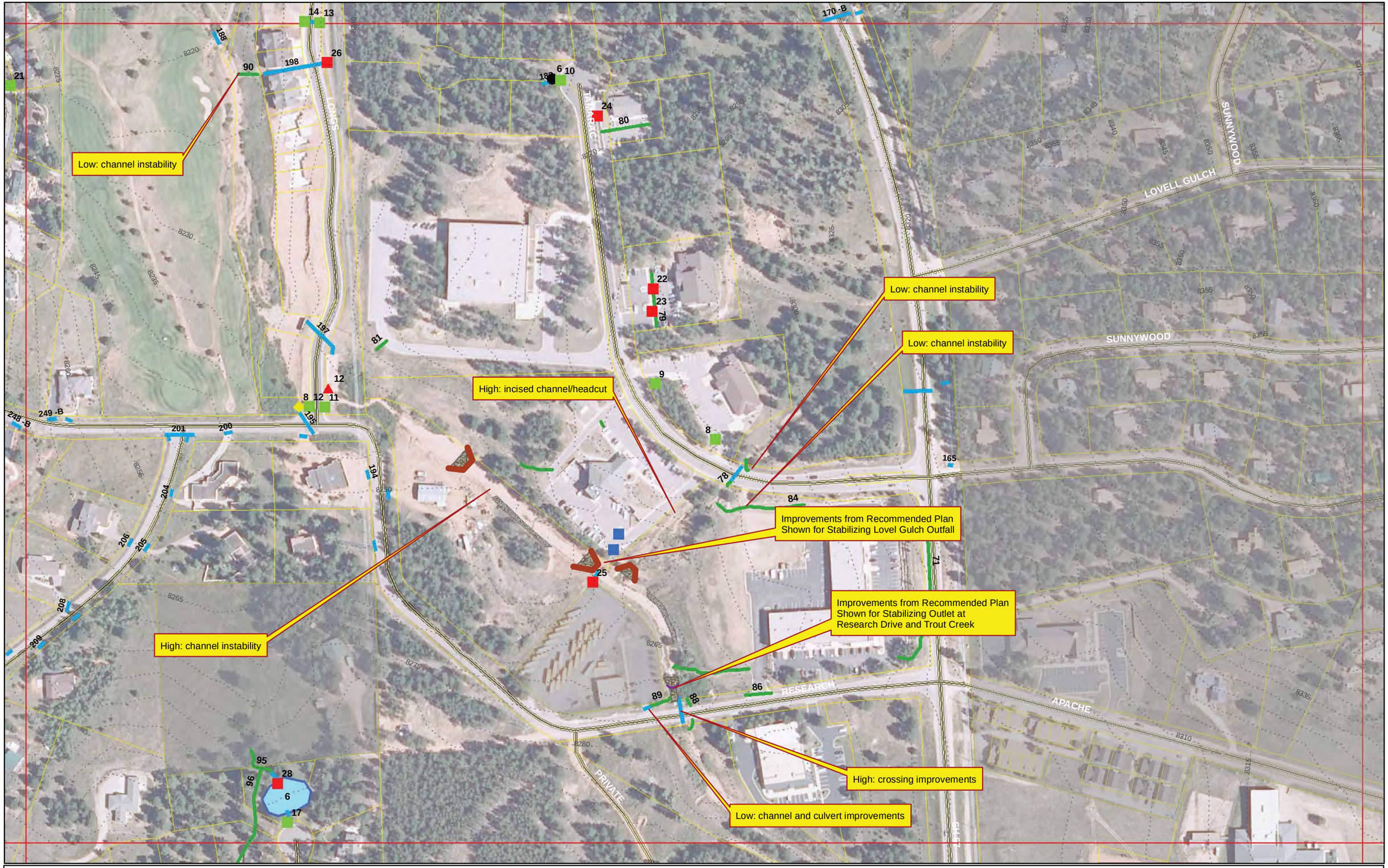
MAINTENANCE ONLY - GRID ID E3

Object ID	Maintenance	Annual Cost
Culvert ID 188	Culvert Cleaning	$32
Culvert ID 197*	Culvert Cleaning	$104
Culvert ID 249*	Culvert Cleaning	$22
Culvert ID 250*	Culvert Cleaning	$17
Culvert ID 203	Culvert Cleaning	$18
Detention P. ID 6	Pond Cleaning	$305
Culvert ID 221	Culvert Cleaning	$29
Culvert ID 193*	Culvert Cleaning	$25
Culvert ID 192*	Culvert Cleaning	$26
Curb Inlet ID 10	Inlet Cleaning	$63
Culvert ID 183	Culvert Cleaning	$33
Culvert ID 191*	Culvert Cleaning	$25
Culvert ID 163*	Culvert Cleaning	$14
Culvert ID 165*	Street Cleaning	$13
Culvert ID 168*	Culvert Cleaning	$20

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Inlet Cleaning: $63/each
Detention Pond Cleaning: $1903/acre

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 13
GRID ID: E3

CIP PRIORITIES - GRID ID E4

HIGH: None

MEDIUM: None

LOW: None

Object ID: Vallew View Outfall Alt. 2
(Fully Piped with Detention Facilities)
Issue(s): Flooding on FEMA Maps
Possible Solution: Piped Conveyance with Detention
Total Capital Improvement Cost: $4,730,270
Annual Operation and Maintenance Cost: $49

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID E4

Object ID	Maintenance	Annual Cost
Culvert ID 349*	Culvert Cleaning	$24
Culvert ID 351*	Culvert Cleaning	$21
Culvert ID 354*	Culvert Cleaning	$23
Culvert ID 356*	Culvert Cleaning	$22
Culvert ID 359*	Culvert Cleaning	$25
Culvert ID 362*	Culvert Cleaning	$25
Culvert ID 363*	Culvert Cleaning	$24
Culvert ID 364*	Culvert Cleaning	$28
Culvert ID 365*	Culvert Cleaning	$20
Culvert ID 367*	Culvert Cleaning	$20
Culvert ID 368*	Culvert Cleaning	$23
Culvert ID 370*	Culvert Cleaning	$24
Culvert ID 371*	Culvert Cleaning	$30
Culvert ID 372*	Culvert Cleaning	$20
Culvert ID 439*	Culvert Cleaning	$23
Culvert ID 436*	Culvert Cleaning	$25
Culvert ID 433*	Culvert Cleaning	$17
Culvert ID 432*	Culvert Cleaning	$20
Culvert ID 431*	Culvert Cleaning	$24
Culvert ID 429*	Culvert Cleaning	$16
Culvert ID 434	Culvert Cleaning	$50
Culvert ID 425*	Culvert Cleaning	$22
Culvert ID 426*	Culvert Cleaning	$21
Culvert ID 428*	Culvert Cleaning	$21

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 14
GRID ID: E4

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID F2

HIGH: None

MEDIUM:

Object ID: Detention Pond ID 9
Issue(s): limited water quality
Possible Solution: improve outlet works
Total Capital Improvement Cost: $10,230
Annual Operation and Maintenance Cost: $343

LOW:

Object ID: Culvert ID 222
Issue(s): erosion
Possible Solution: entrance improvements
Total Capital Improvement Cost: $3,410
Annual Operation and Maintenance Cost: $49

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

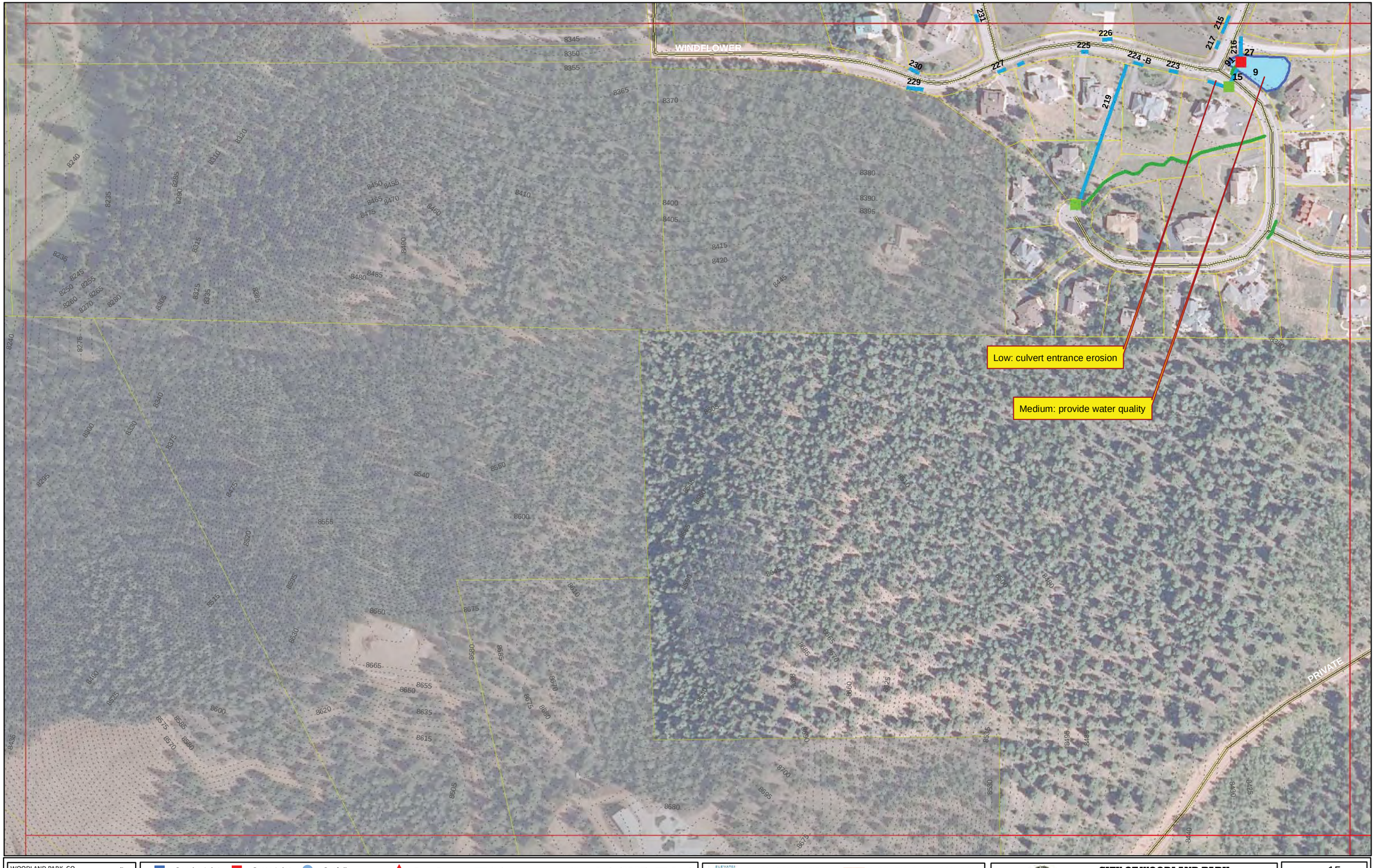
MAINTENANCE ONLY - GRID ID F2

Object ID	Maintenance	Annual Cost
Culvert ID 219	Culvert Cleaning	$332
Culvert ID 218	Culvert Cleaning	$45
Culvert ID 217*	Culvert Cleaning	$20
Culvert ID 223*	Culvert Cleaning	$22
Culvert ID 224*	Culvert Cleaning	$26
Culvert ID 225*	Culvert Cleaning	$17
Culvert ID 228*	Culvert Cleaning	$18
Culvert ID 227*	Culvert Cleaning	$22
Culvert ID 229*	Culvert Cleaning	$40
Culvert ID 230*	Culvert Cleaning	$27

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 15
GRID ID: F2

CIP PRIORITIES - GRID ID F3

HIGH: None

MEDIUM:

Object ID: Detention Pond ID 7, 8
Issue(s): repairs and improvements needed
Possible Solution: repairs and retro-fit for water quality
Total Capital Improvement Cost: $23,355
Annual Operation and Maintenance Cost: $533

Object ID: No survey, detention pond off StoneRidge
Issue(s): repairs and improvements needed
Possible Solution: repairs and retro-fit for water quality
Total Capital Improvement Cost: $15,277
Annual Operation and Maintenance Cost: $647

LOW:

Object ID: No survey, TC drainage, downstream SH67
Issue(s): channel instability
Possible Solution: check structure
Total Capital Improvement Cost: $29,157
Annual Operation and Maintenance Cost: $600

Object ID: No survey, TC drainage, upstream SH67
Issue(s): channel instability
Possible Solution: check structure
Total Capital Improvement Cost: $17,494
Annual Operation and Maintenance Cost: $900

Object ID: Culvert ID 309
Issue(s): erosion
Possible Solution: entrance improvement
Total Capital Improvement Cost: $4,264
Annual Operation and Maintenance Cost: $49

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

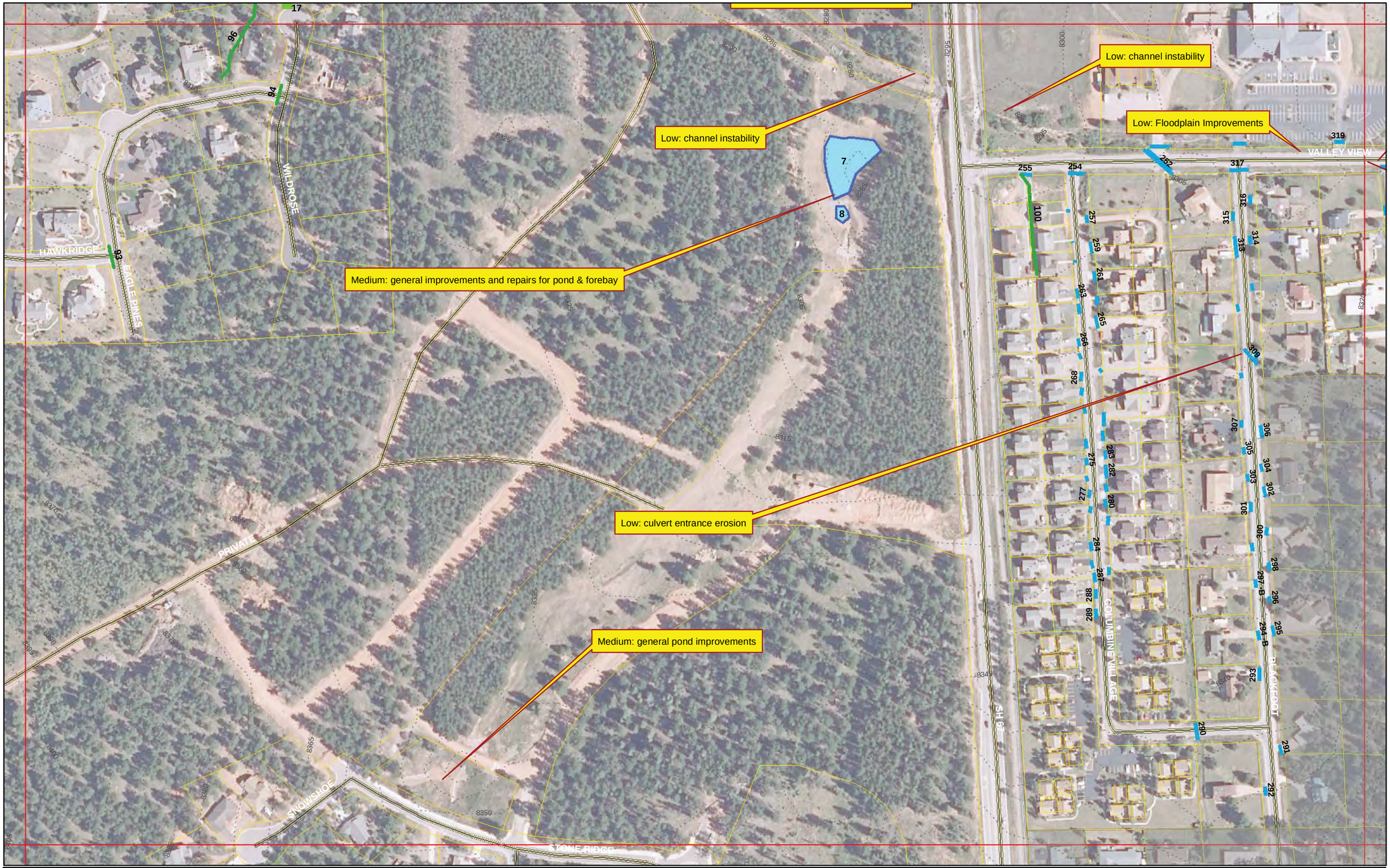
MAINTENANCE ONLY - GRID ID F3

Object ID	Maintenance	Annual Cost
Culvert ID 319*	Culvert Cleaning	$26
Culvert ID 251	Culvert Cleaning	$17
Culvert ID 290	Culvert Cleaning	$41
Culvert ID 260*	Culvert Cleaning	$6
Culvert ID 263*	Culvert Cleaning	$23
Culvert ID 264*	Culvert Cleaning	$24
Culvert ID 267*	Culvert Cleaning	$14
Culvert ID 268*	Culvert Cleaning	$23
Culvert ID 285*	Culvert Cleaning	$19
Culvert ID 287*	Culvert Cleaning	$23
Culvert ID 254	Culvert Cleaning	$38
Culvert ID 286*	Culvert Cleaning	$19
Culvert ID 279*	Culvert Cleaning	$23
Culvert ID 280*	Culvert Cleaning	$20
Culvert ID 282*	Culvert Cleaning	$32
Culvert ID 273*	Culvert Cleaning	$24
Culvert ID 272*	Culvert Cleaning	$34
Culvert ID 261*	Culvert Cleaning	$25
Culvert ID 259*	Culvert Cleaning	$30
Culvert ID 257*	Culvert Cleaning	$18
Culvert ID 292*	Culvert Cleaning	$22
Culvert ID 291*	Culvert Cleaning	$25
Culvert ID 293*	Culvert Cleaning	$32
Culvert ID 294*	Culvert Cleaning	$23
Culvert ID 297*	Culvert Cleaning	$20
Culvert ID 299*	Culvert Cleaning	$21
Culvert ID 300*	Culvert Cleaning	$20
Culvert ID 301*	Culvert Cleaning	$25
Culvert ID 306*	Culvert Cleaning	$31
Culvert ID 310*	Culvert Cleaning	$21
Culvert ID 311*	Culvert Cleaning	$17
Culvert ID 312*	Culvert Cleaning	$18
Culvert ID 313*	Culvert Cleaning	$52
Culvert ID 314*	Culvert Cleaning	$21
Culvert ID 315*	Culvert Cleaning	$23
Culvert ID 317	Culvert Cleaning	$45

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 16
GRID ID: F3

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID F4

HIGH: None

MEDIUM:

Object ID: Detention Pond ID 10
Issue(s): water quality limited, improvements
Possible Solution: new outlet works, easement
Total Capital Improvement Cost: $23,381
Annual Operation and Maintenance Cost: $152

Object ID: Channel ID 104
Issue(s): channel instability
Possible Solution: drop structure
Total Capital Improvement Cost: $55,130
Annual Operation and Maintenance Cost: $585

LOW:

Object ID: No survey, Chippewa & Valley View
Issue(s): headcut/erosion
Possible Solution: check structure
Total Capital Improvement Cost: $11,662
Annual Operation and Maintenance Cost: $0

Object ID: No survey, Valley View d.s. of Chippewa
Issue(s): channel instability
Possible Solution: riprap
Total Capital Improvement Cost: $35,636
Annual Operation and Maintenance Cost: $750

Object ID: No survey, Park View Estates Park
Issue(s): limited channel conveyance
Possible Solution: general conveyance improvements
Total Capital Improvement Cost: $34,100
Annual Operation and Maintenance Cost: $300

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID F4

Object ID	Maintenance	Annual Cost
Culvert ID 327*	Culvert Cleaning	$20
Culvert ID 326*	Culvert Cleaning	$22
Culvert ID 325*	Culvert Cleaning	$19
Culvert ID 324*	Culvert Cleaning	$24
Culvert ID 323*	Culvert Cleaning	$22
Culvert ID 322*	Culvert Cleaning	$22
Culvert ID 321*	Culvert Cleaning	$23
Culvert ID 328	Culvert Cleaning	$38
Culvert ID 336*	Culvert Cleaning	$21
Culvert ID 335*	Culvert Cleaning	$23
Culvert ID 334*	Culvert Cleaning	$18
Culvert ID 333*	Culvert Cleaning	$20
Culvert ID 340*	Culvert Cleaning	$17
Culvert ID 343*	Culvert Cleaning	$21
Culvert ID 344*	Culvert Cleaning	$21
Culvert ID 403*	Culvert Cleaning	$23
Culvert ID 402*	Culvert Cleaning	$17
Culvert ID 401*	Culvert Cleaning	$21
Culvert ID 404*	Culvert Cleaning	$14
Culvert ID 398*	Culvert Cleaning	$16
Culvert ID 395*	Culvert Cleaning	$17
Culvert ID 394*	Culvert Cleaning	$18
Culvert ID 379*	Culvert Cleaning	$27
Culvert ID 382*	Culvert Cleaning	$19
Culvert ID 385*	Culvert Cleaning	$11
Culvert ID 386*	Culvert Cleaning	$20
Culvert ID 392*	Culvert Cleaning	$22
Culvert ID 405*	Culvert Cleaning	$20
Culvert ID 407*	Culvert Cleaning	$33
Culvert ID 408*	Culvert Cleaning	$23
Culvert ID 412*	Culvert Cleaning	$28
Culvert ID 387	Culvert Cleaning	$33
Culvert ID 416	Culvert Cleaning	$44
Culvert ID 424*	Culvert Cleaning	$25
Culvert ID 423*	Culvert Cleaning	$17
Culvert ID 422*	Culvert Cleaning	$16
Culvert ID 421*	Culvert Cleaning	$21
Culvert ID 420*	Culvert Cleaning	$19
Culvert ID 417*	Culvert Cleaning	$32
Culvert ID 418*	Culvert Cleaning	$17

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...

Low: headcut/erosion

Low: channel instability

Low: limited channel conveyance

Low: Floodpain Improvements and Mulit Use Detention Facilities in Open Space Locations

Medium: channel instability

Medium: water quality limitations and general pond improvements

PIUTE
NAVAJO
CHIPPEWA
SUNSHINE
MAIN
APPLE SUN
VALLEY VIEW
KIOWA
BLUE SKY
WILDFLOWER
COLORADO
GLOVER'S

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CITY OF WOODLAND PARK
220 W. SOUTH AVE
WOODLAND PARK, CO 80863

ENGINUITY ENGINEERING SOLUTIONS
10106 W. SAN JUAN WAY, STE 215
LITTLETON, CO 80127

CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 17
GRID ID: F4

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID F5

HIGH: None

MEDIUM:

Object ID: No survey, Rampart & Kelley's
Issue(s): erosion and outfall
Possible Solution: repair outfall, grading
Total Capital Improvement Cost: $25,823
Annual Operation and Maintenance Cost: $1,713

Object ID: No survey, Rampart Range & Fox Hill
Issue(s): road erosion
Possible Solution: riprap
Total Capital Improvement Cost: $11,935
Annual Operation and Maintenance Cost: $0

LOW:

Object ID: Detention ID 11
Issue(s): water quality improvements needed
Possible Solution: retrofit outlet structure
Total Capital Improvement Cost: $15,345
Annual Operation and Maintenance Cost: $1,085

Object ID: Detention ID 12
Issue(s): water quality improvements needed
Possible Solution: new outlet structure
Total Capital Improvement Cost: $31,971
Annual Operation and Maintenance Cost: $152

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

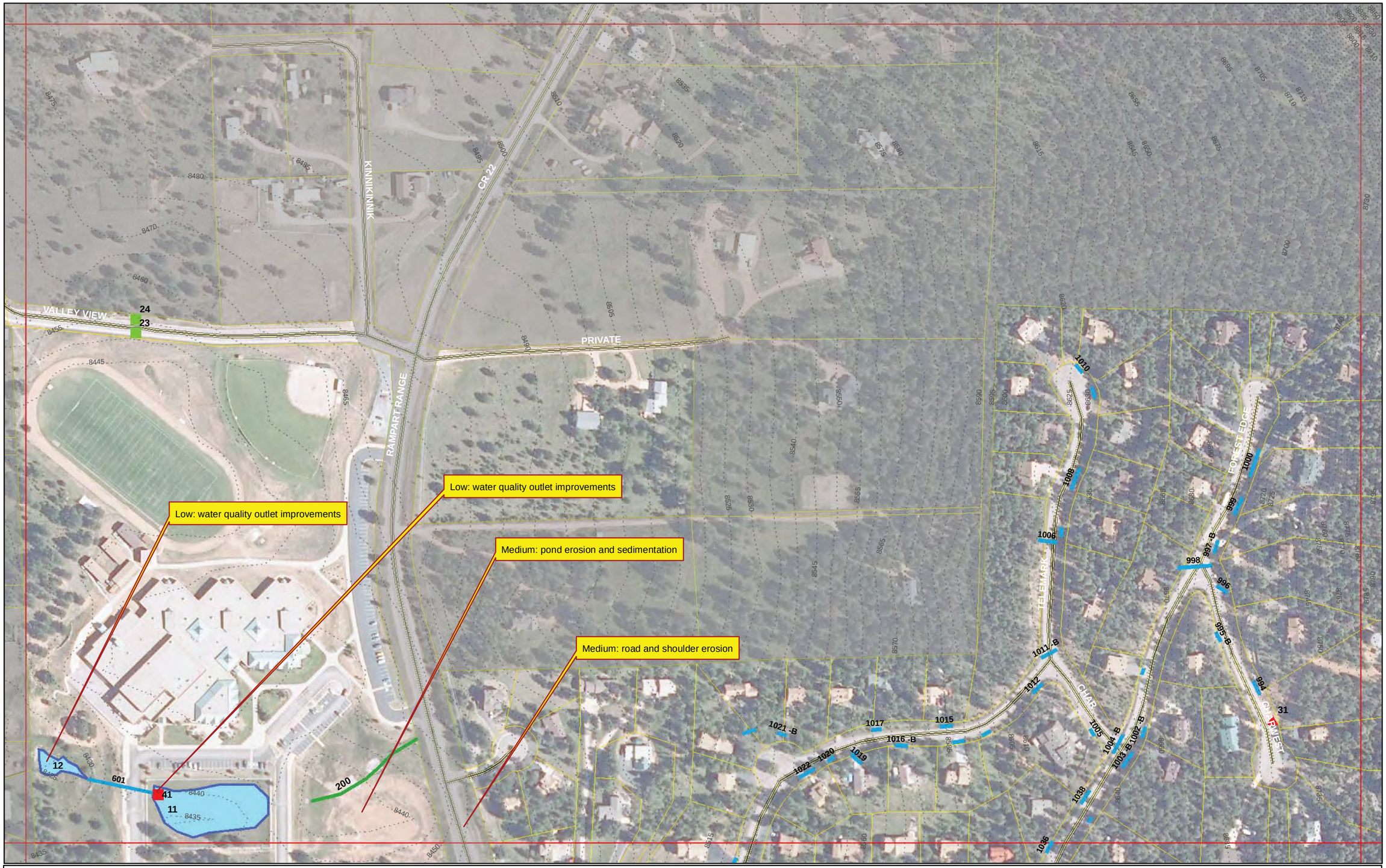
MAINTENANCE ONLY - GRID ID F5

Object ID	Maintenance	Annual Cost
Culvert ID 1021	Culvert Cleaning	$23
Culvert ID 1010*	Culvert Cleaning	$25
Culvert ID 1009*	Culvert Cleaning	$30
Culvert ID 1007*	Culvert Cleaning	$23
Culvert ID 1012*	Culvert Cleaning	$33
Culvert ID 1013*	Culvert Cleaning	$23
Culvert ID 1014*	Culvert Cleaning	$29
Culvert ID 1016*	Culvert Cleaning	$31
Culvert ID 1018*	Culvert Cleaning	$15
Culvert ID 1011	Culvert Cleaning	$43
Culvert ID 1019	Culvert Cleaning	$33
Culvert ID 1005*	Culvert Cleaning	$20
Culvert ID 1004	Culvert Cleaning	$49
Culvert ID 997*	Culvert Cleaning	$31
Culvert ID 1001*	Culvert Cleaning	$15
Culvert ID 1002*	Culvert Cleaning	$28
Culvert ID 1003*	Culvert Cleaning	$43
Culvert ID 995*	Culvert Cleaning	$26
Culvert ID 994*	Culvert Cleaning	$35
Road Dmg ID 31*	Street Cleaning	$175

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Street Cleaning: $1903/acre

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

CITY OF WOODLAND PARK
220 W. SOUTH AVE
WOODLAND PARK, CO 80863

ENGINUITY ENGINEERING SOLUTIONS
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LITTLETON, CO 80127

CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 18
GRID ID: F5

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID G2

HIGH:	None
MEDIUM:	None
LOW:	None

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID G2

Object ID	Maintenance	Annual Cost
Culvert ID 1450	Culvert Cleaning	$45
Culvert ID 1451*	Culvert Cleaning	$26
Culvert ID 1452*	Culvert Cleaning	$17
Culvert ID 1475*	Culvert Cleaning	$19

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 20
GRID ID: G2

CIP PRIORITIES - GRID ID G3

HIGH: None

MEDIUM:

Object ID: No survey, detention near Red Feather
Issue(s): limited water quality
Possible Solution: new outlet works
Total Capital Improvement Cost: $13,640
Annual Operation and Maintenance Cost: $95

LOW:

Object ID: No survey, SH67 btw Kelley's & Red Fthr.
Issue(s): eroded shoulders and ditches
Possible Solution: low flow channel, riprap
Total Capital Improvement Cost: $433,924
Annual Operation and Maintenance Cost: $4,500

Object ID: Culvert ID 677
Issue(s): damaged culvert
Possible Solution: replace
Total Capital Improvement Cost: $7,944
Annual Operation and Maintenance Cost: $75

Object ID: Culvert ID 650
Issue(s): damaged culvert
Possible Solution: replace
Total Capital Improvement Cost: $9,528
Annual Operation and Maintenance Cost: $35

Object ID: No survey, along Red Feather
Issue(s): erosion at outfall and channel
Possible Solution: riprap
Total Capital Improvement Cost: $2,714
Annual Operation and Maintenance Cost: $75

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

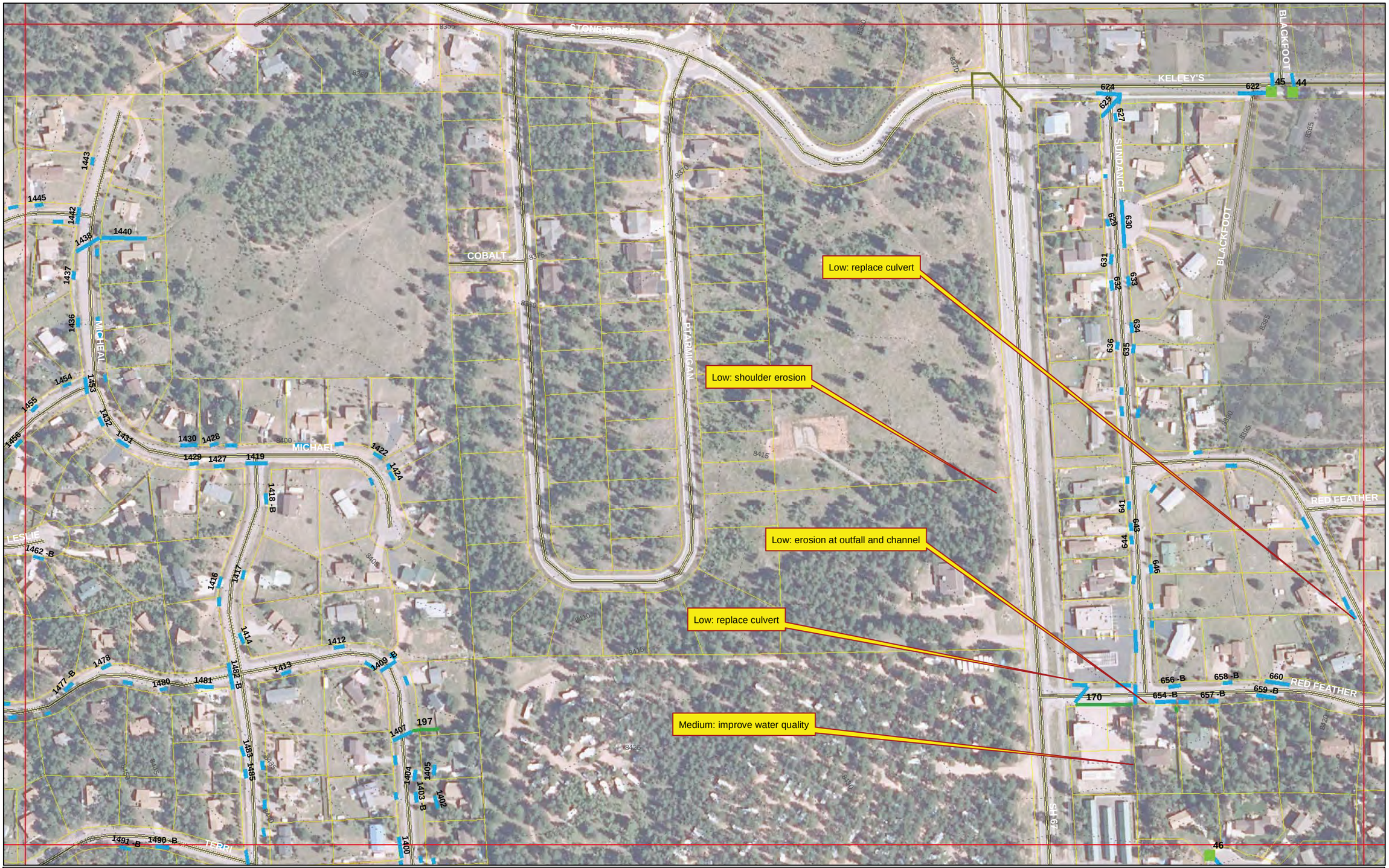
MAINTENANCE ONLY - GRID ID G3

Object ID	Maintenance	Annual Cost
Culvert ID 1441*	Culvert Cleaning	$19
Culvert ID 1437*	Culvert Cleaning	$20
Culvert ID 1435*	Culvert Cleaning	$14
Culvert ID 1433*	Culvert Cleaning	$19
Culvert ID 1430*	Culvert Cleaning	$41
Culvert ID 1426*	Culvert Cleaning	$28
Culvert ID 1420*	Culvert Cleaning	$35
Culvert ID 1421*	Culvert Cleaning	$21
Culvert ID 1423*	Culvert Cleaning	$15
Culvert ID 1424*	Culvert Cleaning	$21
Culvert ID 1425*	Culvert Cleaning	$19
Culvert ID 1419	Culvert Cleaning	$53
Culvert ID 1418*	Culvert Cleaning	$25
Culvert ID 1417*	Culvert Cleaning	$21
Culvert ID 1416*	Culvert Cleaning	$28
Culvert ID 1414*	Culvert Cleaning	$26
Culvert ID 1482	Culvert Cleaning	$63
Culvert ID 1481*	Culvert Cleaning	$42
Culvert ID 1480*	Culvert Cleaning	$18
Culvert ID 1483*	Culvert Cleaning	$25
Culvert ID 1486*	Culvert Cleaning	$22
Culvert ID 1487*	Culvert Cleaning	$19
Culvert ID 1412*	Culvert Cleaning	$25
Culvert ID 1411*	Culvert Cleaning	$28
Culvert ID 1410*	Culvert Cleaning	$18
Culvert ID 1408*	Culvert Cleaning	$23
Culvert ID 1406*	Culvert Cleaning	$23
Culvert ID 1401*	Culvert Cleaning	$18
Culvert ID 1403*	Culvert Cleaning	$25
Culvert ID 1409	Culvert Cleaning	$42
Culvert ID 1407	Culvert Cleaning	$49
Culvert ID 623	Culvert Cleaning	$46
Culvert ID 624	Culvert Cleaning	$61
Culvert ID 627*	Culvert Cleaning	$20
Culvert ID 630*	Culvert Cleaning	$11
Culvert ID 633*	Culvert Cleaning	$23
Culvert ID 635*	Culvert Cleaning	$21
Culvert ID 639*	Culvert Cleaning	$23
Culvert ID 643*	Culvert Cleaning	$19
Culvert ID 644*	Culvert Cleaning	$21
Culvert ID 646*	Culvert Cleaning	$22
Culvert ID 645*	Culvert Cleaning	$20
Culvert ID 647*	Culvert Cleaning	$15
Culvert ID 648*	Culvert Cleaning	$15
Culvert ID 649*	Culvert Cleaning	$53
Culvert ID 681*	Culvert Cleaning	$21
Culvert ID 680*	Culvert Cleaning	$27
Culvert ID 679*	Culvert Cleaning	$24
Culvert ID 678*	Culvert Cleaning	$25
Culvert ID 676*	Culvert Cleaning	$31
Culvert ID 651	Culvert Cleaning	$47
Culvert ID 652*	Culvert Cleaning	$36
Culvert ID 654*	Culvert Cleaning	$48
Culvert ID 655*	Culvert Cleaning	$24
Culvert ID 656*	Culvert Cleaning	$29
Culvert ID 658*	Culvert Cleaning	$23
Culvert ID 660*	Culvert Cleaning	$57
Culvert ID 657*	Culvert Cleaning	$22
Culvert ID 659*	Culvert Cleaning	$46

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 21
GRID ID: G3

CIP PRIORITIES - GRID ID G4

HIGH: None

MEDIUM:

Object ID: Detention Pond ID 15
Issue(s): sedimentation, limited water quality
Possible Solution: new outlet works
Total Capital Improvement Cost: $13,981
Annual Operation and Maintenance Cost: $190

Object ID: Curb Inlet 47
Issue(s): inadequate drainage
Possible Solution: new inlet
Total Capital Improvement Cost: $9,950
Annual Operation and Maintenance Cost: $63

Object ID: Road Damage 25
Issue(s): sedimentation
Possible Solution: curb, gutter and concrete apron
Total Capital Improvement Cost: $3,923
Annual Operation and Maintenance Cost: $0

LOW:

Object ID: Culvert ID 722
Issue(s): pooling
Possible Solution: reset culvert
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $72

Object ID: Detention Pond ID 16
Issue(s): limited water quality
Possible Solution: new outlet works
Total Capital Improvement Cost: $22,165
Annual Operation and Maintenance Cost:

Object ID: Channel ID 167
Issue(s): channel instability
Possible Solution: riprap
Total Capital Improvement Cost: $33,080
Annual Operation and Maintenance Cost: $1,110

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID G4

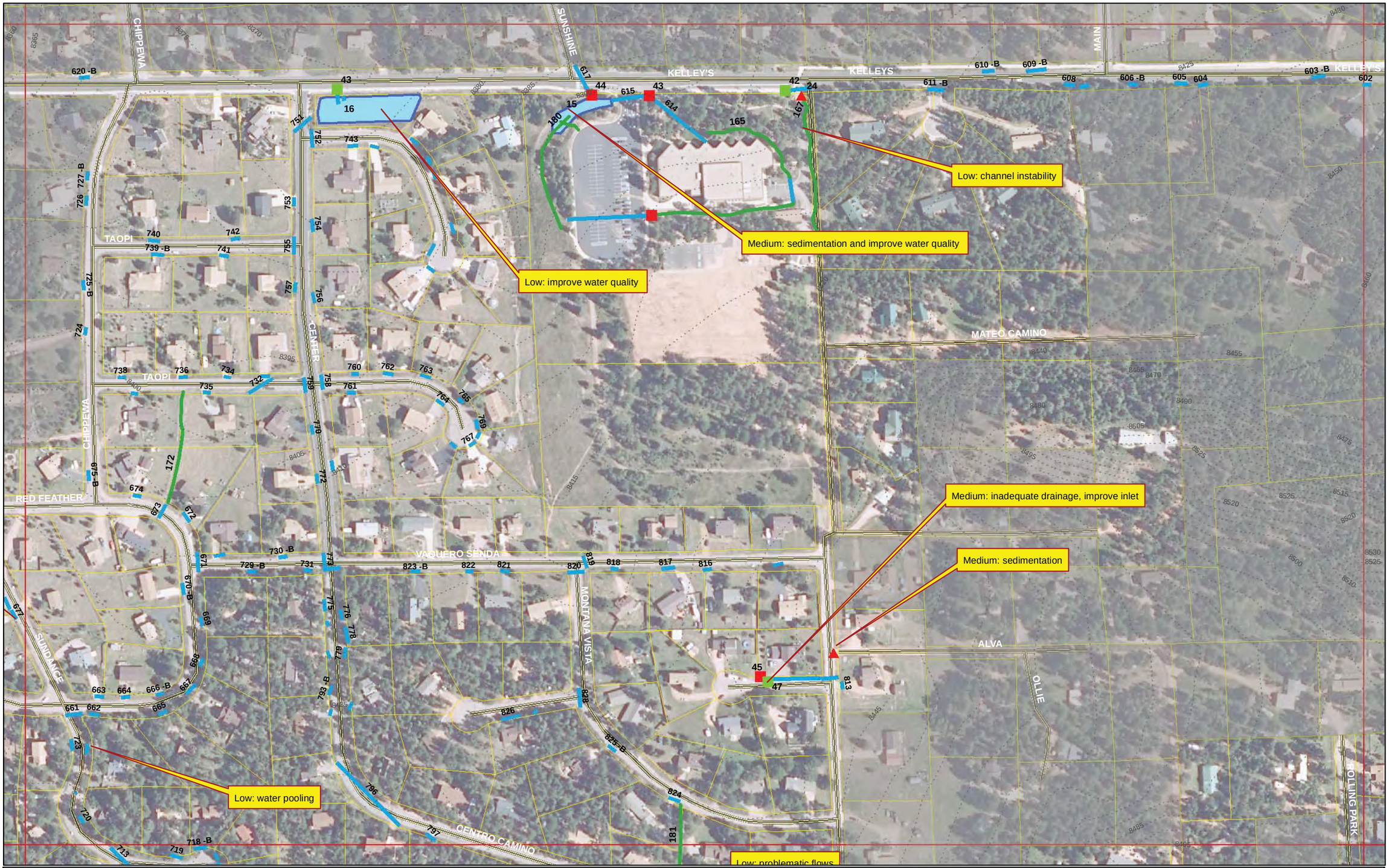
Object ID	Maintenance	Annual Cost
Culvert ID 620*	Culvert Cleaning	$26
Culvert ID 675*	Culvert Cleaning	$25
Culvert ID 725*	Culvert Cleaning	$24
Culvert ID 726*	Culvert Cleaning	$24
Culvert ID 727*	Culvert Cleaning	$20
Culvert ID 670*	Culvert Cleaning	$29
Culvert ID 669*	Culvert Cleaning	$22
Culvert ID 667*	Culvert Cleaning	$32
Culvert ID 666*	Culvert Cleaning	$20
Culvert ID 665*	Culvert Cleaning	$22
Culvert ID 664*	Culvert Cleaning	$22
Culvert ID 663*	Culvert Cleaning	$23
Culvert ID 723*	Culvert Cleaning	$27
Culvert ID 728*	Culvert Cleaning	$26
Culvert ID 729*	Culvert Cleaning	$24
Culvert ID 730*	Culvert Cleaning	$22
Culvert ID 731*	Culvert Cleaning	$19
Culvert ID 773	Culvert Cleaning	$36
Culvert ID 738*	Culvert Cleaning	$21
Culvert ID 737*	Culvert Cleaning	$18
Culvert ID 736*	Culvert Cleaning	$22
Culvert ID 734*	Culvert Cleaning	$19
Culvert ID 759	Culvert Cleaning	$38
Culvert ID 740*	Culvert Cleaning	$28
Culvert ID 739*	Culvert Cleaning	$31
Culvert ID 742*	Culvert Cleaning	$23
Culvert ID 755	Culvert Cleaning	$42
Culvert ID 757*	Culvert Cleaning	$24
Culvert ID 756*	Culvert Cleaning	$25
Culvert ID 772*	Culvert Cleaning	$23
Culvert ID 774	Culvert Cleaning	$41
Culvert ID 776*	Culvert Cleaning	$25
Culvert ID 778*	Culvert Cleaning	$39
Culvert ID 780*	Culvert Cleaning	$19
Culvert ID 793*	Culvert Cleaning	$24
Culvert ID 794*	Culvert Cleaning	$20
Culvert ID 795*	Culvert Cleaning	$16
Culvert ID 797*	Culvert Cleaning	$29
Culvert ID 752	Culvert Cleaning	$44
Culvert ID 743*	Culvert Cleaning	$24
Culvert ID 744*	Culvert Cleaning	$22
Culvert ID 747*	Culvert Cleaning	$24
Culvert ID 746*	Culvert Cleaning	$21
Culvert ID 745*	Culvert Cleaning	$22
Culvert ID 750*	Culvert Cleaning	$27
Culvert ID 748*	Culvert Cleaning	$31
Culvert ID 749*	Culvert Cleaning	$22
Culvert ID 760*	Culvert Cleaning	$17
Culvert ID 762*	Culvert Cleaning	$26
Culvert ID 764*	Culvert Cleaning	$22
Culvert ID 765*	Culvert Cleaning	$15
Culvert ID 769*	Culvert Cleaning	$19
Culvert ID 768*	Culvert Cleaning	$18
Culvert ID 767*	Culvert Cleaning	$19
Culvert ID 766*	Culvert Cleaning	$19
Culvert ID 823*	Culvert Cleaning	$22
Culvert ID 822*	Culvert Cleaning	$19
Culvert ID 821*	Culvert Cleaning	$22
Culvert ID 818*	Culvert Cleaning	$18
Culvert ID 817*	Culvert Cleaning	$32
Culvert ID 816*	Culvert Cleaning	$22
Culvert ID 820	Culvert Cleaning	$40
Culvert ID 824*	Culvert Cleaning	$29
Culvert ID 825*	Culvert Cleaning	$24
Culvert ID 826*	Culvert Cleaning	$45

MAINTENANCE ONLY - continued...

Object ID	Maintenance	Annual Cost
Culvert ID 616*	Culvert Cleaning	$202
Culvert ID 612*	Culvert Cleaning	$62
Culvert ID 615*	Culvert Cleaning	$87
Culvert ID 820	Culvert Cleaning	$40
Culvert ID 611	Culvert Cleaning	$41
Culvert ID 610	Culvert Cleaning	$29
Culvert ID 609	Culvert Cleaning	$49
Culvert ID 603	Culvert Cleaning	$31
Culvert ID 607*	Culvert Cleaning	$23
Culvert ID 606*	Culvert Cleaning	$21
Culvert ID 826*	Culvert Cleaning	$45

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 22
GRID ID: G4

CIP PRIORITIES - GRID ID G5

HIGH: None

MEDIUM: None

LOW:

Object ID: Culvert ID 883
Issue(s): pooling water
Possible Solution: reset culvert
Total Capital Improvement Cost: $4,264
Annual Operation and Maintenance Cost: $44

Object ID: No survey, Forest Edge
Issue(s): channel incision
Possible Solution: soil riprap
Total Capital Improvement Cost: $15,176
Annual Operation and Maintenance Cost: $750

Object ID: No survey, Rampart Range & Kelley's
Issue(s): erosion and sedimentation
Possible Solution: channel improvements
Total Capital Improvement Cost: $17,050
Annual Operation and Maintenance Cost: $300

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID G5

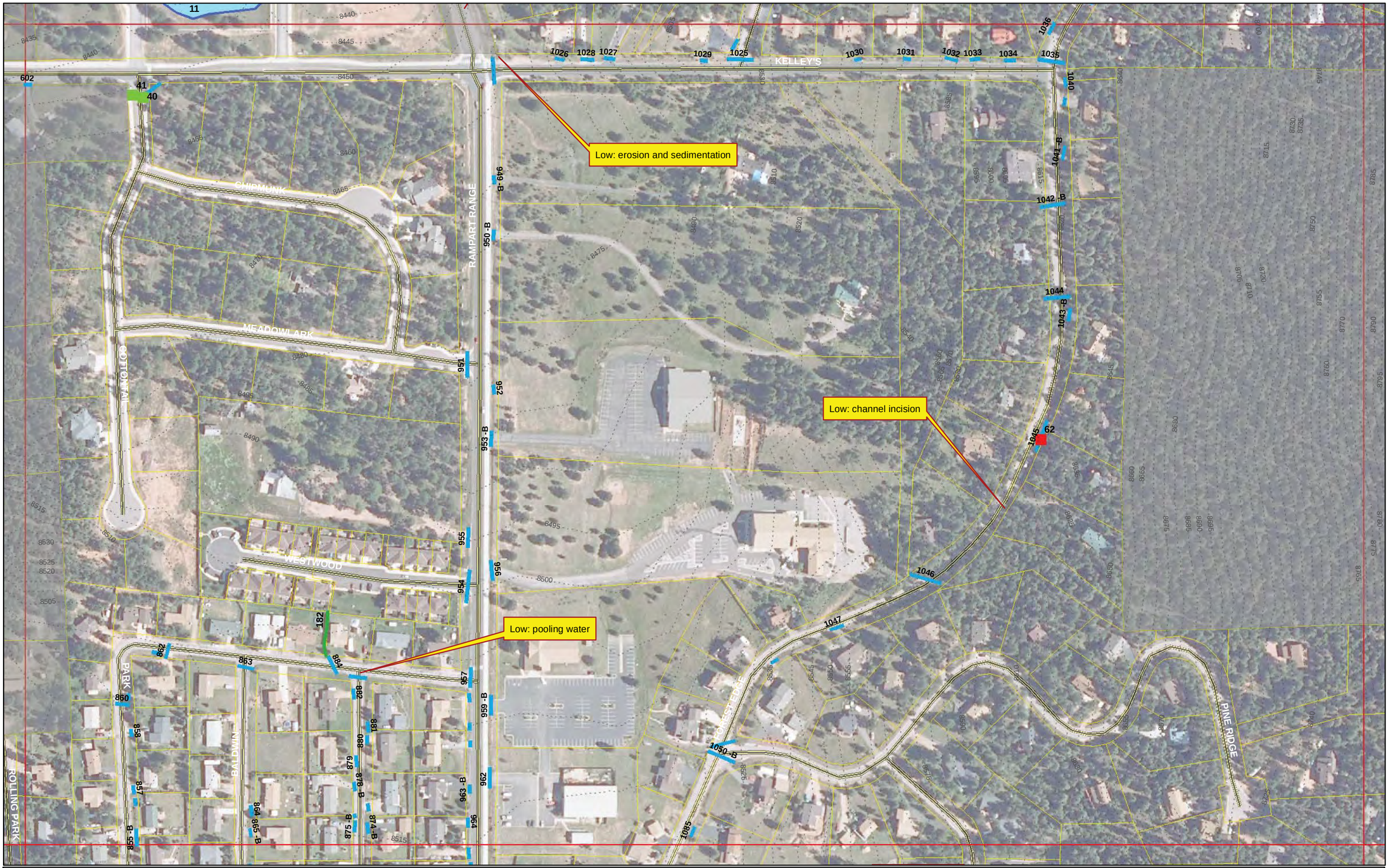
Object ID	Maintenance	Annual Cost
Culvert ID 855*	Culvert Cleaning	$42
Culvert ID 856*	Culvert Cleaning	$17
Culvert ID 857*	Culvert Cleaning	$22
Culvert ID 858*	Culvert Cleaning	$18
Culvert ID 859*	Culvert Cleaning	$16
Culvert ID 860	Culvert Cleaning	$33
Culvert ID 863*	Culvert Cleaning	$39
Culvert ID 864*	Culvert Cleaning	$27
Culvert ID 865*	Culvert Cleaning	$21
Culvert ID 882*	Culvert Cleaning	$25
Culvert ID 881*	Culvert Cleaning	$27
Culvert ID 880*	Culvert Cleaning	$21
Culvert ID 879*	Culvert Cleaning	$28
Culvert ID 878*	Culvert Cleaning	$21
Culvert ID 877*	Culvert Cleaning	$18
Culvert ID 875*	Culvert Cleaning	$28
Culvert ID 874*	Culvert Cleaning	$26
Culvert ID 964*	Culvert Cleaning	$25
Culvert ID 963*	Culvert Cleaning	$21
Culvert ID 962*	Culvert Cleaning	$50
Culvert ID 961*	Culvert Cleaning	$16
Culvert ID 960*	Culvert Cleaning	$19
Culvert ID 959*	Culvert Cleaning	$48
Culvert ID 958*	Culvert Cleaning	$21
Culvert ID 954	Culvert Cleaning	$77
Culvert ID 956*	Culvert Cleaning	$48
Culvert ID 955*	Culvert Cleaning	$48
Culvert ID 953*	Culvert Cleaning	$37
Culvert ID 952*	Culvert Cleaning	$23
Culvert ID 951	Culvert Cleaning	$62
Culvert ID 950*	Culvert Cleaning	$25
Culvert ID 949*	Culvert Cleaning	$22
Culvert ID 948	Culvert Cleaning	$64
Culvert ID 1028*	Culvert Cleaning	$32
Culvert ID 1027*	Culvert Cleaning	$27
Culvert ID 1036*	Culvert Cleaning	$31
Culvert ID 1039*	Culvert Cleaning	$20
Culvert ID 1041*	Culvert Cleaning	$34
Culvert ID 1042	Culvert Cleaning	$6
Culvert ID 1043*	Culvert Cleaning	$32
Culvert ID 1045*	Culvert Cleaning	$79
Culvert ID 1047*	Culvert Cleaning	$35
Culvert ID 1048*	Culvert Cleaning	$21
Culvert ID 1049	Culvert Cleaning	$61
Culvert ID 1050	Culvert Cleaning	$68
No Survey (1)	Channel Cleaning	$1,560
Culvert ID 1085*	Culvert Cleaning	$51

(1) No survey, channel leaves intersection of Forest Edge and Pine Ridge and runs behind houses.

*Private or public entity other than
Woodland Park may be responsible

Culvert Cleaning: $1/LF
Channel Cleaning: $3/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CITY OF WOODLAND PARK
220 W. SOUTH AVE
WOODLAND PARK, CO 80863

ENGINUITY ENGINEERING SOLUTIONS
10106 W. SAN JUAN WAY, STE 215
LITTLETON, CO 80127

CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 23
GRID ID: G5

CIP PRIORITIES - GRID ID H3

HIGH: None

MEDIUM:

Object ID: Detention Pond 14
Issue(s): water quality improvement needed
Possible Solution: New outlet works
Total Capital Improvement Cost: $12,789
Annual Operation and Maintenance Cost: $95

LOW:

Object ID: Road Damage 19 & 20
Issue(s): Poor drainage and ponding
Possible Solution: New outlet works
Total Capital Improvement Cost: $25,153
Annual Operation and Maintenance Cost: $50

Object ID: Detention Pond 21
Issue(s): water quality improvement needed
Possible Solution: retro-fit water quality improvements
Total Capital Improvement Cost: $4,264
Annual Operation and Maintenance Cost: $381

Object ID: no survey, Walnut St south of Bowman
Issue(s): incised and deep open channels
Possible Solution: channel mitigation/stabilization
Total Capital Improvement Cost: $11,425
Annual Operation and Maintenance Cost: $1,005

Object ID: no survey, Walnut St north of County Rd
Issue(s): incised and deep open channels
Possible Solution: channel mitigation/stabilization
Total Capital Improvement Cost: $37,510
Annual Operation and Maintenance Cost: $3,300

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID H3

Object ID	Maintenance	Annual Cost
Culvert ID 1491*	Culvert Cleaning	$28
Culvert ID 1490*	Culvert Cleaning	$32
Culvert ID 1489*	Culvert Cleaning	$19
Culvert ID 1488	Culvert Cleaning	$48
Culvert ID 1498*	Culvert Cleaning	$20
Culvert ID 1500*	Culvert Cleaning	$24
Culvert ID 1503*	Culvert Cleaning	$32
Culvert ID 1505*	Culvert Cleaning	$31
Culvert ID 1507*	Culvert Cleaning	$187
Culvert ID 1391*	Culvert Cleaning	$22
Culvert ID 1390*	Culvert Cleaning	$19
Culvert ID 1388*	Culvert Cleaning	$26
Culvert ID 1387*	Culvert Cleaning	$29
Culvert ID 1386*	Culvert Cleaning	$43
Culvert ID 1384*	Culvert Cleaning	$22
Culvert ID 1508	Culvert Cleaning	$18
Culvert ID 1380*	Culvert Cleaning	$26
Road Dmg ID 40	Street Cleaning	$70
Culvert ID 1370*	Culvert Cleaning	$27
Culvert ID 1369*	Culvert Cleaning	$25
Culvert ID 1360	Culvert Cleaning	$52
Culvert ID 1368*	Culvert Cleaning	$30
Grate Inlet ID 79	Culvert Cleaning	$210
Culvert ID 1375*	Culvert Cleaning	$22
Culvert ID 1373*	Culvert Cleaning	$22
Culvert ID 1372*	Culvert Cleaning	$24
Culvert ID 1371*	Culvert Cleaning	$31
Culvert ID 1352*	Culvert Cleaning	$17
Culvert ID 1353*	Culvert Cleaning	$20
Culvert ID 1355*	Culvert Cleaning	$21
Culvert ID 1356*	Culvert Cleaning	$23
Culvert ID 1357*	Culvert Cleaning	$21
Culvert ID 1358*	Culvert Cleaning	$23
Culvert ID 1359*	Culvert Cleaning	$26
Culvert ID 1351*	Culvert Cleaning	$23
Culvert ID 1366*	Culvert Cleaning	$28
Culvert ID 1365*	Culvert Cleaning	$19
Culvert ID 1362*	Culvert Cleaning	$46
Culvert ID 682*	Culvert Cleaning	$20
Culvert ID 703*	Culvert Cleaning	$32
Culvert ID 700*	Culvert Cleaning	$23
Culvert ID 701*	Culvert Cleaning	$22
Culvert ID 698*	Culvert Cleaning	$27
Culvert ID 697*	Culvert Cleaning	$28
Culvert ID 696*	Culvert Cleaning	$25
Culvert ID 695*	Culvert Cleaning	$26
Culvert ID 694*	Culvert Cleaning	$30
Culvert ID 691*	Culvert Cleaning	$32
Culvert ID 692*	Culvert Cleaning	$16
Culvert ID 689*	Culvert Cleaning	$36
Culvert ID 687*	Culvert Cleaning	$30
Culvert ID 685*	Culvert Cleaning	$26
Culvert ID 693*	Culvert Cleaning	$29
Culvert ID 559*	Culvert Cleaning	$32
Culvert ID 562*	Culvert Cleaning	$33
Culvert ID 563*	Culvert Cleaning	$28
Culvert ID 443*	Culvert Cleaning	$24
Culvert ID 444*	Culvert Cleaning	$16
Culvert ID 448*	Culvert Cleaning	$28
Culvert ID 449*	Culvert Cleaning	$20
Culvert ID 454*	Culvert Cleaning	$25
Culvert ID 455*	Culvert Cleaning	$22
Culvert ID 456*	Culvert Cleaning	$21
Culvert ID 445	Culvert Cleaning	$37
Culvert ID 453	Culvert Cleaning	$45

MAINTENANCE ONLY - continued...

Object ID	Maintenance	Annual Cost
Culvert ID 452	Culvert Cleaning	$41

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Street Cleaning: $1903/acre
Channel Cleaning: $3/LF



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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LITTLETON, CO 80127

CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 27
GRID ID: H3

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID H4

HIGH: None

MEDIUM:

Object ID: Channel ID 162, 163, 164
Issue(s): poorly defined channel, low conveyance
Possible Solution: curb and gutter
Total Capital Improvement Cost: $37,510
Annual Operation and Maintenance Cost: $0

LOW:

Object ID: Channel ID 174
Issue(s): problematic flows
Possible Solution: easement
Total Capital Improvement Cost: $5,000
Annual Operation and Maintenance Cost: $495

Object ID: No survey, intersection of Pine & Del Este
Issue(s): channel instability
Possible Solution: stabilize
Total Capital Improvement Cost: $17,050
Annual Operation and Maintenance Cost: $150

Object ID: Channel ID 181
Issue(s): problematic flows
Possible Solution: easement
Total Capital Improvement Cost: $5,000
Annual Operation and Maintenance Cost: $837

Object ID: Channel ID 130
Issue(s): problematic flows
Possible Solution: easement and channel improvements
Total Capital Improvement Cost: $14,105
Annual Operation and Maintenance Cost: $480

Object ID: Culvert ID 572, Channel ID 148
Issue(s): problematic flows
Possible Solution: easement
Total Capital Improvement Cost: $5,000
Annual Operation and Maintenance Cost: $84

Object ID: Road Damage ID 26
Issue(s): erosion and sedimentation
Possible Solution: bank stabilization
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $0

Object ID: Road Damage ID 18
Issue(s): ponding
Possible Solution: storm drain installation
Total Capital Improvement Cost: $17,735
Annual Operation and Maintenance Cost: $113

Object ID: Channel ID 149
Issue(s): poorly defined channel, low conveyance
Possible Solution: create/define channel
Total Capital Improvement Cost: $3,042
Annual Operation and Maintenance Cost: $270

Object ID: Channel ID 132, 133
Issue(s): no inlets or curb
Possible Solution: add curb and inlets
Total Capital Improvement Cost: $25,575
Annual Operation and Maintenance Cost: $0

CIP PRIORITIES - continued...

Object ID: Road Damage ID 21
Issue(s): poding
Possible Solution: storm drain installation
Total Capital Improvement Cost: $17,735
Annual Operation and Maintenance Cost: $113

Object ID: Channel ID 131, Culvert ID 551, RD ID 17
Issue(s): erosion
Possible Solution: channel and road improvements
Total Capital Improvement Cost: $13,640
Annual Operation and Maintenance Cost: $167

Note: Additional information on Object IDs and Costs can be found in the appendices.

MAINTENANCE ONLY - GRID ID H4

Object ID	Maintenance	Annual Cost
Culvert ID 718*	Culvert Cleaning	$30
Culvert ID 717*	Culvert Cleaning	$18
Culvert ID 716*	Culvert Cleaning	$20
Culvert ID 715*	Culvert Cleaning	$21
Culvert ID 714*	Culvert Cleaning	$43
Culvert ID 719*	Culvert Cleaning	$29
Culvert ID 713	Culvert Cleaning	$67
Channel ID 175	Channel Cleaning	$2,508
Culvert ID 712*	Culvert Cleaning	$26
Culvert ID 710*	Culvert Cleaning	$48
Culvert ID 709*	Culvert Cleaning	$19
Culvert ID 707*	Culvert Cleaning	$24
Culvert ID 706*	Culvert Cleaning	$31
Culvert ID 705*	Culvert Cleaning	$23
Culvert ID 579*	Culvert Cleaning	$56
Culvert ID 781*	Culvert Cleaning	$42
Culvert ID 786*	Culvert Cleaning	$25
Culvert ID 787*	Culvert Cleaning	$54
Culvert ID 788*	Culvert Cleaning	$25
Culvert ID 790*	Culvert Cleaning	$17
Culvert ID 789,	Culvert Cleaning	$71
Culvert ID 784*	Culvert Cleaning	$27
Culvert ID 782*	Culvert Cleaning	$26
Culvert ID 792	Culvert Cleaning	$44
Culvert ID 798	Culvert Cleaning	$39
Culvert ID 799	Culvert Cleaning	$49
Culvert ID 800	Culvert Cleaning	$24
Culvert ID 802*	Culvert Cleaning	$29
Culvert ID 803*	Culvert Cleaning	$18
Culvert ID 805*	Culvert Cleaning	$27
Culvert ID 806*	Culvert Cleaning	$27
Culvert ID 807*	Culvert Cleaning	$23
Culvert ID 808*	Culvert Cleaning	$14
Culvert ID 810*	Culvert Cleaning	$21
Culvert ID 564*	Culvert Cleaning	$32
Culvert ID 565*	Culvert Cleaning	$18
Culvert ID 567*	Culvert Cleaning	$22
Culvert ID 566*	Culvert Cleaning	$20
Culvert ID 569	Culvert Cleaning	$45
Culvert ID 571	Culvert Cleaning	$43
Culvert ID 573*	Culvert Cleaning	$23
Culvert ID 574*	Culvert Cleaning	$26
Culvert ID 575*	Culvert Cleaning	$23
Culvert ID 550	Culvert Cleaning	$74
Culvert ID 829	Culvert Cleaning	$50
Culvert ID 830	Culvert Cleaning	$78
Culvert ID 831*	Culvert Cleaning	$27
Culvert ID 832*	Culvert Cleaning	$35
Culvert ID 833,	Culvert Cleaning	$52
Culvert ID 834*	Culvert Cleaning	$19
Culvert ID 835*	Culvert Cleaning	$24
Culvert ID 836*	Culvert Cleaning	$51
Culvert ID 837*	Culvert Cleaning	$64
Culvert ID 838*	Culvert Cleaning	$21
Culvert ID 839*	Culvert Cleaning	$24
Culvert ID 840*	Culvert Cleaning	$24
Culvert ID 841*	Culvert Cleaning	$26
Culvert ID 843*	Culvert Cleaning	$22
Culvert ID 844*	Culvert Cleaning	$35
Culvert ID 845*	Culvert Cleaning	$32
Culvert ID 846*	Culvert Cleaning	$29
Culvert ID 847*	Culvert Cleaning	$21
Culvert ID 848*	Culvert Cleaning	$27
Culvert ID 849*	Culvert Cleaning	$34
Culvert ID 850*	Culvert Cleaning	$33

MAINTENANCE ONLY - continued...

Object ID	Maintenance	Annual Cost
Culvert ID 851*	Culvert Cleaning	**$22**
Culvert ID 500	Culvert Cleaning	$64
Culvert ID 584	Culvert Cleaning	$45
Culvert ID 585*	Culvert Cleaning	$19
Culvert ID 586*	Culvert Cleaning	$21
Culvert ID 485	Culvert Cleaning	$49
Culvert ID 484	Culvert Cleaning	$47
Culvert ID 515	Culvert Cleaning	$41
Culvert ID 516	Culvert Cleaning	$41
Culvert ID 583	Culvert Cleaning	$62
Culvert ID 534	Culvert Cleaning	$39
Culvert ID 552	Culvert Cleaning	$39
Culvert ID 496	Culvert Cleaning	$46
Culvert ID 495	Culvert Cleaning	$40
Culvert ID 513	Culvert Cleaning	$37
Culvert ID 923	Culvert Cleaning	$37
Road Dmg. ID 22	Road Grading	$250
Culvert ID 589*	Culvert Cleaning	$15
Culvert ID 529	Culvert Cleaning	$78
Culvert ID 554	Culvert Cleaning	$454
Culvert ID 921	Culvert Cleaning	$82
Culvert ID 922	Culvert Cleaning	$38
Culvert ID 920*	Culvert Cleaning	$26
Culvert ID 919*	Culvert Cleaning	$34
Culvert ID 918*	Culvert Cleaning	$25
Culvert ID 917*	Culvert Cleaning	$23
Culvert ID 916*	Culvert Cleaning	$42
Culvert ID 915*	Culvert Cleaning	$20
Culvert ID 914*	Culvert Cleaning	$20
Culvert ID 502	Culvert Cleaning	$69
Culvert ID 501*	Culvert Cleaning	$28
Culvert ID 499*	Culvert Cleaning	$22
Culvert ID 494*	Culvert Cleaning	$24
Culvert ID 493*	Culvert Cleaning	$20
Culvert ID 492*	Culvert Cleaning	$20
Culvert ID 491*	Culvert Cleaning	$23
Culvert ID 483*	Culvert Cleaning	$34
Culvert ID 480*	Culvert Cleaning	$30
Culvert ID 476*	Culvert Cleaning	$20
Culvert ID 518*	Culvert Cleaning	$26
Culvert ID 514*	Culvert Cleaning	$40
Culvert ID 512*	Culvert Cleaning	$28
Culvert ID 511*	Culvert Cleaning	$32
Culvert ID 510*	Culvert Cleaning	$13
Culvert ID 533*	Culvert Cleaning	$9
Culvert ID 536	Culvert Cleaning	$43
Culvert ID 537*	Culvert Cleaning	$7
Culvert ID 535*	Culvert Cleaning	$23
Culvert ID 540*	Culvert Cleaning	$11
Culvert ID 541*	Culvert Cleaning	$20
Culvert ID 543*	Culvert Cleaning	$33
Culvert ID 542*	Culvert Cleaning	$13
Culvert ID 544*	Culvert Cleaning	$29
Culvert ID 545*	Culvert Cleaning	$22
Culvert ID 547*	Culvert Cleaning	$9
Culvert ID 548*	Culvert Cleaning	$29
Culvert ID 546*	Culvert Cleaning	$30
Culvert ID 925*	Culvert Cleaning	$19
Culvert ID 926*	Culvert Cleaning	$32

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Road Grading: $125/hr
Channel Cleaning: $3/LF

Low: problematic flows

Low: problematic flows

Low: channel instability

Low: erosion and sedimentation

Low: problematic flows

Low: problematic flows

Low: minor channel and road improvements needed

Low:curb and inlet improvements needed at intersection

Low :poorly defined channel and low conveyance

Low: ponding

Low: ponding

Medium: poorly defined channel and low conveyance

CENTRO CAMINO

ARDILLA CAMINO

DELESTE

CENTER

TELLER

ROLLING PARK

COUNTY

WEST

GUNNISON

MAPLE

PINE

BOWMAN

KANSAS

LAKE

PARK

FAIRVIEW

ONYX HIGH

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Curb Inlet | Grate Inlet | Manhole | Outfall | Outlet Structure | Road Damage | Channel | Culvert | Detention Pond | Storm Drain (CDOT) | Sheet Grid | Roads | Parcels

CITY OF WOODLAND PARK
220 W. SOUTH AVE
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ENGINUITY ENGINEERING SOLUTIONS
10106 W. SAN JUAN WAY, STE 215
LITTLETON, CO 80127

CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 28
GRID ID: H4

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID H5

HIGH: None

MEDIUM: None

LOW:

Object ID: Road Damage ID 27
Issue(s): road damage
Possible Solution: hillside stabilization
Total Capital Improvement Cost: $18,755
Annual Operation and Maintenance Cost: $0

Object ID: Road Damage ID 34
Issue(s): road damage
Possible Solution: grading and excavation
Total Capital Improvement Cost: $3,838
Annual Operation and Maintenance Cost: $450

Object ID: No survey, intersection of Forest Edge
Issue(s): channel/intersection improvements
Possible Solution: general improvements
Total Capital Improvement Cost: $25,575
Annual Operation and Maintenance Cost: $40

Object ID: Road Damage ID 35
Issue(s): road damage
Possible Solution: parking lot and drainage improvements
Total Capital Improvement Cost: $56,265
Annual Operation and Maintenance Cost: $0

Object ID: Road Damage ID 33
Issue(s): road damage
Possible Solution: improve culvert crossing
Total Capital Improvement Cost: $4,264
Annual Operation and Maintenance Cost: $30

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID H5

Object ID	Maintenance	Annual Cost
Culvert ID 854*	Culvert Cleaning	$18
Culvert ID 853*	Culvert Cleaning	$22
Culvert ID 852*	Culvert Cleaning	$43
Culvert ID 902*	Culvert Cleaning	$82
Culvert ID 904*	Culvert Cleaning	$18
Culvert ID 905*	Culvert Cleaning	$31
Culvert ID 907*	Culvert Cleaning	$24
Culvert ID 908*	Culvert Cleaning	$18
Culvert ID 909*	Culvert Cleaning	$58
Culvert ID 910*	Culvert Cleaning	$23
Culvert ID 899*	Culvert Cleaning	$68
Culvert ID 900*	Culvert Cleaning	$57
Culvert ID 898*	Culvert Cleaning	$23
Culvert ID 897*	Culvert Cleaning	$27
Culvert ID 896*	Culvert Cleaning	$18
Culvert ID 893*	Culvert Cleaning	$21
Culvert ID 890*	Culvert Cleaning	$42
Culvert ID 891*	Culvert Cleaning	$21
Culvert ID 889*	Culvert Cleaning	$34
Culvert ID 888*	Culvert Cleaning	$21
Culvert ID 867*	Culvert Cleaning	$71
Culvert ID 866*	Culvert Cleaning	$22
Culvert ID 868	Culvert Cleaning	$44
Culvert ID 887	Culvert Cleaning	$71
Culvert ID 869*	Culvert Cleaning	$33
Culvert ID 873*	Culvert Cleaning	$19
Culvert ID 976	Culvert Cleaning	$70
Culvert ID 965*	Culvert Cleaning	$27
Culvert ID 966*	Culvert Cleaning	$24
Culvert ID 968*	Culvert Cleaning	$44
Culvert ID 969*	Culvert Cleaning	$17
Culvert ID 970*	Culvert Cleaning	$22
Culvert ID 972*	Culvert Cleaning	$29
Culvert ID 973*	Culvert Cleaning	$24
Road Dmg. ID 29	Road Grading	$250
Culvert ID 1088*	Culvert Cleaning	$18
Culvert ID 1086	Culvert Cleaning	$40
Culvert ID 1087*	Culvert Cleaning	$26
Culvert ID 1060*	Culvert Cleaning	$19
Road Dmg. ID 32*	Street Cleaning	$70
Culvert ID 1111*	Culvert Cleaning	$29
Culvert ID 1114*	Culvert Cleaning	$32
Culvert ID 1122*	Culvert Cleaning	$27
Culvert ID 1115	Culvert Cleaning	$46
Culvert ID 1119*	Culvert Cleaning	$15
Culvert ID 1118*	Culvert Cleaning	$27
Culvert ID 1116*	Culvert Cleaning	$24
Culvert ID 1107*	Culvert Cleaning	$42
Culvert ID 1105*	Culvert Cleaning	$16
Culvert ID 1103*	Culvert Cleaning	$19
Culvert ID 1101*	Culvert Cleaning	$16
Culvert ID 1100	Culvert Cleaning	$40
Culvert ID 1099*	Culvert Cleaning	$41
Culvert ID 1098*	Culvert Cleaning	$50
Culvert ID 1097*	Culvert Cleaning	$23
Culvert ID 1096*	Culvert Cleaning	$27
Culvert ID 1095	Culvert Cleaning	$51
Culvert ID 1084*	Culvert Cleaning	$51
Culvert ID 1090*	Culvert Cleaning	$22
Culvert ID 1089*	Culvert Cleaning	$51
Culvert ID 1082*	Culvert Cleaning	$38
Culvert ID 1080*	Culvert Cleaning	$33
Culvert ID 1064*	Culvert Cleaning	$33
Culvert ID 1062*	Culvert Cleaning	$34
Culvert ID 1053*	Culvert Cleaning	$49

MAINTENANCE ONLY - continued...

Object ID	Maintenance	Annual Cost
Culvert ID 1061*	Culvert Cleaning	$30
Culvert ID 1059*	Culvert Cleaning	$37
Culvert ID 1058*	Culvert Cleaning	$29
Culvert ID 1051*	Culvert Cleaning	$21
Culvert ID 1072*	Culvert Cleaning	$21
Culvert ID 1074*	Culvert Cleaning	$17
Culvert ID 1076*	Culvert Cleaning	$29
Culvert ID 1075*	Culvert Cleaning	$18
Culvert ID 1078*	Culvert Cleaning	$25

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Road Grading: $125/hr
Street Cleaning: $1903/acre

Low: road damage

Low: road damage

Low: road damage

Low: roadside channel improvements

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 29
GRID ID: H5

CIP PRIORITIES - GRID ID I3

HIGH: None

MEDIUM:

Object ID: No survey, Browning Avenue
Issue(s): poor conveyance
Possible Solution: concrete pan
Total Capital Improvement Cost: $16,199
Annual Operation and Maintenance Cost: $0

LOW:

Object ID: No survey, Coraline Street
Issue(s): problematic street runoff
Possible Solution: curb and gutter
Total Capital Improvement Cost: $10,230
Annual Operation and Maintenance Cost: $0

Object ID: Channel ID 150
Issue(s): poorly defined channel
Possible Solution: grading and define
Total Capital Improvement Cost: $2,864
Annual Operation and Maintenance Cost: $729

Object ID: Road Damage ID 13
Issue(s): road damage
Possible Solution: drainage improvements
Total Capital Improvement Cost: $5,969
Annual Operation and Maintenance Cost: $63

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID I3

Object ID	Maintenance	Annual Cost
Culvert ID 1349*	Culvert Cleaning	$18
Culvert ID 1350*	Culvert Cleaning	$29
Culvert ID 1348*	Culvert Cleaning	$19
Culvert ID 1347	Culvert Cleaning	$37
Culvert ID 1289*	Culvert Cleaning	$33
Culvert ID 1280*	Culvert Cleaning	$28
Culvert ID 1288*	Culvert Cleaning	$38
Culvert ID 1279*	Culvert Cleaning	$16
Culvert ID 1278	Culvert Cleaning	$34
Culvert ID 1277*	Culvert Cleaning	$30
Culvert ID 1247*	Culvert Cleaning	$28
Culvert ID 1248*	Culvert Cleaning	$26
Culvert ID 1249*	Culvert Cleaning	$27
Culvert ID 1250*	Culvert Cleaning	$21
Culvert ID 1251*	Culvert Cleaning	$41
Culvert ID 1254*	Culvert Cleaning	$83
Culvert ID 1256*	Culvert Cleaning	$23
Culvert ID 1257*	Culvert Cleaning	$22
Culvert ID 1258*	Culvert Cleaning	$30
Culvert ID 1262*	Culvert Cleaning	$23
Culvert ID 1264*	Culvert Cleaning	$51
Culvert ID 1265*	Culvert Cleaning	$20
Culvert ID 1268*	Culvert Cleaning	$22
Culvert ID 1269*	Culvert Cleaning	$33
Culvert ID 1309*	Culvert Cleaning	$26
Culvert ID 1310*	Culvert Cleaning	$42
Culvert ID 1311*	Culvert Cleaning	$32
Culvert ID 1313*	Culvert Cleaning	$23
Culvert ID 1314	Culvert Cleaning	$46
Culvert ID 457	Culvert Cleaning	$60
Culvert ID 458	Culvert Cleaning	$61
Culvert ID 459*	Culvert Cleaning	$23
Culvert ID 460*	Culvert Cleaning	$19
Culvert ID 461*	Culvert Cleaning	$24
Culvert ID 462*	Culvert Cleaning	$38
Culvert ID 463*	Culvert Cleaning	$29
Culvert ID 464*	Culvert Cleaning	$43
Culvert ID 465	Culvert Cleaning	$42

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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LITTLETON, CO 80127

CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 33
GRID ID: I3

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID I4

HIGH: None

Object ID: No survey, deep trap channel along Park
Issue(s): deep channel
Possible Solution: safety/guard rail and piped system
Total Capital Improvement Cost: $404,138
Annual Operation and Maintenance Cost: $0

MEDIUM:

Object ID: Road Damage ID 14
Issue(s): poorly defined channel
Possible Solution: concrete pan
Total Capital Improvement Cost: $7,589
Annual Operation and Maintenance Cost: $0

Object ID: Channel ID 117
Issue(s): poorly defined channel
Possible Solution: concrete pan
Total Capital Improvement Cost: $13,299
Annual Operation and Maintenance Cost: $0

Object ID: Channel ID 127
Issue(s): incised channel
Possible Solution: curb and gutter
Total Capital Improvement Cost: $26,230
Annual Operation and Maintenance Cost: $0

Object ID: Road Damage ID 23
Issue(s): road damage
Possible Solution: concrete pan
Total Capital Improvement Cost: $2,133
Annual Operation and Maintenance Cost: $0

Object ID: Detention Pond ID 18
Issue(s): establish vegetation
Possible Solution: re-seeding
Total Capital Improvement Cost: $453
Annual Operation and Maintenance Cost: $400

Object ID: Outlet Structure ID 11
Issue(s): headcut/incised channel
Possible Solution: drop structures
Total Capital Improvement Cost: $252,627
Annual Operation and Maintenance Cost: $1,950

LOW:

Object ID: Channel ID 115
Issue(s): poorly defined channel
Possible Solution: general channel improvements
Total Capital Improvement Cost: $17,137
Annual Operation and Maintenance Cost: $402

Object ID: Channel ID 116
Issue(s): channel incision
Possible Solution: general channel improvements
Total Capital Improvement Cost: $12,022
Annual Operation and Maintenance Cost: $282

Object ID: Road Damage ID 15
Issue(s): poorly defined channel
Possible Solution: concrete pan
Total Capital Improvement Cost: $3,751
Annual Operation and Maintenance Cost: $0

CIP PRIORITIES - continued...

Object ID: Channel ID 121
Issue(s): poorly defined channel
Possible Solution: concrete pan
Total Capital Improvement Cost: $2,645
Annual Operation and Maintenance Cost: $0

Object ID: Culvert ID 524, 525
Issue(s): culvert improvements
Possible Solution: junction box/grate inlet
Total Capital Improvement Cost: $15,345
Annual Operation and Maintenance Cost: $63

Object ID: Channel ID 129
Issue(s): channel improvements
Possible Solution: soil riprap
Total Capital Improvement Cost: $4,705
Annual Operation and Maintenance Cost: $420

Object ID: Channel ID 142
Issue(s): channel improvements
Possible Solution: curb and gutter
Total Capital Improvement Cost: $9,002
Annual Operation and Maintenance Cost: $0

Object ID: Road Damage ID 28
Issue(s): road damage
Possible Solution: concrete pan
Total Capital Improvement Cost: $2,304
Annual Operation and Maintenance Cost: $0

Object ID: Channel ID 155
Issue(s): poor conveyance
Possible Solution: concrete pan
Total Capital Improvement Cost: $5,884
Annual Operation and Maintenance Cost: $0

Object ID: Road Damage ID 39
Issue(s): road damage
Possible Solution: general road repair
Total Capital Improvement Cost: $4,264
Annual Operation and Maintenance Cost: $0
Annual Operation and Maintenance Cost:

Note: Additional information on Object IDs and Costs can be found in the appendices.

MAINTENANCE ONLY - GRID ID I4

Object ID	Maintenance	Annual Cost
Culvert ID 490*	Culvert Cleaning	$18
Culvert ID 489*	Culvert Cleaning	$20
Culvert ID 468*	Culvert Cleaning	$91
Culvert ID 467*	Culvert Cleaning	$19
Culvert ID 466*	Culvert Cleaning	$22
Culvert ID 470	Culvert Cleaning	$45
Culvert ID 472*	Culvert Cleaning	$7
Culvert ID 473	Culvert Cleaning	$41
Culvert ID 469*	Culvert Cleaning	$27
Culvert ID 474	Culvert Cleaning	$35
Culvert ID 520*	Culvert Cleaning	$28
Culvert ID 521,	Culvert Cleaning	$43
Culvert ID 509	Culvert Cleaning	$41
Road Dmg. ID 16	Sediment Clearing	$109
Culvert ID 507*	Culvert Cleaning	$21
Culvert ID 508*	Culvert Cleaning	$15
Culvert ID 506	Culvert Cleaning	$38
Culvert ID 505*	Culvert Cleaning	$23
Culvert ID 522*	Culvert Cleaning	$20
Culvert ID 523*	Culvert Cleaning	$28
Culvert ID 529*	Culvert Cleaning	$78
Channel ID 134	Channel Cleaning	$1,401
Culvert ID 557	Culvert Cleaning	$34
Culvert ID 556*	Culvert Cleaning	$21
Culvert ID 927*	Culvert Cleaning	$36
Culvert ID 929	Culvert Cleaning	$46
Culvert ID 930	Culvert Cleaning	$39
Culvert ID 946*	Culvert Cleaning	$20
Culvert ID 944*	Culvert Cleaning	$24
Culvert ID 943*	Culvert Cleaning	$20
Culvert ID 933	Culvert Cleaning	$102
Culvert ID 591*	Culvert Cleaning	$27
Culvert ID 592*	Culvert Cleaning	$37
Culvert ID 593*	Culvert Cleaning	$19
Culvert ID 594*	Culvert Cleaning	$20
Culvert ID 595*	Culvert Cleaning	$24
Culvert ID 596*	Culvert Cleaning	$25
Culvert ID 1214	Culvert Cleaning	$33
Culvert ID 1213	Culvert Cleaning	$44
Culvert ID 1212	Culvert Cleaning	$26
Culvert ID 1151	Culvert Cleaning	$32
Culvert ID 1152	Culvert Cleaning	$37
Culvert ID 1153*	Culvert Cleaning	$47
Culvert ID 1238*	Culvert Cleaning	$17

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Street Cleaning: $1903/acre
Channel cleaning: $3/LF

MAINTENANCE ONLY - continued...

Low: channel improvements

Low: culvert improvements

Medium: poorly defined channel

Low: channel improvments

Medium: incised channel

Medium: road damage

Low: road damage

Low: poor conveyance

Low: poorly defined channel

High: deep channel trapezoidal channel. Protect with guard rail and eventually replace with piped system.

Low: channel incision

Medium: establish vegetation

Low: poorly defined channel

Low: road damage

Low: road damage

Medium: road damage

Medium: headcut/incised channel

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 34
GRID ID: I4

CIP PRIORITIES - GRID ID I5

HIGH: None

MEDIUM:

Object ID: Culvert ID 940
Issue(s): poor inlet condition
Possible Solution: retrofit grate, inlet improvements
Total Capital Improvement Cost: $12,704
Annual Operation and Maintenance Cost: $63

Object ID: Culvert ID 941
Issue(s): poor inlet condition
Possible Solution: add inlet
Total Capital Improvement Cost: $12,931
Annual Operation and Maintenance Cost: $63

LOW:

Object ID: No survey, Boundary and Midland
Issue(s): poor conveyance
Possible Solution: curb & gutter, concrete pan
Total Capital Improvement Cost: $9,038
Annual Operation and Maintenance Cost: $0

Object ID: Detention Pond ID 23
Issue(s): limited water quality
Possible Solution: new outlet works
Total Capital Improvement Cost: $10,230
Annual Operation and Maintenance Cost: $152

Object ID: Grate Inlet ID 57
Issue(s): inlet improvements
Possible Solution: improve inlet
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $63

Object ID: Grate Inlet ID 60
Issue(s): inlet improvements
Possible Solution: improve inlet
Total Capital Improvement Cost: $5,969
Annual Operation and Maintenance Cost: $63

Object ID: Grate Inlet ID 61
Issue(s): inlet improvements
Possible Solution: improve inlet
Total Capital Improvement Cost: $5,969
Annual Operation and Maintenance Cost: $63

Object ID: No survey, NW corner of school
Issue(s): channel incision
Possible Solution: riprap and channel stabilization
Total Capital Improvement Cost: $25,048
Annual Operation and Maintenance Cost: $450

Object ID: No survey, SE of South and Boundary
Issue(s): problematic flows
Possible Solution: add inlet and pipe flows
Total Capital Improvement Cost: $44,161
Annual Operation and Maintenance Cost: $363

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID I5

Object ID	Maintenance	Annual Cost
Grate Inlet ID 51	Inlet Cleaning	$63
Grate Inlet ID 50	Inlet Cleaning	$63
Culvert ID 936*	Culvert Cleaning	$25
Culvert ID 937	Culvert Cleaning	$252
Culvert ID 939*	Culvert Cleaning	$11
Culvert ID 942	Culvert Cleaning	$44
Culvert ID 934*	Culvert Cleaning	$25
Culvert ID 935*	Culvert Cleaning	$38
Culvert ID 931	Culvert Cleaning	$42
Culvert ID 977*	Culvert Cleaning	$45
Culvert ID 986	Culvert Cleaning	$94
Culvert ID 980*	Culvert Cleaning	$54
Culvert ID 981*	Culvert Cleaning	$49

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Inlet Cleaning: $63/each

MAINTENANCE ONLY - continued...

Low: inlet improvements

Low: problematic flows

Low: channel incision

Medium: poor inlet

Medium: poor inlet

Low: poor conveyance

Low: inlet improvements

Low: inlet improvements

Low: improve water quality

SOUTH

BOUNDARY

HENRIETTA

MIDLAND

BALDWIN

PIKES PEAK

CRAGE

PANTHER

RED BUFFALO

FOX MOUNTAIN

THUNDER RIDGE

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Curb Inlet | Grate Inlet | Manhole | Outfall | Outlet Structure | Road Damage | Channel | Culvert | Detention Pond | Storm Drain (CDOT) | Sheet Grid | Roads | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 35
GRID ID: I5

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID I6

HIGH: None

MEDIUM: None

LOW:

Object ID: Detention Pond ID 26
Issue(s): limited water quality
Possible Solution: new outlet works
Total Capital Improvement Cost: $13,640
Annual Operation and Maintenance Cost: $1,256

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID I6

Object ID	Maintenance	Annual Cost
None		

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 36
GRID ID: I6

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID J3

HIGH: None

MEDIUM: None

LOW:

Object ID: No survey, Evergreen and Lafayette
Issue(s): problematic flows
Possible Solution: curb & gutter, concrete pan
Total Capital Improvement Cost: $13,263
Annual Operation and Maintenance Cost: $0

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

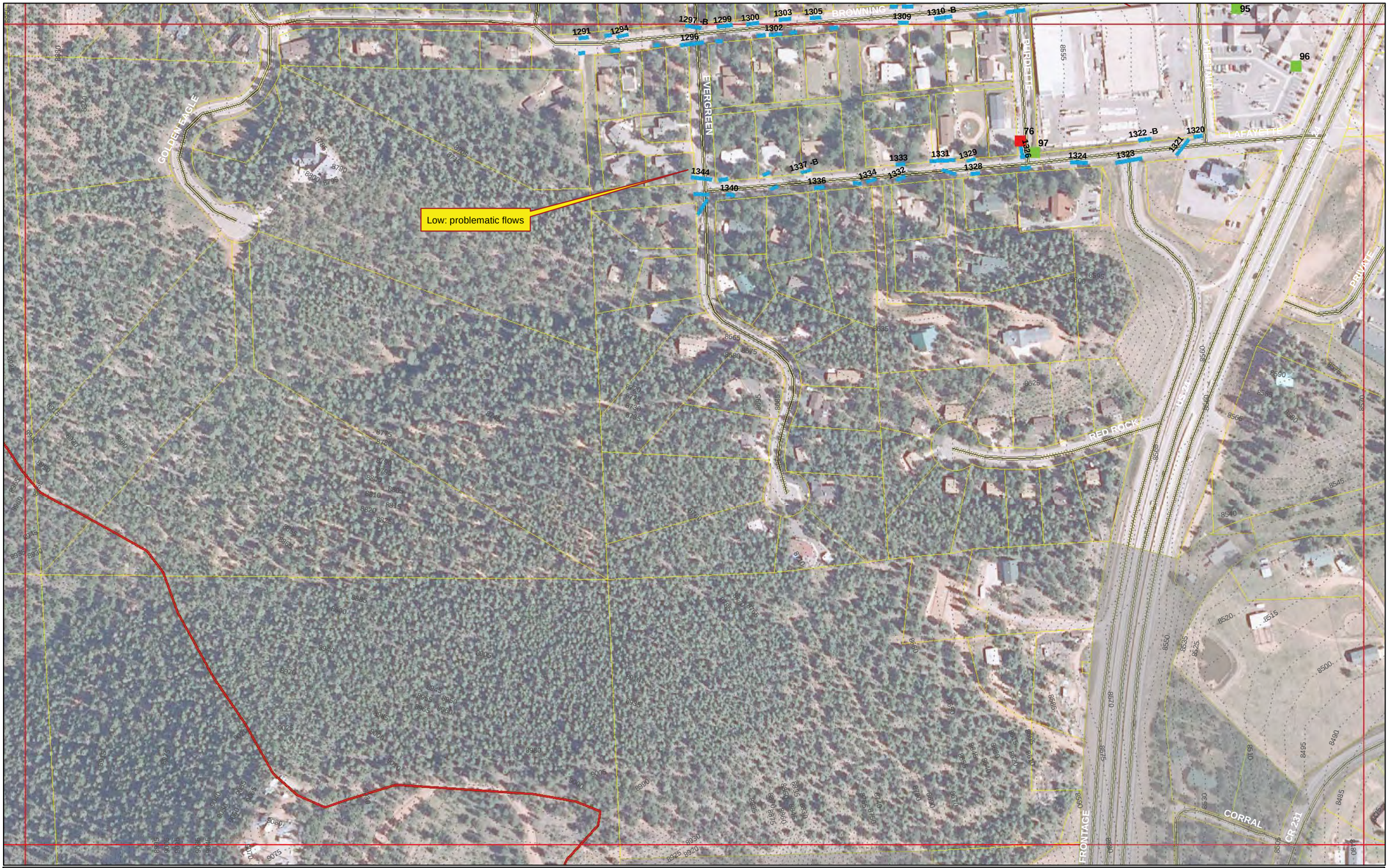
MAINTENANCE ONLY - GRID ID J3

Object ID	Maintenance	Annual Cost
Culvert ID 1293*	Culvert Cleaning	
Culvert ID 1298*	Culvert Cleaning	
Culvert ID 1304*	Culvert Cleaning	
Culvert ID 1306*	Culvert Cleaning	
Culvert ID 1297	Culvert Cleaning	
Culvert ID 1344	Culvert Cleaning	
Culvert ID 1343	Culvert Cleaning	
Culvert ID 1342	Culvert Cleaning	
Culvert ID 1337*	Culvert Cleaning	
Culvert ID 1339*	Culvert Cleaning	
Culvert ID 1338*	Culvert Cleaning	
Culvert ID 1341*	Culvert Cleaning	
Culvert ID 1333*	Culvert Cleaning	
Culvert ID 1330*	Culvert Cleaning	
Culvert ID 1324*	Culvert Cleaning	
Culvert ID 1322*	Culvert Cleaning	

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 39
GRID ID: J3

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID J4

HIGH: None

MEDIUM:

Object ID: Road Damage ID 38
Issue(s): problematic flows
Possible Solution: pipe flows
Total Capital Improvement Cost: $63,084
Annual Operation and Maintenance Cost: $350

Object ID: Road Damage ID 37
Issue(s): road damage
Possible Solution: riprap and repairs
Total Capital Improvement Cost: $11,567
Annual Operation and Maintenance Cost: $0

LOW:

Object ID: No survey, near O'Reilly's
Issue(s): street runoff, causing erosion
Possible Solution: curb & gutter, inlet, new WQ pond
Total Capital Improvement Cost: $136,868
Annual Operation and Maintenance Cost: $476

Object ID: No survey, Pikeview & Park
Issue(s): deep roadside channels
Possible Solution: add guardrail
Total Capital Improvement Cost: $10,658
Annual Operation and Maintenance Cost: $0

Object ID: No survey, Fountain Cr at Cavalier Park
Issue(s): channel/bank repairs
Possible Solution: repair grout, bank erosion mitigation
Total Capital Improvement Cost: $25,575
Annual Operation and Maintenance Cost: $1,575

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

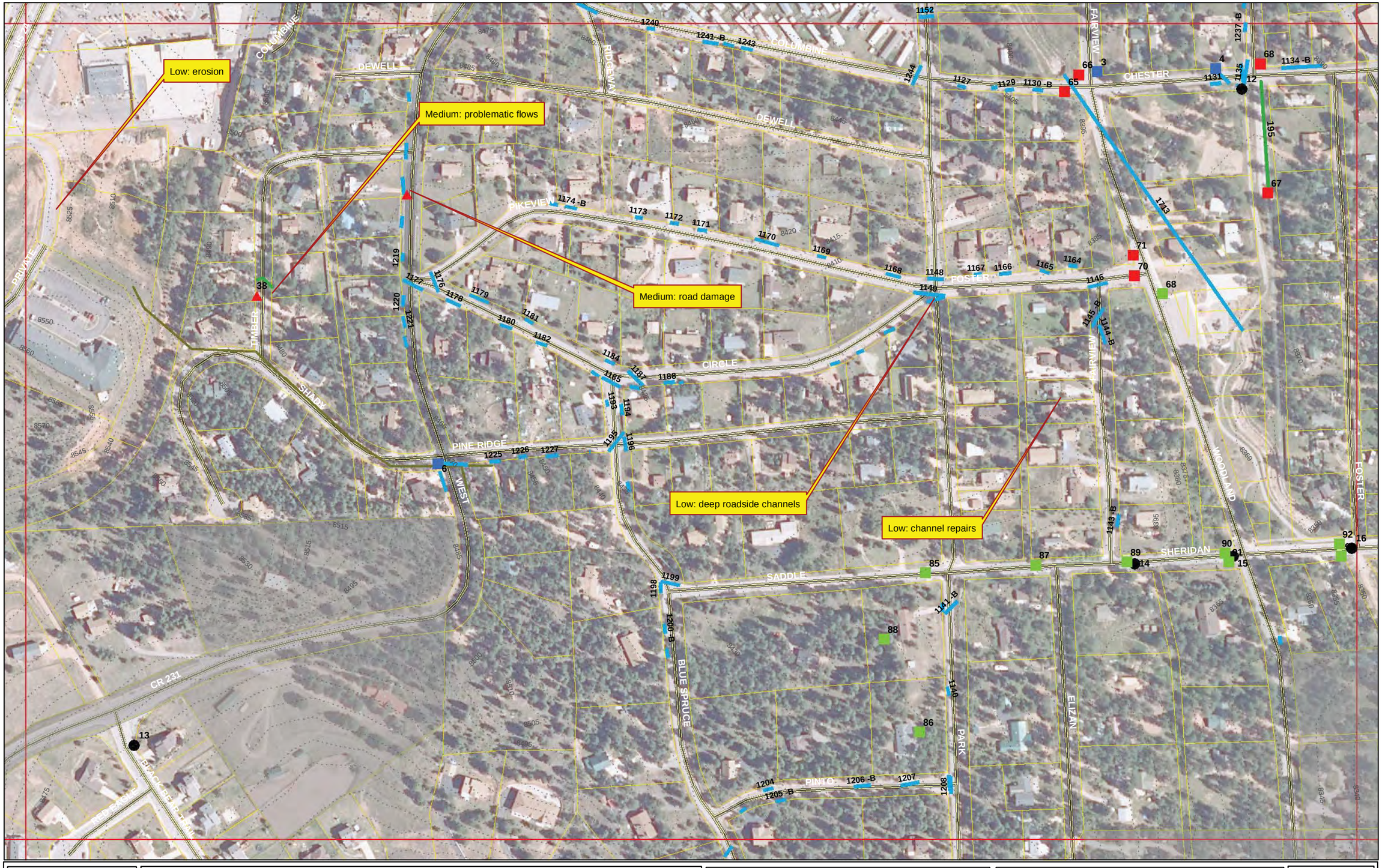
MAINTENANCE ONLY - GRID ID J4

Object ID	Maintenance	Annual Cost
Culvert ID 1220*	Culvert Cleaning	$27
Culvert ID 1219*	Culvert Cleaning	$20
Culvert ID 1218*	Culvert Cleaning	$29
Culvert ID 1216*	Culvert Cleaning	$38
Culvert ID 1215*	Culvert Cleaning	$22
Culvert ID 1241*	Culvert Cleaning	$38
Culvert ID 1242*	Culvert Cleaning	$27
Culvert ID 1243*	Culvert Cleaning	$29
Culvert ID 1244	Culvert Cleaning	$52
Culvert ID 1175*	Culvert Cleaning	$21
Culvert ID 1174*	Culvert Cleaning	$29
Culvert ID 1176	Culvert Cleaning	$51
Culvert ID 1185	Culvert Cleaning	$50
Culvert ID 1178*	Culvert Cleaning	$38
Culvert ID 1179*	Culvert Cleaning	$50
Culvert ID 1180*	Culvert Cleaning	$31
Culvert ID 1181*	Culvert Cleaning	$22
Culvert ID 1182*	Culvert Cleaning	$29
Culvert ID 1183*	Culvert Cleaning	$22
Culvert ID 1184*	Culvert Cleaning	$26
Culvert ID 1195	Culvert Cleaning	$58
Culvert ID 1196	Culvert Cleaning	$34
Culvert ID 1197*	Culvert Cleaning	$26
Culvert ID 1198*	Culvert Cleaning	$46
Culvert ID 1200*	Culvert Cleaning	$24
Culvert ID 1201*	Culvert Cleaning	$24
Culvert ID 1203*	Culvert Cleaning	$19
Culvert ID 1205*	Culvert Cleaning	$25
Culvert ID 1206*	Culvert Cleaning	$40
Culvert ID 1207*	Culvert Cleaning	$45
Culvert ID 1139*	Culvert Cleaning	$38
Culvert ID 1208*	Culvert Cleaning	$41
Culvert ID 1140*	Culvert Cleaning	$23
Culvert ID 1141*	Culvert Cleaning	$42
Culvert ID 1142*	Culvert Cleaning	$22
Culvert ID 1148	Culvert Cleaning	$38
Culvert ID 1143*	Culvert Cleaning	$31
Culvert ID 1144*	Culvert Cleaning	$47
Culvert ID 1145	Culvert Cleaning	$52
Culvert ID 1164*	Culvert Cleaning	$22
Grate Inlet ID 70	Inlet Cleaning	$63
Grate Inlet ID 71	Inlet Cleaning	$63
Culvert ID 1130*	Culvert Cleaning	$25
Culvert ID 1127*	Culvert Cleaning	$21
Culvert ID 1132	Culvert Cleaning	$43
Culvert ID 1134*	Culvert Cleaning	$25
Culvert ID 1237*	Culvert Cleaning	$20

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Inlet Cleaning: $63/each

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

CITY OF WOODLAND PARK
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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 40
GRID ID: J4

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID J5

HIGH:

Object ID: Road Damage ID 30
Issue(s): road damage
Possible Solution: inlets, curb & gutter
Total Capital Improvement Cost: $44,493
Annual Operation and Maintenance Cost: $126

MEDIUM:

Object ID: Channel ID 199
Issue(s): channel incision/headcut
Possible Solution: drop structure
Total Capital Improvement Cost: $109,827
Annual Operation and Maintenance Cost: $600

Object ID: Detention Pond 24
Issue(s): pond improvements
Possible Solution: riprap
Total Capital Improvement Cost: $13,856
Annual Operation and Maintenance Cost: $228

LOW:

Object ID: Detention Pond 22
Issue(s): pond repairs water quality improvements
Possible Solution: general repairs and improvements
Total Capital Improvement Cost: $20,460
Annual Operation and Maintenance Cost: $228

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID J5

Object ID	Maintenance	Annual Cost
Culvert ID 1229*	Culvert Cleaning	$20
Culvert ID 1231*	Culvert Cleaning	$22
Culvert ID 1234*	Culvert Cleaning	$22
Culvert ID 1232*	Culvert Cleaning	$24
No Survey (1)	Channel Cleaning	$2,550
Culvert ID 1236	Culvert Cleaning	$49
Grate Inlet 89	Inlet Cleaning	$63
Culvert ID 1510	Culvert Cleaning	$54
Culvert ID 1522	Culvert Cleaning	$17
Culvert ID 1521	Culvert Cleaning	$37
Culvert ID 1520*	Culvert Cleaning	$34

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Inlet Cleaning: $63/each
Channel Cleaning: $3/LF

(1) Spruce Street btw Sheridan and Scott

MAINTENANCE ONLY - continued...

Low: pond repairs and water quality improvements

Medium: pond improvements

High: Road damage and Icing due to in-adequate drainage. Replace CMP culverts and improve drainage with additional drop inlet(s).

Medium: channel incision/headcut

WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 41
GRID ID: J5

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID K4

HIGH: None

MEDIUM:

Object ID: Detention Pond ID 20
Issue(s): pond improvements and water quality
Possible Solution: new outlet works, sediment removal
Total Capital Improvement Cost: $30,690
Annual Operation and Maintenance Cost: $533

LOW:

Object ID: Road Damage ID 36
Issue(s): road damage
Possible Solution: stabilize slope
Total Capital Improvement Cost: $6,115
Annual Operation and Maintenance Cost: $0

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

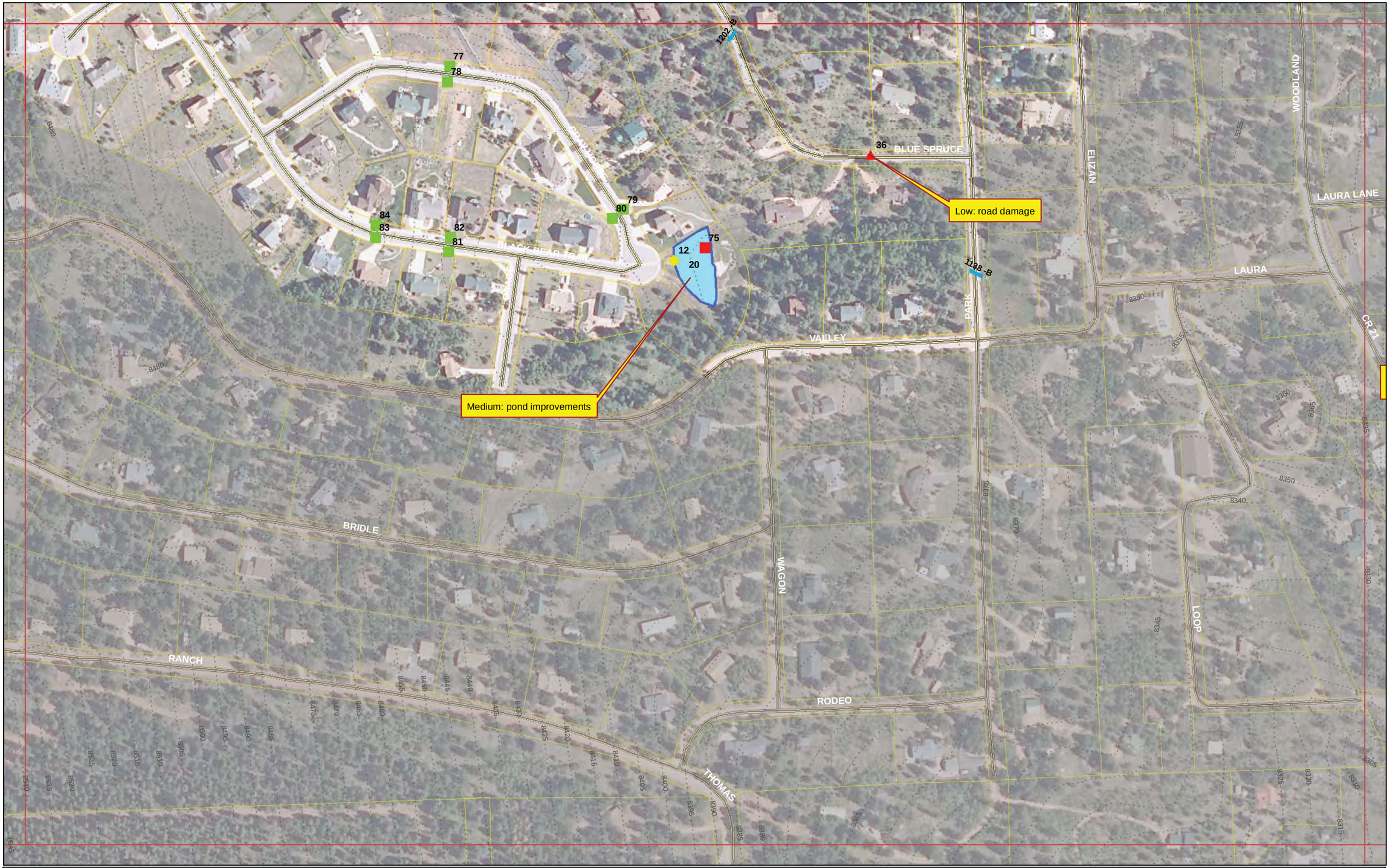
MAINTENANCE ONLY - GRID ID K4

Object ID	Maintenance	Annual Cost
Culvert ID 1202	Culvert Cleaning	$32
Culvert ID 1138	Culvert Cleaning	$35

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 47
GRID ID: K4

CIP PRIORITIES - GRID ID K5

HIGH:

Object ID: No survey, FC upstream of Aspen Garden
Issue(s): channel instability
Possible Solution: drop structure
Total Capital Improvement Cost: $214,392
Annual Operation and Maintenance Cost: $3,000

Object ID: No survey, Paradise Cir. And US 24
Issue(s): ponding/flooding
Possible Solution: drainage improvements
Total Capital Improvement Cost: $63,024
Annual Operation and Maintenance Cost: $1,110

MEDIUM:

Object ID: No survey, Paradise and Ponderosa
Issue(s): incised channel
Possible Solution: check structures
Total Capital Improvement Cost: $26,243
Annual Operation and Maintenance Cost: $450

LOW:

Object ID: No survey, Paradise Lodge Lane
Issue(s): channel erosion
Possible Solution: riprap
Total Capital Improvement Cost: $24,552
Annual Operation and Maintenance Cost: $900

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

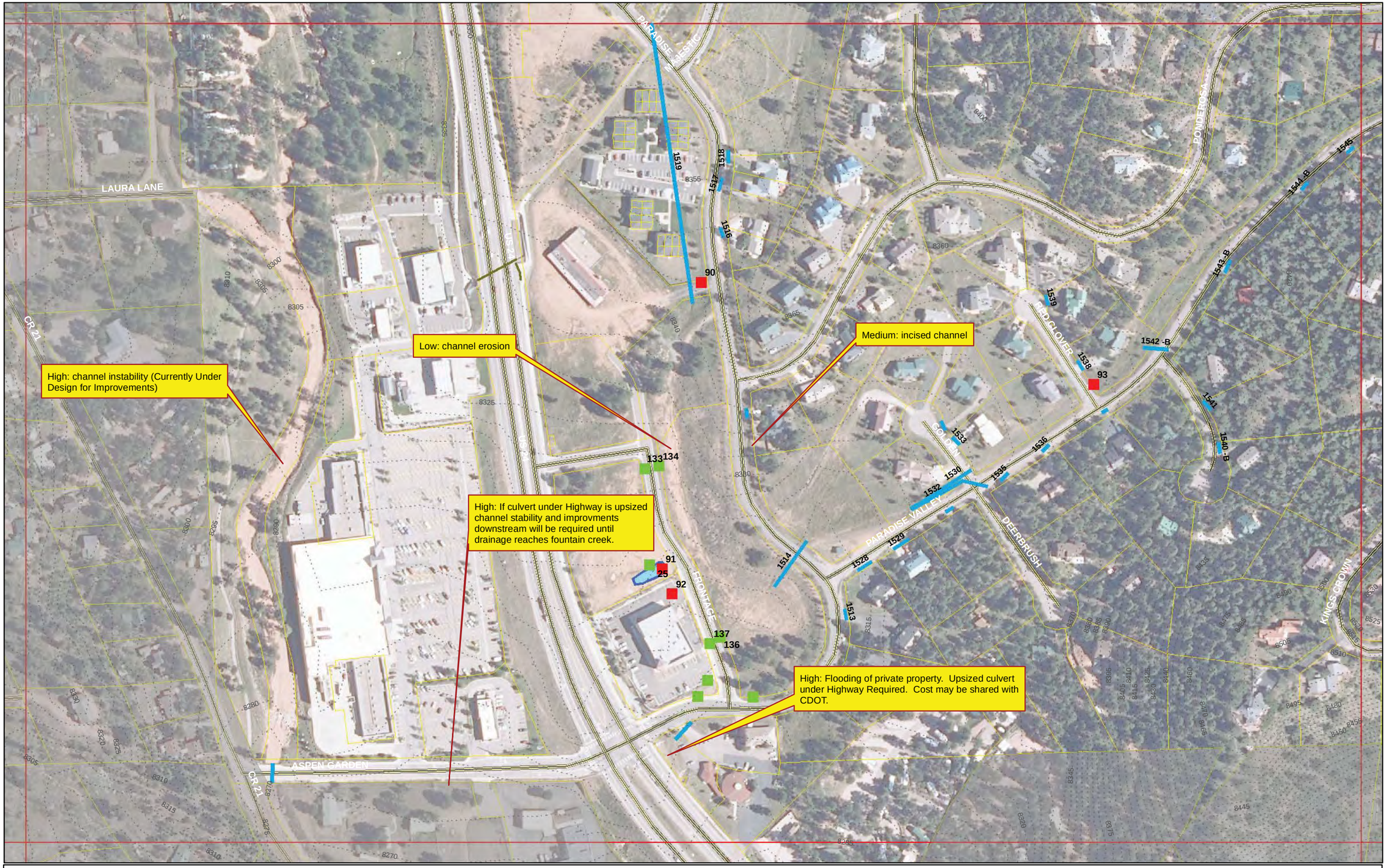
MAINTENANCE ONLY - GRID ID K5

Object ID	Maintenance	Annual Cost
Culvert ID 1528*	Culvert Cleaning	$39
Culvert ID 1529*	Culvert Cleaning	$44
Culvert ID 1531*	Culvert Cleaning	$22
Culvert ID 1533*	Culvert Cleaning	$26
Culvert ID 1534*	Culvert Cleaning	$25
Culvert ID 1535*	Culvert Cleaning	$26
Culvert ID 1537*	Culvert Cleaning	$16
Culvert ID 1539*	Culvert Cleaning	$25
Culvert ID 1542	Culvert Cleaning	$61
Culvert ID 1541*	Culvert Cleaning	$29
Culvert ID 1540*	Culvert Cleaning	$27
Culvert ID 1543*	Culvert Cleaning	$32
Culvert ID 1544*	Culvert Cleaning	$24
Culvert ID 1545*	Culvert Cleaning	$23

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet · Grate Inlet · Outfall · Road Damage · Culvert · Storm Drain (CDOT) · Roads
Curb Inlet · Manhole · Outlet Structure · Channel · Detention Pond · Sheet Grid · Parcels

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CITY OF WOODLAND PARK
220 W. SOUTH AVE
WOODLAND PARK, CO 80863

ENGINUITY ENGINEERING SOLUTIONS
10106 W. SAN JUAN WAY, STE 215
LITTLETON, CO 80127

CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 48
GRID ID: K5

CIP PRIORITIES - GRID ID K6	
HIGH:	None
MEDIUM:	None
LOW:	None

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID K6

Object ID	Maintenance	Annual Cost
Culvert ID 1546*	Culvert Cleaning	$26
Culvert ID 1547*	Culvert Cleaning	$28
Culvert ID 1548*	Culvert Cleaning	$34
Culvert ID 1556*	Culvert Cleaning	$19
Culvert ID 1555*	Culvert Cleaning	$35
Culvert ID 1554*	Culvert Cleaning	$44
Culvert ID 1552*	Culvert Cleaning	$28
Culvert ID 1551*	Culvert Cleaning	$32
Culvert ID 1550*	Culvert Cleaning	$17
Culvert ID 1549*	Culvert Cleaning	$25
Culvert ID 1572*	Culvert Cleaning	$21
Culvert ID 1571*	Culvert Cleaning	$26
Culvert ID 1560*	Culvert Cleaning	$27
Culvert ID 1561*	Culvert Cleaning	$27
Culvert ID 1562*	Culvert Cleaning	$32
Culvert ID 1576*	Culvert Cleaning	$53
Culvert ID 1614*	Culvert Cleaning	$30
Culvert ID 1613*	Culvert Cleaning	$21
Culvert ID 1607*	Culvert Cleaning	$22
Culvert ID 1606*	Culvert Cleaning	$25
Culvert ID 1604*	Culvert Cleaning	$28
Culvert ID 1602*	Culvert Cleaning	$28
Culvert ID 1599*	Culvert Cleaning	$24
Culvert ID 1597*	Culvert Cleaning	$27
Culvert ID 1596*	Culvert Cleaning	$25
Culvert ID 1600*	Culvert Cleaning	$19
Culvert ID 1598*	Culvert Cleaning	$21
Culvert ID 1595*	Culvert Cleaning	$24
Culvert ID 1593*	Culvert Cleaning	$25
Culvert ID 1592*	Culvert Cleaning	$19
Culvert ID 1591*	Culvert Cleaning	$42
Culvert ID 1598*	Culvert Cleaning	$21
Culvert ID 1588*	Culvert Cleaning	$46
Culvert ID 1587*	Culvert Cleaning	$42
Culvert ID 1586*	Culvert Cleaning	$22
Culvert ID 1584*	Culvert Cleaning	$34
Culvert ID 1583*	Culvert Cleaning	$20
Culvert ID 1582*	Culvert Cleaning	$28
Culvert ID 1577*	Culvert Cleaning	$33
Culvert ID 1578*	Culvert Cleaning	$33
Culvert ID 1579	Culvert Cleaning	$79

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 49
GRID ID: K6

CAPITAL IMPROVEMENT PLAN

CIP PRIORITIES - GRID ID L5

HIGH:

Object ID: No survey, Fountain Creek
Issue(s): channel and bank instability
Possible Solution: Stabilize creek with drops and bank protection
Total Capital Improvement Cost: $5,430,674
Annual Operation and Maintenance Cost: $3,000

Object ID:
Issue(s):
Possible Solution:
Total Capital Improvement Cost:
Annual Operation and Maintenance Cost:

Object ID:
Issue(s):
Possible Solution:
Total Capital Improvement Cost:
Annual Operation and Maintenance Cost:

MEDIUM: None

LOW: None

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID L5

Object ID	Maintenance	Annual Cost
None		

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 53
GRID ID: L5

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID L6

HIGH: None

MEDIUM: None

LOW:

Object ID: Culvert ID 1635
Issue(s): improved inlet(s) needed
Possible Solution: inlet improvements
Total Capital Improvement Cost: $4,264
Annual Operation and Maintenance Cost: $42

Object ID: No survey, Sunrise Court
Issue(s): street side erosion
Possible Solution: curb and gutter
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $0

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID L6

Object ID	Maintenance	Annual Cost
Culvert ID 1645	Culvert Cleaning	$40
Culvert ID 1647*	Culvert Cleaning	$31
Culvert ID 1646*	Culvert Cleaning	$46
Culvert ID 1648*	Culvert Cleaning	$9
Culvert ID 1649*	Culvert Cleaning	$24
Culvert ID 1644*	Culvert Cleaning	$35
Culvert ID 1643*	Culvert Cleaning	$20
Culvert ID 1642	Culvert Cleaning	$52
Culvert ID 1624*	Culvert Cleaning	$25
Culvert ID 1623*	Culvert Cleaning	$32
Culvert ID 1622*	Culvert Cleaning	$29
Culvert ID 1621	Culvert Cleaning	$43
Culvert ID 1620*	Culvert Cleaning	$26
Culvert ID 1619*	Culvert Cleaning	$21
Culvert ID 1618*	Culvert Cleaning	$32
Culvert ID 1617*	Culvert Cleaning	$30
Culvert ID 1616*	Culvert Cleaning	$21
Culvert ID 1615*	Culvert Cleaning	$40
Culvert ID 1636*	Culvert Cleaning	$16
Culvert ID 1641*	Culvert Cleaning	$40
Culvert ID 1634*	Culvert Cleaning	$24
Culvert ID 1633*	Culvert Cleaning	$18
Culvert ID 1631*	Culvert Cleaning	$31
Culvert ID 1630*	Culvert Cleaning	$30
Culvert ID 1629*	Culvert Cleaning	$21
Culvert ID 1628	Culvert Cleaning	$55
Culvert ID 1626*	Culvert Cleaning	$22
Culvert ID 1627*	Culvert Cleaning	$38

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1'=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 54
GRID ID: L6

CIP PRIORITIES - GRID ID M5

HIGH: None

MEDIUM: None

LOW:

Object ID: No survey, Fountain Creek
Issue(s): bank erosion
Possible Solution: riprap
Total Capital Improvement Cost: $184,140
Annual Operation and Maintenance Cost: $1,500

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID M5

Object ID	Maintenance	Annual Cost
None		

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 55
GRID ID: M5

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID M6

HIGH: None

MEDIUM: None

LOW:

Object ID: No survey, Morning Sun & Sun Valley
Issue(s): channel conveyance
Possible Solution: grading and riprap
Total Capital Improvement Cost: $32,994
Annual Operation and Maintenance Cost: $2,100

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID M6

Object ID	Maintenance	Annual Cost
Culvert ID 1660,	Culvert Cleaning	$99
Culvert ID 1682*	Culvert Cleaning	$21
Culvert ID 1683*	Culvert Cleaning	$30
Culvert ID 1687*	Culvert Cleaning	$24
Culvert ID 1688*	Culvert Cleaning	$20
Culvert ID 1657*	Culvert Cleaning	$18
Culvert ID 1656*	Culvert Cleaning	$26
Culvert ID 1650*	Culvert Cleaning	$21
Culvert ID 1651	Culvert Cleaning	$46
Culvert ID 1652*	Culvert Cleaning	$39
Culvert ID 1654*	Culvert Cleaning	$24
Culvert ID 1653*	Culvert Cleaning	$39
Culvert ID 1655*	Culvert Cleaning	$64
Culvert ID 1658*	Culvert Cleaning	$40
Culvert ID 1662*	Culvert Cleaning	$20
Culvert ID 1663*	Culvert Cleaning	$22
Culvert ID 1664*	Culvert Cleaning	$28
Culvert ID 1665*	Culvert Cleaning	$18
Culvert ID 1666*	Culvert Cleaning	$25
Culvert ID 1669	Culvert Cleaning	$50
Culvert ID 1674*	Culvert Cleaning	$23
Culvert ID 1675*	Culvert Cleaning	$20
Culvert ID 1676*	Culvert Cleaning	$24
Culvert ID 1677*	Culvert Cleaning	$26
Culvert ID 1680*	Culvert Cleaning	$20
Culvert ID 1681*	Culvert Cleaning	$23
Culvert ID 1668*	Culvert Cleaning	$20
Culvert ID 1670*	Culvert Cleaning	$21
Culvert ID 1671*	Culvert Cleaning	$22
Culvert ID 1672*	Culvert Cleaning	$39
Culvert ID 1673*	Culvert Cleaning	$20

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF
Channel Cleaning: $3/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 56
GRID ID: M6

Notes: 1.) Masked locations are outside of the Woodland Park City Limits. 2.) Numbers above items indicate the Object ID that is referenced within the Appendix

CIP PRIORITIES - GRID ID N6

HIGH: None

MEDIUM: None

LOW:

Object ID: Culvert ID 1709
Issue(s): erosion at culvert entrance
Possible Solution: improve inlet
Total Capital Improvement Cost: $5,115
Annual Operation and Maintenance Cost: $37

Note: Additional information on Object IDs and Costs can be found in the appendices.

CIP PRIORITIES - continued...

MAINTENANCE ONLY - GRID ID N6

Object ID	Maintenance	Annual Cost
Culvert ID 1684	Culvert Cleaning	$20
Culvert ID 1685	Culvert Cleaning	$19

*Private or public entity other than Woodland Park may be responsible

Culvert Cleaning: $1/LF

MAINTENANCE ONLY - continued...



WOODLAND PARK, CO
CONTOUR INTERVAL: 5 FEET
SCALE: 1"=200

Combo Inlet | Grate Inlet | Outfall | Road Damage | Culvert | Storm Drain (CDOT) | Roads
Curb Inlet | Manhole | Outlet Structure | Channel | Detention Pond | Sheet Grid | Parcels

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CITY OF WOODLAND PARK
STORMWATER CAPITAL IMPROVEMENT AND MASTER PLAN

SHEET: 58
GRID ID: N6

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APPENDIX B - 2015 CIP COST DEVELOPMENT

APPENDIX B - 2015 CIP COST DEVELOPMENT

SUMMARY PAGE

Priority	Reach ID:	Grid ID	Drainagaeway	Jurisdiction	Total Capital Cost	Annual O&M Cost
High	TC-ReachDP-SH67	D3	Trout Creek	City of Woodland Park	$34,250	$685
High	LVG-ReachC182	E3	Lovell Gulch	City of Woodland Park	$335,681	$1,500
High	TC-ReachC191-C189	E3	Trout Creek	City of Woodland Park	$160,101	$2,100
High	TC-ReachC189	E3	Trout Creek	City of Woodland Park	$588,172	$50
High	FC-ReachRD30	J5	Fountain Creek	City of Woodland Park	$44,493	$126
HIgh	FC-ReachUS of C1715	K5	Fountain Creek	City of Woodland Park	$214,392	$3,000
HIgh	FC-ReachC1512	K5	Fountain Creek	City of Woodland Park	$63,024	$1,110
High	FC-ReachBatchPlant	L5	Fountain Creek	City of Woodland Park	$5,430,674	$0
High	FC-ReachWestTrull	L5	Fountain Creek	City of Woodland Park	$62,130	$0
High	FC-ReachLagoons	L5	Fountain Creek	City of Woodland Park	$213,979	$4,500
High	FC-ReachParkSouthOf24	I4	Fountain Creek	City of Woodland Park	$404,138	$0
Medium	TC-ReachC84	C3	Trout Creek	City of Woodland Park	$10,011	$40
Medium	TC-ReachNear C126	C4	Trout Creek	City of Woodland Park	$18,755	$126
Medium	TC-ReachSH67 & Regent	D3	Trout Creek	City of Woodland Park	$129,846	$400
Medium	TC-ReachDP5	E2	Trout Creek	City of Woodland Park	$10,230	$571
Medium	TC-ReachDP9	F2	Trout Creek	City of Woodland Park	$10,230	$343
Medium	TC-ReachDP7	F3	Trout Creek	City of Woodland Park	$18,945	$533
Medium	TC-ReachDP8	F3	Trout Creek	City of Woodland Park	$4,410	$38
Medium	TC-ReachNear StoneRidge	F3	Trout Creek	City of Woodland Park	$15,277	$647
Medium	TC-ReachDP10	F4	Trout Creek	City of Woodland Park	$23,381	$152
Medium	TC-ReachCH104	F4	Trout Creek	City of Woodland Park	$55,130	$585
Medium	TC-ReachDP Rampart&Kelley	F5	Trout Creek	City of Woodland Park	$25,823	$1,713
Medium	TC-ReachRD Rampart&FoxHill	F5	Trout Creek	City of Woodland Park	$11,935	$0
Medium	TC-ReachDP RedFeather	G3	Trout Creek	City of Woodland Park	$13,640	$95
Medium	TC-ReachDP15	G4	Trout Creek	City of Woodland Park	$13,981	$190
Medium	TC-ReachCB47	G4	Trout Creek	City of Woodland Park	$9,950	$63
Medium	TC-ReachRD25	G4	Trout Creek	City of Woodland Park	$3,923	$0
Medium	TC-ReachDP14	H3	Trout Creek	City of Woodland Park	$12,789	$95
Medium	TC-ReachCH162-163-164	H4	Trout Creek	City of Woodland Park	$37,510	$0
Medium	FC-ReachBrowningEastOfBurdette	I3	Fountain Creek	City of Woodland Park	$16,199	$0
Medium	FC-ReachRD14	I4	Fountain Creek	City of Woodland Park	$7,589	$0
Medium	FC-ReachCH117	I4	Fountain Creek	City of Woodland Park	$13,299	$0
Medium	FC-ReachCH127	I4	Fountain Creek	City of Woodland Park	$26,230	$0
Medium	FC-ReachRD23	I4	Fountain Creek	City of Woodland Park	$2,133	$0
Medium	FC-ReachDP18	I4	Fountain Creek	City of Woodland Park	$453	$400
Medium	FC-ReachnearUS24	I4	Fountain Creek	City of Woodland Park	$252,627	$1,950
Medium	FC-ReachC940	I5	Fountain Creek	City of Woodland Park	$12,704	$63
Medium	FC-ReachC941	I5	Fountain Creek	City of Woodland Park	$12,931	$63
Medium	FC-ReachRD38	J4	Fountain Creek	City of Woodland Park	$63,084	$350
Medium	FC-ReachRD37	J4	Fountain Creek	City of Woodland Park	$11,567	$0
Medium	FC-ReachCH199	J5	Fountain Creek	City of Woodland Park	$109,827	$600
Medium	FC-ReachDP24	J5	Fountain Creek	City of Woodland Park	$13,856	$228
Medium	FC-ReachDP20	K4	Fountain Creek	City of Woodland Park	$30,690	$533
Medium	FC-ReachParadiseSofPndrsa	K5	Fountain Creek	City of Woodland Park	$26,243	$450
Low	TC-ReachC73	B2	Trout Creek	CDOT	$6,820	$57
Low	TC-ReachGI16	B2	Trout Creek	CDOT	$5,115	$63
Low	TC-ReachCH34	C2	Trout Creek	Private	$12,958	$816
Low	TC-ReachGI18	C2	Trout Creek	CDOT	$5,115	$63
Low	TC-ReachCH36	C2	Trout Creek	Private	$5,115	$14
Low	TC-ReachC64	C2	Trout Creek	CDOT	$13,640	$45
Low	TC-ReachCH32	C2	Trout Creek	CDOT	$18,789	$672
Low	TC-ReachCH31	C2	Trout Creek	Private	$6,219	$561
Low	TC-ReachDP1	C2	Trout Creek	Private	$19,778	$95
Low	TC-ReachCH38	C3	Trout Creek	City of Woodland Park	$5,115	$339
Low	TC-ReachRD9	C3	Trout Creek	City of Woodland Park	$5,115	$0
Low	TC-ReachC61	D2	Trout Creek	Private	$1,296	$138
Low	TC-ReachDP4	D2	Trout Creek	Private	$37,646	$114
Low	TC-ReachCH27	D2	Trout Creek	Private	$34,100	$3,897
Low	TC-ReachCH28	D2	Trout Creek	Private	$17,050	$1,818
Low	TC-ReachC55	D2	Trout Creek	Private	$1,519	$165
Low	TC-ReachC58	D2	Trout Creek	Private	$2,584	$17
Low	TC-ReachC60	D3	Trout Creek	Private	$3,444	$50
Low	TC-ReachCH75	D3	Trout Creek	CDOT	$11,935	$1,563
Low	TC-ReachCH76	D3	Trout Creek	CDOT	$5,115	$54
Low	TC-ReachC56	D3	Trout Creek	Private	27051	$86
Low	TC-ReachCI2	D3	Trout Creek	Private	$9,950	$63
Low	TC-ReachC57	D3	Trout Creek	Private	$78,951	$338
Low	TC-ReachGI20	D3	Trout Creek	CDOT	$5,115	$63
Low	TC-ReachRD10	D3	Trout Creek	Private	$4,264	$0
Low	TC-ReachPembrook&Parkway	D3	Trout Creek	City of Woodland Park	$34,987	$2,400
Low	TC-ReachCI18	E2	Trout Creek	City of Woodland Park	$9,950	$63
Low	TC-ReachGI29	E2	Trout Creek	City of Woodland Park	$1,808	$63
Low	TC-ReachCH97	E2	Trout Creek	City of Woodland Park	$12,775	$300
Low	TC-ReachCh90	E3	Trout Creek	Private	$1,815	$138
Low	LVG-ReachCH84	E3	Lovell Gulch	Private	$51,491	$326
Low	TC-ReachC190	E3	Trout Creek	Private	$3,647	$23
Low	TC-ReachC222	F2	Trout Creek	City of Woodland Park	$3,410	$49
Low	TC-ReachJustDSofSH67	F3	Trout Creek	City of Woodland Park	$29,157	$600
Low	TC-ReachJustUSofSH67	F3	Trout Creek	City of Woodland Park	$17,494	$900
Low	TC-ReachC309	F3	Trout Creek	City of Woodland Park	$4,264	$49
Low	TC-ReachValleView	E4	Trout Creek	City of Woodland Park	$4,730,270	$0
Low	TC-ReachChippewa&ValleyView	F4	Trout Creek	City of Woodland Park	$11,662	$0
Low	TC-ReachValleyViewDSChippewa	F4	Trout Creek	City of Woodland Park	$35,636	$750
Low	TC-ReachParkViewEstatesPark	F4	Trout Creek	City of Woodland Park	$34,100	$300
Low	TC-ReachDP11	F5	Trout Creek	Private	$15,345	$1,085
Low	TC-ReachDP12	F5	Trout Creek	Private	$31,971	$152
Low	TC-ReachSH67btwKlly&RedFthr	G3	Trout Creek	CDOT	$433,924	$4,500
Low	TC-ReachC677	G3	Trout Creek	Private	$7,944	$75
Low	TC-ReachC650	G3	Trout Creek	Private	$9,528	$35
Low	TC-ReachRedFthrEastof67	G3	Trout Creek	City of Woodland Park	$2,714	$75
Low	TC-ReachC722	G4	Trout Creek	Private	$5,115	$72
Low	TC-ReachDP16	G4	Trout Creek	City of Woodland Park	$22,165	$590
Low	TC-ReachCH167	G4	Trout Creek	Private	$33,080	$1,110
Low	TC-ReachC883	G5	Trout Creek	City of Woodland Park	$4,264	$44
Low	TC-ReachForestEdge	G5	Trout Creek	City of Woodland Park	$15,176	$750
Low	TC-ReachRmpRange&Kelleys	G5	Trout Creek	City of Woodland Park	$17,050	$300
Low	TC-ReachDP21	H3	Trout Creek	City of Woodland Park	$4,264	$381
Low	TC-ReachWalnutNofCounty	H3	Trout Creek	City of Woodland Park	$11,425	$1,005
Low	TC-ReachWalnutSofBowman	H3	Trout Creek	City of Woodland Park	$37,510	$3,300
Low	TC-ReachCH174	H4	Trout Creek	City of Woodland Park	$5,000	$495
Low	TC-ReachPine&DelEste	H4	Trout Creek	City of Woodland Park	$17,050	$150
Low	TC-ReachCH181	H4	Trout Creek	City of Woodland Park	$5,000	$837
Low	TC-ReachCH130	H4	Trout Creek	City of Woodland Park	$14,105	$480
Low	TC-ReachC572	H4	Trout Creek	City of Woodland Park	$5,000	$84
Low	TC-ReachRD26	H4	Trout Creek	Private	$5,115	$0
Low	FC-ReachRD18	H4	Fountain Creek	City of Woodland Park	$17,735	$113
Low	TC-ReachCH149	H4	Trout Creek	City of Woodland Park	$3,042	$270
Low	TC-ReachCH132CH133	H4	Trout Creek	City of Woodland Park	$25,575	$0
Low	TC-ReachRD21	H4	Trout Creek	City of Woodland Park	$17,735	$113
Low	TC-ReachCH131	H4	Trout Creek	City of Woodland Park	$13,640	$167
Low	FC-ReachRD27	H5	Fountain Creek	Private	$18,755	$0
Low	TC-ReachRD34	H5	Trout Creek	City of Woodland Park	$3,838	$450
Low	FC-ReachC1100	H5	Fountain Creek	City of Woodland Park	$25,575	$40
Low	FC-ReachRD35	H5	Fountain Creek	Private	$56,265	$0
Low	FC-ReachRD33	H5	Fountain Creek	Private	$4,264	$30
Low	TC-ReachCoraline&South	I3	Trout Creek	City of Woodland Park	$10,230	$0
Low	TC-ReachCH150	I3	Trout Creek	City of Woodland Park	$2,864	$729
Low	FC-ReachRD13	I3	Fountain Creek	City of Woodland Park	$5,969	$63
Low	FC-ReachCH115	I4	Fountain Creek	City of Woodland Park	$17,137	$402
Low	FC-ReachCH116	I4	Fountain Creek	City of Woodland Park	$12,022	$282
Low	FC-ReachRD15	I4	Fountain Creek	City of Woodland Park	$3,751	$0
Low	FC-ReachCH121	I4	Fountain Creek	City of Woodland Park	$2,645	$0
Low	FC-ReachC524&C525	I4	Fountain Creek	City of Woodland Park	$15,345	$63
Low	FC-ReachCH129	I4	Fountain Creek	City of Woodland Park	$4,705	$420
Low	FC-ReachCH142	I4	Fountain Creek	City of Woodland Park	$9,002	$0
Low	FC-ReachRD28	I4	Fountain Creek	City of Woodland Park	$2,304	$0
Low	FC-ReachCH155	I4	Fountain Creek	City of Woodland Park	$5,884	$0
Low	FC-ReachRD39	I4	Fountain Creek	Private	$4,264	$0
Low	FC-ReachBoundarySofMidland	I5	Fountain Creek	City of Woodland Park	$9,038	$0
Low	FC-ReachDP23	I5	Fountain Creek	City of Woodland Park	$10,230	$152
Low	FC-ReachGI57	I5	Fountain Creek	City of Woodland Park	$5,115	$63
Low	FC-ReachGI60	I5	Fountain Creek	Private	$5,969	$63
Low	FC-ReachGI61	I5	Fountain Creek	Private	$5,969	$63
Low	FC-ReachNWcornerWPHS	I5	Fountain Creek	Private	$25,048	$450
Low	FC-ReachSEofSouth&Bndry	I5	Fountain Creek	Private	$44,161	$363
Low	FC-ReachDP26	I6	Fountain Creek	City of Woodland Park	$13,640	$1,256
Low	FC-ReachEvergreen&Lafayette	J3	Fountain Creek	City of Woodland Park	$13,263	$0
Low	FC-ReachnearOReillys	J4	Fountain Creek	Private	$136,868	$476
Low	FC-ReachPark&Foster	J4	Fountain Creek	City of Woodland Park	$10,658	$0
Low	FC-ReachCavalierPark	J4	Fountain Creek	City of Woodland Park	$25,575	$1,575
Low	FC-ReachDP22	J5	Fountain Creek	City of Woodland Park	$20,460	$228
Low	FC-ReachRD36	K4	Fountain Creek	City of Woodland Park	$6,115	$0
Low	FC-ReachParadiseLodgeLn	K5	Fountain Creek	City of Woodland Park	$24,552	$900
Low	FC-ReachC1635	L6	Fountain Creek	City of Woodland Park	$4,264	$42
Low	FC-ReachSunriseCt	L6	Fountain Creek	City of Woodland Park	$5,115	$0
Low	FC-ReachFCupstreamOfWalMrt	M5	Fountain Creek	Teller County	$184,140	$1,500
Low	FC-ReachnearMrningSun&SunVlly	M6	Fountain Creek	City of Woodland Park	$32,994	$2,100
Low	FC-ReachC1709	N6	Fountain Creek	City of Woodland Park	$5,115	$37
Low	TC-ReachCH77	E3	Trout Creek	City of Woodland Park	$11,935	$0
Low	TC-ReachRD19&20	H3	Trout Creek	City of Woodland Park	$35,153	$0

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP-SH67				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP-SH67	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range			193	C.Y.	$30.00	$5,790.00	Pond approx. 125' x 125' (Google Earth), excavate 4 inches
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->		EA		$0.00	
Water Quality Appurtenances		User Defined Unit Cost ---->	1	EA	$1,500.00	$1,500.00	Retro-fitting a WQ orifice
Removals							
Special Items (User Defined)							
Riprap Check Structures	<----User Defined Items	User Defined Unit Cost ---->	5	EA	$900.00	$4,500.00	Assumed one foot tall, 10 foot wide riprap checks
Master Plan Capital Improvement Cost Summary							
Capital Improvement Costs							
Pipe Culverts and Storm Drains						$0.00	
Concrete Box Culverts						$0.00	
Hydraulic Structures						$0.00	
Channel Improvements						$0.00	
Detention/Water Quality Facilities						$7,290.00	
Removals						$0.00	
Landscaping and Maintenance Improvements						$0.00	
Special Items (User Defined)						$4,500.00	
Subtotal Capital Improvement Costs						**$11,790.00**	
Additional Capital Improvement Costs							
Dewatering		User Defined Lump Sum Cost ---->		L.S.		$0.00	
Mobilization			5%			$590.00	
Traffic Control		User Defined Lump Sum Cost ---->		L.S.		$0.00	
Utility Coordination/Relocation		User Defined Lump Sum Cost ---->		L.S.		$0.00	
Stormwater Management/Erosion Control			5%			$590.00	
Subtotal Additional Capital Improvement Costs						**$1,180.00**	
Land Acquisition Costs							
ROW/Easements						$0.00	
Subtotal Land Acquisition Costs						**$0.00**	
Other Costs (percentage of Capital Improvement Costs)							
Engineering			15%			$1,946.00	
Legal/Administrative			5%			$649.00	
Contract Admin/Construction Management			10%			$1,297.00	
Contingency			25%			$3,243.00	
Subtotal Other Costs						**$7,135.00**	
Total Capital Improvement Costs						**$20,105.00**	

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	0.36	ACRE	$1,903.00	$685.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$685.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$34,250.00**	

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Lovell Gulch				
REACH :	C182				
JURISDICTION :	City of Woodland Park				
REACH ID:	LVG-ReachC182	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)						QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains											
Concrete Box Culverts											
Hydraulic Structures											
Sloping Drop Structures											
Height (ft)	Bottom Width (ft)	Yn (ft)		La (ft)	Hard Basin Length (ft)	Total Width (ft)					
5	15	2.6		5.00	56.00	35.80	3	EA	$65,626.89	$196,881.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
Check Structures											
Check Structure, Concrete								L.F.	$342.00	$0.00	
Channel Improvements											
Detention/Water Quality Facilities											
Removals											
Landscaping and Maintenance Improvements											
Special Items (User Defined)											
Land Acquisition											

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$196,881.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$196,881.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$9,844.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$9,844.00
Subtotal Additional Capital Improvement Costs				**$19,688.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$32,485.00
Legal/Administrative		5%		$10,828.00
Contract Admin/Construction Management		10%		$21,657.00
Contingency		25%		$54,142.00
Subtotal Other Costs				**$119,112.00**
Total Capital Improvement Costs				**$335,681.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	500	L.F.	$3.00	$1,500.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$1,500.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$75,000.00**

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C191-C189				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachC191-C189	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Sloping Drop Structures						
Check Structures						
Check Structure, Concrete		50	L.F.	$342.00	$17,100.00	
Channel Improvements						
24-inch Riprap, Type VH		500	C.Y.	$108.00	$54,000.00	
Boulder Edging, 36" High		200	L.F.	$114.00	$22,800.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$17,100.00
Channel Improvements				$76,800.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$93,900.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$4,695.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$4,695.00
Subtotal Additional Capital Improvement Costs				**$9,390.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$15,494.00
Legal/Administrative		5%		$5,165.00
Contract Admin/Construction Management		10%		$10,329.00
Contingency		25%		$25,823.00
Subtotal Other Costs				**$56,811.00**
Total Capital Improvement Costs				**$160,101.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	700	L.F.	$3.00	$2,100.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$2,100.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$105,000.00**

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C189				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachC189	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)						QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains											
Concrete Box Culverts											
Box Culvert Pipe											
Individual Box Span (ft)	Box Height (ft)	No. of Barrels					Length (ft)				
6	6	2					50	L.F.	$1,538.78	$76,939.00	Size of boxes based on 50 Year Event
								L.F.	$0.00	$0.00	
								L.F.	$0.00	$0.00	
Headwall and Toewalls											
Individual Box Span (ft)	No. of Barrels	Total Span (ft)	Concrete (C.Y.)	Steel (lbs)	U/S Headwall	D/S Headwall					
6	2	15.00	1.28	331.50	Yes	Yes	2	EA	$1,301.78	$2,604.00	
		0.00	0.00	0.00			0	EA	$0.00	$0.00	
		0.00	0.00	0.00			0	EA	$0.00	$0.00	
Wingwalls (includes wingwalls on either side of channel and concrete apron)											
Individual Box Span (ft)	Box Rise (ft)	No. of Barrels	Total Interior Span (ft)	Length (ft)	Concrete (C.Y.)	Steel (lbs)					
6	6	2	13.00	18	18.96	846.22	2	EA	$15,273.15	$30,546.30	
			0.00	0	0.00	0.00	0	EA	$0.00	$0.00	
Hydraulic Structures											
Sloping Drop Structures											
Height (ft)	Bottom Width (ft)	Yn (ft)		La (ft)	Hard Basin Length (ft)	Total Width (ft)					
5	15	5.2		5.00	56.00	56.60	1	EA	$103,548.57	$103,549.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
Check Structures											
Check Structure, Concrete								L.F.	$342.00	$0.00	
Channel Improvements											
Detention/Water Quality Facilities											
Removals											
Landscaping and Maintenance Improvements											
Special Items (User Defined)											
Land Acquisition											

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$110,089.00
Hydraulic Structures					$103,549.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$213,638.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**	$7,500.00	L.S.		$7,500.00
Mobilization		5%			$10,682.00
Traffic Control	**User Defined Lump Sum Cost ---->**	$7,500.00	L.S.		$7,500.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**	$5,000.00	L.S.		$5,000.00
Stormwater Management/Erosion Control		5%			$10,682.00
Subtotal Additional Capital Improvement Costs					**$41,364.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$38,250.00
Legal/Administrative		5%			$12,750.00
Contract Admin/Construction Management		10%			$25,500.00
Contingency		25%			$63,751.00
Subtotal Other Costs					**$140,251.00**
Total Capital Improvement Costs					**$395,253.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**	1	50	L.F.	$1.00	$50.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$50.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,500.00**

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD30				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD30	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels						
24-inch / 75 / 1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.	75	L.F.	$91.00	$6,825.00	Replace existing CMP culverts
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
24-inch / Yes / 1 / No / No		0	EA	$1,230.00	$0.00	
No		0	EA	$0.00	$0.00	
Manholes and Inlets						
Manhole, 4' Dia. (Pipe Dia. < 36")			EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")			EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")			EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)			EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)			EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot		2	EA	$5,835.00	$11,670.00	One inlet to capture Short Ave. flow, the other really an improvement near McDon
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Removal of culvert pipe (D<48")		40	L.F.	$25.00	$1,000.00	
Removal of culvert pipe (48"<D<84")			L.F.	$63.00	$0.00	
Removal of culvert pipe (D>84")			L.F.	$95.00	$0.00	
Concrete Box Culvert			L.F./CELL	$127.00	$0.00	
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Inlet Improvements / <----User Defined Items	User Defined Unit Cost ---->	1	EA	$1,000.00	$1,000.00	Improve entrance around existng CDOT Type D
Curb and Gutter / <----User Defined Items	User Defined Unit Cost ---->	280	L.F.	$20.00	$5,600.00	
<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$18,495.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$1,000.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$6,600.00
Subtotal Capital Improvement Costs				**$26,095.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$1,305.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$1,305.00
Subtotal Additional Capital Improvement Costs				**$2,610.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$4,306.00
Legal/Administrative		5%		$1,435.00
Contract Admin/Construction Management		10%		$2,871.00
Contingency		25%		$7,176.00
Subtotal Other Costs				**$15,788.00**
Total Capital Improvement Costs				**$44,493.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	2	1	EA	$63.00	$126.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$126.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$6,300.00**

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	US of C1715				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachUS of C1715	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Sloping Drop Structures						
Height (ft) / Bottom Width (ft) / Yn (ft) / La (ft) / Hard Basin Length (ft) / Total Width (ft)	5 / 50 / 2.29 / 5.00 / 56.00 / 68.32	1	EA	$125,743.47	$125,743.00	Under evaluation by third party, just a rough approximation
	0.00 / 0.00 / 0.00		EA	$0.00	$0.00	
	0.00 / 0.00 / 0.00		EA	$0.00	$0.00	
	0.00 / 0.00 / 0.00		EA	$0.00	$0.00	
Check Structures						
Check Structure, Concrete			L.F.	$342.00	$0.00	
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$125,743.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$125,743.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$6,287.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$6,287.00
Subtotal Additional Capital Improvement Costs				**$12,574.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$20,748.00
Legal/Administrative		5%		$6,916.00
Contract Admin/Construction Management		10%		$13,832.00
Contingency		25%		$34,579.00
Subtotal Other Costs				**$76,075.00**
Total Capital Improvement Costs				**$214,392.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	1000	L.F.	$3.00	$3,000.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$3,000.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$150,000.00**

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	C1512				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachC1512	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.					
24-inch / 55 / 1		55	L.F.	$91.00	$5,005.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
24-inch / Yes / 1 / Yes / Yes		2	EA	$1,230.00	$2,460.00	
No		0	EA	$0.00	$0.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Excavation, Mid Range		150	C.Y.	$30.00	$4,500.00	
12-inch Riprap, Type M		250	C.Y.	$76.00	$19,000.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Slotted inlet across drive into shops	<----User Defined Items	1	EA	$6,000.00	$6,000.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$7,465.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$23,500.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$6,000.00
Subtotal Capital Improvement Costs					**$36,965.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$1,848.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$1,848.00
Subtotal Additional Capital Improvement Costs					**$3,696.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$6,099.00
Legal/Administrative		5%			$2,033.00
Contract Admin/Construction Management		10%			$4,066.00
Contingency		25%			$10,165.00
Subtotal Other Costs					**$22,363.00**
Total Capital Improvement Costs					**$63,024.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	370	L.F.	$3.00	$1,110.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
Total Annual Operation and Maintenance Cost						**$1,110.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$55,500.00**

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	BatchPlant				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachBatchPlant	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)						QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Hydraulic Structures											
Sloping Drop Structures											
Height (ft)	Bottom Width (ft)	Yn (ft)		La (ft)	Hard Basin Length (ft)	Total Width (ft)					
8	90	5		8.00	71.00	130.00	5	EA	$308,229.30	$1,541,147.00	
Channel Improvements											
Excavation, Mid Range							8200	C.Y.	$30.00	$246,000.00	
Soil Riprap, Type VH							12000	C.Y.	$114.00	$1,368,000.00	
									$0.00	$0.00	
									$0.00	$0.00	
									$0.00	$0.00	
Detention/Water Quality Facilities											
Removals											
Landscaping and Maintenance Improvements											
Special Items (User Defined)											
Remove Broken Concrete	<----User Defined Items				User Defined Unit Cost ---->		600	Ton	$50.00	$30,000.00	
	<----User Defined Items				User Defined Unit Cost ---->					$0.00	
Land Acquisition											

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$1,541,147.00
Channel Improvements					$1,614,000.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$30,000.00
Subtotal Capital Improvement Costs					**$3,185,147.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$159,257.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$159,257.00
Subtotal Additional Capital Improvement Costs					**$318,514.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$525,549.00
Legal/Administrative		5%			$175,183.00
Contract Admin/Construction Management		10%			$350,366.00
Contingency		25%			$875,915.00
Subtotal Other Costs					**$1,927,013.00**
Total Capital Improvement Costs					**$5,430,674.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	WestTrull				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachWestTrull	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Excavation, Mid Range		270	C.Y.	$30.00	$8,100.00	
24-inch Riprap, Type VH		230	C.Y.	$108.00	$24,840.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Remove Broken Concrete	<----User Defined Items — User Defined Unit Cost ---->	70	Ton	$50.00	$3,500.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$32,940.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$3,500.00
Subtotal Capital Improvement Costs					**$36,440.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$1,822.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$1,822.00
Subtotal Additional Capital Improvement Costs					**$3,644.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$6,013.00
Legal/Administrative		5%			$2,004.00
Contract Admin/Construction Management		10%			$4,008.00
Contingency		25%			$10,021.00
Subtotal Other Costs					**$22,046.00**
Total Capital Improvement Costs					**$62,130.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
	<----User Defined Items — User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	Lagoons				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachLagoons	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
24-inch Riprap, Type VH		1000	C.Y.	$108.00	$108,000.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Detention (User Entered Quantities)						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Remove Large Mining Tires	<----User Defined Items	35	EA	$500.00	$17,500.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$108,000.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$17,500.00
Subtotal Capital Improvement Costs					**$125,500.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$6,275.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$6,275.00
Subtotal Additional Capital Improvement Costs					**$12,550.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$20,708.00
Legal/Administrative		5%			$6,903.00
Contract Admin/Construction Management		10%			$13,805.00
Contingency		25%			$34,513.00
Subtotal Other Costs					**$75,929.00**
Total Capital Improvement Costs					**$213,979.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	1500	L.F.	$3.00	$4,500.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost						**$4,500.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$225,000.00**	

HIGH PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	ParkSouthOf24				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachParkSouthOf24	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)						QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains											
Circular Pipes											
Diameter (in)	Length (ft)	No. of Barrels									
54-inch	720	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.				720	L.F.	$274.00	$197,280.00	
							0	L.F.	$0.00	$0.00	
Flare End Sections											
Diameter (in)	Applicable	No. of Barrels	U/S FES	D/S FES							
Headwalls											
Diameter (in)	Applicable	No. of Barrels	U/S Headwall	D/S Headwall	Concrete (C.Y.)	Steel (lbs)					
54-inch	Yes	1			2.12	209.00	0	EA	$1,822.32	$0.00	
Wingwalls (includes concrete apron)											
Diameter (in)		No. of Barrels	Interior Span (ft)	Length (ft)	Concrete (C.Y.)	Steel (lbs)					
54-inch		1	8.75	16	13.80	633.11	0	EA	$11,134.00	$0.00	
Manholes and Inlets											
Manhole, 4' Dia. (Pipe Dia. < 36")								EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")								EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")								EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)								EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)								EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot								EA	$5,835.00	$0.00	
Concrete Box Culverts											
Hydraulic Structures											
Channel Improvements											
Detention/Water Quality Facilities											
Removals											
Landscaping and Maintenance Improvements											
Special Items (User Defined)											
Safety Rail	<----User Defined Items				User Defined Unit Cost ---->		530	L.F.	$75.00	$39,750.00	To protect along trap channel along park (guardrail)
Land Acquisition											
Temporary Easements								EA		$0.00	
Easement/ROW Acquisition								ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$197,280.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$39,750.00
Subtotal Capital Improvement Costs				**$237,030.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$11,852.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$11,852.00
Subtotal Additional Capital Improvement Costs				**$23,704.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$39,110.00
Legal/Administrative		5%		$13,037.00

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C84				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachC84	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.					
24-inch / 40 / 1		40	L.F.	$91.00	$3,640.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
24-inch / Yes / 1 / Yes / No		1	EA	$1,230.00	$1,230.00	
No		0	EA	$0.00	$0.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Removal of culvert pipe (D<48")		40	L.F.	$25.00	$1,000.00	
Removal of culvert pipe (48"<D<84")			L.F.	$63.00	$0.00	
Removal of culvert pipe (D>84")			L.F.	$95.00	$0.00	
Concrete Box Culvert			L.F./CELL	$127.00	$0.00	
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$4,870.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$1,000.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$5,870.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$294.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$294.00
Subtotal Additional Capital Improvement Costs				**$588.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$969.00
Legal/Administrative		5%		$323.00
Contract Admin/Construction Management		10%		$646.00
Contingency		25%		$1,615.00
Subtotal Other Costs				**$3,553.00**
Total Capital Improvement Costs				**$10,011.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	40	L.F.	$1.00	$40.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$40.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$2,000.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	Near C126				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachNear C126	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Curb and Gutter	<----User Defined Items	User Defined Unit Cost ---->	500	L.F.	$20.00	$10,000.00	
Inlet Improvements	<----User Defined Items	User Defined Unit Cost ---->	2	EA	$500.00	$1,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$11,000.00
Subtotal Capital Improvement Costs					**$11,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$550.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$550.00
Subtotal Additional Capital Improvement Costs					**$1,100.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,815.00
Legal/Administrative		5%			$605.00
Contract Admin/Construction Management		10%			$1,210.00
Contingency		25%			$3,025.00
Subtotal Other Costs					**$6,655.00**
Total Capital Improvement Costs					**$18,755.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	2	EA	$63.00	$126.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$126.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$6,300.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	SH67 & Regent				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachSH67 & Regent	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.					
24-inch / 400 / 1		400	L.F.	$91.00	$36,400.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
24-inch / Yes / 1		0	EA	$1,230.00	$0.00	
No		0	EA	$0.00	$0.00	
Manholes and Inlets						
Manhole, 4' Dia. (Pipe Dia. < 36")			EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")			EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")			EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)			EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)			EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot		1	EA	$5,835.00	$5,835.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		20	C.Y.	$76.00	$1,520.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Removal of culvert pipe (D<48")		400	L.F.	$25.00	$10,000.00	
Removal of culvert pipe (48"<D<84")			L.F.	$63.00	$0.00	
Removal of culvert pipe (D>84")			L.F.	$95.00	$0.00	
Concrete Box Culvert			L.F./CELL	$127.00	$0.00	
Landscaping and Maintenance Improvements						
Wetlands Plantings			ACRE	$31,710.00	$0.00	
Reclamation & seeding (native grasses)			ACRE	$1,268.00	$0.00	
Trail/Path, Concrete (10' Width)		400	L.F.	$56.00	$22,400.00	
Trail/Path, Crusher Fines (10' Width)			L.F.	$14.00	$0.00	
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$42,235.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$1,520.00
Detention/Water Quality Facilities				$0.00
Removals				$10,000.00
Landscaping and Maintenance Improvements				$22,400.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$76,155.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$3,808.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$3,808.00
Subtotal Additional Capital Improvement Costs				**$7,616.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$12,566.00
Legal/Administrative		5%		$4,189.00
Contract Admin/Construction Management		10%		$8,377.00
Contingency		25%		$20,943.00
Subtotal Other Costs				**$46,075.00**
Total Capital Improvement Costs				**$129,846.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	400	L.F.	$1.00	$400.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$400.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$20,000.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP5				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP5	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range				C.Y.	$30.00	$0.00	
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->		EA		$0.00	
Water Quality Appurtenances		User Defined Unit Cost ---->	1	EA	$6,000.00	$6,000.00	
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$6,000.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$6,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$300.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$300.00
Subtotal Additional Capital Improvement Costs					**$600.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$990.00
Legal/Administrative		5%			$330.00
Contract Admin/Construction Management		10%			$660.00
Contingency		25%			$1,650.00
Subtotal Other Costs					**$3,630.00**
Total Capital Improvement Costs					**$10,230.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	0.3	ACRE	$1,903.00	$571.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
	<----User Defined Items User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost						**$571.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$28,550.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP9				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP9	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Detention (Complete-in-Place)						
Detention Facility 1 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range			C.Y.	$30.00	$0.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	**User Defined Unit Cost ---->**		EA		$0.00	
Water Quality Appurtenances	**User Defined Unit Cost ---->**	1	EA	$6,000.00	$6,000.00	
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$6,000.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$6,000.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$300.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$300.00
Subtotal Additional Capital Improvement Costs				**$600.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$990.00
Legal/Administrative		5%		$330.00
Contract Admin/Construction Management		10%		$660.00
Contingency		25%		$1,650.00
Subtotal Other Costs				**$3,630.00**
Total Capital Improvement Costs				**$10,230.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	0.18	ACRE	$1,903.00	$343.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$343.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$17,150.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP7				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP7	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range				C.Y.	$30.00	$0.00	
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->		EA		$0.00	
Water Quality Appurtenances		User Defined Unit Cost ---->	1	EA	$2,587.00	$2,587.00	Retrofit for water qualtiy
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs			
Pipe Culverts and Storm Drains		$0.00	
Concrete Box Culverts		$0.00	
Hydraulic Structures		$0.00	
Channel Improvements		$0.00	
Detention/Water Quality Facilities		$2,587.00	
Removals		$0.00	
Landscaping and Maintenance Improvements		$0.00	
Special Items (User Defined)		$0.00	
Subtotal Capital Improvement Costs		**$2,587.00**	
Additional Capital Improvement Costs			
Dewatering	User Defined Lump Sum Cost ---->	$0.00	
Mobilization	5%	$129.00	
Traffic Control	User Defined Lump Sum Cost ---->	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->	$0.00	
Stormwater Management/Erosion Control	5%	$129.00	
Subtotal Additional Capital Improvement Costs		**$258.00**	
Land Acquisition Costs			
ROW/Easements		$0.00	
Subtotal Land Acquisition Costs		**$0.00**	
Other Costs (percentage of Capital Improvement Costs)			
Engineering	15%	$427.00	
Legal/Administrative	5%	$142.00	
Contract Admin/Construction Management	10%	$285.00	
Contingency	25%	$711.00	
Subtotal Other Costs		**$1,565.00**	
Total Capital Improvement Costs		**$4,410.00**	

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	0.26	ACRE	$1,903.00	$495.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$495.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$24,750.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP8				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP8	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.					
30-inch / 10 / 1		10	L.F.	$114.00	$1,140.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
30-inch / Yes / 1 / No / Yes		1	EA	$1,991.00	$1,991.00	
	No	0	EA	$0.00	$0.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
24-inch Riprap, Type VH		60	C.Y.	$108.00	$6,480.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range		50	C.Y.	$30.00	$1,500.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	User Defined Unit Cost ---->		EA		$0.00	
Water Quality Appurtenances	User Defined Unit Cost ---->		EA		$0.00	
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs	
Pipe Culverts and Storm Drains	$3,131.00
Concrete Box Culverts	$0.00
Hydraulic Structures	$0.00
Channel Improvements	$6,480.00
Detention/Water Quality Facilities	$1,500.00
Removals	$0.00
Landscaping and Maintenance Improvements	$0.00
Special Items (User Defined)	$0.00
Subtotal Capital Improvement Costs	**$11,111.00**
Additional Capital Improvement Costs	
Dewatering (User Defined Lump Sum Cost ---->)	$0.00
Mobilization (5%)	$556.00
Traffic Control (User Defined Lump Sum Cost ---->)	$0.00
Utility Coordination/Relocation (User Defined Lump Sum Cost ---->)	$0.00
Stormwater Management/Erosion Control (5%)	$556.00
Subtotal Additional Capital Improvement Costs	**$1,112.00**
Land Acquisition Costs	
ROW/Easements	$0.00
Subtotal Land Acquisition Costs	**$0.00**
Other Costs (percentage of Capital Improvement Costs)	
Engineering (15%)	$1,833.00
Legal/Administrative (5%)	$611.00
Contract Admin/Construction Management (10%)	$1,222.00
Contingency (25%)	$3,056.00
Subtotal Other Costs	**$6,722.00**
Total Capital Improvement Costs	**$18,945.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	0.02	ACRE	$1,903.00	$38.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$38.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$1,900.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	Near StoneRidge				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachNear StoneRidge	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
18-inch Riprap, Type H		60	C.Y.	$101.00	$6,060.00	Repairs to riprap rundown into pond
				$0.00	$0.00	
Detention/Water Quality Facilities						
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range		30	C.Y.	$30.00	$900.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	User Defined Unit Cost ---->		EA		$0.00	
Water Quality Appurtenances	User Defined Unit Cost ---->	1	EA	$2,000.00	$2,000.00	Retrofit WQ outlet
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$6,060.00
Detention/Water Quality Facilities					$2,900.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$8,960.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$448.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$448.00
Subtotal Additional Capital Improvement Costs					**$896.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,478.00
Legal/Administrative		5%			$493.00
Contract Admin/Construction Management		10%			$986.00
Contingency		25%			$2,464.00
Subtotal Other Costs					**$5,421.00**
Total Capital Improvement Costs					**$15,277.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	0.34	ACRE	$1,903.00	$647.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$647.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$32,350.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP10				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP10	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range			150	C.Y.	$30.00	$4,500.00	Excavate and muck out existing sediment
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->	1	EA	$6,000.00	$6,000.00	New outlet structure
Water Quality Appurtenances		User Defined Unit Cost ---->		EA		$0.00	
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition			0.18	ACRE	$30,000.00	$5,477.00	Only an estimate, may not be necessary

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$10,500.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$10,500.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->			L.S.	$0.00
Mobilization		5%			$525.00
Traffic Control	User Defined Lump Sum Cost ---->			L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->			L.S.	$0.00
Stormwater Management/Erosion Control		5%			$525.00
Subtotal Additional Capital Improvement Costs					**$1,050.00**
Land Acquisition Costs					
ROW/Easements					$5,477.00
Subtotal Land Acquisition Costs					**$5,477.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,733.00
Legal/Administrative		5%			$578.00
Contract Admin/Construction Management		10%			$1,155.00
Contingency		25%			$2,888.00
Subtotal Other Costs					**$6,354.00**
Total Capital Improvement Costs					**$23,381.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	0.08	ACRE	$1,903.00	$152.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost						**$152.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$7,600.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH104				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH104	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Sloping Drop Structures						
Height (ft) / Bottom Width (ft) / Yn (ft) / La (ft) / Hard Basin Length (ft) / Total Width (ft)	4 / 8 / 1.35 / 5.00 / 52.00 / 18.80	1	EA	$32,333.75	$32,334.00	Yn based on 88 cfs (100-yr), trap channel w/ 8 ft. bottom width,
	0.00 / 0.00 / 0.00		EA	$0.00	$0.00	2:1 side slopes, .01 ft/ft longitudinal, Manning's n=.025
	0.00 / 0.00 / 0.00		EA	$0.00	$0.00	
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains				$0.00	
Concrete Box Culverts				$0.00	
Hydraulic Structures				$32,334.00	
Channel Improvements				$0.00	
Detention/Water Quality Facilities				$0.00	
Removals				$0.00	
Landscaping and Maintenance Improvements				$0.00	
Special Items (User Defined)				$0.00	
Subtotal Capital Improvement Costs				**$32,334.00**	
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Mobilization		5%		$1,617.00	
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Stormwater Management/Erosion Control		5%		$1,617.00	
Subtotal Additional Capital Improvement Costs				**$3,234.00**	
Land Acquisition Costs					
ROW/Easements				$0.00	
Subtotal Land Acquisition Costs				**$0.00**	
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%		$5,335.00	
Legal/Administrative		5%		$1,778.00	
Contract Admin/Construction Management		10%		$3,557.00	
Contingency		25%		$8,892.00	
Subtotal Other Costs				**$19,562.00**	
Total Capital Improvement Costs				**$55,130.00**	

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	195	L.F.	$3.00	$585.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$585.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$29,250.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP Rampart&Kelley				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP Rampart&Kelley	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)					QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains										
Circular Pipes										
Diameter (in)	Length (ft)	No. of Barrels								
42-inch	10	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.			10	L.F.	$160.00	$1,600.00	
						0	L.F.	$0.00	$0.00	
Flare End Sections										
Diameter (in)	Applicable	No. of Barrels	U/S FES	D/S FES						
42-inch	Yes	1	No	Yes		1	EA	$2,156.00	$2,156.00	
	No					0	EA	$0.00	$0.00	
Concrete Box Culverts										
Detention/Water Quality Facilities										
Removals										
Landscaping and Maintenance Improvements										
Wetlands Plantings							ACRE	$31,710.00	$0.00	
Reclamation & seeding (native grasses)						0	ACRE	$1,268.00	$190.00	Seeding disturbed areas around pond
Trail/Path, Concrete (10' Width)							L.F.	$56.00	$0.00	
Trail/Path, Crusher Fines (10' Width)							L.F.	$14.00	$0.00	
Special Items (User Defined)										
Land Acquisition										

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$3,756.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$11,200.00
Removals					$0.00
Landscaping and Maintenance Improvements					$190.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$15,146.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$757.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$757.00
Subtotal Additional Capital Improvement Costs					**$1,514.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$2,499.00
Legal/Administrative		5%			$833.00
Contract Admin/Construction Management		10%			$1,666.00
Contingency		25%			$4,165.00
Subtotal Other Costs					**$9,163.00**
Total Capital Improvement Costs					**$25,823.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	0.9	ACRE	$1,903.00	$1,713.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$1,713.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$85,650.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RD Rampart&FoxHill				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachRD Rampart&FoxHill	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Excavation, Mid Range		70	C.Y.	$30.00	$2,100.00	Repair/stabilize roadside
9-inch Riprap, Type L		70	C.Y.	$70.00	$4,900.00	Repair/stabilize roadside
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary		
Capital Improvement Costs		
Pipe Culverts and Storm Drains	$0.00	
Concrete Box Culverts	$0.00	
Hydraulic Structures	$0.00	
Channel Improvements	$7,000.00	
Detention/Water Quality Facilities	$0.00	
Removals	$0.00	
Landscaping and Maintenance Improvements	$0.00	
Special Items (User Defined)	$0.00	
Subtotal Capital Improvement Costs	**$7,000.00**	
Additional Capital Improvement Costs		
Dewatering	$0.00	
Mobilization	$350.00	
Traffic Control	$0.00	
Utility Coordination/Relocation	$0.00	
Stormwater Management/Erosion Control	$350.00	
Subtotal Additional Capital Improvement Costs	**$700.00**	
Land Acquisition Costs		
ROW/Easements	$0.00	
Subtotal Land Acquisition Costs	**$0.00**	
Other Costs (percentage of Capital Improvement Costs)		
Engineering	$1,155.00	
Legal/Administrative	$385.00	
Contract Admin/Construction Management	$770.00	
Contingency	$1,925.00	
Subtotal Other Costs	**$4,235.00**	
Total Capital Improvement Costs	**$11,935.00**	

Master Plan Operation and Maintenance Cost Summary							
Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
Total Annual Operation and Maintenance Cost						**$0.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$0.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP RedFeather				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP RedFeather	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range				C.Y.	$30.00	$0.00	
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->	1	EA	$6,000.00	$6,000.00	Estimate for new WQ outlet
Water Quality Appurtenances		User Defined Unit Cost ---->	1	EA	$2,000.00	$2,000.00	Estimate for new WQ outlet
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$8,000.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$8,000.00**
Additional Capital Improvement Costs					
Dewatering		User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization			5%		$400.00
Traffic Control		User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation		User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control			5%		$400.00
Subtotal Additional Capital Improvement Costs					**$800.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering			15%		$1,320.00
Legal/Administrative			5%		$440.00
Contract Admin/Construction Management			10%		$880.00
Contingency			25%		$2,200.00
Subtotal Other Costs					**$4,840.00**
Total Capital Improvement Costs					**$13,640.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	0.05	ACRE	$1,903.00	$95.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$95.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$4,750.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP15				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP15	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range			40	C.Y.	$30.00	$1,200.00	Clear sediment
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->	1	EA	$6,000.00	$6,000.00	Replace an outlet
Water Quality Appurtenances		User Defined Unit Cost ---->	1	EA	$1,000.00	$1,000.00	Upgrade an outlet
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$8,200.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$8,200.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$410.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$410.00
Subtotal Additional Capital Improvement Costs					**$820.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,353.00
Legal/Administrative		5%			$451.00
Contract Admin/Construction Management		10%			$902.00
Contingency		25%			$2,255.00
Subtotal Other Costs					**$4,961.00**
Total Capital Improvement Costs					**$13,981.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	0.1	ACRE	$1,903.00	$190.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$190.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$9,500.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CB47				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCB47	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Manholes and Inlets						
Manhole, 4' Dia. (Pipe Dia. < 36")			EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")			EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")			EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)			EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)			EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot		1	EA	$5,835.00	$5,835.00	Estimate for new inlet
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$5,835.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$5,835.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$292.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$292.00
Subtotal Additional Capital Improvement Costs					**$584.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$963.00
Legal/Administrative		5%			$321.00
Contract Admin/Construction Management		10%			$642.00
Contingency		25%			$1,605.00
Subtotal Other Costs					**$3,531.00**
Total Capital Improvement Costs					**$9,950.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$63.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$3,150.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RD25				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachRD25	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Curb and Gutter	<----User Defined Items		User Defined Unit Cost ---->	50	L.F.	$20.00	$1,000.00	
Concrete Apron	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$1,000.00	$1,000.00	
Clearing Sediment	<----User Defined Items		User Defined Unit Cost ---->	10	C.Y.	$30.00	$300.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$2,300.00
Subtotal Capital Improvement Costs					**$2,300.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$115.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$115.00
Subtotal Additional Capital Improvement Costs					**$230.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$380.00
Legal/Administrative		5%			$127.00
Contract Admin/Construction Management		10%			$253.00
Contingency		25%			$633.00
Subtotal Other Costs					**$1,393.00**
Total Capital Improvement Costs					**$3,923.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->				L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->				EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->				EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->				L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->				ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->				ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->				L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$0.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$0.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP14				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP14	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range				C.Y.	$30.00	$0.00	
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->	1	EA	$6,000.00	$6,000.00	
Water Quality Appurtenances		User Defined Unit Cost ---->	1	EA	$1,500.00	$1,500.00	
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$7,500.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$7,500.00**
Additional Capital Improvement Costs					
Dewatering		User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization			5%		$375.00
Traffic Control		User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation		User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control			5%		$375.00
Subtotal Additional Capital Improvement Costs					**$750.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering			15%		$1,238.00
Legal/Administrative			5%		$413.00
Contract Admin/Construction Management			10%		$825.00
Contingency			25%		$2,063.00
Subtotal Other Costs					**$4,539.00**
Total Capital Improvement Costs					**$12,789.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	0.05	ACRE	$1,903.00	$95.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$95.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$4,750.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH162-163-164				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH162-163-164	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Mountable Curb and Gutter	<----User Defined Items	User Defined Unit Cost ---->	1100	L.F.	$20.00	$22,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$22,000.00
Subtotal Capital Improvement Costs					**$22,000.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**			L.S.	$0.00
Mobilization		5%			$1,100.00
Traffic Control	**User Defined Lump Sum Cost ---->**			L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**			L.S.	$0.00
Stormwater Management/Erosion Control		5%			$1,100.00
Subtotal Additional Capital Improvement Costs					**$2,200.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$3,630.00
Legal/Administrative		5%			$1,210.00
Contract Admin/Construction Management		10%			$2,420.00
Contingency		25%			$6,050.00
Subtotal Other Costs					**$13,310.00**
Total Capital Improvement Costs					**$37,510.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	BrowningEastOfBurdette				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachBrowningEastOfBurdette	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Concrete Pan	<----User Defined Items		User Defined Unit Cost ---->	190	S.Y.	$50.00	$9,500.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$9,500.00
Subtotal Capital Improvement Costs					**$9,500.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$475.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$475.00
Subtotal Additional Capital Improvement Costs					**$950.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,568.00
Legal/Administrative		5%			$523.00
Contract Admin/Construction Management		10%			$1,045.00
Contingency		25%			$2,613.00
Subtotal Other Costs					**$5,749.00**
Total Capital Improvement Costs					**$16,199.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost							**$0.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$0.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD14				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD14	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Concrete Pan	<----User Defined Items	User Defined Unit Cost ---->	89	S.Y.	$50.00	$4,450.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$4,450.00
Subtotal Capital Improvement Costs					**$4,450.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$223.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$223.00
Subtotal Additional Capital Improvement Costs					**$446.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$734.00
Legal/Administrative		5%			$245.00
Contract Admin/Construction Management		10%			$490.00
Contingency		25%			$1,224.00
Subtotal Other Costs					**$2,693.00**
Total Capital Improvement Costs					**$7,589.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH117				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH117	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (Complete-in-Place)							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Concrete Pan	<----User Defined Items	User Defined Unit Cost ---->	156	S.Y.	$50.00	$7,800.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$7,800.00
Subtotal Capital Improvement Costs					**$7,800.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->			L.S.	$0.00
Mobilization		5%			$390.00
Traffic Control	User Defined Lump Sum Cost ---->			L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->			L.S.	$0.00
Stormwater Management/Erosion Control		5%			$390.00
Subtotal Additional Capital Improvement Costs					**$780.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,287.00
Legal/Administrative		5%			$429.00
Contract Admin/Construction Management		10%			$858.00
Contingency		25%			$2,145.00
Subtotal Other Costs					**$4,719.00**
Total Capital Improvement Costs					**$13,299.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
	<----User Defined Items User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH127				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH127	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Manholes and Inlets						
Manhole, 4' Dia. (Pipe Dia. < 36")			EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")			EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")			EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)			EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)			EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot		1	EA	$5,835.00	$5,835.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Curb and Gutter	<----User Defined Items	200	L.F.	$20.00	$4,000.00	
Sidewalk	<----User Defined Items	111	S.Y.	$50.00	$5,550.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary		
Capital Improvement Costs		
Pipe Culverts and Storm Drains	$5,835.00	
Concrete Box Culverts	$0.00	
Hydraulic Structures	$0.00	
Channel Improvements	$0.00	
Detention/Water Quality Facilities	$0.00	
Removals	$0.00	
Landscaping and Maintenance Improvements	$0.00	
Special Items (User Defined)	$9,550.00	
Subtotal Capital Improvement Costs	**$15,385.00**	
Additional Capital Improvement Costs		
Dewatering (User Defined Lump Sum Cost ---->)	$0.00	
Mobilization (5%)	$769.00	
Traffic Control (User Defined Lump Sum Cost ---->)	$0.00	
Utility Coordination/Relocation (User Defined Lump Sum Cost ---->)	$0.00	
Stormwater Management/Erosion Control (5%)	$769.00	
Subtotal Additional Capital Improvement Costs	**$1,538.00**	
Land Acquisition Costs		
ROW/Easements	$0.00	
Subtotal Land Acquisition Costs	**$0.00**	
Other Costs (percentage of Capital Improvement Costs)		
Engineering (15%)	$2,538.00	
Legal/Administrative (5%)	$846.00	
Contract Admin/Construction Management (10%)	$1,692.00	
Contingency (25%)	$4,231.00	
Subtotal Other Costs	**$9,307.00**	
Total Capital Improvement Costs	**$26,230.00**	

Master Plan Operation and Maintenance Cost Summary

Description	Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.) (Optional User Defined Unit Cost ---->)			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.) (Optional User Defined Unit Cost ---->)			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.) (Optional User Defined Unit Cost ---->)			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.) (Optional User Defined Unit Cost ---->)			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.) (Optional User Defined Unit Cost ---->)			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.) (Optional User Defined Unit Cost ---->)			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.) (Optional User Defined Unit Cost ---->)			L.F.	$6.00	$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
<----User Defined Items (User Defined Unit Cost ---->)					$0.00	
Total Annual Operation and Maintenance Cost					**$0.00**	
Effective Interest Rate					0.00%	
Total Operation and Maintenance Costs Over 50 Years					**$0.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD23				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD23	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Concrete Pan	<----User Defined Items	User Defined Unit Cost ---->	25	S.Y.	$50.00	$1,250.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains			$0.00	
Concrete Box Culverts			$0.00	
Hydraulic Structures			$0.00	
Channel Improvements			$0.00	
Detention/Water Quality Facilities			$0.00	
Removals			$0.00	
Landscaping and Maintenance Improvements			$0.00	
Special Items (User Defined)			$1,250.00	
Subtotal Capital Improvement Costs			**$1,250.00**	
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Mobilization	5%		$63.00	
Traffic Control	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Stormwater Management/Erosion Control	5%		$63.00	
Subtotal Additional Capital Improvement Costs			**$126.00**	
Land Acquisition Costs				
ROW/Easements			$0.00	
Subtotal Land Acquisition Costs			**$0.00**	
Other Costs (percentage of Capital Improvement Costs)				
Engineering	15%		$206.00	
Legal/Administrative	5%		$69.00	
Contract Admin/Construction Management	10%		$138.00	
Contingency	25%		$344.00	
Subtotal Other Costs			**$757.00**	
Total Capital Improvement Costs			**$2,133.00**	

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$0.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$0.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	DP18				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachDP18	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Check Structure, Concrete			L.F.	$342.00	$0.00	
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Wetlands Plantings			ACRE	$31,710.00	$0.00	
Reclamation & seeding (native grasses)		0	ACRE	$1,268.00	$266.00	
Trail/Path, Concrete (10' Width)			L.F.	$56.00	$0.00	
Trail/Path, Crusher Fines (10' Width)			L.F.	$14.00	$0.00	
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$266.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$266.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$13.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$13.00
Subtotal Additional Capital Improvement Costs					**$26.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$44.00
Legal/Administrative		5%			$15.00
Contract Admin/Construction Management		10%			$29.00
Contingency		25%			$73.00
Subtotal Other Costs					**$161.00**
Total Capital Improvement Costs					**$453.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**	1	0.21	ACRE	$1,903.00	$400.00	
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost							**$400.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$20,000.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	nearUS24				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachnearUS24	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			La (ft)	Hard Basin Length (ft)	Total Width (ft)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains											
Concrete Box Culverts											
Hydraulic Structures											
Sloping Drop Structures											
Height (ft)	Bottom Width (ft)	Yn (ft)									
5	10	2.12		5.00	56.00	26.96	3	EA	$49,389.54	$148,169.00	Yn calculated w/ 117 cfs (100-yr), 10 ft. bottom width rect. Channel,
				0.00	0.00	0.00		EA	$0.00	$0.00	.01 ft/ft slope, and Manning's n = .035
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
Check Structures											
Check Structure, Concrete								L.F.	$342.00	$0.00	
Channel Improvements											
Detention/Water Quality Facilities											
Removals											
Landscaping and Maintenance Improvements											
Special Items (User Defined)											
Land Acquisition											
Temporary Easements								EA		$0.00	
Easement/ROW Acquisition								ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$148,169.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$148,169.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$7,408.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$7,408.00
Subtotal Additional Capital Improvement Costs					**$14,816.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$24,448.00
Legal/Administrative		5%			$8,149.00
Contract Admin/Construction Management		10%			$16,299.00
Contingency		25%			$40,746.00
Subtotal Other Costs					**$89,642.00**
Total Capital Improvement Costs					**$252,627.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	650	L.F.	$3.00	$1,950.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
Total Annual Operation and Maintenance Cost						**$1,950.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$97,500.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	C940				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachC940	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Remove Railing	<----User Defined Items		User Defined Unit Cost ---->	30	L.F.	$15.00	$450.00	
Retrofit Grate	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$5,000.00	$5,000.00	
Channel/Inlet Improvements	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$2,000.00	$2,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs							
Pipe Culverts and Storm Drains						$0.00	
Concrete Box Culverts						$0.00	
Hydraulic Structures						$0.00	
Channel Improvements						$0.00	
Detention/Water Quality Facilities						$0.00	
Removals						$0.00	
Landscaping and Maintenance Improvements						$0.00	
Special Items (User Defined)						$7,450.00	
Subtotal Capital Improvement Costs						**$7,450.00**	
Additional Capital Improvement Costs							
Dewatering			User Defined Lump Sum Cost ---->		L.S.	$0.00	
Mobilization				5%		$373.00	
Traffic Control			User Defined Lump Sum Cost ---->		L.S.	$0.00	
Utility Coordination/Relocation			User Defined Lump Sum Cost ---->		L.S.	$0.00	
Stormwater Management/Erosion Control				5%		$373.00	
Subtotal Additional Capital Improvement Costs						**$746.00**	
Land Acquisition Costs							
ROW/Easements						$0.00	
Subtotal Land Acquisition Costs						**$0.00**	
Other Costs (percentage of Capital Improvement Costs)							
Engineering				15%		$1,229.00	
Legal/Administrative				5%		$410.00	
Contract Admin/Construction Management				10%		$820.00	
Contingency				25%		$2,049.00	
Subtotal Other Costs						**$4,508.00**	
Total Capital Improvement Costs						**$12,704.00**	

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$63.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$3,150.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	C941				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachC941	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Remove Railing	<----User Defined Items		User Defined Unit Cost ---->	20	L.F.	$15.00	$300.00	
Remove Inlet	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$1,000.00	$1,000.00	
Patch Asphalt	<----User Defined Items		User Defined Unit Cost ---->	9	S.Y.	$50.00	$450.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$5,835.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$1,750.00
Subtotal Capital Improvement Costs					**$7,585.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$379.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$379.00
Subtotal Additional Capital Improvement Costs					**$758.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,251.00
Legal/Administrative		5%			$417.00
Contract Admin/Construction Management		10%			$834.00
Contingency		25%			$2,086.00
Subtotal Other Costs					**$4,588.00**
Total Capital Improvement Costs					**$12,931.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$63.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$3,150.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD38				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD38	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)					QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains										
Circular Pipes										
Diameter (in)	Length (ft)	No. of Barrels								
18-inch	350	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.			350	L.F.	$68.00	$23,800.00	
						0	L.F.	$0.00	$0.00	
						0	L.F.	$0.00	$0.00	
Flare End Sections										
Diameter (in)	Applicable	No. of Barrels	U/S FES	D/S FES						
18-inch	Yes	1	Yes	Yes		2	EA	$1,167.00	$2,334.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
Concrete Box Culverts										
Hydraulic Structures										
Channel Improvements										
Detention/Water Quality Facilities										
Removals										
Landscaping and Maintenance Improvements										
Special Items (User Defined)										
Landscape and Fence Restoration	<----User Defined Items				User Defined Unit Cost ---->	1	EA	$5,000.00	$5,000.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
Land Acquisition										
Temporary Easements							EA		$0.00	
Easement/ROW Acquisition						0.10	ACRE	$100,000.00	$10,000.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$26,134.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$5,000.00
Subtotal Capital Improvement Costs				**$31,134.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$1,557.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$1,557.00
Subtotal Additional Capital Improvement Costs				**$3,114.00**
Land Acquisition Costs				
ROW/Easements				$10,000.00
Subtotal Land Acquisition Costs				**$10,000.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$5,137.00
Legal/Administrative		5%		$1,712.00
Contract Admin/Construction Management		10%		$3,425.00
Contingency		25%		$8,562.00
Subtotal Other Costs				**$18,836.00**
Total Capital Improvement Costs				**$63,084.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	350	L.F.	$1.00	$350.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$350.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$17,500.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD37				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD37	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Excavation, Mid Range			55	C.Y.	$30.00	$1,650.00	
6-inch Riprap, Type VL			55	C.Y.	$57.00	$3,135.00	
					$0.00	$0.00	
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Patch Asphalt	<----User Defined Items	User Defined Unit Cost ---->	40	S.Y.	$50.00	$2,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains			$0.00	
Concrete Box Culverts			$0.00	
Hydraulic Structures			$0.00	
Channel Improvements			$4,785.00	
Detention/Water Quality Facilities			$0.00	
Removals			$0.00	
Landscaping and Maintenance Improvements			$0.00	
Special Items (User Defined)			$2,000.00	
Subtotal Capital Improvement Costs			**$6,785.00**	
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Mobilization	5%		$339.00	
Traffic Control	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Stormwater Management/Erosion Control	5%		$339.00	
Subtotal Additional Capital Improvement Costs			**$678.00**	
Land Acquisition Costs				
ROW/Easements			$0.00	
Subtotal Land Acquisition Costs			**$0.00**	
Other Costs (percentage of Capital Improvement Costs)				
Engineering	15%		$1,119.00	
Legal/Administrative	5%		$373.00	
Contract Admin/Construction Management	10%		$746.00	
Contingency	25%		$1,866.00	
Subtotal Other Costs			**$4,104.00**	
Total Capital Improvement Costs			**$11,567.00**	

Master Plan Operation and Maintenance Cost Summary							
Description		**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Total Annual Operation and Maintenance Cost						**$0.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$0.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH199				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH199	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)						QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains											
Concrete Box Culverts											
Hydraulic Structures											
Sloping Drop Structures											
Height (ft)	Bottom Width (ft)	Yn (ft)		La (ft)	Hard Basin Length (ft)	Total Width (ft)					
5	10	3.15		5.00	56.00	35.20	1	EA	$64,413.87	$64,414.00	Yn based on 397 cfs (100-yr), trap. Channel w/ 10 ft. bottom width
				0.00	0.00	0.00		EA	$0.00	$0.00	2:1 side slopes, 0.03 ft/ft longitudinal, Manning's n = .055
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
Check Structures											
Check Structure, Concrete								L.F.	$342.00	$0.00	
Channel Improvements											
Detention/Water Quality Facilities											
Removals											
Landscaping and Maintenance Improvements											
Special Items (User Defined)											
Land Acquisition											
Temporary Easements								EA		$0.00	
Easement/ROW Acquisition								ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$64,414.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$64,414.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$3,221.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$3,221.00
Subtotal Additional Capital Improvement Costs					**$6,442.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$10,628.00
Legal/Administrative		5%			$3,543.00
Contract Admin/Construction Management		10%			$7,086.00
Contingency		25%			$17,714.00
Subtotal Other Costs					**$38,971.00**
Total Capital Improvement Costs					**$109,827.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	200	L.F.	$3.00	$600.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$600.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$30,000.00**

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	DP24				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachDP24	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
9-inch Riprap, Type L		80	C.Y.	$70.00	$5,600.00	Repairs to riprap rundown in pond
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Detention (Complete-in-Place)						
Detention Facility 1 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range		80	C.Y.	$30.00	$2,400.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	User Defined Unit Cost ---->		EA		$0.00	
Water Quality Appurtenances	User Defined Unit Cost ---->		EA		$0.00	
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs						
Pipe Culverts and Storm Drains					$0.00	
Concrete Box Culverts					$0.00	
Hydraulic Structures					$0.00	
Channel Improvements					$5,600.00	
Detention/Water Quality Facilities					$2,400.00	
Removals					$0.00	
Landscaping and Maintenance Improvements					$127.00	
Special Items (User Defined)					$0.00	
Subtotal Capital Improvement Costs					**$8,127.00**	
Additional Capital Improvement Costs						
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00	
Mobilization		5%			$406.00	
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00	
Stormwater Management/Erosion Control		5%			$406.00	
Subtotal Additional Capital Improvement Costs					**$812.00**	
Land Acquisition Costs						
ROW/Easements					$0.00	
Subtotal Land Acquisition Costs					**$0.00**	
Other Costs (percentage of Capital Improvement Costs)						
Engineering		15%			$1,341.00	
Legal/Administrative		5%			$447.00	
Contract Admin/Construction Management		10%			$894.00	
Contingency		25%			$2,235.00	
Subtotal Other Costs					**$4,917.00**	
Total Capital Improvement Costs					**$13,856.00**	

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	0.12	ACRE	$1,903.00	$228.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost						**$228.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$11,400.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	DP20				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachDP20	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Detention (Complete-in-Place)						
Detention Facility 1 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range		400	C.Y.	$30.00	$12,000.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	**User Defined Unit Cost ----->**	1	EA	$6,000.00	$6,000.00	
Water Quality Appurtenances	**User Defined Unit Cost ----->**		EA		$0.00	
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains				$0.00	
Concrete Box Culverts				$0.00	
Hydraulic Structures				$0.00	
Channel Improvements				$0.00	
Detention/Water Quality Facilities				$18,000.00	
Removals				$0.00	
Landscaping and Maintenance Improvements				$0.00	
Special Items (User Defined)				$0.00	
Subtotal Capital Improvement Costs				**$18,000.00**	
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ----->**		L.S.	$0.00	
Mobilization		5%		$900.00	
Traffic Control	**User Defined Lump Sum Cost ----->**		L.S.	$0.00	
Utility Coordination/Relocation	**User Defined Lump Sum Cost ----->**		L.S.	$0.00	
Stormwater Management/Erosion Control		5%		$900.00	
Subtotal Additional Capital Improvement Costs				**$1,800.00**	
Land Acquisition Costs					
ROW/Easements				$0.00	
Subtotal Land Acquisition Costs				**$0.00**	
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%		$2,970.00	
Legal/Administrative		5%		$990.00	
Contract Admin/Construction Management		10%		$1,980.00	
Contingency		25%		$4,950.00	
Subtotal Other Costs				**$10,890.00**	
Total Capital Improvement Costs				**$30,690.00**	

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ----->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ----->**			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ----->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ----->**			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ----->**	1	0.28	ACRE	$1,903.00	$533.00	
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ----->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ----->**			L.F.	$6.00	$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00	
Total Annual Operation and Maintenance Cost							**$533.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$26,650.00**	

MEDIUM PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	ParadiseSofPndrsa				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachParadiseSofPndrsa	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Check Structures						
Check Structure, Concrete		45	L.F.	$342.00	$15,390.00	3 check structures, 15' wide
Channel Improvements						
Detention/Water Quality Facilities						
Detention (Complete-in-Place)						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$15,390.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$15,390.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$770.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$770.00
Subtotal Additional Capital Improvement Costs				**$1,540.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$2,540.00
Legal/Administrative		5%		$847.00
Contract Admin/Construction Management		10%		$1,693.00
Contingency		25%		$4,233.00
Subtotal Other Costs				**$9,313.00**
Total Capital Improvement Costs				**$26,243.00**

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**		1	150	L.F.	$3.00	$450.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**				ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**				L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$450.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$22,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C73				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachC73	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Repair Headwall	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$4,000.00	$4,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$4,000.00
Subtotal Capital Improvement Costs					**$4,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$200.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$200.00
Subtotal Additional Capital Improvement Costs					**$400.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$660.00
Legal/Administrative		5%			$220.00
Contract Admin/Construction Management		10%			$440.00
Contingency		25%			$1,100.00
Subtotal Other Costs					**$2,420.00**
Total Capital Improvement Costs					**$6,820.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	57	L.F.	$1.00	$57.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$57.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,850.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	GI16				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachGI16	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Concrete Apron	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$5,115.00**

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$63.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$3,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH34				
JURISDICTION :	Private				
REACH ID:	TC-ReachCH34	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		100	C.Y.	$76.00	$7,600.00	For channel stabilization
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$7,600.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$7,600.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$380.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$380.00
Subtotal Additional Capital Improvement Costs				**$760.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$1,254.00
Legal/Administrative		5%		$418.00
Contract Admin/Construction Management		10%		$836.00
Contingency		25%		$2,090.00
Subtotal Other Costs				**$4,598.00**
Total Capital Improvement Costs				**$12,958.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	272	L.F.	$3.00	$816.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$816.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$40,800.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	GI18				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachGI18	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Concrete apron	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$3,000.00
Subtotal Capital Improvement Costs					**$3,000.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**			L.S.	$0.00
Mobilization			5%		$150.00
Traffic Control	**User Defined Lump Sum Cost ---->**			L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**			L.S.	$0.00
Stormwater Management/Erosion Control			5%		$150.00
Subtotal Additional Capital Improvement Costs					**$300.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering			15%		$495.00
Legal/Administrative			5%		$165.00
Contract Admin/Construction Management			10%		$330.00
Contingency			25%		$825.00
Subtotal Other Costs					**$1,815.00**
Total Capital Improvement Costs					**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$63.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$3,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH36				
JURISDICTION :	Private				
REACH ID:	TC-ReachCH36	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Repair concrete pan	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	14	L.F.	$1.00	$14.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$14.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$700.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C64				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachC64	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General culvert repairs	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$8,000.00	$8,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$8,000.00
Subtotal Capital Improvement Costs					**$8,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$400.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$400.00
Subtotal Additional Capital Improvement Costs					**$800.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,320.00
Legal/Administrative		5%			$440.00
Contract Admin/Construction Management		10%			$880.00
Contingency		25%			$2,200.00
Subtotal Other Costs					**$4,840.00**
Total Capital Improvement Costs					**$13,640.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	45	L.F.	$1.00	$45.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$45.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,250.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH32				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachCH32	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		145	C.Y.	$76.00	$11,020.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Detention (Complete-in-Place)						
Detention Facility 1 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range			C.Y.	$30.00	$0.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	User Defined Unit Cost ---->		EA		$0.00	
Water Quality Appurtenances	User Defined Unit Cost ---->		EA		$0.00	
Removals						
Removal of culvert pipe (D<48")			L.F.	$25.00	$0.00	
Removal of culvert pipe (48"<D<84")			L.F.	$63.00	$0.00	
Removal of culvert pipe (D>84")			L.F.	$95.00	$0.00	
Concrete Box Culvert			L.F./CELL	$127.00	$0.00	
Landscaping and Maintenance Improvements						
Wetlands Plantings			ACRE	$31,710.00	$0.00	
Reclamation & seeding (native grasses)			ACRE	$1,268.00	$0.00	
Trail/Path, Concrete (10' Width)			L.F.	$56.00	$0.00	
Trail/Path, Crusher Fines (10' Width)			L.F.	$14.00	$0.00	
Special Items (User Defined)						
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
	<----User Defined Items				$0.00	
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains				$0.00	
Concrete Box Culverts				$0.00	
Hydraulic Structures				$0.00	
Channel Improvements				$11,020.00	
Detention/Water Quality Facilities				$0.00	
Removals				$0.00	
Landscaping and Maintenance Improvements				$0.00	
Special Items (User Defined)				$0.00	
Subtotal Capital Improvement Costs				**$11,020.00**	
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Mobilization		5%		$551.00	
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Stormwater Management/Erosion Control		5%		$551.00	
Subtotal Additional Capital Improvement Costs				**$1,102.00**	
Land Acquisition Costs					
ROW/Easements				$0.00	
Subtotal Land Acquisition Costs				**$0.00**	
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%		$1,818.00	
Legal/Administrative		5%		$606.00	
Contract Admin/Construction Management		10%		$1,212.00	
Contingency		25%		$3,031.00	
Subtotal Other Costs				**$6,667.00**	
Total Capital Improvement Costs				**$18,789.00**	

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	224	L.F.	$3.00	$672.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
	<----User Defined Items					$0.00	
Total Annual Operation and Maintenance Cost						**$672.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$33,600.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH31				
JURISDICTION :	Private				
REACH ID:	TC-ReachCH31	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		48	C.Y.	$76.00	$3,648.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$3,648.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$3,648.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$182.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$182.00
Subtotal Additional Capital Improvement Costs				**$364.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$602.00
Legal/Administrative		5%		$201.00
Contract Admin/Construction Management		10%		$401.00
Contingency		25%		$1,003.00
Subtotal Other Costs				**$2,207.00**
Total Capital Improvement Costs				**$6,219.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	187	L.F.	$3.00	$561.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$561.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$28,050.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP1				
JURISDICTION :	Private				
REACH ID:	TC-ReachDP1	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Detention (Complete-in-Place)						
Detention Facility 1 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range		120	C.Y.	$30.00	$3,600.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	**User Defined Unit Cost ---->**	1	EA	$6,000.00	$6,000.00	
Water Quality Appurtenances	**User Defined Unit Cost ---->**	1	EA	$2,000.00	$2,000.00	Pipe for outlet works
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$11,600.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$11,600.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$580.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$580.00
Subtotal Additional Capital Improvement Costs					**$1,160.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,914.00
Legal/Administrative		5%			$638.00
Contract Admin/Construction Management		10%			$1,276.00
Contingency		25%			$3,190.00
Subtotal Other Costs					**$7,018.00**
Total Capital Improvement Costs					**$19,778.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	0.05	ACRE	$1,903.00	$95.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$95.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$4,750.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH38				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH38	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Regrade channel	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	113	L.F.	$3.00	$339.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$339.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$16,950.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RD9				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachRD9	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Replace concrete pan	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Total Annual Operation and Maintenance Cost						**$0.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$0.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C61				
JURISDICTION :	Private				
REACH ID:	TC-ReachC61	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		10	C.Y.	$76.00	$760.00	Scour protection
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$760.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$760.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$38.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$38.00
Subtotal Additional Capital Improvement Costs				**$76.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$125.00
Legal/Administrative		5%		$42.00
Contract Admin/Construction Management		10%		$84.00
Contingency		25%		$209.00
Subtotal Other Costs				**$460.00**
Total Capital Improvement Costs				**$1,296.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	138	L.F.	$1.00	$138.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$138.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$6,900.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP4				
JURISDICTION :	Private				
REACH ID:	TC-ReachDP4	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Detention (Complete-in-Place)						
Detention Facility 1 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range		136	C.Y.	$30.00	$4,080.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	**User Defined Unit Cost ---->**	1	EA	$6,000.00	$6,000.00	
Water Quality Appurtenances	**User Defined Unit Cost ---->**	1	EA	$12,000.00	$12,000.00	
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$22,080.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$22,080.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$1,104.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$1,104.00
Subtotal Additional Capital Improvement Costs				**$2,208.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$3,643.00
Legal/Administrative		5%		$1,214.00
Contract Admin/Construction Management		10%		$2,429.00
Contingency		25%		$6,072.00
Subtotal Other Costs				**$13,358.00**
Total Capital Improvement Costs				**$37,646.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	0.06	ACRE	$1,903.00	$114.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$114.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$5,700.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH27				
JURISDICTION :	Private				
REACH ID:	TC-ReachCH27	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General channel improvements	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$20,000.00	$20,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$20,000.00
Subtotal Capital Improvement Costs				**$20,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$1,000.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$1,000.00
Subtotal Additional Capital Improvement Costs				**$2,000.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$3,300.00
Legal/Administrative		5%		$1,100.00
Contract Admin/Construction Management		10%		$2,200.00
Contingency		25%		$5,500.00
Subtotal Other Costs				**$12,100.00**
Total Capital Improvement Costs				**$34,100.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	1299	L.F.	$3.00	$3,897.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$3,897.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$194,850.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH28				
JURISDICTION :	Private				
REACH ID:	TC-ReachCH28	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General channel improvements	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$10,000.00	$10,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$10,000.00
Subtotal Capital Improvement Costs				**$10,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$500.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$500.00
Subtotal Additional Capital Improvement Costs				**$1,000.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$1,650.00
Legal/Administrative		5%		$550.00
Contract Admin/Construction Management		10%		$1,100.00
Contingency		25%		$2,750.00
Subtotal Other Costs				**$6,050.00**
Total Capital Improvement Costs				**$17,050.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	606	L.F.	$3.00	$1,818.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$1,818.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$90,900.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C55				
JURISDICTION :	Private				
REACH ID:	TC-ReachC55	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Soil Riprap, Type M		10	C.Y.	$89.00	$890.00	Scour protection
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$890.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$890.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$45.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$45.00
Subtotal Additional Capital Improvement Costs				**$90.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$147.00
Legal/Administrative		5%		$49.00
Contract Admin/Construction Management		10%		$98.00
Contingency		25%		$245.00
Subtotal Other Costs				**$539.00**
Total Capital Improvement Costs				**$1,519.00**

Master Plan Operation and Maintenance Cost Summary						
Description		**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	165	L.F.	$1.00	$165.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$165.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$8,250.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C58				
JURISDICTION :	Private				
REACH ID:	TC-ReachC58	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
18-inch Riprap, Type H		15	C.Y.	$101.00	$1,515.00	Entrance protection
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary			
Capital Improvement Costs			
Pipe Culverts and Storm Drains			$0.00
Concrete Box Culverts			$0.00
Hydraulic Structures			$0.00
Channel Improvements			$1,515.00
Detention/Water Quality Facilities			$0.00
Removals			$0.00
Landscaping and Maintenance Improvements			$0.00
Special Items (User Defined)			$0.00
Subtotal Capital Improvement Costs			**$1,515.00**
Additional Capital Improvement Costs			
Dewatering	**User Defined Lump Sum Cost ---->**	L.S.	$0.00
Mobilization	5%		$76.00
Traffic Control	**User Defined Lump Sum Cost ---->**	L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**	L.S.	$0.00
Stormwater Management/Erosion Control	5%		$76.00
Subtotal Additional Capital Improvement Costs			**$152.00**
Land Acquisition Costs			
ROW/Easements			$0.00
Subtotal Land Acquisition Costs			**$0.00**
Other Costs (percentage of Capital Improvement Costs)			
Engineering	15%		$250.00
Legal/Administrative	5%		$83.00
Contract Admin/Construction Management	10%		$167.00
Contingency	25%		$417.00
Subtotal Other Costs			**$917.00**
Total Capital Improvement Costs			**$2,584.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	17	L.F.	$1.00	$17.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$17.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$850.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C60				
JURISDICTION :	Private				
REACH ID:	TC-ReachC60	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
18-inch Riprap, Type H		20	C.Y.	$101.00	$2,020.00	Scour protection
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs			
Pipe Culverts and Storm Drains			$0.00
Concrete Box Culverts			$0.00
Hydraulic Structures			$0.00
Channel Improvements			$2,020.00
Detention/Water Quality Facilities			$0.00
Removals			$0.00
Landscaping and Maintenance Improvements			$0.00
Special Items (User Defined)			$0.00
Subtotal Capital Improvement Costs			**$2,020.00**
Additional Capital Improvement Costs			
Dewatering	**User Defined Lump Sum Cost ---->**	L.S.	$0.00
Mobilization	5%		$101.00
Traffic Control	**User Defined Lump Sum Cost ---->**	L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**	L.S.	$0.00
Stormwater Management/Erosion Control	5%		$101.00
Subtotal Additional Capital Improvement Costs			**$202.00**
Land Acquisition Costs			
ROW/Easements			$0.00
Subtotal Land Acquisition Costs			**$0.00**
Other Costs (percentage of Capital Improvement Costs)			
Engineering	15%		$333.00
Legal/Administrative	5%		$111.00
Contract Admin/Construction Management	10%		$222.00
Contingency	25%		$556.00
Subtotal Other Costs			**$1,222.00**
Total Capital Improvement Costs			**$3,444.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	50	L.F.	$1.00	$50.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$50.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$2,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH75				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachCH75	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General channel improvements	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$7,000.00	$7,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$7,000.00
Subtotal Capital Improvement Costs					**$7,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$350.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$350.00
Subtotal Additional Capital Improvement Costs					**$700.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,155.00
Legal/Administrative		5%			$385.00
Contract Admin/Construction Management		10%			$770.00
Contingency		25%			$1,925.00
Subtotal Other Costs					**$4,235.00**
Total Capital Improvement Costs					**$11,935.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	521	L.F.	$3.00	$1,563.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$1,563.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$78,150.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH76				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachCH76	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
General channel improvements	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$5,115.00**

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**	1	18	L.F.	$3.00	$54.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$54.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,700.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C56				
JURISDICTION :	Private				
REACH ID:	TC-ReachC56	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.					
36-inch / 43 / 2		86	L.F.	$137.00	$11,782.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
36-inch / Yes / 2 / Yes / No		2	EA	$2,042.00	$4,084.00	
No		0	EA	$0.00	$0.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$15,866.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$15,866.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$793.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$793.00
Subtotal Additional Capital Improvement Costs				**$1,586.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$2,618.00
Legal/Administrative		5%		$873.00
Contract Admin/Construction Management		10%		$1,745.00
Contingency		25%		$4,363.00
Subtotal Other Costs				**$9,599.00**
Total Capital Improvement Costs				**$27,051.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	86	L.F.	$1.00	$86.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$86.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$4,300.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CI2				
JURISDICTION :	Private				
REACH ID:	TC-ReachCI2	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Manholes and Inlets						
Manhole, 4' Dia. (Pipe Dia. < 36")			EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")			EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")			EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)			EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)			EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot		1	EA	$5,835.00	$5,835.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$5,835.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$5,835.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$292.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$292.00
Subtotal Additional Capital Improvement Costs				**$584.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$963.00
Legal/Administrative		5%		$321.00
Contract Admin/Construction Management		10%		$642.00
Contingency		25%		$1,605.00
Subtotal Other Costs				**$3,531.00**
Total Capital Improvement Costs				**$9,950.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**	1	1	EA	$63.00	$63.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost							**$63.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$3,150.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C57				
JURISDICTION :	Private				
REACH ID:	TC-ReachC57	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Circular Pipes								
Diameter (in)	Length (ft)	No. of Barrels						
36-inch	169	2	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.	338	L.F.	$137.00	$46,306.00	
				0	L.F.	$0.00	$0.00	
				0	L.F.	$0.00	$0.00	
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$46,306.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$46,306.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$2,315.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$2,315.00
Subtotal Additional Capital Improvement Costs				**$4,630.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$7,640.00
Legal/Administrative		5%		$2,547.00
Contract Admin/Construction Management		10%		$5,094.00
Contingency		25%		$12,734.00
Subtotal Other Costs				**$28,015.00**
Total Capital Improvement Costs				**$78,951.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	338	L.F.	$1.00	$338.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$338.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$16,900.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	GI20				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachGI20	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Concrete apron	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$63.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$3,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RD10				
JURISDICTION :	Private				
REACH ID:	TC-ReachRD10	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General road/driveway repair	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$2,500.00	$2,500.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary					
Capital Improvement Costs					
Pipe Culverts and Storm Drains				$0.00	
Concrete Box Culverts				$0.00	
Hydraulic Structures				$0.00	
Channel Improvements				$0.00	
Detention/Water Quality Facilities				$0.00	
Removals				$0.00	
Landscaping and Maintenance Improvements				$0.00	
Special Items (User Defined)				$2,500.00	
Subtotal Capital Improvement Costs				**$2,500.00**	
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00	
Mobilization		5%		$125.00	
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00	
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00	
Stormwater Management/Erosion Control		5%		$125.00	
Subtotal Additional Capital Improvement Costs				**$250.00**	
Land Acquisition Costs					
ROW/Easements				$0.00	
Subtotal Land Acquisition Costs				**$0.00**	
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%		$413.00	
Legal/Administrative		5%		$138.00	
Contract Admin/Construction Management		10%		$275.00	
Contingency		25%		$688.00	
Subtotal Other Costs				**$1,514.00**	
Total Capital Improvement Costs				**$4,264.00**	

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	Pembrook&Parkway				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachPembrook&Parkway	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)						QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains											
Concrete Box Culverts											
Hydraulic Structures											
Sloping Drop Structures											
Height (ft)	Bottom Width (ft)	Yn (ft)		La (ft)	Hard Basin Length (ft)	Total Width (ft)					
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
				0.00	0.00	0.00		EA	$0.00	$0.00	
Check Structures											
Check Structure, Concrete							60	L.F.	$342.00	$20,520.00	Two structures, 30 feet wide
Channel Improvements											
Detention/Water Quality Facilities											
Removals											
Landscaping and Maintenance Improvements											
Special Items (User Defined)											
Land Acquisition											
Temporary Easements								EA		$0.00	
Easement/ROW Acquisition								ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$20,520.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$20,520.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$1,026.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$1,026.00
Subtotal Additional Capital Improvement Costs				**$2,052.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$3,386.00
Legal/Administrative		5%		$1,129.00
Contract Admin/Construction Management		10%		$2,257.00
Contingency		25%		$5,643.00
Subtotal Other Costs				**$12,415.00**
Total Capital Improvement Costs				**$34,987.00**

Master Plan Operation and Maintenance Cost Summary							
Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	800	L.F.	$3.00	$2,400.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$2,400.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$120,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CI18				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCI18	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Manholes and Inlets						
Manhole, 4' Dia. (Pipe Dia. < 36")			EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")			EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")			EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)			EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)			EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot		1	EA	$5,835.00	$5,835.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs						
Pipe Culverts and Storm Drains					$5,835.00	
Concrete Box Culverts					$0.00	
Hydraulic Structures					$0.00	
Channel Improvements					$0.00	
Detention/Water Quality Facilities					$0.00	
Removals					$0.00	
Landscaping and Maintenance Improvements					$0.00	
Special Items (User Defined)					$0.00	
Subtotal Capital Improvement Costs					$5,835.00	
Additional Capital Improvement Costs						
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00	
Mobilization		5%			$292.00	
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00	
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00	
Stormwater Management/Erosion Control		5%			$292.00	
Subtotal Additional Capital Improvement Costs					$584.00	
Land Acquisition Costs						
ROW/Easements					$0.00	
Subtotal Land Acquisition Costs					$0.00	
Other Costs (percentage of Capital Improvement Costs)						
Engineering		15%			$963.00	
Legal/Administrative		5%			$321.00	
Contract Admin/Construction Management		10%			$642.00	
Contingency		25%			$1,605.00	
Subtotal Other Costs					$3,531.00	
Total Capital Improvement Costs					$9,950.00	

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**	1	1	EA	$63.00	$63.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost							$63.00	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							$3,150.00	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	GI29				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachGI29	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		10	C.Y.	$76.00	$760.00	Re-grade and improve intlet
Excavation, Mid Range		10	C.Y.	$30.00	$300.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary		
Capital Improvement Costs		
Pipe Culverts and Storm Drains	$0.00	
Concrete Box Culverts	$0.00	
Hydraulic Structures	$0.00	
Channel Improvements	$1,060.00	
Detention/Water Quality Facilities	$0.00	
Removals	$0.00	
Landscaping and Maintenance Improvements	$0.00	
Special Items (User Defined)	$0.00	
Subtotal Capital Improvement Costs	**$1,060.00**	
Additional Capital Improvement Costs		
Dewatering — **User Defined Lump Sum Cost ---->**	$0.00	
Mobilization — 5%	$53.00	
Traffic Control — **User Defined Lump Sum Cost ---->**	$0.00	
Utility Coordination/Relocation — **User Defined Lump Sum Cost ---->**	$0.00	
Stormwater Management/Erosion Control — 5%	$53.00	
Subtotal Additional Capital Improvement Costs	**$106.00**	
Land Acquisition Costs		
ROW/Easements	$0.00	
Subtotal Land Acquisition Costs	**$0.00**	
Other Costs (percentage of Capital Improvement Costs)		
Engineering — 15%	$175.00	
Legal/Administrative — 5%	$58.00	
Contract Admin/Construction Management — 10%	$117.00	
Contingency — 25%	$292.00	
Subtotal Other Costs	**$642.00**	
Total Capital Improvement Costs	**$1,808.00**	

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	1	EA	$63.00	$63.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost						**$63.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$3,150.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH97				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH97	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		60	C.Y.	$76.00	$4,560.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition		0.10	ACRE	$50,000.00	$5,000.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$4,560.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$4,560.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$228.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$228.00
Subtotal Additional Capital Improvement Costs					**$456.00**
Land Acquisition Costs					
ROW/Easements					$5,000.00
Subtotal Land Acquisition Costs					**$5,000.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$752.00
Legal/Administrative		5%			$251.00
Contract Admin/Construction Management		10%			$502.00
Contingency		25%			$1,254.00
Subtotal Other Costs					**$2,759.00**
Total Capital Improvement Costs					**$12,775.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	100	L.F.	$3.00	$300.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$300.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$15,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	Ch90				
JURISDICTION :	Private				
REACH ID:	TC-ReachCh90	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		14	C.Y.	$76.00	$1,064.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary			
Capital Improvement Costs			
Pipe Culverts and Storm Drains		$0.00	
Concrete Box Culverts		$0.00	
Hydraulic Structures		$0.00	
Channel Improvements		$1,064.00	
Detention/Water Quality Facilities		$0.00	
Removals		$0.00	
Landscaping and Maintenance Improvements		$0.00	
Special Items (User Defined)		$0.00	
Subtotal Capital Improvement Costs		**$1,064.00**	
Additional Capital Improvement Costs			
Dewatering	**User Defined Lump Sum Cost ---->**	$0.00	
Mobilization	5%	$53.00	
Traffic Control	**User Defined Lump Sum Cost ---->**	$0.00	
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**	$0.00	
Stormwater Management/Erosion Control	5%	$53.00	
Subtotal Additional Capital Improvement Costs		**$106.00**	
Land Acquisition Costs			
ROW/Easements		$0.00	
Subtotal Land Acquisition Costs		**$0.00**	
Other Costs (percentage of Capital Improvement Costs)			
Engineering	15%	$176.00	
Legal/Administrative	5%	$59.00	
Contract Admin/Construction Management	10%	$117.00	
Contingency	25%	$293.00	
Subtotal Other Costs		**$645.00**	
Total Capital Improvement Costs		**$1,815.00**	

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	46	L.F.	$3.00	$138.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$138.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$6,900.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Lovell Gulch				
REACH :	CH84				
JURISDICTION :	Private				
REACH ID:	LVG-ReachCH84	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)					QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains										
Circular Pipes										
Diameter (in)	Length (ft)	No. of Barrels								
24-inch	200	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.			200	L.F.	$91.00	$18,200.00	
						0	L.F.	$0.00	$0.00	
						0	L.F.	$0.00	$0.00	
Flare End Sections										
Diameter (in)	Applicable	No. of Barrels	U/S FES	D/S FES						
24-inch	Yes	1	No	No		0	EA	$1,230.00	$0.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
Concrete Box Culverts										
Hydraulic Structures										
Channel Improvements										
Detention/Water Quality Facilities										
Removals										
Landscaping and Maintenance Improvements										
Special Items (User Defined)										
CDOT Type C	<----User Defined Items				User Defined Unit Cost ---->	2	EA	$5,000.00	$10,000.00	
Outfall protection	<----User Defined Items				User Defined Unit Cost ---->	1	EA	$2,000.00	$2,000.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
Land Acquisition										
Temporary Easements							EA		$0.00	
Easement/ROW Acquisition							ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$18,200.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$12,000.00
Subtotal Capital Improvement Costs				**$30,200.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$1,510.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$1,510.00
Subtotal Additional Capital Improvement Costs				**$3,020.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$4,983.00
Legal/Administrative		5%		$1,661.00
Contract Admin/Construction Management		10%		$3,322.00
Contingency		25%		$8,305.00
Subtotal Other Costs				**$18,271.00**
Total Capital Improvement Costs				**$51,491.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->		1	200	L.F.	$1.00	$200.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->		1	2	EA	$63.00	$126.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->				EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->				L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->				ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->				ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->				L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$326.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$16,300.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C190				
JURISDICTION :	Private				
REACH ID:	TC-ReachC190	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)					QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains										
Circular Pipes										
Diameter (in)	Length (ft)	No. of Barrels								
18-inch	23	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.			23	L.F.	$68.00	$1,564.00	
						0	L.F.	$0.00	$0.00	
						0	L.F.	$0.00	$0.00	
Flare End Sections										
Diameter (in)	Applicable	No. of Barrels	U/S FES	D/S FES						
18-inch	Yes	1	No	No		0	EA	$1,167.00	$0.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
Concrete Box Culverts										
Hydraulic Structures										
Channel Improvements										
Detention/Water Quality Facilities										
Removals										
Landscaping and Maintenance Improvements										
Special Items (User Defined)										
Land Acquisition										
Temporary Easements							EA		$0.00	
Easement/ROW Acquisition							ACRE		$0.00	

Master Plan Capital Improvement Cost Summary					
Capital Improvement Costs					
Pipe Culverts and Storm Drains				$1,564.00	
Concrete Box Culverts				$0.00	
Hydraulic Structures				$0.00	
Channel Improvements				$0.00	
Detention/Water Quality Facilities				$0.00	
Removals				$575.00	
Landscaping and Maintenance Improvements				$0.00	
Special Items (User Defined)				$0.00	
Subtotal Capital Improvement Costs				**$2,139.00**	
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00	
Mobilization		5%		$107.00	
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00	
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00	
Stormwater Management/Erosion Control		5%		$107.00	
Subtotal Additional Capital Improvement Costs				**$214.00**	
Land Acquisition Costs					
ROW/Easements				$0.00	
Subtotal Land Acquisition Costs				**$0.00**	
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%		$353.00	
Legal/Administrative		5%		$118.00	
Contract Admin/Construction Management		10%		$235.00	
Contingency		25%		$588.00	
Subtotal Other Costs				**$1,294.00**	
Total Capital Improvement Costs				**$3,647.00**	

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**		1	23	L.F.	$1.00	$23.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**				L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**				ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**				L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$23.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$1,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C222				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachC222	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Culvert entrance improvements	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$2,000.00	$2,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$2,000.00
Subtotal Capital Improvement Costs				**$2,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$100.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$100.00
Subtotal Additional Capital Improvement Costs				**$200.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$330.00
Legal/Administrative		5%		$110.00
Contract Admin/Construction Management		10%		$220.00
Contingency		25%		$550.00
Subtotal Other Costs				**$1,210.00**
Total Capital Improvement Costs				**$3,410.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	49	L.F.	$1.00	$49.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$49.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,450.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	JustDSofSH67				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachJustDSofSH67	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Check Structure, Concrete		50	L.F.	$342.00	$17,100.00	
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$17,100.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$17,100.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$855.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$855.00
Subtotal Additional Capital Improvement Costs					**$1,710.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$2,822.00
Legal/Administrative		5%			$941.00
Contract Admin/Construction Management		10%			$1,881.00
Contingency		25%			$4,703.00
Subtotal Other Costs					**$10,347.00**
Total Capital Improvement Costs					**$29,157.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**	1	200	L.F.	$3.00	$600.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost							**$600.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$30,000.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	JustUSofSH67				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachJustUSofSH67	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Check Structures						
Check Structure, Concrete		30	L.F.	$342.00	$10,260.00	
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$10,260.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$10,260.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$513.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$513.00
Subtotal Additional Capital Improvement Costs					**$1,026.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,693.00
Legal/Administrative		5%			$564.00
Contract Admin/Construction Management		10%			$1,129.00
Contingency		25%			$2,822.00
Subtotal Other Costs					**$6,208.00**
Total Capital Improvement Costs					**$17,494.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	300	L.F.	$3.00	$900.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$900.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$45,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C309				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachC309	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Improve culvert entrance	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$2,500.00	$2,500.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$2,500.00
Subtotal Capital Improvement Costs				**$2,500.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$125.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$125.00
Subtotal Additional Capital Improvement Costs				**$250.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$413.00
Legal/Administrative		5%		$138.00
Contract Admin/Construction Management		10%		$275.00
Contingency		25%		$688.00
Subtotal Other Costs				**$1,514.00**
Total Capital Improvement Costs				**$4,264.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	49	L.F.	$1.00	$49.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$49.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,450.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	ValleView				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachValleView	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)						QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains											
Circular Pipes											
Diameter (in)	**Length (ft)**	**No. of Barrels**									
60-inch	2320	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.				2320	L.F.	$304.00	$705,280.00	This is Alt. 2, the higher priced alternative.
78-inch	1260	1					1260	L.F.	$495.00	$623,700.00	This is Alt. 2, the higher priced alternative.
48-inch	450	1					450	L.F.	$183.00	$82,350.00	This is Alt. 2, the higher priced alternative.
Flare End Sections											
Diameter (in)	**Applicable**	**No. of Barrels**	**U/S FES**	**D/S FES**							
	No						0	EA	$0.00	$0.00	
	No						0	EA	$0.00	$0.00	
48-inch	Yes	1					0	EA	$2,613.00	$0.00	
Headwalls											
Diameter (in)	**Applicable**	**No. of Barrels**	**U/S Headwall**	**D/S Headwall**	**Concrete (C.Y.)**	**Steel (lbs)**					
60-inch	Yes	1			2.35	236.00	0	EA	$2,024.35	$0.00	
78-inch	Yes	1			3.11	306.00	0	EA	$2,672.71	$0.00	
Wingwalls (includes concrete apron)											
Diameter (in)		**No. of Barrels**	**Interior Span (ft)**	**Length (ft)**	**Concrete (C.Y.)**	**Steel (lbs)**					
60-inch		1	9.50	16	14.03	644.91	0	EA	$11,320.22	$0.00	
78-inch		1	11.75	20	20.85	927.23	0	EA	$16,795.65	$0.00	
Manholes and Inlets											
Manhole, 4' Dia. (Pipe Dia. < 36")								EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")								EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")							6	EA	$5,454.00	$32,724.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)								EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)								EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot								EA	$5,835.00	$0.00	
Detention/Water Quality Facilities											
Detention (Complete-in-Place)											
Detention Facility 1 (Complete-in-Place)							11	AC-FT	$57,839.00	$636,229.00	
Detention Facility 2 (Complete-in-Place)							12	AC-FT	$57,839.00	$694,068.00	
Detention Facility 3 (Complete-in-Place)								AC-FT	$57,839.00	$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains			$1,444,054.00	
Concrete Box Culverts			$0.00	
Hydraulic Structures			$0.00	
Channel Improvements			$0.00	
Detention/Water Quality Facilities			$1,330,297.00	
Removals			$0.00	
Landscaping and Maintenance Improvements			$0.00	
Special Items (User Defined)			$0.00	
Subtotal Capital Improvement Costs			**$2,774,351.00**	
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**	L.S.	$0.00	
Mobilization	5%		$138,718.00	
Traffic Control	**User Defined Lump Sum Cost ---->**	L.S.	$0.00	
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**	L.S.	$0.00	
Stormwater Management/Erosion Control	5%		$138,718.00	
Subtotal Additional Capital Improvement Costs			**$277,436.00**	
Land Acquisition Costs				
ROW/Easements			$0.00	
Subtotal Land Acquisition Costs			**$0.00**	
Other Costs (percentage of Capital Improvement Costs)				
Engineering	15%		$457,768.00	
Legal/Administrative	5%		$152,589.00	
Contract Admin/Construction Management	10%		$305,179.00	
Contingency	25%		$762,947.00	
Subtotal Other Costs			**$1,678,483.00**	
Total Capital Improvement Costs			**$4,730,270.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	Chippewa&ValleyView				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachChippewa&ValleyView	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Check Structures						
Check Structure, Concrete		20	L.F.	$342.00	$6,840.00	
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$6,840.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$6,840.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$342.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$342.00
Subtotal Additional Capital Improvement Costs					**$684.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,129.00
Legal/Administrative		5%			$376.00
Contract Admin/Construction Management		10%			$752.00
Contingency		25%			$1,881.00
Subtotal Other Costs					**$4,138.00**
Total Capital Improvement Costs					**$11,662.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
<-----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	ValleyViewDSChippewa				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachValleyViewDSChippewa	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		275	C.Y.	$76.00	$20,900.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$20,900.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$20,900.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$1,045.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$1,045.00
Subtotal Additional Capital Improvement Costs					**$2,090.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$3,449.00
Legal/Administrative		5%			$1,150.00
Contract Admin/Construction Management		10%			$2,299.00
Contingency		25%			$5,748.00
Subtotal Other Costs					**$12,646.00**
Total Capital Improvement Costs					**$35,636.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	250	L.F.	$3.00	$750.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$750.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$37,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	ParkViewEstatesPark				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachParkViewEstatesPark	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Lump sum channel conveyance improvements	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$20,000.00	$20,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$20,000.00
Subtotal Capital Improvement Costs				**$20,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$1,000.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$1,000.00
Subtotal Additional Capital Improvement Costs				**$2,000.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$3,300.00
Legal/Administrative		5%		$1,100.00
Contract Admin/Construction Management		10%		$2,200.00
Contingency		25%		$5,500.00
Subtotal Other Costs				**$12,100.00**
Total Capital Improvement Costs				**$34,100.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	100	L.F.	$3.00	$300.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$300.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$15,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	ParkViewEstatesPark				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachParkViewEstatesPark	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Lump sum channel conveyance improvements	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$20,000.00	$20,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$20,000.00
Subtotal Capital Improvement Costs				**$20,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$1,000.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$1,000.00
Subtotal Additional Capital Improvement Costs				**$2,000.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$3,300.00
Legal/Administrative		5%		$1,100.00
Contract Admin/Construction Management		10%		$2,200.00
Contingency		25%		$5,500.00
Subtotal Other Costs				**$12,100.00**
Total Capital Improvement Costs				**$34,100.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	100	L.F.	$3.00	$300.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$300.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$15,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP11				
JURISDICTION :	Private				
REACH ID:	TC-ReachDP11	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range			C.Y.	$30.00	$0.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	User Defined Unit Cost ---->	1	EA	$7,000.00	$7,000.00	New outlet works
Water Quality Appurtenances	User Defined Unit Cost ---->	1	EA	$2,000.00	$2,000.00	
Removals						
Removal of culvert pipe (D<48")			L.F.	$25.00	$0.00	
Removal of culvert pipe (48"<D<84")			L.F.	$63.00	$0.00	
Removal of culvert pipe (D>84")			L.F.	$95.00	$0.00	
Concrete Box Culvert			L.F./CELL	$127.00	$0.00	
Landscaping and Maintenance Improvements						
Wetlands Plantings			ACRE	$31,710.00	$0.00	
Reclamation & seeding (native grasses)			ACRE	$1,268.00	$0.00	
Trail/Path, Concrete (10' Width)			L.F.	$56.00	$0.00	
Trail/Path, Crusher Fines (10' Width)			L.F.	$14.00	$0.00	
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$9,000.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$9,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$450.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$450.00
Subtotal Additional Capital Improvement Costs					**$900.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,485.00
Legal/Administrative		5%			$495.00
Contract Admin/Construction Management		10%			$990.00
Contingency		25%			$2,475.00
Subtotal Other Costs					**$5,445.00**
Total Capital Improvement Costs					**$15,345.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	0.57	ACRE	$1,903.00	$1,085.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$1,085.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$54,250.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP12				
JURISDICTION :	Private				
REACH ID:	TC-ReachDP12	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (Complete-in-Place)							
Detention Facility 1 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range			125	C.Y.	$30.00	$3,750.00	
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->	1	EA	$7,000.00	$7,000.00	
Water Quality Appurtenances		User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
Removals							
Removal of culvert pipe (D<48")				L.F.	$25.00	$0.00	
Removal of culvert pipe (48"<D<84")				L.F.	$63.00	$0.00	
Removal of culvert pipe (D>84")				L.F.	$95.00	$0.00	
Concrete Box Culvert				L.F./CELL	$127.00	$0.00	
Landscaping and Maintenance Improvements							
Wetlands Plantings				ACRE	$31,710.00	$0.00	
Reclamation & seeding (native grasses)				ACRE	$1,268.00	$0.00	
Trail/Path, Concrete (10' Width)				L.F.	$56.00	$0.00	
Trail/Path, Crusher Fines (10' Width)				L.F.	$14.00	$0.00	
Special Items (User Defined)							
Dewatering	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$5,000.00	$5,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$13,750.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$5,000.00
Subtotal Capital Improvement Costs					**$18,750.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$938.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$938.00
Subtotal Additional Capital Improvement Costs					**$1,876.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$3,094.00
Legal/Administrative		5%			$1,031.00
Contract Admin/Construction Management		10%			$2,063.00
Contingency		25%			$5,157.00
Subtotal Other Costs					**$11,345.00**
Total Capital Improvement Costs					**$31,971.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	0.08	ACRE	$1,903.00	$152.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$152.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$7,600.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	SH67btwKlly&RedFthr				
JURISDICTION :	CDOT				
REACH ID:	TC-ReachSH67btwKlly&RedFthr	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Concrete Low Flow Channel		1500	L.F.	$51.00	$76,500.00	
Soil Riprap, Type M		2000	C.Y.	$89.00	$178,000.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$254,500.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$254,500.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$12,725.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$12,725.00
Subtotal Additional Capital Improvement Costs				**$25,450.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$41,993.00
Legal/Administrative		5%		$13,998.00
Contract Admin/Construction Management		10%		$27,995.00
Contingency		25%		$69,988.00
Subtotal Other Costs				**$153,974.00**
Total Capital Improvement Costs				**$433,924.00**

Master Plan Operation and Maintenance Cost Summary						
Description		**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	1500	L.F.	$3.00	$4,500.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**				$0.00
Total Annual Operation and Maintenance Cost						**$4,500.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$225,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C677				
JURISDICTION :	Private				
REACH ID:	TC-ReachC677	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.					
18-inch / 25 / 1		25	L.F.	$68.00	$1,700.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
18-inch / Yes / 1 / Yes / Yes		2	EA	$1,167.00	$2,334.00	
	No	0	EA	$0.00	$0.00	
	No	0	EA	$0.00	$0.00	
Headwalls						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Removal of culvert pipe (D<48")		25	L.F.	$25.00	$625.00	
Removal of culvert pipe (48"<D<84")			L.F.	$63.00	$0.00	
Removal of culvert pipe (D>84")			L.F.	$95.00	$0.00	
Concrete Box Culvert			L.F./CELL	$127.00	$0.00	
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs						
Pipe Culverts and Storm Drains					$4,034.00	
Concrete Box Culverts					$0.00	
Hydraulic Structures					$0.00	
Channel Improvements					$0.00	
Detention/Water Quality Facilities					$0.00	
Removals					$625.00	
Landscaping and Maintenance Improvements					$0.00	
Special Items (User Defined)					$0.00	
Subtotal Capital Improvement Costs					**$4,659.00**	
Additional Capital Improvement Costs						
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00	
Mobilization		5%			$233.00	
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00	
Stormwater Management/Erosion Control		5%			$233.00	
Subtotal Additional Capital Improvement Costs					**$466.00**	
Land Acquisition Costs						
ROW/Easements					$0.00	
Subtotal Land Acquisition Costs					**$0.00**	
Other Costs (percentage of Capital Improvement Costs)						
Engineering		15%			$769.00	
Legal/Administrative		5%			$256.00	
Contract Admin/Construction Management		10%			$513.00	
Contingency		25%			$1,281.00	
Subtotal Other Costs					**$2,819.00**	
Total Capital Improvement Costs					**$7,944.00**	

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	25	L.F.	$3.00	$75.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost						**$75.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$3,750.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C650				
JURISDICTION :	Private				
REACH ID:	TC-ReachC650	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)					QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains										
Circular Pipes										
Diameter (in)	Length (ft)	No. of Barrels								
18-inch	35	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.			35	L.F.	$68.00	$2,380.00	
						0	L.F.	$0.00	$0.00	
						0	L.F.	$0.00	$0.00	
Flare End Sections										
Diameter (in)	Applicable	No. of Barrels	U/S FES	D/S FES						
18-inch	Yes	1	Yes	Yes		2	EA	$1,167.00	$2,334.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
Concrete Box Culverts										
Hydraulic Structures										
Channel Improvements										
Detention/Water Quality Facilities										
Removals										
Removal of culvert pipe (D<48")						35	L.F.	$25.00	$875.00	
Removal of culvert pipe (48"<D<84")							L.F.	$63.00	$0.00	
Removal of culvert pipe (D>84")							L.F.	$95.00	$0.00	
Concrete Box Culvert							L.F./CELL	$127.00	$0.00	
Landscaping and Maintenance Improvements										
Special Items (User Defined)										
Land Acquisition										
Temporary Easements							EA		$0.00	
Easement/ROW Acquisition							ACRE		$0.00	

Master Plan Capital Improvement Cost Summary					
Capital Improvement Costs					
Pipe Culverts and Storm Drains				$4,714.00	
Concrete Box Culverts				$0.00	
Hydraulic Structures				$0.00	
Channel Improvements				$0.00	
Detention/Water Quality Facilities				$0.00	
Removals				$875.00	
Landscaping and Maintenance Improvements				$0.00	
Special Items (User Defined)				$0.00	
Subtotal Capital Improvement Costs				**$5,589.00**	
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Mobilization		5%		$279.00	
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Stormwater Management/Erosion Control		5%		$279.00	
Subtotal Additional Capital Improvement Costs				**$558.00**	
Land Acquisition Costs					
ROW/Easements				$0.00	
Subtotal Land Acquisition Costs				**$0.00**	
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%		$922.00	
Legal/Administrative		5%		$307.00	
Contract Admin/Construction Management		10%		$615.00	
Contingency		25%		$1,537.00	
Subtotal Other Costs				**$3,381.00**	
Total Capital Improvement Costs				**$9,528.00**	

Master Plan Operation and Maintenance Cost Summary							
Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	35	L.F.	$1.00	$35.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$35.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$1,750.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RedFthrEastof67				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachRedFthrEastof67	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		15	C.Y.	$76.00	$1,140.00	
Excavation, Mid Range		15	C.Y.	$30.00	$450.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$1,590.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$1,590.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$80.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$80.00
Subtotal Additional Capital Improvement Costs					**$160.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$263.00
Legal/Administrative		5%			$88.00
Contract Admin/Construction Management		10%			$175.00
Contingency		25%			$438.00
Subtotal Other Costs					**$964.00**
Total Capital Improvement Costs					**$2,714.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**	1	25	L.F.	$3.00	$75.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$75.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$3,750.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C722				
JURISDICTION :	Private				
REACH ID:	TC-ReachC722	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Reset culvert and grade	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	24	L.F.	$3.00	$72.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$72.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$3,600.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP16				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP16	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (Complete-in-Place)							
Detention Facility 1 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range				C.Y.	$30.00	$0.00	
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		**User Defined Unit Cost ---->**	1	EA	$10,000.00	$10,000.00	
Water Quality Appurtenances		**User Defined Unit Cost ---->**	1	EA	$3,000.00	$3,000.00	
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary			
Capital Improvement Costs			
Pipe Culverts and Storm Drains		$0.00	
Concrete Box Culverts		$0.00	
Hydraulic Structures		$0.00	
Channel Improvements		$0.00	
Detention/Water Quality Facilities		$13,000.00	
Removals		$0.00	
Landscaping and Maintenance Improvements		$0.00	
Special Items (User Defined)		$0.00	
Subtotal Capital Improvement Costs		**$13,000.00**	
Additional Capital Improvement Costs			
Dewatering	**User Defined Lump Sum Cost ---->**	$0.00	
Mobilization	5%	$650.00	
Traffic Control	**User Defined Lump Sum Cost ---->**	$0.00	
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**	$0.00	
Stormwater Management/Erosion Control	5%	$650.00	
Subtotal Additional Capital Improvement Costs		**$1,300.00**	
Land Acquisition Costs			
ROW/Easements		$0.00	
Subtotal Land Acquisition Costs		**$0.00**	
Other Costs (percentage of Capital Improvement Costs)			
Engineering	15%	$2,145.00	
Legal/Administrative	5%	$715.00	
Contract Admin/Construction Management	10%	$1,430.00	
Contingency	25%	$3,575.00	
Subtotal Other Costs		**$7,865.00**	
Total Capital Improvement Costs		**$22,165.00**	

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**	1	0.31	ACRE	$1,903.00	$590.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$590.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$29,500.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH167				
JURISDICTION :	Private				
REACH ID:	TC-ReachCH167	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Soil Riprap, Type M		218	C.Y.	$89.00	$19,402.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$19,402.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$19,402.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$970.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$970.00
Subtotal Additional Capital Improvement Costs				**$1,940.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$3,201.00
Legal/Administrative		5%		$1,067.00
Contract Admin/Construction Management		10%		$2,134.00
Contingency		25%		$5,336.00
Subtotal Other Costs				**$11,738.00**
Total Capital Improvement Costs				**$33,080.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	370	L.F.	$3.00	$1,110.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$1,110.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$55,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C883				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachC883	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Reset culvert and grade	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$2,500.00	$2,500.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs			
Pipe Culverts and Storm Drains			$0.00
Concrete Box Culverts			$0.00
Hydraulic Structures			$0.00
Channel Improvements			$0.00
Detention/Water Quality Facilities			$0.00
Removals			$0.00
Landscaping and Maintenance Improvements			$0.00
Special Items (User Defined)			$2,500.00
Subtotal Capital Improvement Costs			**$2,500.00**
Additional Capital Improvement Costs			
Dewatering	User Defined Lump Sum Cost ---->	L.S.	$0.00
Mobilization	5%		$125.00
Traffic Control	User Defined Lump Sum Cost ---->	L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->	L.S.	$0.00
Stormwater Management/Erosion Control	5%		$125.00
Subtotal Additional Capital Improvement Costs			**$250.00**
Land Acquisition Costs			
ROW/Easements			$0.00
Subtotal Land Acquisition Costs			**$0.00**
Other Costs (percentage of Capital Improvement Costs)			
Engineering	15%		$413.00
Legal/Administrative	5%		$138.00
Contract Admin/Construction Management	10%		$275.00
Contingency	25%		$688.00
Subtotal Other Costs			**$1,514.00**
Total Capital Improvement Costs			**$4,264.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	44	L.F.	$1.00	$44.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$44.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,200.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	ForestEdge				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachForestEdge	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Soil Riprap, Type M		100	C.Y.	$89.00	$8,900.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$8,900.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$8,900.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$445.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$445.00
Subtotal Additional Capital Improvement Costs				**$890.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$1,469.00
Legal/Administrative		5%		$490.00
Contract Admin/Construction Management		10%		$979.00
Contingency		25%		$2,448.00
Subtotal Other Costs				**$5,386.00**
Total Capital Improvement Costs				**$15,176.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	250	L.F.	$3.00	$750.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$750.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$37,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RmpRange&Kelleys				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachRmpRange&Kelleys	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General improvements	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$10,000.00	$10,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$10,000.00
Subtotal Capital Improvement Costs					**$10,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->			L.S.	$0.00
Mobilization		5%			$500.00
Traffic Control	User Defined Lump Sum Cost ---->			L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->			L.S.	$0.00
Stormwater Management/Erosion Control		5%			$500.00
Subtotal Additional Capital Improvement Costs					**$1,000.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,650.00
Legal/Administrative		5%			$550.00
Contract Admin/Construction Management		10%			$1,100.00
Contingency		25%			$2,750.00
Subtotal Other Costs					**$6,050.00**
Total Capital Improvement Costs					**$17,050.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	100	L.F.	$3.00	$300.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$300.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$15,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	DP21				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachDP21	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Detention (Complete-in-Place)						
Detention Facility 1 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)			AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)						
Excavation, Low Range			C.Y.	$14.00	$0.00	
Excavation, Mid Range			C.Y.	$30.00	$0.00	
Excavation, High Range			C.Y.	$39.00	$0.00	
Outlet Works	**User Defined Unit Cost ---->**		EA		$0.00	
Water Quality Appurtenances	**User Defined Unit Cost ---->**	1	EA	$2,500.00	$2,500.00	Retrofit for water quality
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
<----User Defined Items	**User Defined Unit Cost ---->**				$0.00	
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$2,500.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$2,500.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$125.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$125.00
Subtotal Additional Capital Improvement Costs				**$250.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$413.00
Legal/Administrative		5%		$138.00
Contract Admin/Construction Management		10%		$275.00
Contingency		25%		$688.00
Subtotal Other Costs				**$1,514.00**
Total Capital Improvement Costs				**$4,264.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	0.2	ACRE	$1,903.00	$381.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$381.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$19,050.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	WalnutNofCounty				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachWalnutNofCounty	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Steep/incised channel mitigation	<----User Defined Items	User Defined Unit Cost ---->	1100	L.F.	$20.00	$22,000.00	May include guard railing
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains			$0.00	
Concrete Box Culverts			$0.00	
Hydraulic Structures			$0.00	
Channel Improvements			$0.00	
Detention/Water Quality Facilities			$0.00	
Removals			$0.00	
Landscaping and Maintenance Improvements			$0.00	
Special Items (User Defined)			$22,000.00	
Subtotal Capital Improvement Costs			**$22,000.00**	
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Mobilization	5%		$1,100.00	
Traffic Control	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Stormwater Management/Erosion Control	5%		$1,100.00	
Subtotal Additional Capital Improvement Costs			**$2,200.00**	
Land Acquisition Costs				
ROW/Easements			$0.00	
Subtotal Land Acquisition Costs			**$0.00**	
Other Costs (percentage of Capital Improvement Costs)				
Engineering	15%		$3,630.00	
Legal/Administrative	5%		$1,210.00	
Contract Admin/Construction Management	10%		$2,420.00	
Contingency	25%		$6,050.00	
Subtotal Other Costs			**$13,310.00**	
Total Capital Improvement Costs			**$37,510.00**	

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	1100	L.F.	$3.00	$3,300.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$3,300.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$165,000.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	WalnutSofBowman				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachWalnutSofBowman	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Incised channel mitigation	<----User Defined Items	User Defined Unit Cost ---->	335	L.F.	$20.00	$6,700.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$6,700.00
Subtotal Capital Improvement Costs					**$6,700.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$335.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$335.00
Subtotal Additional Capital Improvement Costs					**$670.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,106.00
Legal/Administrative		5%			$369.00
Contract Admin/Construction Management		10%			$737.00
Contingency		25%			$1,843.00
Subtotal Other Costs					**$4,055.00**
Total Capital Improvement Costs					**$11,425.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	335	L.F.	$3.00	$1,005.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$1,005.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$50,250.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH174				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH174	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition		0.10	ACRE	$50,000.00	$5,000.00	Easement mzay already exist

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$0.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$0.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$0.00
Subtotal Additional Capital Improvement Costs					**$0.00**
Land Acquisition Costs					
ROW/Easements					$5,000.00
Subtotal Land Acquisition Costs					**$5,000.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$0.00
Legal/Administrative		5%			$0.00
Contract Admin/Construction Management		10%			$0.00
Contingency		25%			$0.00
Subtotal Other Costs					**$0.00**
Total Capital Improvement Costs					**$5,000.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	165	L.F.	$3.00	$495.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost						**$495.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$24,750.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	Pine&DelEste				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachPine&DelEste	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Stabilize channel	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$10,000.00	$10,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$10,000.00
Subtotal Capital Improvement Costs					**$10,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$500.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$500.00
Subtotal Additional Capital Improvement Costs					**$1,000.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,650.00
Legal/Administrative		5%			$550.00
Contract Admin/Construction Management		10%			$1,100.00
Contingency		25%			$2,750.00
Subtotal Other Costs					**$6,050.00**
Total Capital Improvement Costs					**$17,050.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	50	L.F.	$3.00	$150.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$150.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$7,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH181				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH181	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition		0.10	ACRE	$50,000.00	$5,000.00	May already have an easemen t

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$0.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$0.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$0.00
Subtotal Additional Capital Improvement Costs					**$0.00**
Land Acquisition Costs					
ROW/Easements					$5,000.00
Subtotal Land Acquisition Costs					**$5,000.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$0.00
Legal/Administrative		5%			$0.00
Contract Admin/Construction Management		10%			$0.00
Contingency		25%			$0.00
Subtotal Other Costs					**$0.00**
Total Capital Improvement Costs					**$5,000.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	279	L.F.	$3.00	$837.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost						**$837.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$41,850.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH130				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH130	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Soil Riprap, Type M		60	C.Y.	$89.00	$5,340.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition		0.10	ACRE	$50,000.00	$5,000.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$5,340.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$5,340.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$267.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$267.00
Subtotal Additional Capital Improvement Costs				**$534.00**
Land Acquisition Costs				
ROW/Easements				$5,000.00
Subtotal Land Acquisition Costs				**$5,000.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$881.00
Legal/Administrative		5%		$294.00
Contract Admin/Construction Management		10%		$587.00
Contingency		25%		$1,469.00
Subtotal Other Costs				**$3,231.00**
Total Capital Improvement Costs				**$14,105.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	160	L.F.	$3.00	$480.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$480.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$24,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	C572				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachC572	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition		0.10	ACRE	$50,000.00	$5,000.00	May already have an easement

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$0.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$0.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$0.00
Subtotal Additional Capital Improvement Costs					**$0.00**
Land Acquisition Costs					
ROW/Easements					$5,000.00
Subtotal Land Acquisition Costs					**$5,000.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$0.00
Legal/Administrative		5%			$0.00
Contract Admin/Construction Management		10%			$0.00
Contingency		25%			$0.00
Subtotal Other Costs					**$0.00**
Total Capital Improvement Costs					**$5,000.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	84	L.F.	$1.00	$84.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$84.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$4,200.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RD26				
JURISDICTION :	Private				
REACH ID:	TC-ReachRD26	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Bank Stabilization	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$3,000.00
Subtotal Capital Improvement Costs					**$3,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->			L.S.	$0.00
Mobilization		5%			$150.00
Traffic Control	User Defined Lump Sum Cost ---->			L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->			L.S.	$0.00
Stormwater Management/Erosion Control		5%			$150.00
Subtotal Additional Capital Improvement Costs					**$300.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$495.00
Legal/Administrative		5%			$165.00
Contract Admin/Construction Management		10%			$330.00
Contingency		25%			$825.00
Subtotal Other Costs					**$1,815.00**
Total Capital Improvement Costs					**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD18				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD18	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels						
18-inch / 50 / 1		50	L.F.	$68.00	$3,400.00	
	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.	0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
18-inch / Yes / 1 / No / Yes		1	EA	$1,167.00	$1,167.00	
/ No / / /		0	EA	$0.00	$0.00	
/ No / / /		0	EA	$0.00	$0.00	
Manholes and Inlets						
Manhole, 4' Dia. (Pipe Dia. < 36")			EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")			EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")			EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)			EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)			EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot		1	EA	$5,835.00	$5,835.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$10,402.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$10,402.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$520.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$520.00
Subtotal Additional Capital Improvement Costs					**$1,040.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,716.00
Legal/Administrative		5%			$572.00
Contract Admin/Construction Management		10%			$1,144.00
Contingency		25%			$2,861.00
Subtotal Other Costs					**$6,293.00**
Total Capital Improvement Costs					**$17,735.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	50	L.F.	$1.00	$50.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
	<----User Defined Items / User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$113.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$5,650.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH149				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH149	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Soil Riprap, Type M		15	C.Y.	$89.00	$1,335.00	
Excavation, Mid Range		15	C.Y.	$30.00	$450.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$1,785.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$1,785.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$89.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$89.00
Subtotal Additional Capital Improvement Costs					**$178.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$294.00
Legal/Administrative		5%			$98.00
Contract Admin/Construction Management		10%			$196.00
Contingency		25%			$491.00
Subtotal Other Costs					**$1,079.00**
Total Capital Improvement Costs					**$3,042.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	90	L.F.	$3.00	$270.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$270.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$13,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH132CH133				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH132CH133	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
General intersection improvements	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$15,000.00	$15,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$15,000.00
Subtotal Capital Improvement Costs					**$15,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$750.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$750.00
Subtotal Additional Capital Improvement Costs					**$1,500.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$2,475.00
Legal/Administrative		5%			$825.00
Contract Admin/Construction Management		10%			$1,650.00
Contingency		25%			$4,125.00
Subtotal Other Costs					**$9,075.00**
Total Capital Improvement Costs					**$25,575.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RD21				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachRD21	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.					
18-inch / 50 / 1		50	L.F.	$68.00	$3,400.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
18-inch / Yes / 1 / No / Yes		1	EA	$1,167.00	$1,167.00	
	No	0	EA	$0.00	$0.00	
	No	0	EA	$0.00	$0.00	
Headwalls						
Wingwalls (includes concrete apron)						
Manholes and Inlets						
Manhole, 4' Dia. (Pipe Dia. < 36")			EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")			EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")			EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)			EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)			EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot		1	EA	$5,835.00	$5,835.00	
Concrete Box Culverts						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$10,402.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$10,402.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$520.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$520.00
Subtotal Additional Capital Improvement Costs					**$1,040.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,716.00
Legal/Administrative		5%			$572.00
Contract Admin/Construction Management		10%			$1,144.00
Contingency		25%			$2,861.00
Subtotal Other Costs					**$6,293.00**
Total Capital Improvement Costs					**$17,735.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	50	L.F.	$1.00	$50.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$113.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$5,650.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH131				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH131	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General channel and road improvements	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$8,000.00	$8,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$8,000.00
Subtotal Capital Improvement Costs				**$8,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$400.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$400.00
Subtotal Additional Capital Improvement Costs				**$800.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$1,320.00
Legal/Administrative		5%		$440.00
Contract Admin/Construction Management		10%		$880.00
Contingency		25%		$2,200.00
Subtotal Other Costs				**$4,840.00**
Total Capital Improvement Costs				**$13,640.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	167	L.F.	$1.00	$167.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$167.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$8,350.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD27				
JURISDICTION :	Private				
REACH ID:	FC-ReachRD27	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Hillside stabilization	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$11,000.00	$11,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$11,000.00
Subtotal Capital Improvement Costs					**$11,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$550.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$550.00
Subtotal Additional Capital Improvement Costs					**$1,100.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,815.00
Legal/Administrative		5%			$605.00
Contract Admin/Construction Management		10%			$1,210.00
Contingency		25%			$3,025.00
Subtotal Other Costs					**$6,655.00**
Total Capital Improvement Costs					**$18,755.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RD34				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachRD34	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Excavation, Mid Range		75	C.Y.	$30.00	$2,250.00	Create drainage swale
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$2,250.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$2,250.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$113.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$113.00
Subtotal Additional Capital Improvement Costs					**$226.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$371.00
Legal/Administrative		5%			$124.00
Contract Admin/Construction Management		10%			$248.00
Contingency		25%			$619.00
Subtotal Other Costs					**$1,362.00**
Total Capital Improvement Costs					**$3,838.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	150	L.F.	$3.00	$450.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$450.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$22,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	C1100				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachC1100	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General improvements at intersection	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$15,000.00	$15,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs	
Pipe Culverts and Storm Drains	$0.00
Concrete Box Culverts	$0.00
Hydraulic Structures	$0.00
Channel Improvements	$0.00
Detention/Water Quality Facilities	$0.00
Removals	$0.00
Landscaping and Maintenance Improvements	$0.00
Special Items (User Defined)	$15,000.00
Subtotal Capital Improvement Costs	**$15,000.00**
Additional Capital Improvement Costs	
Dewatering	$0.00
Mobilization	$750.00
Traffic Control	$0.00
Utility Coordination/Relocation	$0.00
Stormwater Management/Erosion Control	$750.00
Subtotal Additional Capital Improvement Costs	**$1,500.00**
Land Acquisition Costs	
ROW/Easements	$0.00
Subtotal Land Acquisition Costs	**$0.00**
Other Costs (percentage of Capital Improvement Costs)	
Engineering	$2,475.00
Legal/Administrative	$825.00
Contract Admin/Construction Management	$1,650.00
Contingency	$4,125.00
Subtotal Other Costs	**$9,075.00**
Total Capital Improvement Costs	**$25,575.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	40	L.F.	$1.00	$40.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$40.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD35				
JURISDICTION :	Private				
REACH ID:	FC-ReachRD35	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General Drainage	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$11,000.00	$11,000.00	
Parking Lot	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$15,000.00	$15,000.00	
Sidewalk	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$7,000.00	$7,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs		
Pipe Culverts and Storm Drains	$0.00	
Concrete Box Culverts	$0.00	
Hydraulic Structures	$0.00	
Channel Improvements	$0.00	
Detention/Water Quality Facilities	$0.00	
Removals	$0.00	
Landscaping and Maintenance Improvements	$0.00	
Special Items (User Defined)	$33,000.00	
Subtotal Capital Improvement Costs	**$33,000.00**	
Additional Capital Improvement Costs		
Dewatering (User Defined Lump Sum Cost ---->)	$0.00	
Mobilization (5%)	$1,650.00	
Traffic Control (User Defined Lump Sum Cost ---->)	$0.00	
Utility Coordination/Relocation (User Defined Lump Sum Cost ---->)	$0.00	
Stormwater Management/Erosion Control (5%)	$1,650.00	
Subtotal Additional Capital Improvement Costs	**$3,300.00**	
Land Acquisition Costs		
ROW/Easements	$0.00	
Subtotal Land Acquisition Costs	**$0.00**	
Other Costs (percentage of Capital Improvement Costs)		
Engineering (15%)	$5,445.00	
Legal/Administrative (5%)	$1,815.00	
Contract Admin/Construction Management (10%)	$3,630.00	
Contingency (25%)	$9,075.00	
Subtotal Other Costs	**$19,965.00**	
Total Capital Improvement Costs	**$56,265.00**	

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$0.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$0.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD33				
JURISDICTION :	Private				
REACH ID:	FC-ReachRD33	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Improve culvert crossing	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$2,500.00	$2,500.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$2,500.00
Subtotal Capital Improvement Costs					**$2,500.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$125.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$125.00
Subtotal Additional Capital Improvement Costs					**$250.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$413.00
Legal/Administrative		5%			$138.00
Contract Admin/Construction Management		10%			$275.00
Contingency		25%			$688.00
Subtotal Other Costs					**$1,514.00**
Total Capital Improvement Costs					**$4,264.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	30	L.F.	$1.00	$30.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$30.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$1,500.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	Coraline&South				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCoraline&South	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Curb and gutter	<----User Defined Items		User Defined Unit Cost ---->	300	L.F.	$20.00	$6,000.00	East side of Coraline
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$6,000.00
Subtotal Capital Improvement Costs				**$6,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$300.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$300.00
Subtotal Additional Capital Improvement Costs				**$600.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$990.00
Legal/Administrative		5%		$330.00
Contract Admin/Construction Management		10%		$660.00
Contingency		25%		$1,650.00
Subtotal Other Costs				**$3,630.00**
Total Capital Improvement Costs				**$10,230.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH150				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH150	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Excavation, Mid Range		56	C.Y.	$30.00	$1,680.00	Grading
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$1,680.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$1,680.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$84.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$84.00
Subtotal Additional Capital Improvement Costs					**$168.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$277.00
Legal/Administrative		5%			$92.00
Contract Admin/Construction Management		10%			$185.00
Contingency		25%			$462.00
Subtotal Other Costs					**$1,016.00**
Total Capital Improvement Costs					**$2,864.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	243	L.F.	$3.00	$729.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$729.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$36,450.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD13				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD13	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Drainage Improvements	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$3,500.00	$3,500.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,500.00
Subtotal Capital Improvement Costs				**$3,500.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$175.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$175.00
Subtotal Additional Capital Improvement Costs				**$350.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$578.00
Legal/Administrative		5%		$193.00
Contract Admin/Construction Management		10%		$385.00
Contingency		25%		$963.00
Subtotal Other Costs				**$2,119.00**
Total Capital Improvement Costs				**$5,969.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$63.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$3,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH115				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH115	ESTIMATED BY :	Dave Dubler	DATE :	12/8/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General channel improvements	<----User Defined Items		User Defined Unit Cost ---->	134	L.F.	$75.00	$10,050.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$10,050.00
Subtotal Capital Improvement Costs				**$10,050.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$503.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$503.00
Subtotal Additional Capital Improvement Costs				**$1,006.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$1,658.00
Legal/Administrative		5%		$553.00
Contract Admin/Construction Management		10%		$1,106.00
Contingency		25%		$2,764.00
Subtotal Other Costs				**$6,081.00**
Total Capital Improvement Costs				**$17,137.00**

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->				L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->				EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->				EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->		1	134	L.F.	$3.00	$402.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->				ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->				ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->				L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$402.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$20,100.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH116				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH116	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General channel improvements	<----User Defined Items		User Defined Unit Cost ---->	94	L.F.	$75.00	$7,050.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains			$0.00	
Concrete Box Culverts			$0.00	
Hydraulic Structures			$0.00	
Channel Improvements			$0.00	
Detention/Water Quality Facilities			$0.00	
Removals			$0.00	
Landscaping and Maintenance Improvements			$0.00	
Special Items (User Defined)			$7,050.00	
Subtotal Capital Improvement Costs			**$7,050.00**	
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Mobilization	5%		$353.00	
Traffic Control	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Stormwater Management/Erosion Control	5%		$353.00	
Subtotal Additional Capital Improvement Costs			**$706.00**	
Land Acquisition Costs				
ROW/Easements			$0.00	
Subtotal Land Acquisition Costs			**$0.00**	
Other Costs (percentage of Capital Improvement Costs)				
Engineering	15%		$1,163.00	
Legal/Administrative	5%		$388.00	
Contract Admin/Construction Management	10%		$776.00	
Contingency	25%		$1,939.00	
Subtotal Other Costs			**$4,266.00**	
Total Capital Improvement Costs			**$12,022.00**	

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	94	L.F.	$3.00	$282.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$282.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$14,100.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD15				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD15	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Concrete pan	<----User Defined Items	User Defined Unit Cost ---->	44	S.Y.	$50.00	$2,200.00	Pan upstream of road damage 15
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$2,200.00
Subtotal Capital Improvement Costs				**$2,200.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$110.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$110.00
Subtotal Additional Capital Improvement Costs				**$220.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$363.00
Legal/Administrative		5%		$121.00
Contract Admin/Construction Management		10%		$242.00
Contingency		25%		$605.00
Subtotal Other Costs				**$1,331.00**
Total Capital Improvement Costs				**$3,751.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH121				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH121	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Concrete pan	<----User Defined Items		User Defined Unit Cost ---->	31	S.Y.	$50.00	$1,550.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$1,550.00
Subtotal Capital Improvement Costs				**$1,550.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$78.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$78.00
Subtotal Additional Capital Improvement Costs				**$156.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$256.00
Legal/Administrative		5%		$85.00
Contract Admin/Construction Management		10%		$171.00
Contingency		25%		$427.00
Subtotal Other Costs				**$939.00**
Total Capital Improvement Costs				**$2,645.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	C524&C525				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachC524&C525	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Junction box w/grate inlet	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$9,000.00	$9,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$9,000.00
Subtotal Capital Improvement Costs					**$9,000.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$450.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$450.00
Subtotal Additional Capital Improvement Costs					**$900.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,485.00
Legal/Administrative		5%			$495.00
Contract Admin/Construction Management		10%			$990.00
Contingency		25%			$2,475.00
Subtotal Other Costs					**$5,445.00**
Total Capital Improvement Costs					**$15,345.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$63.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$3,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH129				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH129	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Soil Riprap, Type M		31	C.Y.	$89.00	$2,759.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$2,759.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$2,759.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$138.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$138.00
Subtotal Additional Capital Improvement Costs				**$276.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$455.00
Legal/Administrative		5%		$152.00
Contract Admin/Construction Management		10%		$304.00
Contingency		25%		$759.00
Subtotal Other Costs				**$1,670.00**
Total Capital Improvement Costs				**$4,705.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**	1	140	L.F.	$3.00	$420.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$420.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$21,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH142				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH142	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Curb and gutter	<----User Defined Items	User Defined Unit Cost ---->	264	L.F.	$20.00	$5,280.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$5,280.00
Subtotal Capital Improvement Costs					**$5,280.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$264.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$264.00
Subtotal Additional Capital Improvement Costs					**$528.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$871.00
Legal/Administrative		5%			$290.00
Contract Admin/Construction Management		10%			$581.00
Contingency		25%			$1,452.00
Subtotal Other Costs					**$3,194.00**
Total Capital Improvement Costs					**$9,002.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD28				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD28	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Concrete pan	<----User Defined Items	User Defined Unit Cost ---->	27	S.Y.	$50.00	$1,350.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$1,350.00
Subtotal Capital Improvement Costs					**$1,350.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->			L.S.	$0.00
Mobilization		5%			$68.00
Traffic Control	User Defined Lump Sum Cost ---->			L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->			L.S.	$0.00
Stormwater Management/Erosion Control		5%			$68.00
Subtotal Additional Capital Improvement Costs					**$136.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$223.00
Legal/Administrative		5%			$74.00
Contract Admin/Construction Management		10%			$149.00
Contingency		25%			$372.00
Subtotal Other Costs					**$818.00**
Total Capital Improvement Costs					**$2,304.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CH155				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCH155	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Concrete pan	<----User Defined Items	User Defined Unit Cost ---->	69	S.Y.	$50.00	$3,450.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,450.00
Subtotal Capital Improvement Costs				**$3,450.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$173.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$173.00
Subtotal Additional Capital Improvement Costs				**$346.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$569.00
Legal/Administrative		5%		$190.00
Contract Admin/Construction Management		10%		$380.00
Contingency		25%		$949.00
Subtotal Other Costs				**$2,088.00**
Total Capital Improvement Costs				**$5,884.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD39				
JURISDICTION :	Private				
REACH ID:	FC-ReachRD39	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
General road repair	<----User Defined Items	User Defined Unit Cost ---->	1	E.A.	$2,500.00	$2,500.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains			$0.00	
Concrete Box Culverts			$0.00	
Hydraulic Structures			$0.00	
Channel Improvements			$0.00	
Detention/Water Quality Facilities			$0.00	
Removals			$0.00	
Landscaping and Maintenance Improvements			$0.00	
Special Items (User Defined)			$2,500.00	
Subtotal Capital Improvement Costs			**$2,500.00**	
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Mobilization	5%		$125.00	
Traffic Control	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->	L.S.	$0.00	
Stormwater Management/Erosion Control	5%		$125.00	
Subtotal Additional Capital Improvement Costs			**$250.00**	
Land Acquisition Costs				
ROW/Easements			$0.00	
Subtotal Land Acquisition Costs			**$0.00**	
Other Costs (percentage of Capital Improvement Costs)				
Engineering	15%		$413.00	
Legal/Administrative	5%		$138.00	
Contract Admin/Construction Management	10%		$275.00	
Contingency	25%		$688.00	
Subtotal Other Costs			**$1,514.00**	
Total Capital Improvement Costs			**$4,264.00**	

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Total Annual Operation and Maintenance Cost						**$0.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$0.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	BoundarySofMidland				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachBoundarySofMidland	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Curb and gutter	<----User Defined Items		User Defined Unit Cost ---->	125	L.F.	$20.00	$2,500.00	
Concrete pan	<----User Defined Items		User Defined Unit Cost ---->	56	S.Y.	$50.00	$2,800.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$5,300.00
Subtotal Capital Improvement Costs				**$5,300.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$265.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$265.00
Subtotal Additional Capital Improvement Costs				**$530.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$875.00
Legal/Administrative		5%		$292.00
Contract Admin/Construction Management		10%		$583.00
Contingency		25%		$1,458.00
Subtotal Other Costs				**$3,208.00**
Total Capital Improvement Costs				**$9,038.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	DP23				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachDP23	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Improved outlet works	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$6,000.00	$6,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$6,000.00
Subtotal Capital Improvement Costs				**$6,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$300.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$300.00
Subtotal Additional Capital Improvement Costs				**$600.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$990.00
Legal/Administrative		5%		$330.00
Contract Admin/Construction Management		10%		$660.00
Contingency		25%		$1,650.00
Subtotal Other Costs				**$3,630.00**
Total Capital Improvement Costs				**$10,230.00**

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ----->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ----->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ----->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ----->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ----->**	1	0.08	ACRE	$1,903.00	$152.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ----->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ----->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ----->**					$0.00
Total Annual Operation and Maintenance Cost							**$152.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$7,600.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	GI57				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachGI57	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (User Entered Quantities)							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Improve inlet	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Total Annual Operation and Maintenance Cost						**$63.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$3,150.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	GI60				
JURISDICTION :	Private				
REACH ID:	FC-ReachGI60	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Improve intlet	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$3,500.00	$3,500.00	Improvements to capture flow
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,500.00
Subtotal Capital Improvement Costs				**$3,500.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$175.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$175.00
Subtotal Additional Capital Improvement Costs				**$350.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$578.00
Legal/Administrative		5%		$193.00
Contract Admin/Construction Management		10%		$385.00
Contingency		25%		$963.00
Subtotal Other Costs				**$2,119.00**
Total Capital Improvement Costs				**$5,969.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$63.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$3,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	GI61				
JURISDICTION :	Private				
REACH ID:	FC-ReachGI61	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Improve inlet	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$3,500.00	$3,500.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,500.00
Subtotal Capital Improvement Costs				**$3,500.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$175.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$175.00
Subtotal Additional Capital Improvement Costs				**$350.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$578.00
Legal/Administrative		5%		$193.00
Contract Admin/Construction Management		10%		$385.00
Contingency		25%		$963.00
Subtotal Other Costs				**$2,119.00**
Total Capital Improvement Costs				**$5,969.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$63.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$3,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	NWcornerWPHS				
JURISDICTION :	Private				
REACH ID:	FC-ReachNWcornerWPHS	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
18-inch Riprap, Type H				65	C.Y.	$101.00	$6,565.00	
						$0.00	$0.00	
						$0.00	$0.00	
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Remove broken concrete	<----User Defined Items		User Defined Unit Cost ---->	25	C.Y.	$25.00	$625.00	
General excavation	<----User Defined Items		User Defined Unit Cost ---->	250	C.Y.	$30.00	$7,500.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$6,565.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$8,125.00
Subtotal Capital Improvement Costs					**$14,690.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->			L.S.	$0.00
Mobilization			5%		$735.00
Traffic Control	User Defined Lump Sum Cost ---->			L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->			L.S.	$0.00
Stormwater Management/Erosion Control			5%		$735.00
Subtotal Additional Capital Improvement Costs					**$1,470.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering			15%		$2,424.00
Legal/Administrative			5%		$808.00
Contract Admin/Construction Management			10%		$1,616.00
Contingency			25%		$4,040.00
Subtotal Other Costs					**$8,888.00**
Total Capital Improvement Costs					**$25,048.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->	1	3	L.F.	$3.00	$9.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$9.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$450.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	SEofSouth&Bndry				
JURISDICTION :	Private				
REACH ID:	FC-ReachSEofSouth&Bndry	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Circular Pipes						
Diameter (in) / Length (ft) / No. of Barrels						
18-inch / 300 / 1		300	L.F.	$68.00	$20,400.00	
	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.	0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
		0	L.F.	$0.00	$0.00	
Flare End Sections						
Diameter (in) / Applicable / No. of Barrels / U/S FES / D/S FES						
18-inch / Yes / 1 / No		0	EA	$1,167.00	$0.00	
No		0	EA	$0.00	$0.00	
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
CDOT type c inlet	<----User Defined Items — User Defined Unit Cost ---->	1	EA	$5,500.00	$5,500.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
	<----User Defined Items — User Defined Unit Cost ---->				$0.00	
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$20,400.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$5,500.00
Subtotal Capital Improvement Costs					**$25,900.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.		$0.00
Mobilization		5%			$1,295.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.		$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$1,295.00
Subtotal Additional Capital Improvement Costs					**$2,590.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$4,274.00
Legal/Administrative		5%			$1,425.00
Contract Admin/Construction Management		10%			$2,849.00
Contingency		25%			$7,123.00
Subtotal Other Costs					**$15,671.00**
Total Capital Improvement Costs					**$44,161.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	300	L.F.	$1.00	$300.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	1	EA	$63.00	$63.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$363.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$18,150.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	DP26				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachDP26	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Detention (Complete-in-Place)							
Detention Facility 1 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention Facility 2 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)				AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)							
Excavation, Low Range				C.Y.	$14.00	$0.00	
Excavation, Mid Range				C.Y.	$30.00	$0.00	
Excavation, High Range				C.Y.	$39.00	$0.00	
Outlet Works		User Defined Unit Cost ---->	1	EA	$6,000.00	$6,000.00	Improve or replace current outlet works
Water Quality Appurtenances		User Defined Unit Cost ---->	1	EA	$2,000.00	$2,000.00	
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$8,000.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$0.00
Subtotal Capital Improvement Costs				**$8,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$400.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$400.00
Subtotal Additional Capital Improvement Costs				**$800.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$1,320.00
Legal/Administrative		5%		$440.00
Contract Admin/Construction Management		10%		$880.00
Contingency		25%		$2,200.00
Subtotal Other Costs				**$4,840.00**
Total Capital Improvement Costs				**$13,640.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	0.66	ACRE	$1,903.00	$1,256.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$1,256.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$62,800.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	Evergreen&Lafayette				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachEvergreen&Lafayette	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Concrete pan	<----User Defined Items		User Defined Unit Cost ---->	36	S.Y.	$50.10	$1,803.00	
Curb and gutter	<----User Defined Items		User Defined Unit Cost ---->	250	L.F.	$22.00	$5,500.00	
Concrete rundown	<----User Defined Items		User Defined Unit Cost ---->	10	S.Y.	$50.00	$475.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$7,778.00
Subtotal Capital Improvement Costs				**$7,778.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$389.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$389.00
Subtotal Additional Capital Improvement Costs				**$778.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$1,283.00
Legal/Administrative		5%		$428.00
Contract Admin/Construction Management		10%		$856.00
Contingency		25%		$2,139.00
Subtotal Other Costs				**$4,706.00**
Total Capital Improvement Costs				**$13,262.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	nearOReillys				
JURISDICTION :	Private				
REACH ID:	FC-ReachnearOReillys	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)					QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains										
Circular Pipes										
Diameter (in)	Length (ft)	No. of Barrels								
18-inch	200	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.			200	L.F.	$68.00	$13,600.00	
						0	L.F.	$0.00	$0.00	
Flare End Sections										
Diameter (in)	Applicable	No. of Barrels	U/S FES	D/S FES						
18-inch	Yes	1	No	No		0	EA	$1,167.00	$0.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
Manholes and Inlets										
Manhole, 4' Dia. (Pipe Dia. < 36")							EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")							EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")							EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)							EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)							EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot						1	EA	$5,835.00	$5,835.00	
Concrete Box Culverts										
Hydraulic Structures										
Channel Improvements										
Detention/Water Quality Facilities										
Detention (Complete-in-Place)										
Detention Facility 1 (Complete-in-Place)						1	AC-FT	$57,839.00	$57,839.00	
Detention Facility 2 (Complete-in-Place)							AC-FT	$57,839.00	$0.00	
Detention Facility 3 (Complete-in-Place)							AC-FT	$57,839.00	$0.00	
Detention (User Entered Quantities)										
Excavation, Low Range							C.Y.	$14.00	$0.00	
Excavation, Mid Range							C.Y.	$30.00	$0.00	
Excavation, High Range							C.Y.	$39.00	$0.00	
Outlet Works					User Defined Unit Cost ---->		EA		$0.00	
Water Quality Appurtenances					User Defined Unit Cost ---->		EA		$0.00	
Removals										
Landscaping and Maintenance Improvements										
Special Items (User Defined)										
Curb and gutter	<----User Defined Items				User Defined Unit Cost ---->	150	L.F.	$20.00	$3,000.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
	<----User Defined Items				User Defined Unit Cost ---->				$0.00	
Land Acquisition										
Temporary Easements							EA		$0.00	
Easement/ROW Acquisition							ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$19,435.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$57,839.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$80,274.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$4,014.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$4,014.00
Subtotal Additional Capital Improvement Costs				**$8,028.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$13,245.00
Legal/Administrative		5%		$4,415.00
Contract Admin/Construction Management		10%		$8,830.00
Contingency		25%		$22,076.00
Subtotal Other Costs				**$48,566.00**
Total Capital Improvement Costs				**$136,868.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->	1	0.25	ACRE	$1,903.00	$476.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
	<----User Defined Items					$0.00
Total Annual Operation and Maintenance Cost						**$476.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$23,800.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	Park&Foster				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachPark&Foster	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Safety rail	<----User Defined Items	User Defined Unit Cost ---->	125	L.F.	$50.00	$6,250.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$6,250.00
Subtotal Capital Improvement Costs					**$6,250.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->			L.S.	$0.00
Mobilization		5%			$313.00
Traffic Control	User Defined Lump Sum Cost ---->			L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->			L.S.	$0.00
Stormwater Management/Erosion Control		5%			$313.00
Subtotal Additional Capital Improvement Costs					**$626.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$1,031.00
Legal/Administrative		5%			$344.00
Contract Admin/Construction Management		10%			$688.00
Contingency		25%			$1,719.00
Subtotal Other Costs					**$3,782.00**
Total Capital Improvement Costs					**$10,658.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
	<----User Defined Items	User Defined Unit Cost ---->				$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	CavalierPark				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachCavalierPark	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Repair grout, bank erosion mitigation	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$15,000.00	$15,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$15,000.00
Subtotal Capital Improvement Costs				**$15,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$750.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$750.00
Subtotal Additional Capital Improvement Costs				**$1,500.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$2,475.00
Legal/Administrative		5%		$825.00
Contract Admin/Construction Management		10%		$1,650.00
Contingency		25%		$4,125.00
Subtotal Other Costs				**$9,075.00**
Total Capital Improvement Costs				**$25,575.00**

Master Plan Operation and Maintenance Cost Summary							
Description			**Frequency**	**Quantity**	**Unit**	**Unit Cost**	**Total Annual Cost**
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**		1	525	L.F.	$3.00	$1,575.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**				ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**				ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**				L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$1,575.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$78,750.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	DP22				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachDP22	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
General pond repairs	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$12,000.00	$12,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$12,000.00
Subtotal Capital Improvement Costs				**$12,000.00**
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Mobilization		5%		$600.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$600.00
Subtotal Additional Capital Improvement Costs				**$1,200.00**
Land Acquisition Costs				
ROW/Easements				$0.00
Subtotal Land Acquisition Costs				**$0.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$1,980.00
Legal/Administrative		5%		$660.00
Contract Admin/Construction Management		10%		$1,320.00
Contingency		25%		$3,300.00
Subtotal Other Costs				**$7,260.00**
Total Capital Improvement Costs				**$20,460.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		**Optional User Defined Unit Cost ---->**	1	0.12	ACRE	$1,903.00	$228.00
Mowing (e.g. channels, ponds, etc.)		**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost							**$228.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$11,400.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	RD36				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachRD36	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Detention (User Entered Quantities)								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Stabilize slope	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$6,000.00	$3,000.00	Grading and seeding, collecting and routing water not cost effective
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements				1	EA	$1,000.00	$1,000.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary				
Capital Improvement Costs				
Pipe Culverts and Storm Drains				$0.00
Concrete Box Culverts				$0.00
Hydraulic Structures				$0.00
Channel Improvements				$0.00
Detention/Water Quality Facilities				$0.00
Removals				$0.00
Landscaping and Maintenance Improvements				$0.00
Special Items (User Defined)				$3,000.00
Subtotal Capital Improvement Costs				**$3,000.00**
Additional Capital Improvement Costs				
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00
Mobilization		5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00
Stormwater Management/Erosion Control		5%		$150.00
Subtotal Additional Capital Improvement Costs				**$300.00**
Land Acquisition Costs				
ROW/Easements				$1,000.00
Subtotal Land Acquisition Costs				**$1,000.00**
Other Costs (percentage of Capital Improvement Costs)				
Engineering		15%		$495.00
Legal/Administrative		5%		$165.00
Contract Admin/Construction Management		10%		$330.00
Contingency		25%		$825.00
Subtotal Other Costs				**$1,815.00**
Total Capital Improvement Costs				**$6,115.00**

Master Plan Operation and Maintenance Cost Summary							
Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->				L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->				EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->				EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->				L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->				ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->				ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->				L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$0.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	ParadiseLodgeLn				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachParadiseLodgeLn	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
12-inch Riprap, Type M		150	C.Y.	$76.00	$11,400.00	
Excavation, Mid Range		100	C.Y.	$30.00	$3,000.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$14,400.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$14,400.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$720.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$720.00
Subtotal Additional Capital Improvement Costs					**$1,440.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$2,376.00
Legal/Administrative		5%			$792.00
Contract Admin/Construction Management		10%			$1,584.00
Contingency		25%			$3,960.00
Subtotal Other Costs					**$8,712.00**
Total Capital Improvement Costs					**$24,552.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	300	L.F.	$3.00	$900.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$900.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$45,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	C1635				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachC1635	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Improve inlet	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$2,500.00	$2,500.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs			
Pipe Culverts and Storm Drains			$0.00
Concrete Box Culverts			$0.00
Hydraulic Structures			$0.00
Channel Improvements			$0.00
Detention/Water Quality Facilities			$0.00
Removals			$0.00
Landscaping and Maintenance Improvements			$0.00
Special Items (User Defined)			$2,500.00
Subtotal Capital Improvement Costs			**$2,500.00**
Additional Capital Improvement Costs			
Dewatering	User Defined Lump Sum Cost ---->	L.S.	$0.00
Mobilization	5%		$125.00
Traffic Control	User Defined Lump Sum Cost ---->	L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->	L.S.	$0.00
Stormwater Management/Erosion Control	5%		$125.00
Subtotal Additional Capital Improvement Costs			**$250.00**
Land Acquisition Costs			
ROW/Easements			$0.00
Subtotal Land Acquisition Costs			**$0.00**
Other Costs (percentage of Capital Improvement Costs)			
Engineering	15%		$413.00
Legal/Administrative	5%		$138.00
Contract Admin/Construction Management	10%		$275.00
Contingency	25%		$688.00
Subtotal Other Costs			**$1,514.00**
Total Capital Improvement Costs			**$4,264.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	42	L.F.	$1.00	$42.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
	<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost							**$42.00**
Effective Interest Rate							0.00%
Total Operation and Maintenance Costs Over 50 Years							**$2,100.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	SunriseCt				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachSunriseCt	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Curb and gutter	<----User Defined Items		User Defined Unit Cost ---->	150	L.F.	$20.00	$3,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs				
Pipe Culverts and Storm Drains			$0.00	
Concrete Box Culverts			$0.00	
Hydraulic Structures			$0.00	
Channel Improvements			$0.00	
Detention/Water Quality Facilities			$0.00	
Removals			$0.00	
Landscaping and Maintenance Improvements			$0.00	
Special Items (User Defined)			$3,000.00	
Subtotal Capital Improvement Costs			**$3,000.00**	
Additional Capital Improvement Costs				
Dewatering	**User Defined Lump Sum Cost ---->**	L.S.	$0.00	
Mobilization	5%		$150.00	
Traffic Control	**User Defined Lump Sum Cost ---->**	L.S.	$0.00	
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**	L.S.	$0.00	
Stormwater Management/Erosion Control	5%		$150.00	
Subtotal Additional Capital Improvement Costs			**$300.00**	
Land Acquisition Costs				
ROW/Easements			$0.00	
Subtotal Land Acquisition Costs			**$0.00**	
Other Costs (percentage of Capital Improvement Costs)				
Engineering	15%		$495.00	
Legal/Administrative	5%		$165.00	
Contract Admin/Construction Management	10%		$330.00	
Contingency	25%		$825.00	
Subtotal Other Costs			**$1,815.00**	
Total Capital Improvement Costs			**$5,115.00**	

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
	<----User Defined Items	**User Defined Unit Cost ---->**					$0.00	
Total Annual Operation and Maintenance Cost						**$0.00**	
Effective Interest Rate						0.00%	
Total Operation and Maintenance Costs Over 50 Years						**$0.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	FCupstreamOfWalMrt				
JURISDICTION :	Teller County				
REACH ID:	FC-ReachFCupstreamOfWalMrt	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Hydraulic Structures						
Channel Improvements						
24-inch Riprap, Type VH		1000	C.Y.	$108.00	$108,000.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$108,000.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$0.00
Subtotal Capital Improvement Costs					**$108,000.00**
Additional Capital Improvement Costs					
Dewatering	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Mobilization		5%			$5,400.00
Traffic Control	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Utility Coordination/Relocation	**User Defined Lump Sum Cost ---->**		L.S.		$0.00
Stormwater Management/Erosion Control		5%			$5,400.00
Subtotal Additional Capital Improvement Costs					**$10,800.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%			$17,820.00
Legal/Administrative		5%			$5,940.00
Contract Admin/Construction Management		10%			$11,880.00
Contingency		25%			$29,700.00
Subtotal Other Costs					**$65,340.00**
Total Capital Improvement Costs					**$184,140.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	**Optional User Defined Unit Cost ---->**	1	500	L.F.	$3.00	$1,500.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	**Optional User Defined Unit Cost ---->**			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	**Optional User Defined Unit Cost ---->**			L.F.	$6.00	$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
	<----User Defined Items **User Defined Unit Cost ---->**					$0.00
Total Annual Operation and Maintenance Cost						**$1,500.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$75,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	nearMrningSun&SunVlly				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachnearMrningSun&SunVlly	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)	QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains						
Concrete Box Culverts						
Hydraulic Structures						
Channel Improvements						
Excavation, Mid Range		200	C.Y.	$30.00	$6,000.00	
Soil Riprap, Type M		150	C.Y.	$89.00	$13,350.00	
				$0.00	$0.00	
				$0.00	$0.00	
				$0.00	$0.00	
Detention/Water Quality Facilities						
Removals						
Landscaping and Maintenance Improvements						
Special Items (User Defined)						
Land Acquisition						
Temporary Easements			EA		$0.00	
Easement/ROW Acquisition			ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs	
Pipe Culverts and Storm Drains	$0.00
Concrete Box Culverts	$0.00
Hydraulic Structures	$0.00
Channel Improvements	$19,350.00
Detention/Water Quality Facilities	$0.00
Removals	$0.00
Landscaping and Maintenance Improvements	$0.00
Special Items (User Defined)	$0.00
Subtotal Capital Improvement Costs	**$19,350.00**
Additional Capital Improvement Costs	
Dewatering	$0.00
Mobilization	$968.00
Traffic Control	$0.00
Utility Coordination/Relocation	$0.00
Stormwater Management/Erosion Control	$968.00
Subtotal Additional Capital Improvement Costs	**$1,936.00**
Land Acquisition Costs	
ROW/Easements	$0.00
Subtotal Land Acquisition Costs	**$0.00**
Other Costs (percentage of Capital Improvement Costs)	
Engineering	$3,193.00
Legal/Administrative	$1,064.00
Contract Admin/Construction Management	$2,129.00
Contingency	$5,322.00
Subtotal Other Costs	**$11,708.00**
Total Capital Improvement Costs	**$32,994.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->	1	700	L.F.	$3.00	$2,100.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$2,100.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$105,000.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Fountain Creek				
REACH :	C1709				
JURISDICTION :	City of Woodland Park				
REACH ID:	FC-ReachC1709	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)			QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains								
Concrete Box Culverts								
Hydraulic Structures								
Channel Improvements								
Detention/Water Quality Facilities								
Removals								
Landscaping and Maintenance Improvements								
Special Items (User Defined)								
Improved inlet	<----User Defined Items		User Defined Unit Cost ---->	1	EA	$3,000.00	$3,000.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
	<----User Defined Items		User Defined Unit Cost ---->				$0.00	
Land Acquisition								
Temporary Easements					EA		$0.00	
Easement/ROW Acquisition					ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains					$0.00
Concrete Box Culverts					$0.00
Hydraulic Structures					$0.00
Channel Improvements					$0.00
Detention/Water Quality Facilities					$0.00
Removals					$0.00
Landscaping and Maintenance Improvements					$0.00
Special Items (User Defined)					$3,000.00
Subtotal Capital Improvement Costs					**$3,000.00**
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->			L.S.	$0.00
Mobilization			5%		$150.00
Traffic Control	User Defined Lump Sum Cost ---->			L.S.	$0.00
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->			L.S.	$0.00
Stormwater Management/Erosion Control			5%		$150.00
Subtotal Additional Capital Improvement Costs					**$300.00**
Land Acquisition Costs					
ROW/Easements					$0.00
Subtotal Land Acquisition Costs					**$0.00**
Other Costs (percentage of Capital Improvement Costs)					
Engineering			15%		$495.00
Legal/Administrative			5%		$165.00
Contract Admin/Construction Management			10%		$330.00
Contingency			25%		$825.00
Subtotal Other Costs					**$1,815.00**
Total Capital Improvement Costs					**$5,115.00**

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->	1	37	L.F.	$1.00	$37.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$37.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$1,850.00**	

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	CH77				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachCH77	ESTIMATED BY :	Dave Dubler	DATE :	12/10/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains							
Concrete Box Culverts							
Hydraulic Structures							
Channel Improvements							
Detention/Water Quality Facilities							
Removals							
Landscaping and Maintenance Improvements							
Special Items (User Defined)							
Replace concrete rundown	<----User Defined Items	User Defined Unit Cost ---->	1	EA	$7,000.00	$7,000.00	Existing rundown is undermined
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
	<----User Defined Items	User Defined Unit Cost ---->				$0.00	
Land Acquisition							
Temporary Easements				EA		$0.00	
Easement/ROW Acquisition				ACRE		$0.00	

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs	
Pipe Culverts and Storm Drains	$0.00
Concrete Box Culverts	$0.00
Hydraulic Structures	$0.00
Channel Improvements	$0.00
Detention/Water Quality Facilities	$0.00
Removals	$0.00
Landscaping and Maintenance Improvements	$0.00
Special Items (User Defined)	$7,000.00
Subtotal Capital Improvement Costs	**$7,000.00**
Additional Capital Improvement Costs	
Dewatering	$0.00
Mobilization	$350.00
Traffic Control	$0.00
Utility Coordination/Relocation	$0.00
Stormwater Management/Erosion Control	$350.00
Subtotal Additional Capital Improvement Costs	**$700.00**
Land Acquisition Costs	
ROW/Easements	$0.00
Subtotal Land Acquisition Costs	**$0.00**
Other Costs (percentage of Capital Improvement Costs)	
Engineering	$1,155.00
Legal/Administrative	$385.00
Contract Admin/Construction Management	$770.00
Contingency	$1,925.00
Subtotal Other Costs	**$4,235.00**
Total Capital Improvement Costs	**$11,935.00**

Master Plan Operation and Maintenance Cost Summary

Description		Frequency	Quantity	Unit	Unit Cost	Total Annual Cost
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)	Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$63.00	$0.00
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	Optional User Defined Unit Cost ---->			EA	$634.00	$0.00
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)	Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)	Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00
Mowing (e.g. channels, ponds, etc.)	Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)	Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
<----User Defined Items	User Defined Unit Cost ---->					$0.00
Total Annual Operation and Maintenance Cost						**$0.00**
Effective Interest Rate						0.00%
Total Operation and Maintenance Costs Over 50 Years						**$0.00**

LOW PRIORITY

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH

PROJECT :	Woodland Park Storm Water Master Plan				
DRAINAGEWAY :	Trout Creek				
REACH :	RD19&20				
JURISDICTION :	City of Woodland Park				
REACH ID:	TC-ReachRD19&20	ESTIMATED BY :	Dave Dubler	DATE :	11/24/2014

DESCRIPTION	SUPPORTING DATA (USER DEFINED AND CALCULATED)					QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Pipe Culverts and Storm Drains										
Circular Pipes										
Diameter (in)	Length (ft)	No. of Barrels								
18-inch	50	1	Note : Prices reflect circular reinforced concrete pipe. For arch or elliptical pipes, user shall use equivalent circular pipe diameter.			50	L.F.	$68.00	$3,400.00	
						0	L.F.	$0.00	$0.00	
						0	L.F.	$0.00	$0.00	
Flare End Sections										
Diameter (in)	Applicable	No. of Barrels	U/S FES	D/S FES						
18-inch	Yes	1	Yes	No		1	EA	$1,167.00	$1,167.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
	No					0	EA	$0.00	$0.00	
Manholes and Inlets										
Manhole, 4' Dia. (Pipe Dia. < 36")							EA	$3,678.00	$0.00	
Manhole, 5' Dia. (Pipe Dia. 36" - 42")							EA	$4,947.00	$0.00	
Manhole, 6' Dia. (Pipe Dia. = 48")							EA	$5,454.00	$0.00	
Type B Manhole (Pipe Dia. 48" and larger, deflection < 10 degrees)							EA	$15,221.00	$0.00	
Type P Manhole (Pipe Dia. 48" and larger, deflection > 10 degrees)							EA	$19,026.00	$0.00	
Storm Inlet, Type R/Type 14, 5-foot						1	EA	$5,835.00	$5,835.00	
Concrete Box Culverts										
Hydraulic Structures										
Channel Improvements										
Detention/Water Quality Facilities										
Removals										
Landscaping and Maintenance Improvements										
Special Items (User Defined)										
Mountable Curb	<----User Defined Items			User Defined Unit Cost ---->		200	L.F.	$20.00	$4,000.00	
Concrete Apron	<----User Defined Items			User Defined Unit Cost ---->		7	S.Y.	$50.00	$350.00	
	<----User Defined Items			User Defined Unit Cost ---->					$0.00	
	<----User Defined Items			User Defined Unit Cost ---->					$0.00	
	<----User Defined Items			User Defined Unit Cost ---->					$0.00	
	<----User Defined Items			User Defined Unit Cost ---->					$0.00	
	<----User Defined Items			User Defined Unit Cost ---->					$0.00	
	<----User Defined Items			User Defined Unit Cost ---->					$0.00	
	<----User Defined Items			User Defined Unit Cost ---->					$0.00	
	<----User Defined Items			User Defined Unit Cost ---->					$0.00	
Land Acquisition										

Master Plan Capital Improvement Cost Summary

Capital Improvement Costs					
Pipe Culverts and Storm Drains				$10,402.00	
Concrete Box Culverts				$0.00	
Hydraulic Structures				$0.00	
Channel Improvements				$0.00	
Detention/Water Quality Facilities				$0.00	
Removals				$0.00	
Landscaping and Maintenance Improvements				$0.00	
Special Items (User Defined)				$4,350.00	
Subtotal Capital Improvement Costs				**$14,752.00**	
Additional Capital Improvement Costs					
Dewatering	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Mobilization		5%		$738.00	
Traffic Control	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Utility Coordination/Relocation	User Defined Lump Sum Cost ---->		L.S.	$0.00	
Stormwater Management/Erosion Control		5%		$738.00	
Subtotal Additional Capital Improvement Costs				**$1,476.00**	
Land Acquisition Costs					
ROW/Easements				$0.00	
Subtotal Land Acquisition Costs				**$0.00**	
Other Costs (percentage of Capital Improvement Costs)					
Engineering		15%		$2,434.00	
Legal/Administrative		5%		$811.00	
Contract Admin/Construction Management		10%		$1,623.00	
Contingency		25%		$4,057.00	
Subtotal Other Costs				**$8,925.00**	
Total Capital Improvement Costs				**$25,153.00**	

Master Plan Operation and Maintenance Cost Summary

Description			Frequency	Quantity	Unit	Unit Cost	Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, etc.)		Optional User Defined Unit Cost ---->			L.F.	$1.00	$0.00	
Manhole and Inlet Maintenance (e.g. sediment & debris removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$63.00	$0.00	
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)		Optional User Defined Unit Cost ---->			EA	$634.00	$0.00	
Channel Maintenance (e.g. sediment & debris removal, erosion, tree & weed removal, etc.)		Optional User Defined Unit Cost ---->			L.F.	$3.00	$0.00	
Detention/WQ Maintenance (e.g. sediment & debris removal, mucking out, tree & weed removal, structural repairs, etc.)		Optional User Defined Unit Cost ---->			ACRE	$1,903.00	$0.00	
Mowing (e.g. channels, ponds, etc.)		Optional User Defined Unit Cost ---->			ACRE	$63.00	$0.00	
Trail Maintenance (e.g. structural repairs, crusher fines, etc.)		Optional User Defined Unit Cost ---->			L.F.	$6.00	$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
	<----User Defined Items	User Defined Unit Cost ---->					$0.00	
Total Annual Operation and Maintenance Cost							**$0.00**	
Effective Interest Rate							0.00%	
Total Operation and Maintenance Costs Over 50 Years							**$0.00**	

APPENDIX C - HYDROLOGY

Woodland Park Hydrologic Summary Table
Page 1 of 6

Element ID	Drainage Area to Element (sq. Miles)	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
		Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)
B1	0.4091	13.3	0.14	22.6	0.25	42.8	0.4	90.5	0.71	145.5	1.03	217.9	1.43
B10	0.6103	2.1	0.05	11	0.15	31.3	0.28	82.5	0.57	143	0.87	224.3	1.25
B11	1.3807	19.7	0.14	49.9	0.28	94.6	0.46	188.9	0.81	290.7	1.16	420.4	1.6
B12	0.4687	17.3	0.21	30.9	0.36	51.3	0.55	94.4	0.9	140.6	1.26	199.6	1.7
B13	0.0822	4	0.2	7.2	0.34	12.6	0.51	24.3	0.86	37.1	1.21	53.2	1.64
B14	0.0643	1.7	0.14	5.1	0.27	10.6	0.45	22.2	0.8	34.4	1.15	50.3	1.58
B15	3.7605	715.4	0.88	1014	1.21	1341	1.55	1888.8	2.14	2392.2	2.67	2968.8	3.28
B16	1.1473	24.7	0.18	44.9	0.31	76.5	0.48	144.2	0.81	218.2	1.15	313.6	1.57
B17	3.4448	22.4	0.08	81.6	0.2	180.1	0.36	401.2	0.68	647.8	1.02	968.2	1.43
B18	0.2099	4.7	0.14	13.1	0.28	26.1	0.47	53.7	0.82	83.9	1.17	121.7	1.61
B19	0.3369	11.9	0.16	21.7	0.28	40	0.45	81.6	0.77	127.6	1.1	187.1	1.51
B2	0.0187	16.1	1.18	21.7	1.56	27.5	1.96	36.8	2.6	45.1	3.18	54.4	3.83
B20	1.1525	43.2	0.17	77.1	0.3	136.9	0.47	269.2	0.8	414.6	1.14	604	1.56
B21	0.0844	13	0.4	21.8	0.61	33.1	0.85	54.2	1.29	74.8	1.72	99.4	2.23
B22	0.102	10.3	0.36	17.1	0.56	26.3	0.79	44.1	1.21	62.1	1.62	83.8	2.12
B23	0.0033	1.9	0.84	2.7	1.16	3.6	1.51	5.1	2.08	6.5	2.61	8	3.21
B24	0.0875	9.1	0.33	15.7	0.51	24.6	0.74	42.2	1.14	59.9	1.55	81.2	2.03
B25	0.0138	7	0.84	10	1.16	13.3	1.51	18.7	2.08	23.7	2.61	29.4	3.21
B26	0.0065	1.9	0.57	3	0.82	4.3	1.11	6.5	1.61	8.6	2.08	11	2.63
B27	0.0057	0.2	0.13	0.3	0.24	0.6	0.39	1.4	0.69	2.2	1.01	3.4	1.4
B28	0.1454	13.3	0.36	22.1	0.56	33.8	0.8	56	1.22	78.3	1.63	105.3	2.13
B29	0.0264	1.9	0.22	3.4	0.37	5.9	0.56	11.3	0.91	17	1.27	24	1.71
B3	0.0177	1.6	0.18	2.2	0.29	3.9	0.45	7.8	0.76	12.4	1.09	18.3	1.49
B30	0.0779	14.2	0.47	22.9	0.7	33.8	0.96	53.6	1.43	72.7	1.87	95.4	2.4
B31	0.0192	0.9	0.13	1.4	0.24	2.9	0.39	6.5	0.69	10.7	1	16.1	1.4
B32	0.2632	3.8	0.09	9.6	0.2	21.8	0.35	51.4	0.65	85.3	0.97	129.3	1.36
B33	0.0066	0.8	0.32	1.5	0.51	2.3	0.73	4	1.14	5.7	1.54	7.8	2.02
B34	0.1999	4.8	0.13	8.3	0.24	15.6	0.39	32.8	0.69	52.4	1	78.6	1.4
B35	0.0122	0.6	0.13	1	0.24	2.1	0.39	4.7	0.69	7.6	1	11.2	1.4
B36	0.0941	4.5	0.17	7.8	0.29	14.4	0.46	29.3	0.78	45.7	1.12	66.4	1.53
B37	0.018	1.7	0.3	3.1	0.48	4.9	0.7	8.5	1.1	12.1	1.49	16.6	1.97
B38	0.0303	7.8	0.55	12.3	0.8	17.7	1.08	27.1	1.57	36.1	2.04	46.6	2.59
B39	0.0802	8.2	0.28	14.8	0.45	24.2	0.66	42.8	1.05	61.6	1.43	84.4	1.9
B4	0.0171	1	0.13	1.6	0.24	3.4	0.39	7.9	0.69	12.8	1	18.9	1.4
B40	0.0097	1.3	0.32	2.2	0.51	3.5	0.73	6.1	1.14	8.7	1.54	11.9	2.02
B41	0.0386	1.2	0.12	1.9	0.22	3.7	0.37	8.2	0.66	13.5	0.97	20.5	1.35
B42	0.0776	3.3	0.21	5.9	0.35	10.1	0.53	19	0.88	28.6	1.24	40.9	1.67
B43	0.0085	2.4	0.57	3.8	0.82	5.4	1.11	8.3	1.61	10.9	2.08	14	2.63
B44	0.3201	22.6	0.29	38.8	0.46	61.9	0.67	108.5	1.07	157	1.45	216.4	1.92
B45	0.0159	1.1	0.23	1.9	0.39	3.2	0.58	6	0.95	8.9	1.31	12.6	1.76
B46	0.0413	3.4	0.26	6.1	0.42	10.1	0.63	18.1	1	26.6	1.38	37.1	1.84
B47	2.38	42.1	0.14	77.6	0.26	139.2	0.41	277.3	0.72	432.6	1.04	635.3	1.44
B48	0.1027	2.4	0.16	6.3	0.31	11.9	0.5	23.6	0.87	36	1.24	51.6	1.69
B49	0.1093	8.7	0.32	15.9	0.52	25.3	0.76	43.3	1.18	61.3	1.6	83	2.1
B5	0.0416	9.2	0.5	14.8	0.74	21.4	1.01	33.1	1.49	44.3	1.94	57.5	2.48
B50	0.1207	4.5	0.2	9.2	0.35	16.2	0.55	30.7	0.91	46	1.28	65	1.73
B51	0.2969	1.8	0.07	9.2	0.18	24	0.33	59.3	0.64	99.5	0.96	150.9	1.36
B52	0.1127	8.2	0.28	14.3	0.45	23.1	0.66	40.6	1.05	59	1.43	81.7	1.9
B53	0.0108	0.7	0.2	1.4	0.35	2.4	0.53	4.7	0.88	7	1.23	9.9	1.67

Woodland Park Hydrologic Summary Table
Page 2 of 6

Element ID	Drainage Area to Element (sq. Miles)	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
		Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)
B54	0.2536	8.1	0.17	20.9	0.33	39.2	0.53	77.1	0.91	116.7	1.29	165.1	1.75
B55	0.0257	2.1	0.28	3.7	0.45	5.9	0.66	10.5	1.05	15.2	1.44	21	1.9
B56	0.0056	6.2	1.52	8	1.94	9.8	2.38	12.6	3.07	15.1	3.68	17.9	4.36
B57	0.2724	12.4	0.18	22.2	0.31	39.7	0.48	78.7	0.81	121.2	1.15	174.9	1.58
B58	0.0256	2.9	0.26	5.4	0.43	9.1	0.63	16.2	1.01	23.4	1.39	32	1.85
B59	0.0294	6.8	0.46	11.2	0.68	16.6	0.94	26.2	1.4	35.4	1.84	46.2	2.37
B6	6.9752	40.5	0.08	133.3	0.2	281.3	0.36	606.3	0.68	967.6	1.02	1434.6	1.43
B61	0.067	3.8	0.17	6.8	0.3	12.5	0.47	25.4	0.8	39.3	1.14	56.6	1.56
B62	0.2248	11.7	0.26	23.4	0.45	38.8	0.67	69.5	1.08	100.4	1.49	137.8	1.97
B63	0.0128	1.3	0.31	2.4	0.5	4	0.72	7	1.14	10	1.55	13.6	2.04
B64	0.1634	11.1	0.26	19.5	0.42	31.9	0.62	57.7	1	84.7	1.37	118	1.83
B65	0.0256	10.5	0.7	15.6	0.99	21.2	1.31	30.8	1.84	39.6	2.34	49.8	2.93
B66	0.2337	10.4	0.22	21.4	0.39	36.8	0.6	68	0.98	100.8	1.37	141	1.83
B67	0.0352	3.6	0.32	6.1	0.5	9.7	0.73	16.7	1.13	23.7	1.53	32.2	2.01
B68	0.2849	16.6	0.29	32.4	0.49	52.9	0.72	91.8	1.15	130.4	1.57	177.4	2.07
B69	0.0584	6.6	0.34	12.1	0.55	19.2	0.79	32.4	1.23	45.3	1.66	60.6	2.17
B7	0.4214	3.3	0.09	13.7	0.21	31.9	0.37	73	0.69	118.8	1.03	177.5	1.45
B70	0.0796	8.8	0.39	15.2	0.61	23.3	0.86	38	1.32	52.4	1.76	69.7	2.28
B71	0.1645	12.8	0.3	23.5	0.49	37.8	0.71	65.5	1.12	93.6	1.53	128	2.02
B72	0.0101	0.4	0.18	0.7	0.31	1.3	0.48	2.6	0.81	4	1.15	5.9	1.57
B73	0.2532	8.2	0.15	17.3	0.29	33.3	0.46	68.9	0.79	108	1.13	157.4	1.56
B74	0.3361	30.6	0.32	52.6	0.51	82.7	0.73	141.9	1.13	202	1.53	274.7	2.01
B75	0.057	4.6	0.28	8.1	0.45	13.1	0.66	23	1.05	33.3	1.44	46.1	1.9
B76	0.0684	12.8	0.51	20.3	0.75	29.4	1.02	45.7	1.49	61.3	1.95	79.7	2.49
B77	0.1474	28.1	0.57	43.6	0.82	61.8	1.1	94	1.6	124.6	2.07	160.4	2.62
B78	0.0237	6	0.54	9.5	0.78	13.6	1.06	21	1.55	28	2.01	36.2	2.56
B79	0.0328	6	0.42	10	0.63	15.1	0.88	24.6	1.32	33.9	1.75	44.9	2.26
B8	1.4777	14.6	0.1	50.3	0.24	106.4	0.41	228.7	0.75	363.3	1.1	533.8	1.53
B80	0.0394	6.3	0.45	10.2	0.68	15.1	0.94	24	1.39	32.7	1.84	42.9	2.36
B81	0.0204	9.3	0.84	13.3	1.16	17.8	1.51	25.1	2.08	31.9	2.61	39.7	3.21
B82	0.0205	9.7	0.77	14.2	1.08	19.2	1.41	27.6	1.96	35.4	2.48	44.3	3.07
B83	0.258	50.7	0.52	80.3	0.77	115.7	1.04	178.5	1.53	238.4	1.99	308.8	2.53
B84	0.4006	24.4	0.25	43.3	0.41	71.5	0.6	129.8	0.97	191	1.35	266.4	1.8
B85	0.0147	4.8	0.62	7.3	0.89	10.2	1.19	15.2	1.7	20	2.19	25.5	2.75
B86	0.1877	5.4	0.12	8.9	0.23	17	0.38	36.8	0.68	59.8	0.99	90	1.38
B87	0.008	0.3	0.13	0.5	0.24	1.1	0.39	2.4	0.69	3.9	1	5.8	1.4
B88	0.8777	36.1	0.27	58.4	0.43	90.2	0.63	155	0.99	223.8	1.36	310.2	1.81
B89	0.0368	10.5	0.65	14.6	0.89	19.7	1.15	29.1	1.62	38.2	2.06	49	2.58
B9	0.266	1.5	0.07	7.9	0.18	20.9	0.33	52.2	0.63	87.9	0.95	133.7	1.35
B90	0.3172	23.1	0.33	38.9	0.52	60	0.74	101.5	1.15	143.9	1.56	195.3	2.04
C1	0.0964	8	0.26	13	0.42	20	0.62	38.5	0.99	57.9	1.36	83.4	1.81
C10	6.4406	137.5	0.18	289.4	0.33	501.1	0.52	944.5	0.88	1470	1.24	2144	1.68
C101	4.9962	84.4	0.14	195.3	0.29	350.1	0.47	693.2	0.81	1113.9	1.17	1648.7	1.61
C11	0.0386	1.2	0.12	1.9	0.22	3.7	0.37	8.2	0.66	13.5	0.97	20.5	1.35
C12	0.0303	7.8	0.55	12.3	0.8	17.7	1.08	27.1	1.57	36.1	2.04	46.6	2.59
C13	0.018	1.7	0.3	3.1	0.48	4.9	0.7	8.5	1.1	12.1	1.49	16.6	1.97
C14	0.0941	4.5	0.17	7.8	0.29	14.4	0.46	29.3	0.78	45.7	1.12	66.4	1.53
C15	0.0122	0.6	0.13	1	0.24	2.1	0.39	4.7	0.69	7.6	1	11.2	1.4
C16	0.0123	0.9	0.23	1.6	0.38	2.6	0.57	4.5	0.93	6.7	1.29	9.5	1.73

Woodland Park Hydrologic Summary Table
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Element ID	Drainage Area to Element (sq. Miles)	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
		Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)
C17	0.0192	0.9	0.13	1.4	0.24	2.9	0.39	6.5	0.69	10.7	1	16.1	1.4
C18	0.0057	0.2	0.13	0.3	0.24	0.6	0.39	1.4	0.69	2.2	1.01	3.4	1.4
C19	0.0581	18.5	0.69	25.1	0.96	32.7	1.27	45.9	1.78	58.5	2.27	73	2.83
C2	0.067	3.8	0.17	6.8	0.3	12.5	0.47	25.4	0.8	39.3	1.14	56.6	1.56
C20	0.4091	13.3	0.14	22.6	0.25	42.8	0.4	90.5	0.71	145.5	1.03	217.9	1.43
C21	0.487	24.4	0.19	38.6	0.32	63.8	0.49	124.3	0.82	192.1	1.16	283.4	1.58
C22	0.583	30.6	0.21	48.2	0.34	79.8	0.52	153.1	0.86	234.9	1.2	341.5	1.63
C23	0.0033	1.9	0.84	2.7	1.16	3.6	1.51	5.1	2.08	6.5	2.61	8	3.21
C24	0.2057	12.4	0.21	21.7	0.35	37.5	0.53	72.7	0.87	111.3	1.22	161.8	1.66
C25	0.2245	14.5	0.22	25	0.36	42.3	0.55	80.8	0.9	122.3	1.25	176.2	1.69
C26	1.0998	35.4	0.17	66.5	0.3	120.6	0.47	241.5	0.79	380.1	1.13	559.5	1.55
C27	2.1236	34.1	0.16	78.6	0.3	145	0.48	284.4	0.83	438.7	1.19	631.6	1.62
C28	2.3868	35.8	0.15	83.4	0.29	154.2	0.47	303.6	0.81	469.6	1.16	677.8	1.6
C29	23.9375	212.9	0.13	475	0.26	958.4	0.44	2088.5	0.77	3313.6	1.11	4897.5	1.54
C3	0.0256	2.9	0.26	5.4	0.43	9.1	0.63	16.2	1.01	23.4	1.39	32	1.85
C30	27.698	769	0.23	1109.8	0.39	1524.9	0.59	2755.3	0.95	4323.5	1.32	6338.7	1.77
C31	0.0643	1.7	0.14	5.1	0.27	10.6	0.45	22.2	0.8	34.4	1.15	50.3	1.58
C33	1.3807	19.7	0.14	49.9	0.28	94.6	0.46	188.9	0.81	290.7	1.16	420.4	1.6
C34	0.6103	2.1	0.05	11	0.15	31.3	0.28	82.5	0.57	143	0.87	224.3	1.25
C35	0.8763	3.4	0.06	16.2	0.16	43.9	0.3	114.1	0.59	198.1	0.89	312.3	1.28
C36	1.4777	14.6	0.1	50.3	0.24	106.4	0.41	228.7	0.75	363.3	1.1	533.8	1.53
C37	1.8991	17.5	0.1	59.1	0.23	125.3	0.4	273.2	0.74	435.6	1.08	645.3	1.51
C38	12.8068	79.5	0.09	243	0.22	513.3	0.38	1089.6	0.71	1734.5	1.04	2577.8	1.46
C39	6.9752	40.5	0.08	133.3	0.2	281.3	0.36	606.3	0.68	967.6	1.02	1434.6	1.43
C4	0.2724	12.4	0.18	22.2	0.31	39.7	0.48	78.7	0.81	121.2	1.15	174.9	1.58
C40	0.0171	1	0.13	1.6	0.24	3.4	0.39	7.9	0.69	12.8	1	18.9	1.4
C41	0.0348	2.5	0.15	3.6	0.27	7.1	0.42	14.8	0.73	24.2	1.04	36	1.44
C42	0.343	64.7	0.53	100.2	0.78	142.8	1.06	221.4	1.54	298.1	2	387.2	2.54
C43	0.2932	53.3	0.5	84.5	0.74	122.9	1.01	192.6	1.48	259.6	1.93	338.6	2.47
C44	0.0056	6.2	1.52	8	1.94	9.8	2.38	12.6	3.07	15.1	3.68	17.9	4.36
C45	0.0159	1.1	0.23	1.9	0.39	3.2	0.58	6	0.95	8.9	1.31	12.6	1.76
C46	0.1999	4.8	0.13	8.3	0.24	15.6	0.39	32.8	0.69	52.4	1	78.6	1.4
C47	0.985	66.1	0.26	111.8	0.42	182.8	0.62	332.9	0.99	493.9	1.37	693.2	1.82
C48	0.5099	50.9	0.39	85	0.59	129.7	0.83	220.1	1.26	309.8	1.67	415.2	2.17
C49	0.1093	8.7	0.32	15.9	0.52	25.3	0.76	43.3	1.18	61.3	1.6	83	2.1
C5	0.0257	2.1	0.28	3.7	0.45	5.9	0.66	10.5	1.05	15.2	1.44	21	1.9
C50	0.0875	9.1	0.33	15.7	0.51	24.6	0.74	42.2	1.14	59.9	1.55	81.2	2.03
C51	0.0676	8.3	0.28	13.6	0.44	22	0.64	39.4	1.02	57.1	1.39	78.6	1.84
C52	0.0101	0.4	0.18	0.7	0.31	1.3	0.48	2.6	0.81	4	1.15	5.9	1.57
C53	0.008	0.3	0.13	0.5	0.24	1.1	0.39	2.4	0.69	3.9	1	5.8	1.4
C54	0.0108	0.7	0.2	1.4	0.35	2.4	0.53	4.7	0.88	7	1.23	9.9	1.67
C55	0.0147	4.8	0.62	7.3	0.89	10.2	1.19	15.2	1.7	20	2.19	25.5	2.75
C56	0.1291	15.4	0.38	25.6	0.59	39.7	0.83	66.8	1.26	94.4	1.68	126.3	2.18
C57	0.0256	10.5	0.7	15.6	0.99	21.2	1.31	30.8	1.84	39.6	2.34	49.8	2.93
C58	0.0394	6.3	0.45	10.2	0.68	15.1	0.94	24	1.39	32.7	1.84	42.9	2.36
C59	0.0204	9.3	0.84	13.3	1.16	17.8	1.51	25.1	2.08	31.9	2.61	39.7	3.21
C6	0.5501	8.7	0.11	25.9	0.23	56.8	0.39	127.2	0.71	205	1.04	306.3	1.45
C60	0.0205	9.7	0.77	14.2	1.08	19.2	1.41	27.6	1.96	35.4	2.48	44.3	3.07
C61	6.2839	360.2	0.25	618.6	0.41	1011.2	0.6	1836.5	0.97	2736.7	1.33	3864.6	1.78

Woodland Park Hydrologic Summary Table
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Element ID	Drainage Area to Element (sq. Miles)	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
		Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)
C62	0.258	50.7	0.52	80.3	0.77	115.7	1.04	178.5	1.53	238.4	1.99	308.8	2.53
C63	0.3361	30.6	0.32	52.6	0.51	82.7	0.73	141.9	1.13	202	1.53	274.7	2.01
C64	0.4035	81.4	0.56	124.7	0.81	175.6	1.09	268.3	1.58	358.3	2.04	464.5	2.58
C65	0.4835	50.2	0.4	83.4	0.6	129.2	0.84	216.3	1.27	302.5	1.7	407.2	2.2
C66	0.5976	112.4	0.54	172.5	0.78	245.5	1.05	377.8	1.52	508.9	1.98	665.9	2.51
C67	0.0822	4	0.2	7.2	0.34	12.6	0.51	24.3	0.86	37.1	1.21	53.2	1.64
C68	1.2529	167.7	0.46	263.4	0.68	387.9	0.93	620.4	1.38	858.3	1.81	1138.3	2.33
C69	1.8929	198.5	0.37	315.2	0.57	474	0.8	789.8	1.21	1105.1	1.62	1504.9	2.1
C7	0.2248	11.6	0.25	23	0.42	38.5	0.64	69.1	1.04	100.3	1.43	138.4	1.91
C70	0.2342	15.5	0.22	26.6	0.37	44.6	0.55	84.9	0.91	128.5	1.26	182.7	1.7
C71	0.4006	24.4	0.25	43.3	0.41	71.5	0.6	129.8	0.97	191	1.35	266.4	1.8
C72	4.4252	311.5	0.29	518.8	0.45	823.3	0.66	1444.3	1.04	2126.4	1.42	2959	1.88
C73	0.2532	8.2	0.15	17.3	0.29	33.3	0.46	68.9	0.79	108	1.13	157.4	1.56
C74	0.8037	16.6	0.13	41	0.26	72.7	0.43	123	0.77	167.3	1.12	220.3	1.54
C75	0.1645	12.8	0.3	23.5	0.49	37.8	0.71	65.5	1.12	93.6	1.53	128	2.02
C76	0.0796	8.8	0.39	15.2	0.61	23.3	0.86	38	1.32	52.4	1.76	69.7	2.28
C77	0.4489	32.5	0.29	59	0.48	94.7	0.7	164.6	1.11	236.4	1.51	323.3	2
C78	3.4366	54.3	0.15	128.3	0.29	223.6	0.48	482.3	0.83	734.3	1.19	1057.7	1.63
C79	3.8862	75.7	0.16	172.3	0.31	296.9	0.5	554.1	0.86	860.8	1.22	1249.7	1.67
C8	0.1027	2.4	0.16	6.3	0.31	11.9	0.5	23.6	0.87	36	1.24	51.6	1.69
C80	1.11	10.4	0.09	24.8	0.21	62.8	0.36	156.8	0.67	270.8	0.99	420	1.4
C81	0.3172	23.1	0.33	38.9	0.52	60	0.74	101.5	1.15	143.9	1.56	195.3	2.04
C82	6.0286	123.1	0.17	261.3	0.32	452.1	0.5	864.3	0.85	1361.4	1.21	1989.3	1.66
C83	0.1127	8.2	0.28	14.3	0.45	23.1	0.66	40.6	1.05	59	1.43	81.7	1.9
C84	0.1877	5.4	0.12	8.9	0.23	17	0.38	36.8	0.68	59.8	0.99	90	1.38
C85	21.6274	180.8	0.13	431.5	0.26	887.5	0.43	1905.5	0.76	3017.5	1.1	4471	1.53
C86	0.0776	3.3	0.21	5.9	0.35	10.1	0.53	19	0.88	28.6	1.24	40.9	1.67
C87	22.6088	197.5	0.13	450.5	0.26	914.1	0.43	1978.4	0.76	3133.8	1.11	4615.2	1.53
C88	22.7902	199.2	0.13	453.5	0.26	917.6	0.43	1987.9	0.77	3145.5	1.11	4636.6	1.53
C9	0.1207	4.5	0.2	9.2	0.35	16.2	0.55	30.7	0.91	46	1.28	65	1.73
C97	0.5435	22.5	0.17	39.5	0.3	71.6	0.46	144.5	0.79	225.2	1.12	327.9	1.54
KellyPond	0.4489	23.2	0.29	58.1	0.48	97.4	0.71	167.1	1.11	234.9	1.51	320.7	1.99
MiddleSchooDetention	0.5501	8.6	0.11	24.8	0.23	49.8	0.39	96.2	0.71	124.5	1.04	153	1.45
PaintPonyConf	1.2526	39.2	0.19	95.2	0.34	159.4	0.53	275.6	0.89	395.2	1.26	530.9	1.71
R1	0.0964	7.9	0.26	12.9	0.42	19.8	0.62	37.7	0.99	58	1.36	82.3	1.81
R10	6.4406	137.4	0.18	289	0.33	498.4	0.52	944.3	0.88	1469.7	1.24	2139.9	1.68
R1001	1.2526	39.2	0.19	94.8	0.34	158.3	0.53	275.5	0.89	391.7	1.26	529.6	1.71
R101	0.5435	22.2	0.17	39.1	0.3	70.9	0.46	143	0.79	222.9	1.12	323.1	1.54
R11	0.0386	1.2	0.12	1.9	0.22	3.7	0.37	8.1	0.66	13.3	0.97	20.3	1.36
R12	0.0303	7.8	0.55	12.1	0.8	17.3	1.08	26	1.58	35	2.04	45.6	2.59
R13	0.018	1.7	0.31	3	0.48	4.8	0.7	8.4	1.1	12.1	1.5	16.6	1.98
R14	0.0941	4.4	0.17	7.7	0.29	14	0.46	28.8	0.78	45.1	1.12	65.4	1.53
R15	0.0122	0.6	0.13	1	0.24	2.1	0.39	4.5	0.69	7	1	10.6	1.39
R16	0.0123	0.9	0.23	1.6	0.38	2.5	0.57	4.4	0.93	6.5	1.29	9.3	1.73
R17	0.0192	0.9	0.13	1.4	0.24	2.9	0.39	6.3	0.69	10.5	1	15.9	1.4
R18	0.0057	0.2	0.13	0.3	0.24	0.6	0.39	1.4	0.69	2.2	1.01	3.3	1.41
R19	0.0581	17.1	0.69	23.6	0.96	31.1	1.27	44.5	1.78	57.1	2.27	70.6	2.83
R2	0.067	3.8	0.17	6.5	0.3	12.3	0.47	24.8	0.8	38	1.14	55.4	1.57
R20	0.4091	13.3	0.14	22.7	0.25	42.6	0.4	90.2	0.71	144.7	1.03	217	1.43

Woodland Park Hydrologic Summary Table
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Element ID	Drainage Area to Element (sq. Miles)	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
		Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)
R21	0.487	24.2	0.19	38	0.32	63.8	0.49	124.2	0.82	192.1	1.16	279.7	1.59
R22	0.583	30.3	0.21	48	0.34	79	0.52	151.3	0.86	233.3	1.2	340.2	1.63
R23	0.0033	1.9	0.85	2.6	1.16	3.4	1.5	4.7	2.08	6	2.61	7.5	3.22
R24	0.2057	12.4	0.21	21.5	0.35	37.1	0.53	72.4	0.87	110.6	1.22	158	1.66
R25	0.2245	14.5	0.22	24.8	0.36	41.9	0.55	80.3	0.9	122.2	1.25	174.2	1.69
R26	1.0998	35.3	0.17	66.5	0.3	119.5	0.47	240.4	0.79	379.1	1.13	555.1	1.55
R27	2.1236	34.1	0.16	78.5	0.3	144.7	0.48	284.2	0.83	437.9	1.19	631.4	1.62
R28	2.3868	35.7	0.15	83.3	0.29	154	0.47	303.4	0.81	469.1	1.16	677	1.6
R29	23.9375	212.5	0.13	474.8	0.26	958.3	0.44	2087.1	0.77	3313.2	1.11	4897.4	1.54
R3	0.0256	2.8	0.26	5.3	0.43	8.6	0.63	15.6	1.01	22.9	1.39	31.1	1.85
R31	0.0643	1.6	0.14	5	0.27	10.5	0.45	21.9	0.8	34.5	1.15	49.7	1.58
R33	1.3807	19.7	0.14	49.9	0.28	94.6	0.46	188.7	0.81	290.2	1.16	420	1.6
R34	0.6103	2.1	0.05	11	0.15	31.2	0.28	82.2	0.57	142.6	0.87	223.1	1.25
R35	0.8763	3.4	0.06	16.2	0.16	43.8	0.3	113.8	0.59	198.3	0.9	312.1	1.29
R36	1.4777	14.6	0.1	50.1	0.24	106.4	0.41	228.2	0.75	361.9	1.1	532.6	1.53
R37	1.8991	17.5	0.1	59	0.23	125.1	0.4	272.7	0.74	434.6	1.08	643.4	1.51
R38	12.8068	79.4	0.09	242.9	0.22	512.8	0.38	1088.6	0.71	1732.6	1.04	2575.6	1.46
R39	6.9752	40.5	0.08	133.2	0.2	281.2	0.36	605.9	0.68	966.6	1.02	1433.2	1.43
R4	0.2724	12.3	0.18	21.9	0.31	39.3	0.48	78.1	0.81	119.9	1.15	173.4	1.58
R40	0.0171	1	0.13	1.5	0.24	3.2	0.39	7	0.69	11.7	1	17.7	1.4
R42	0.343	64.4	0.53	100.1	0.78	142.7	1.06	219.5	1.54	292.5	2	380.3	2.54
R43	0.2932	53.4	0.5	84.4	0.74	122.4	1.01	190.5	1.48	254.7	1.93	331.9	2.47
R44	0.0056	6	1.52	7.7	1.95	9.5	2.38	12.1	3.07	14.8	3.7	17.6	4.38
R46	0.1999	4.8	0.13	8.3	0.24	15.6	0.39	32.6	0.69	52.3	1	78.2	1.4
R47	0.985	65.2	0.26	111.2	0.42	181.3	0.62	332.4	0.99	490.7	1.37	686.2	1.82
R48	0.5099	50.5	0.39	84	0.59	129.6	0.83	217.7	1.26	306.1	1.67	414.4	2.17
R5	0.0257	2.1	0.28	3.6	0.45	5.9	0.66	10.4	1.05	15	1.44	20.6	1.9
R50	0.0875	9	0.33	15.4	0.51	24.1	0.74	41.6	1.15	59	1.55	79.8	2.03
R51	0.0676	7.9	0.28	13.4	0.44	21.6	0.65	37.4	1.02	55.5	1.39	75.3	1.84
R52	0.0101	0.4	0.18	0.7	0.31	1.3	0.48	2.6	0.81	4	1.15	5.8	1.57
R53	0.008	0.3	0.13	0.5	0.24	1.1	0.39	2.3	0.69	3.8	1	5.7	1.4
R54	0.0108	0.7	0.21	1.3	0.35	2.3	0.53	4.6	0.88	6.8	1.23	9.9	1.67
R55	0.0147	4.7	0.62	7.3	0.89	10.1	1.19	14.8	1.7	19.5	2.19	24.6	2.75
R56	0.1291	15.2	0.38	25.6	0.59	39.5	0.83	65.5	1.26	92.5	1.68	124.4	2.17
R58	0.0394	6.2	0.45	10.1	0.68	14.8	0.94	23.4	1.39	31.9	1.84	42.1	2.36
R59	0.0204	8.9	0.84	12.6	1.16	17	1.51	24.3	2.08	31	2.61	38.4	3.22
R6	0.5501	8.5	0.11	23.3	0.23	43.7	0.39	65.4	0.71	85	1.04	132.8	1.45
R60	0.0205	9.5	0.77	13.9	1.08	18.6	1.41	27	1.97	35.1	2.49	44.6	3.08
R62	0.258	49.7	0.52	78.4	0.77	113.2	1.04	176	1.53	235.9	1.99	306.4	2.53
R63	0.3361	30.4	0.32	51.8	0.51	81.9	0.73	139.6	1.13	199.6	1.53	272.3	2.01
R64	0.4035	81.4	0.56	123.7	0.81	173.9	1.09	266	1.58	352.8	2.04	455.4	2.58
R65	0.4835	50.1	0.4	83.4	0.6	127.1	0.84	214.7	1.27	301.9	1.7	404.5	2.2
R66	0.5976	110.2	0.54	170.3	0.78	243.4	1.05	375.6	1.53	501.9	1.98	661.8	2.51
R67	0.0822	4	0.2	7.2	0.34	12.5	0.51	24.1	0.86	36.9	1.21	52.5	1.64
R68	1.2529	165.4	0.46	260.8	0.68	384.2	0.93	620	1.38	848.8	1.81	1123.2	2.33
R69	1.8929	197	0.37	312.2	0.57	469.8	0.8	786.7	1.21	1104.7	1.62	1491.4	2.1
R7	0.2248	11.6	0.25	22.8	0.42	38.3	0.64	68.8	1.04	99.9	1.43	137.9	1.91
R70	0.2342	15.2	0.22	26	0.37	43.5	0.55	83.6	0.91	127.5	1.26	182.6	1.7
R71	0.4006	24.3	0.25	43.1	0.41	71.2	0.6	128.9	0.97	189.7	1.35	266.5	1.8

Woodland Park Hydrologic Summary Table
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Element ID	Drainage Area to Element (sq. Miles)	2-Year		5-Year		10-Year		25-Year		50-Year		100-Year	
		Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)	Peak Flow (cfs)	Runoff Volume (inches)
R72	4.4252	309.8	0.29	516.9	0.46	813.2	0.66	1437.3	1.04	2110.6	1.42	2930.3	1.88
R73	0.2532	8.1	0.15	17.3	0.29	33.2	0.46	67.9	0.79	106	1.13	155.4	1.56
R74	0.8037	16.5	0.13	40.8	0.26	72.5	0.43	122.3	0.77	166.8	1.12	219.4	1.55
R75	0.1645	12.7	0.3	23.3	0.49	37.7	0.71	64.9	1.12	93.2	1.53	127.4	2.02
R76	0.0796	8.7	0.39	15	0.61	23.1	0.87	37.9	1.32	52.2	1.76	69.3	2.28
R77	0.4489	23.2	0.29	58.5	0.48	94.4	0.71	164.4	1.11	233	1.51	319.3	1.99
R78	3.4366	54	0.15	127.8	0.29	223.1	0.48	478.8	0.83	732.6	1.19	1055.9	1.63
R79	3.8862	75.5	0.16	171.4	0.31	296.2	0.5	553.4	0.86	859.4	1.22	1245.5	1.67
R8	0.1027	2.4	0.16	6.3	0.31	11.8	0.5	23.6	0.87	36	1.24	51.3	1.69
R80	1.11	10.4	0.09	24.8	0.21	62.7	0.36	155.8	0.67	269.2	0.99	418.3	1.4
R81	0.3172	23.1	0.33	38.7	0.52	60	0.74	101.1	1.15	143.2	1.56	193.5	2.04
R82	6.0286	122.8	0.17	261.2	0.32	451.2	0.5	863.1	0.85	1361.2	1.21	1988.6	1.66
R83	0.1127	8.2	0.28	14.2	0.45	22.9	0.66	40.4	1.05	58.7	1.43	81	1.9
R84	0.1877	5.4	0.13	8.9	0.23	17	0.38	36.7	0.68	59.5	0.99	89.4	1.39
R85	21.6274	180.1	0.13	431.4	0.26	884.9	0.43	1905.5	0.76	3015.1	1.1	4463	1.53
R86	0.0776	3.3	0.21	5.9	0.35	10.1	0.53	18.9	0.88	28.5	1.24	40.7	1.67
R87	22.6088	196.8	0.13	450.3	0.26	912.9	0.43	1977.8	0.76	3130.5	1.11	4614.8	1.53
R88	22.7902	198.6	0.13	453.3	0.26	915.9	0.43	1987.1	0.77	3145.2	1.11	4634.3	1.53
R89	0.1093	8.7	0.32	15.9	0.52	25.2	0.76	43	1.18	60.5	1.6	82.2	2.1
R9	0.1207	4.5	0.2	9.2	0.35	16.1	0.55	30.4	0.91	45.8	1.28	65	1.73
R90	0.0348	2.3	0.15	3.6	0.27	6.9	0.42	14.8	0.73	23.3	1.05	33.7	1.44
R91	0.0256	10.3	0.7	15.4	0.99	20.8	1.31	29.4	1.84	38	2.34	48.3	2.93
R92	0.0159	1.1	0.23	1.9	0.39	3.2	0.58	6	0.95	8.9	1.31	12.5	1.76
R93	0.4394	20.3	0.21	36.4	0.35	61.8	0.54	117.1	0.89	175.9	1.24	249.7	1.68
R94	4.9962	84.3	0.14	194.6	0.29	348.7	0.47	690	0.81	1113.4	1.17	1646.5	1.61
R95	2.1655	209.7	0.36	335.3	0.54	506.3	0.77	852.4	1.18	1209	1.58	1636.1	2.06
R96	2.2384	212.2	0.35	338.7	0.54	515.4	0.77	862.8	1.17	1227.6	1.57	1676	2.05
R97	0.7629	28.1	0.18	50.9	0.31	90.5	0.48	177.9	0.81	271.8	1.14	398.7	1.57
SeconDetention	0.5501	8.7	0.11	23.3	0.23	43.8	0.39	65.5	0.71	85	1.04	133.4	1.45
1126B	0.4394	20.5	0.21	36.5	0.35	62.2	0.54	116.9	0.89	176.5	1.24	252.1	1.68
1127B	0.3235	9.5	0.13	16.1	0.24	30.3	0.4	64.1	0.7	103.4	1.01	154.9	1.41
1128B	0.2784	10.9	0.15	18.6	0.26	34.9	0.42	73.5	0.73	117.9	1.06	175.1	1.46
1222B	0.0384	4.2	0.3	7.3	0.48	11.8	0.7	20.6	1.1	29.5	1.49	40.2	1.97
1223B	0.0473	5	0.32	8.7	0.51	13.7	0.73	23.5	1.14	33.3	1.54	45.2	2.02
1229B	0.2651	12	0.19	21.4	0.33	37.5	0.5	72.6	0.84	110.6	1.19	159.6	1.62
1230B	0.1312	14.8	0.37	24.9	0.56	38.3	0.8	63.7	1.22	89.5	1.64	120.5	2.14
1231B	0.1627	6.8	0.15	11.8	0.27	22.1	0.43	46.4	0.74	73.6	1.07	108.4	1.48
90C	0.4394	20.5	0.21	36.5	0.35	62.2	0.54	116.9	0.89	176.5	1.24	252.1	1.68
91C	0.7629	28.2	0.18	51.2	0.31	90.8	0.48	178.2	0.81	274.6	1.15	401.5	1.56
95C	2.1655	209.5	0.36	336	0.54	510.6	0.77	858.7	1.18	1210.5	1.58	1661	2.06
96C	2.2384	213.7	0.35	342.2	0.54	516.7	0.77	872.9	1.17	1237	1.57	1681	2.05

Appendix C - Basin Hydrologic Values

Basin ID	Basin Area (square Miles)	Basin Area (Acres)	Initial Abstraction (inches)	Weighted SCS Curve Number Values	SCS Lag Time (hours)	SCS Lag Time (Minutes)	Basin Slope (%)	Watershed Length (feet)	Mean Elevation (Feet)
1126B	0.439	281.22	1.17	63.12	0.52	31.38	19.27%	6588.73	8559.17
1127B	0.323	207.04	1.32	60.18	0.50	30.02	18.19%	5473.37	8419.71
1128B	0.278	178.18	1.29	60.83	0.35	21.17	35.84%	5516.33	8553.89
1222B	0.038	24.58	1.03	66.00	0.27	16.18	8.08%	1836.41	8276.31
1223B	0.047	30.27	1.01	66.50	0.32	19.46	9.66%	2627.76	8234.75
1229B	0.265	169.66	1.20	62.54	0.45	27.26	29.15%	7023.66	8560.43
1230B	0.131	83.97	0.96	67.59	0.39	23.22	14.31%	4342.41	8254.54
1231B	0.163	104.13	1.28	61.00	0.33	19.66	26.54%	4191.08	8265.26
B1	0.409	261.82	1.31	60.40	0.43	26.04	31.94%	6561.43	8993.96
B10	0.610	390.59	1.32	60.26	0.62	37.22	29.95%	9805.06	9086.47
B11	1.381	883.65	1.11	64.41	1.23	73.89	14.40%	16699.19	8939.26
B12	0.469	299.97	1.16	63.35	0.82	49.26	13.62%	9390.76	8721.38
B13	0.082	52.61	1.19	62.69	0.42	25.13	15.00%	4209.72	8483.50
B14	0.064	41.15	1.12	64.08	0.30	17.92	11.07%	2386.40	8692.10
B15	3.760	2406.72	0.58	77.64	0.95	56.95	24.79%	26684.54	8827.90
B16	1.147	734.27	1.23	61.96	1.33	79.56	11.50%	14709.01	8363.20
B17	3.445	2204.67	1.18	62.85	1.15	69.01	23.19%	19636.99	8800.79
B18	0.210	134.34	1.10	64.52	0.51	30.31	18.05%	6336.63	8696.24
B19	0.337	215.62	1.25	61.54	0.45	27.23	24.80%	6143.61	8320.11
B2	0.019	11.97	0.42	82.50	0.10	6.24	4.88%	736.81	8428.72
B20	1.153	737.60	1.23	61.87	0.52	31.48	32.67%	8841.47	8230.17
B21	0.084	54.02	0.92	68.38	0.28	16.63	18.63%	3462.58	8290.33
B22	0.102	65.28	0.97	67.44	0.46	27.41	9.86%	4213.13	8180.52
B23	0.003	2.11	0.60	77.00	0.12	6.94	5.49%	731.04	8459.15
B24	0.088	56.00	1.00	66.57	0.35	21.03	16.00%	3977.24	8526.48
B25	0.014	8.83	0.60	77.00	0.16	9.42	8.54%	1412.69	8347.25
B26	0.007	4.16	0.78	72.00	0.19	11.33	7.49%	1370.76	8315.56
B27	0.006	3.65	1.33	60.13	0.36	21.42	17.69%	3523.07	8511.18
B28	0.145	93.06	0.96	67.46	0.55	33.22	9.06%	5084.58	8377.84
B29	0.026	16.90	1.15	63.50	0.26	15.80	10.79%	1968.16	8410.91
B3	0.018	11.33	1.33	60.00	0.12	7.39	14.39%	814.72	8483.65
B30	0.078	49.86	0.86	70.00	0.30	17.85	17.05%	3779.50	8487.43
B31	0.019	12.29	1.33	60.00	0.19	11.52	25.87%	2048.57	8502.85
B32	0.263	168.45	1.29	60.78	0.46	27.57	26.34%	6321.56	8629.55
B33	0.007	4.22	1.01	66.50	0.22	13.17	10.10%	1658.23	8360.07
B34	0.200	127.94	1.33	60.00	0.65	39.19	18.81%	7757.40	8512.99
B35	0.012	7.81	1.33	60.00	0.15	9.24	20.57%	1347.90	8414.95
B36	0.094	60.22	1.25	61.57	0.32	18.96	28.72%	4286.75	8669.50
B37	0.018	11.52	1.03	66.00	0.33	19.98	5.23%	1821.01	8194.11
B38	0.030	19.39	0.79	71.60	0.22	13.26	15.41%	2583.06	8327.28
B39	0.080	51.33	1.06	65.36	0.24	14.42	19.23%	2676.62	8408.34
B4	0.017	10.94	1.33	60.00	0.09	5.47	20.58%	699.74	8517.44
B40	0.010	6.21	1.01	66.50	0.21	12.52	13.61%	1875.52	8326.01
B41	0.039	24.70	1.36	59.56	0.39	23.53	8.28%	2421.83	8242.98
B42	0.078	49.66	1.17	63.06	0.59	35.47	8.14%	4473.71	8290.08
B43	0.009	5.44	0.78	72.00	0.20	12.04	10.08%	1779.70	8213.15
B44	0.320	204.86	1.05	65.59	0.52	31.30	12.82%	5514.57	8227.12
B45	0.016	10.18	1.13	64.00	0.35	20.94	6.59%	2090.56	8207.88
B46	0.041	26.43	1.09	64.80	0.30	18.18	8.73%	2142.68	8228.57
B47	2.380	1523.20	1.30	60.54	1.19	71.44	26.04%	20480.95	8596.86

Appendix C - Basin Hydrologic Values

Basin ID	Basin Area (square Miles)	Basin Area (Acres)	Initial Abstraction (inches)	Weighted SCS Curve Number Values	SCS Lag Time (hours)	SCS Lag Time (Minutes)	Basin Slope (%)	Watershed Length (feet)	Mean Elevation (Feet)
B48	0.103	65.73	1.05	65.57	0.67	40.36	6.15%	4784.94	8446.88
B49	0.109	69.95	0.91	68.68	0.52	31.26	7.05%	4192.87	8503.86
B5	0.042	26.62	0.83	70.67	0.24	14.65	13.27%	2582.02	8378.48
B50	0.121	77.25	1.09	64.75	0.62	36.93	7.94%	4891.70	8460.84
B51	0.297	190.02	1.23	61.90	0.45	26.98	27.24%	6513.87	8858.18
B52	0.113	72.13	1.06	65.33	0.46	27.44	11.68%	4376.58	8344.97
B53	0.011	6.91	1.17	63.00	0.23	13.84	8.23%	1386.20	8248.97
B54	0.254	162.30	1.01	66.42	0.49	29.66	19.70%	6926.46	8649.10
B55	0.026	16.45	1.06	65.38	0.38	22.77	8.42%	2829.37	8493.65
B56	0.006	3.58	0.27	88.00	0.11	6.46	6.53%	1177.35	8484.17
B57	0.272	174.34	1.22	62.04	0.39	23.29	36.71%	6560.19	8929.48
B58	0.026	16.38	1.08	64.83	0.15	9.22	21.45%	1609.60	8339.73
B59	0.029	18.82	0.87	69.67	0.17	10.34	24.53%	2372.06	8274.54
B6	6.975	4464.13	1.18	62.86	1.75	105.25	20.42%	30752.00	9262.80
B61	0.067	42.88	1.23	61.93	0.24	14.46	26.57%	2943.64	8394.37
B62	0.225	143.87	0.93	68.24	0.65	39.22	10.39%	6992.46	8444.65
B63	0.013	8.19	0.95	67.83	0.29	17.27	6.77%	1892.93	8391.68
B64	0.163	104.58	1.09	64.71	0.43	26.06	13.67%	4436.46	8185.62
B65	0.026	16.38	0.68	74.50	0.16	9.74	13.01%	1750.51	8359.22
B66	0.234	149.57	1.02	66.28	0.59	35.18	13.20%	6646.63	8471.65
B67	0.035	22.53	1.01	66.38	0.35	21.11	11.02%	3146.03	8507.84
B68	0.285	182.34	0.87	69.57	0.69	41.68	6.66%	5974.34	8382.01
B69	0.058	37.38	0.87	69.80	0.34	20.43	5.49%	2189.19	8403.62
B7	0.421	269.70	1.17	63.13	0.67	40.00	24.00%	10240.00	8832.71
B70	0.080	50.94	0.84	70.44	0.48	28.69	6.13%	3662.44	8480.02
B71	0.165	105.28	0.96	67.52	0.46	27.86	6.19%	3221.94	8476.71
B72	0.010	6.46	1.23	62.00	0.45	27.06	7.34%	2889.75	8225.58
B73	0.253	162.05	1.19	62.65	0.41	24.87	28.25%	6163.19	8784.15
B74	0.336	215.10	1.01	66.42	0.42	25.33	20.72%	5870.49	8673.73
B75	0.057	36.48	1.06	65.42	0.39	23.10	8.89%	2983.71	8311.19
B76	0.068	43.78	0.83	70.75	0.34	20.62	6.23%	2475.45	8399.87
B77	0.147	94.34	0.78	71.90	0.42	25.13	8.59%	4029.70	8455.75
B78	0.024	15.17	0.80	71.33	0.22	13.12	7.22%	1572.63	8444.46
B79	0.033	20.99	0.91	68.75	0.21	12.77	11.62%	1876.40	8443.59
B8	1.478	945.73	1.11	64.26	0.92	55.00	18.00%	13210.00	9134.93
B80	0.039	25.22	0.87	69.58	0.35	21.10	7.86%	2830.35	8486.74
B81	0.020	13.06	0.60	77.00	0.21	12.82	6.63%	1771.58	8490.91
B82	0.020	13.12	0.64	75.80	0.14	8.49	12.30%	1490.34	8520.42
B83	0.258	165.12	0.81	71.19	0.34	20.21	20.09%	5091.65	8693.40
B84	0.401	256.38	1.11	64.41	0.47	28.25	29.27%	7820.61	8872.68
B85	0.015	9.41	0.74	73.00	0.20	11.95	10.63%	1887.79	8275.77
B86	0.188	120.13	1.34	59.90	0.48	28.84	19.09%	5319.32	8481.57
B87	0.008	5.12	1.33	60.00	0.25	14.93	8.94%	1458.42	8239.86
B88	0.878	561.73	1.15	63.44	1.16	69.76	11.16%	12842.85	8409.02
B89	0.037	23.55	1.04	65.83	0.27	16.06	8.76%	1901.34	8430.44
B9	0.266	170.24	1.24	61.73	0.45	26.95	20.97%	5493.90	8676.38
B90	0.317	203.01	1.00	66.74	0.66	39.65	14.46%	8295.57	8505.85

Runoff Curve Number Report
(Generated by WMS)

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Runoff Curve Number Report for Basin B64

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	23.614	1416.836
B	Developed, Open Space	72	23.614	1700.203
B	Grassland/Herbaceous	69	33.734	2327.659
B	Shrub/Scrub	56	23.614	1322.380

CN (Weighted) = Total Product \ Total Area
64.7097

Runoff Curve Number Report for Basin B72

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	1.077	77.568
B	Evergreen Forest	60	5.387	323.200

CN (Weighted) = Total Product \ Total Area
62

Runoff Curve Number Report for Basin B86

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	117.198	7031.883
B	Shrub/Scrub	56	2.930	164.077

CN (Weighted) = Total Product \ Total Area
59.9024

Runoff Curve Number Report for Basin B87

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	5.120	307.200

CN (Weighted) = Total Product \ Total Area

Runoff Curve Number Report for Basin B85

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	7.526	541.901
B	Developed, Low Intensity	77	1.882	144.883

CN (Weighted) = Total Product \ Total Area
73

Runoff Curve Number Report for Basin B88

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	63.472	3554.424
B	Evergreen Forest	60	336.401	20184.053
B	Grassland/Herbaceous	69	25.389	1751.823
B	Developed, Low Intensity	77	69.819	5376.067
B	Developed, Open Space	72	57.125	4112.977
B	Pasture/Hay	69	9.521	656.934

CN (Weighted) = Total Product \ Total Area
63.4407

Runoff Curve Number Report for Basin B90

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	58.938	4243.501
B	Evergreen Forest	60	78.583	4715.001
B	Developed, Low Intensity	77	19.646	1512.730
B	Grassland/Herbaceous	69	39.292	2711.126
B	Shrub/Scrub	56	6.549	366.722

CN (Weighted) = Total Product \ Total Area
66.7419

Runoff Curve Number Report for Basin B65

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	8.192	589.824
B	Developed, Low Intensity	77	8.192	630.784

CN (Weighted) = Total Product \ Total Area

B	Evergreen Forest	60	10.423	625.371
B	Developed, Low Intensity	77	10.423	802.560

CN (Weighted) = Total Product \ Total Area
65.4286

Runoff Curve Number Report for Basin B76

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	10.944	842.688
B	Evergreen Forest	60	16.416	984.960
B	Developed, Medium Intensity	88	5.472	481.536
B	Developed, Open Space	72	10.944	787.968

CN (Weighted) = Total Product \ Total Area
70.75

Runoff Curve Number Report for Basin B77

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	6.506	390.356
B	Developed, Low Intensity	77	35.783	2755.262
B	Developed, Medium Intensity	88	9.759	858.783
B	Grassland/Herbaceous	69	19.518	1346.728
B	Developed, Open Space	72	9.759	702.641
B	Shrub/Scrub	56	13.012	728.664

CN (Weighted) = Total Product \ Total Area
71.8966

Runoff Curve Number Report for Basin B79

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	5.248	314.880
B	Developed, Low Intensity	77	5.248	404.096
B	Grassland/Herbaceous	69	10.496	724.224

CN (Weighted) = Total Product \ Total Area
68.75

Runoff Curve Number Report for Basin B80

HSG	Land Use Description	CN	Area acres	Product CN x A

B	Evergreen Forest	60	8.405	504.320
B	Developed, Low Intensity	77	14.709	1132.619
B	Shrub/Scrub	56	2.101	117.675

CN (Weighted) = Total Product \ Total Area
69.5833

Runoff Curve Number Report for Basin B81

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	13.056	1005.31

CN (Weighted) = Total Product \ Total Area
77

Runoff Curve Number Report for Basin B82

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	7.872	606.144
B	Evergreen Forest	60	2.624	157.440
B	Developed, Medium Intensity	88	2.624	230.912

CN (Weighted) = Total Product \ Total Area
75.8

Runoff Curve Number Report for Basin B83

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	37.119	2227.14
B	Developed, Low Intensity	77	88.00	6776.00
B	Developed, Open Space	72	32.00	2304.00
B	Shrub/Scrub	56	8.00	448.00

CN (Weighted) = Total Product \ Total Area
71.19

Runoff Curve Number Report for Basin B84

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	25.013	1925.999
B	Shrub/Scrub	56	6.253	350.182
B	Evergreen Forest	60	131.318	7879.087

B	Deciduous Forest	60	15.633	937.987
B	Developed, Open Space	72	9.380	675.350
B	Grassland/Herbaceous	69	68.786	4746.212

CN (Weighted) = Total Product \ Total Area
==========
64.4146

Runoff Curve Number Report for Basin B24

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	4.000	224.000
B	Developed, Open Space	72	32.000	2304.000
B	Evergreen Forest	60	20.000	1200.000

CN (Weighted) = Total Product \ Total Area
==========
66.5714

Runoff Curve Number Report for Basin B34

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	127.935	7676.100

CN (Weighted) = Total Product \ Total Area
==========
60

Runoff Curve Number Report for Basin B45

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	3.392	244.224
B	Evergreen Forest	60	6.784	407.040

CN (Weighted) = Total Product \ Total Area
==========
64

Runoff Curve Number Report for Basin B56

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Medium Intensity	88	3.584	315.392

CN (Weighted) = Total Product \ Total Area
==========
88

Runoff Curve Number Report for Basin B67

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	2.816	168.960
B	Developed, Low Intensity	77	8.448	650.496
B	Developed, Open Space	72	2.816	202.752
B	Shrub/Scrub	56	8.448	473.088

CN (Weighted) = Total Product \ Total Area
==========
66.375

Runoff Curve Number Report for Basin B78

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	7.584	583.968
B	Shrub/Scrub	56	2.528	141.568
B	Grassland/Herbaceous	69	2.528	174.432
B	Developed, Open Space	72	2.528	182.016

CN (Weighted) = Total Product \ Total Area
==========
71.3333

Runoff Curve Number Report for Basin B89

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	3.925	302.251
B	Grassland/Herbaceous	69	7.851	541.696
B	Evergreen Forest	60	11.776	706.560

CN (Weighted) = Total Product \ Total Area
==========
65.8333

Runoff Curve Number Report for Basin B3

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	11.328	679.680

CN (Weighted) = Total Product \ Total Area
==========
60

Runoff Curve Number Report for Basin B4

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	10.944	656.640

CN (Weighted) = Total Product \ Total Area
==========
60

Runoff Curve Number Report for Basin B5

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	23.666	1703.936
B	Evergreen Forest	60	2.958	177.493

CN (Weighted) = Total Product \ Total Area
==========
70.6667

Runoff Curve Number Report for Basin B6

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Grassland/Herbaceous	69	1316.222	90819.327
B	Evergreen Forest	60	2930.052	175803.095
D	Evergreen Forest	79	6.136	484.762
B	Developed, Open Space	72	95.112	6848.037
B	Shrub/Scrub	56	67.499	3779.920
B	Developed, Low Intensity	77	30.681	2362.450
B	Open Water	0	9.204	0.000
B	Woody Wetlands	55	9.204	506.239

CN (Weighted) = Total Product \ Total Area
==========
62.8577

Runoff Curve Number Report for Basin B7

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	45.491	3275.332
B	Developed, Low Intensity	77	6.499	500.398
B	Evergreen Forest	60	181.963	10917.773
B	Grassland/Herbaceous	69	32.493	2242.043
B	Shrub/Scrub	56	3.249	181.963

CN (Weighted) = Total Product \ Total Area
==========
63.13

Runoff Curve Number Report for Basin B8

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	585.448	35126.891
B	Deciduous Forest	60	75.057	4503.448
B	Grassland/Herbaceous	69	51.039	3521.696
B	Shrub/Scrub	56	6.005	336.257
B	Developed, Open Space	72	24.018	1729.324
B	Woody Wetlands	55	24.018	1321.011
B	Mixed Forest	60	6.005	360.276
D	Grassland/Herbaceous	84	3.002	252.193
D	Evergreen Forest	79	156.120	12333.442
D	Developed, Open Space	86	12.009	1032.791
D	Developed, Low Intensity	88	3.002	264.202

CN (Weighted) = Total Product \ Total Area
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64.2698

Runoff Curve Number Report for Basin B9

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	100.141	6008.435
B	Shrub/Scrub	56	20.028	1121.575
B	Grassland/Herbaceous	69	30.042	2072.910
B	Woody Wetlands	55	3.338	183.591
B	Developed, Open Space	72	10.014	721.012
B	Mixed Forest	60	3.338	200.281
B	Deciduous Forest	60	3.338	200.281

CN (Weighted) = Total Product \ Total Area
==========
61.7255

Runoff Curve Number Report for Basin B10

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Grassland/Herbaceous	69	9.450	652.033
B	Evergreen Forest	60	324.442	19466.502
B	Woody Wetlands	55	31.499	1732.456
B	Deciduous Forest	60	25.199	1511.961

CN (Weighted) = Total Product \ Total Area
==========
60.26

Runoff Curve Number Report for Basin B11

HSG	Land Use Description	CN	Area acres	Product CN x A

B	Grassland/Herbaceous	69	464.171	32027.797
B	Evergreen Forest	60	299.132	17947.944
D	Evergreen Forest	79	3.438	271.626
B	Woody Wetlands	55	3.438	189.107
B	Shrub/Scrub	56	106.587	5968.895
B	Developed, Low Intensity	77	3.438	264.749
B	Developed, Open Space	72	3.438	247.558

CN (Weighted) = Total Product \ Total Area

64.4125

Runoff Curve Number Report for Basin B12

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Grassland/Herbaceous	69	91.827	6336.038
B	Evergreen Forest	60	162.227	9733.623
B	Developed, Low Intensity	77	18.365	1414.130
B	Shrub/Scrub	56	15.304	857.049
B	Developed, Open Space	72	9.183	661.152
B	Open Water	0	3.061	0.000

CN (Weighted) = Total Product \ Total Area

63.3469

Runoff Curve Number Report for Basin B14

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	25.324	1519.458
B	Developed, Low Intensity	77	3.166	243.746
B	Grassland/Herbaceous	69	12.662	873.689

CN (Weighted) = Total Product \ Total Area

64.0769

Runoff Curve Number Report for Basin B15

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	186.780	11206.818
D	Evergreen Forest	79	2100.513	165940.511
D	Grassland/Herbaceous	84	82.673	6944.553
D	Woody Wetlands	77	3.062	235.772
D	Shrub/Scrub	77	30.620	2357.718
B	Shrub/Scrub	56	3.062	171.470

CN (Weighted) = Total Product \ Total Area

77.6399

Runoff Curve Number Report for Basin B16

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	368.684	22121.015
B	Shrub/Scrub	56	145.615	8154.414
B	Grassland/Herbaceous	69	139.418	9619.853
B	Developed, Open Space	72	65.062	4684.450
B	Woody Wetlands	55	3.098	170.400
B	Deciduous Forest	60	12.393	743.564

CN (Weighted) = Total Product \ Total Area

61.9578

Runoff Curve Number Report for Basin B17

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	1744.079	104644.728
D	Grassland/Herbaceous	84	24.564	2063.417
D	Evergreen Forest	79	196.516	15524.758
B	Grassland/Herbaceous	69	171.951	11864.649
B	Shrub/Scrub	56	64.482	3610.980
B	Developed, Open Space	72	3.071	221.080

CN (Weighted) = Total Product \ Total Area

62.85

Runoff Curve Number Report for Basin B18

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	73.884	4433.055
B	Developed, Open Space	72	20.150	1450.818
B	Developed, Low Intensity	77	11.195	861.983
B	Grassland/Herbaceous	69	22.389	1544.853
B	Shrub/Scrub	56	6.717	376.138

CN (Weighted) = Total Product \ Total Area

64.5167

Runoff Curve Number Report for Basin B19

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	506.664	30399.859
B	Developed, Open Space	72	27.305	1965.979
B	Grassland/Herbaceous	69	87.984	6070.870

B	Shrub/Scrub	56	66.746	3737.787
B	Developed, Low Intensity	77	12.136	934.447
B	Pasture/Hay	69	3.034	209.340

CN (Weighted) = Total Product \ Total Area
==========
61.5431

Runoff Curve Number Report for Basin B20

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	507.968	30478.065
B	Shrub/Scrub	56	69.585	3896.739
B	Grassland/Herbaceous	69	45.230	3120.870
B	Developed, Open Space	72	69.585	5010.093
B	Developed, Low Intensity	77	24.355	1875.306
B	Deciduous Forest	60	20.875	1252.523

CN (Weighted) = Total Product \ Total Area
==========
61.8679

Runoff Curve Number Report for Basin B21

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	4.155	232.684
B	Developed, Open Space	72	33.241	2393.324
B	Evergreen Forest	60	8.310	498.609
B	Deciduous Forest	60	4.155	249.305
B	Developed, Low Intensity	77	4.155	319.941

CN (Weighted) = Total Product \ Total Area
==========
68.3846

Runoff Curve Number Report for Basin B22

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	13.340	800.427
B	Shrub/Scrub	56	30.016	1680.896
B	Developed, Low Intensity	77	23.346	1797.625
B	Developed, Medium Intensity	88	6.670	586.980
B	Grassland/Herbaceous	69	40.021	2761.472
B	Developed, Open Space	72	3.335	240.128
B	Pasture/Hay	69	3.335	230.123

CN (Weighted) = Total Product \ Total Area
==========
67.4444

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B Shrub/Scrub 56 66.746 3737.787
B Developed, Low Intensity 77 12.136 934.447
B Pasture/Hay 69 3.034 209.340

CN (Weighted) = Total Product \ Total Area
==========
61.5431

Runoff Curve Number Report for Basin B20

HSG Land Use Description CN Area acres Product CN x A

B Evergreen Forest 60 507.968 30478.065
B Shrub/Scrub 56 69.585 3896.739
B Grassland/Herbaceous 69 45.230 3120.870
B Developed, Open Space 72 69.585 5010.093
B Developed, Low Intensity 77 24.355 1875.306
B Deciduous Forest 60 20.875 1252.523

CN (Weighted) = Total Product \ Total Area
==========
61.8679

Runoff Curve Number Report for Basin B21

HSG Land Use Description CN Area acres Product CN x A

B Shrub/Scrub 56 4.155 232.684
B Developed, Open Space 72 33.241 2393.324
B Evergreen Forest 60 8.310 498.609
B Deciduous Forest 60 4.155 249.305
B Developed, Low Intensity 77 4.155 319.941

CN (Weighted) = Total Product \ Total Area
==========
68.3846

Runoff Curve Number Report for Basin B22

HSG Land Use Description CN Area acres Product CN x A

B Evergreen Forest 60 13.340 800.427
B Shrub/Scrub 56 30.016 1680.896
B Developed, Low Intensity 77 23.346 1797.625
B Developed, Medium Intensity 88 6.670 586.980
B Grassland/Herbaceous 69 40.021 2761.472
B Developed, Open Space 72 3.335 240.128
B Pasture/Hay 69 3.335 230.123

CN (Weighted) = Total Product \ Total Area
==========
67.4444

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Runoff Curve Number Report for Basin B23

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	2.112	162.624

CN (Weighted) = Total Product \ Total Area
77

Runoff Curve Number Report for Basin B25

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	8.832	635.904

CN (Weighted) = Total Product \ Total Area
77

Runoff Curve Number Report for Basin B26

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	4.160	299.520

CN (Weighted) = Total Product \ Total Area
72

Runoff Curve Number Report for Basin B27

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	0.912	51.072
B	Evergreen Forest	60	2.280	136.800
B	Grassland/Herbaceous	69	0.456	31.464

CN (Weighted) = Total Product \ Total Area
60.125

Runoff Curve Number Report for Basin B30

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	19.05	1143.00
B	Developed, Low Intensity	77	27.8	2140.6
B	Grassland/Herbaceous	69	3.0	207.00

CN (Weighted) = Total Product \ Total Area
70.02

Runoff Curve Number Report for Basin B31

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	12.288	737.280

CN (Weighted) = Total Product \ Total Area
60

Runoff Curve Number Report for Basin B33

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	2.112	162.624
B	Shrub/Scrub	56	2.112	118.272

CN (Weighted) = Total Product \ Total Area
66.5

Runoff Curve Number Report for Basin B35

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	7.808	468.480

CN (Weighted) = Total Product \ Total Area
60

Runoff Curve Number Report for Basin B29

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	5.632	315.392
B	Developed, Low Intensity	77	2.816	216.832
B	Developed, Open Space	72	2.816	202.752
B	Evergreen Forest	60	5.632	337.920

CN (Weighted) = Total Product \ Total Area
63.5

Runoff Curve Number Report for Basin B32

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	126.983	7618.987
B	Grassland/Herbaceous	69	23.323	1609.317
B	Woody Wetlands	55	5.183	285.064
B	Shrub/Scrub	56	12.957	725.618

CN (Weighted) = Total Product \ Total Area
60.7846

Runoff Curve Number Report for Basin B37

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	5.760	414.720
B	Evergreen Forest	60	5.760	345.600

CN (Weighted) = Total Product \ Total Area
66

Runoff Curve Number Report for Basin B38

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	7.757	558.490
B	Developed, Low Intensity	77	7.757	597.274
B	Evergreen Forest	60	3.878	232.704

CN (Weighted) = Total Product \ Total Area
71.6

Runoff Curve Number Report for Basin B39

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	4.666	261.306
B	Grassland/Herbaceous	69	13.999	965.900
B	Evergreen Forest	60	18.665	1119.884
B	Developed, Open Space	72	13.999	1007.895

CN (Weighted) = Total Product \ Total Area
65.3636

Runoff Curve Number Report for Basin B40

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	3.104	239.008
B	Shrub/Scrub	56	3.104	173.824

CN (Weighted) = Total Product \ Total Area
66.5

Runoff Curve Number Report for Basin B41

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	2.745	153.714
B	Evergreen Forest	60	21.959	1317.547

CN (Weighted) = Total Product \ Total Area
59.5556

Runoff Curve Number Report for Basin B42

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	6.208	347.648
B	Evergreen Forest	60	27.936	1676.160
B	Developed, Open Space	72	12.416	893.952
B	Grassland/Herbaceous	69	3.104	214.176

CN (Weighted) = Total Product \ Total Area
63.0625

Runoff Curve Number Report for Basin B44

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	81.295	4877.690
B	Shrub/Scrub	56	16.259	910.502
B	Grassland/Herbaceous	69	35.770	2468.111
B	Developed, Low Intensity	77	9.755	751.164
B	Developed, Open Space	72	55.280	3980.195
B	Pasture/Hay	69	6.504	448.748

CN (Weighted) = Total Product \ Total Area
65.5873

Runoff Curve Number Report for Basin B43

HSG	Land Use Description	CN	Area	Product

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	5.440	391.680

CN (Weighted) = Total Product \ Total Area
72

Runoff Curve Number Report for Basin B46

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	10.573	761.242
B	Evergreen Forest	60	15.859	951.552

CN (Weighted) = Total Product \ Total Area
64.8

Runoff Curve Number Report for Basin B47

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	1367.448	82046.892
B	Grassland/Herbaceous	69	37.379	2579.151
B	Shrub/Scrub	56	62.298	3488.706
B	Developed, Low Intensity	77	15.575	1199.243
B	Developed, Open Space	72	34.264	2467.014
B	Pasture/Hay	69	6.230	429.858

CN (Weighted) = Total Product \ Total Area
60.5378

Runoff Curve Number Report for Basin B48

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	37.151	2229.037
B	Developed, Low Intensity	77	22.862	1760.367
B	Shrub/Scrub	56	5.715	320.067

CN (Weighted) = Total Product \ Total Area
65.5652

Runoff Curve Number Report for Basin B49

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	19.078	1144.669

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	38.156	2747.206
B	Shrub/Scrub	56	3.180	178.060
B	Developed, Low Intensity	77	9.539	734.496

CN (Weighted) = Total Product \ Total Area
68.6818

Runoff Curve Number Report for Basin B50

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	4.828	270.368
B	Evergreen Forest	60	48.280	2896.800
B	Developed, Open Space	72	4.828	347.616
B	Developed, Low Intensity	77	19.312	1487.024

CN (Weighted) = Total Product \ Total Area
64.75

Runoff Curve Number Report for Basin B51

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	3.276	252.261
B	Developed, Open Space	72	22.933	1651.165
B	Evergreen Forest	60	157.254	9435.228
B	Deciduous Forest	60	3.276	196.567
B	Grassland/Herbaceous	69	3.276	226.052

CN (Weighted) = Total Product \ Total Area
61.8966

Runoff Curve Number Report for Basin B52

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	34.347	2472.960
B	Evergreen Forest	60	27.477	1648.640
B	Shrub/Scrub	56	6.869	384.683
B	Deciduous Forest	60	3.435	206.080

CN (Weighted) = Total Product \ Total Area
65.3333

Runoff Curve Number Report for Basin B53

HSG	Land Use Description	CN	Area acres	Product CN x A

B	Evergreen Forest	60	5.184	311.040
B	Developed, Open Space	72	1.728	124.416

CN (Weighted) = Total Product \ Total Area
63

Runoff Curve Number Report for Basin B54

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Grassland/Herbaceous	69	20.657	1425.315
B	Developed, Low Intensity	77	29.510	2272.242
B	Developed, Open Space	72	29.510	2124.694
B	Evergreen Forest	60	79.676	4780.561
B	Deciduous Forest	60	2.951	177.058

CN (Weighted) = Total Product \ Total Area
66.4182

Runoff Curve Number Report for Basin B55

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Grassland/Herbaceous	69	4.112	283.728
B	Evergreen Forest	60	6.168	370.080
B	Developed, Open Space	72	2.056	148.032
B	Shrub/Scrub	56	2.056	115.136
B	Developed, Low Intensity	77	2.056	158.312

CN (Weighted) = Total Product \ Total Area
65.375

Runoff Curve Number Report for Basin B57

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	3.353	258.150
B	Developed, Open Space	72	3.353	241.387
B	Shrub/Scrub	56	3.353	187.745
B	Evergreen Forest	60	120.693	7241.608
B	Deciduous Forest	60	13.410	804.623
B	Grassland/Herbaceous	69	30.173	2081.962

CN (Weighted) = Total Product \ Total Area
62.0385

Runoff Curve Number Report for Basin B58

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	2.731	210.261
B	Evergreen Forest	60	10.923	655.360
B	Developed, Open Space	72	2.731	196.608

CN (Weighted) = Total Product \ Total Area
64.8333

Runoff Curve Number Report for Basin B59

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	6.272	482.944
B	Evergreen Forest	60	6.272	376.320
B	Developed, Open Space	72	6.272	451.584

CN (Weighted) = Total Product \ Total Area
69.6667

Runoff Curve Number Report for Basin B61

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	3.063	235.840
B	Evergreen Forest	60	24.503	1470.171
B	Shrub/Scrub	56	6.126	343.040
B	Grassland/Herbaceous	69	6.126	422.674
B	Deciduous Forest	60	3.063	183.771

CN (Weighted) = Total Product \ Total Area
61.9286

Runoff Curve Number Report for Basin B62

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	65.085	4686.084
B	Developed, Low Intensity	77	17.128	1318.818
B	Developed, Medium Intensity	88	3.426	301.444
B	Grassland/Herbaceous	69	3.426	236.360
B	Evergreen Forest	60	51.383	3082.950
B	Shrub/Scrub	56	3.426	191.828

CN (Weighted) = Total Product \ Total Area
68.2381

Runoff Curve Number Report for Basin B63

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Grassland/Herbaceous	69	2.731	188.416
B	Evergreen Forest	60	2.731	163.840
B	Developed, Open Space	72	1.365	98.304
B	Developed, Low Intensity	77	1.365	105.131

CN (Weighted) = Total Product \ Total Area
==========
67.8333

Runoff Curve Number Report for Basin B28

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	45.199	2711.918
B	Developed, Low Intensity	77	23.929	1842.509
B	Developed, Open Space	72	18.611	1340.006
B	Shrub/Scrub	56	2.659	148.890
B	Developed, Medium Intensity	88	2.659	233.969

CN (Weighted) = Total Product \ Total Area
==========
67.4571

Runoff Curve Number Report for Basin B36

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	5.736	412.965
B	Grassland/Herbaceous	69	2.868	197.879
B	Evergreen Forest	60	48.753	2925.166
B	Deciduous Forest	60	2.868	172.069

CN (Weighted) = Total Product \ Total Area
==========
61.5714

Runoff Curve Number Report for Basin B13

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	3.288	253.176
B	Evergreen Forest	60	36.168	2170.080
B	Developed, Open Space	72	3.288	236.736
B	Grassland/Herbaceous	69	6.576	453.744
B	Shrub/Scrub	56	3.288	184.128

CN (Weighted) = Total Product \ Total Area

==========
62.6875

Runoff Curve Number Report for Basin B1

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	226.700	13602.024
B	Grassland/Herbaceous	69	15.965	1101.572
B	Deciduous Forest	60	9.579	574.733
B	Shrub/Scrub	56	9.579	536.418

CN (Weighted) = Total Product \ Total Area
==========
60.4024

Runoff Curve Number Report for Basin 1126B

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	152.840	9170.410
B	Grassland/Herbaceous	69	61.136	4218.388
B	Developed, Low Intensity	77	12.227	941.495
B	Shrub/Scrub	56	30.568	1711.810
B	Developed, Open Space	72	21.398	1540.629
B	Woody Wetlands	55	3.057	168.124

CN (Weighted) = Total Product \ Total Area
==========
63.1196

Runoff Curve Number Report for Basin 1127B

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	18.266	1022.900
B	Evergreen Forest	60	176.572	10594.325
B	Grassland/Herbaceous	69	12.177	840.240

CN (Weighted) = Total Product \ Total Area
==========
60.1765

Runoff Curve Number Report for Basin 1128B

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Open Space	72	5.939	427.628
B	Developed, Low Intensity	77	2.970	228.662
B	Evergreen Forest	60	148.482	8908.924
B	Deciduous Forest	60	17.818	1069.071
B	Grassland/Herbaceous	69	2.970	204.905

CN (Weighted) = Total Product \ Total Area
==========
60.8333

Runoff Curve Number Report for Basin 1222B

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Evergreen Forest	60	3.509	210.556
B	Developed, Medium Intensity	88	3.509	308.816
B	Shrub/Scrub	56	10.528	589.558
B	Developed, Low Intensity	77	3.509	270.214
B	Grassland/Herbaceous	69	3.509	242.140

CN (Weighted) = Total Product \ Total Area
==========
66

Runoff Curve Number Report for Basin 1223B

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Shrub/Scrub	56	10.091	565.103
B	Developed, Open Space	72	5.046	363.281
B	Developed, Low Intensity	77	5.046	388.509
B	Grassland/Herbaceous	69	10.091	696.288

CN (Weighted) = Total Product \ Total Area
==========
66.5

Runoff Curve Number Report for Basin 1229B

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	9.424	725.657
B	Grassland/Herbaceous	69	18.848	1300.529
B	Developed, Open Space	72	9.424	678.537
B	Evergreen Forest	60	128.796	7727.779
B	Shrub/Scrub	56	3.141	175.917

CN (Weighted) = Total Product \ Total Area
==========
62.537

Runoff Curve Number Report for Basin 1230B

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	12.440	957.880
B	Developed, Open Space	72	34.210	2463.120

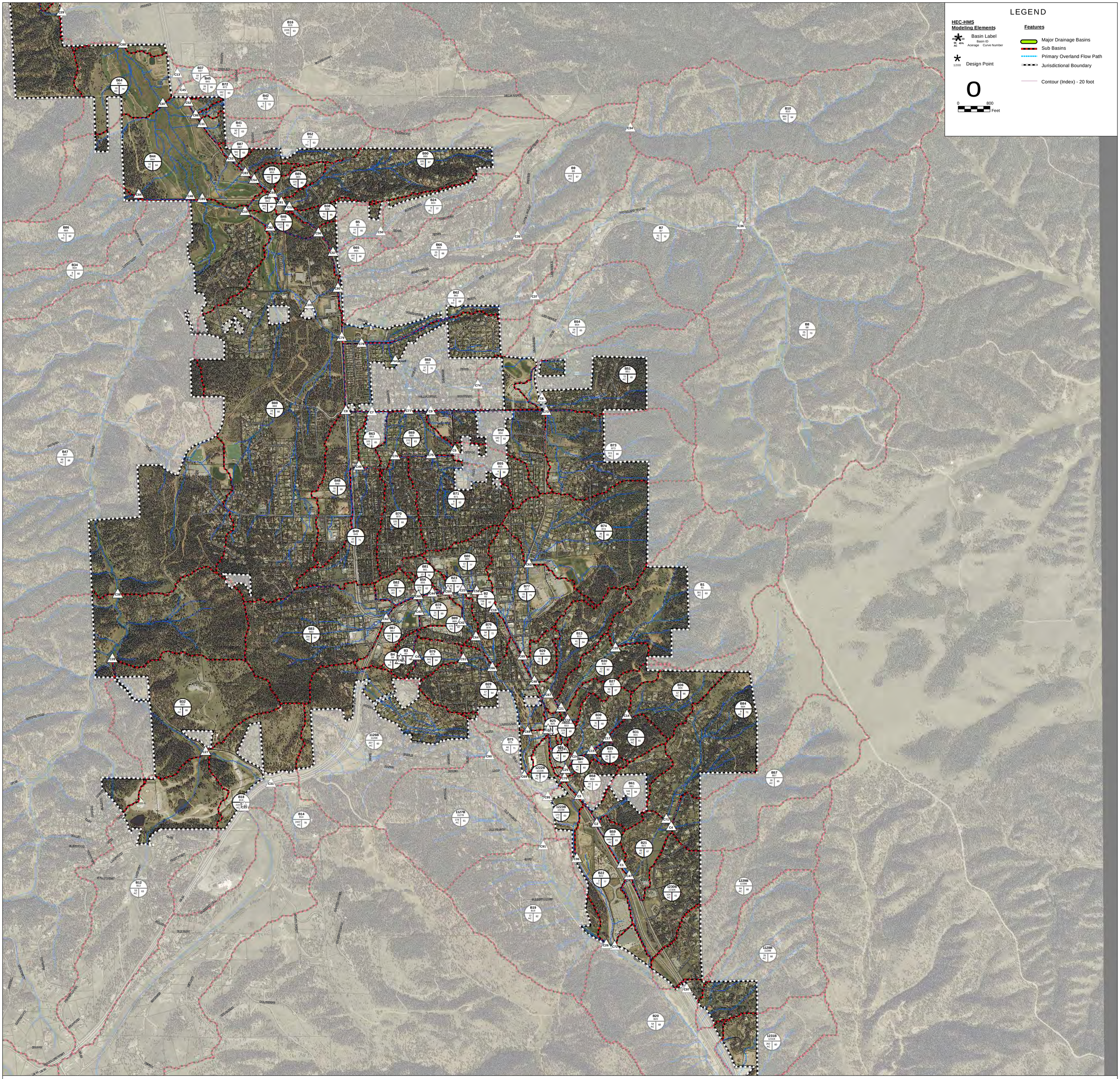
B	Shrub/Scrub	56	3.110	174.160
B	Grassland/Herbaceous	69	3.110	214.590
B	Evergreen Forest	60	21.770	1306.200
B	Deciduous Forest	60	9.330	559.800

CN (Weighted) = Total Product \ Total Area
==========
67.5926

Runoff Curve Number Report for Basin 1231B

HSG	Land Use Description	CN	Area acres	Product CN x A
B	Developed, Low Intensity	77	6.510	501.233
B	Shrub/Scrub	56	35.802	2004.931
B	Developed, Open Space	72	6.510	468.685
B	Evergreen Forest	60	48.821	2929.283
B	Grassland/Herbaceous	69	6.510	449.157

CN (Weighted) = Total Product \ Total Area
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61



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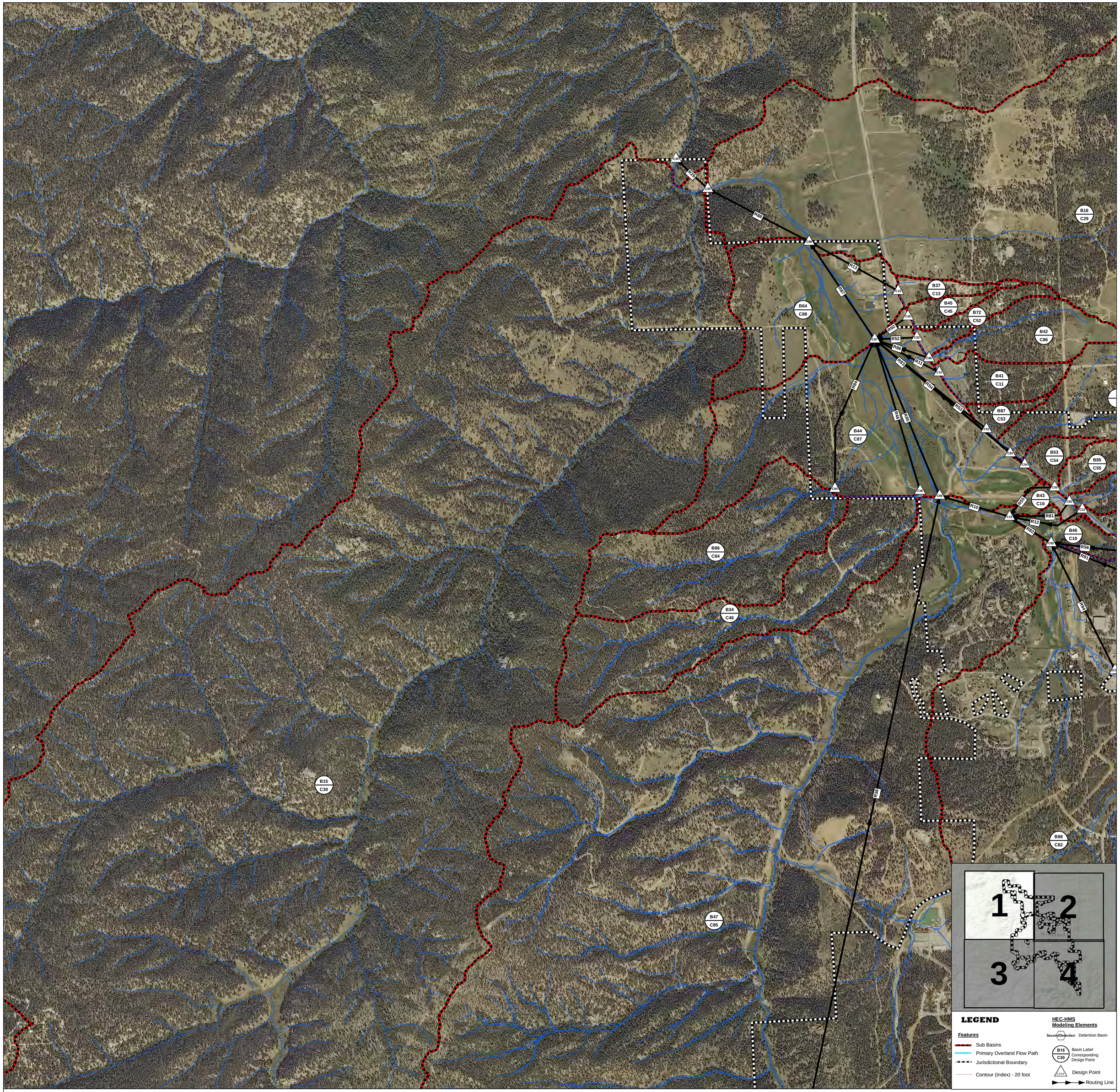
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CITY OF WOODLAND PARK
STORMWATER MASTER PLAN
EXISTING CONDITIONS HYDROLOGIC WORK MAP

Appendix C
Hydrology



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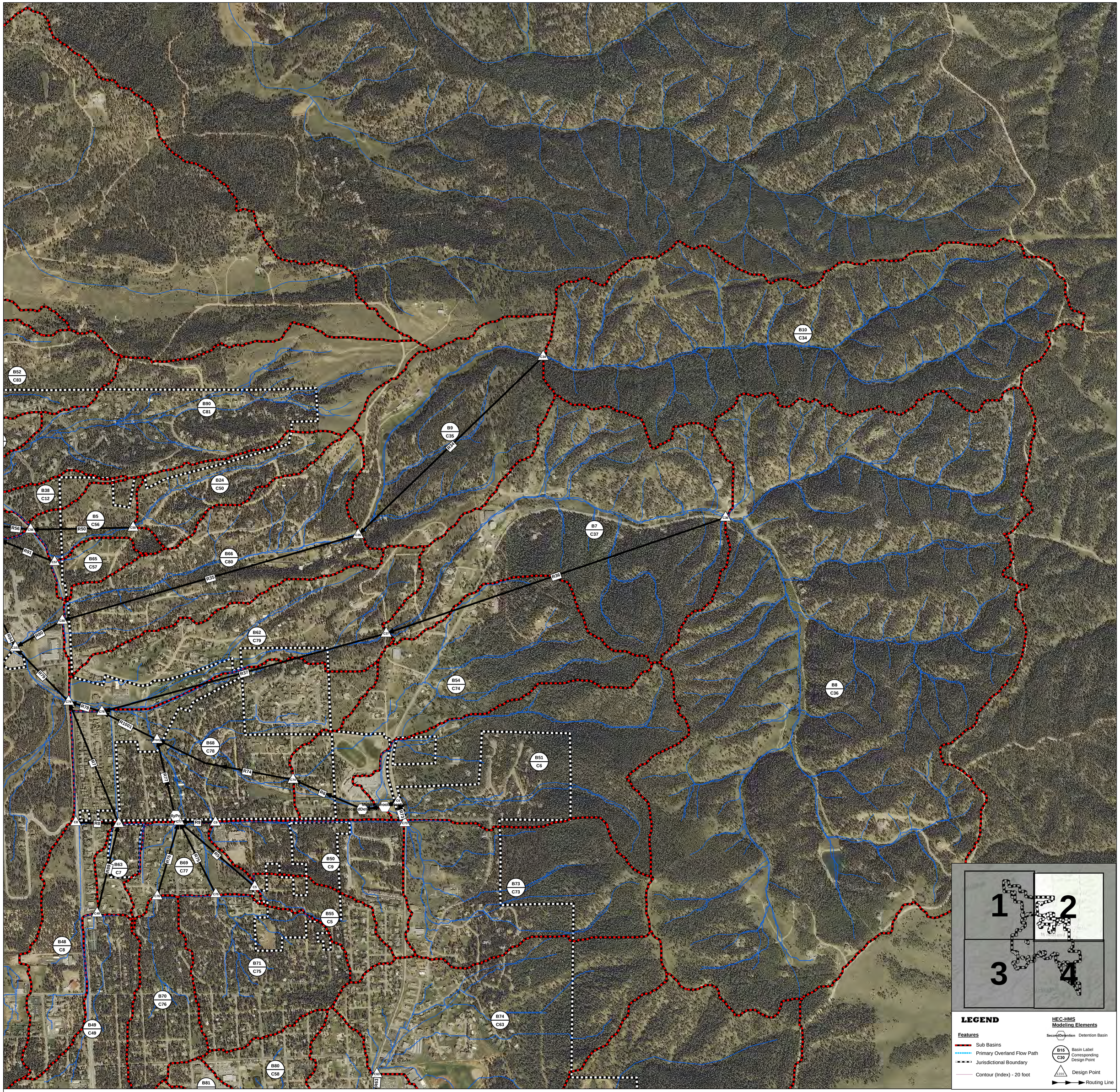
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CITY OF WOODLAND PARK
STORMWATER MASTER PLAN
HYDROLOGIC MODEL ROUTING MAP



WOODLAND PARK, CO
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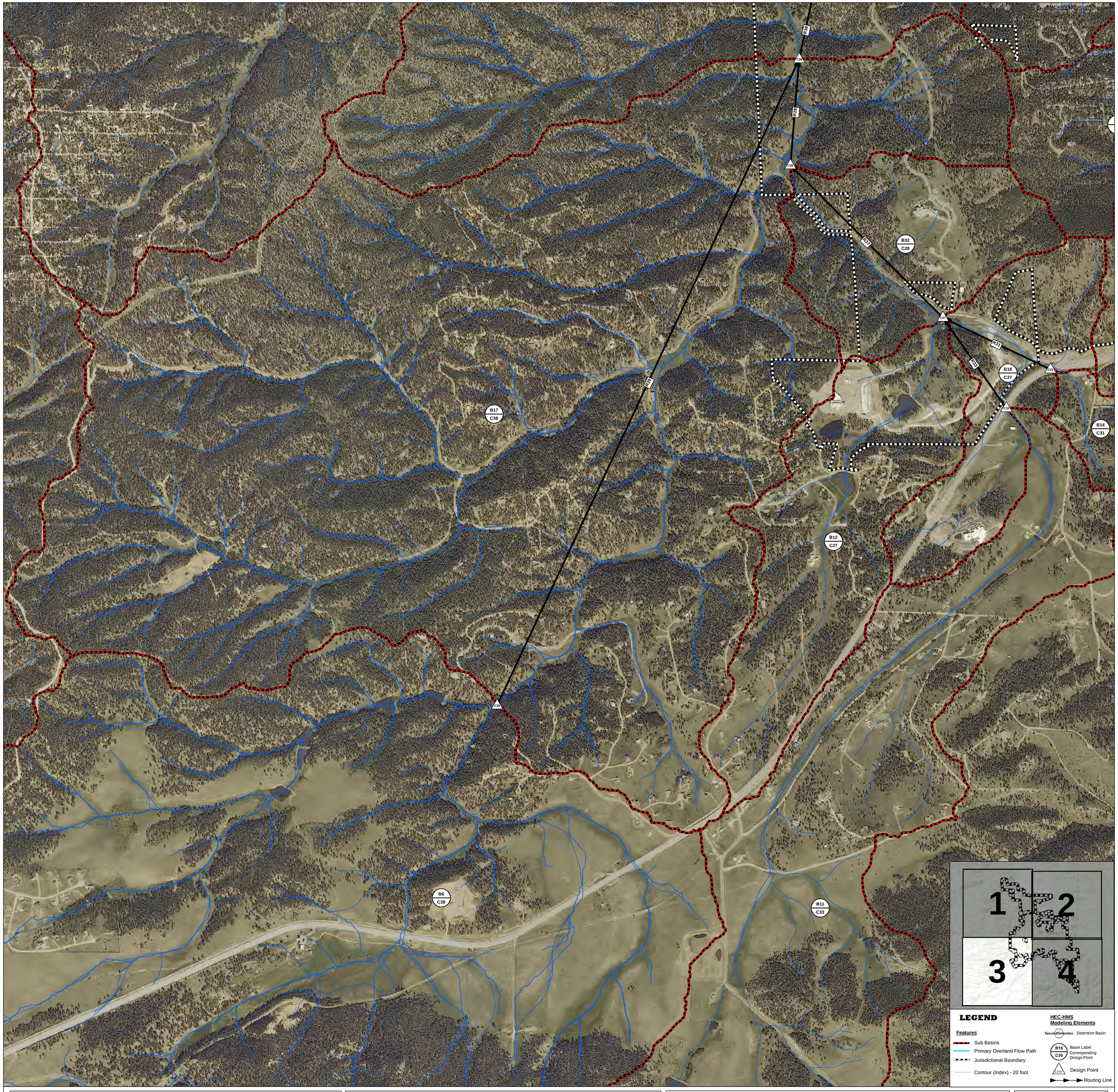
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STORMWATER MASTER PLAN
HYDROLOGIC MODEL ROUTING MAP

PAGE NUMBER
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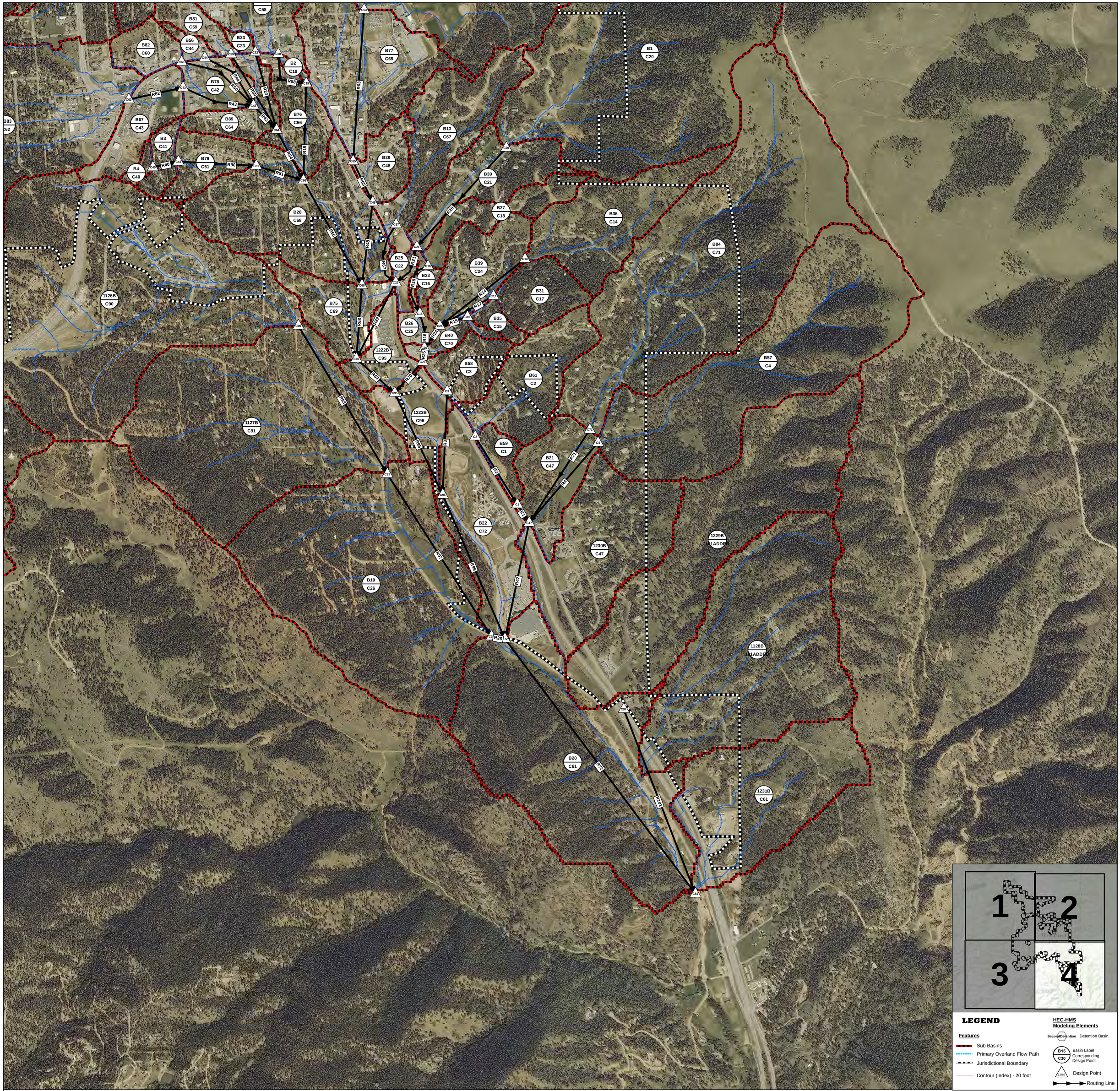
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CITY OF WOODLAND PARK
STORMWATER MASTER PLAN
HYDROLOGIC MODEL ROUTING MAP



LEGEND

Features

- Sub Basins
- Primary Overland Flow Path
- Jurisdictional Boundary
- Contour (Index) - 20 foot

HEC-HMS Modeling Elements

- SecondDetention — Detention Basin
- B15 / C30 — Basin Label Corresponding Design Point
- 2265 — Design Point
- Routing Line

WOODLAND PARK, CO
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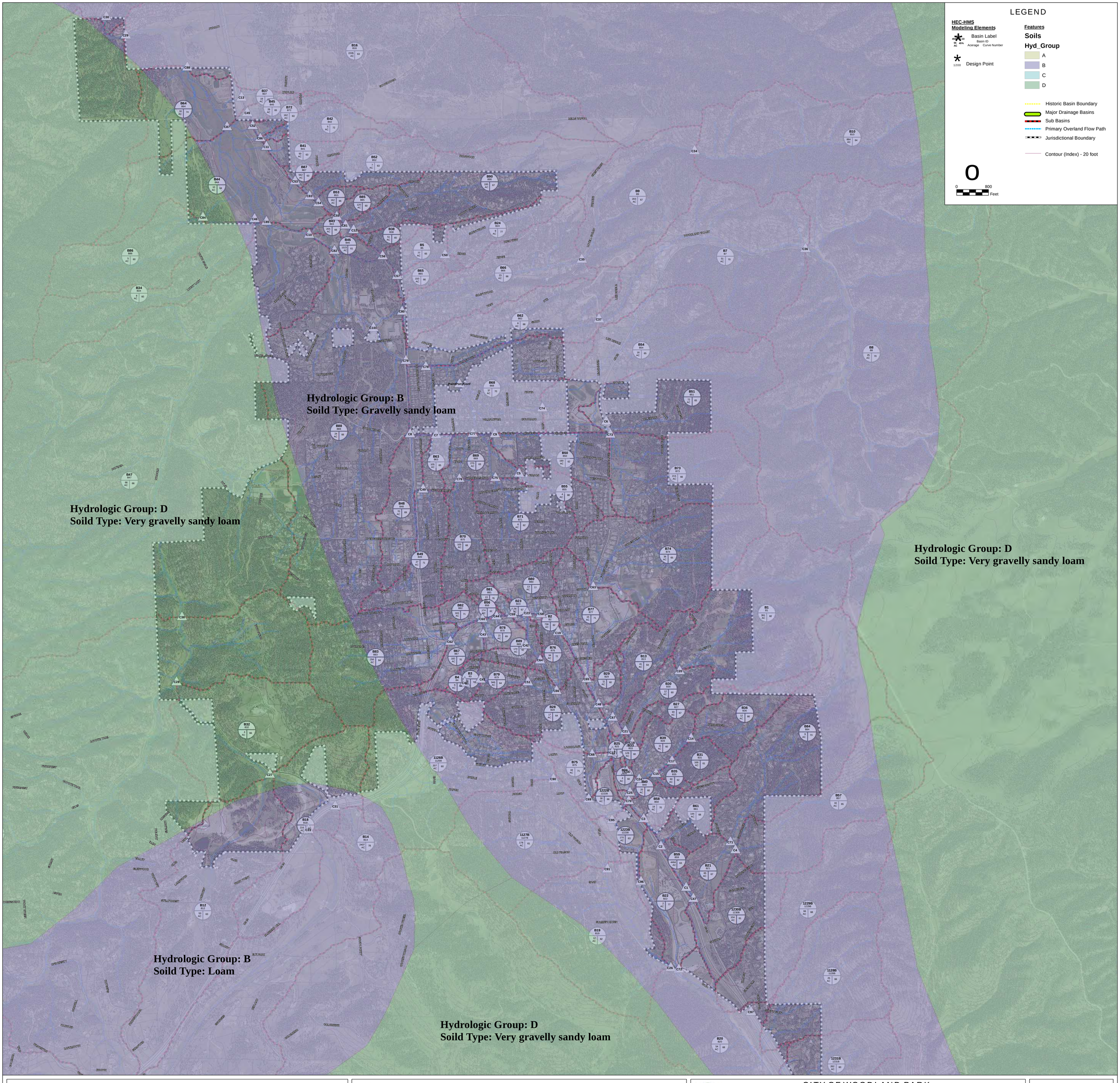
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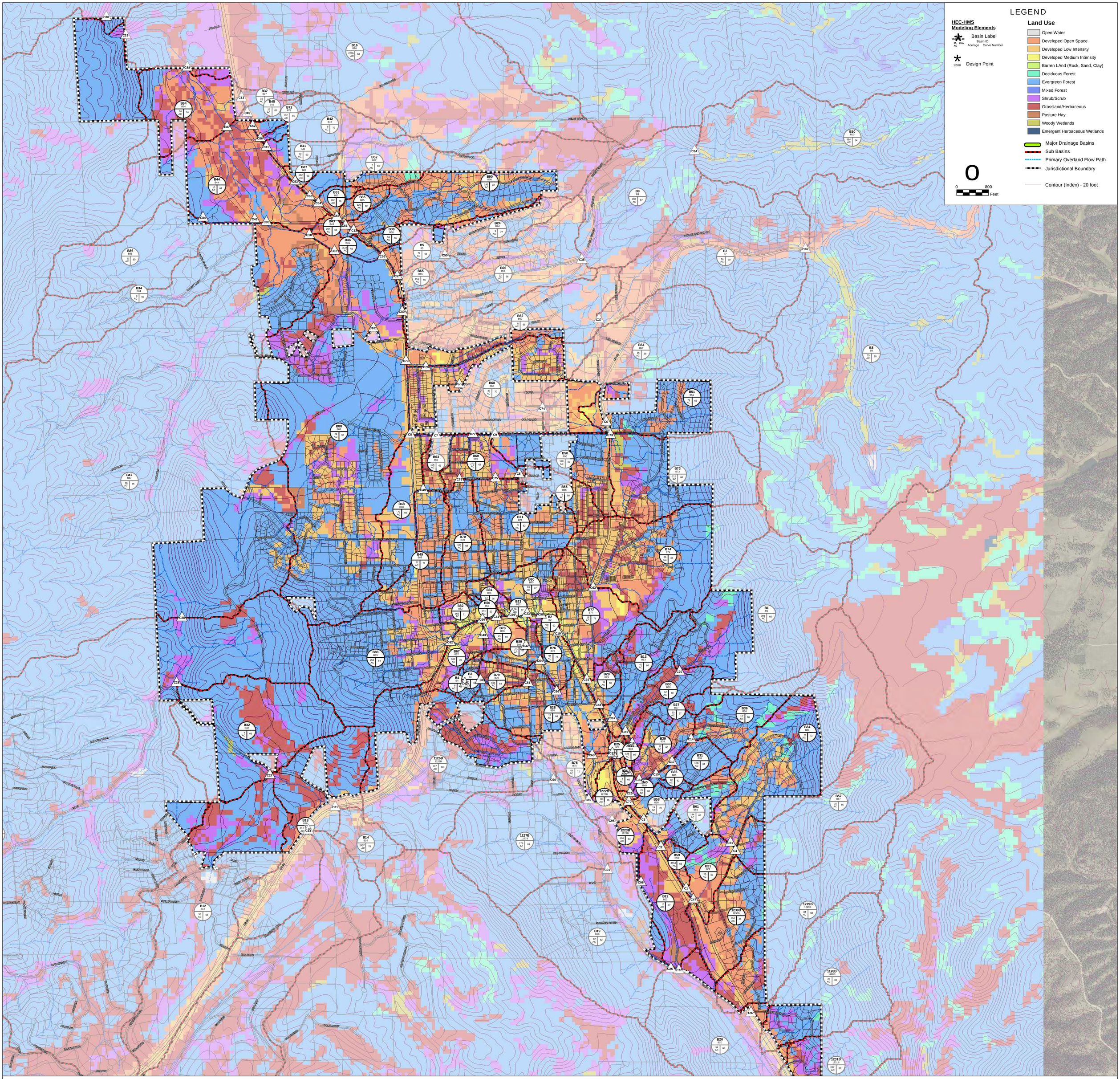
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HYDROLOGIC SOILS MAP

Appendix C
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CONTOUR INTERVAL: 20 FEET
SCALE: 1'=800

0

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CITY OF WOODLAND PARK
STORMWATER MASTER PLAN
HYDROLOGIC LAND USE CLASSIFICATIONS

Appendix C
Hydrology

LEGEND

Maximum Flood Depths*

- 3" - 6"
- 6" - 12"
- 1' - 1.5'
- 1.5' - 3'
- 3' - 4.5'
- 4.5' - 6'
- > 6'

Features

- Primary Overland Flow Path
- Drainage Basin Delineation (Topo Based)
- Cross Section

N

0 600 Feet

GSSHA MODEL
TROUT CREEK WATERSHED
(4-METER) 13-FOOT GRID

Note: Some areas are outside the mapped survey of the City and the Depths do not follow the topography outside the City Limits at some locations.

GSSHA MODEL
FOUNTAIN CREEK WATERSHED
(4-METER) 13-FOOT GRID

WOODLAND PARK, CO
CONTOUR INTERVAL: 20 FEET
SCALE: 1"=800

N

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CITY OF WOODLAND PARK
STORMWATER MASTER PLAN
GSSHA ANALYSIS - UNIFORM RAINFALL

Appendix C
Hydrology
GSSHA Depth Grid Map

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APPENDIX D - GEOMORPHOLOGY REPORT

REPORT

GEOMORPHIC ASSESSMENT

Fountain Creek in Woodland Park between Aspen Garden Road and Crystola Road

Submitted To: Enginuity Engineering Solutions
10106 West San Juan Way, Suite 215
Littleton, Colorado 80127

Submitted By: Golder Associates Inc.
44 Union Boulevard, Suite 300
Lakewood, Colorado 80228

June 29, 2015

1409863 001 R01 Rev0

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1.0 INTRODUCTION

This geomorphic assessment of Fountain Creek from Aspen Garden Road to Crystola Road has been prepared as part of the overall Town of Woodland Park Stormwater Master and Capital Improvement Plan, which is currently being prepared by Enginuity Engineering Solutions. The goal of this assessment is to:

- Perform a site visit and coordinate with private property owners
- Perform a plan form and bank stability analysis of the existing conditions and identify stability issues
- Evaluate the bed stability of the existing condition
- Identify problematic sediment production and depositional zones
- Identify infrastructure at risk
- Develop and recommend stable channel section and plan form alternatives
- Develop recommendations and conceptual capital cost estimates for channel stability improvements

1.1 Data Collection and Review

Prior to initiating the work, available data related to the geomorphology, sediment transport potential, hydrology, and hydraulic capacity of the existing system was obtained and reviewed. The data available included the following:

- Aerial photographs (dates)
- Ayres report
- FEMA effective hydraulic model
- Preliminary hydrology from Master Plan
- USGS Topographic Map
- USGS Stream Gauges
- Survey Data
- Published Articles (see References)

1.2 Site Visit

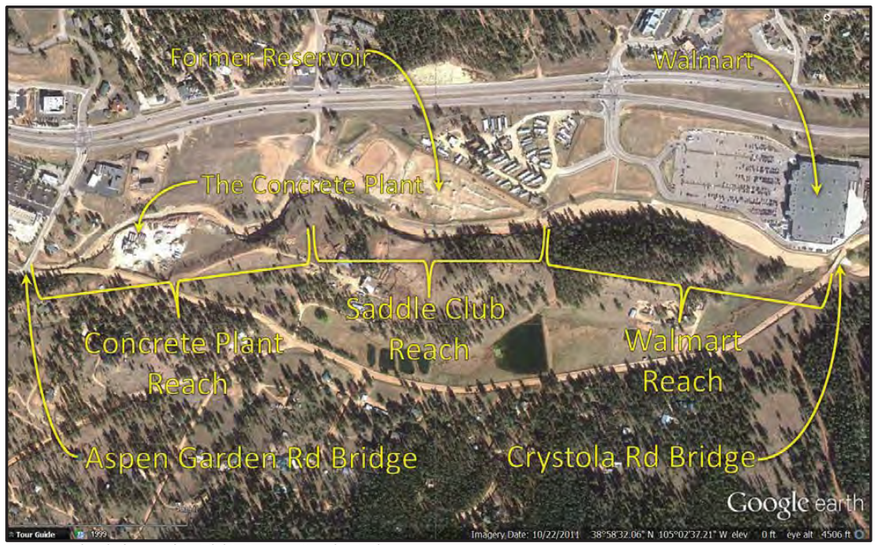
A site reconnaissance of the Study Reach of Fountain Creek was conducted on March 12, 2015, by Golder staff Mr. Robert Humphries and Mr. Steve Rogers, P.E. The upstream reaches of Fountain Creek were also visited. Adjacent property owners were notified prior to the site visit. During the site visit, the overall condition and geomorphologic stability of the reach of Fountain Creek were noted. Observations made during the site visit were incorporated into the overall evaluations and recommendations.

2.0 SITE CONDITIONS

This section describes the overall site conditions and discusses intermediate reaches that were established for purposes of the evaluations.

2.1 Reach Descriptions

The Study Reach (aka the Site) lies near the headwaters of the Fountain Creek Drainage. This proximity to the drainage divide from adjacent basins results in a relatively small catchment basin. Golder has divided the Study Reach into three sub-reaches for descriptive purposes. These sub-reaches are, starting from upstream; the Concrete Plant Reach (Reach 1), the Saddle Club Reach (Reach 2), and the Walmart Reach (Reach 3). A description of the reaches both upstream and downstream of the Study Reach and the three sub-reaches are given below. Throughout this report the terms river-right and river-left are used to refer to the land adjacent to the river, as though the observer was facing downstream.



Note: Flow is from Left to Right. Source: Google Earth

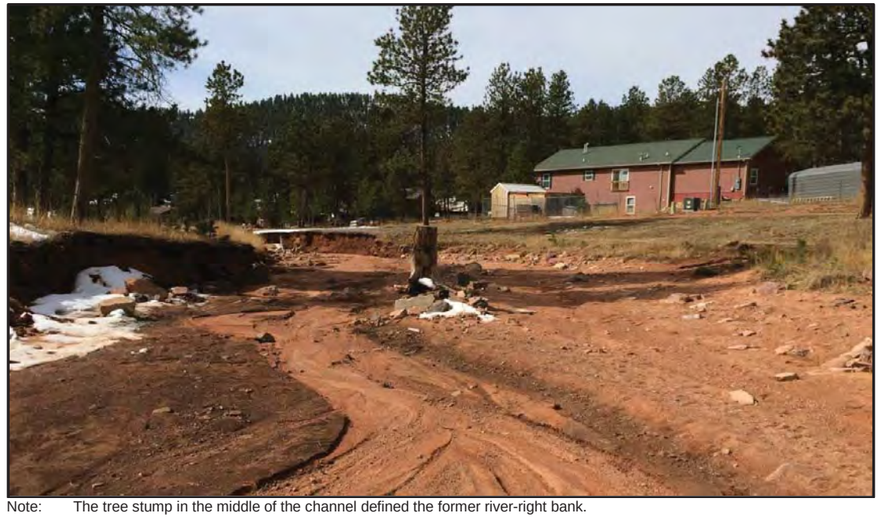
Figure 1 Reach Delineation

2.1.1 Upstream of the Study Reach

Large portions of the Fountain Creek Watershed upstream from the Site have been stabilized via culverts, drop structures, and hard stabilization techniques. The frequent use of culverts and grouted riprap have substantially stabilized the channel bed and banks upstream from the Study Reach and minimized the potential for bank erosion and lateral channel migration in large portions of the upstream basin (Figure 2). Additionally, the construction of two retention basins upstream of the site will likely attenuate the passage of a flood wave, consequently reducing peak discharges. However, in contrast to the largely protected channels of most of the drainage basin, the reach immediately upstream of the Study Reach has recently experienced significant erosion and has undergone substantial morphology change (Figure 3).



Figure 2 Typical Channel Upstream of the Study Reach; View Looking Downstream from Cavalier Park



Note: The tree stump in the middle of the channel defined the former river-right bank.

Figure 3 Reach Immediately Upstream of the Study Reach; View Looking Downstream, Behind Safeway

Immediately upstream of the Aspen Garden Bridge is a drop structure that serves to control the channel gradient and dissipate hydraulic energy during high magnitude discharge events. The reach upstream from this drop structure is experiencing substantial erosion and channel change, likely associated with recent construction and high magnitude discharge events. Golder understands that the remediation of this reach is being designed by another consulting firm, and is outside the purview of this assessment (Ayers 2014).

The right-of-way of the road parallel to the channel on the river-right side has been recently surveyed, as indicated by survey markers present during the site investigation. The right-of-way markers indicate that it is partially within the channel, such that the edge of the right-of-way marker is at the toe of the river-right bank (Figure 5). Additionally, the erosion of the river-left bank has undermined the foundation of a nearby utility pole (Figure 6).



Figure 5 Right-of-Way Marker at Toe of Bank Downstream from Aspen Garden Bridge; View Looking Downstream



Figure 6 Erosion of a Utility Pole Foundation in the River-Left Bank

Figure 6 Erosion of a Utility Pole Foundation in the River-Left Bank

Substantial channel modifications have been made near the Concrete Plant. Beginning in the meander bend immediately upstream, and continuing to downstream of the Concrete Plant, large quantities of construction debris and un-designed revetment material have been added to both banks of the channel (Figure 7 and Figure 8). Additionally, near the Concrete Plant significant quantities of fill material have been added to the floodplain to elevate the portion of the land that previously made up the local flood plain (Figure 9). Immediately adjacent to the Concrete Plant's infrastructure on the river-right bank, concrete has been poured down the bank and allowed to harden in place as form of bank protection (Figure 10). Recently poured concrete was observed during the site visit.



Figure 7 Construction Debris, River-Left, Across From the Concrete Plant



Figure 8 Bank Protection at the Concrete Plant; View Looking Downstream



Figure 9 Fill Placed on Top of Former Floodplain; View is toward the River-Right Downstream of the Concrete Plant



Figure 10 Poured Concrete on the River-Right Bank at the Concrete Plant; View Looking Upstream

In the further downstream portions of the Concrete Plant Reach, the addition of fill material to the river-right bank ceases and a modern floodplain and channel bank have formed. However, this self-forming portion of the river is relatively short as the channel is constrained again shortly downstream, with construction debris stabilization material on the river-left and a natural sediment bluff on the river-right. The natural sediment bluff is being eroded by the channel, and has been stabilized at the toe by conventional riprap and construction debris (Figure 12). Within the downstream portion of the Concrete Plant Reach, the river contains such features as large sediment block failure of river-left bank, and an island separated from the higher banks by a secondary channel (Figure 11).



Figure 11 Sediment Block Erosion Pattern on River-Left Bank; View Looking Downstream



Note: Modern floodplain formation at the upstream, left hand side of the image, the island and back-bar channel in the center, and the riprap protection bluff on the right side of the image. Flow is from left to right.

Figure 12 Downstream Portion of Concrete Plant Reach; Saddle Club Reach

Starting in the downstream portion of the Concrete Plant Reach and continuing through the Saddle Club Reach and into the upper portion of the Walmart Reach, the river-left bank has had several feet of fill material added to the floodplain. Golder believed that a large portion of this fill material is associated with the construction of the reservoir on the river-left bank. According to the aerial imagery collected during this investigation, the reservoir was constructed sometime between 1954 and 1971 (see Figure 27 and Figure 28) and drained sometime between 1988 and 1999 (see Figure 31 and Figure 32). The reservoir embankments are still present on the floodplain and the long side of the trapezoidal shaped reservoir runs parallel to the channel for most of the downstream portion of the Saddle Club Reach.

At the upstream end of the Saddle Club Reach, a culvert outlet and surface channel join the main channel from the river left. The discharge point of the culvert is not flush with the channel and discharges several feet above the elevation of the channel bed. The surface channel is also associated with significant erosion. This has resulted in erosion and the remedial efforts, which consist of the addition of a large quantity of construction debris and large boulders within the surface channel and the culvert outlet (Figure 13).



Figure 13 Culvert Joins from River-Left; View is toward the River-Left



Figure 14 Saddle Club Reach is Lined on Both Sides by Large Quantities of Revetment Material; View Looking Downstream

Through most of the Saddle Club Reach and into the upper part of the Walmart Reach, the river-right bank is being eroded. The bank consists of a bluff made of in situ valley sediments. Along most of the Saddle Club Reach the toe of the bluff, where it meets the river banks, is protected by riprap, construction debris, and many very large tires, and in one instance, an old rusted car body (Figure 16). These tires likely came from nearby mining operations and have been chained together for the purpose of protecting the bank from erosion (Figure 15).



Figure 15 One of Several Sets of Large Tires Placed on the River-Right Bank with the Saddle Club Reach



Figure 16 Car Body Used as Bank Protection; View is toward the River-Left

The downstream end of the Saddle Club Reach is defined by the downstream end of the adjacent former Saddle Club. At the downstream end of the former reservoir, there are several structures associated with old outlets works and a retaining wall (Figure 17 and Figure 18).



Figure 17 Retaining Wall at Downstream End of Saddle Club Reach; View is toward the River-Left



Figure 18 Reservoir Downstream Outlet Structures

2.1.3 Walmart Reach

The upstream portion of the sub reach is characterized by the placement of a large quantity of grouted riprap on the river-left bank and the entry of a culvert. The culvert is integrated into the grouted riprap (Figure 20) and appears to be likely recently constructed (Figure 19). Five other defining features characterize the Walmart Reach; a retaining wall (Figure 22), several drop structures (Figure 21), erosion of the river-right bank (top right corner of Figure 21), the confluence of Silver Creek from the river-right (Figure 23), and the bridge at Crystola Road. The retaining wall defines the river-left bank of the channel for most of the reach. The wall is smooth and generally straight, except near the bridge. The low roughness of the smooth concrete likely accelerates the velocity of river in high discharge events. The thalweg of the channel is immediately at the toe of the retaining wall for its entire length. The large diameter grouted riprap ends upstream of the retaining wall. Only one drop structure was observed within the reach, however, in personal communication with Mr. William Alspach, Director and City Engineer for the City of Woodland Park, Golder was informed that there are other drop structures within the reach that are buried beneath the sand bed. It is important to note that the bridge at Crystola Road likely functions as a grade control structure and also likely provides a backwater effect that limits the velocities within the Walmart Reach.



Figure 19 Culvert Outlet at Upstream End of Walmart Reach on River-Left



Figure 20 Large Riprap on River-Left Bank at Upstream End of Walmart Reach



Figure 23 Confluence of Silver Creek; View is Looking Upstream of the Silver Creek Channel from the Confluence with the Main Channel



Figure 22 River-Left Retaining Wall in Walmart Reach; View Looking Upstream



Figure 23 Confluence of Silver Creek; View is Looking Upstream of the Silver Creek Channel from the Confluence with the Main Channel



Figure 24 Upstream Side of the Bridge at Crystola Road

2.1.4 Downstream of the Study Reach

Downstream of the Study Reach, Fountain Creek remains a sand bedded channel for several miles before becoming a narrower, steeper, gravel and boulder bedded channel and subsequently a waterfall near the city of Green Mountain Falls. Within the sand bedded portion close to the Study Reach, Golder observed significant channel dynamics and bank erosion.

3.0 GEOMORPHIC ASSESSMENT

The geomorphic assessment of the Study Reach included:

- A review of historical aerial imagery
- A review of the hydrology and hydraulics associated with the existing system
- Development of hydraulic and sediment transport equations to evaluate the overall stability of the existing system
- Development of calculations for recommended stable channel sections

3.1 Historic Aerial Imagery

The following section presents a series of aerial imagery of the Site starting in 1953, with the latest image collected in 2011. In all of these images, the modern channel alignment within the Study Reach is depicted in yellow. Generally, the channel has remained in a similar alignment through time, with changes in channel alignment in the upstream half of the Study Reach being more substantial than those in the lower half. Caution must be used in correlating the modern channel with these historic alignments. While the historic images have been correlated to the modern landscape as precisely as possible without manipulating the images, the images have not been geospatially referenced, nor ortho-rectified to remove lens induced curvature.

3.1.1 1953

The characteristics of the Study Reach based on this historic aerial imagery indicate the following:

- Wide, sand bedded, multi-threaded channel, especially in the Concrete Plant and Saddle Club Reaches.
- Floodplain present on both sides of the channel in the Concrete Plant Reach.
- Small floodplain features on the river-right side in the Saddle Club Reach.
- Main channel not continuously adjacent to in situ sedimentary material on the river-right bank in the Saddle Club Reach, as occurs in modern condition.
- No channel armoring, floodplain infilling, nor channel encroachment.
- Channel is eroding the in situ material in some places, notable at the downstream end of the Concrete Plant Reach. On the right hand, side of Figure 12 the high, eroded bank present in 1953 can be seen in its present day form.
- Several minor tributaries join the main channel from the river-left side. The downstream-most tributary joins the main channel downstream of the Study Reach, but the Tributary upstream of this one joins enters the river-left flood plain and appears to bifurcate on the floodplain, forming multiple distributary channel on the floodplain surface. This depositional feature may have been channelized and diverted to the main channel.
- Note that Figure 26 does not match the modern landscape with sufficient precision to assess landscape change.
- Minimal development of floodplain in the form of buildings in the modern Walmart Reach.



Figure 25 1953 No. 1 of 2



Figure 26 1953 No. 2 of 2

3.1.2 1954

The aerial imagery from 1954 is similar to 1953 with only some channel alignment changes in the Concrete Plant Reach:

- Similar to 1953

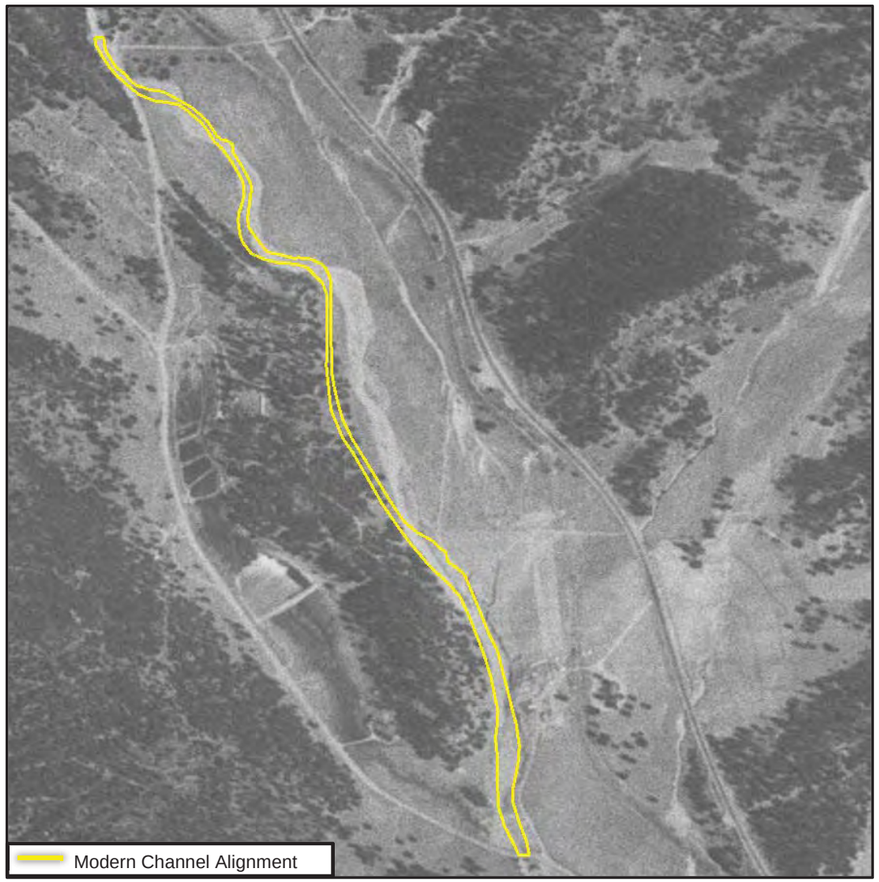


Figure 27 1954

3.1.3 1971

The characteristics of the Study Reach based on this historic aerial imagery indicate the following:

- A reservoir has been constructed in the Saddle Club Reach, consequently narrowing the channel in that reach
- The Concrete Plant has yet to be constructed and the channel in the Concrete Plant Reach is still wide
- Continued development of the river-left floodplain has occurred in the form of a trailer park adjacent to the reservoir and the addition of several buildings at the upstream end of the Study Reach

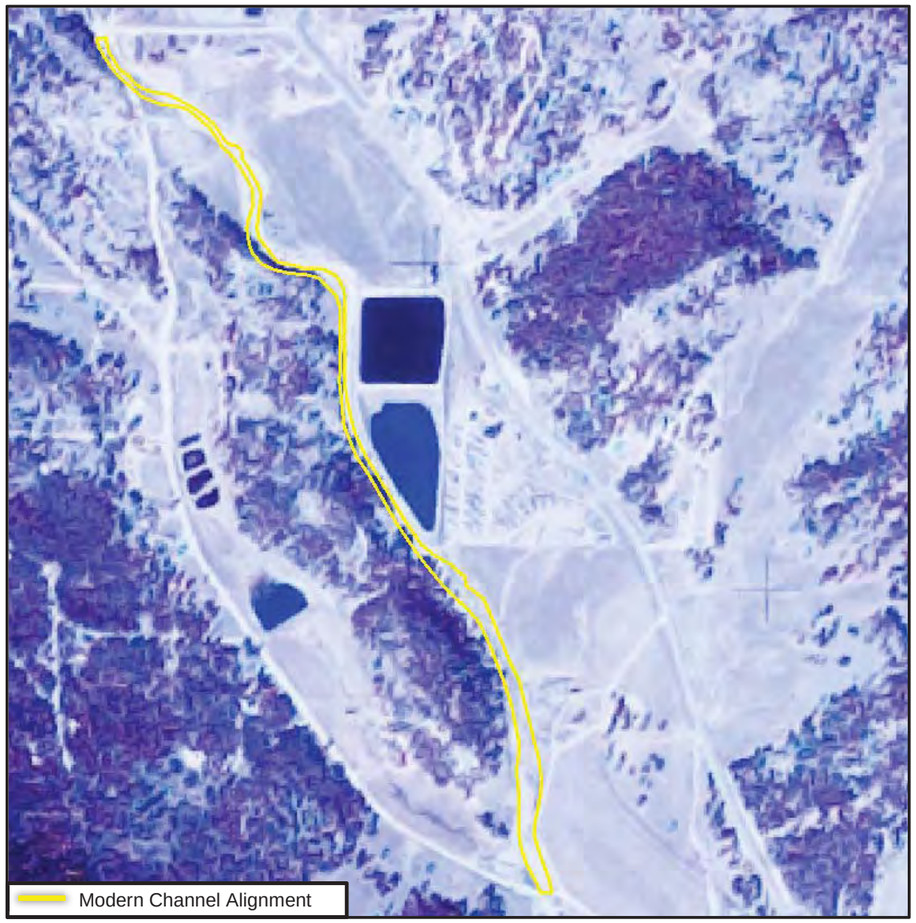


Figure 28 1971

3.1.4 1972

The aerial imagery from 1972 is similar to 1971 with no significant alterations in development and/or overall plan form.



Figure 29 1972

3.1.5 1988

The characteristics of the Study Reach based on this historic aerial imagery indicate the following:

- Low image resolution obscure interpretation
- Continued development of the river-left floodplain
- Possible construction of the Concrete plant
- Channel still wide in Concrete Plant Reach and narrow in Walmart Reach

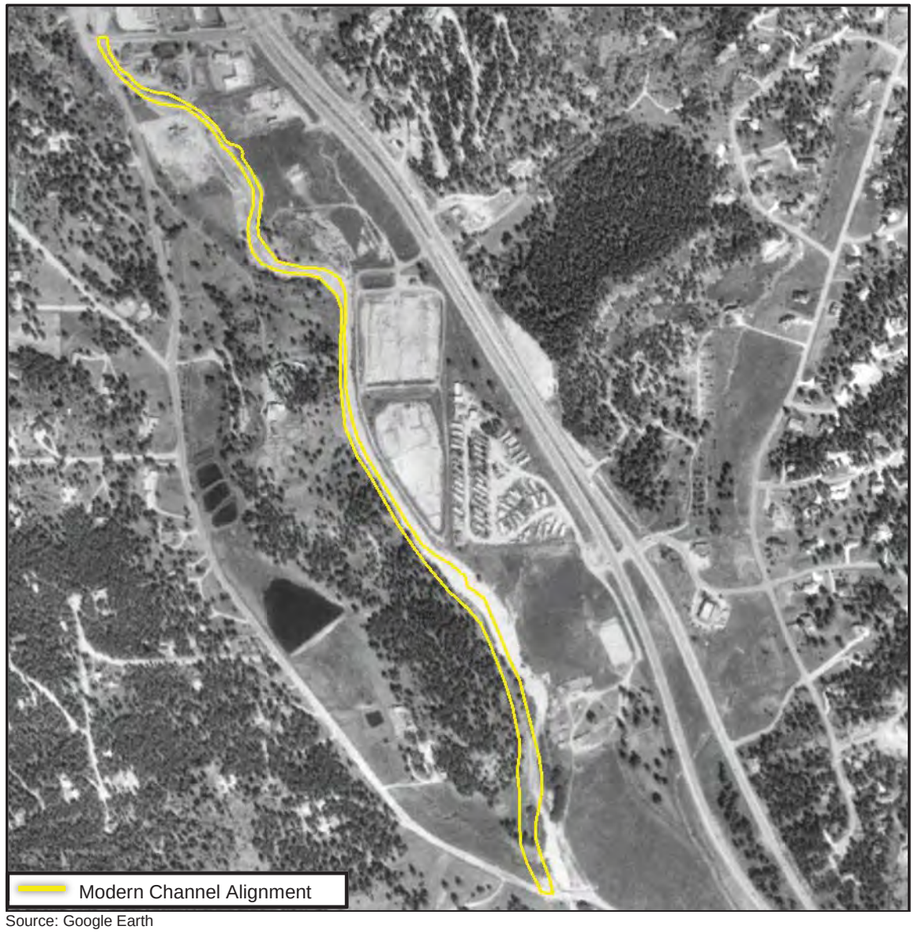


Figure 30 1988

3.1.6 1999

The characteristics of the Study Reach based on this historic aerial imagery indicate the following:

- River-left reservoirs drained
- Concrete Plant encroaches on Concrete Plant Reach channel and constricts channel width
- Continued development of river-left floodplain
- Walmart Reach still has narrow channel



Source: Google Earth

Figure 31 1999

3.1.7 2003

The characteristics of the Study Reach based on this historic aerial imagery indicate the following:

- Concrete Plant and Saddle Club Reaches attain modern morphology, while Walmart Reach remains narrow



Source: Google Earth

Figure 32 2003

3.1.8 2004

The characteristics of the Study Reach based on this historic aerial imagery indicate the following:

- Similar to 2003
- Concrete Plant and Saddle Club Reaches attain modern morphology, while Walmart Reach remains narrow



Source: Google Earth

Figure 33 2004



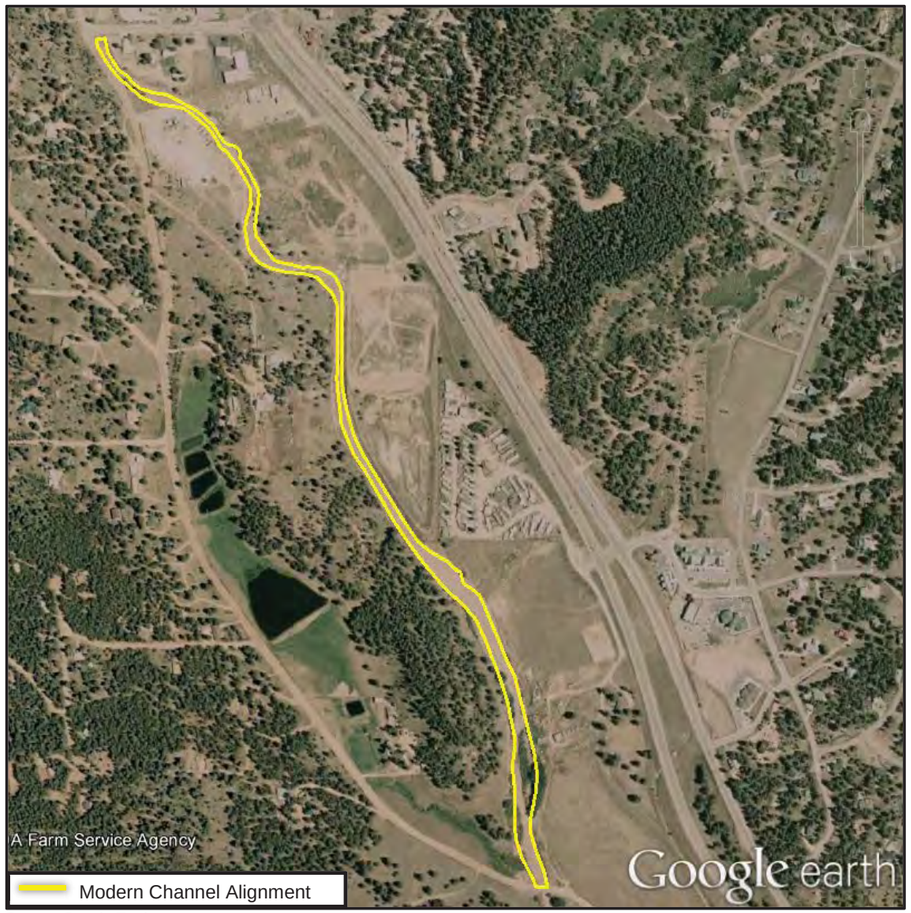
Source: Google Earth

Figure 34 2004

3.1.9 2005

The characteristics of the Study Reach based on this historic aerial imagery indicate the following:

- Similar to 2003 and 2004
- Concrete Plant and Saddle Club Reaches attain modern morphology, while Walmart Reach remains narrow



Source: Google Earth

Figure 35 2005

3.1.10 2011

The characteristics of the Study Reach based on this historic aerial imagery indicate the following:

- Channel has attained modern morphology
- The construction of the Walmart shopping center in the downstream portion of the Study Reach has likely resulted in the alteration of the channel banks and the widening of the channel
- Figure 37 and Figure 38 are both from the same source. Figure 37 includes overlays of other geographic information, including the source of the spring that feeds Spring Creek



Source: Google Earth

Figure 36 2011



Figure 37 USGS Topo Imagery 2011 Woodland Park Quad



Figure 38 USGS Topo Imagery Woodland Park, CO 2011

3.2 Hydrologic Setting

Although not directly observable in the preceding images, the urbanization and development of the watershed and growth of the Town of Woodland Park and the surrounding areas has resulted in an increased runoff coefficient that increases the rate at which water is delivered to the channel as the result of a precipitation event (Stogner 2000). Within the channel this has the effect of increased peak discharge rates, thereby increasing the sediment transport and erosive capacity of a given discharge event, which has had substantial consequences throughout the drainage.

While the occurrence of the increase in peak discharge within the Fountain Creek watershed over time due to urbanization has been well documented (Stogner 2000), the Study Reach is located in the upper portions of the watershed that are less developed than reaches further downstream. Additionally, much of the channel upstream of the Study Reach has been stabilized. This proximity to the headwaters of the drainage and the channel stabilization can potentially decrease the magnitude of the increased peak discharge trend that has been observed in the downstream reaches.

3.3 General Geomorphic Description

In the earliest photographic evidence (1953), Fountain Creek within the Study Reach has a wide multi-threaded sand bedded morphology with a floodplain present where ever the channel is not constrained by less erodible material. The intermittent discharge pattern of the Study Reach decreases the potential for vegetation to establish on the channel banks and bed, thereby decreasing bank cohesion and facilitating the formation of a wide multithreaded, sand bedded channel. The multiple channel threads are contained within the main channel, defined by a steep bank formed by floodplain sediments or less erodible material. The main channel dimensions are determined by the more erosion resistant bank material of the in situ sediments and the floodplain deposits. The banks of the main channel have substantially different characteristics from each other. The older, in situ sedimentary deposits and bedrock outcrop of the river-right bank, and the floodplain configuration and land use patterns on the river-left bank, interact with the river in fundamentally different patterns. Although, a small floodplain was present on the river-right side in the upstream reaches of the Study Reach in the earlier photographic images.

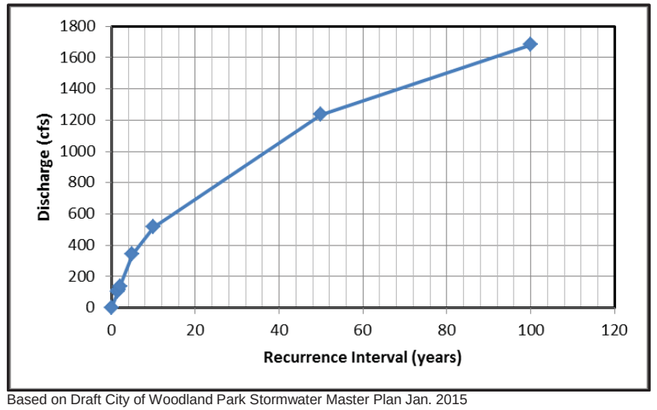
The river-right bank consists of older sedimentary material, likely deposited shortly after deglaciation approximately 10,000 years before present, for the majority of the Study Reach. However, a small outcrop of bedrock, of igneous origins, is present at the downstream most portion of the Study Reach immediately upstream of the confluence with Spring Creek and the Crystola Bridge. Only within the Concrete Plant Reach and for a small portion of the Reservoir Reach has there been historic fluvially deposited sediment on the river-right bank. For the rest of the Study Reach the river-right bank is essentially an erosional environment consisting of the deposited sediment that makes up the adjacent hillside. More recently, the river-right bank has been armored by construction material and debris. While it is likely that the in situ sediments served as a boundary for the river-right bank during the period of photographic record, once the encroachment of the river-left bank (discussed below) began, it is likely that the river ran closer to the river-right bank, resulting in more erosion and steepening of the bank. It is likely that this encroachment from the river-left, and consequent erosion of the river-right bank, took place sometime between 1954 and 1971. Within the Concrete Plant Reach the Concrete Plant was constructed sometime between 1988 and 1999, although it is possible that this took place earlier as the imagery from 1988 is inconclusive.

There have been significant changes in the land use patterns of the river-left bank that have likely had substantial influence on the channel morphology. Sometime between 1954 and 1971, the reservoir on the

river-left floodplain was constructed. It is likely that coincident with the construction of this reservoir that a large quantity of fill was placed on the river-left floodplain. This pattern is generally consistent across the time span of the historic aerial photographic record presented in this report.

3.3.1 Bankfull and Design Discharges

The two primary goals in assessing the discharge characteristics of the Study Reach are to determine the channel forming discharge and to determine a maximum discharge that the system is anticipated to withstand (stable channel system). The channel forming discharge, often referred to as the effective discharge and equated to the bankfull discharge, is that discharge that is thought to do the most geomorphic work. This discharge event will be large enough that it transports a significant quantity of sediment, but small enough such that it occurs frequently enough to be of significance. In practice, this discharge is often selected based on a recurrence interval analysis. The discharge corresponding to the 1 to 2.5 year discharge event is generally accepted as the design criteria for the bankfull channel, with the most commonly applied recurrence interval value for effective discharge being 2 years. The results from the research of Klasz et al. 2012 report that a value of 1.69 years is the most appropriate value to use when incorporating the influence of drainage area. For this investigation, the Draft Master Plan (Enginuity, 2015), Table 3-7 reports the results of the estimate discharge values for a range of return intervals, from 5 to 100 years. Golder has projected this relationship to smaller discharges based on the concept that this relationship has a y intercept of 0 discharge and 0 year, meaning that there are no years that have no discharge. While it is not impossible for Fountain Creek to remain dry through an entire wet season, Golder believes that this event is unlikely. Thus, the recurrence interval relationship, defined in the Master Plan (Enginuity, 2015) can be projected to the lower recurrence interval values. The results of this assessment are presented in Figure 39. Note that only the low recurrence interval discharge values are used from the Master Plan (2015), and that higher recurrence interval discharge values are sourced from FEMA modeling results (see Section 3.6).



Based on Draft City of Woodland Park Stormwater Master Plan Jan. 2015

Figure 39 Recurrence Interval for Fountain Creek at Saddle Club Property

Based on the recurrence interval calculations presented in Figure 39, a discharge event with a 1.65-year recurrence interval would have a discharge of approximately 116 ft³/s. The implication of these discharge values to stable channel and infrastructure design are presented below.

3.3.2 Stream Gauge

Downstream from the Study Reach, the USGS operated a hydrometric station from 2001 to 2005. Although this period of record is not long enough to robustly assess the range of discharge values for a given recurrence interval, the record can provide other insight into the hydrology of Fountain Creek. The hydrograph for the period of record is presented in Figure 40.

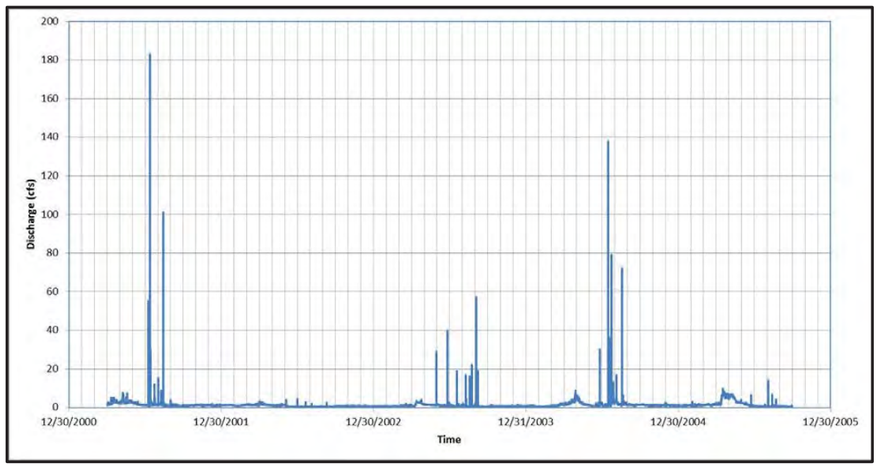


Figure 40 Hydrograph of USGS Station 07099990 Fountain Creek at Green Mountain Falls, CO

To compare the recurrence interval of the peak discharge events of each year of record to the recurrence interval curve presented in Section 3.3 the discharge values from the gauge are reduced proportionally by drainage area. The drainage area of the catchment at the gauge is 16.6 square miles according to the USGS website, and the drainage area at the Crystola Bridge is approximately 4.7 square miles according to a rough approximation of the drainage area in Google Earth. The correlation between drainage area and discharge is commonly represented as a linear relationship defined as:

$$Q = kA^c \quad (1)$$

In which Q is discharge (cms), k is a measure of the river base flow (m/s), A is the drainage area (m^2), and c is the scaling power dependency (*) (Glaster et al. 2006). In a simplifying approximation, k and c can be assumed to be equal to 1, and thus the discharges at the stream gauge can be scaled proportionately to the difference in drainage areas. The maximum discharge values at the gauge for each year, their drainage area proportionately scaled values and the recurrence interval of those scaled values are presented in ().

Table 1 Scaled Discharges from Green Mountain Falls Gauge

Year	Maximum Discharge for Each Year (cfs) at Green Mountain Falls Gauge (cfs)	Gauge Discharges Scaled Proportionately to the Drainage Area at Crystola Bridge (cfs)	Recurrence Interval of Scaled Discharges (years)
2001	183	50.6	0.7
2002	4.4	1.2	0.0
2003	57	15.8	0.2
2004	138	38.2	0.6
2005	14	3.9	0.1

Several conclusions can be drawn from the hydrograph at the Green Mountain Falls Gauge.

1. It is likely that none of the peak annual discharge values that occurred during the period of record resulted in discharges greater than the bankfull discharge at the Crystola Bridge.
2. Both the nival peak of the hydrograph associated with the annual snowmelt, and the storm hydrographs resulting from the winter precipitation events can be observed within the data set.
3. The high magnitude discharge events are more likely to be associated with the winter/spring storm events and not the snowmelt driven hydrograph peaks.

3.3.3 Existing Model Results

Based on the analysis present in the 100-year FEMA flood maps, which were last updated March of 2010, the Study Reach contains several of the cross sections modeled in the National Flood Insurance Program results. The results of the FEMA modeling and results of Golder calculations using this information are presented in Section 3.6.

3.3.4 Channel Slope

The channel slope was calculated using Google Earth and confirmed with available 2-foot contour interval topographic mapping. The profile tool was used to cut the channel profile presented in Figure 41. From this assessment, the average channel slope for the whole reach is 0.0283 or 2.83%. While sufficient for the level of analysis presented here, the slope value will need to be calculated using high precision survey data for design purposes.

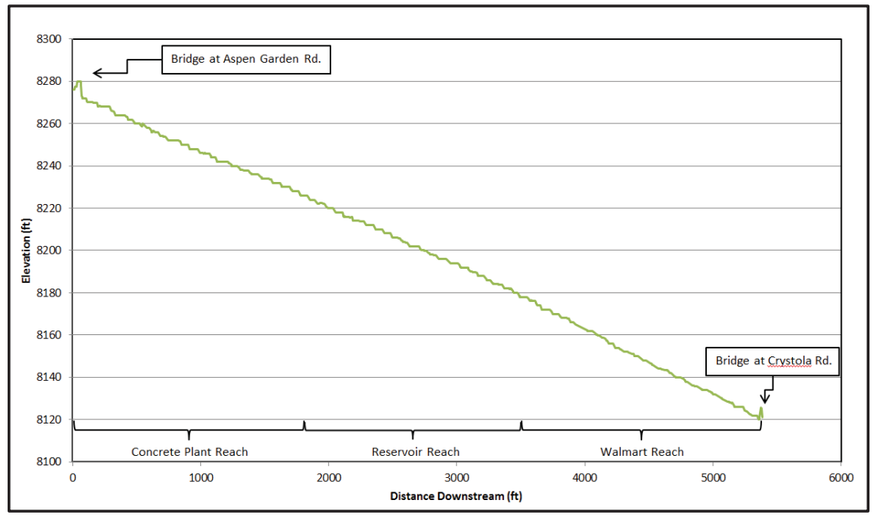


Figure 41 Channel Profile

3.3.5 Grain Size Distributions

From qualitative observation conducted during Golder's site visit, the material that composes the bed of the channel mostly consists of medium to coarse sand. For this assessment, Golder has assumed a median grain diameter of 0.001 m (or 1mm) for the bed material. Again, this parameter will need to be assessed more quantitatively for design purposes.

3.3.6 Channel Roughness

A channel roughness, in the form of a Manning's n value, is needed for the sediment transport and hydraulic assessments presented in the next section. Manning's n is an empirical variable that represents the roughness of the grains, the banks, the channel curvature, and the vegetation as a single value. The inclusion of all of these various materials into a single parameter, as well as the spatially variable roughness of the bed, banks, and overbank areas, makes selecting a value difficult. To represent the relatively low roughness of the sand bed without bedforms, the very rough various revetment features, and the lack of vegetation Golder has selected a value of 0.035 to represent the channel.

3.4 Sediment Transport

In this assessment, the sediment transport potential of Fountain Creek near the Saddle Club is presented for the 1.65-year discharge event. A simple approach that uses the Manning's equation, the continuity equation, the Shields criteria for the threshold of motion, and the Wong and Parker (2003) version of the

Meyer-Peter and Mueller equation is presented. This approach is based on some assumptions and approximations that will need to be refined before application of these principles to detailed design. The input parameters and the results of the applied equations are presented in Table 2.

3.4.1 Manning's and Continuity

The Manning's and the Continuity equations are simplified understandings of the relation of velocity to channel dimensions and bed roughness and the conservation of mass. When solved in relation to each other they provide a means of determining the flow depth and velocity, given a channel width, a total roughness, and a discharge.

Manning's equation takes the form of:

$$v = \frac{d^{2/3} S^{1/2}}{n} \quad (2)$$

In which v is the average velocity of the flowing water (m/s), d is the cross sectional averaged flow depth (m), S is the channel bed slope (m/m), and n is the Manning's roughness coefficient ($m^{-1/6}$).

The continuity equation takes the form of:

$$Q = vwd \quad (3)$$

In which Q is the discharge of channel (m^3/s), v is the average velocity of the flowing water (m/s), and d is the cross sectional averaged flow depth (m).

The method for determining values for slope and roughness are presented in Sections 3.3.4 and 3.3.6. The method of determining the value for channel width is simply to take the average of multiple channel width from with the Saddle Club Reach via Google Earth. By setting the Manning's and continuity equations equal to each other they can be solved for bankfull flow. The results of this step in the assessment are presented in Table 2.

3.4.2 Shield's Threshold of Entrainment

Shield's (1936) seminal work on the threshold of sediment transport still stands as an effective method of assessing sediment transport potential. For this portion of our assessment, Golder has non-dimensionalized the Shear Stress at the bankfull flow for use in the sediment transport rate assessment in Section 3.4.3. This is accomplished via the following formulas:

$$\tau_b = \rho_w g d S \quad (4)$$

In which Tau (τ_b) is the boundary Shear Stress at bankfull flow (Pa), rho (ρ_w) is the density of water (1000 kg/m³), g is the acceleration due to gravity (9.81 m/s²), d is the cross sectional averaged flow depth, and S is the bed slope. This results in a boundary Shear Stress value of 53.5 Pa. This value is then non-dimensionalized via the following equation:

$$\tau^* = \frac{\tau}{(\rho_s - \rho_w)gD} \quad (5)$$

In which Tau (τ^*) is dimensionless Shear Stress, rho (ρ_s) is the density of continental crust (2650 kg/m³), and D is the median grain diameter of the bed sediment (m). The result of this calculation is a dimensionless Shear Stress value of 3.3. This value is then used in the next section to determine a sediment transport rate for the bankfull flow condition.

3.4.3 Meyer-Peter and Müller by Wong and Parker (2003)

Wong and Parker (2003) reassessed the original Meyer-Peter and Müller (1948) equation defining bed material load sediment transport rate. The equation is a threshold – power law equation that uses a critical Shear Stress value to define the threshold of motion of the particle. For this investigation we have applied the Wong and Parker (2003) recommended value of 0.0495 for critical dimensionless Shear Stress (τ^*_{crit}). Their version of the equation takes the form:

$$q_b^* = 3.97(\tau^* - \tau^*_{crit})^{3/2} \quad (6)$$

In which q_b^* is the specific dimensionless volumetric bed material load sediment transport rate. This value is then dimensionalized via the following equation:

$$q_b = q_b^* D\sqrt{1.65gD} \quad (7)$$

In which q_b is the specific dimensional volumetric bed material load sediment transport rate in m³/s. This value is then integrated by the channel width via the following equation:

$$Q_b = q_b w \quad (8)$$

In which w is the bankfull channel width (m). Thus, Q_b is the volumetric bed material load sediment transport rate in m³/s. This parameter is also presented as mass per time and at different time scales in Table 2.

3.5 Suspended Sediment

The transport of a particle via bed load or in suspension can be assessed based on the ratio of the rate at which a particle settles through the water, and the turbulent forces within the flow. Quantitatively this ratio

is assessed by comparing the settling velocity of a particle to the shear velocity of the flow. The settling velocity is calculated using a relationship defined by Dietrich (1982). This relationship was applied via the use of a spreadsheet tool developed by Gary Parker. The tool is available at: http://hydrolab.illinois.edu/people/parkerg/excel_files.htm.

The shear velocity is defined by the following formula:

$$u^* = \sqrt{\frac{\tau}{\rho_w}} \quad (9)$$

The result of this calculation indicates that the particle in suspension at bankfull flow is likely to be 1.6 mm in diameter. As the median particle diameter present on the bed is estimated to be within this range it is possible that a large portion of the material present on the bed moves in suspension during bankfull flow. It is also possible that this material is re-deposited on the falling limb of the runoff hydrograph. During the site visit, Golder observed that the bed largely consisted of transportable medium sand. Given the recent high magnitude discharge events and the erosion from the reach upstream of the Study Reach, the presence of this mobile sediment indicates that sediment transport occurs with relatively high frequency and that more sediment is delivered to the channel than it can transport.

3.5.1 Discussion of Sediment Transport Calculations

The results presented in Table 2 are a capacity based sediment transport estimate. This means that the rate of sediment transport is based on several primary concepts, and is thereby constrained by the associated assumptions. These concepts and their limits are as follows:

1. Only bed material load is assessed in this process. Bed material load is defined as those particles that will, at some point in their passage through the fluvial system, come to rest on the bed of the river. Essentially this means that bed material load is equal to total load minus the wash load and the dissolved load.
2. The quantity of material estimated is based on the ability of flowing water to move sediment and not on the rate at which sediment is delivered to the channel for transport. In this analysis, the effective discharge has been defined by the discharge of a 1.69-year recurrence interval storm event. The cumulative sediment transport results presented in Table 2 are the result of a constant discharge of 2.91 m³/s (103 cfs) occurring for the duration defined by the recurrence interval of the storm event. In arid environments, and especially in ephemeral or intermittent streams, the quantity of sediment delivered to the channel can be greater than the ability of the flowing water to transport the sediment. Golder believes this may be the case in the Study Reach as the bed is composed almost entirely of sand sized particles. Thus, the use of the magnitude and the recurrence interval of the bankfull discharge may not be the correct approach. The small grain size distribution of the material on the bed indicates that a large portion of this material will likely move in suspension during bankfull flow conditions.

Table 2 Sediment Transport

Variable	Parameter Name	Metric	Unit	Standard	Unit
Qbf	Bankfull Discharge	2.91	m^3/s	102.6	ft^3/s
v	Velocity	1.60	m/s	5.2	ft/s
d	Width Averaged Bankfull Flow Depth	0.19	m	0.62	ft
w	Bankfull Width	9.41	m	30.5	ft
S	Bed Slope	0.0283	*	-	-
n	Manning's Roughness Coefficient	0.035	$m^{-1/6}$	-	-
rho w	Density of Water	1000	kg/m^3	62.4	lbs/ft^3
rho s	Density of Rock	2650	kg/m^3	165.4	lbs/ft^3
g	Acceleration due to Gravity	9.807	m/s^2	32.17	ft/s^2
Tau	Shear Stress	53.47	Pa	1.1167	lbs/ft^2
Tau*	Dimensionless Shear Stress	3.30	*		
SP	Stream Power	0.10	kW/m^2		
D50	Median Particle Diameter	0.001	m	0.0032	ft
u*	Shear Velocity	0.23	m/s	0.76	ft/s
d_{sus}	Diameter of Particle at Threshold of Suspension	0.0016	m	0.00513	ft
q*b	Specific Dimensionless Volumetric Bed Material Load Sediment Transport Rate	23.31	*		
Tau^*_{crit}	Critical Shear Stress	0.0495	*		
q_b	Specific Dimensional Volumetric Bed Material Load Sediment Transport Rate	0.003	m^3/s	0.10	ft^3/s
Q_b	Total Dimensional Volumetric Bed Material Load Sediment Transport Rate	0.028	m^3/s	0.99	ft^3/s
s/day	Seconds Per Day	86400	s		
t	Days of Transport Per Year	0.67	days		
Q_b	Total Dimensional Volumetric Bed Material Load Sediment Transport Rate	1607	$m^3/year$	56742	$ft^3/year$
Q_b	Total Dimensional Volumetric Bed Material Load Sediment Transport Rate	$4.26x10^6$	kg/year	$9.39x10^6$	lbs/year

3.6 FEMA 100-year Flood Analysis Assessment

In Figure 42 the plan view map of the FEMA 100-year discharge event flood map is presented. Golder did not used the published discharge values from this study to assess the hydraulic conditions of the 100-year recurrence interval flood and the stability of the channel during this discharge, but instead used those presented in the Master Plan (2015). The published results from the Master Plan and those of Golder analysis are presented in Table 3. The discharge values from the FEMA report have been adjusted proportionately to the discharge values from the Master Plan. The cross sections were assessed in a similar fashion, the results of this assessment are presented in Sections 3.4 and 3.5. However, instead of assessing the sediment transport capacity of a single point in the channel at multiple discharges, as we presented in the previous sections, these data are assessed for their potential to erode at the 100-year flood event.

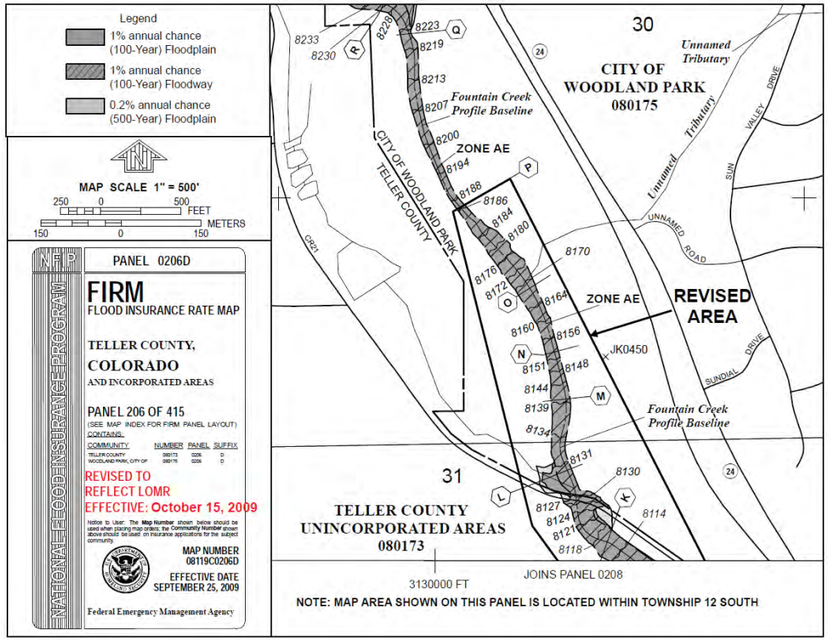


Figure 42 FEMA Q100 Flood Mapping

Similarly to the bankfull flow calculations, the 100-year discharge was assessed for shear stress on the bed. Table 3 reports these values.

Table 3 Hydraulic Properties of the 100-year flood

Cross Section	Distance	Distance	W	W	d	d	V	V	Qw	Qw	Slope	Shear Stress	Shear Velocity	Tau*	d sus	q*b	qb	Qb	Qb	Qb	Stream Power
	ft	m	ft	m	ft	m	ft/s	m/s	cfs	cms	*	Pa	m/s	*	m	*	m²/s	m²/s	m²/year	kg/year	kW/m²
K	7600	2340.8	183	56.4	2.3	0.7	8.6	3.8	2391.4	67.7	0.0237	165	0.406	10.2	0.003	128	0.016	0.92	47033	1.25E+08	0.53
L	8150	2510.2	69	21.3	8.3	2.5	6.3	9.0	2370.3	67.1	0.0249	623	0.789	38.5	0.011	946	0.120	2.56	130729	3.46E+08	3.86
M	8600	2648.8	119	36.7	3.1	0.9	9.8	4.6	2363.7	66.9	0.0200	186	0.431	11.5	0.004	153	0.020	0.72	36587	9.70E+07	0.63
N	8900	2741.2	80	24.6	4.0	1.2	11.0	5.5	2305.0	65.3	0.0430	516	0.719	31.9	0.009	714	0.091	2.24	114402	3.03E+08	2.91
O	9325	2872.1	122	37.6	3.0	0.9	9.8	4.6	2376.2	67.3	0.0386	352	0.593	21.7	0.006	401	0.051	1.92	97934	2.60E+08	1.64
P	10000	3080.0	54	16.6	4.1	1.3	11.4	5.7	1683.0	47.7	0.0262	329	0.573	20.3	0.006	362	0.046	0.77	39150	1.04E+08	1.48
Q	11150	3434.2	54	16.6	4.1	1.3	11.5	5.6	1682.3	47.6	0.0313	389	0.624	24.0	0.007	466	0.059	0.99	50413	1.34E+08	1.90
R	11450	3526.6	64	19.7	2.2	0.7	12.0	3.6	1681.0	47.6	0.0270	175	0.419	10.8	0.003	140	0.018	0.35	18009	4.77E+07	0.58

3.7 Channel Stability

Channel stability is determined by the ratio of the erosive capacity of the flowing water relative to the ability of the material that makes up the bank to resist erosion. Two methods were used to assess the ability of the bank material to resist erosion. These results were then compared to the erosive capacity of the bank full flow and the 100-year flood event.

The ability of the bank material to resist erosion is assessed via two methods. The first relies on published velocities at the threshold of erosion from Etcheverry (1915). The second relies on the erodibility index method developed by Annandale (2006). The erodibility index is a semi-empirical index method that uses the physical properties of an earth material to assess its ability to resist erosion. A robust presentation of the erodibility index method is beyond the scope of this report. However, the input variables and the formulas used to determine their ability to resist erosion are presented below. Table 4 summarizes the results from both these methods.

The erodibility index method assesses four primary parameters to determine the erosion resistance capacity of an earth material. Broadly, these parameters are the strength of material (M_s), the size of the block or particle of the material (K_b), the strength of the interparticle bonds (K_d), and the orientation of the discontinuities of the material relative to the hydraulic forces driving erosion (J_s). Many of these parameters are designed for use in fracture rock and are not directly applicable to cohesive granular material, thus the values of block size and discontinuity orientation are set to unity. These parameters are converted to an index value via the following equation.

$$K_h = M_s * K_b * K_d * J_s \quad (10)$$

Where K_h is the index value of the erosion threshold. This index value is converted to a critical stream power via the following equation.

$$SP_{crit} = K_h^{0.75} \quad (11)$$

In which SP_{crit} is the stream power at which the earth material will erode.

The calculation of the hydraulic forces applied to these earth materials at the bankfull flow and the 100-year flood are calculated via the following equations.

$$SP = 7.853\left(\frac{\left(\tau^{3/2}\right)}{\sqrt{\rho}}\right) \quad (12)$$

The results of these calculations are presented in Table 4. From these results, it is apparent that both the bankfull flow and the 100-year discharge are capable of eroding the bank material, with only the strongest estimate of the ability of the material to resist erosion, from the high estimate of the Annandale method, potentially being able to resist erosion at the bankfull discharge.

Table 4 Erodibility – Stream Power (kW/m²)

Qbf	Q100 (Max)	Etcheverry (1915)		Annandale (2006)	
		low	high	low	high
0.10	1.26	0.01	0.02	0.07	0.14

4.0 REMEDIAL RECOMMENDATIONS

The remediation approach presented herein prioritizes the stability of the landscape and the community interaction with the open space. Golder presents a range of alternatives to facilitate future design decision making. Golder also recommends that significant effort be invested in clearly and transparently communicating with stakeholders and interested parties so that attainable project goals can be defined and specific steps towards achieving those goals can be put into action.

The initial design decision to be made will be to determine channel form. To this end, we have developed three (3) channel geometry alternatives as described below:

- Alternative 1: Widening of the existing channel at its current gradient and including engineered bank protection
- Alternative 2: Raising the channel with drop structures
- Alternative 3: Controlling the channel incision with grade control structures

Regardless of which alternative is ultimately selected, there are some design recommendations that are common to all of the alternatives.

4.1 Channel Geometry

Only a limited portion of the Study Reach can have these remedial elements applied to it (Figure 45 and Figure 46). At the upstream end of the site, the widening of the channel and flood plain can be applied starting at the approximate middle of the mender bend containing the Concrete Plant and continuing downstream until the downstream end of the former reservoir. Upstream of the Concrete Plant, bank protection will likely have to be applied to minimize the ongoing erosion. Downstream of the widened reach Golder recommends that the post-remedial design conditions be assessed with an appropriate hydraulic model, but at this time, no remedial measures are recommended for the Walmart Reach.

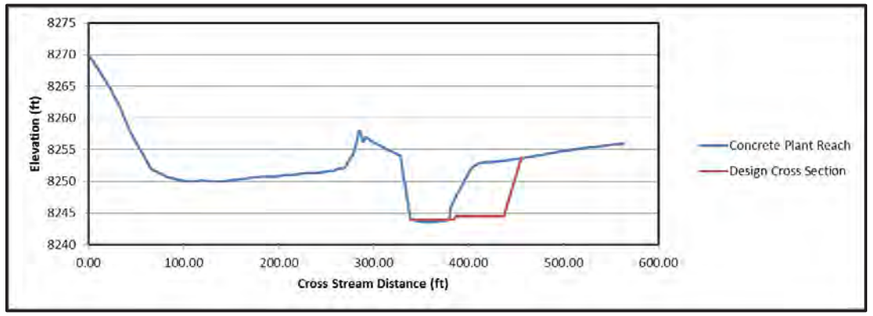
4.1.1 Without Drop Structures

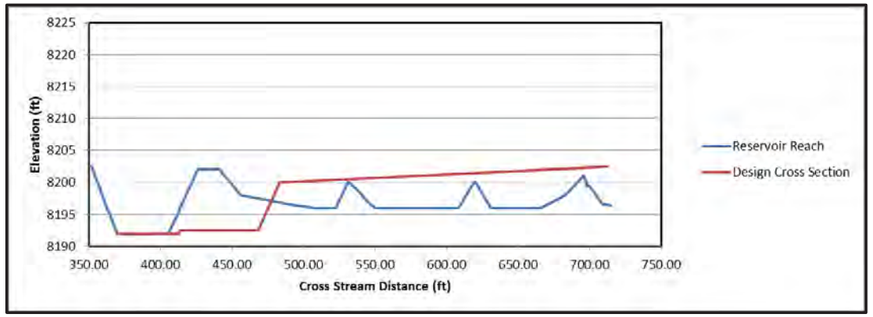
This channel geometry alternative involves the widening of the existing channel at the current grade, and the addition of a floodplain. The inset channel is designed to contain the bankfull flow, while the floodplain is sized to convey the 100-year flood event. These features will be carved out of the existing terrain and will likely not require any fill material. Both the banks of the inset channel and the larger floodplain will need to be supported by stabilized banks. The primary advantages of this alternative are the low cost and minimum construction material needed. Additionally, keeping the channel at the existing grade and widening it, will ensure that discharges larger than the 100-year flood can be contained within the channel. The disadvantages of this alternative are that it will likely make a larger portion of the landscape less accessible to the public and adjacent developments, and further isolate the river from the community.

A cross section depicting the geometry of the designed channel within the Concrete Plant and Saddle Club Reaches, as well as a plan view depiction of the area to be widened are presented in Figure 44.



Figure 43 Channel Cross-Section Locations





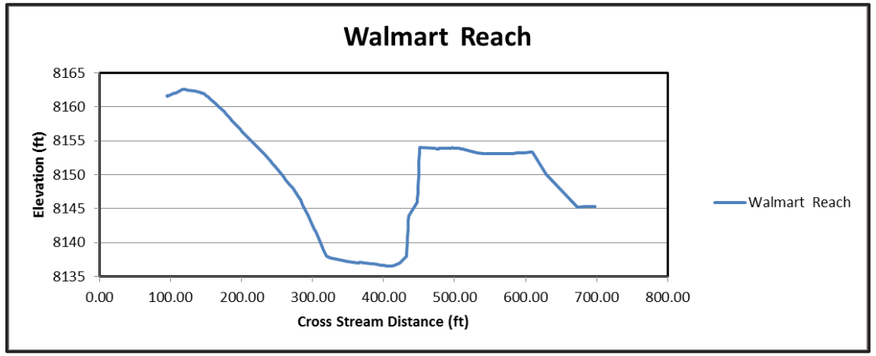


Figure 44 Cross Sections and Proposed Design Surface; View Looking Upstream

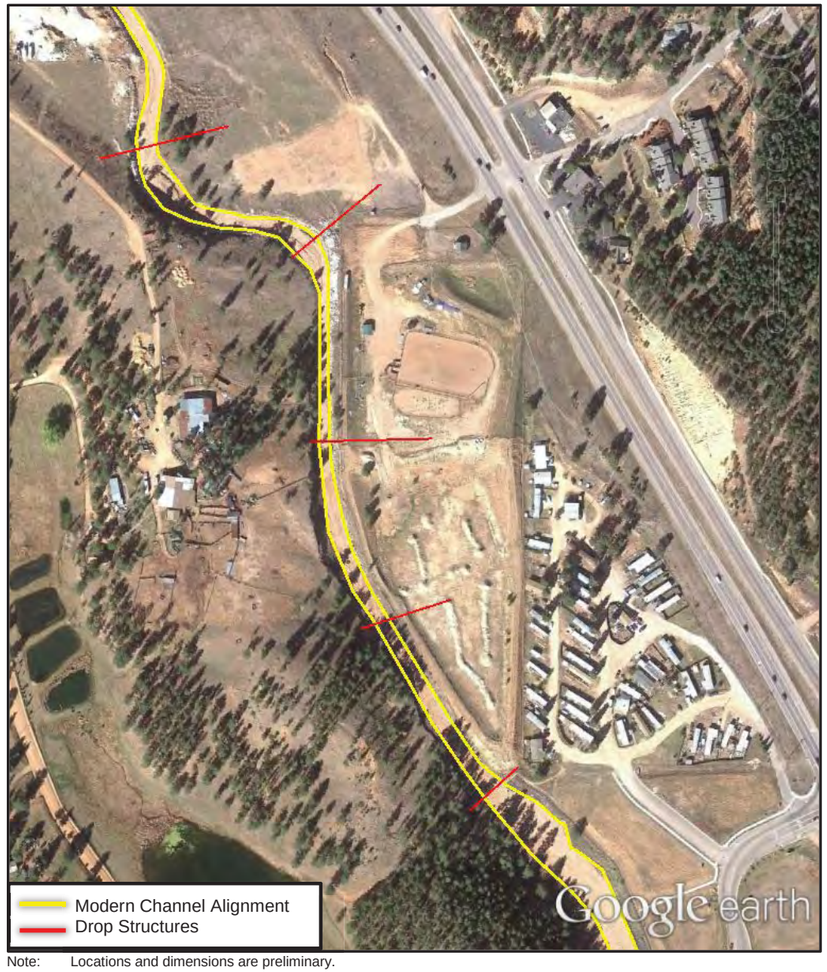


Note: Locations and dimensions are preliminary.

Figure 45 Portion of Channel to be Widened Indicated in Red; with Drop Structures

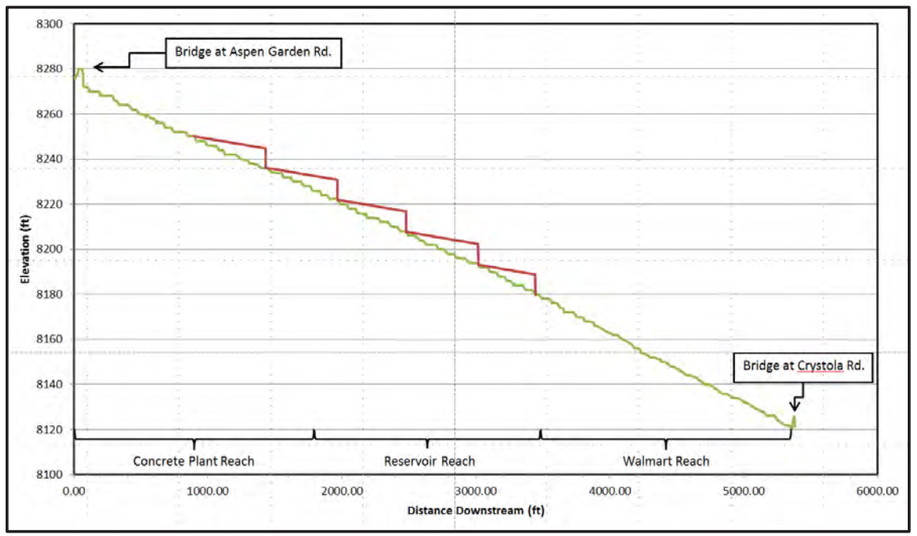
This design alternative proposes to decrease the gradient of the channel within the widened reach through the construction of drop structures (Figure 46, Figure 47, Figure 48, and Figure 49). The installation of up to six drop structures will control the channel gradient, minimize erosion, and bring the

river level within the remediated reach up to the same level as the rest of the surrounding valley floor. This channel geometry alternative likely represents the most stable and costliest design alternative.



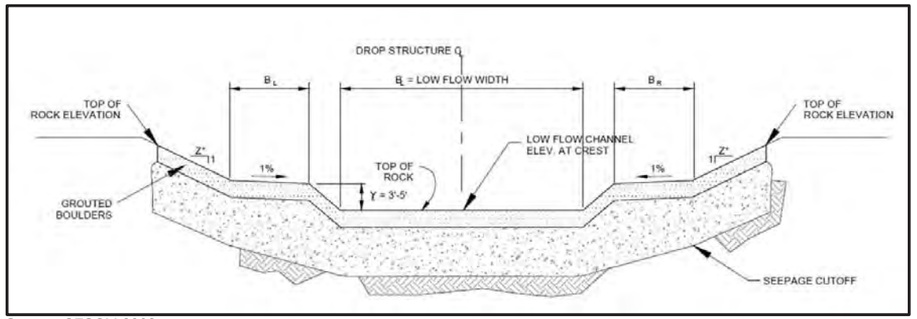
Note: Locations and dimensions are preliminary.

Figure 46 Drop Structures



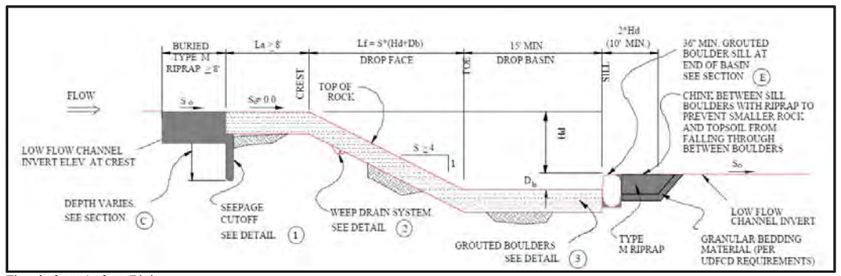
Note: Locations and dimensions of drop structures are preliminary.

Figure 47 Drop Structures Relative to Study Reach Channel Profile



Source: CFSCM 2008.

Figure 48 Sketch of Proposed Drop Structure Cross Section at Crest



Flow is from Left to Right.

Figure 49 Drop Structure Schematic in Profile

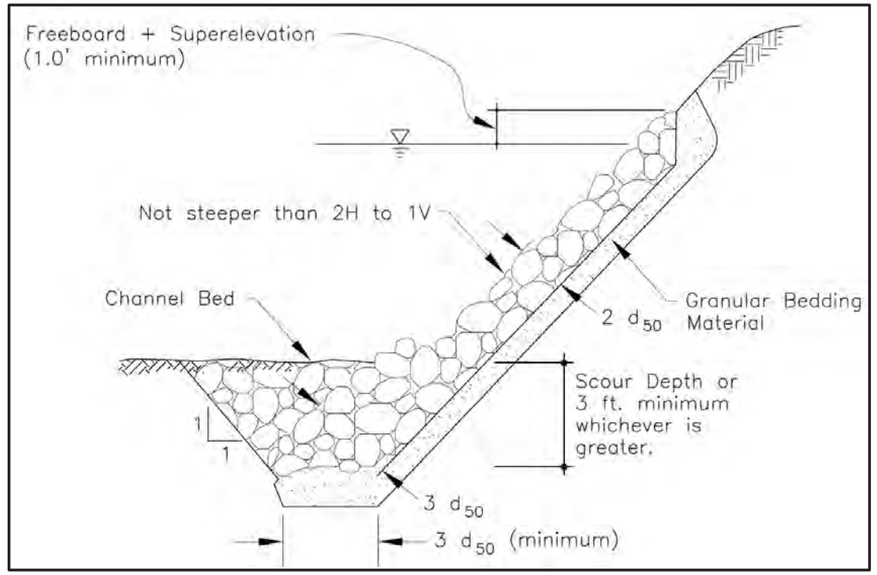
4.1.2 Grade Control Alternative

The third alternative channel geometry that Golder proposes is an optimized design that combines features of the first and second alternatives. The exact specifications and prescribed elements will need to be determined for their ability to meet project goals, but the overall plan is to incorporate those elements of bank stabilization and gradient control that employ grade control structures as opposed to drop structures. It is likely that grade control structures could be used in combination with bank protection to achieve similar results to those of the other alternative approaches.

4.2 Revetment Removal and Re-design

For most of Study Reach from Aspen Garden Bridge to the top of the Walmart Reach, the banks and especially the toe of the banks have been lined with un-designed revetment material. This intention in placing this material was undoubtedly to protect the banks of the channel from further erosion. The material consists of construction debris, waste rock, left over concrete, old tires, car bodies, and an assortment of other items. While well intentioned, the placement of these materials in a haphazard fashion has resulted in insufficient erosion protection and a public eyesore. Golder recommends the complete removal and redesign of all of the bank protection and erosion revetment present between Aspen Garden Bridge and the downstream end of the Saddle Club Reach.

While in most river restoration plans vegetation is incorporated into the remediation plan to enhance stabilization efforts and aesthetics, the arid environment and the intermittent water regime make relying on vegetation as an erosion prevention mechanism impossible. To compensate for the lack of applicable bioremediation techniques, Golder proposes to implement standard bank protection measures in the form of a riprapped bank (Figure 50).



Source: CFSCM 2008.

Figure 50 Sketch of Proposed Riprapped Bank Protection

4.3 Tributary Confluences

In the modern configuration, three unnamed tributaries join the main stem of Fountain Creek from the river-left within the Study Reach. The first joins at the upstream end of the Saddle Club Reach at a heavily protected culvert outfall (see Figure 13). The second joins the river via the outlet works of the former reservoir (see Figure 18) and the third joins immediately downstream of the second via a grouted culvert (see Figure 19).

Golder does not recommend any changes to the tributary inlet works associated with confluence #3. The inlet works at confluence #2 should be assessed relative to the larger design decisions associated with the use of drop structures. The absence of drop structures may facilitate minimal alteration to the second confluence. Confluence #1 will have to be redesigned regardless of which design alternative is selected. Golder recommends that the confluence channels #1 and #2 be designed to include an outlet at the edge of the remediated area such that they enter the floodplain as open channels. These outlet works may require energy dissipating structures at the point of entry onto the floodplain. These channels should traverse the floodplain in designed channels that incorporate erosion protection and then join the main stem at an equally protected but still open channel confluence.

4.4 Recommendations for Final Design

All of the elements proposed within this report will need to be re-assessed with an appropriate hydraulic model to ensure that no increases in regulatory Base Flood Elevations (BFE) occur and that sufficient erosion protection and conformity to the pertinent hydrologic regulations is maintained. A Conditional Letter of Map Revision (CLOMR) will likely be required for any stream stability improvements.

In this report, Golder is not recommending that any changes be made to the Walmart Reach. However, we do recommend that the conditions in the Walmart Reach be assessed with a two-dimensional hydraulic model, as the changes to the upstream reach may influence this portion of the channel.

4.5 Recreational Trail

Golder recommends that a recreation trail be incorporated into these remedial works. The trail would be an extension of the existing trail upstream of Aspen Garden Way and will need to provide safe passage for recreational users, while also not interfering with the hydrology of the floodplain. Alternative 1 provides an opportunity to incorporate this trail onto the raised overbank/floodplain area that would be created. In addition, this area could be used for stormwater and water quality features that may be incorporated into future development within the Study Reach.

4.6 Implementation Cost Estimation

A cost estimate of the three alternatives is presented in Table 5. The cost alternatives presented here are based on preliminary construction volumes.

Table 5 Alternatives Cost Estimate

Reach	Alternative 1 Channel Setback	Alternative 2 Drop Structures	Alternative 3 Grade Control Structures
1	$681,240	$789,375	$458,220
2	$946,915	$782,085	$511,275
3	$33,275	$33,275	$33,275
Totals	**$1,661,430**	**$1,604,735**	**$1,002,770**

4.7 Recommendation Summary

Based on the evaluations undertaken, Golder recommends that the Alternative 1 (Combination of Stabilization and Channel Setback) be pursued for implementation as part of the overall Master Plan.

In addition, the modifications should include the following:

- To be incorporated into all alternatives:
  - Remove all un-designed revetment material.
  - Design revetment elements and install where appropriate.
    - Re-use existing material when suitable
    - Size revetment material using a 2D hydraulic model
    - Assess whether the use of grout between riprap clast is needed
  - Include recreational trail
    - Either within floodplain or outside of remediated area
    - Choose pathway construction material relative to location and hydraulics.
  - Incorporate tributary confluences into remedial plan
  - Use a 2D hydraulic model to assess design conditions for erosion potential.
  - Tie remedial works into the upstream end of the Walmart Reach
- Channel geometry alternatives
  - Without drop structures
    - Inset channel and floodplain, or just wide inset channel.
    - Substantial bank protection
  - With drop structures
    - Inset channel and floodplain, or just wide inset channel.
    - Less bank protection than without the drop structures, but still substantial
  - With grade control structures
    - This alternative will likely involve the use of grade control structure that are similar to drop structures, but will be constructed at the existing gradient, as well as substantial bank protection elements.

5.0 CLOSING

This geomorphologic assessment of Fountain Creek has been developed as part of the preparation of the overall Town of Woodland Park Stormwater Master and Capital Improvement Plan.

GOLDER ASSOCIATES INC.

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SWR/RPH/rjg

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APPENDIX A
CALCULATIONS

June 2015

Appendix A
Calculations

1409863 001 R01 Rev0

	0.308	m per foot							From Sheet Vs, versus, D: settling velocity versus grain diameter																		
	0.092903	feet squared to m squared							y = 0.0152x^2 - 0.0014x^2 + 0.0061x + 4E-05																		
rho w	1000	kg/m^3	density of water						0.0152	0.0014	0.0061	4.00E-05															
rho s	2650	kg/m^3	density of rock						d = the grain size that is at the threshold of suspension based on the population (m)																		
g	9.81	m/s^2	acceleration due to gravity																								
ks	0.15	m	Assumed roughness height																								
D50	0.001	m																									
Tau*crit	0.0495	*																									
s in 7 hours	25200	s																									
s/day	86400	s																									
days of tra	0.55	d																									
			Floodway						Base Flood Water Surface Elevation (feet NAD88)																		
Cross section	Distance	Distance	W	W	A	A	d	d	V	V	Qw	Qw	Reg	Reg	without floodway	without floodway	with floodway	with floodway	increase	Slope	Shear Stress	Shear Velocity	Tau*	d sus	q*b	qb	qb	Qb	Qb	Stream Power
	ft	m	ft	m	ft^2	m^2	ft	m	ft/s	m/s	cfs	cms	ft	m	ft	m	ft	m		*	Pa	m/s	*	m	m^3/s	m^3/s	m^3/year	kg/year	kW/m^2
K	7600	2340.8	183	56.4	422	39.21	1.4	0.4	8.6	2.8	2391.4	67.7	8116.4	2499.9	8116.4	2499.9	8116.4	2499.9	0.0	0.023684	101.1	0.32	6.25	0.00229	61.25	0.008	0.44	22456	5.95E+07	0.25
L	8150	2510.2	69	21.3	571	53.05	2.6	0.8	6.3	4.1	2370.3	67.1	8130.1	2504.1	8130.1	2504.1	8130.1	2504.1	0.2	0.024009	189.9	0.44	11.71	0.00365	158.56	0.020	0.43	21918	5.81E+07	0.65
M	8600	2648.8	119	36.7	366	34.00	1.8	0.6	9.8	3.3	2363.7	66.9	8139.1	2506.8	8139.1	2506.8	8139.1	2506.8	0.0	0.02	109.8	0.33	6.78	0.00242	69.35	0.009	0.32	16534	4.38E+07	0.29
N	8900	2741.2	80	24.6	318	29.54	2.3	0.7	11.0	3.8	2305.0	65.3	8152.0	2510.8	8152.0	2510.8	8152.0	2510.8	0.0	0.043	295.0	0.54	18.23	0.00534	307.69	0.039	0.96	49313	1.31E+08	1.26
O	9325	2872.1	122	37.6	368	34.19	1.8	0.6	9.8	3.2	2376.2	67.3	8168.4	2515.9	8168.4	2515.9	8168.4	2515.9	0.0	0.038588	209.3	0.46	12.93	0.00395	183.57	0.023	0.88	44867	1.19E+08	0.75
P	10000	3080.0	54	16.6	224	20.81	2.4	0.7	11.4	3.9	1683.0	47.7	8186.1	2521.3	8186.1	2521.3	8186.1	2521.3	0.0	0.026222	188.6	0.43	11.65	0.00363	156.89	0.020	0.33	16971	4.50E+07	0.64
Q	11150	3434.2	54	16.6	222	20.62	2.4	0.7	11.5	3.9	1682.3	47.6	8222.1	2532.4	8222.1	2532.4	8222.1	2532.4	0.0	0.031304	225.1	0.47	13.91	0.00420	204.79	0.026	0.43	22154	5.87E+07	0.84
R	11450	3526.6	64	19.7	234	21.74	2.2	0.7	12.0	3.6	1681.0	47.6	8230.2	2534.9	8230.2	2534.9	8230.2	2534.9	0.0	0.027	175.3	0.42	10.83	0.00342	140.46	0.018	0.35	18059	4.77E+07	0.58

Erodibility (Annandale 2006)			
EIM	low	high	
Ms	0.02	0.09	
Kb	1	1	
phi	28	33	
Kd	0.531709	0.649408	
Js	1	1	
K	0.010634	0.058447	*
SP crit	0.07	0.14	kW/m^2

Erodibility (Etcheverry 1915)			
	low	high	
V crit	2.00	2.75	ft/s
V crit	0.61	0.84	m/s
k	0.4		*
d	0.045166	0.072823229	m
Tau crit	12.53624	20.21256807	Pa
SP crit	0.01	0.02	kW/m^2



Continuity	Q = Vwd			
Qbf	2.91	cms	102.60	cfs
v	1.60	m/s	5.21	ft/s
d	0.19	m	0.63	ft
w	9.41	m	30.54	ft
S	0.0281	*		
n	0.035	m^-1/6		
Shear Stress		Tau = rho*g*d*S		
rho w	1000	kg/m^3	62.43	lbs/ft^3
rho s	2650	kg/m^3	165.43	lbs/ft^3
g	9.807	m/s^2	32.17	ft/s^2
Tau	53.47	Pa	1.12	lbs/ft^2
Tau*	3.10	*		
SP	0.10	kW/m^2		
D50	0.001	m	0.00	ft
u*	0.23	m/s	0.76	ft/s
d of suspended particle thresh	0.001564	m	0.01	ft
q*b	23.31	*		
Tau*crit	0.0495	*		
qb	0.003	m^3/s	0.10	ft^3/s
Qb	0.0279	m^3/s	0.99	ft^3/s
s/day	86,400	s		
days of transport per year	0.55	d		
Qb	1,426	m^3/year	50,363	ft^3/year
Qb	3,779,191	kg/year	8,331,697	lbs/year

Golder Associates

APPENDIX B
DETAILED BUDGET

June 2015

Appendix B
Detailed Budget
Alt 1 - Reach 1

1409863 001 R01 Rev0

COST ESTIMATE					
PROJECT: Fountain Creek-Aspen Garden Way to Crystola Road (Reach 1)		**DESIGN LEVEL:** Planning		**PROJECT NO: 140-9863**	
ITEM: Alternative 1 - Channel Setback		**ESTIMATED BY:** S. Rogers		**DATE:** 4/26/2015	
NO	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL COST**
1	Mobilization/De-mobilization (10% approx.)	1	lump sum	$50,000	$50,000
2	Dewatering/Diversion/Erosion Control	1	lump sum	$25,000	$25,000
3	Earthwork				
3a	Debris Removal	2,400	cubic yards	$ 24.00	$57,600
3b	Excavation (Unclassified)	16,000	cubic yards	$ 11.00	$176,000
3c	Compacted Fill	0	cubic yards	$ 8.00	$0
4	Revetment				
4a	Bank Revetment (Riprap)	800	cubic yards	$ 75.00	$60,000
4b	Bank Revetment (Bedding)	600	cubic yards	$ 58.00	$34,800
4b	Grouted Riprap Drop Structure	0	each	$ 56,000.00	$0
4c	CIP Concrete Grade Control Structure	0	each	$ 33,700.00	$0
5	Other Items				
5a	Re-vegetation	3	acre	$ 10,000.00	$30,000
5b	Outlet Stabilization	1	each	$ 5,000.00	$5,000
5c				$0	$0
5d				$0	$0
5e				$0	$0
6	Unlisted Items (10%)				$44,000
	Total Estimated Construction Costs				**$482,400**
	Contingency (25%)				$120,600
	Permitting/CLOMR (Est.)				$20,000
	Engineering Design (10%)				$48,240
	Legal Fees (Est.)				$10,000
	Total Estimated Implementation Costs				**$681,240**

June 2015

Appendix B
Detailed Budget
Alt 1 - Reach 2

1409863 001 R01 Rev0

COST ESTIMATE					
PROJECT: Fountain Creek-Aspen Garden Way to Crystola Road (Reach 2)		**DESIGN LEVEL:** Planning		**PROJECT NO: 140-9863**	
ITEM: Alternative 1 - Channel Setback		**ESTIMATED BY:** S. Rogers		**DATE:** 4/26/2015	
NO	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT COST**	**TOTAL COST**
1	Mobilization/De-mobilization (10% approx.)	1	lump sum	$50,000	$50,000
2	Dewatering/Diversion/Erosion Control	1	lump sum	$25,000	$25,000
3	Earthwork				
3a	Debris Removal	2,300	cubic yards	$ 24.00	$55,200
3b	Excavation (Unclassified)	30,000	cubic yards	$ 11.00	$330,000
3c	Compacted Fill	0	cubic yards	$ 8.00	$0
4	Revetment				
4a	Bank Revetment (Riprap)	767	cubic yards	$ 75.00	$57,500
4b	Bank Revetment (Bedding)	567	cubic yards	$ 58.00	$32,867
4b	Grouted Riprap Drop Structure	0	each	$ 56,000.00	$0
4c	CIP Concrete Grade Control Structure	0	each	$ 33,700.00	$0
5	Other Items				
5a	Re-vegetation	3	acre	$ 10,000.00	$30,000
5b	Outlet Stabilization	2	each	$ 5,000.00	$10,000
5c				$0	$0
5d				$0	$0
5e				$0	$0
6	Unlisted Items (10%)				$59,000
	Total Estimated Construction Costs				**$649,567**
	Contingency (25%)				$162,392
	Permitting/CLOMR (Est.)				$20,000
	Engineering Design (10%)				$64,957
	Legal Fees (Est.)				$50,000
	Total Estimated Implementation Costs				**$946,915**

June 2015

Appendix B
Detailed Budget
Alt 2 - Reach 1

1409863 001 R01 Rev0

COST ESTIMATE					
PROJECT:	Fountain Creek-Aspen Garden Way to Crystola Road (Reach 1)	**DESIGN LEVEL:**	Planning	**PROJECT NO: 140-9863**	
ITEM:	Alternative 2 - Drop Structures	**ESTIMATED BY:**	S. Rogers	**DATE:**	4/26/2015

NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization/De-mobilization (10% approx.)	1	lump sum	$50,000	$50,000
2	Dewatering/Diversion/Erosion Control	1	lump sum	$25,000	$25,000
3	Earthwork				
3a	Debris Removal	2,400	cubic yards	$ 24.00	$57,600
3b	Excavation (Unclassified)	0	cubic yards	$ 11.00	$0
3c	Compacted Fill	24,000	cubic yards	$ 8.00	$192,000
4	Revetment				
4a	Bank Revetment (Riprap)	300	cubic yards	$ 75.00	$22,500
4b	Bank Revetment (Bedding)	300	cubic yards	$ 58.00	$17,400
4b	Grouted Riprap Drop Structure	2	each	$ 56,000.00	$112,000
4c	CIP Concrete Grade Control Structure	0	each	$ 33,700.00	$0
5	Other Items				
5a	Re-vegetation	3	acre	$ 10,000.00	$30,000
5b	Outlet Stabilization	1	each	$ 5,000.00	$5,000
5c				$0	$0
5d				$0	$0
5e				$0	$0
6	Unlisted Items (10%)				$51,000
	Total Estimated Construction Costs				**$562,500**
	Contingency (25%)				$140,625
	Permitting/CLOMR (Est.)				$20,000
	Engineering Design (10%)				$56,250
	Legal Fees (Est.)				$10,000
	Total Estimated Implementation Costs				**$789,375**

June 2015

Appendix B
Detailed Budget
Alt 2 - Reach 2

1409863 001 R01 Rev0

COST ESTIMATE					
PROJECT:	Fountain Creek-Aspen Garden Way to Crystola Road (Reach 2)	**DESIGN LEVEL:**	Planning	**PROJECT NO: 140-9863**	
ITEM:	Alternative 2 - Drop Structures	**ESTIMATED BY:**	S. Rogers	**DATE:**	4/26/2015

NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization/De-mobilization (10% approx.)	1	lump sum	$50,000	$50,000
2	Dewatering/Diversion/Erosion Control	1	lump sum	$25,000	$25,000
3	Earthwork				
3a	Debris Removal	2,300	cubic yards	$ 24.00	$55,200
3b	Excavation (Unclassified)	0	cubic yards	$ 11.00	$0
3c	Compacted Fill	16,000	cubic yards	$ 8.00	$128,000
4	Revetment				
4a	Bank Revetment (Riprap)	300	cubic yards	$ 75.00	$22,500
4b	Bank Revetment (Bedding)	300	cubic yards	$ 58.00	$17,400
4b	Grouted Riprap Drop Structure	3	each	$ 56,000.00	$168,000
4c	CIP Concrete Grade Control Structure	0	each	$ 33,700.00	$0
5	Other Items				
5a	Re-vegetation	3	acre	$ 10,000.00	$30,000
5b	Outlet Stabilization	2	each	$ 5,000.00	$10,000
5c				$0	$0
5d				$0	$0
5e				$0	$0
6	Unlisted Items (10%)				$51,000
	Total Estimated Construction Costs				**$557,100**
	Contingency (25%)				$139,275
	Permitting/CLOMR (Est.)				$20,000
	Engineering Design (10%)				$55,710
	Legal Fees (Est.)				$10,000
	Total Estimated Implementation Costs				**$782,085**

June 2015

Appendix B
Detailed Budget
Alt 3 - Reach 1

1409863 001 R01 Rev0

COST ESTIMATE					
PROJECT:	Fountain Creek-Aspen Garden Way to Crystola Road (Reach 1)	**DESIGN LEVEL:**	Planning	**PROJECT NO: 140-9863**	
ITEM:	Alternative 3 - Grade Control Structures	**ESTIMATED BY:**	S. Rogers	**DATE:**	4/26/2015

NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization/De-mobilization (10% approx.)	1	lump sum	$50,000	$50,000
2	Dewatering/Diversion/Erosion Control	1	lump sum	$25,000	$25,000
3	Earthwork				
3a	Debris Removal	2,400	cubic yards	$ 24.00	$57,600
3b	Excavation (Unclassified)	0	cubic yards	$ 11.00	$0
3c	Compacted Fill	0	cubic yards	$ 8.00	$0
4	Revetment				
4a	Bank Revetment (Riprap)	400	cubic yards	$ 75.00	$30,000
4b	Bank Revetment (Bedding)	400	cubic yards	$ 58.00	$23,200
4b	Grouted Riprap Drop Structure	0	each	$ 56,000.00	$0
4c	CIP Concrete Grade Control Structure	2	each	$ 33,700.00	$67,400
5	Other Items				
5a	Re-vegetation	3	acre	$ 10,000.00	$30,000
5b	Outlet Stabilization	1	each	$ 5,000.00	$5,000
5c				$0	$0
5d				$0	$0
5e				$0	$0
6	Unlisted Items (10%)				$29,000
	Total Estimated Construction Costs				**$317,200**
	Contingency (25%)				$79,300
	Permitting/CLOMR (Est.)				$20,000
	Engineering Design (10%)				$31,720
	Legal Fees (Est.)				$10,000
	Total Estimated Implementation Costs				**$458,220**

June 2015

Appendix B
Detailed Budget
Alt 3 - Reach 2

1409863 001 R01 Rev0

COST ESTIMATE					
PROJECT:	Fountain Creek-Aspen Garden Way to Crystola Road (Reach 2)	**DESIGN LEVEL:**	Planning	**PROJECT NO: 140-9863**	
ITEM:	Alternative 3 - Grade Control Structures	**ESTIMATED BY:**	S. Rogers	**DATE:**	4/26/2015

NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization/De-mobilization (10% approx.)	1	lump sum	$50,000	$50,000
2	Dewatering/Diversion/Erosion Control	1	lump sum	$25,000	$25,000
3	Earthwork				
3a	Debris Removal	2,300	cubic yards	$ 24.00	$55,200
3b	Excavation (Unclassified)	0	cubic yards	$ 11.00	$0
3c	Compacted Fill	0	cubic yards	$ 8.00	$0
4	Revetment				
4a	Bank Revetment (Riprap)	400	cubic yards	$ 75.00	$30,000
4b	Bank Revetment (Bedding)	400	cubic yards	$ 58.00	$23,200
4b	Grouted Riprap Drop Structure	0	each	$ 56,000.00	$0
4c	CIP Concrete Grade Control Structure	3	each	$ 33,700.00	$101,100
5	Other Items				
5a	Re-vegetation	3	acre	$ 10,000.00	$30,000
5b	Outlet Stabilization	2	each	$ 5,000.00	$10,000
5c				$0	$0
5d				$0	$0
5e				$0	$0
6	Unlisted Items (10%)				$32,000
	Total Estimated Construction Costs				**$356,500**
	Contingency (25%)				$89,125
	Permitting/CLOMR (Est.)				$20,000
	Engineering Design (10%)				$35,650
	Legal Fees (Est.)				$10,000
	Total Estimated Implementation Costs				**$511,275**

June 2015 | **Appendix B Detailed Budget Reach 3** | 1409863 001 R01 Rev0

COST ESTIMATE					
PROJECT:	Fountain Creek-Aspen Garden Way to Crystola Road (Reach 3)	**DESIGN LEVEL:**	Planning	**PROJECT NO: 140-9863**	
ITEM:	General Stabilization	**ESTIMATED BY:**	S. Rogers	**DATE:**	4/26/2015

NO	DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL COST
1	Mobilization/De-mobilization (10% approx.)	1	lump sum	$10,000	$5,000
2	Dewatering/Diversion/Erosion Control	1	lump sum	$5,000	$5,000
3	Earthwork				
3a	Debris Removal	0	cubic yards	$ 24.00	$0
3b	Excavation (Unclassified)	0	cubic yards	$ 11.00	$0
3c	Compacted Fill	0	cubic yards	$ 8.00	$0
4	Revetment				
4a	Bank Revetment (Riprap)	50	cubic yards	$ 75.00	$3,750
4b	Bank Revetment (Bedding)	15	cubic yards	$ 58.00	$870
4b	Grouted Riprap Drop Structure	0	each	$ 56,000.00	$0
4c	CIP Concrete Grade Control Structure	0	each	$ 33,700.00	$0
5	Other Items				
5a	Re-vegetation	0.5	acre	$ 10,000.00	$5,000
5b	Outlet Stabilization	1	each	$ 5,000.00	$5,000
5c				$0	$0
5d				$0	$0
5e				$0	$0
6	Unlisted Items (10%)				$2,000
	Total Estimated Construction Costs				**$26,620**
	Contingency (25%)				$6,655
	Permitting/CLOMR (Est.)				$0
	Engineering Design (10%)				$0
	Legal Fees (Est.)				$0
	Total Estimated Implementation Costs				**$33,275**

June 2015 | **Appendix B Detailed Budget Grouted Riprap Drop** | 1409863 001 R01 Rev0

Typical Grouted Riprap Drop Structure			
Dimensions			
Slope		0.25	ft/ft
Length		50	feet
Height		8.5	feet
Slope Length		35	feet
Concrete Cutoff Thickness		2	feet
Concrete Cutoff Height		5	feet
Riprap Apron Length		20	feet
Riprap Thickness		2.5	feet
Unit Rates			
Concrete	$	600.00	cubic yard
Grouted Riprap	$	190.00	cubic yard
Excavation	$	11.00	cubic yard
Riprap	$	75.00	cubic yard
Total Estimated Cost per drop	**$**	**56,000**	

Cost per square yard $ 288

June 2015 | **Appendix B** | 1409863 001 R01 Rev0

Detailed Budget

Grade Control Structure

Typical Grade Control Structure			
Dimensions			
Width		2	feet
Length		50	feet
Height		10	feet
Riprap Apron Length		20	feet
Riprap Apron Thickness		2	feet
Unit Rates			
CIP Concrete	$	600.00	cubic yard
Excavation	$	11.00	cubic yard
Riprap	$	75.00	cubic yard
Total Estimated Cost	**$**	**33,700**	
Cost per foot	$	674	

June 2015 | **Appendix B** | 1409863 001 R01 Rev0

Detailed Budget

Unit Rates

Unit Rates			
Debris Removal	$	24.00	cubic yard
Excavation	$	11.00	cubic yard
Compacted Fill	$	8.00	cubic yard
Riprap	$	75.00	cubic yard
Bedding	$	58.00	cubic yard
Grouted Riprap/Boulders	$	190.00	cubic yard
Concrete	$	600.00	cubic yard
Re-vegetation	$	10,000.00	acre
Outlet Stabilization	$	5,000.00	each

June 2015

Appendix B
Detailed Budget Summary

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Reach	Alternative 1-Channel Setback	Alternative 2-Drop Structures	Alternative 3-Grade Control Structures
1	$681,240	$789,375	$458,220
2	$946,915	$782,085	$511,275
3	$33,275	$33,275	$33,275
TOTAL	**$1,661,430**	**$1,604,735**	**$1,002,770**

Distance	3500 feet		
Cost per mile	$ 2,506,386	$ 2,420,857	$ 1,512,750

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APPENDIX E - FLOODPLAIN INFORMATION

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Loy Gulch, Paint Pony, East Fork Paint Pony LOMR



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City of Woodland Park
Letter of Map Revision (LOMR) Report — August 2015

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I. INTRODUCTION

1.1 Purpose

The City of Woodland Park, Colorado, is undertaking a multi-year project in order to update their comprehensive Stormwater Mater Plan. A core plan objective is to update select Flood Insurance Rate Maps (FIRMs) within Woodland Park using the effective FEMA hydrology. Through the planning process, Loy Gulch, Paint Pony, and East Fork Paint Pony have been identified as flooding sources that will be updated through the Letter of Map Change (LOMC) process. This Letter of Map Revision (LOMR) submittal has been compiled to update the effective FIRMs and Flood Insurance Study Report (FIS) for the Town of Woodland Park and Unincorporated Areas of Teller County, Colorado, for these identified flooding sources based on updated topographic data and updated hydraulic analyses.

1.2 Effective Studies

J.F. Sato and Associates, Inc. completed the hydrologic and hydraulic analyses for Loy Gulch, Paint Pony, and the East Fork Paint Pony in September 1985. On the Loy Gulch basin, the final drainage design developed by Aspen Engineering in April 1983 for Park View Estates was used as the basis for estimating flows above State Highway 67. These studies were initially published by FEMA in the Countywide Flood Insurance Study (FIS) for Teller County, Colorado and Incorporated Areas dated September 30, 1988. These studies where then incorporated and republished by FEMA in the Revised Countywide FIS dated September 25, 2009. The datum was updated from the National Geodetic Vertical Datum of 1929 (NGVD 29) to the North American Vertical Datum of 1988 (NAVD 88) but no additional modifications were made to the original studies.

Conditional Letter of Map Revision (CLOMR) Case# 08-08-0511R, effective December 8, 2009, was submitted to evaluate the effects of a proposed culvert, channel relocation, channelization, excavation, and fill would have on the effective flood study for Loy Gulch. After project construction was completed, an as-built LOMR Case# 10-09-0932P, effective November 17, 2011, was submitted to update the effective FIRM and FIS report for Loy Gulch based on updated topographic information and the as-built hydraulic analysis. It was later determined that there was a shift in the delineation of the effective floodplain for Loy Gulch which caused the revised floodplain produced by LOMR Case# 10-09-0932P to be shifted away from the actual channel location. As a result, LOMR Case# 14-08-0167P, effective March 26, 2015, was submitted to revised the affected portion of Loy Gulch from approximately 1,260 feet upstream of the confluence with Trout Creek to just Downstream of Research Drive. LOMR Case# 14-08-0167P superseded the entire revision reach of Case# 10-09-0932P and is currently the only effective LOMR or CLOMR that affects proposed revision areas.

1.3 Location and Scope

The City of Woodland Park is located within the northeastern portion of Teller County, Colorado, along the eastern boundary with El Paso County and is approximately 18 miles northwest of the City of Colorado Springs. This area is located within the eastern range of the Rocky Mountains and is encompassed by Pike National Forest. Woodland Park spans the divide between the Arkansas River Basin (Fountain Creek) and the South Platt River Basin to the north (Trout Creek). The elevation within Woodland Park ranges from approximately 8,000 feet on Fountain Creek to approximately 8,500 feet on the divide which is located near the center of the community.

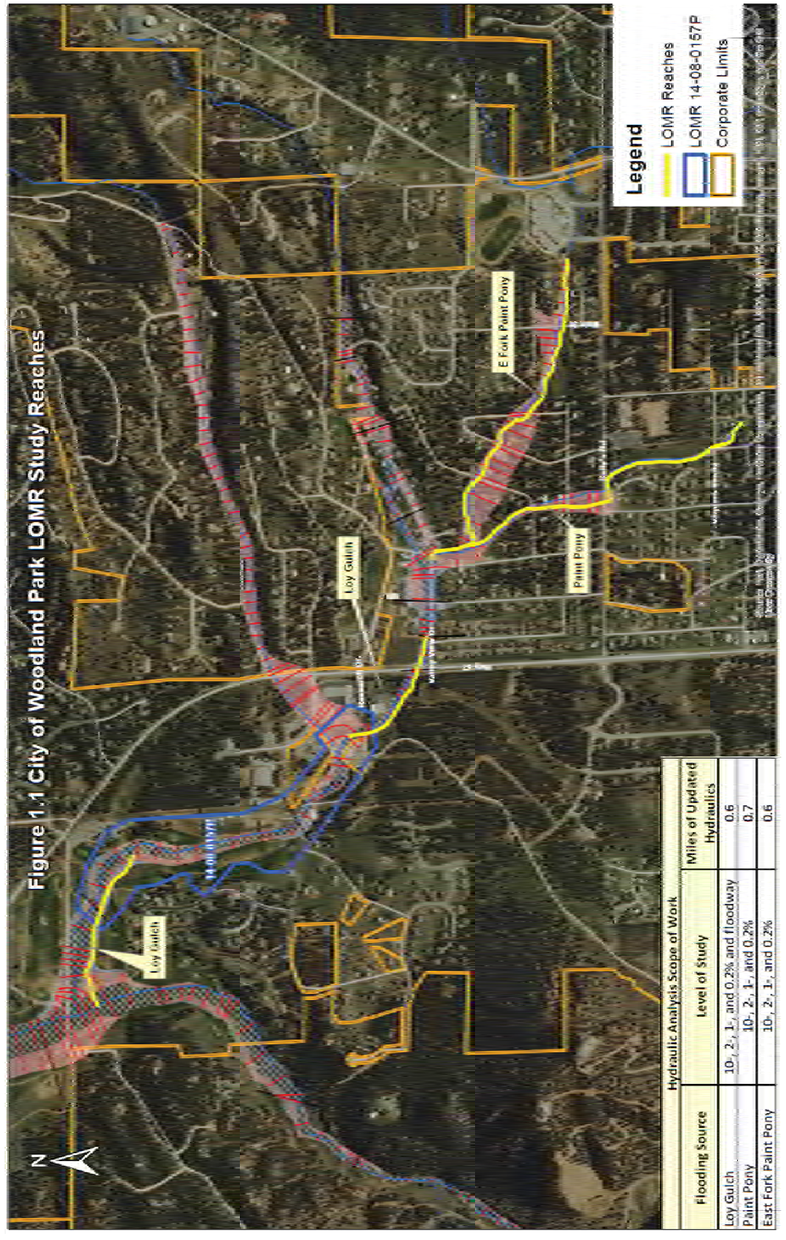


Figure 1.1 City of Woodland Park LOMR Study Reaches

This LOMR application proposes to revise the following reaches based on updated topographic information and revised hydraulic analyses (see Figure 1.1 for approximate locations):

- Loy Gulch – from the confluence to approximately 1,647 feet upstream of the confluence with Trout Creek. The upstream end of the revision reach ties into the effective LOMR Case# 14-08-0167P.
  - Note – After discussions with the City, the downstream reach of Loy Gulch was not included with the LOMR application. This information has been retained in this report so it can be submitted at a future date.
- Loy Gulch – from approximately 187 feet downstream of Research Drive to approximately 338 feet upstream of State Highway 67. The downstream end of the revision reach ties into the effective LOMR Case# 14-08-0167P.
- Paint Pony – from the confluence with the Loy Gulch floodplain to the upstream limit of study.
- East Fork Paint Pony – from the confluence with Paint Pony to the upstream limit of study.

1.4 Topographic Mapping

The topographic data was provided by Landmark Mapping, LTD and was derived from a photogrammetric survey conducted on April 24, 2014. The final survey report submitted by Rampart Surveys, Inc. was dated 9/1/2015. Two datasets with different vertical accuracies were collected. The main urbanized areas of Woodland Park were flown using a Light Detection and Ranging (LIDAR) system with a 2-foot vertical accuracy while the less populated areas of the City were covered with 5-foot vertical accuracy. A Topographic Data QC Review of this data was performed and the data was subsequently utilized to develop Digital Terrain Model (DTM) for use in the hydraulic model development. The projection of the data is StatePlane_Colorado_Central FIPS 0502 Feet, the horizontal datum is NAD 1983, and the vertical datum is NAVD 1988.

Projected Coordinate System: NAD_1983_StatePlane_Colorado_Central_FIPS_0502_Feet
Projection: Lambert_Conformal_Conic
Geographic Coordinate System: GCS_North_American_1983
Datum: D_North_American_1983

1.5 Structure Survey

Rampart Surveys, Inc. carried out ground surveys during December 2014 and May 2015. The final survey report submitted by Rampart Surveys, Inc. was May 15, 2015. Channel cross sections were surveyed upstream and downstream of all hydraulic structures within the revision reach. In addition, culvert geometries were surveyed in detail and the data was recorded through field notes and photographs. Spot elevations for all structure crossings, including structure inverts, were recorded and provided in a point shape file. All survey backup data, field drawing, notes, and photographs can be found in Appendix B of this report.

Surveyor: Rampart Surveys, Inc.
Survey Dates: 12/3/14 – 12/5/14 and 5/15/15
Horizontal Datum: NAD 1983 State Plane Colorado Central FIPS 0502 (Feet)
Vertical Datum: NAVD 88

II. HYDROLOGY

The discharges for the flood recurrence intervals having a 10-percent, 2-percent, 1-percent, and 0.2-percent chance of being equaled or exceeded in any given year, were obtained from the effective FIS for Teller County, Colorado and Incorporated areas dated September 25, 2009. The discharge values for this FIS were established by the September 1985, J.F. Sato and Associates, Inc. hydrologic report titled *Hydrology Report for Flood Insurance Studies in Arapahoe, Douglas, and Teller Counties.* To develop a rainfall-runoff relationship, the U.S. Soil Conservation Service (SCS) TR-20 computer program was used [U.S. Department of Agriculture, Soil Conservation Service, May 1983]. In addition, previous hydrologic studies were used in developing the final hydrologic discharges presented in the above referenced report.

The initial discharge values for each flooding source were obtained from the effective FIS Summary of Discharge Table 2. In addition, the effective HEC-2 hydraulic models were reviewed to determine if additional flow change locations were incorporated into the effective analysis that were not reported in the Summary of Discharge Table 2. This review determined that one additional discharge change location was available for East Fork Paint Pony. It was also verified that all applicable discharge change locations for Loy Gulch were published in the FIS report. After a comprehensive search of the FEMA Library, Mapping Information Platform (MIP), and data request to the City of Woodland Park; it was determined that a copy of the effective HEC-2 modeling for Paint Pony was unavailable. However, the two discharge locations published in the FIS were deemed sufficient to update the hydraulic analysis for Paint Pony.

Table 2.1 – Effective FIS Discharges

Flooding Source and Location	Drainage Area (Square Miles)	Peak Discharges (Cubic Feet Per Second) 10-Percent-Annual-Chance	2-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
Loy Gulch					
Just West of Highway 67	5.2	240	690	1,040	1,970
At Confluence with Lovell Gulch	4.3	230	630	930	1,720
East Fork Paint Pony					
At Confluence with Paint Pony	0.7	70	200	290	490
At Confluence with unnamed tributary	0.5	35[1]	100[1]	145[1]	245[1]
Paint Pony					
At Confluence with Loy Gulch	1.1	110	280	410	670
At Confluence with East Fork Paint Pony	0.4	40	80	120	180

[1]Discharge obtained from effective HEC-2 model printout

III. HYDRAULIC MODELING

3.1 Model Development Overview

A comprehensive search was conducted to obtain copies of the effective hydraulic modeling for Loy Gulch, Paint Pony, and East Fork Paint Pony. The initial data search of the MIP produced printouts for the effective HEC-2 hydraulic model input and output values for Loy Gulch and the East Fork Paint Pony. In addition, copies of the effective HEC-RAS hydraulic modeling from effective LOMR Case# 14-08-0167P were available for download from the MIP; however, a copy of the effective modeling for Paint Pony was unavailable. An additional search of the FEMA Library through an external data request also failed to yield a copy of the Paint Pony effective model. A request was also submitted to the City of

Woodland Park in an attempt to determine if a copy of the effective Paint Pony modeling was available in the community archives but the community was also unable to locate this data.

Ideally digital copies of the effective hydraulic modeling would be available for use in producing duplicate effective models for the proposed revision reaches. In this case, the copies of the effective hydraulic models were only available in hard copy format for Loy Gulch and the East Fork Paint but an effective copy of the Paint Pony hydraulic model was unavailable. The age of the effective analyses indicates that they are outdated and no longer represent current existing conditions. In addition, this LOMR request is based solely map changes based on flood hazard information meant to improve upon that shown on the flood map or within the flood study without incorporating any proposed man made changes. Therefore, it was determined that producing duplicate effective models for these flooding sources would provide minimal benefit so duplicate effective models were not produced. However, a duplicate effective model was created for the effective HEC-RAS hydraulic modeling from effective LOMR Case# 14-08-0167P. Copies of all the available effective hydraulic models are provide in Appendix C of this report.

Existing conditions hydraulic models for Loy Gulch, Paint Pony, and East Fork Paint Pony were produced using the U.S. Army Corps of Engineers (USACE) HEC-RAS program, version 4.1. Cross section geometry for the revision reaches was cut from a Triangulated Irregular Network (TIN) digital terrain model using the USACE HEC-GeoRAS program, Version 10.1, and input into HEC-RAS for detailed model development. Culvert geometries and locations were recorded by Rampart Surveys, Inc. through survey data, photographs, and field notes. This data was used to manually enter culvert data into the HEC-RAS models. At the upstream and downstream ends of all hydraulic structures, surveyed channel cross section information was incorporated into the georeferenced cross section geometry that was collected with HEC-GeoRAS.

Manning's 'n' roughness values were evaluated using photographs taken by Rampart Surveys, Inc. and aerial imagery. The channel 'n' values were set to 0.035 for all modeled reaches and were based on channel integrity and stream bed composition. The overbank 'n' values were set from 0.014 to 0.06 depending on the specific land use and vegetation density. These values were deemed to be realistically conservative and are in agreement with the effective detailed study. A land use shape file was created in HEC-GeoRAS and attributed with Manning's 'n' values according to the specific land use. This allowed the HEC-RAS cross sections to be automatically attributed with the appropriate Manning's 'n' values when creating model cross sections within HEC-GeoRAS.

The majority of the studied flooding sources pass through residential areas within the City of Woodland Park. In order to capture potential obstructions to flow, a shape file was created in HEC-GeoRAS to capture the locations of all structures near or within the floodplain. This allowed the location and extent of potential flow obstructions to be automatically captured within the model cross section geometry when creating model cross sections within HEC-GeoRAS. The Manning's 'n' values were chosen according to the specific land uses but the incorporation of blocked obstructions within the modeling was used to simulate flood behavior within the residential areas. Care was taken when placing cross sections to capture the full extent of flow obstruction in order to ensure the modeling results were representative of actual flow conditions within these residential areas.

All the HEC-RAS hydraulic models were executed under the assumption of subcritical flow to produce the most conservative water surface elevations.

3.2 Loy Gulch – Downstream Golf Course Reach - Note – After discussions with the City, the downstream reach of Loy Gulch was not included with the LOMR application. This information has been retained in this report so it can be submitted at a future date.

In order to correct significant shifts in the effective floodplain and floodway delineation, the downstream end of Loy Gulch was selected for revision through this LOMR submittal. The revision reach of Loy Gulch begins at the confluence with Trout Creek and ends approximately 1,647 feet upstream of the confluence with Trout Creek. The updated analysis revealed that the effective floodplain does not currently coincide with the location of the low flow channel. In addition, the actual confluence with Trout Creek doesn't coincide with the effective confluence location.

The area of the Loy Gulch downstream revision is covered by topographic data with a 5-foot contour interval level of accuracy. This is the only revision reach that uses the 5-foot contour topographic data. The effective hydraulic analysis was based on topographic mapping with a 5-foot contour interval so this updated LOMR analysis matches the topographic resolution that was used in the effective analysis. A HEC-RAS hydraulic analysis was completed which incorporated the effective hydrology and the updated topographic data. The HEC-RAS modeling incorporated the same recurrence intervals studied in the effective FIS which included the 10-percent, 2-percent, 1-percent, and 0.2-percent chance of being equaled or exceeded in any given year, as well as a floodway. The starting boundary condition was set to normal depth and the channel slope was calculated between the most downstream model cross sections.

A floodway analysis was performed for this study reach and is included in the corresponding HEC-RAS models as a separate plan. Initial floodway runs were performed using Method 1 with the equal conveyance option turned on and a target rise in water surface elevation of 0.5 foot. The Method 1 results were input into Method 4 and negative surcharges and surcharges greater than 0.5 foot were removed by manually adjusting the encroachment stations.

During model construction, it was observed that the low flow channel may not have the capacity to convey the entire 100-year flow so a lateral weir was incorporated on the northern (right) overbank using HEC-GeoRAS. Weir coefficients were set to be within the range of acceptable values given in the document "Combined 1D and 2D modeling with HEC-RAS" by the USACE HEC (Hydraulic Engineering Center) in August 2013. These recommended values are lower than values that have been recommended in the past, but are backed up by testing by HEC that revealed that weir coefficients for lateral weirs should be lower than the generally accepted values for inline weirs. The lateral weir was optimized in order to calculate the discharge for a split flow that breaks out of the main channel and travels to the northwest. The 100-year discharge in the split was minimal so the split flow floodplain can be mapped as Shaded Zone X shallow flooding. However, flow splits out to the north during the 500-year flood event so a separate reach was incorporated into the HEC-RAS model to determine the extents of the Shaded Zone X split flow floodplain based on the calculated 500-year split flow. A separate flow calculation plan was incorporated into the HEC-RAS model which contained the lateral weir flow optimization calculations. An additional regulatory plan was then created in the HEC-RAS model where discharge estimates for the split flow were hard coded into the model.

In order to achieve a tie-into the effective study for Loy Gulch at the upstream end of the revision reach, the effective geometry for Cross Section 400 from effective LOMR Case# 14-08-0167P was incorporated into the HEC-RAS hydraulic modeling. Cross Section 400 was selected as the upstream tie-in location because the effective floodplain coincided with the physical channel location in this area. Effective cross sections that were downstream of this location did not accurately represent the existing ground geometry so a graphical tie into the effective floodplain could not have been achieved.

A check was performed to ensure the updated modeling tied back into the effective analyses at the upstream end of the revision reach. This review showed that all modeled recurrence intervals tie back into their effective water surface elevations (WSEL) well within the 0.5 foot tolerance. The actual tie-in for the 100-year WSEL was within 0.00 foot at the upstream location.

3.3 Loy Gulch – Upstream Reach

In order to correct significant shifts in the effective floodplain and floodway delineation, a reach of Loy Gulch upstream of effective LOMR Case# 14-08-0167P was selected for revision through this LOMR submittal. This revision reach of Loy Gulch begins approximately 187 feet downstream of Research Drive and ends approximately 338 feet upstream of State Highway 67.

This area of the Loy Gulch is covered by topographic data with a 2-foot contour interval level of accuracy. A HEC-RAS hydraulic analysis was completed which incorporated the effective hydrology, updated topographic data, and hydraulic structure survey data. The HEC-RAS modeling incorporated the same recurrence intervals studied in the effective FIS which included the 10-percent, 2-percent, 1-percent, and 0.2-percent chance of being equaled or exceeded in any given year, as well as a floodway. The starting boundary condition was set to the known water surface elevations that were obtained from effective profile 13P which was revised by effective LOMR Case# 14-08-0167P.

A floodway analysis was performed for this study reach and is included in the corresponding HEC-RAS models as a separate plan. Initial floodway runs were performed using Method 1 with the equal conveyance option turned on and a target rise in water surface elevation of 0.5 foot. The Method 1 results were input into Method 4 and negative surcharges and surcharges greater than 0.5 foot were removed by manually adjusting the encroachment stations.

In order to achieve a tie-into the effective study for Loy Gulch at the upstream end of the revision reach, the effective geometry for FEMA Lettered Cross Section G was incorporated into the HEC-RAS hydraulic modeling. The effective Cross Section G was selected as the upstream tie-in location because the effective floodplain coincided with the physical channel location in this area. Cross Section G corresponds to section number 6000.000 in the effective HEC-2 model printout for Loy Gulch. The effective datum shift of +4.2 feet (NGVD 29 + 4.2 feet = NAVD 88) was applied to vertical elevations in order to match the currently effective vertical datum of NAVD 88.

A final check was performed to ensure the updated modeling tied back into the effective analyses at the upstream and downstream ends of the revision reach. This review showed that all modeled recurrence intervals tie back into their effective water surface elevations (WSEL) well within the 0.5 foot tolerance. The actual tie-in for the 100-year WSEL is within 0.00 foot at both locations.

3.4 Paint Pony

Through the planning process, it was determined that Paint Pony was due for an updated hydraulic analysis. As a result, the entire effective reach of Paint Pony was restudied starting from the confluence with the Loy Gulch floodplain and ending at the effective upstream limit of study. The upstream reach of Paint Pony was mapped as an approximate Zone A floodplain and this analysis proposes to update the entire reach to a detailed study.

The revision reach for Paint Pony is covered by topographic data with a 2-foot contour interval level of accuracy. A HEC-RAS hydraulic analysis was completed which incorporated the effective hydrology,

updated topographic data, and hydraulic structure survey data. The HEC-RAS modeling incorporated the same recurrence intervals studied in the effective FIS which included the 10-percent, 2-percent, 1-percent, and 0.2-percent chance of being equaled or exceeded in any given year. No effective floodway was present for Paint Pony and a floodway is not being added as part of this LOMR submittal. The starting boundary condition was set to normal depth where the channel slope was calculated between the most downstream model cross sections.

The updated analysis showed that the 100-year floodplain is mainly contained in the channel for the upper portions of Paint Pony. All the culverts along this reach are undersized which cases backwater upstream of the culvert and overtopping of the roadways.

The currently effective analysis indicates that the detention basin at Kelly's Road overtops during the 100-year flood event. However, the updated analysis showed that the majority of the 100-year discharge can be conveyed within the detention basin outlet at Kelly's Road. The 100-year floodplain does overtop Kelly's Road but the flow depths are less than 1 foot average depth so the overflow floodplain can be mapped as Shaded Zone X shallow flooding. A separate HEC-RAS model was run to determine the extents of the Shaded Zone X for the Paint Pony Overflow floodplain and the floodplain limits were based on the 500-year flood discharge that weir flows over Kelly's Road. The Paint Pony Overflow rejoins the main channel of Paint Pony at the location of the downstream detention basin outlet.

Further downstream at the confluence with East Fork Paint Pony, the channel does not have the capacity to convey the entire 100-year flood discharge. A lateral weir was incorporated on the western (left) overbank to calculate the discharge for a split flow that breaks out of the main channel and travels to the west. The flow leaves the main channel as shallow flooding and forms a split flow reach called Paint Pony Split that runs along Chippewa Trail and parallel to Paint Pony. The 100-year flow depths that break out from Paint Pony are less than 1 foot average depth so the Paint Pony Split floodplain can be mapped as Shaded Zone X shallow flooding. The Paint Pony Split rejoins with Paint Pony and Loy Gulch combined floodplain at the Chippewa Trail culvert. The drainage ditch that forms Paint Pony Split doesn't have the capacity to convey the entire split flow discharge so another lateral weir was added to the model on the western (left) overbank to calculate the discharge for the second split flow called Paint Pony Split 2 which breaks out to the west. The 100-year flow depths that break out from Paint Pony Split are less than 1 foot average depth so the Paint Pony Split 2 floodplain can be mapped as Shaded Zone X shallow flooding. The shallow flooding split flow travels to the west before turning northwest upstream of Columbine Village Drive where it can rejoin Point Pony and Loy Gulch through culverts under Valley View Drive and/or overtopping the roadway. Separate reaches for the Paint Pony Split flows were modeled in HEC-RAS to determine the extents of the Shaded Zone X split flow floodplains which were based on the extents of 500-year floodplain. A separate flow calculation plan was incorporated into the HEC-RAS model which contained the lateral weir flow optimization calculations. Weir coefficients were set to be within the range of acceptable values given in the document "Combined 1D and 2D modeling with HEC-RAS" by the USACE HEC (Hydraulic Engineering Center) in August 2013. An additional regulatory plan was then created in the HEC-RAS model where discharge estimates for the split flow were hard coded into the model.

When running the weir flow optimization HEC-RAS plan for the lateral weirs along Paint Pony, it was observed that the flow values did not converge for some of the modeled recurrence intervals. We believe this lack of convergence is due to the model's complexity associated with incorporating multiple lateral weirs that occur at different elevations. However, efforts to make the model converge for all recurrence intervals while not reducing the fidelity of the model (particularly for the 100-year flood) have been reasonably successful. Specifically, combinations of larger calculation tolerances were programmed into the HEC-RAS model such as increasing the water surface calculation tolerance, increasing the critical depth calculation tolerance, and increasing the flow tolerance factor in weir split flow were all attempted.

It is possible to make all the modeled recurrence intervals converge by maxing out these tolerances, but the model becomes less precise. The precision of the model is especially critical for determining the discharges of the split flows, and we believe that the model is producing reasonable results even though it does not converge for all modeled recurrence intervals. Therefore, we made the decision to minimally adjust the calculation tolerances until the 100-year and 500-year flows converged. This resulted in a model that converged for all recurrence intervals with the exception of the 50-year flood.

The effective analysis assumed that Loy Gulch and Paint Pony shared coincident flood peaks. As a result, the effective analysis models a combined floodplain for Loy Gulch and Paint Pony from Pautte Trail (were the floodplains combine) to the confluence with the Paint Pony channel. Revising Loy Gulch is outside the scope of this LOMR revision so Paint Pony was modeled independently of Loy Gulch by setting the starting boundary condition for Paint Pony to normal depth and the channel slope was calculated between the most downstream model cross sections. This allowed the Paint Pony WSELs to be calculated without the consideration of backwater from Loy Gulch. This approach does not require a WSEL tie-into the effective Loy Gulch profile and the backwater from Loy Gulch will be manually added to the downstream end of the profile for Paint Pony. In addition, this updated analysis completely restudies the entire reach of Paint Pony so there is no upstream WSEL tie-in to consider.

3.5 East Fork Paint Pony

Through the planning process, it was determined that East Fork Paint Pony was due for an updated hydraulic analysis. As a result, the entire effective reach of East Fork Paint Pony was restudied starting from the confluence with Paint Pony and ending at the effective upstream limit of study.

The revision reach for East Fork Paint Pony is covered by topographic data with a 2-foot contour interval level of accuracy. A HEC-RAS hydraulic analysis was completed which incorporated the effective hydrology, updated topographic data, and hydraulic structure survey data. The HEC-RAS modeling incorporated the same recurrence intervals studied in the effective FIS which included the 10-percent, 2-percent, 1-percent, and 0.2-percent chance of being equaled or exceeded in any given year. No effective floodway was present for East Fork Paint Pony and a floodway is not being added as part of this LOMR submittal. The starting boundary condition was set to normal depth and the channel slope was calculated between the most downstream model cross sections.

The updated analysis showed that the 100-year floodplain is mainly contained in the channel for the upper portions of East Fork Paint Pony. All the culverts along this reach are undersized which causes backwater upstream of the culverts and overtopping of the roadways. In some instances, the downstream internal structure cross sections within HEC-RAS show extended water surface elevations when compared to the ground geometry and road deck. The upstream channel geometry indicates that the overtopping flow would be concentrated around the channel location and indicates that the flow momentum would cause the majority of the overtopping flow to continue downstream to rejoin the stream channel. In each case, the depth of the 100-year floodplain is less than 1.0 foot average depth which indicates any potential breakout flow would ultimately be mapped as Shaded Zone X floodplain. In addition, any shallow flooding that escaped from the main channel would likely be contained in existing drainage diches or storm drains. This indicates that the current modeling approach is reasonable and provides an accurate representation of the flood hazard for flow that overtops these culverts.

It was assumed that Paint Pony and East Fork Paint Pony did not share coincident flood peaks. As a result, the starting boundary condition for East Fork Paint Pony was set to normal depth and the flood elevations were calculated without the consideration of backwater from Paint Pony. The channel slope for the normal depth boundary condition was calculated between the most downstream model cross

sections. This approach does not require a WSEL tie-into the effective Paint Pony profile and the backwater from Paint Pony will be manually added to the downstream end of the profile for East Fork Paint Pony. In addition, this updated analysis completely restudies the entire reach of East Fork Paint Pony so there is no upstream WSEL tie-in to consider.

IV. FLOOD HAZARD MAPPING

4.1 Flood Hazard Mapping Overview

The HEC-RAS model output was imported into the HEC-GeoRAS program to generate floodplain boundaries for the 1-percent and 0.2-percent annual chance floods. Cross sections from the final HEC-RAS models were attributed with 1%- and 0.2%-annual-chance-flood water surface elevations and were intersected with the TIN in HEC-GeoRAS to delineate ‘first-cut’ floodplain boundaries. The first cut boundaries were reviewed and refined manually to accurately reflect the results of the hydraulic models. Quality control was performed to remove small islands, smooth out the 1%- and 0.2%-annual-chance event floodplain delineations, and ensure logical tie-ins to the effective floodplains at the upstream and downstream ends of the revision reaches. In some cases, engineering judgement was used to ensure the mapped floodplain boundaries accurately represented the flood hazards for each flood event.

For revision reaches that involved a floodway revision, the final encroachment stations from the HEC-RAS modeling were imported into ArcGIS through HEC-GeoRAS. The floodway was then manually delineated between modeled cross sections using engineering judgment and to ensure a smooth floodway delineation.

4.2 Loy Gulch – Downstream Golf Course Reach - Note – After discussions with the City, the downstream reach of Loy Gulch was not included with the LOMR application. This information has been retained in this report so it can be submitted at a future date.

The updated hydraulic analysis indicated that the physical confluence with Trout Creek did not corresponded to the confluence location shown in the effective FIRM and FIS report. As a result, the effective floodplain boundaries on the right overbank of Trout Creek were redelineated based on effective Base Flood Elevations (BFEs) and the updated topographic contours. The backwater from Trout Creek was mapped over the downstream end of Loy Gulch to achieve a graphical tie-into the updated effective delineation.

The resulting boundary of the 500-year floodplain was narrower than the currently effective 500-year floodplain. However, the Loy Gulch Split to the north indicated that the 500-year floodplain should be delineated conservatively in this area. In addition, the modeling results indicate that there is the potential for more breakout flows for 500-year flood event on the right overbank at HEC-RAS Cross Section 224.6924. It is recommended that the intersection between the Loy Gulch Split and the effective floodplain boundary for the 500-year floodplain is used as the tie-in location for this flood event. This would maintain a conservative floodplain delineation near the confluence with Trout Creek. Because the Loy Gulch Split will be mapped as Shaded Zone X, it is recommended that the streamline and cross section are not added to the annotated FIRM.

The upstream end of Loy Gulch formed a graphical tie-into the effective study at Cross Section 400 from effective LOMR Case# 14-08-0167P. The graphical tie-in was reviewed to ensure the 100-year floodplain, 500-year floodplain, and floodway tied back into the effective delineations within 5% of the effective FIRM scale or 25 feet for the 500 scale FIRM. This review showed the floodplains and

floodway tie back into the effective delineation at the modeled cross section within tolerance at the upstream end of the revision. However, the floodplain shape files were extended past the modeled cross sections to produce a smooth transition back to the effective floodplain delineations.

4.3 Loy Gulch – Upstream Reach

The downstream end of this reach of Loy Gulch ties into the effective floodplain and floodway delineation of effective LOMR Case# 14-08-0167P. This location was chosen because the channel was incised which indicated that the effective floodplain delineation could be reproduced when the starting boundary condition was set to the known water surface elevation. An updated HEC-RAS cross section was cut from the TIN in this location and the known water surface elevations were obtained from the annotated profile 13P which was produced by effective LOMR Case# 14-08-0167P.

In order to achieve a tie-into the effective study for Loy Gulch at the upstream end of the revision reach, the effective geometry for FEMA Lettered Cross Section G was incorporated into the HEC-RAS hydraulic modeling. The effective Cross Section G was selected as the upstream tie-in location because the effective floodplain coincided with the physical channel location in this area.

The resulting 100-year floodplain, 500-year floodplain, and floodway that tied back into the effective delineations within 5% of the effective FIRM scale or 25 feet for the 500 scale FIRM. The floodplains and floodway delineations tie back into the effective delineation at modeled cross sections on the upstream and downstream ends of the revision. However, the floodplain shape files were extended past the modeled cross sections to produce a smooth transition back to the effective floodplain delineations.

At the upstream end of this revision, it appears that the effective streamline does not coincide with the location of the channel. In order to correct this discrepancy without impacting the updated analysis, the revised streamline was extended upstream to tie into the effective streamline at a location that falls within the stream channel. The updated streamline has minimal impact on the reach length when compared to the effective (less than 1 foot difference) so it should have negligible impacts on the effective reach lengths.

4.4 Paint Pony

The effective analysis modeled a combined floodplain for Loy Gulch and Paint Pony starting at Pautte Trail. As a result, this location was chosen as the downstream tie-in location for the Paint Pony floodplain. The modeling for Paint Pony started at normal depth so the floodplain could be defined without influence from Loy Gulch at the confluence. The BFEs from Loy Gulch and Pant Pony were compared at the floodplain confluence and the more conservative BFE was used to delineation the 100-year floodplain delineation. This results in backwater from Loy Gulch being mapped over the downstream end of the Paint Pony floodplain at the confluence. The effective Zone AE floodplain delineation for the combined Loy Gulch/Paint Pony floodplain was redelineated based on effective BFEs and updated topographic information. The 500-year floodplain delineation forms a tie-into the effective delineation where the two floodplains intersect. The intersection of the effective and revised 500-year floodplain delineations were smoothed to produce a more reasonable transition.

The effective streamline for Paint Pony doesn't correspond with the location of the stream channel. An updated streamline was produced that follows the Paint Pony channel to the confluence with the Loy Gulch channel. This updated streamline intersects with the revised section of streamline for Loy Gulch that is described in the previous section. The combined Loy Gulch/Paint Pony floodplain references the

Loy Gulch streamline for profile stationing so updating the Pant Pony streamline would not influence the effective profile for this reach.

The floodplains for Paint Pony Split and Paint Pony Split 2 are mapped as shallow flooding Zone X shaded based on the calculated 500-year flood discharges. The updated 500-year floodplain delineation forms a tie-into the effective 500-year delineation where the two floodplains intersect. The intersection of the effective and revised 500-year floodplain delineations were smoothed to produce a more reasonable transition. At the downstream end of Paint Pony Split 2, the 500-year floodplain delineation was mapped conservatively to show the flow overtopping Valley View Drive in order to combine with the Loy Gulch floodplain. Because the Paint Pony Splits will be mapped as Shaded Zone X, it is recommended that the streamlines and cross sections are not added to the annotated FIRM.

Further upstream on Paint Pony, a separate HEC-RAS model was run to determine the extents of the Paint Pony Overflow floodplain for flow that overtops the detention basin at Kelly's Road. The 100-year floodplain does overtop Kelly's Road but the resulting shallow flooding has average depths less than 1.0 foot so the Paint Pony Overflow can be mapped as a Shaded Zone X floodplain. The floodplain limits were based on the 500-year flood discharge that weir flows over Kelly's Road and the floodplain delineation was smoothed based on engineering judgement. The Paint Pony Overflow rejoins the main channel of Paint Pony at the location of the downstream detention basin outlet.

This updated analysis completely restudies the entire reach of Paint Pony so there is no upstream floodplain tie-in to consider.

4.5 East Fork Paint Pony

The modeling for East Form Paint Pony stated at normal depth so the floodplain could be defined without influence from Paint Pony at the confluence. The BFEs from East Fork Paint Pony and Pant Pony were compared at the confluence and the more conservative BFE was used to delineation the 100-year floodplain delineation. This resulted in a smooth transition between floodplains at the confluence and produced a conservative floodplain delineation. A similar procedure was followed when delineating the floodplain for the 500-year flood.

The updated analysis for East Fork Paint Pony completely restudies the entire effective reach so there is no upstream floodplain tie-in to consider.

V. CONCLUSION

Based on the above discussion and documentation included in this report, we believe that this project is in compliance with FEMA regulations for a Letter of Map Revision request for map changes based on flood hazard information meant to improve upon that shown on the effective FIRM and FIS report. Any questions concerning this LOMR submittal should be addressed to Joe Kuechenmeister, P.E., CFM, by phone at (720)479-3181 or by email JKuechenmeister@mbakerintl.com.