Revise the title to Preliminary Drainage Report.

MASTER DEVELOPMENT DRAINAGE PLAN

FOR

Tract C

CLAREMONT COMMERCIAL SUBDIVISION FILING NO. 2
A RESUBDIVISON OF TRACT OF CLAREMONT BUSINESS PARK FILING NO. 2

EL PASO COUNTY, COLORADO

NOVEMBER 2019

Prepared for:

Hammers Construction, Inc.
1411 Woosley Heights
Colorado Springs, CO 80906
(719) 570-1599
&
Lena Gail Case
c/o Randy Case II
102 E. Pikes Peak Ave, Suite 200
Colorado Springs, CO 80903

Prepared by:

CIVIL CONSULTANTS, INC.

20 Boulder Crescent, Suite 110
Colorado Springs, CO 80903
(719) 955-5485

Project #44-037
PCD - SP-XX-XXX

SP197

Please revise title, typical.

MASTER DEVELOPMENT DRAINAGE PLAN FOR CLAREMONT COMMERCIAL SUBDIVISION FILING NO. 2 A RESUBDIVISION OF TRACT C OF CLAREMONT BUSINESS PARK FILING NO.2 EL PASO COUNTY COLORADO

DRAINAGE PLAN STATEMENTS

ENGINEERS STATEMENT

The attached drainage plan and report was prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

_____
Virgil A. Sanchez, P.E. #37160
For and on Behalf of M&S Civil Consultants, Inc

DEVELOPER'S STATEMENT

I, the developer(s) have read and will comply with all the requirements specified in this drainage report and plan.

BY:_____ BY:_____

TITLE:_____ TITLE:_____
DATE:_____ DATE:_____

ADDRESS: Lena Gail Case
2432 Parkview Lane
Colorado Springs, CO 80903

Hammers Construction, Inc.
1411 Woosley Heights
Colorado Springs, CO 80906

EL PASO COUNTY'S STATEMENT

Filed in accordance with the requirements of El Paso County Land Development Code, Drainage Criteria Manual Volumes 1 and 2, and the Engineering Manual, as amended.

BY:_____ DATE:_____
Jennifer Irvin, P.E.
County Engineer / ECM Administrator

CONDITIONS:

MASTER DEVELOPMENT DRAINAGE PLAN FOR
CLAREMONT COMMERCIAL SUBDIVISION FILING NO. 2
A RESUBDIVISION OF TRACT C OF
CLAREMONT BUSINESS PARK FILING NO.2
EL PASO COUNTY COLORADO

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APPENDIX

MASTER DEVELOPMENT DRAINAGE PLAN FOR CLAREMONT COMMERCIAL SUBDIVISION FILING NO. 2 A RESUBDIVISION OF TRACT C OF CLAREMONT BUSINESS PARK FILING NO.2 EL PASO COUNTY COLORADO

Previous report was approved in December of 2018

PURPOSE

This document is intended to serve as the Master Development Drainage Plan for Claremont Commercial Subdivision Filing No. 2 and will effectively supersede the previously approved Preliminary Drainage Report for Claremont Commercial Subdivision Fil No. 2, A Resubdivision of Tract C of Claremont Buisness (sic) Park Filing No. 2, El Paso County, Colorado previously approved in March of 2018. The purpose of this document is to identify and analyze the onsite drainage patterns and to ensure that post development runoff is routed through the site safely and in a manner that satisfies the requirements set forth by the El Paso County and City of Colorado Springs Drainage Criteria Manual. The proposed principal use for the site will be neighborhood commercial and light industrial. The parcel is zoned by El Paso County for commercial service as CS. This is the preliminary drainage report; a final drainage report shall be required with the final plat. A drainage letter will be required with the development of the individual lots, provided that no significant changes from the approved final drainage report are being proposed.

GENERAL LOCATION AND DESCRIPTION

Claremont Commercial Subdivision Filing No. 2 is located in the Northeast ¼ of the Northeast ¼ of Section 8, and the Southeast ¼ of the Southeast ¼ of Section 5, Township 14 South, Range 65 West of the 6th P.M. in El Paso County, Colorado. The site is bordered to the southeast by U.S. Highway 24 and to the northeast by N. Marksheffel Road, to the north and west by Meadowbrook Parkway, and to the south by a vacant, undeveloped lot. The site lies within the Sand Creek Drainage Basin. Flows from this site are tributary to Sand Creek.

The site consists of 13.7 acres which is currently vacant land with a relatively new roadway infrastructure for Meadowbrook Parkway and associated utilities services directly adjacent to the site. Vegetation is sparse, consisting of native grasses and weeds. Existing site terrain generally slopes from north to southwest at grade rates that vary between 1.2% and 2%. A soil retention wall runs along the eastside of the proposed site, next to U.S. Highway 24 and N. Marksheffel Road, and borders a large portion of the back of the proposed lots. The Claremont Commercial site is currently zoned "CS" and the proposed principal use for the site will be neighborhood commercial and light industrial.

Two sand filter basins will provide water quality treatment for the proposed development. The outlet structures of the proposed water quality ponds will tie into an existing storm sewer system near Meadowbrook Parkway, which routes the treated runoff southwest into Sand Creek. See Appendix for details.

SOILS

Soils for this project are delineated by the map in the appendix as Ellicott Loamy Course Sand (28), Blendon Sandy Loam (10) and Blakeland Loamy Sand (8) and have been characterized as Hydrologic Soil Types "A" & "B". Soils in the study area are shown as mapped by S.C.S. in the "Soils Survey of El Paso County Area". See Appendix for soils report.

HYDROLOGIC CALCULATIONS

Hydrologic calculations were performed using the El Paso County and City of Colorado Springs Storm Drainage Design Criteria manual and where applicable the Urban Storm Drainage Criteria Manual. The Rational Method was used to estimate stormwater runoff anticipated from design storms with 5-year and 100-year recurrence intervals.

HYDRAULIC CALCULATIONS

Hydraulic calculations were estimated using the Manning's Formula and the methods described in the El Paso County and City of Colorado Springs Storm Drainage Design Criteria manual. The relevant data sheets are included in the Appendix of this report.

FLOODPLAIN STATEMENT

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 08041C0756G, revised December 7, 2018. No portion of this site is located within the 100 year floodplain. See Appendix.

The previous page indicates 2 sand filter basins. Please revise.

The drainage plan and recently approved drainage report for adjacent property indicate a 42" RCP along Meadowbrook Pwky. Please revise accordingly.

DRAINAGE CRITERIA

This drainage analysis has been prepared in accordance with the current City of Colorado Springs/El Paso County Drainage Criteria Manual. Calculations were performed to determine runoff quantities for the 5-year and 100-year frequency storms for developed conditions using the Rational Method as required for basins having areas less than 100 acres. See Appendix for calculations.

Please revise your label of the previously approved drainage report as it is not an MDDP. It is a Final Drainage Report.

FOUR STEP PROCESS

Step1 Employ Runoff Reduction Practices –Roof drains will be directed to property lines swales to minimize direct connection of impervious surfaces.

Step 2 Stabilize Drainageways – The site is upstream of an existing 40"/48" RCP storm sewer system that directly discharges to Sand Creek Channel via an outlet structure with wingwalls. The "Final Drainage Report for Claremont Business Park Filing No. 2", dated November 2006, by Matrix Design Group, Inc. (henceforth referred to as "MDDP") has been designed to discharge developed flows via a 48" RCP storm sewer system directly into the East Fork Sand Creek. The Claremont Commercial Filing No. 2 site proposes a Sand Filter Water Quality Facility before flows are discharged to the existing private 40"/48" RCP system east of Meadowbrook Parkway. The outlet underdrain has been designed to drain the pond in a peak event within 12 hours, therefore it's not anticipated to have negative effects on the downstream drainageways.

Step 3 Provide Water Quality Capture Volume – Two Sand Filter Basin water quality facilities are proposed to provide WQCV.

Step4 Consider Need for Industrial and Commercial BMP's – This submittal provides a final grading and erosion control plan with BMPs in place. The proposed project will use silt fence, a vehicle

preliminary GEC has been provided. Final GEC plan will be provided with the final plat. Please revise.

Please include discussion regarding existing pipes/stub outs on the property indicated in the previously approved drainage reports by Matrix and why they were not used.

tracking control pad, a concrete washout area, mulching and reseeding to mitigate the potential for erosion across the site.

Please revise your label of the previously approved drainage report as it is not an MDDP. It is a Final Drainage Report.

EXISTING DRAINAGE CONDITIONS

The CLAREMONT COMMERCIAL Filing No, 2 site consists of 13.7 acres and is situated east of the East Fork Reach of the Sand Creek Watershed. This area was previously studied in the "Final Drainage Report for Claremont Business Park Filing No. 2", dated November 2006, by Matrix Design Group, Inc. (henceforth referred to as "MDDP"). The MDDP calculations indicate that, under the fully developed conditions, the total tributary area of Sub-basins B1, B2, and B3 (18.1 acres), with basin B3 including the eastern half of Meadowbrook Parkway, would produce a cumulative runoff of approximately Q5=42.6 cfs and Q100=86.6 cfs (Design Point 2). The MDDP illustrated that the watershed would drain from east to the southwest towards Meadowbrook Parkway. As stated in the MDDP, overlot grading activities for the entire site have been completed. Per Resolution 16-426 of the BoCC, on-site WQCV is required but on-site stormwater detention is not required per the FDR for Claremont Business Park Fil. 2.

A 48" public storm sewer runs along Woolsey Heights and is routed directly to the Sand Creek channel. Two 10' Type R at grade inlets exist at the intersection of Woolsey Heights and Meadowbrook Parkway, one on the northwest and the other on the northeast corner of the intersection. Runoff from the site and the two surrounding streets, Meadowbrook Parkway and Woolsey Heights, is intercepted by these inlets and conveyed to the Sand Creek channel via the existing 48" public storm sewer.

Refer to the drainage basin descriptions that follow for additional information as well as the Drainage Map located within the Appendix of this report.

Please indicate who owns the private storm sewer.

revise sentence accordingly.

PROPOSED DRAINAGE CHARACTERISTICS

General Concept Drainage Discussion

The majority of the site will consist of neighborhood commercial and light industrial, asphalt, curb, two storm water quality sand filter basins, and landscaping. The site will typically drain using across asphalt and impermeable surfaces which direct runoff primarily to the south and southwest to proposed private pipe systems which direct runoff to one of two private ponds. The outlet structures of the proposed water quality ponds will release runoff to the existing private 42" RCP storm sewer located at the southwest corner of the site. A survey and inspection of the existing 42" RCP shall be made before use. The existing private 42" storm sewer ties into an existing public 48" storm sewer which will route the treated runoff to Sand Creek. For more information of drainage basins, existing and proposed structures refer to the Proposed Drainage Map located within the Appendix of this report.

Detailed Drainage Discussion

Basin A, 0.19 acres, consists of steep slopes of 32% adjacent to portions of U.S Highway 24 and N. Marksheffel Rd. The roadway embankment within **Basin A** slopes into a soil retention wall that runs along the south east boundary of the site. Runoff for **Basin A** is limited has been calculated to reach peak flow rates of Q5=0.1 cfs and Q100=0.6 cfs. Flows produced within the basin will be conveyed westward into adjacent basins (**Basin B**) as sheet flow.

Basin B, 1.39 acres, consists of Lot 11 along the northeast corner of the proposed site. Runoff produced within **Basin B** is anticipated to reach peak runoff rates of Q5=5.5 cfs and Q100=10.1 cfs. A proposed private 24" polyethylene storm drain (**Pipe 1**) will be extended to **Design Point 1**(Q5=5.5 cfs and Q100=10.1 cfs) to capture runoff from **Basins A** and **B**.

Please also include in your narrative how your proposed flows entering the existing storm system compare to the previously approved drainage report from Matrix. State whether or not the existing facilities are adequate. Please take into account the recently approved drainage report from the lot to the south (PCD file no. PPR192) that will also tie into this existing system.

The acreage shown on the drainage plan does not match the narrative. Revise so that they match.

The lot designations do not match what is shown on the preliminary plan please revise so that they match.

Basin C, 0.30 acres, consists of portion of steep slopes of up to 33% that lie adjacent to portions of U.S Highway 24. Similar to **Basin A**, the roadway embankment within **Basin C**, slopes into a soil retention wall that runs along the eastern boundary. Runoff for **Basin C** has been calculated to reach peak flow rates of Q5=0.1 cfs and Q100=1.0 cfs. The limited runoff produced is assumed to be conveyed westward into adjacent **Basin D** as sheet flow.

Basin D, 1.39 acres, consists of Lot 10 along the eastern boundary of the proposed site. Runoff produced within **Basin D** is anticipated to reach peak runoff rates of Q5=6.3 cfs and Q100=11.5 cfs. A proposed private 24" polyethylene storm drain (**Pipe 2**) will be extended to **Design Point 2**(Q5=6.4 cfs and Q100=12.4 cfs) to capture runoff from **Basins C** and **D**. Runoff collected within Pipes 1 and 2 will be routed to a proposed private water quality pond via a private 30" polyethylene storm drain (**Pipe 3**) at peak flow rates of Q5=11.8 cfs and Q100=22.6 cfs. A small riprap pad will be required to reduce velocities prior to entering the pond.

Include in your narrative a discussion regarding the swale shown between basin D and basin I.

Basin E, 1.39 acres, consists of Lot 9 and a portion of the planned private access entrance, which is located adjacent to a portion of Meadowbrook Parkway. Runoff produced within **Basin E** is anticipated to reach peak runoff rates of Q5=6.5 cfs and Q100=11.8 cfs. A proposed private 24" polyethylene storm drain (**Pipe 4**) will be extended from the private pond to collect runoff reaching **Design Point 3**(Q5=5.5 cfs and Q100=10.1 cfs).

Basin F, 0.36 acres, consists of a land (Tract B) which is dedicated to house a proposed private onsite Sand Filter Basin Water Quality Pond (**Pond 1**) adjacent to existing Meadowbrook Parkway. Runoff produced within **Basin F** will ultimately combine with flows entering the pond via **Pipes 3** and **4** at **Design Point 4**. The total flow anticipated to reach the pond (**DP4**) is calculated by the rational method to be Q5=18.2 cfs and Q100=35.0 cfs. Using the UD-Detention worksheet, flows treated via the Sand Filter Basin are to be discharged through a 6.0' x 2.91' CDOT Modified Type D outlet structure and proposed private 24" polyethylene Storm Sewer (Pipe Runs 5, 5.1, 5.2). The proposed pond shall be constructed with 4:1 SS and is anticipated to store 0.095, 0.155 and 0.183 ac-ft and discharge 0.1 cfs, 7.2 cfs, and 15.5 cfs in the water quality, 5 year and 100 year events respectively. The emergency spillway shall be designed to discharge the peak inflow safely to Meadowbrook Parkway in the event that the inlet would become clogged. Runoff conveyed in Pipe 5.2 will combine with flows from a second onsite pond, prior to being discharged downstream via an existing 42" RCP storm sewer.

Basin G, 0.27 acres, consists of a landscaping strip running alongside and adjacent to Meadowbrook Parkway and a small section of pavement associated with site access. Excluding the small section of street the basin consists primarily of trees, bushes/grasses, and decorative ground cover. Low runoff values produced by Basin Q of Q5=0.5 cfs and Q100=1.3 cfs will travel as sheet flow into Meadowbrook Parkway.

Should this be G?

Pipe 7 is indicated as 30" on the drainage plan. Revise accordingly.

Basin H, 0.71 acres, consists of steep slopes of up to 33% adjacent to portions of U.S Highway 24. The roadway embankment within **Basin H** slopes into a soil retention wall that runs along the south east boundary of the site. Runoff for **Basin H** has been calculated to reach peak flow rates of Q5=0.3 cfs and Q100=2.0 cfs. Flows produced within the basin will be conveyed westward into adjacent basins (**Basin I**) as sheet flow.

Basin I, 2.75 acres, consists of Lots 5 and 6, portions of Lots 2-4 and 7 and section of proposed private street, which is generally located within the center of the proposed site. Runoff produced within **Basin I** is anticipated to reach peak runoff rates of Q5=9.8 cfs and Q100=17.9 cfs. Runoff from the **Basins H** and **I** shall be conveyed via side lot swales and curb and gutter to a proposed private street and a pair of proposed CDOT Type R at grade inlets located at **Design Point 5** (Q5=10.1 cfs and Q100=19.8 cfs). Runoff intercepted by the inlets will be conveyed south to a second proposed water quality pond via proposed private 24" polyethylene **Pipes 6** and **7** at 5 year flow rates of 6.4 cfs and 10.1 cfs and at 100 year flow rates of 10.6 and 16.6 cfs respectively. Runoff bypassing the inlets will continue west within the street to **Design Point 6.**

also includes lot 8

The flow should be greater in pipes 10 and 10.1 as flow from pipe 9 should also be included as stated in your narrative. Revise accordingly.

Basin J, 1.05 acres, consists of portions of Lots 1, 2 and 7 and a segment of the proposed street, which is located along the western edge of the proposed site. Runoff produced within **Basin J** is anticipated to reach peak runoff rates of Q5=4.4 cfs and Q100=8.0 cfs. Runoff from the **Basins J** and flow-by from **DP5** shall intercepted by a pair of proposed CDOT Type R at grade inlets located at **Design Point 6**(Q5=4.4 cfs and Q100=11.2 cfs). Runoff intercepted by the proposed inlets will be conveyed south to a second proposed water quality pond via proposed private 18" and 24" polyethylene **Pipes 8** and **9** at 5 year flow rates of 2.8 cfs and 4.4 cfs and at 100 year flow rates of 6.9 and 11.0 cfs respectively. Based upon the preliminary assumptions, approximately 0.1 cfs will bypass DP6 and will be continue within the curb and gutter to the adjacent street in the 100 year event.

Basin K, 0.42 acres, consists of the rear halves of Lots 1 and 2, which is generally located along the southwest corner of the proposed site. Runoff produced within **Basin K** is anticipated to reach peak runoff rates of Q5=1.8 cfs and Q100=3.2 cfs. Runoff from the **Basins K** can be conveyed to a manhole at the southwest corner of Lot 1 which can be fitted with a beehive style grate or inlet. Runoff collected at the local depression would combine with flows in **Pipe 9** and continue to the proposed water quality pipe via pipes 10 and 10.1 at peak flow rates of 2.8 cfs and 4.4 cfs in the 5 and 100 year storm events.

Basin L, 1.32 acres, consists of steep slopes of 32% adjacent to portions of U.S Highway 24. The roadway embankment within **Basin L** slopes into a soil retention wall that runs along the south east boundary of the site. Runoff for **Basin L** has been calculated to reach peak flow rates of Q5=0.5 cfs and Q100=3.5 cfs. Flows produced within the basin will be conveyed westward into adjacent basins (**Basin M**) as sheet flow.

Basin M, 1.84 acres, consists of a portion of Lots 3 and 4, which is generally located along the south and southeast sides of the proposed site. Runoff produced within **Basin M** is anticipated to reach peak runoff rates of Q5=6.7 cfs and Q100=12.2 cfs. Runoff from the **Basins L** and **M** shall be conveyed to a proposed line swale or pipe system that will extend out of proposed WQ Pond 2. Peak runoff reaching **Design Point 8** is anticipated to have peak flow rates of Q5=7.2 cfs and Q100=15.7 cfs. The proposed swale would need to be a minimum of 1.5' deep at 0.5% using a 2' bottom width and 3:1 side slopes. A riprap rundown and pad would need to be required to arrest flows entering the pond. Should a pipe system be extend it would likely be a minimum of 24".

Basin N, 0.47 acres, consists of a land (Tract A) which is dedicated to house a proposed private onsite Sand Filter Basin Water Quality Pond (**Pond 2**) adjacent to existing Meadowbrook Parkway. Runoff produced within **Basin N** will ultimately combine with flows entering the pond via **Pipes 7, 10.1** and from the Swale **(DP8)**. The total flow anticipated to reach the pond (**Design Point 9**) is calculated by the rational method to be Q5=18.5 cfs and Q100=38.4 cfs. Using the UD-Detention worksheet, flows treated via the Sand Filter Basin are to be discharged through a 7.0' x 2.91' CDOT Modified Type D outlet structure and proposed private 24" polyethylene Storm Sewer (Pipe Run 11). The proposed pond shall be constructed with 4:1 SS and is anticipated to store 0.120, 0.196 and 0.298 ac-ft and discharge 0.2 cfs, 11.0 cfs, and 23.1 cfs in the water quality, 5 year and 100 year events respectively. The emergency spillway shall be designed to discharge the peak inflow safely to Meadowbrook Parkway in the event that the inlet would become clogged. Runoff conveyed in Pipe 11 will combine with flows within Pipe 5.2, prior to being discharged downstream via an existing 42" RCP storm sewer and into the backside of the existing 10' Type R at grade inlet along existing Woolsey Heights and then to the west via an existing 48" storm sewer.

Basin O, 0.16 acres, consists of a landscaping strip running alongside and adjacent to Meadowbrook Parkway. The basin will most likely be composed of trees, bushes/grasses, and decorative ground cover. Low runoff values produced by **Basin O** of Q5=0.2 cfs and Q100=0.6 cfs will travel as sheet flow into Meadowbrook Parkway.

Basin P, 0.03 acres, consists of steep slopes of up to 33% adjacent to portions of U.S Highway 24. The roadway embankment within **Basin P** slopes into a soil retention wall that runs along the south east boundary of the site. Runoff for **Basin P** has been calculated to reach peak flow rates of Q5=0.0 cfs and Q100=0.1 cfs. Flows produced within the basin will be conveyed westward into adjacent basins (**Basin Q**) as sheet flow.

Basin Q, 0.11 acres, consists of a thin utility corridor alongside the south boundary of the site. The basin will most likely be composed native ground cover. Low runoff values produced by Basin Q of Q5=0.0 cfs and Q100=0.3 cfs will combine with flows from **Basin P** and will discharge to adjacent site to the south as sheet flow.

There are no planned or required improvements to the Sand Creek Drainage Channel with the development of the CLAREMONT COMMERCIAL site.

WATER QUALITY PROVISIONS AND MAINTENANCE

The subject site was previously analyzed within the Final Drainage Report for Claremont Business Park Filing No. 2 prepared by Matrix Design Group approved April 24, 2006. Per Resolution 16-426 of the BoCC, on-site WQCV is required but on-site stormwater detention is not required per the FDR for Claremont Business Park Fil. 2. The water quality volume required for the site has been determined using the UDFCD UD-Detention workbook per the guidelines set forth in the City of Colorado Springs/El Paso County Drainage Criteria Manual - Volume II.

As previously discussed water quality for the site is provided by two proposed Sand Filter Basins (SFB). Pond 1 is designed to treat runoff from approx 5.33 acres, by providing 0.095 acre-feet of water quality storage, while Pond 2 will runoff from approx 8.57 acres, by providing 0.120 acre-feet of water quality storage.

will treat runoff

Flows tributary to the two SFBs are released through outlet structures into an existing storm sewer system located along Meadowbrook Parkway. The water quality basins will be private and shall be maintained by the property owner. Access shall be granted to the owner and El Paso County for access and maintenance of the private WQCV facility. A private maintenance agreement document shall accompany the final drainage report(s) submittal(s) which construct the two pond

Per County criteria water quality must be provided for 100% of the site. ECM section I.7.1.C.1 indicates that 20% of site, not to exceed 1 acre may be excluded. Provide discussion regarding the proposed basins that will not be treated and ensure that the total will not exceed 1 acre.

EROSION CONTROL

It is the policy of the El Paso County that we submit a grading and erosion control plan with the drainage report. Proposed silt fence, vehicle traffic control, and concrete washout area are proposed as erosion control measures.

CONSTRUCTION COST OPINION

Private Drainage Facilities (NON-Reimbursable):

Item	Description	Quantity	Unit Cost	Cost
1.	18" PP	48 LF	$40 /LF	$1,920.00
2.	24" PP	1327 LF	$48 /LF	$63,696.00
3.	30" PP	126 LF	$65 /LF	$8,190.00

4.	At Grade Inlets (Type R) L=15'	4	EA	$7,200	/EA	$28,800.00
5.	Manholes	5	EA	$4,000	/EA	$20,000.00
6.	WQCV Sand Filter Pond	2	EA	$19,000	/EA	$38,000.00
					Total	**$160,606.00**

M & S Civil Consultants, Inc. (M & S) cannot and does not guarantee the construction cost will not vary from these opinions of probable costs. These opinions represent our best judgment as design professionals familiar with the construction industry and this development in particular. The above is only an estimate of the facility cost in 2018.

Please state that drainage fees were previously paid for this property.

DRAINAGE & BRIDGE FEES

This site is in the Sand Creek Drainage Basin. The site is proposed to be subdivided into sixteen commercial lots. Since the property was previously platted as Tract C of Claremont Business Park Filing No. 2 (Reception No. 207712506), no additional Drainage Bridge and/or Pond fees are required. In the appendix, see "Final Drainage Report for Claremont Business Park Filing No. 2", Revised November 2006, by Matrix Design Group, Inc, for previously paid drainage and bridge fees.

the drainage fees section of the Matrix report was not included. Please include in the appendix.

SUMMARY

Development of Claremont Commercial Subdivision Filing No. 2 will not adversely affect the surrounding development. The proposed drainage facilities will adequately convey, detain and route runoff from the onsite & offsite flows to existing facilities. All drainage facilities described herein and shown on the included Proposed Drainage Map (See Appendix) are subject to change being dependent upon individual lot development. Care will be taken to accommodate overland emergency flow routes on site and temporary drainage conditions.

REFERENCES

1.) "El Paso County and City of Colorado Springs Drainage Criteria Manual".

2.) "Urban Storm Drainage Criteria Manual"

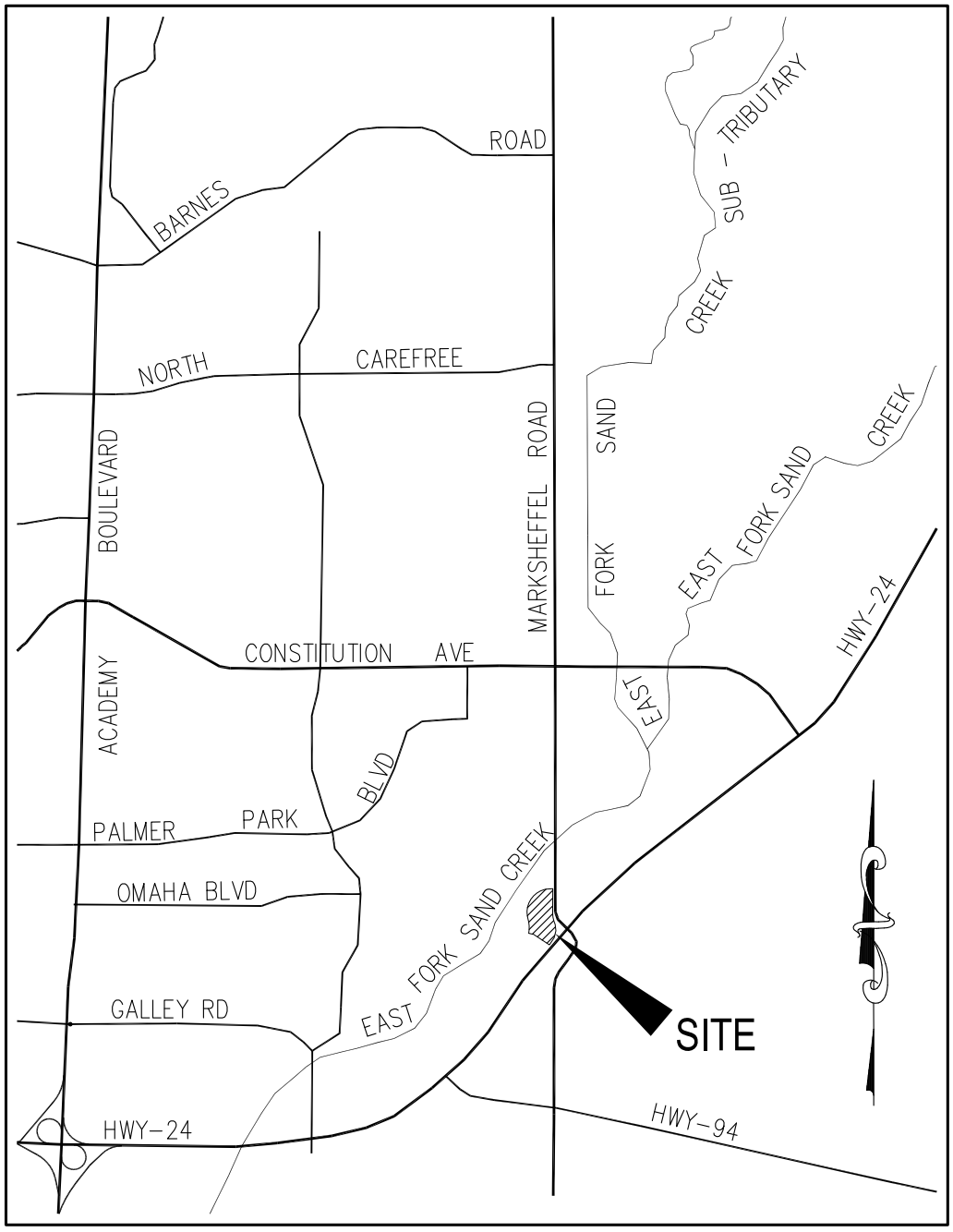
3.) SCS Soils Map for El Paso County.

4.) Flood Insurance Rate Map (FIRM), Federal Emergency Management Agency, Effective date December 7, 2018.

5.) "Final Drainage Report for Claremont Business Park Filing No. 2", dated November 2006, by Matrix Design Group, Inc.

APPENDIX

VICINITY MAP



VICINITY MAP

N.T.S.

M&S CIVIL CONSULTANTS, INC.
20 BOULDER CRESCENT, SUITE 110
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

SOILS MAP

Summary by Map Unit — El Paso County Area, Colorado (CO625)

Map unit symbol	Map unit name	Rating
8	Blakeland loamy sand, 1 to 9 percent slopes	A
10	Blendon sandy loam, 0 to 3 percent slopes	B
28	Ellicott loamy coarse sand, 0 to 5 percent slopes	A

CLAREMONT COMMERCIAL FILING NO. 2

HYDROLOGIC TYPE A SOILS

HYDROLOGIC TYPE B SOILS

SITE BOUNDARY

NOT TO SCALE

SOILS MAP

M&S CIVIL CONSULTANTS, INC.

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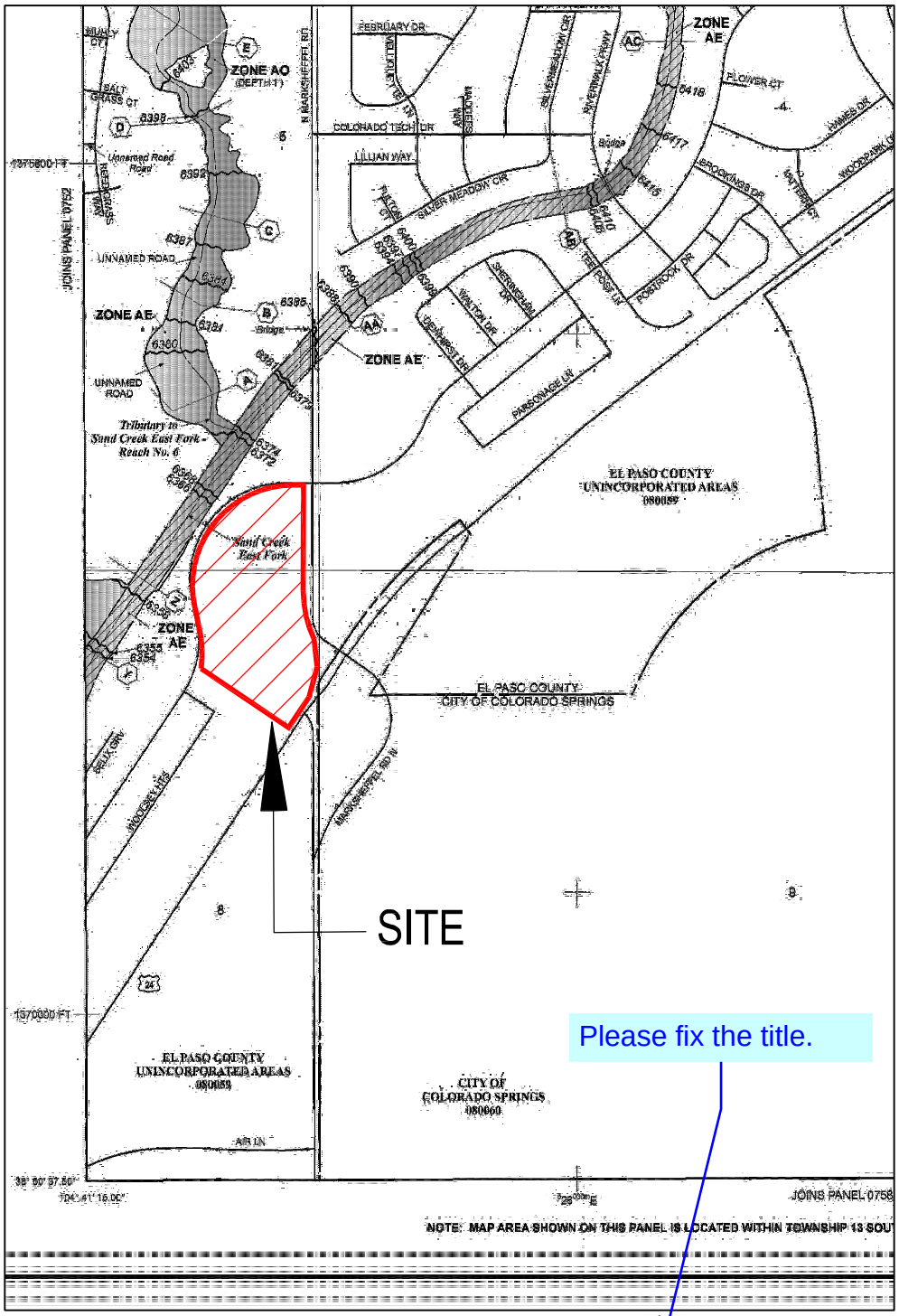
FIRM PANEL W/ REVISED LOMR



CLAREMONT COMMERCIAL FILING NO. 3

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- ZONE A — No Base Flood Elevations determined.
- ZONE AE — Base Flood Elevations determined.
- ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
- ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.
- ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988 (NAVD 88)

- A — A — Cross section line
- 23 — 23 — Transect line
- 97° 07' 30.00", 32° 22' 30.00" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4276000 mN — 1000-meter Universal Transverse Mercator grid ticks, zone 13
- 6000000 FT — 5000-foot grid ticks: Colorado State Plane coordinate system, central zone (FIPSZONE 0502), Lambert Conformal Conic Projection
- DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M1.6 — River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
MARCH 17, 1997

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
DECEMBER 7, 2018 - to update corporate limits, to change Base Flood Elevations and Special Flood Hazard Areas, to update map format, to add roads and road names, and to incorporate previously issued Letters of Map Revision.

For community map revision history prior to countywide mapping, refer to the Community Map History Table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

LEGEND

SITE BOUNDARY

NFIP — NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0756G

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 756 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0756	G
EL PASO COUNTY	080059	0756	G

*Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

MAP NUMBER
08041C0756G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

Please provide a legible FIRM Map

NOT TO SCALE

FIRM MAP

M&S CIVIL CONSULTANTS, INC.

O:\44037A-CBP F2-Lots 1-8\44037A-CBP F2-Lots 1-8\dwg\Eng Exhibits\44037 FIRM Claremont.dwg 11/22/2019 12:31 PM

HYDROLOGIC CALCULATIONS

Please update the title

MDDP CLAREMONT COMMERICAL FILING NO. 2
PROPOSED DRAINAGE CALCULATIONS
(Area Runoff Coefficient Summary)

			ROOFS 0.73-0.81 COMMERCIAL AREAS 0.81-0.88 ASPHALT DRIVES 0.90-0.96			*LANDSCAPED AREAS 0.16-0.41 GRAVEL STORAGE YARD 0.30-0.50 LIGHT INDUST AREAS 0.59-0.70*			*PARKS 0.12-0.39 GREENBELTS/AGRI. 0.09-0.36*			*WEIGHTED*	
BASIN	**TOTAL AREA** *(SF)*	**TOTAL AREA** *(Acres)*	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**AREA** *(Acres)*	**C_5**	**C_{100}**	**C_5**	**C_{100}**
A	*8359.6*	**0.19**	0.00	0.73	0.81	0.00	0.30	0.50	0.19	0.09	0.36	***0.09***	***0.36***
B	*60660.5*	**1.39**	1.39	0.81	0.88	0.00	0.59	0.70	0.00	0.30	0.50	***0.81***	***0.88***
C	*13279.8*	**0.30**	0.00	0.81	0.88	0.00	0.59	0.70	0.30	0.09	0.36	***0.09***	***0.36***
D	*66703.6*	**1.53**	1.53	0.81	0.88	0.00	0.59	0.70	0.00	0.09	0.36	***0.81***	***0.88***
E	*67533.9*	**1.55**	1.55	0.81	0.88	0.00	0.59	0.70	0.00	0.09	0.36	***0.81***	***0.88***
F	*15781.4*	**0.36**	0.00	0.73	0.81	0.00	0.30	0.50	0.36	0.12	0.39	***0.12***	***0.39***
G	*12722.3*	**0.29**	0.06	0.90	0.96	0.23	0.16	0.41	0.00	0.09	0.36	***0.32***	***0.53***
H	*31099.0*	**0.71**	0.00	0.90	0.96	0.00	0.16	0.41	0.71	0.09	0.36	***0.09***	***0.36***
I	*119584.6*	**2.75**	2.75	0.81	0.88	0.00	0.30	0.50	0.00	0.12	0.39	***0.81***	***0.88***
J	*45863.7*	**1.05**	1.05	0.81	0.88	0.00	0.30	0.50	0.00	0.09	0.36	***0.81***	***0.88***
K	*18476.1*	**0.42**	0.42	0.81	0.88	0.00	0.30	0.50	0.00	0.09	0.36	***0.81***	***0.88***
L	*57315.2*	**1.32**	0.00	0.81	0.88	0.00	0.30	0.50	1.32	0.09	0.36	***0.09***	***0.36***
M	*80126.1*	**1.84**	1.84	0.81	0.88	0.00	0.30	0.50	0.00	0.09	0.36	***0.81***	***0.88***
N	*20642.4*	**0.47**	0.00	0.81	0.88	0.00	0.16	0.41	0.47	0.12	0.39	***0.12***	***0.39***
O	*6997.2*	**0.16**	0.02	0.90	0.96	0.00	0.30	0.50	0.14	0.12	0.41	***0.22***	***0.48***
P	*1393.0*	**0.03**	0.00	0.81	0.88	0.00	0.30	0.50	0.03	0.09	0.36	***0.09***	***0.36***
Q	*4961.4*	**0.11**	0.00	0.90	0.96	0.00	0.30	0.50	0.11	0.09	0.36	***0.09***	***0.36***

Calculated by: DLM
Date: 11/19/2019
Checked by: VAS

MDDP CLAREMONT COMMERICAL FILING NO. 2
PROPOSED DRAINAGE CALCULATIONS
(Area Drainage Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*STREET / CHANNEL FLOW*				*Time of Travel (T_t)*		*INTENSITY **		*TOTAL FLOWS*	
BASIN	**AREA TOTAL**	**C_5**	**C_{100}**	**C_5**	**Length**	**Height**	**T_C**	**Length**	**Slope**	**Velocity**	**T_t**	**TOTAL**	**CHECK**	**I_5**	**I_{100}**	**Q_5**	**Q_{100}**
	(Acres)	*From DCM Table 5-1*			*(ft)*	*(ft)*	*(min)*	*(ft)*	*(%)*	*(fps)*	*(min)*	*(min)*	*(min)*	*(in/hr)*	*(in/hr)*	*(c.f.s.)*	*(c.f.s.)*
A	0.19	0.09	0.36	0.09	40	5.0	5.0	0	0.0%	0.0	0.0	5.0	10.2	5.2	8.7	***0.1***	***0.6***
B	1.39	0.81	0.88	0.81	80	1.0	4.4	250	1.6%	2.5	1.7	6.0	11.8	4.9	8.2	***5.5***	***10.1***
C	0.30	0.09	0.36	0.09	40	8.0	4.3	0	0.0%	0.0	0.0	4.3	10.2	5.2	8.7	***0.1***	***1.0***
D	1.53	0.81	0.88	0.81	60	1.2	3.2	350	2.0%	2.8	2.1	5.3	12.3	5.1	8.5	***6.3***	***11.5***
E	1.55	0.81	0.88	0.81	60	1.2	3.2	167	2.0%	2.8	1.0	4.2	11.3	5.2	8.7	***6.5***	***11.8***
F	0.36	0.12	0.39	0.12	60	1.2	10.9	30	33.0%	11.5	0.0	10.9	10.5	4.1	6.8	***0.2***	***1.0***
G	0.29	0.32	0.53	0.32	25	0.5	5.6	0	0.0%	0.0	0.0	5.6	10.1	5.0	8.4	***0.5***	***1.3***
H	0.71	0.09	0.36	0.09	100	17.0	7.2	0	0.0%	0.0	0.0	7.2	10.6	4.6	7.8	***0.3***	***2.0***
I	2.75	0.81	0.88	0.81	60	1.2	3.2	425	2.0%	1.4	5.0	8.2	12.7	4.4	7.4	***9.8***	***17.9***
J	1.05	0.81	0.88	0.81	60	1.2	3.2	200	2.0%	2.8	1.2	4.4	11.4	5.2	8.7	***4.4***	***8.0***
K	0.42	0.81	0.88	0.81	60	1.2	3.2	175	2.0%	2.8	1.0	4.3	11.3	5.2	8.7	***1.8***	***3.2***
L	1.32	0.09	0.36	0.09	120	17.0	8.3	0	0.0%	0.0	0.0	8.3	10.7	4.4	7.4	***0.5***	***3.5***
M	1.84	0.81	0.88	0.81	100	1.0	5.2	400	1.5%	2.4	2.7	8.0	12.8	4.5	7.5	***6.7***	***12.2***
N	0.47	0.12	0.39	0.12	60	1.2	10.9	30	33.0%	11.5	0.0	10.9	10.5	4.1	6.8	***0.2***	***1.3***
O	0.16	0.22	0.48	0.22	25	0.5	6.3	0	0.0%	0.0	0.0	6.3	10.1	4.8	8.1	***0.2***	***0.6***
P	0.03	0.09	0.36	0.09	120	17.0	8.3	0	0.0%	0.0	0.0	8.3	10.7	4.4	7.4	***0.0***	***0.1***
Q	0.11	0.09	0.36	0.09	25	0.5	7.1	0	0.0%	0.0	0.0	7.1	10.1	4.6	7.8	***0.0***	***0.3***

* Intensity equations assume a minimum travel time of 5 minutes.

Calculated by: DLM
Date: 11/19/2019
Checked by: VAS

Per DCM ch 6, length of overland flow is max 100 ft. for urban land uses. Revise accordingly.

MDDP CLAREMONT COMMERICAL FILING NO. 2
PROPOSED DRAINAGE CALCULATIONS
(Basin Routing Summary)

From Area Runoff Coefficient Summary				*OVERLAND*				*PIPE / CHANNEL FLOW*				*Time of Travel (T_t)*	*INTENSITY **		*TOTAL FLOWS*		
DESIGN POINT	**CONTRIBUTING BASINS** *DPS AND/OR PIPES*	**CA_5**	**CA_{100}**	**C_5**	**Length** *(ft)*	**Height** *(ft)*	**T_C** *(min)*	**Length** *(ft)*	**Slope** *(%)*	**Velocity** *(fps)*	**T_t** *(min)*	**TOTAL** *(min)*	**I_5** *(in/hr)*	**I_{100}** *(in/hr)*	**Q_5** *(c.f.s.)*	**Q_{100}** *(c.f.s.)*	COMMENTS
1	**A, B**	1.15	1.29	TAKEN FROM BASIN B								6.0	4.9	8.2	***5.6***	***10.6***	Proposed PVT 24" Storm Sewer
2	**C, D**	1.27	1.46	TAKEN FROM BASIN D								5.3	5.1	8.5	***6.4***	***12.4***	Proposed PVT 24" Storm Sewer
3	**E**	1.26	1.36	TAKEN FROM BASIN E (Adj to Min Tc)								5.0	5.2	8.7	***6.5***	***11.8***	Proposed PVT 24" Storm Sewer
4	**F, DP 1-3**	3.71	4.26	TAKEN FROM DESIGN POINT 1								6.0	4.9	8.2	***18.2***	***35.0***	PVT Sand Filter Basin FSD Pond 1
5	**H, I**	2.29	2.67	TAKEN FROM BASIN I								8.2	4.4	7.4	***10.1***	***19.8***	10' and 15' Type R Inlets (assumed split flows)
6	**J, FB DP5**	0.85	1.29	TAKEN FROM BASIN J (Adj to Min Tc)								5.0	5.2	8.7	***4.4***	***11.2***	10' and 15' Type R Inlets (assumed split flows)
7	**K**	0.34	0.37	TAKEN FROM BASIN K (Adj to Min Tc)								5.0	5.2	8.7	***1.8***	***3.2***	Manhole w/ Grate
8	**L, M**	1.61	2.09	TAKEN FROM BASIN M								8.0	4.5	7.5	***7.2***	***15.7***	PVT Swale or PVT 24" Storm Sewer
9	**DP5, DP7, DP8, N**	4.30	5.32	TAKEN FROM DESIGN POINT 8								8.0	4.5	7.5	***19.2***	***40.0***	PVT Sand Filter Basin FSD Pond 2

Calculated by: DLM
Date: 11/19/2019
Checked by: VAS

This design point should also include flow from design point 6.

MDDP CLAREMONT COMMERICAL FILING NO. 2
PROPOSED DRAINAGE CALCULATIONS
(Storm Sewer Routing Summary)

pipe run 6

PIPE RUN	Contributing Pipes/Design Points	Equivalent CA_5	Equivalent CA_{100}	Maximum T_C	Intensity* I_5	Intensity* I_{100}	Flow Q_5	Flow Q_{100}	Pipe Size
1	DP1	1.15	1.29	6.0	5.2	8.7	6.5	11.8	PROP 24" PP
2	DP2	1.27	1.46	5.3	5.1	8.5	6.4	12.4	PROP 24" PP
3	PR1, PR2	2.41	2.75	6.0	4.9	8.2	11.8	22.6	PROP 30" PP
4	DP3	1.26	1.36	5.0	5.2	8.7	6.5	11.8	PROP 24" PP
5	POND 1 OUTFALL	1.48	1.89	6.0	4.9	8.2	7.2	15.5	PROP 24" PP
5.1	PIPE 5	1.48	1.89	6.0	4.9	8.2	7.2	15.5	PROP 24" PP
5.2	PIPE 5.1	1.48	1.89	6.0	4.9	8.2	7.2	15.5	PROP 24" PP
6	INLET 1	1.44	1.43	8.2	4.4	7.4	6.4	10.6	PROP 24" PP
7	PIPE 1, INLET 2	2.28	2.24	8.2	4.4	7.4	10.1	16.6	PROP 30" PP
8	INLET 3	0.55	0.80	5.0	5.2	8.7	2.8	6.9	PROP 18" PP
9	PIPE 8, INLET 4	0.86	1.27	5.0	5.2	8.7	4.4	11.0	PROP 24" PP
10	PIPE 9, DP7	1.20	1.64	5.0	5.2	8.7	6.2	14.3	PROP 24" PP
10.1	PIPE 10	1.20	1.64	5.0	5.2	8.7	6.2	14.3	PROP 24" PP
11	POND 2 OUTFALL	2.45	3.07	8.0	4.5	7.5	11.0	23.1	PROP 30" PP
12	PR5.2, PR11	3.93	4.50	8.0	4.5	7.5	17.6	33.8	PROP 24" PP

* Intensity equations assume a minimum travel time of 5 minutes.

DP - Design Point
PR - Pipe Run
FB- Flow By from Design Point
INT- Intercepted Flow from Design Point

Calculated by: DLM
Date: 11/20/2019
Checked by: VAS

existing 42" pipe?

HYDRAULIC CALCULATIONS / SFB WQCV CALCULATIONS

CLAREMONT COMMERICAL FILING NO. 2 (PROPOSED CONDITIONS)

Weighted Percent Imperviousness of Proposed WQ Sand Filter Basin 1				
Contributing Basins	***Area (Acres)***	***C_5***	***Impervious % (I)***	***(Acres)*(I)***
A	0.19	0.09	2	0.38
B	1.39	0.81	95	132.29
C	0.30	0.09	2	0.61
D	1.53	0.81	95	145.47
E	1.55	0.81	95	147.28
F	0.36	0.12	7	2.54
Totals	***5.33***			***428.58***
Imperviousness % to FSD	***80.4***			

1.77 A soils 33%
3.57 B soils 67%
5.33 total area

Revise title

Revise the title to match the other calculation sheets which indicate Claremont Commercial.....

Claremont Bus. Park Filing No. 2

MASTER DEVELOPMENT DRAINAGE PLAN CALCULATIONS

(Pond Volume Calculation)

WQCV POND 1

Elevation	SF	CF	Storage AF	Storage Sum
6373.00	3,690.00	0.00	0.00	0.00
6374.00	4,280.00	3,985.00	0.09	0.09
6375.00	6,051.00	5,165.50	0.12	0.21
6376.00	7,382.00	6,716.50	0.15	0.36
6376.50	8,085.00	3,866.75	0.09	0.45

Total = 19,734 CF

Total = 0.5 Ac-ft

Calculated by: DLM

Date: 11/20/2019

Checked by:

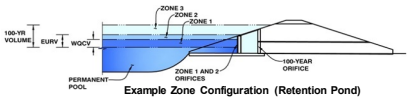
Please use the latest UD detention worksheet by Urban Drainage. Note that the hydraulics and pond design will be reviewed with the final drainage report.

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Claremont Commercial Filing No. 2

Basin ID: WQ Pond 1



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	SF		
Watershed Area =	5.33	acres	
Watershed Length =	735	ft	
Watershed Slope =	0.016	ft/ft	
Watershed Imperviousness =	80.40%	percent	
Percentage Hydrologic Soil Group A =	33.0%	percent	
Percentage Hydrologic Soil Group B =	67.0%	percent	
Percentage Hydrologic Soil Groups C/D =	0.0%	percent	
Desired WQCV Drain Time =	12.0	hours	
Location for 1-hr Rainfall Depths =	User Input		
Water Quality Capture Volume (WQCV) =	0.118	acre-feet	
Excess Urban Runoff Volume (EURV) =	0.505	acre-feet	
2-yr Runoff Volume (P1 = 1.19 in.) =	0.398	acre-feet	
5-yr Runoff Volume (P1 = 1.5 in.) =	0.522	acre-feet	
10-yr Runoff Volume (P1 = 1.75 in.) =	0.640	acre-feet	
25-yr Runoff Volume (P1 = 2 in.) =	0.772	acre-feet	
50-yr Runoff Volume (P1 = 2.25 in.) =	0.881	acre-feet	
100-yr Runoff Volume (P1 = 2.52 in.) =	1.021	acre-feet	
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet	
Approximate 2-yr Detention Volume =	0.375	acre-feet	
Approximate 5-yr Detention Volume =	0.492	acre-feet	
Approximate 10-yr Detention Volume =	0.603	acre-feet	
Approximate 25-yr Detention Volume =	0.668	acre-feet	
Approximate 50-yr Detention Volume =	0.706	acre-feet	
Approximate 100-yr Detention Volume =	0.749	acre-feet	

Optional User Override 1-hr Precipitation

1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

Stage-Storage Calculation

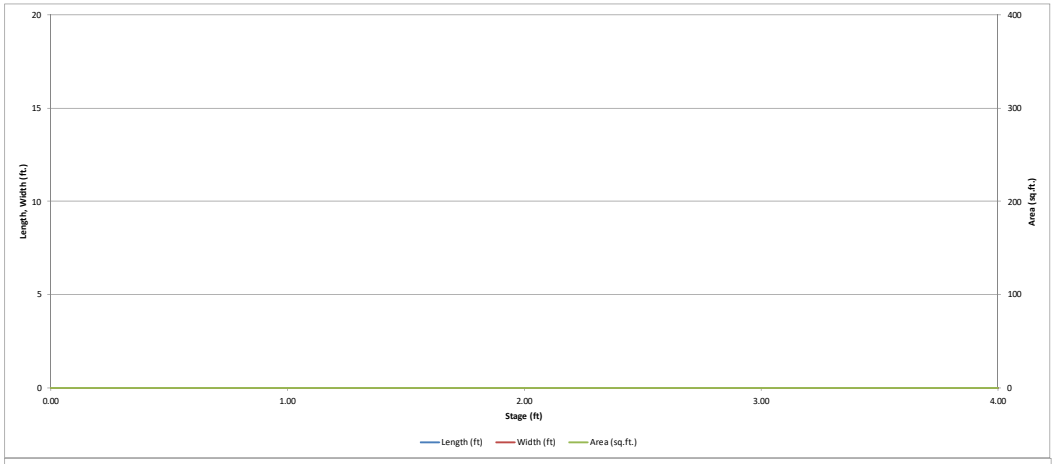
Zone 1 Volume (WQCV) =	0.118	acre-feet
Zone 2 Volume (100-year - Zone 1) =	0.632	acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.749	acre-feet
Initial Surcharge Volume (ISV) =	N/A	ft^3
Initial Surcharge Depth (ISD) =	N/A	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	N/A	ft
Slope of Trickle Channel (S_{TC}) =	N/A	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

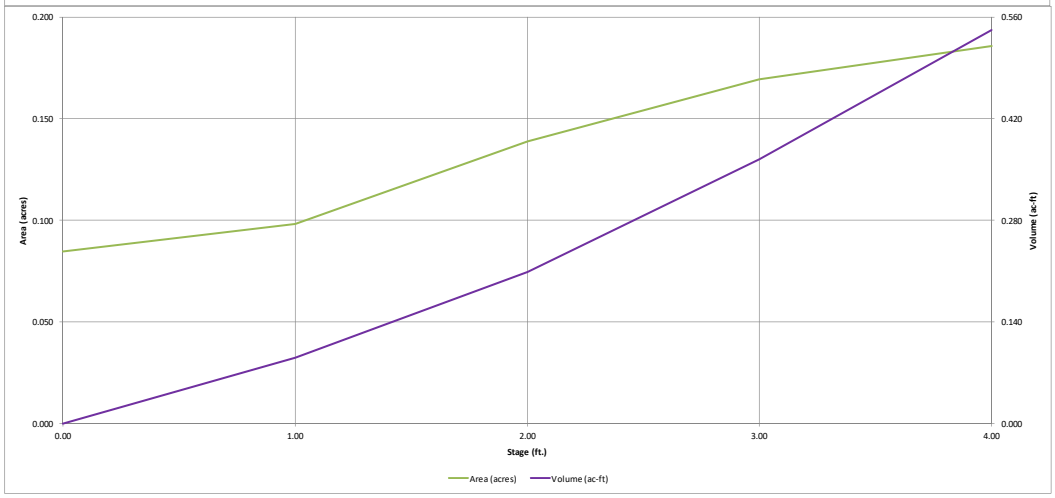
Depth Increment = ft

Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
6373.0 Media Surface	--	0.00	--	--	--	3,690	0.085		
6374.0	--	1.00	--	--	--	4,280	0.098	3,942	0.091
6375.0	--	2.00	--	--	--	6,051	0.139	9,090	0.209
6376.0	--	3.00	--	--	--	7,382	0.169	15,867	0.364
6377.0	--	4.00	--	--	--	8,085	0.186	23,600	0.542

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



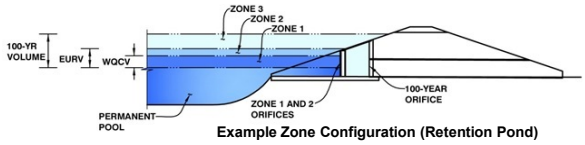


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Claremont Commercial Filing No. 2

Basin ID: WQ Pond 1



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.26	0.118	Filtration Media
Zone 2 (100-year)		0.632	Weir&Pipe (Restrict)
Zone 3			
		0.749	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	2.55	ft (distance below the filtration media surface)	Underdrain Orifice Area =	0.0	ft^2
Underdrain Orifice Diameter =	1.61	inches	Underdrain Orifice Centroid =	0.07	feet

Calculated Parameters for Underdrain

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	N/A	ft (relative to basin bottom at Stage = 0 ft)	WQ Orifice Area per Row =	N/A	ft^2
Depth at top of Zone using Orifice Plate =	N/A	ft (relative to basin bottom at Stage = 0 ft)	Elliptical Half-Width =	N/A	feet
Orifice Plate: Orifice Vertical Spacing =	N/A	inches	Elliptical Slot Centroid =	N/A	feet
Orifice Plate: Orifice Area per Row =	N/A	inches	Elliptical Slot Area =	N/A	ft^2

Calculated Parameters for Plate

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (optional)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Orifice Area (sq. inches)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Orifice Area (sq. inches)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected			Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Area =			ft^2
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)	Vertical Orifice Centroid =			feet
Vertical Orifice Diameter =			inches				

Calculated Parameters for Vertical Orifice

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 2 Weir	Not Selected			Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.26		ft (relative to basin bottom at Stage = 0 ft)	Height of Grate Upper Edge, H_t =	1.26		feet
Overflow Weir Front Edge Length =	6.00		feet	Over Flow Weir Slope Length =	2.91		feet
Overflow Weir Slope =	0.00		H:V (enter zero for flat grate)	Grate Open Area / 100-yr Orifice Area =	4.84		should be ≥ 4
Horiz. Length of Weir Sides =	2.91		feet	Overflow Grate Open Area w/o Debris =	12.22		ft^2
Overflow Grate Open Area % =	70%		%, grate open area/total area	Overflow Grate Open Area w/ Debris =	6.11		ft^2
Debris Clogging % =	50%		%				

Calculated Parameters for Overflow Weir

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 2 Restrictor	Not Selected			Zone 2 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.69		ft (distance below basin bottom at Stage = 0 ft)	Outlet Orifice Area =	2.53		ft^2
Outlet Pipe Diameter =	24.00		inches	Outlet Orifice Centroid =	0.83		feet
Restrictor Plate Height Above Pipe Invert =	18.00		inches	Half-Central Angle of Restrictor Plate on Pipe =	2.09	N/A	radians

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	2.00	ft (relative to basin bottom at Stage = 0 ft)	Spillway Design Flow Depth=	0.46	feet
Spillway Crest Length =	15.00	feet	Stage at Top of Freeboard =	3.46	feet
Spillway End Slopes =	4.00	H:V	Basin Area at Top of Freeboard =	0.18	acres
Freeboard above Max Water Surface =	1.00	feet			

Calculated Parameters for Spillway

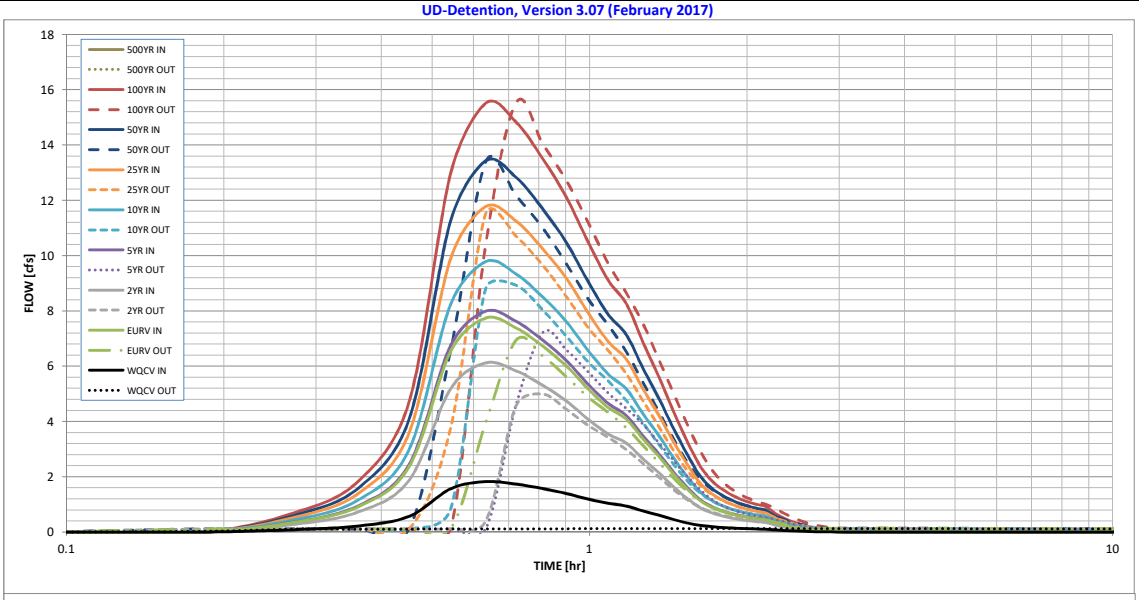
Routed Hydrograph Results

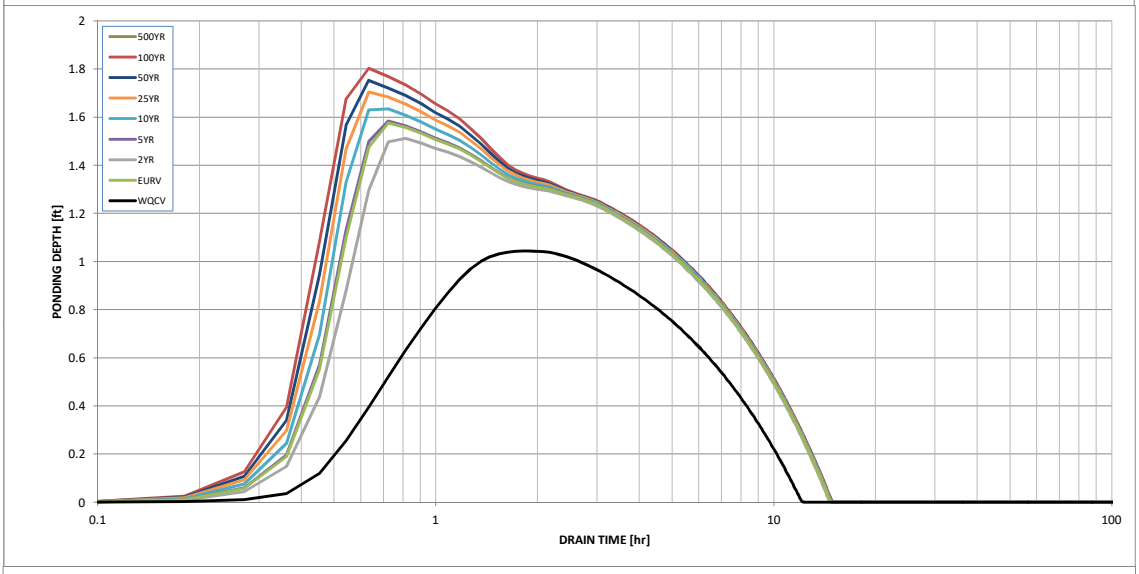
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	0.00
Calculated Runoff Volume (acre-ft) =	0.118	0.505	0.398	0.522	0.640	0.772	0.881	1.021	0.000
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.117	0.505	0.398	0.521	0.640	0.772	0.881	1.020	#N/A
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.01	0.12	0.41	0.62	0.90	0.00
Predevelopment Peak Q (cfs) =	0.0	0.0	0.0	0.1	0.7	2.2	3.3	4.8	0.0
Peak Inflow Q (cfs) =	1.8	7.7	6.1	8.0	9.8	11.8	13.4	15.5	#N/A
Peak Outflow Q (cfs) =	0.1	6.9	5.0	7.2	8.9	11.5	13.4	15.5	#N/A
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	95.8	13.5	5.2	4.1	3.2	#N/A
Structure Controlling Flow =	Filtration Media	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	#N/A
Max Velocity through Grate 1 (fps) =	N/A	0.54	0.37	0.5	0.7	0.9	1.0	1.2	#N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	#N/A
Time to Drain 97% of Inflow Volume (hours) =	12	13	13	13	13	12	12	12	#N/A
Time to Drain 99% of Inflow Volume (hours) =	**12**	14	14	14	14	14	14	14	#N/A
Maximum Ponding Depth (ft) =	1.04	1.58	1.51	1.58	1.63	1.70	1.75	1.80	#N/A
Area at Maximum Ponding Depth (acres) =	0.10	0.12	0.12	0.12	0.12	0.13	0.13	0.13	#N/A
Maximum Volume Stored (acre-ft) =	0.095	0.154	0.147	0.155	0.161	0.170	0.177	0.183	#N/A

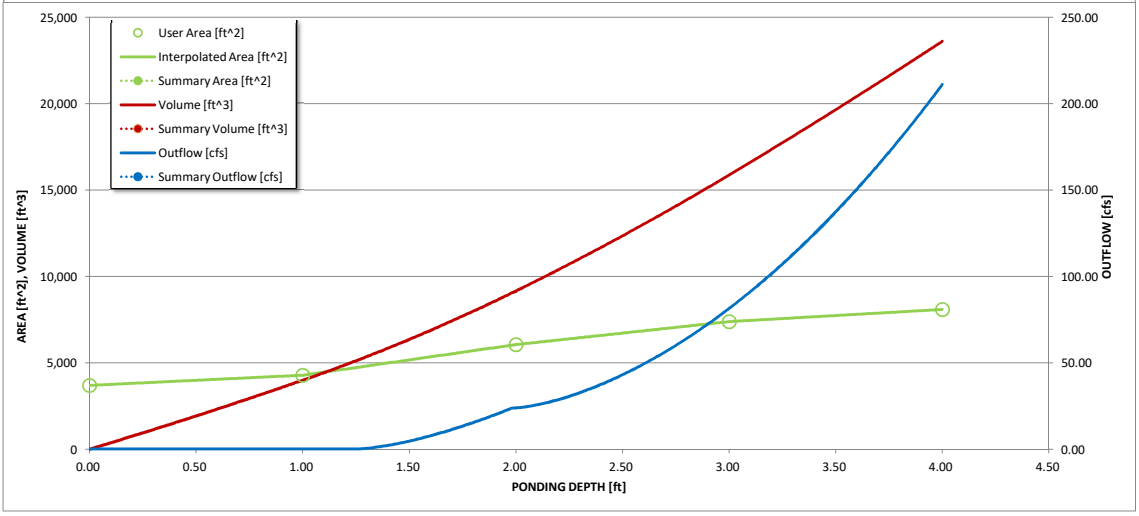
*Provide note indicating that per resolution 16-426 of the BoCC, on-site WQCV is required but on-site stormwater detention is not required per the FDR for Claremont Business Park Fil. 2. This has been requested on previous projects you've done in this area.

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename:

Storm Inflow Hydrographs **UD-Detention, Version 3.07 (February 2017)**

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

Time Interval	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	#N/A
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.43 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	0:05:26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
Hydrograph	0:10:52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
Constant	0:16:17	0.08	0.35	0.27	0.36	0.43	0.52	0.59	0.68	#N/A
0.921	0:21:43	0.22	0.93	0.73	0.96	1.17	1.40	1.60	1.84	#N/A
	0:27:09	0.57	2.38	1.89	2.46	3.00	3.60	4.10	4.73	#N/A
	0:32:35	1.57	6.54	5.18	6.75	8.24	9.90	11.26	12.99	#N/A
	0:38:01	1.82	7.74	6.11	7.99	9.78	11.78	13.42	15.51	#N/A
	0:43:26	1.73	7.38	5.83	7.62	9.33	11.25	12.82	14.83	#N/A
	0:48:52	1.57	6.72	5.30	6.94	8.50	10.24	11.67	13.50	#N/A
	0:54:18	1.39	5.99	4.72	6.19	7.59	9.15	10.44	12.08	#N/A
	0:59:44	1.19	5.17	4.07	5.34	6.55	7.91	9.03	10.46	#N/A
	1:05:10	1.04	4.51	3.55	4.65	5.71	6.89	7.86	9.10	#N/A
	1:10:35	0.94	4.08	3.21	4.21	5.17	6.24	7.13	8.25	#N/A
	1:16:01	0.76	3.36	2.64	3.47	4.27	5.16	5.90	6.84	#N/A
	1:21:27	0.61	2.74	2.14	2.83	3.48	4.22	4.83	5.61	#N/A
	1:26:53	0.46	2.10	1.64	2.17	2.68	3.26	3.74	4.35	#N/A
	1:32:19	0.33	1.56	1.21	1.61	2.00	2.44	2.80	3.27	#N/A
	1:37:44	0.24	1.13	0.88	1.17	1.45	1.76	2.02	2.37	#N/A
	1:43:10	0.19	0.88	0.69	0.91	1.12	1.36	1.56	1.82	#N/A
	1:48:36	0.16	0.72	0.56	0.75	0.92	1.12	1.28	1.49	#N/A
	1:54:02	0.14	0.61	0.48	0.63	0.78	0.95	1.09	1.27	#N/A
	1:59:28	0.12	0.54	0.42	0.56	0.69	0.83	0.95	1.11	#N/A
	2:04:53	0.11	0.49	0.38	0.50	0.62	0.75	0.86	1.00	#N/A
	2:10:19	0.10	0.45	0.35	0.46	0.57	0.69	0.79	0.92	#N/A
	2:15:45	0.07	0.33	0.26	0.34	0.42	0.51	0.58	0.67	#N/A
	2:21:11	0.05	0.24	0.19	0.25	0.31	0.37	0.43	0.49	#N/A
	2:26:37	0.04	0.18	0.14	0.18	0.23	0.27	0.31	0.36	#N/A
	2:32:02	0.03	0.13	0.10	0.13	0.17	0.20	0.23	0.27	#N/A
	2:37:28	0.02	0.09	0.07	0.10	0.12	0.14	0.17	0.19	#N/A
	2:42:54	0.01	0.07	0.05	0.07	0.08	0.10	0.12	0.14	#N/A
	2:48:20	0.01	0.05	0.04	0.05	0.06	0.07	0.08	0.10	#N/A
	2:53:46	0.01	0.03	0.02	0.03	0.04	0.05	0.06	0.07	#N/A
	2:59:11	0.00	0.02	0.01	0.02	0.02	0.03	0.03	0.04	#N/A
	3:04:37	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	#N/A
	3:10:03	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	#N/A
	3:15:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:20:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:26:20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:31:46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:37:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:42:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:48:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:53:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:58:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:04:21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:09:47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:15:13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:20:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:26:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:31:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:36:56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:42:22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:47:47	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:53:13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:58:39	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:04:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:09:31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:14:56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:20:22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:25:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:31:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:36:40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:42:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:47:31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:52:57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:58:23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	6:03:49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	6:09:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	6:14:40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	6:20:06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	6:25:32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	6:30:58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A

CLAREMONT COMMERICAL FILING NO. 2 (PROPOSED CONDITIONS)

Weighted Percent Imperviousness of Proposed WQ Sand Filter Basin 2				
Contributing Basins	***Area (Acres)***	***C_5***	***Impervious % (I)***	***(Acres)*(I)***
H	0.71	0.09	2	1.43
I	2.75	0.81	95	260.80
J	1.05	0.81	95	100.02
K	0.42	0.81	2	0.85
L	1.32	0.09	2	2.63
M	1.84	0.81	95	174.75
N	0.47	0.12	7	3.32
Totals	***8.57***			***543.80***
Imperviousness of WQ Pond 2	***63.5***			

8.57 B soils
8.57 total area

Claremont Commercial Filing No.2
DRAINAGE REPORT DRAINAGE CALCULATIONS
(Pond Volume Calculation)

WQCV POND 2

Elevation	SF	CF	Storage AF	Storage Sum
6365.50	3,292.00	0.00	0.00	0.00
6366.00	3,840.00	1,783.00	0.04	0.04
6367.00	5,015.00	4,427.50	0.10	0.14
6368.00	6,290.00	5,652.50	0.13	0.27
6369.00	7,665.00	6,977.50	0.16	0.43

Total = 18,841 CF

Total = 0.4 Ac-ft

Calculated by: DLM

Date: 3/20/2017

Checked by:

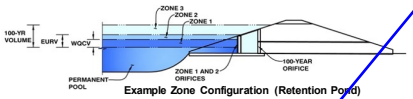
based on the soils map provided, the soil group for this pond should be "A"

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)

Project: Claremont Commerical Fil No. 2

Basin ID: WQ Pond 2



Example Zone Configuration (Retention Pond)

Required Volume Calculation

Selected BMP Type =	SF	
Watershed Area =	8.57	acres
Watershed Length =	665	ft
Watershed Slope =	0.018	ft/ft
Watershed Imperviousness =	63.50%	percent
Percentage Hydrologic Soil Group A =	0.0%	percent
Percentage Hydrologic Soil Group B =	100.0%	percent
Percentage Hydrologic Soil Groups C/D =	0.0%	percent
Desired WQCV Drain Time =	12.0	hours
Location for 1-hr Rainfall Depths =	User Input	
Water Quality Capture Volume (WQCV) =	0.142	acre-feet
Excess Urban Runoff Volume (EURV) =	0.593	acre-feet
2-yr Runoff Volume (P1 = 1.19 in.) =	0.490	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.656	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	0.846	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	1.097	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	1.278	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	1.516	acre-feet
500-yr Runoff Volume (P1 = 0 in.) =	0.000	acre-feet
Approximate 2-yr Detention Volume =	0.459	acre-feet
Approximate 5-yr Detention Volume =	0.616	acre-feet
Approximate 10-yr Detention Volume =	0.788	acre-feet
Approximate 25-yr Detention Volume =	0.850	acre-feet
Approximate 50-yr Detention Volume =	0.885	acre-feet
Approximate 100-yr Detention Volume =	0.960	acre-feet

Optional User Override 1-hr Precipitation	
1.19	inches
1.50	inches
1.75	inches
2.00	inches
2.25	inches
2.52	inches
	inches

Stage-Storage Calculation

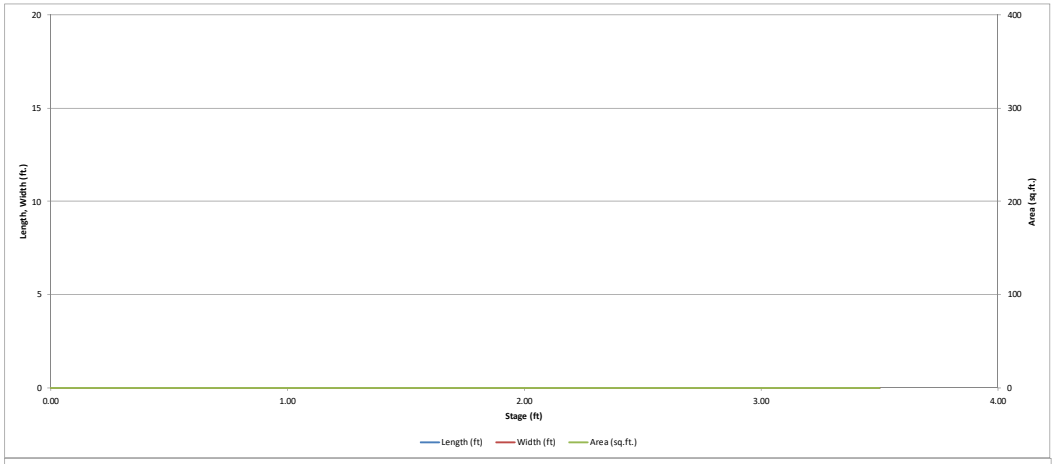
Zone 1 Volume (WQCV) =	0.142	acre-feet
Zone 2 Volume (100-year - Zone 1) =	0.818	acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.960	acre-feet
Initial Surcharge Volume (ISV) =	user	ft^3
Initial Surcharge Depth (ISD) =	user	ft
Total Available Detention Depth (H_{total}) =	user	ft
Depth of Trickle Channel (H_{TC}) =	user	ft
Slope of Trickle Channel (S_{TC}) =	user	ft/ft
Slopes of Main Basin Sides (S_{main}) =	user	H:V
Basin Length-to-Width Ratio ($R_{L/W}$) =	user	
Initial Surcharge Area (A_{ISV}) =	user	ft^2
Surcharge Volume Length (L_{ISV}) =	user	ft
Surcharge Volume Width (W_{ISV}) =	user	ft
Depth of Basin Floor (H_{FLOOR}) =	user	ft
Length of Basin Floor (L_{FLOOR}) =	user	ft
Width of Basin Floor (W_{FLOOR}) =	user	ft
Area of Basin Floor (A_{FLOOR}) =	user	ft^2
Volume of Basin Floor (V_{FLOOR}) =	user	ft^3
Depth of Main Basin (H_{MAIN}) =	user	ft
Length of Main Basin (L_{MAIN}) =	user	ft
Width of Main Basin (W_{MAIN}) =	user	ft
Area of Main Basin (A_{MAIN}) =	user	ft^2
Volume of Main Basin (V_{MAIN}) =	user	ft^3
Calculated Total Basin Volume (V_{total}) =	user	acre-feet

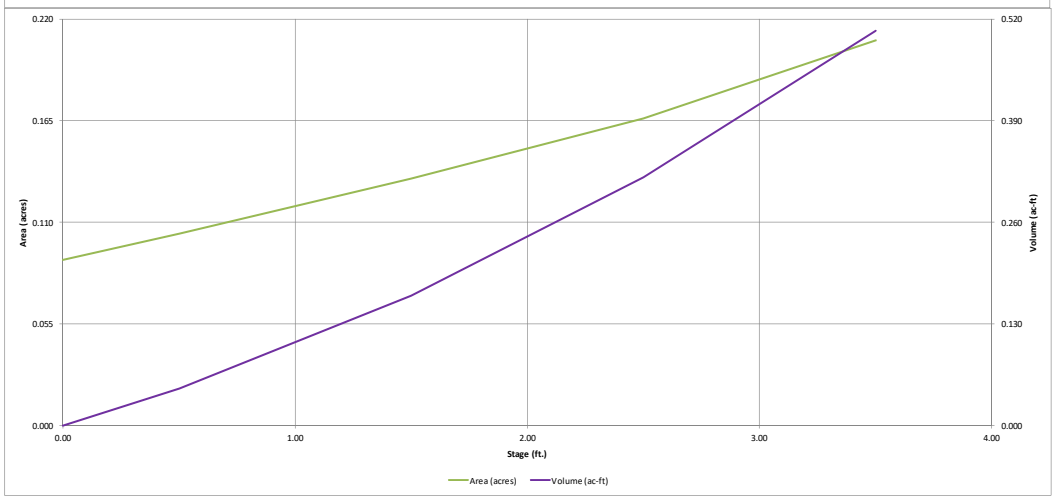
Depth Increment = ft

	Stage - Storage Description	Stage (ft)	Optional Override Stage (ft)	Length (ft)	Width (ft)	Area (ft^2)	Optional Override Area (ft^2)	Area (acre)	Volume (ft^3)	Volume (ac-ft)
65.5	Media Surface	--	0.00	--	--	--	3,907	0.090		
66		--	0.50	--	--	--	4,521	0.104	2,062	0.047
67		--	1.50	--	--	--	5,829	0.134	7,224	0.166
68.00		--	2.50	--	--	--	7,244	0.166	13,818	0.317
69.00		--	3.50	--	--	--	9,079	0.208	21,980	0.505

DETENTION BASIN STAGE-STORAGE TABLE BUILDER

UD-Detention, Version 3.07 (February 2017)



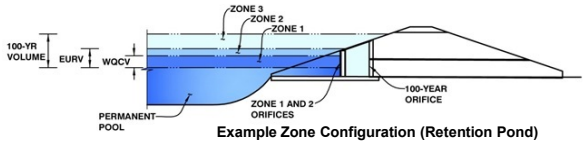


Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)

Project: Claremont Commerical Fil No. 2

Basin ID: WQ Pond 2



Example Zone Configuration (Retention Pond)

	Stage (ft)	Zone Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.31	0.142	Filtration Media
Zone 2 (100-year)		0.818	Weir&Pipe (Restrict)
Zone 3			
		0.960	Total

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =	2.65	ft (distance below the filtration media surface)
Underdrain Orifice Diameter =	1.75	inches

Calculated Parameters for Underdrain

Underdrain Orifice Area =	0.0	ft^2
Underdrain Orifice Centroid =	0.07	feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Invert of Lowest Orifice =	N/A	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Orifice Plate =	N/A	ft (relative to basin bottom at Stage = 0 ft)
Orifice Plate: Orifice Vertical Spacing =	N/A	inches
Orifice Plate: Orifice Area per Row =	N/A	inches

Calculated Parameters for Plate

WQ Orifice Area per Row =	N/A	ft^2
Elliptical Half-Width =	N/A	feet
Elliptical Slot Centroid =	N/A	feet
Elliptical Slot Area =	N/A	ft^2

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (optional)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Orifice Area (sq. inches)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Orifice Area (sq. inches)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =			ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =			inches

Calculated Parameters for Vertical Orifice

	Not Selected	Not Selected	
Vertical Orifice Area =			ft^2
Vertical Orifice Centroid =			feet

User Input: Overflow Weir (Dropbox) and Grate (Flat or Sloped)

	Zone 2 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	1.31		ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	7.00		feet
Overflow Weir Slope =	0.00		H:V (enter zero for flat grate)
Horiz. Length of Weir Sides =	2.91		feet
Overflow Grate Open Area % =	70%		%, grate open area/total area
Debris Clogging % =	50%		%

Calculated Parameters for Overflow Weir

	Zone 2 Weir	Not Selected	
Height of Grate Upper Edge, H_t =	1.31		feet
Over Flow Weir Slope Length =	2.91		feet
Grate Open Area / 100-yr Orifice Area =	6.41		should be ≥ 4
Overflow Grate Open Area w/o Debris =	14.26		ft^2
Overflow Grate Open Area w/ Debris =	7.13		ft^2

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 2 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	3.00		ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	24.00		inches
Restrictor Plate Height Above Pipe Invert =	16.00		inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate

	Zone 2 Restrictor	Not Selected	
Outlet Orifice Area =	2.22		ft^2
Outlet Orifice Centroid =	0.75		feet
Half-Central Angle of Restrictor Plate on Pipe =	1.91	N/A	radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage=	2.50	ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length =	20.00	feet
Spillway End Slopes =	4.00	H:V
Freeboard above Max Water Surface =	1.00	feet

Calculated Parameters for Spillway

Spillway Design Flow Depth=	0.57	feet
Stage at Top of Freeboard =	4.07	feet
Basin Area at Top of Freeboard =	0.21	acres

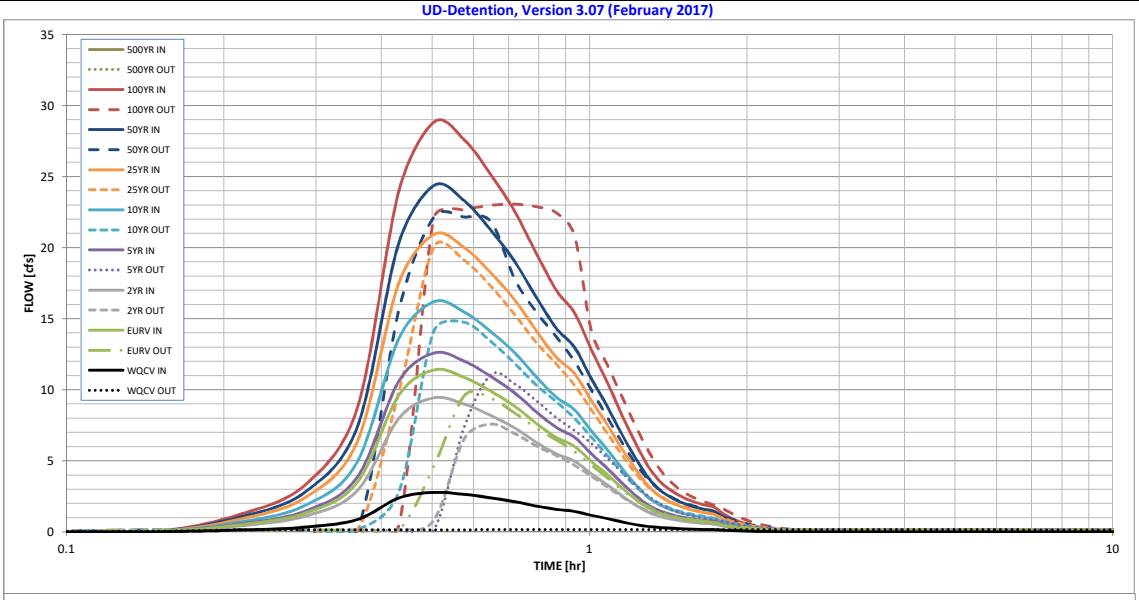
Routed Hydrograph Results

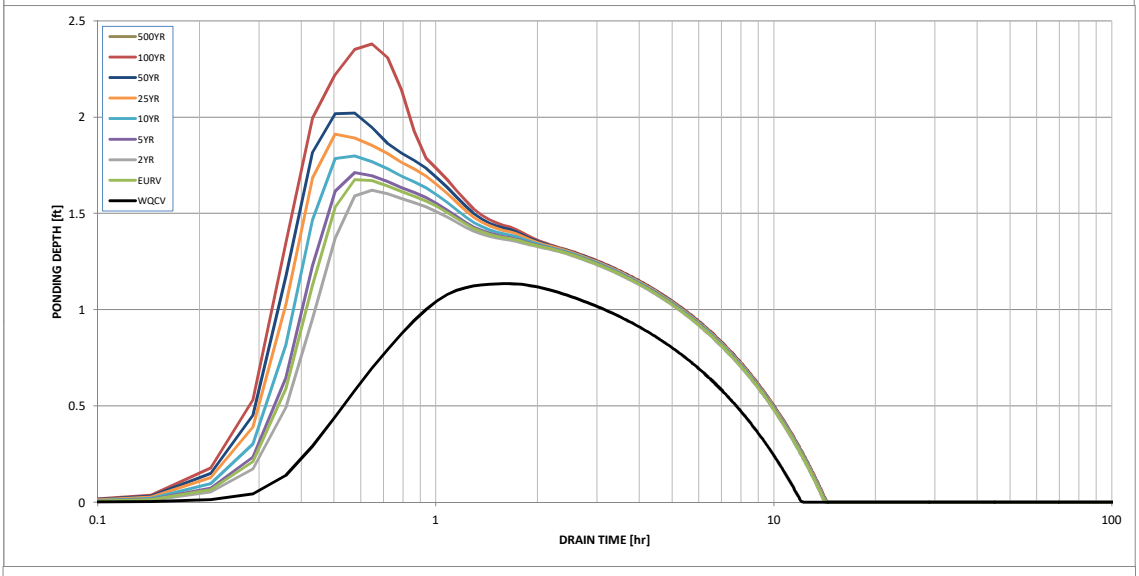
Design Storm Return Period =	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
One-Hour Rainfall Depth (in) =	0.53	1.07	1.19	1.50	1.75	2.00	2.25	2.52	0.00
Calculated Runoff Volume (acre-ft) =	0.142	0.593	0.490	0.656	0.846	1.097	1.278	1.516	0.000
OPTIONAL Override Runoff Volume (acre-ft) =									
Inflow Hydrograph Volume (acre-ft) =	0.141	0.593	0.489	0.655	0.845	1.096	1.277	1.515	#N/A
Predevelopment Unit Peak Flow, q (cfs/acre) =	0.00	0.00	0.01	0.03	0.25	0.79	1.10	1.46	0.00
Predevelopment Peak Q (cfs) =	0.0	0.0	0.1	0.2	2.1	6.8	9.4	12.5	0.0
Peak Inflow Q (cfs) =	2.8	11.4	9.4	12.6	16.2	20.9	24.4	28.8	#N/A
Peak Outflow Q (cfs) =	0.2	9.6	7.6	11.0	14.7	20.0	22.1	23.1	#N/A
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	61.3	6.9	3.0	2.4	1.8	#N/A
Structure Controlling Flow =	Filtration Media	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Overflow Grate 1	Outlet Plate 1	Outlet Plate 1	#N/A
Max Velocity through Grate 1 (fps) =	N/A	0.62	0.49	0.7	1.0	1.4	1.5	1.6	#N/A
Max Velocity through Grate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	#N/A
Time to Drain 97% of Inflow Volume (hours) =	12	13	13	13	12	11	11	10	#N/A
Time to Drain 99% of Inflow Volume (hours) =	**12**	14	14	14	14	13	13	13	#N/A
Maximum Ponding Depth (ft) =	1.13	1.67	1.62	1.71	1.80	1.91	2.02	2.38	#N/A
Area at Maximum Ponding Depth (acres) =	0.12	0.14	0.14	0.14	0.14	0.15	0.15	0.16	#N/A
Maximum Volume Stored (acre-ft) =	0.120	0.190	0.183	0.196	0.207	0.225	0.241	0.298	#N/A

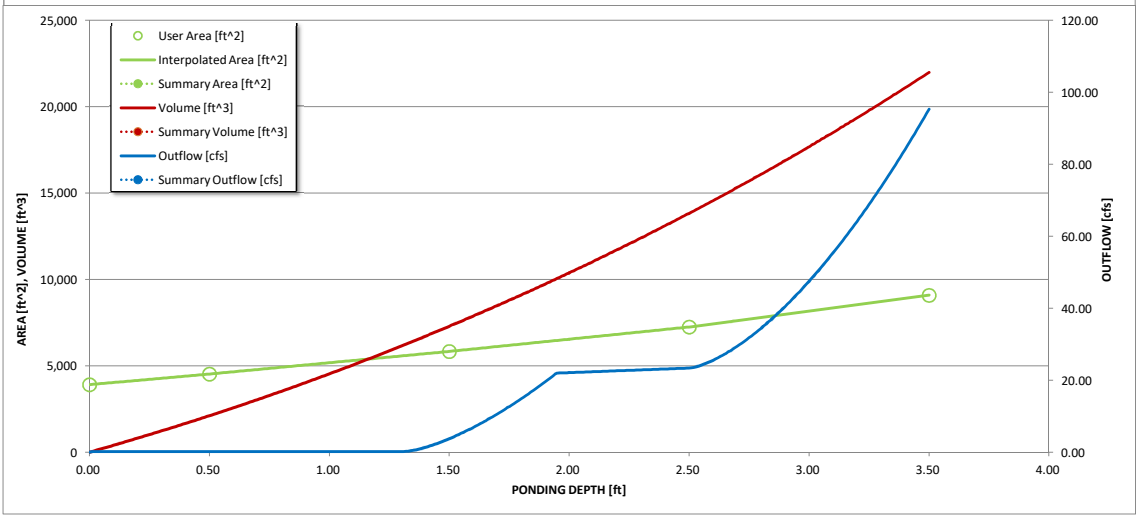
*Provide note indicating that per resolution 16-426 of the BoCC, on-site WQCV is required but on-site stormwater detention is not required per the FDR for Claremont Business Park Fil. 2. This has been requested on previous projects you've done in this area.

Detention Basin Outlet Structure Design

UD-Detention, Version 3.07 (February 2017)







S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

Detention Basin Outlet Structure Design

Outflow Hydrograph Workbook Filename:

Storm Inflow Hydrographs **UD-Detention, Version 3.07 (February 2017)**

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

Time Interval	SOURCE	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	WORKBOOK	#N/A
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
4.32 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	0:04:19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
Hydrograph Constant	0:08:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	0:12:58	0.13	0.51	0.42	0.56	0.71	0.92	1.06	1.25	#N/A
1.157	0:17:17	0.34	1.36	1.13	1.50	1.93	2.48	2.88	3.40	#N/A
	0:21:36	0.86	3.50	2.90	3.86	4.95	6.37	7.40	8.73	#N/A
	0:25:55	2.38	9.61	7.97	10.59	13.59	17.50	20.31	23.97	#N/A
	0:30:14	2.77	11.40	9.43	12.58	16.19	20.93	24.35	28.82	#N/A
	0:34:34	2.63	10.87	8.99	12.00	15.47	20.00	23.29	27.58	#N/A
	0:38:53	2.39	9.90	8.18	10.93	14.08	18.21	21.20	25.10	#N/A
	0:43:12	2.12	8.84	7.30	9.76	12.59	16.31	19.00	22.51	#N/A
	0:47:31	1.81	7.63	6.29	8.43	10.89	14.12	16.47	19.54	#N/A
	0:51:50	1.58	6.65	5.48	7.34	9.48	12.29	14.32	16.98	#N/A
	0:56:10	1.43	6.02	4.97	6.65	8.59	11.14	12.99	15.40	#N/A
	1:00:29	1.16	4.96	4.09	5.49	7.11	9.24	10.79	12.81	#N/A
	1:04:48	0.93	4.05	3.33	4.49	5.82	7.58	8.86	10.54	#N/A
	1:09:07	0.70	3.12	2.55	3.46	4.50	5.89	6.90	8.23	#N/A
	1:13:26	0.51	2.32	1.89	2.57	3.37	4.43	5.21	6.24	#N/A
	1:17:46	0.37	1.68	1.37	1.86	2.43	3.21	3.79	4.56	#N/A
	1:22:05	0.29	1.30	1.07	1.44	1.88	2.47	2.90	3.48	#N/A
	1:26:24	0.24	1.07	0.88	1.19	1.54	2.02	2.38	2.84	#N/A
	1:30:43	0.21	0.91	0.75	1.01	1.31	1.71	2.01	2.40	#N/A
	1:35:02	0.18	0.80	0.66	0.88	1.15	1.50	1.76	2.10	#N/A
	1:39:22	0.17	0.72	0.59	0.80	1.03	1.35	1.58	1.89	#N/A
	1:43:41	0.15	0.66	0.55	0.74	0.95	1.24	1.46	1.73	#N/A
	1:48:00	0.11	0.49	0.40	0.54	0.70	0.91	1.07	1.28	#N/A
	1:52:19	0.08	0.36	0.29	0.40	0.51	0.67	0.78	0.93	#N/A
	1:56:38	0.06	0.26	0.22	0.29	0.38	0.49	0.58	0.69	#N/A
	2:00:58	0.04	0.19	0.16	0.21	0.28	0.36	0.43	0.51	#N/A
	2:05:17	0.03	0.14	0.11	0.15	0.20	0.26	0.31	0.37	#N/A
	2:09:36	0.02	0.10	0.08	0.11	0.14	0.19	0.22	0.26	#N/A
	2:13:55	0.01	0.07	0.06	0.08	0.10	0.13	0.16	0.19	#N/A
	2:18:14	0.01	0.05	0.04	0.05	0.07	0.09	0.11	0.13	#N/A
	2:22:34	0.01	0.03	0.02	0.03	0.04	0.05	0.06	0.08	#N/A
	2:26:53	0.00	0.01	0.01	0.01	0.02	0.03	0.03	0.04	#N/A
	2:31:12	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02	#N/A
	2:35:31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	2:39:50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	2:44:10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	2:48:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	2:52:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	2:57:07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:01:26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:05:46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:10:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:14:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:18:43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:23:02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:27:22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:31:41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:36:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:40:19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:44:38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:48:58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:53:17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	3:57:36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:01:55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:06:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:10:34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:14:53	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:19:12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:23:31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:27:50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:32:10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:36:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:40:48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:45:07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:49:26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:53:46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	4:58:05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:02:24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:06:43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A
	5:11:02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	#N/A

Worksheet for Pipe 1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	11.80 cfs

Results	
Normal Depth	15.3 in
Flow Area	2.1 ft²
Wetted Perimeter	3.7 ft
Hydraulic Radius	6.9 in
Top Width	1.92 ft
Critical Depth	14.8 in
Percent Full	63.9 %
Critical Slope	0.006 ft/ft
Velocity	5.57 ft/s
Velocity Head	0.48 ft
Specific Energy	1.76 ft
Froude Number	0.935
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	15.3 in
Critical Depth	14.8 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Pipe 2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	12.40 cfs

Results	
Normal Depth	15.9 in
Flow Area	2.2 ft²
Wetted Perimeter	3.8 ft
Hydraulic Radius	7.0 in
Top Width	1.89 ft
Critical Depth	15.2 in
Percent Full	66.1 %
Critical Slope	0.006 ft/ft
Velocity	5.62 ft/s
Velocity Head	0.49 ft
Specific Energy	1.81 ft
Froude Number	0.918
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	0.0 %
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	15.9 in
Critical Depth	15.2 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Pipe 3

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	30.0 in
Discharge	22.60 cfs

Results	
Normal Depth	19.9 in
Flow Area	3.5 ft²
Wetted Perimeter	4.8 ft
Hydraulic Radius	8.7 in
Top Width	2.36 ft
Critical Depth	19.4 in
Percent Full	66.4 %
Critical Slope	0.005 ft/ft
Velocity	6.53 ft/s
Velocity Head	0.66 ft
Specific Energy	2.32 ft
Froude Number	0.952
Maximum Discharge	31.20 cfs
Discharge Full	29.00 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	33.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	19.9 in
Critical Depth	19.4 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

Worksheet for Pipe 4

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	11.80 cfs

Results	
Normal Depth	15.3 in
Flow Area	2.1 ft²
Wetted Perimeter	3.7 ft
Hydraulic Radius	6.9 in
Top Width	1.92 ft
Critical Depth	14.8 in
Percent Full	63.9 %
Critical Slope	0.006 ft/ft
Velocity	5.57 ft/s
Velocity Head	0.48 ft
Specific Energy	1.76 ft
Froude Number	0.935
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	33.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	15.3 in
Critical Depth	14.8 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Pipe 5

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	15.50 cfs

Results	
Normal Depth	19.0 in
Flow Area	2.7 ft²
Wetted Perimeter	4.4 ft
Hydraulic Radius	7.3 in
Top Width	1.62 ft
Critical Depth	17.0 in
Percent Full	79.3 %
Critical Slope	0.006 ft/ft
Velocity	5.80 ft/s
Velocity Head	0.52 ft
Specific Energy	2.11 ft
Froude Number	0.796
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.005 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	33.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	19.0 in
Critical Depth	17.0 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Pipe 5.1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	15.50 cfs

Results	
Normal Depth	19.0 in
Flow Area	2.7 ft²
Wetted Perimeter	4.4 ft
Hydraulic Radius	7.3 in
Top Width	1.62 ft
Critical Depth	17.0 in
Percent Full	79.3 %
Critical Slope	0.006 ft/ft
Velocity	5.80 ft/s
Velocity Head	0.52 ft
Specific Energy	2.11 ft
Froude Number	0.796
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.005 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	33.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	19.0 in
Critical Depth	17.0 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Pipe 5.2

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	15.50 cfs

Results	
Normal Depth	19.0 in
Flow Area	2.7 ft²
Wetted Perimeter	4.4 ft
Hydraulic Radius	7.3 in
Top Width	1.62 ft
Critical Depth	17.0 in
Percent Full	79.3 %
Critical Slope	0.006 ft/ft
Velocity	5.80 ft/s
Velocity Head	0.52 ft
Specific Energy	2.11 ft
Froude Number	0.796
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.005 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	33.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	19.0 in
Critical Depth	17.0 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Pipe 6

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	10.60 cfs

Results	
Normal Depth	14.3 in
Flow Area	1.9 ft²
Wetted Perimeter	3.5 ft
Hydraulic Radius	6.6 in
Top Width	1.96 ft
Critical Depth	14.0 in
Percent Full	59.5 %
Critical Slope	0.005 ft/ft
Velocity	5.44 ft/s
Velocity Head	0.46 ft
Specific Energy	1.65 ft
Froude Number	0.964
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	33.8 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	14.3 in
Critical Depth	14.0 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

Worksheet for Pipe 7

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	30.0 in
Discharge	16.60 cfs

Results	
Normal Depth	16.3 in
Flow Area	2.7 ft²
Wetted Perimeter	4.1 ft
Hydraulic Radius	7.9 in
Top Width	2.49 ft
Critical Depth	16.5 in
Percent Full	54.2 %
Critical Slope	0.005 ft/ft
Velocity	6.11 ft/s
Velocity Head	0.58 ft
Specific Energy	1.94 ft
Froude Number	1.031
Maximum Discharge	31.20 cfs
Discharge Full	29.00 cfs
Slope Full	0.002 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	54.2 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	16.3 in
Critical Depth	16.5 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

Worksheet for Pipe 8

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	18.0 in
Discharge	6.90 cfs

Results	
Normal Depth	13.7 in
Flow Area	1.4 ft²
Wetted Perimeter	3.2 ft
Hydraulic Radius	5.4 in
Top Width	1.28 ft
Critical Depth	12.2 in
Percent Full	76.2 %
Critical Slope	0.007 ft/ft
Velocity	4.77 ft/s
Velocity Head	0.35 ft
Specific Energy	1.50 ft
Froude Number	0.791
Maximum Discharge	7.99 cfs
Discharge Full	7.43 cfs
Slope Full	0.004 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	45.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	13.7 in
Critical Depth	12.2 in
Channel Slope	0.005 ft/ft
Critical Slope	0.007 ft/ft

Worksheet for Pipe 9

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	11.00 cfs

Results	
Normal Depth	14.6 in
Flow Area	2.0 ft²
Wetted Perimeter	3.6 ft
Hydraulic Radius	6.7 in
Top Width	1.95 ft
Critical Depth	14.3 in
Percent Full	60.9 %
Critical Slope	0.005 ft/ft
Velocity	5.49 ft/s
Velocity Head	0.47 ft
Specific Energy	1.69 ft
Froude Number	0.955
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.002 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	45.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	14.6 in
Critical Depth	14.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

Worksheet for Pipe 10

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	14.30 cfs

Results	
Normal Depth	17.7 in
Flow Area	2.5 ft²
Wetted Perimeter	4.1 ft
Hydraulic Radius	7.2 in
Top Width	1.76 ft
Critical Depth	16.3 in
Percent Full	73.8 %
Critical Slope	0.006 ft/ft
Velocity	5.76 ft/s
Velocity Head	0.52 ft
Specific Energy	1.99 ft
Froude Number	0.854
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.004 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	45.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	17.7 in
Critical Depth	16.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Pipe 10.1

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	24.0 in
Discharge	14.30 cfs

Results	
Normal Depth	17.7 in
Flow Area	2.5 ft²
Wetted Perimeter	4.1 ft
Hydraulic Radius	7.2 in
Top Width	1.76 ft
Critical Depth	16.3 in
Percent Full	73.8 %
Critical Slope	0.006 ft/ft
Velocity	5.76 ft/s
Velocity Head	0.52 ft
Specific Energy	1.99 ft
Froude Number	0.854
Maximum Discharge	17.21 cfs
Discharge Full	16.00 cfs
Slope Full	0.004 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	45.9 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	17.7 in
Critical Depth	16.3 in
Channel Slope	0.005 ft/ft
Critical Slope	0.006 ft/ft

Worksheet for Pipe 11

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	30.0 in
Discharge	23.10 cfs

Results	
Normal Depth	20.2 in
Flow Area	3.5 ft²
Wetted Perimeter	4.8 ft
Hydraulic Radius	8.8 in
Top Width	2.34 ft
Critical Depth	19.6 in
Percent Full	67.4 %
Critical Slope	0.005 ft/ft
Velocity	6.56 ft/s
Velocity Head	0.67 ft
Specific Energy	2.35 ft
Froude Number	0.943
Maximum Discharge	31.20 cfs
Discharge Full	29.00 cfs
Slope Full	0.003 ft/ft
Flow Type	Subcritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	49.6 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	20.2 in
Critical Depth	19.6 in
Channel Slope	0.005 ft/ft
Critical Slope	0.005 ft/ft

Worksheet for Pipe 12

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Roughness Coefficient	0.013
Channel Slope	0.005 ft/ft
Diameter	42.0 in
Discharge	33.80 cfs

Results	
Normal Depth	20.4 in
Flow Area	4.6 ft²
Wetted Perimeter	5.4 ft
Hydraulic Radius	10.3 in
Top Width	3.50 ft
Critical Depth	21.6 in
Percent Full	48.5 %
Critical Slope	0.004 ft/ft
Velocity	7.30 ft/s
Velocity Head	0.83 ft
Specific Energy	2.53 ft
Froude Number	1.119
Maximum Discharge	76.52 cfs
Discharge Full	71.14 cfs
Slope Full	0.001 ft/ft
Flow Type	Supercritical

GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Average End Depth Over Rise	0.0 %
Normal Depth Over Rise	48.5 %
Downstream Velocity	Infinity ft/s
Upstream Velocity	Infinity ft/s
Normal Depth	20.4 in
Critical Depth	21.6 in
Channel Slope	0.005 ft/ft
Critical Slope	0.004 ft/ft

BOCC RESOLUTION 16-426

BOCC

Chuck Broerman
11/28/2016 11:50:04 AM
Doc $0.00 2
Rec $0.00 Pages
El Paso County, CO
216137149

RESOLUTION NO. 16- 426

BOARD OF COUNTY COMMISSIONERS
COUNTY OF EL PASO, STATE OF COLORADO

Resolution Denying an Appeal by Hammers Construction LLC (APP-16-002) of the Administrative Determination made by the Planning and Community Development Department Executive Director regarding the requirement for permanent/post construction Water Quality (permanent stormwater quality best management practices or BMP's).

WHEREAS, pursuant to §§30-11-101(1)(e) and 30-11-107(1)(e), C.R.S., the Board of County Commissioners of El Paso County, Colorado (hereinafter "Board) has the legislative authority to manage the concerns of El Paso County when deemed by the Board to be in the best interests of the County and its inhabitants; and

WHEREAS, after consultation with the County Attorney's Office, the Executive Director of Planning and Community Development on August 4, 2016 issued an administrative determination finding made an administrative determination that all undeveloped lots within the Claremont Business Park are subject to installation of permanent stormwater management best management practices (BMP's) associated with development, and that the terms of a 2008 approved deviation relieving the developer of the requirements have not been met.; and

WHEREAS, an appeal of the administrative determination was filed by Hammers Construction on August 10, 2016, and a hearing date was set for September 27, 2016 to hear the appeal; and

WHEREAS, the hearing was continued to a date certain of November 22, 2016; and

WHEREAS, at the Applicant's appeal hearing on November 22, 2016, testimony from the Applicant and the Applicant's representatives was heard by the Board in favor of the appeal, testimony from representatives of Planning and Community Development Department and was presented, and such testimony and associated evidence was weighed by the Board; and

WHEREAS, the Board, having reviewed the testimony and evidence, hereby finds and determines that the requested appeal of the administrative determination by the Planning and Community Development Executive Director by the Applicant did not satisfy the criteria of approval to overturn the administrative determination.

NOW, THEREFORE, BE IT RESOLVED that the Board of County Commissioners of El Paso County, Colorado, hereby denies the appeal of the administrative determination by Hammers Construction and determines that permanent stormwater management best management practices (BMP's) are required with new development within the Claremont Business Park: and

BE IT FURTHER RESOLVED that Sallie Clark, duly elected, qualified member and Chair of the Board of County Commissioners, or Darryl Glenn, duly elected, qualified member and Vice Chair of the Board of County Commissioners, be and is hereby authorized on behalf of the Board to execute any and all documents necessary to carry out the intent of the Board as described herein.

DONE THIS 22nd day of November, 2016, at Colorado Springs Colorado.

BOARD OF COUNTY COMMISSIONERS
EL PASO COUNTY, COLORADO

By: _____
Chair of the Board

ATTEST: _____
County Clerk & Recorder

EXISTING DRAINAGE MAP

NEW DOC

FINAL DRAINAGE REPORT

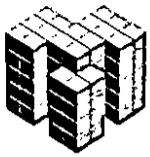
For

"Claremont Business Park Filing No. 2"

Prepared for:
El Paso County
Department of Public Works
Engineering Division

On Behalf of:
Claremont Development, Inc.

Prepared by:



Matrix Design Group, Inc.
Integrated Design Solutions
Infrastructure Engineering
Community Development
Program Management

2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
(719) 575-0100
fax (719) 572-0208

Revised November 2006

05.151.006

Engineer's Statement:

The *revisions* (changes made to the base Final Drainage Report since July, 2006) to the attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. The revisions encompassed adding additional right of way to the study area at the County's request, the handling of offsite drainage due to the additional right of way, a breakdown of private drainage within lot numbers 10 through 25 of Filing No. 2 due to cross-lot drainage (contrary to note # 25 on the recorded plat), profiling additional inlets along the channel edge, and rip-rap sizing for outlet structures along the channel. The Final Drainage Report dated July, 2006 was prepared under the direct supervision of Richard G. Gallegos, Jr. in July, 2006 and stamped (see next sheet).

The Final Drainage Report was prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing the *revisions* to this report.

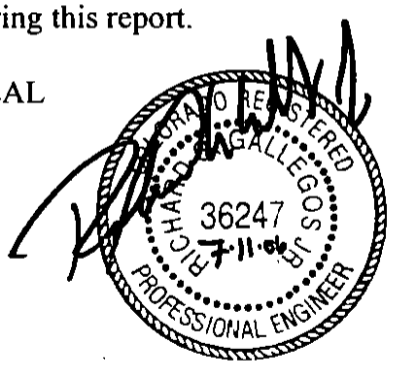
SEAL

Brady A. Shyrock
Registered Professional Engineer
State of Colorado
No. 38164

Engineer's Statement:

The attached drainage plan and report were prepared under my direction and supervision and are correct to the best of my knowledge and belief. Said drainage report has been prepared according to the criteria established by the County for drainage reports and said report is in conformity with the master plan of the drainage basin. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

SEAL



Richard G. Gallegos, Jr.
Registered Professional Engineer
State of Colorado
No. 36247

Developer's Statement:

I, the developer have read and will comply with all of the requirements specified in this drainage report and plan.

Claremont Development, Inc.
Business Name

By: _____

Title: _____

Address: 3460 Capital Drive
Colorado Springs, CO 80915

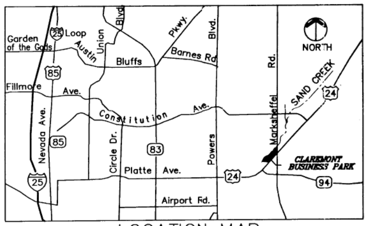
El Paso County:

Filed in accordance with Section 51.1 of the El Paso Land Development Code, as amended.

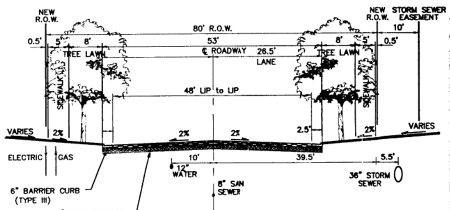
For Mr. John McCarty, County Engineer/Director — Date 4/23/07

Conditions:

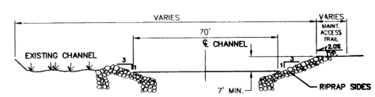
DRAINAGE PLAN
CLAREMONT BUSINESS PARK FILING NO. 2



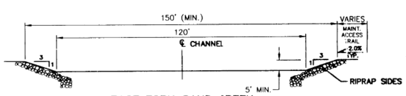
LOCATION MAP
NTS



MEADOWBROOK PARKWAY TYPICAL SECTION
NOT TO SCALE

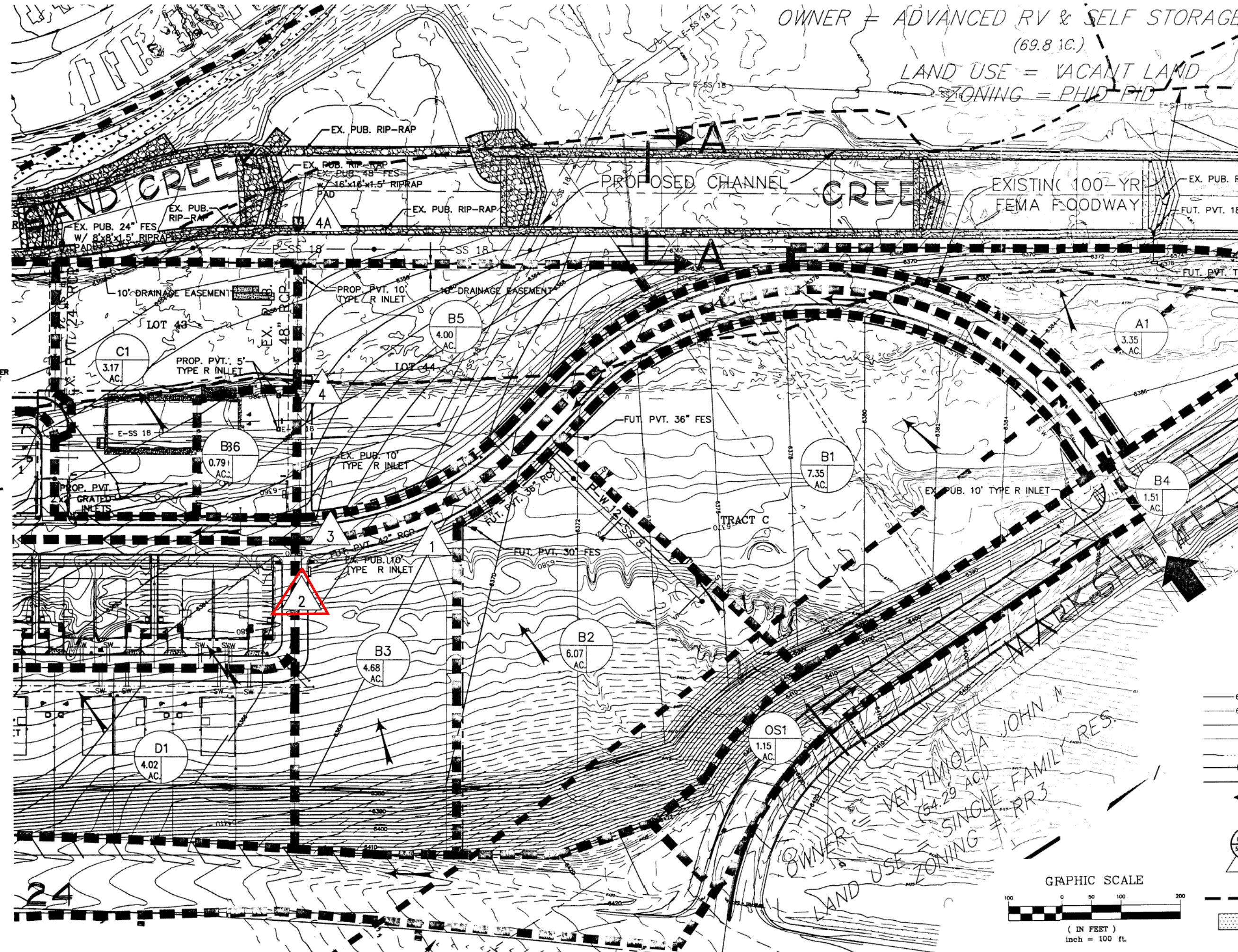


EAST FORK SAND CREEK
SECTION B–B
N.T.S.
FOR INFORMATION ONLY



EAST FORK SAND CREEK
SECTION A–A
N.T.S.
FOR INFORMATION ONLY

NOTE:
CONSTRUCTION OF THE EAST FORK SAND CREEK CHANNEL IMPROVEMENTS WILL BE REQUIRED TO REMOVE A PORTION OF CLAREMONT BUSINESS PARK FILING No. 1 FROM THE EXISTING 100-YEAR FLOODPLAIN (PER FEMA FLOOD INSURANCE RATE MAPS 752F AND 756F)



DESIGN POINT SUMMARY			
D.P.	SUB-BASINS	Q(5)	Q(100)
1	B1, B2	31.5	63.6
2	1, B3, OS1(flow by)	42.6	86.6
3	2(sewer), B4(flow by)	43.1	88.2
4	3, B6	44.1	90.1
4A	4, B5	52.8	107.5
5	D1(flow by), D3	13.5	25.9
6	5, D4	24.1	48.9
7	6, D5	40.8	82.5
8	7, D6, B4(flow by)	53.1	107.6
9	8, D7	61.6	124.5
10	D1(flow by), D2, E1, E2	19.4	40.6
11	10, E4	27.7	57.1
12	11, E5	36.3	74.3
13	12, E6	41.8	85.3

LEGEND

- 6520 — PROPOSED CONTOUR
- 6520 — EXISTING CONTOUR
- PROPOSED STORM DRAIN PIPE
- EXISTING STORM DRAIN PIPE
- DRAINAGE CHANNEL
- PROPOSED TYPE 'R' INLET
- PROPOSED TYPE I OR II MANHOLE
- FLOW ARROW
- BASIN DESIGNATION
- "C" COEFFICIENT (100 YR)
- BASIN AREA (ACRES)
- FILING 1 LIMITS
- DRAINAGE BASIN BOUNDARY
- FILING NO. 2

GRAPHIC SCALE
100 0 50 100 200
(IN FEET)
1 inch = 100 ft.

REFERENCE DRAWINGS
X-BASE-04 052 001
x-util
X-TOPO
X-ROAD
X-BASE
X-TOPO-09-01-05-bas

NO.	DATE	DESCRIPTION	BY

REVISIONS

BENCHMARK DATA(ELEV.)
(DATUM)
(DESCRIPTION/LOCATION)

C:\Documents and Settings\rich_gallegos\My Documents\05.151.036(FILING2)\Water Resources\302-FDR\DR01-02.dwg
PLOT DATE: Mar 02, 2007 9:28am

SUBDIVIDER
HAMMERS CONSTRUCTION INC.
3460 CAPITAL DRIVE
COLORADO SPRINGS, CO 80915-9710

FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC.

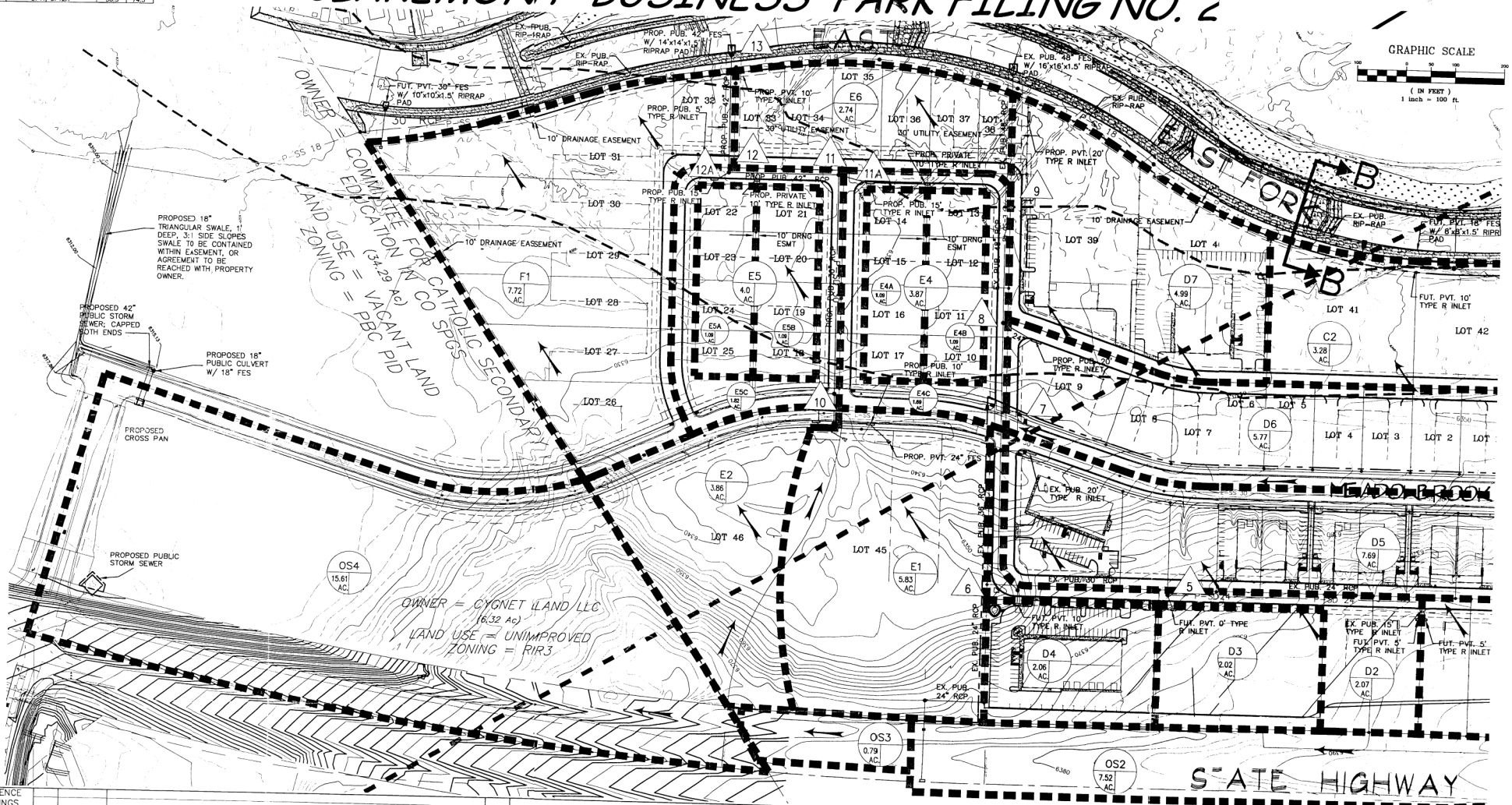
Matrix Design Group, Inc.
Integrated Design Solutions 2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

CLAREMONT BUSINESS PARK
FINAL DRAINAGE PLAN
MASTER DEVELOPMENT DRAINAGE PLAN
FINAL DRAINAGE PLAN
FILING NO. 2

DESIGNED BY: RGG
DRAWN BY: GES
CHECKED BY: JPL
SCALE HORIZ: 1"= 100' VERT: N/A
DATE ISSUED: SEPTEMBER 2006
SHEET NO. 1 OF 2 SHEETS
DR01

DRAINAGE PLAN
CLAREMONT BUSINESS PARK FILING NO. 2

DESIGN POINT SUMMARY			
D.P.	SUB-BASINS	Q(5)	Q(100)
11A	E4A, E4B, E4C	11.5	23.0
11	DP10, DP11A	27.7	57.1
12A	E5A, E5B, E5C	11.7	23.5
12	DP11, DP12A	36.3	74.3



REFERENCE DRAWINGS

X-BASE-04.052.001
x-util
X-TOPO
X-ROAD
X-BASE
X-TOPO-09-01-05-bas

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

BENCHMARK DATA(ELEV.) _____
(DATUM) _____
(DESCRIPTION/LOCATION) _____

C:\Documents and Settings\rich_gallegos\My Documents\05.151.006(FILIN~2\DR02-revised-02-19-07.dwg
PLOT DATE: Mar 02, 2007 8:44am

SUBDIVIDER

HAMMERS CONSTRUCTION INC.
3460 CAPITAL DRIVE
COLORADO SPRINGS, CO 80915-9710

FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC.

Matrix Design Group, Inc.
Integrated Design Solutions 2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

CLAREMONT BUSINESS PARK

REVISED FINAL DRAINAGE PLAN

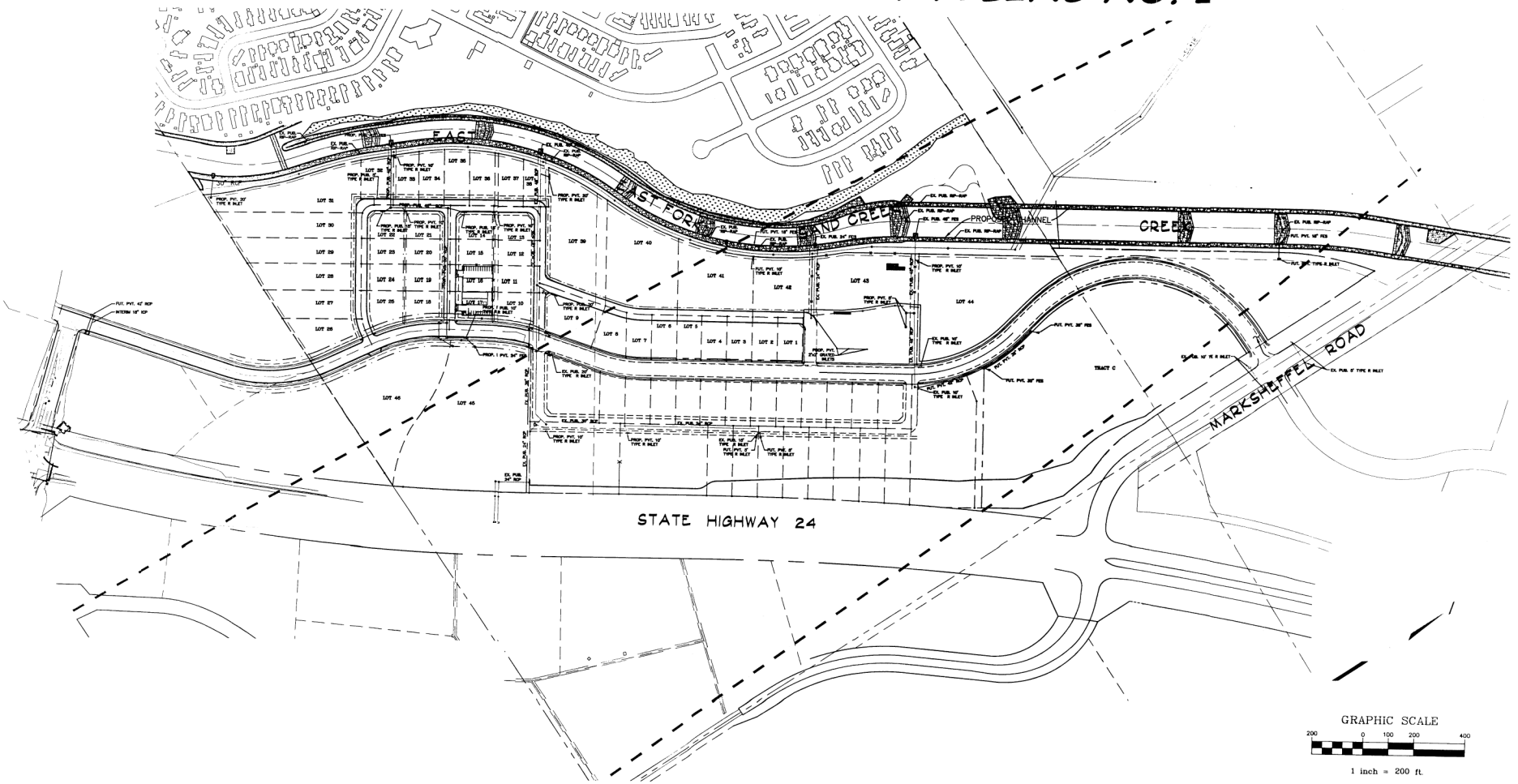
MASTER DEVELOPMENT DRAINAGE PLAN
REVISED FINAL DRAINAGE PLAN
FILING NO. 2

DESIGNED BY:	RGG	SCALE	
DRAWN BY:	BAS	HORIZ:	1"= 100'
CHECKED BY:	JPL	VERT:	N/A

DATE ISSUED: FEBRUARY 2007
SHEET NO. 1 OF 1 SHEETS

DR02

STORM DRAINAGE DESIGNATION PLAN
CLAREMONT BUSINESS PARK FILING NO. 2



GRAPHIC SCALE

200 0 100 200 400

1 inch = 200 ft.

REFERENCE DRAWINGS

x-title
x-utl
X-BASE

NO.	DATE	DESCRIPTION	BY
		REVISIONS	

BENCHMARK DATA(ELEV.)_____

(DATUM)_____

(DESCRIPTION/LOCATION)_____

NAME: C:\Documents and Settings\rich_gallegos\My Documents\05.151.006\Civil\Dgn Water Resources\302-FDR\SD-EXHIBIT.dwg
PCP: Matrix.ctb
PLOT DATE: Mar 07, 2007 8:19am

SUBDIVIDER:
HAMMERS CONSTRUCTION, INC.
3460 CAPITIAL DRIVE
COLORADO SPRINGS, CO 80915

FOR AND ON BEHALF OF
MATRIX DESIGN GROUP, INC.

Matrix Design Group, Inc.
Integrated Design Solutions 2435 Research Parkway, Suite 300
Colorado Springs, CO 80920
Phone 719-575-0100
Fax 719-575-0208

CLAREMONT BUSINESS PARK FILING NO. 2

STORM DRAINAGE DESIGNATION PLAN
FILING NO. 2

DESIGNED BY:	BAS	SCALE	
DRAWN BY:	BAS	HORIZ.	1" = 200'
CHECKED BY:	RGG	VERT.	N/A

DATE ISSUED: JANUARY, 2007

SHEET NO. 1 OF 1 SHEETS

EXH01

DRAINAGE MAP

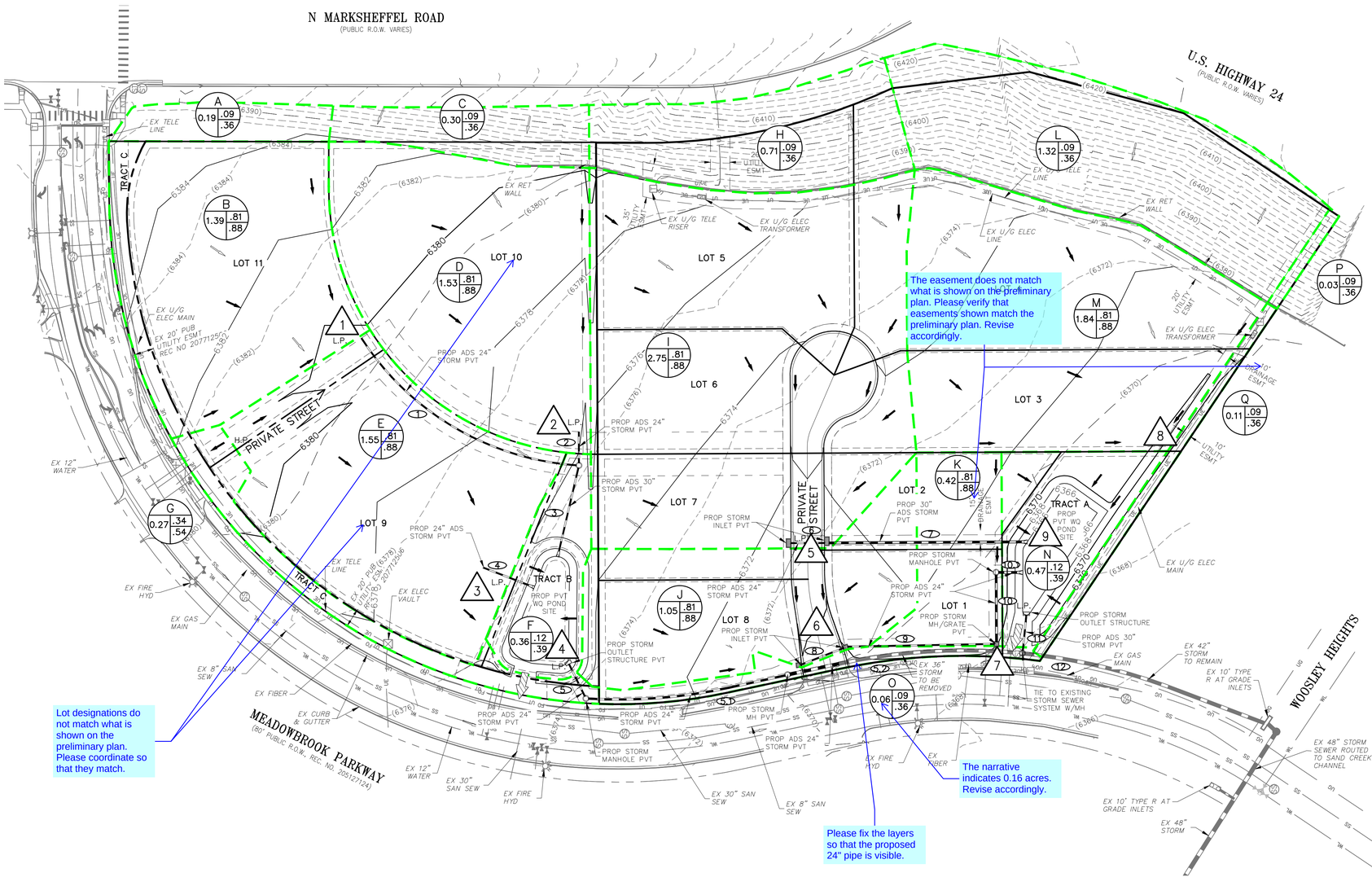
CLAREMONT COMMERCIAL FILING NO. 2

COUNTY OF EL PASO, STATE OF COLORADO

MASTER DEVELOPMENT DRAINAGE PLAN

NOVEMBER 2019

Revise title accordingly.



The easement does not match what is shown on the preliminary plan. Please verify that easements shown match the preliminary plan. Revise accordingly.

Lot designations do not match what is shown on the preliminary plan. Please coordinate so that they match.

The narrative indicates 0.16 acres. Revise accordingly.

Please fix the layers so that the proposed 24" pipe is visible.

LEGEND

- BASIN DESIGNATION (Z / 25 / .25 / .35 / C5 / C100 / ACRES)
- PIPE RUN REFERENCE LABEL
- SURFACE DESIGN POINT
- BASIN BOUNDARY
- (6920) EXISTING CONTOUR
- 6920 PROP CONTOUR
- UGE UNDERGROUND ELECTRICAL
- EXISTING GAS LINE
- STORM SEWER PIPE
- EXISTING STORM SEWER PIPE
- CROSSPAN
- INLET
- EXISTING FLOW DIRECTION ARROW
- EMERGENCY OVERFLOW DIRECTION
- FLOW DIRECTION
- FLARED END SECTION
- H.P. HIGH POINT
- L.P. LOW POINT

1" = 60'

0 30 60 120

Scale in Feet

BASIN SUMMARY

BASIN	AREA (ACRES)	Q_5	Q_{100}
A	0.19	0.1	0.6
B	1.39	5.5	10.1
C	0.3	0.1	1.0
D	1.53	6.3	11.5
E	1.55	6.5	11.8
F	0.36	0.2	1.0
G	0.29	0.5	1.3
H	0.71	0.3	2.0
I	2.75	9.8	17.9
J	1.05	4.4	8.0
K	0.42	1.8	3.2
L	1.32	0.5	3.5
M	1.84	6.7	12.2
N	0.47	0.2	1.3
O	0.16	0.2	0.6
P	0.03	0.0	0.1
Q	0.11	0.0	0.3

DESIGN POINT SUMMARY

DESIGN POINT	Q_5	Q_{100}	BASIN	STRUCTURE
1	5.6	10.6	A, B	24" PP
2	6.4	12.4	C, D	24" PP
3	6.5	11.8	E	24" PP
4	18.2	35.0	F, DP1–3	POND 1
5	10.1	19.8	H, I	10'/15' INLETS
6	4.4	11.2	J, FBDP5	10'/15' INLETS
7	1.8	3.2	DP6, IN–K	MH W/GRATE
8	7.2	15.7	L, M	24" PP OR SWALE
9	18.5	38.4	DP5,7,8, N	POND 2

STORM SEWER SUMMARY

PIPE RUN	Q_5	Q_{100}	PIPE SIZE	CONTRIBUTING DP/BASIN/PIPES
1	6.5	11.8	24"	DP1
2	6.4	12.4	24"	DP2
3	11.8	22.6	30"	PR1, PR2
4	6.5	11.8	24"	DP3
5	7.2	15.5	24"	POND 1 OUTFALL
5.1	7.2	15.5	24"	PR5
5.2	7.2	15.5	24"	PR5.1
6	6.4	10.6	24"	INLET 1
7	10.1	16.6	30"	PR1, INLET 2
8	2.8	6.9	18"	INLET 3
9	4.4	11.0	24"	PR8, INLET 4
10	6.2	14.3	24"	PR9, DP7
10.1	6.2	14.3	24"	PIPE 10
11	11.0	23.1	30"	POND 2 OUTFALL
12	17.6	33.8	EX42"	PR5, PR11

SF WQCV POND 1 SUMMARY

EPC/URBAN DRAINAGE SAND FILTER BASIN–SEE STD. DET.

AREA REQUIRED	2,335 SF
AREA PROVIDED	3,690 SF

SF ELEV = 6373.00
WQCV WSE = 6374.04
100 YR SPILLWAY ELEV = 6375.00
100 YR WSE = 6374.80

SF WQCV POND 2 SUMMARY

EPC/URBAN DRAINAGE SAND FILTER BASIN–SEE STD. DET.

AREA REQUIRED	2,962 SF
AREA PROVIDED	3,292 SF

SF ELEV = 6365.50
WQCV WSE = 6366.63
100 YR SPILLWAY ELEV = 6368.00
100 YR WSE = 6367.88

FOR LOCATING & MARKING GAS, ELECTRIC, WATER & TELEPHONE LINES
FOR BURIED UTILITY INFORMATION
48 HRS BEFORE YOU DIG
CALL 1–800–922–1987

M&S CIVIL CONSULTANTS, INC.
102 E. PIKES PEAK AVE., 5TH FLOOR
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

CLAREMONT COMMERCIAL FIL. NO. 2

MASTER DEVELOPMENT DRAINAGE PLAN

PROJECT NO. 44-037A | FILE: \dwg\Eng Exhibits\44037-PDRM.dwg

DESIGNED BY: GW
DRAWN BY: CLP
CHECKED BY: VAS

SCALE
HORIZ: 1"=60'
VERT: N/A

DATE: 11-19-2019

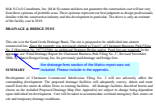
SHEET 1 OF 1

PDM01

File: D:\44037A-CBP 72-Lots 1-8\44037A-CBP 72-Lots 1-8\dwg\Dev Plan\PRELIM DRAINAGE REPORT MAP\44037-PDRM.dwg Plotstamp: 11/22/2019 2:03 PM

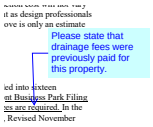
Prelim Drainage Report_v1_redlines.pdf Markup Summary

Callout (41)



Subject: Callout
Page Label: 10
Author: Daniel Torres
Date: 1/13/2020 1:08:29 PM
Status:
Color:
Layer:
Space:

the drainage fees section of the Matrix report was not included. Please include in the appendix.

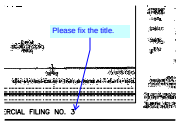


Subject: Callout
Page Label: 10
Author: Daniel Torres
Date: 1/13/2020 1:17:48 PM
Status:
Color:
Layer:
Space:

Please state that drainage fees were previously paid for this property.

Subject: Callout
Page Label: 1
Author: Daniel Torres
Date: 1/13/2020 1:28:32 PM
Status:
Color:
Layer:
Space:

Revise the title to Preliminary Drainage Report.

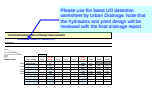


Subject: Callout
Page Label: 18
Author: Daniel Torres
Date: 1/13/2020 10:27:32 AM
Status:
Color:
Layer:
Space:

Please fix the title.

Subject: Callout
Page Label: 20
Author: Daniel Torres
Date: 1/13/2020 10:30:20 AM
Status:
Color:
Layer:
Space:

Please update the title

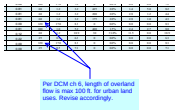


Subject: Callout
Page Label: 27
Author: Daniel Torres
Date: 1/13/2020 10:53:58 AM
Status:
Color:
Layer:
Space:

Please use the latest UD detention worksheet by Urban Drainage. Note that the hydraulics and pond design will be reviewed with the final drainage report.

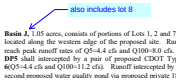
Subject: Callout
Page Label: 65
Author: Daniel Torres
Date: 1/13/2020 10:56:02 AM
Status:
Color:
Layer:
Space:

Please fix the layers so that the proposed 24" pipe is visible.



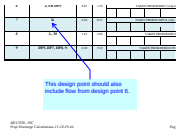
Subject: Callout
Page Label: 21
Author: Daniel Torres
Date: 1/13/2020 11:44:13 AM
Status:
Color:
Layer:
Space:

Per DCM ch 6, length of overland flow is max 100 ft. for urban land uses. Revise accordingly.



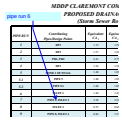
Subject: Callout
Page Label: 8
Author: Daniel Torres
Date: 1/13/2020 12:30:58 PM
Status:
Color:
Layer:
Space:

also includes lot 8



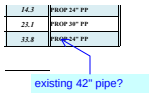
Subject: Callout
Page Label: 22
Author: Daniel Torres
Date: 1/13/2020 12:33:15 PM
Status:
Color:
Layer:
Space:

This design point should also include flow from design point 6.



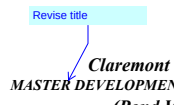
Subject: Callout
Page Label: 23
Author: Daniel Torres
Date: 1/13/2020 12:35:23 PM
Status:
Color:
Layer:
Space:

pipe run 6



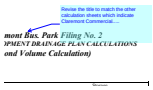
Subject: Callout
Page Label: 23
Author: Daniel Torres
Date: 1/13/2020 12:38:31 PM
Status:
Color:
Layer:
Space:

existing 42" pipe?



Subject: Callout
Page Label: 26
Author: Daniel Torres
Date: 1/13/2020 12:40:56 PM
Status:
Color:
Layer:
Space:

Revise title

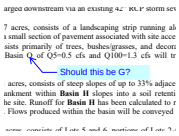


Subject: Callout
Page Label: 26
Author: Daniel Torres
Date: 1/13/2020 12:41:49 PM
Status:
Color:
Layer:
Space:

Revise the title to match the other calculation sheets which indicate Claremont Commercial.....

Subject: Callout
Page Label: 34
Author: Daniel Torres
Date: 1/13/2020 12:49:11 PM
Status:
Color:
Layer:
Space:

based on the soils map provided, the soil group for this pond should be "A"



Subject: Callout
Page Label: 7
Author: Daniel Torres
Date: 1/13/2020 8:29:26 AM
Status:
Color:
Layer:
Space:

Should this be G?

Subject: Callout
Page Label: 7
Author: Daniel Torres
Date: 1/13/2020 8:34:23 AM
Status:
Color:
Layer:
Space:

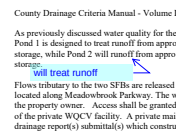
Pipe 7 is indicated as 30" on the drainage plan. Revise accordingly.

Subject: Callout
Page Label: 65
Author: Daniel Torres
Date: 1/13/2020 9:21:21 AM
Status:
Color:
Layer:
Space:

The easement does not match what is shown on the preliminary plan. Please verify that easements shown match the preliminary plan. Revise accordingly.

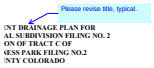
Subject: Callout
Page Label: 65
Author: Daniel Torres
Date: 1/13/2020 9:46:49 AM
Status:
Color:
Layer:
Space:

The narrative indicates 0.16 acres. Revise accordingly.



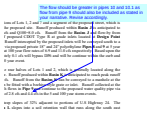
Subject: Callout
Page Label: 9
Author: Daniel Torres
Date: 1/13/2020 9:59:01 AM
Status:
Color:
Layer:
Space:

will treat runoff



Subject: Callout
Page Label: 2
Author: Daniel Torres
Date: 1/14/2020 7:28:44 AM
Status:
Color:
Layer:
Space:

Please revise title, typical.

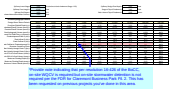


Subject: Callout
Page Label: 8
Author: Daniel Torres
Date: 1/14/2020 7:35:02 AM
Status:
Color:
Layer:
Space:

The flow should be greater in pipes 10 and 10.1 as flow from pipe 9 should also be included as stated in your narrative. Revise accordingly.

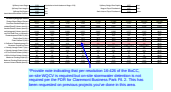
Subject: Callout
Page Label: 9
Author: Daniel Torres
Date: 1/14/2020 7:35:27 AM
Status:
Color:
Layer:
Space:

Per County criteria water quality must be provided for 100% of the site. ECM section I.7.1.C.1 indicates that 20% of site, not to exceed 1 acre may be excluded. Provide discussion regarding the proposed basins that will not be treated and ensure that the total will not exceed 1 acre.



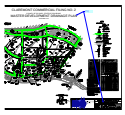
Subject: Callout
Page Label: 29
Author: Daniel Torres
Date: 1/14/2020 7:49:33 AM
Status:
Color:
Layer:
Space:

*Provide note indicating that per resolution 16-426 of the BoCC, on-site WQCV is required but on-site stormwater detention is not required per the FDR for Claremont Business Park Fil. 2. This has been requested on previous projects you've done in this area.



Subject: Callout
Page Label: 36
Author: Daniel Torres
Date: 1/14/2020 7:49:49 AM
Status:
Color:
Layer:
Space:

*Provide note indicating that per resolution 16-426 of the BoCC, on-site WQCV is required but on-site stormwater detention is not required per the FDR for Claremont Business Park Fil. 2. This has been requested on previous projects you've done in this area.

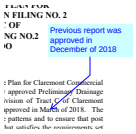


Subject: Callout
Page Label: 65
Author: Daniel Torres
Date: 1/14/2020 7:50:14 AM
Status:
Color:
Layer:
Space:

Revise title accordingly.

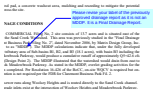
Subject: Callout
Page Label: 5
Author: Daniel Torres
Date: 1/8/2020 1:10:08 PM
Status:
Color:
Layer:
Space:

The previous page indicates 2 sand filter basins. Please revise.



Subject: Callout
Page Label: 4
Author: Daniel Torres
Date: 1/8/2020 1:15:07 PM
Status:
Color:
Layer:
Space:

Previous report was approved in December of 2018

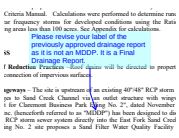


Subject: Callout
Page Label: 6
Author: Daniel Torres
Date: 1/8/2020 1:16:27 PM
Status:
Color:
Layer:
Space:

Please revise your label of the previously approved drainage report as it is not an MDDP. It is a Final Drainage Report.

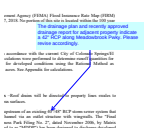
Subject: Callout
Page Label: 5
Author: Daniel Torres
Date: 1/8/2020 1:31:55 PM
Status:
Color:
Layer:
Space:

preliminary GEC has been provided. Final GEC plan will be provided with the final plat. Please revise.



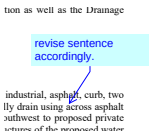
Subject: Callout
Page Label: 5
Author: Daniel Torres
Date: 1/8/2020 1:32:40 PM
Status:
Color:
Layer:
Space:

Please revise your label of the previously approved drainage report as it is not an MDDP. It is a Final Drainage Report.



Subject: Callout
Page Label: 5
Author: Daniel Torres
Date: 1/8/2020 1:34:28 PM
Status:
Color:
Layer:
Space:

The drainage plan and recently approved drainage report for adjacent property indicate a 42" RCP along Meadowbrook Pwky. Please revise accordingly.



Subject: Callout
Page Label: 6
Author: Daniel Torres
Date: 1/8/2020 1:37:29 PM
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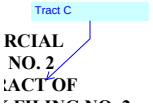
revise sentence accordingly.



Subject: Callout
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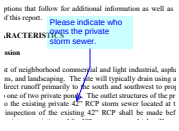

Subject: Callout
Page Label: 6
Author: Daniel Torres
Date: 1/8/2020 4:58:22 PM
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Please indicate who owns the private storm sewer.

Subject: Callout
Page Label: 65
Author: Daniel Torres
Date: 1/9/2020 3:05:05 PM
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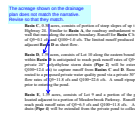
Lot designations do not match what is shown on the preliminary plan. Please coordinate so that they match.



Subject: Callout
Page Label: 7
Author: Daniel Torres
Date: 1/9/2020 3:09:18 PM
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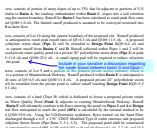
The acreage shown on the drainage plan does not match the narrative. Revise so that they match.



Subject: Callout
Page Label: 7
Author: Daniel Torres
Date: 1/9/2020 3:28:17 PM
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Include in your narrative a discussion regarding the swale shown between basin D and basin I.

Subject: Callout
Page Label: 6
Author: Daniel Torres
Date: 1/9/2020 7:35:02 AM
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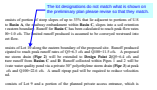
Please include discussion regarding existing pipes/stub outs on the property indicated in the previously approved drainage reports by Matrix and why they were not used.



Subject: Callout
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Author: Daniel Torres
Date: 1/9/2020 8:35:00 AM
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The lot designations do not match what is shown on the preliminary plan please revise so that they match.

Highlight (24)

Subject: Highlight
Page Label: 20
Author: Daniel Torres
Date: 1/13/2020 10:30:26 AM
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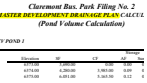

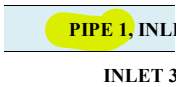

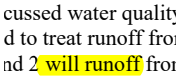

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Author: Daniel Torres
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Author: Daniel Torres
Date: 1/13/2020 10:33:16 AM
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Author: Daniel Torres
Date: 1/13/2020 10:33:30 AM
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MASTER DEVELOPMENT DRAINAGE PLAN

Subject: Highlight
Page Label: 23
Author: Daniel Torres
Date: 1/13/2020 12:35:37 PM
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Page Label: 9
Author: Daniel Torres
Date: 1/13/2020 9:54:01 AM
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RESUBDIVISION OF TRACT C OF
CLAREMONT BUSINESS PARK FILING NO.2
EL PASO COUNTY COLORADO
DRAINAGE PLAN STATEMENTS
ENGINEERS STATEMENT

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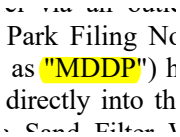
MASTER DEVELOPMENT DRAINAGE PLAN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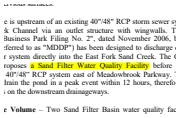
e is upstream of an existing 40"/48" RCP storm sewer s
k Channel via an outlet structure with wingwalls. T
Business Park Filing No. 2", dated November 2006,
ferred to as "MDDP") has been designed to discharge
r system directly into the East Fork Sand Creek. The
roposes a Sand Filter Water Quality Facility before
40"/48" RCP system east of Meadowbrook Parkway.
lain the pond in a peak event within 12 hours, thereb
on the downstream drainageways.
e **Volume** – Two Sand Filter Basin water quality fa

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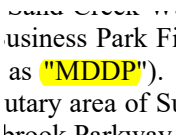
a Sand Filter Water Quality Facility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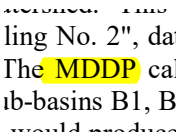
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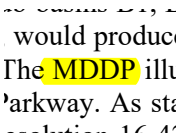
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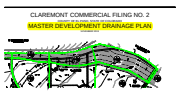

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Author: Daniel Torres
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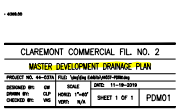
MASTER DEVELOPMENT DRAINAGE PLAN



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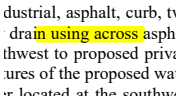

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MASTER DEVELOPMENT DRAINAGE PLAN

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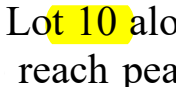
MASTER DEVELOPMENT DRAINAGE PLAN



Subject: Highlight
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Author: Daniel Torres
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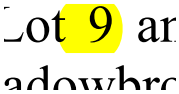

Subject: Highlight
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Author: Daniel Torres
Date: 1/9/2020 10:58:01 AM
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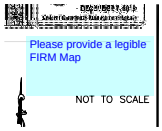
Text Box (2)



Subject: Text Box
Page Label: 18
Author: Daniel Torres
Date: 1/13/2020 10:30:54 AM
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Please provide a legible FIRM Map

Subject: Text Box
Page Label: 6
Author: Daniel Torres
Date: 1/14/2020 7:29:49 AM
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Please also include in your narrative how your proposed flows entering the existing storm system compare to the previously approved drainage report from Matrix. State whether or not the existing facilities are adequate. Please take into account the recently approved drainage report from the lot to the south (PCD file no. PPR192) that will also tie into this existing system.