

CLAREMONT BUSINESS PARK 2

**“AMENDMENT” OF THE
PRELIMINARY DRAINAGE REPORT
FOR
CLAREMONT BUSINESS PARK 2 FILING NO.1
A RESUBDIVISION OF TRACT C OF
CLAREMONT BUSINESS PARK FILING NO. 2**

EL PASO COUNTY, COLORADO

SEPTEMBER 2020

Prepared for:

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&
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Project #44-037
PCD – SP 197

CLAREMONT BUSINESS PARK 2
"AMENDMENT" OF THE
PRELIMINARY DRAINAGE REPORT 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: Lena Gail Case BY: [Signature]
TITLE: owner TITLE: Pres
DATE: 9-14-2020 DATE: 9-14-2020

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

Hammers Construction, Inc.
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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: _____]
Jennifer Irvin, P.E.
County Engineer / ECM Administrator

APPROVED
Engineering Department

09/21/2020 8:29:21 AM
dsdnijkamp

EPC Planning & Community
Development Department

CONDITIONS:

CLAREMONT BUSINESS PARK 2
“AMENDMENT” OF THE
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TABLE OF CONTENTS

PURPOSE	4
GENERAL LOCATION AND DESCRIPTION	4
SOILS	4
HYDROLOGIC CALCULATIONS	5
HYDRAULIC CALCULATIONS	5
FLOODPLAIN STATEMENT	5
DRAINAGE CRITERIA	5
FOUR STEP PROCESS	5
EXISTING DRAINAGE CONDITIONS	6
PROPOSED DRAINAGE CONDITIONS	6
DRAINAGE EASEMENTS	9
WATER QUALITY PROVISIONS AND MAINTENANCE	9
EROSION CONTROL	10
CONSTRUCTION COST OPINION	10
DRAINAGE & BRIDGE FEES	10
SUMMARY	11
REFERENCES	12

APPENDIX

Vicinity Map
Soils Map
FEMA FIRM Panel
Hydrologic Calculations
Hydraulic Calculations/ SFB WQCV Calculations
BOCC Resolution 16-426
Proposed Drainage Map
Existing Drainage Map & Excerpt of Matrix Report

CLAREMONT BUSINESS PARK 2
“AMENDMENT” OF THE
PRELIMINARY DRAINAGE REPORT FOR
CLAREMONT BUSINESS PARK 2 FILING NO.1
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CLAREMONT BUSINESS PARK FILING NO.2
EL PASO COUNTY COLORADO

PURPOSE

This document is intended to serve as the Claremont Business Park 2 “Amendment” to the Preliminary Drainage Report for Claremont Business Park 2 Filing No. 1 and will effectively supersede the approved “Final Drainage Report for Claremont Business Park Filing No. 2”, El Paso County, Colorado, prepared by the Matrix Design Group, revised November 2006. 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 a preliminary drainage report; a Final Drainage Report shall be required with a Final Plat application, provided that no significant change from this Preliminary Drainage Report is being proposed.

GENERAL LOCATION AND DESCRIPTION

Claremont Business Park 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 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 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 (2) sand filter basins will provide water quality treatment for the proposed developments. 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.

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.

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 42"/48" RCP storm sewer system that directly discharges to Sand Creek Channel via an outlet structure with wingwalls (privately owned and maintained by the Central Marksheffel Metropolitan District). The "Final Drainage Report for Claremont Business Park Filing No. 2", dated November 2006, by Matrix Design Group, Inc. (henceforth referred to as "Matrix FDR") 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 two (2) Sand Filter Water Quality Facilities before flows from both WQ facilities are discharged to the existing private 42"/48" RCP system east of Meadowbrook Parkway. The outlet underdrains are redesigned to drain the ponds 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 (2) Sand Filter Basin water quality facilities are proposed to provide WQCV.

Step4 Consider Need for Industrial and Commercial BMP's – This submittal provides a Preliminary Grading and Erosion Control plan. A Final GEC plan with BMP's in place shall be required with a Final Plat and Site Development applications. The proposed project will use silt fence, a vehicle tracking control pad, a concrete washout area, mulching and reseeded to mitigate the potential for erosion across the site.

EXISTING DRAINAGE CONDITIONS

The Claremont Business Park 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 "Matrix FDR"). The Matrix FDR 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 $Q_5=42.6$ cfs and $Q_{100}=86.6$ cfs (Design Point 2). The Matrix FDR illustrates that the watershed would drain from east to the southwest towards Meadowbrook Parkway. Sub-Basin B2 identifies a private 30" RCP (Matrix FDR) to be installed and used to drain the sub-basin into the 42"/48" storm system. The existing 30" RCP is stubbed to the east from an existing storm manhole (See Drainage Map). This system is privately owned and maintained by the Central Marksheffel Metropolitan District.

A separate system; Sub-Basin B1 identifies a private 36" RCP to be installed along Meadowbrook Pkwy and stubbed to the sub-basin and used to drain also into the 42"/48" storm system. Field inspection of the existing manhole show the private 30" and 36" RCP were installed. This report and construction drawings require the existing 30" and 36" RCP are to be removed. The elevation of the pipe does not work with the current design. (See Proposed Drainage, Basin O).

As stated in the Matrix FDR, 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.

An existing 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.

PROPOSED DRAINAGE CHARACTERISTICS

General Concept Drainage Discussion

The majority of the site will consist of neighborhood commercial and light industrial, asphalt, curb, two (2) storm water quality sand filter basins, and landscaping. The flows generated by the site will typically sheetflow 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 10 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=5.6 cfs and Q100=10.6 cfs) to capture runoff from **Basins A** and **B**.

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, 1.53 acres, consists of Lot 8 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. A swale/berm shall be constructed along the south line of Lot 8, to ensure flows are conveying westerly to a 24" pipe to the proposed storm system and then conveyed to the proposed WQ pond for the retail center area.

Basin E, 1.55 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=6.5cfs and Q100=11.8cfs).

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 0.118, 0.157 and 0.200 ac-ft and discharge 0.1cfs, 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, 0.29 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 G of Q5=0.5 cfs and Q100=1.3 cfs will travel as sheet flow into Meadowbrook Parkway.

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 proposed WQ Pond 2 via proposed private 24" and 30" 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**.

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 **Basin J** and flow-by from **DP5** shall be 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 proposed WQ Pond 2 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.

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 **Basin K** can be conveyed to a manhole, **Design Point 7**, 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 WQ Pond 2 via pipes 10 and 10.1 at peak flow rates of 6.2 cfs and 14.3 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=0.5cfs and Q100=3.7cfs. 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 lined 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 will be required to arrest flows entering the pond. Should a pipe system be extended 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=23.0cfs and Q100=46.3cfs. 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 0.142, 0.202 and 0.311 ac-ft and discharge 0.2 cfs, 12.8 cfs, and 23.3 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.

The Matrix "Final Drainage Report for Claremont Business Park Filing No. 2" calculated that DP 1 combining Sub Basins B1 and B2 generated of (Q5=31.5cfs and Q100=63.6). The existing 42" RCP pipe with the revised development are expected to be less than that of the Matrix report of Q5=17.6 cfs and Q100=33.8 cfs. These flows will combine downstream in the existing 42" pipe with the flows from Lot 2-1A Claremont Business Park of (Q5=7.5cfs and Q100=15.4) The original Matrix Report identified flows at the back side of the 10' Type R inlet (Q5=42.6cfs and Q100=86.6) the combined flows is significantly less that previously reported in the Matrix report. Therefore the proposed development shall not have a negative impact on the downstream storm system and is adequately sized to convey the proposed generated flows.

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 Business Park 2 Filing No.1 site.

DRAINAGE EASEMENTS

The Preliminary Plan for this site is submitting a Waiver of the El Paso County Land Development Code to request 2' foot side lot easements for drainage. Therefore, the drainage easement being 4' foot minimum in width (It is likely that some lots will have a building on each lot, 4 feet apart). A calculation sheet is included in the appendix to show the maximum capacity of a concrete drainage channel with varying slopes. The final drainage report for these lots will show the slope and total amount of drainage to be conveyed in the drainage channel. The final drainage report will indicate the lots where these reduced easement are located and that they will be graded accordingly so that runoff from the area of each lot will be conveyed to these drainage channels. The channel is proposed to be a 6" inch tall x 3' foot wide trickle channel. The final drainage report will ensure that the maximum capacity is not exceeded.

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 0.118 acre-feet of water quality storage, while Pond 2 will treat runoff from approx 8.57 acres, by providing 0.142 acre-feet of water quality storage. Per ECM section 1.7.1.C.1, 20% of the project site (not to exceed 1.0 acre) may be excluded from the 100% WQ treatment requirement per El Paso County criteria. This report identifies that Basins G, O, P and Q are unable to reach one of the two proposed WQ ponds. Combined total acreage of the Basins are 0.59 AC, and doesn't exceed the 1.0 acre maximum allowance of acreage 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 ponds. The rest of the private storm sewer system (Inlets, Storm pipe, manholes, etc..) will be owned and maintained by the Claremont Merchants Association.

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 2020.

DRAINAGE & BRIDGE FEES

This site is in the Sand Creek Drainage Basin. The site is proposed to be subdivided into ten commercial lots. Drainage fees were paid at the time of the previous platting as Tract C of Claremont Business Park Filing No. 2 (Reception No. 207712506), therefore no additional Drainage, Bridge and/or Pond fees are required. The imperviousness from Basins B1 and B2 (77%) in the "Final Drainage Report for Claremont Business Park Filing No. 2", prepared by the Matrix Design Group is more than the imperviousness for the proposed site (70%). Therefore Drainage, Bridge and/or Pond fees are not required. See Appendix of the

“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.

SUMMARY

Development of Claremont Business Park 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 but owners/developer of the lots shall comply with the final drainage report that will be submitted with the final plat application. 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.



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

HYDROLOGIC
TYPE A SOILS



HYDROLOGIC
TYPE B SOILS



SITE BOUNDARY



NOT TO SCALE

SOILS MAP



CLAREMONT BUSINESS PARK FIL. NO. 3

FEMA FIRM PANEL

National Flood Hazard Layer FIRMeTte



Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		Area of Minimal Flood Hazard Zone X
		Effective LOMRs
GENERAL STRUCTURES		Area of Undetermined Flood Hazard Zone D
		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance Water Surface Elevation
		17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
OTHER FEATURES		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **2/13/2020 at 12:07:22 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

38°51'19.98"N



USGS The National Map: Orthoimagery. Data refreshed April, 2019.

0 250 500 1,000 1,500 2,000 Feet 1:6,000

38°50'51.96"N

104°40'49.00"W

HYDROLOGIC CALCULATIONS

"AMENDMENT" TO THE PDR FOR CLAREMONT BUSINESS PARK 2 FILING NO.1
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
<i>A</i>	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
<i>B</i>	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
<i>C</i>	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
<i>D</i>	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
<i>E</i>	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
<i>F</i>	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
<i>G</i>	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
<i>H</i>	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>I</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
<i>J</i>	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
<i>K</i>	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
<i>L</i>	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
<i>M</i>	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
<i>N</i>	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
<i>O</i>	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
<i>P</i>	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
<i>Q</i>	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: GT
Date: 7/30/2020
Checked by: VAS

"AMENDMENT" TO THE PDR FOR CLAREMONT BUSINESS PARK 2 FILING NO.1
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 (Acres)	C ₅	C ₁₀₀	C ₅	Length (ft)	Height (ft)	T _C (min)	Length (ft)	Slope (%)	Velocity (fps)	T _t (min)	TOTAL (min)	CHECK (min)	I ₅ (in/hr)	I ₁₀₀ (in/hr)	Q ₅ (c.f.s.)	Q ₁₀₀ (c.f.s.)
		From DCM Table 5-1															
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	100	17.0	7.2	0	0.0%	0.0	0.0	7.2	10.6	4.6	7.8	0.5	3.7
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	100	17.0	7.2	0	0.0%	0.0	0.0	7.2	10.6	4.6	7.8	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: GT
Date: 7/30/2020
Checked by: VAS

"AMENDMENT" TO THE PDR FOR CLAREMONT BUSINESS PARK 2 FILING NO.1
PROPOSED DRAINAGE CALCULATIONS
(Basin Routing Summary)

From Area Runoff Coefficient Summary				OVERLAND				PIPE / CHANNEL FLOW				Time of Travel (T _t)	INTENSITY *		TOTAL FLOWS		COMMENTS
DESIGN POINT	CONTRIBUTING BASINS DPS AND/OR PIPES	CA ₅	CA ₁₀₀	C _s	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.)	
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 T _c)								5.0	5.2	8.7	6.5	11.8	Proposed PVT 24" Storm Sewer
4	F, Pipes 3 & 4	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	CDOT Type R Inlets (assumed split flows)
6	J, FB DP5	0.85	1.29	TAKEN FROM BASIN J (Adj to Min T _c)								5.0	5.2	8.7	4.4	11.2	CDOT Type R Inlets (assumed split flows)
7	K	0.34	0.37	TAKEN FROM BASIN K (Adj to Min T _c)								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	N, DP8, Pipes 7 and 10.1	5.15	6.16	TAKEN FROM DESIGN POINT 8								8.0	4.5	7.5	23.0	46.3	PVT Sand Filter Basin FSD Pond 2

Calculated by: GT
Date: 7/30/2020
Checked by: VAS

"AMENDMENT" TO THE PDR FOR CLAREMONT COMMERCIAL FILING NO. 2
PROPOSED DRAINAGE CALCULATIONS
(Storm Sewer Routing Summary)

PIPE RUN	Contributing Pipes/Design Points	Equivalent CA_5	Equivalent CA_{100}	Maximum T_C	Intensity*		Flow		Pipe Size
					I_5	I_{100}	Q_5	Q_{100}	
1	DP1	1.15	1.29	6.0	4.9	8.2	5.6	10.6	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 6, 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	12.8	23.3	PROP 24" PP
12	PR5.2, PR11	3.93	4.50	8.0	4.5	7.5	17.6	33.8	EX 42" RCP

* 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: GT

Date: 7/30/2020

Checked by: VAS

HYDRAULIC CALCULATIONS / SFB WQCV CALCULATIONS

Rating Table for 3' wide 6" deep Rectangular Channel

Project Description						
Friction Method		Manning				
Solve For		Formula				
		Discharge				
Input Data						
Roughness Coefficient		0.013				
Channel Slope		0.003 ft/ft				
Normal Depth		6.0 in				
Bottom Width		3.00 ft				
Channel Slope (ft/ft)	Discharge (cfs)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)	
0.003	4.46	2.97	1.5	4.0	3.00	
0.005	6.30	4.20	1.5	4.0	3.00	
0.008	7.72	5.15	1.5	4.0	3.00	
0.010	8.92	5.94	1.5	4.0	3.00	
0.013	9.97	6.65	1.5	4.0	3.00	
0.015	10.92	7.28	1.5	4.0	3.00	
0.018	11.79	7.86	1.5	4.0	3.00	
0.020	12.61	8.41	1.5	4.0	3.00	
0.023	13.37	8.92	1.5	4.0	3.00	
0.025	14.10	9.40	1.5	4.0	3.00	
0.028	14.79	9.86	1.5	4.0	3.00	
0.030	15.44	10.30	1.5	4.0	3.00	

"Amendment" for Claremont Business Park 2 Filing No.1
PRELIMINARY DRAINAGE PLAN CALCULATIONS
(Pond Volume Calculation)

WQCV POND 1

Elevation	SF	CF	Storage	
			AF	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	6,048.00	5,164.00	0.12	0.21
6376.00	7,348.00	6,698.00	0.15	0.36
6376.50	8,082.00	3,857.50	0.09	0.45

Total = 19,705 CF
Total = 0.5 Ac-ft

Calculated by: DLM
Date: 7/30/2020
Checked by: _____

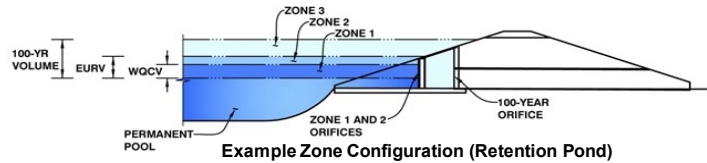
"AMENDMENT" TO THE PDR FOR
CLAREMONT BUSINESS PARK 2 FILING NO.1 (PROPOSED CONDITIONS)

Weighted Percent Imperviousness of Proposed WQ Sand Filter Pond 1				
Contributing Basins	Area (Acres)	C_s	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

MHFD-Detention, Version 4.02 (February 2020)

Project: CLAREMONT BUSINESS PARK 2 FILING NO.1

Basin ID: WQCV POND 1

Watershed Information

Selected BMP Type =	SF	
Watershed Area =	5.33	acres
Watershed Length =	735	ft
Watershed Length to Centroid =	325	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
Target WQCV Drain Time =	12.0	hours
Location for 1-hr Rainfall Depths =	User Input	

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

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.) =	0.399	acre-feet
5-yr Runoff Volume (P1 = 1.5 in.) =	0.525	acre-feet
10-yr Runoff Volume (P1 = 1.75 in.) =	0.629	acre-feet
25-yr Runoff Volume (P1 = 2 in.) =	0.749	acre-feet
50-yr Runoff Volume (P1 = 2.25 in.) =	0.860	acre-feet
100-yr Runoff Volume (P1 = 2.52 in.) =	0.989	acre-feet
500-yr Runoff Volume (P1 = 2.53 in.) =	0.994	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

Define Zones and Basin Geometry

Zone 1 Volume (WQCV) =	0.118	acre-feet
Zone 2 Volume (100-year - Zone 1) =	0.631	acre-feet
Select Zone 3 Storage Volume (Optional) =		acre-feet
Total Detention Basin Volume =	0.749	acre-feet
Initial Surge Volume (ISV) =	N/A	ft ³
Initial Surge 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	

Depth Increment =		ft
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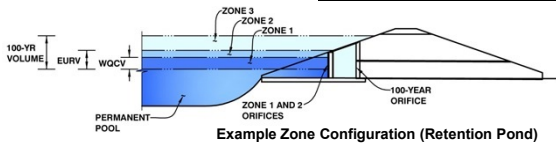
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DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.02 (February 2020)

Project: CLAREMONT BUSINESS PARK 2 FILING NO.1

Basin ID: WQCV POND 1



Example Zone Configuration (Retention Pond)

	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	1.26	0.118	Filtration Media
Zone 2 (100-year)	#VALUE!	0.631	Weir&Pipe (Restrict)
Zone 3			
Total (all zones)		0.749	

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

Underdrain Orifice Invert Depth = 2.50 ft (distance below the filtration media surface)
Underdrain Orifice Diameter = 1.63 inches

Calculated Parameters for Underdrain
Underdrain Orifice Area = 0.0 ft²
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 ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

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)

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

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = Not Selected ft²
Vertical Orifice Centroid = Not Selected feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

Overflow Weir Front Edge Height, H_o = 1.27 ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 6.00 feet
Overflow Weir Grate Slope = 0.00 H:V
Horiz. Length of Weir Sides = 2.91 feet
Overflow Grate Open Area % = 70%
Debris Clogging % = 50%

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H_u = 1.27 feet
Overflow Weir Slope Length = 2.91 feet
Grate Open Area / 100-yr Orifice Area = 7.70
Overflow Grate Open Area w/o Debris = 12.22 ft²
Overflow Grate Open Area w/ Debris = 6.11 ft²

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

Depth to Invert of Outlet Pipe = 2.75 ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter = 24.00 inches
Restrictor Plate Height Above Pipe Invert = 12.10 inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Plate
Outlet Orifice Area = 1.59 ft²
Outlet Orifice Centroid = 0.58 feet
Half-Central Angle of Restrictor Plate on Pipe = 1.58 radians

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage = 2.00 ft (relative to basin bottom at Stage = 0 ft)
Spillway Crest Length = 8.50 feet
Spillway End Slopes = 4:00 H:V
Freeboard above Max Water Surface = 1.00 feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = 0.67 feet
Stage at Top of Freeboard = 3.67 feet
Basin Area at Top of Freeboard = 0.19 acres
Basin Volume at Top of Freeboard = 0.45 acre-ft

Routed Hydrograph Results

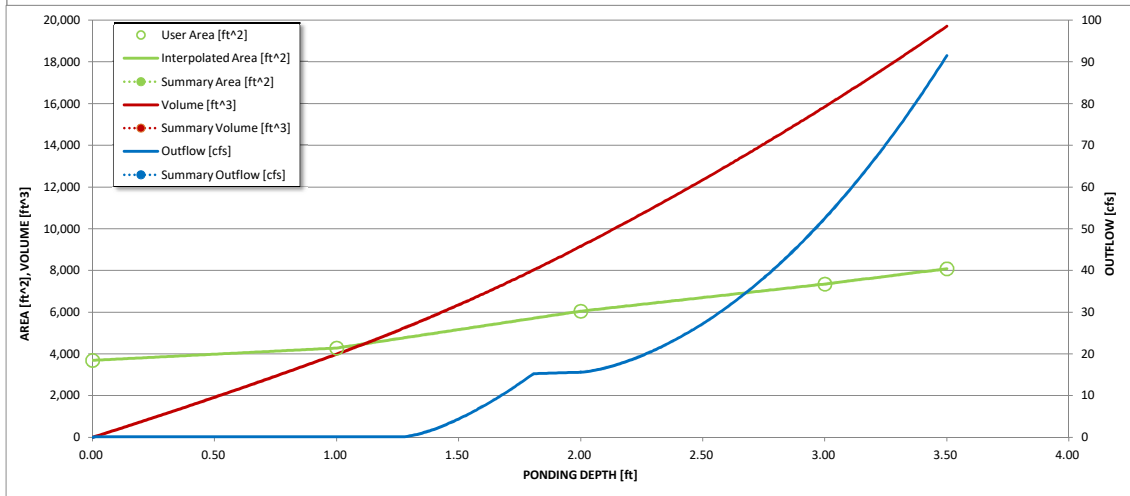
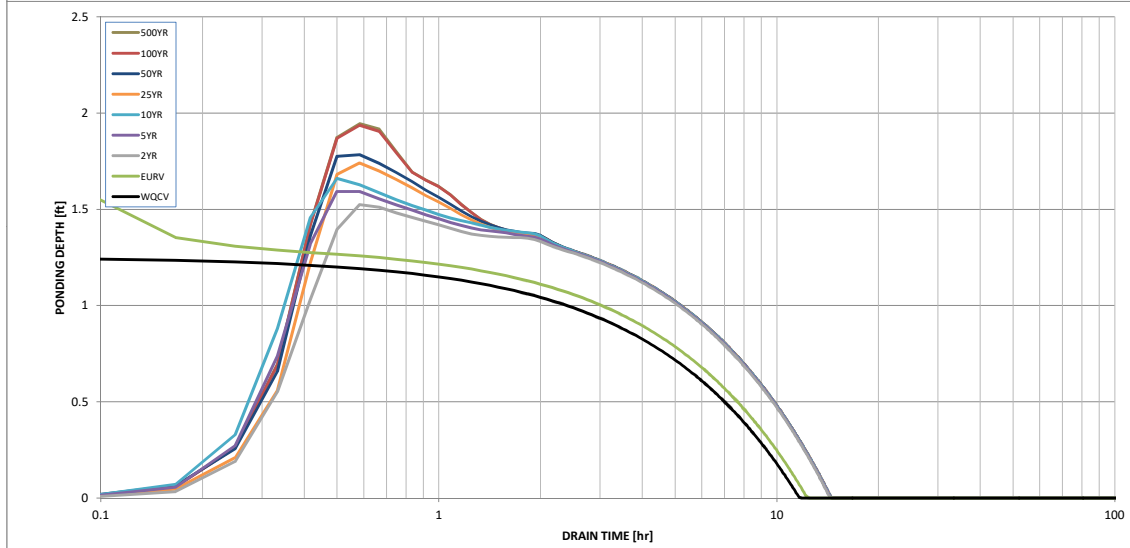
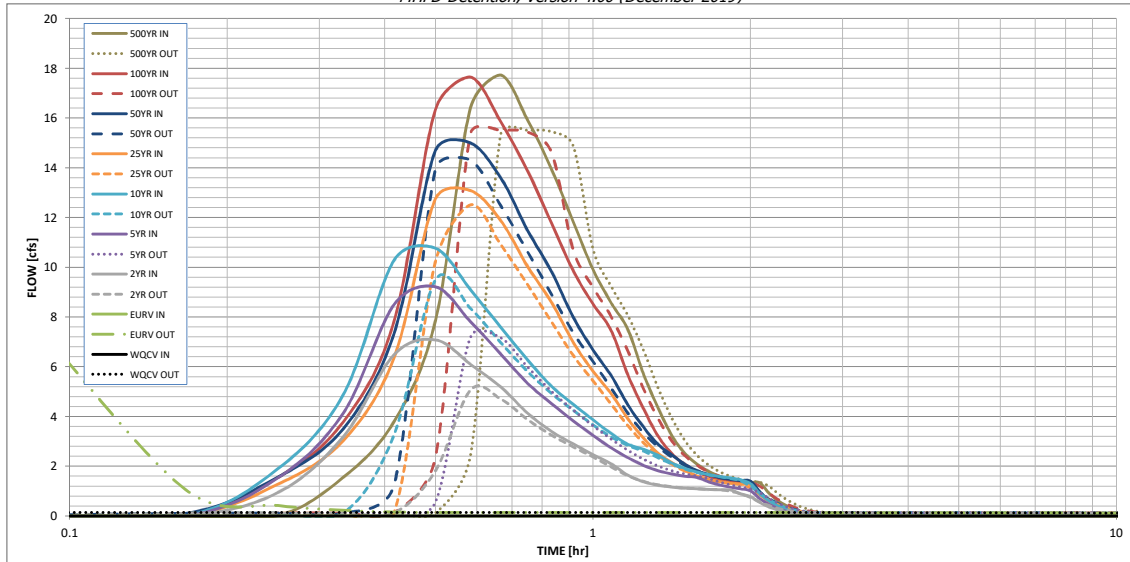
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	2.53
One-Hour Rainfall Depth (in)	N/A	N/A	0.399	0.525	0.629	0.749	0.860	0.989	0.994
CUHP Runoff Volume (acre-ft)	N/A	N/A	0.399	0.525	0.629	0.749	0.860	0.989	0.994
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	0.1	0.9	1.6	3.4	4.5	5.9	5.9
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	0.02	0.16	0.31	0.64	0.84	1.11	1.12
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A	0.02	0.16	0.31	0.64	0.84	1.11	1.12
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	7.1	9.2	10.8	13.1	15.0	17.6	17.7
Peak Inflow Q (cfs)	N/A	N/A	5.1	7.2	9.5	12.5	14.3	15.5	15.5
Peak Outflow Q (cfs)	N/A	N/A	8.2	5.8	3.7	3.2	2.6	2.6	2.6
Ratio Peak Outflow to Predevelopment Q	Filtration Media	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1
Structure Controlling Flow	N/A	0.65	0.39	0.6	0.8	1.0	1.1	1.3	1.3
Max Velocity through Gate 1 (fps)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Max Velocity through Gate 2 (fps)	11	11	13	13	13	12	12	11	11
Time to Drain 97% of Inflow Volume (hours)	12	12	14	14	14	14	14	13	13
Time to Drain 99% of Inflow Volume (hours)	1.26	1.62	1.52	1.59	1.66	1.74	1.78	1.94	1.94
Maximum Ponding Depth (ft)	0.11	0.12	0.12	0.12	0.12	0.13	0.13	0.14	0.14
Area at Maximum Ponding Depth (acres)	0.118	0.159	0.148	0.157	0.164	0.174	0.180	0.200	0.202
Maximum Volume Stored (acre-ft)									

NOTE: Per resolution 16-426 of the BoCC (included in Appendix), on-site WQCV is required but on-site stormwater detention is not required per the FDR for Claremont Business Park Filing No.2.

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)



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

"Amendment" for Claremont Business Park 2 Filing No.1
Preliminary DRAINAGE REPORT DRAINAGE CALCULATIONS
(Pond Volume Calculation)

WQCV POND 2

Elevation	SF	CF	Storage	
			AF	Sum
6365.50	3,907.00	0.00	0.00	0.00
6366.00	4,521.00	2,107.00	0.05	0.05
6367.00	5,829.00	5,175.00	0.12	0.17
6368.00	7,244.00	6,536.50	0.15	0.32
6369.00	9,079.00	8,161.50	0.19	0.50

Total = 21,980 CF
Total = 0.5 Ac-ft

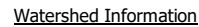
Calculated by: DLM
Date: 7/30/2020
Checked by: _____

"AMENDMENT TO THE PDR FOR
CLAREMONT BUNIESS PARK 2 FILING NO.1 (PROPOSED CONDITIONS)

Weighted Percent Imperviousness of Proposed WQ Sand Filter Pond 2				
Contributing Basins	Area (Acres)	C_s	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

MHFD-Detention, Version 4.02 (February 2020)

Basin ID: WQCV POND 2

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

Optional User Overrides

Define Zones and Basin Geometry

Depth Increment = ft

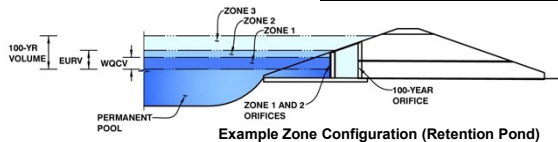
MHFD-Detention_v4-02 (pond 2).xlsm, Basin

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-*Detention*, Version 4.02 (February 2020)

Project: **CLAREMONT BUSINESS PARK 2 FILING NO.1**

Basin ID: **WQCV POND 2**



Example Zone Configuration (Retention Pond)

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

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 ft²
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 ft²
Elliptical Half-Width = N/A feet
Elliptical Slot Centroid = N/A feet
Elliptical Slot Area = N/A ft²

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)

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

Calculated Parameters for Vertical Orifice
Vertical Orifice Area = Not Selected ft²
Vertical Orifice Centroid = Not Selected feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Grate and Outlet Pipe OR Rectangular/Trapezoidal Weir (and No Outlet Pipe))

Overflow Weir Front Edge Height, H_o = 1.31 ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length = 7.00 feet
Overflow Weir Grate Slope = 0.00 H:V
Horiz. Length of Weir Sides = 2.91 feet
Overflow Grate Open Area % = 70%
Debris Clogging % = 50%

Calculated Parameters for Overflow Weir
Height of Grate Upper Edge, H_u = 1.31 feet
Overflow Weir Slope Length = 2.91 feet
Grate Open Area / 100-yr Orifice Area = 6.41
Overflow Grate Open Area w/o Debris = 14.26 ft²
Overflow Grate Open Area w/ Debris = 7.13 ft²

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

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
Outlet Orifice Area = 2.22 ft²
Outlet Orifice Centroid = 0.75 feet
Half-Central Angle of Restrictor Plate on Pipe = 1.91 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 = 10.00 feet
Spillway End Slopes = 4:00 H:V
Freeboard above Max Water Surface = 1.00 feet

Calculated Parameters for Spillway
Spillway Design Flow Depth = 0.84 feet
Stage at Top of Freeboard = 4.34 feet
Basin Area at Top of Freeboard = 0.21 acres
Basin Volume at Top of Freeboard = 0.50 acre-ft

Routed Hydrograph Results

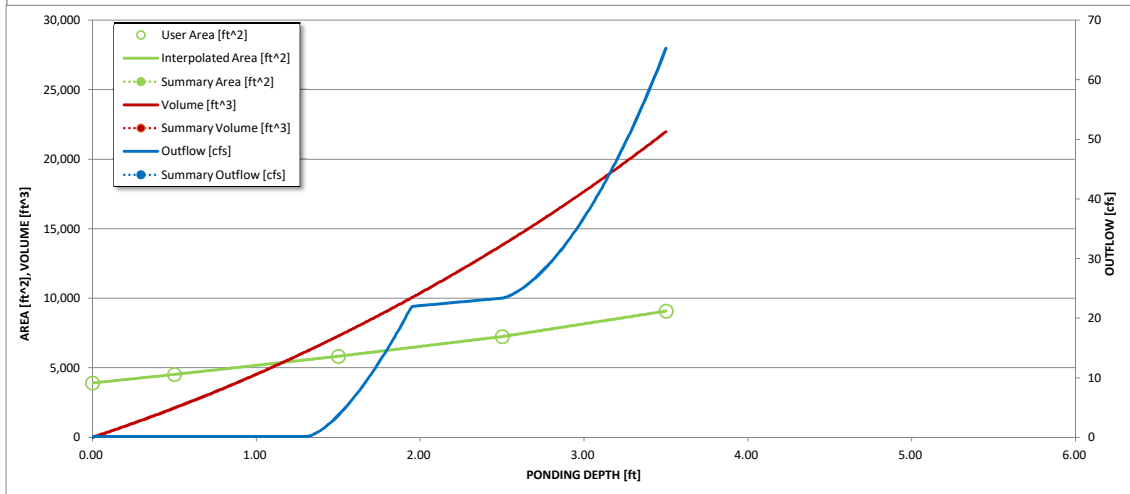
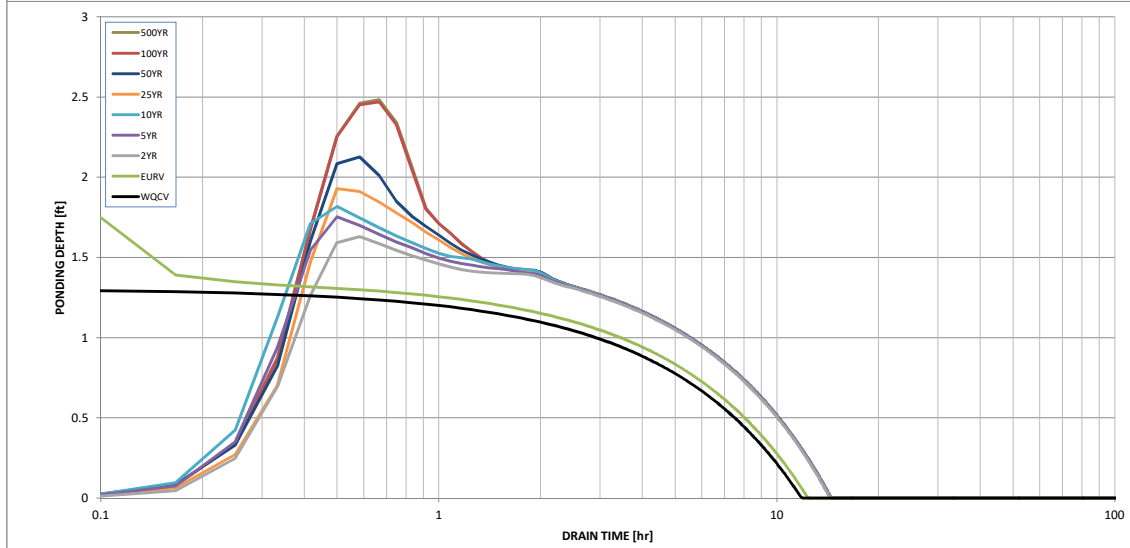
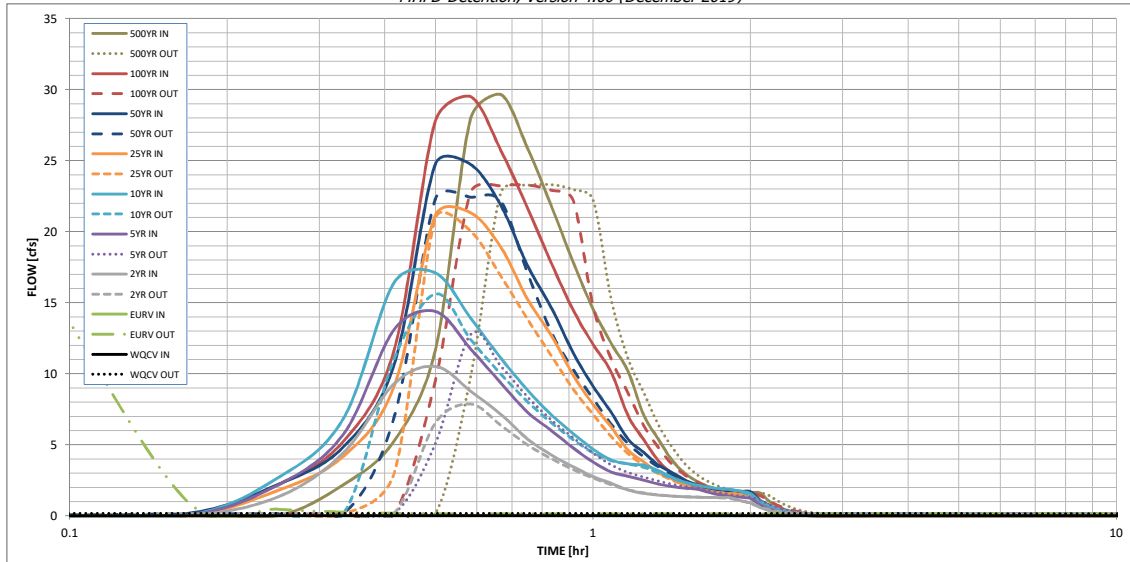
The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AF).

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year	500 Year
Design Storm Return Period	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52	2.53
One-Hour Rainfall Depth (in)	N/A	N/A	0.521	0.713	0.877	1.080	1.254	1.466	1.473
CUHP Runoff Volume (acre-ft)	N/A	N/A	0.521	0.713	0.877	1.080	1.254	1.466	1.473
Inflow Hydrograph Volume (acre-ft)	N/A	N/A	1.2	3.2	4.8	8.5	10.7	13.3	13.4
CUHP Predevelopment Peak Q (cfs)	N/A	N/A	0.14	0.38	0.56	0.99	1.24	1.56	1.57
OPTIONAL Override Predevelopment Peak Q (cfs)	N/A	N/A	0.14	0.38	0.56	0.99	1.24	1.56	1.57
Predevelopment Unit Peak Flow, q (cfs/acre)	N/A	N/A	10.5	14.4	17.1	21.3	24.8	29.5	29.6
Peak Inflow Q (cfs)	N/A	N/A	7.9	12.8	15.6	20.9	22.4	23.3	23.3
Peak Outflow Q (cfs)	N/A	N/A	4.0	3.2	2.5	2.1	1.7	1.7	1.7
Ratio Peak Outflow to Predevelopment Q	N/A	N/A	0.54	0.9	1.1	1.5	1.6	1.6	1.6
Structure Controlling Flow	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Outlet Plate 1	Outlet Plate 1	Outlet Plate 1
Max Velocity through Gate 1 (fps)	N/A	1.29	0.54	0.9	1.1	1.5	1.6	1.6	1.6
Max Velocity through Gate 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	11	13	13	12	12	11	11	11
Time to Drain 99% of Inflow Volume (hours)	12	12	14	14	14	14	13	13	13
Maximum Ponding Depth (ft)	1.31	1.88	1.63	1.75	1.82	1.93	2.13	2.47	2.48
Area at Maximum Ponding Depth (acres)	0.13	0.15	0.14	0.14	0.14	0.15	0.15	0.17	0.17
Maximum Volume Stored (acre-ft)	0.142	0.219	0.183	0.202	0.210	0.226	0.256	0.311	0.314

NOTE: Per resolution 16-426 of the BoCC (included in Appendix), on-site WQCV is required but on-site stormwater detention is not required per the FDR for Claremont Business Park Filing No.2.

DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD-Detention, Version 4.00 (December 2019)



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

BOCC RESOLUTION 16-426

**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**

ATTEST:



Chad D. Broerman
County Clerk & Recorder

By:

Sallie Clark
Chair of the Board

**EXCERPT OF “FINAL DRAINAGE REPORT FOR CLAREMONT
BUSINESS PARK FIL NO. 2 “, BY MATRIX DESIGN DATED
NOVEMBER 2006
&
EXISTING DRAINAGE MAP**



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:



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

Revised November 2006

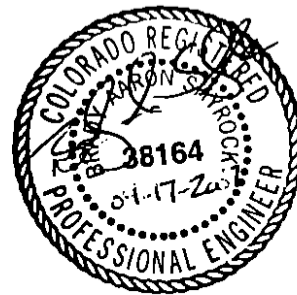
Engineer's Statement:

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.

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

SEAL

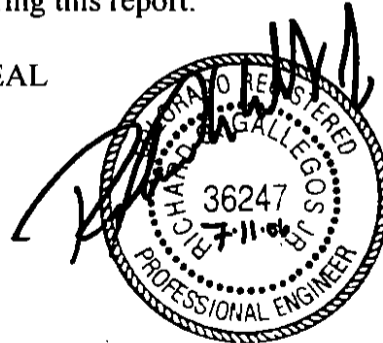


Engineer's Statement:

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:

D. Drainage and Bridge Fees

Claremont Business Park Filing No. 2 has not been previously platted. The drainage basin and bridge fees have been determined per the El Paso County Drainage Basin Fees Sheet, dated February 3, 2006, Resolution No. 06-31. The site is located entirely within the Sand Creek Drainage Basin. The fees are based upon the percent impervious of the development, which have been included within the appendix of this report. The fees due have been calculated as follows.

Claremont Business Park Filing No. 2

Final Drainage Report
Drainage and Bridge Fees

	Area (ac.)	Fee/Imp. Acre	% Imp.	Fee Due	Reimbursable Const. Costs	Fee Credit	Fee Due at Platting	Fee Credit Remaining
Drainage Fee	62.967	\$15,000.00	80%	\$755,604.00	\$0.00	\$1,225,355.45	\$0.00	\$469,751.45
Bridge Fee	62.967	\$1,503.00	80%	\$75,711.52	\$75,711.52	\$0.00	\$0.00	\$0.00
Total Fee Due at Platting							\$0.00	

The developer of Claremont Business Park is completing the construction of the channel improvements on behalf of the Central Marksheffel Metropolitan District. The construction costs for both Filing 1 and Filing 2 combined exceed the drainage fees due for the site. No drainage fees will be required at the time of platting.

It should be noted that the Central Marksheffel Business District is reimbursing the developer of Claremont Business Park Filing 2 for the construction costs of the channel minus the drainage fees due for the site. The District has \$1,225,355.45 of drainage credits available within the Sand Creek Basin. This credit amount is based upon the construction cost estimate for the channel minus the drainage fees assessed for Claremont Business Park Filing No. 1. The District will use an additional \$755,604.00 of the drainage credits for the platting of Claremont Business Park Filing No. 2. The District will have \$469,751.45 of drainage credits left within the Sand Creek Fee basin.

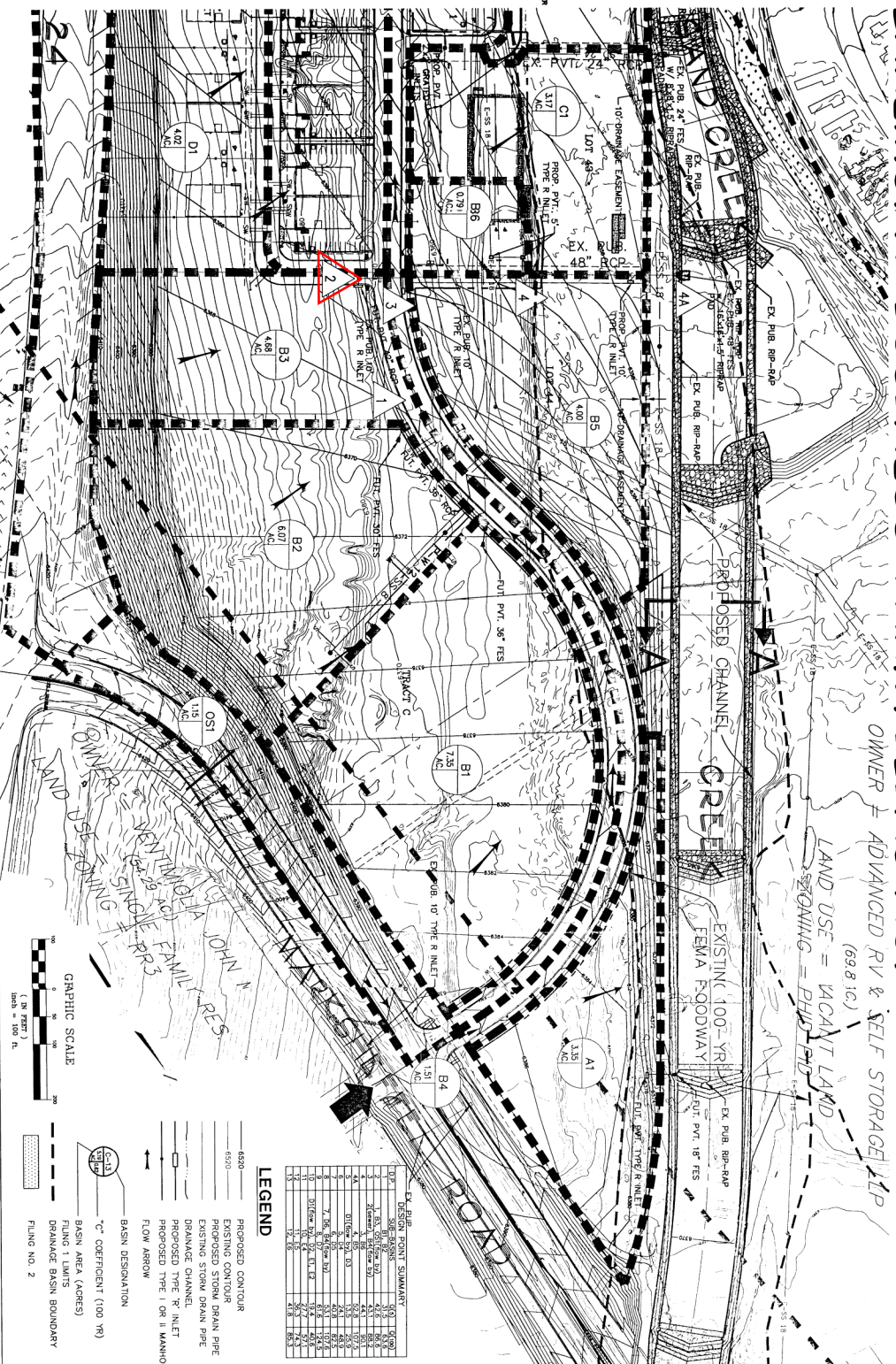
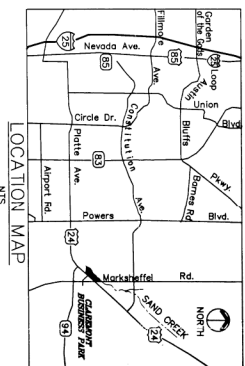
The Central Marksheffel Business District has also constructed the Marksheffel Road Bridge over East Fork Sand Creek. This structure has been identified as a needed public improvement within the Drainage Basin Planning Study for Sand Creek and is eligible for reimbursement. Since the construction of the Marksheffel Bridge is in excess of the \$75,711.52 in bridge fees due for this site, no bridge fees are required at the time of platting. The fee will be deducted from the eligible reimbursable construction costs of the bridge and the remaining credits will be utilized or reimbursement applied for by the Central Marksheffel Business District.

CLAREMONT BUSINESS PARK FILING NO. 2

OWNER = ADVANCED RV & SELF STORAGE LLP

LAND USE = VACANT LAND

SEWAGING = PUBLIC



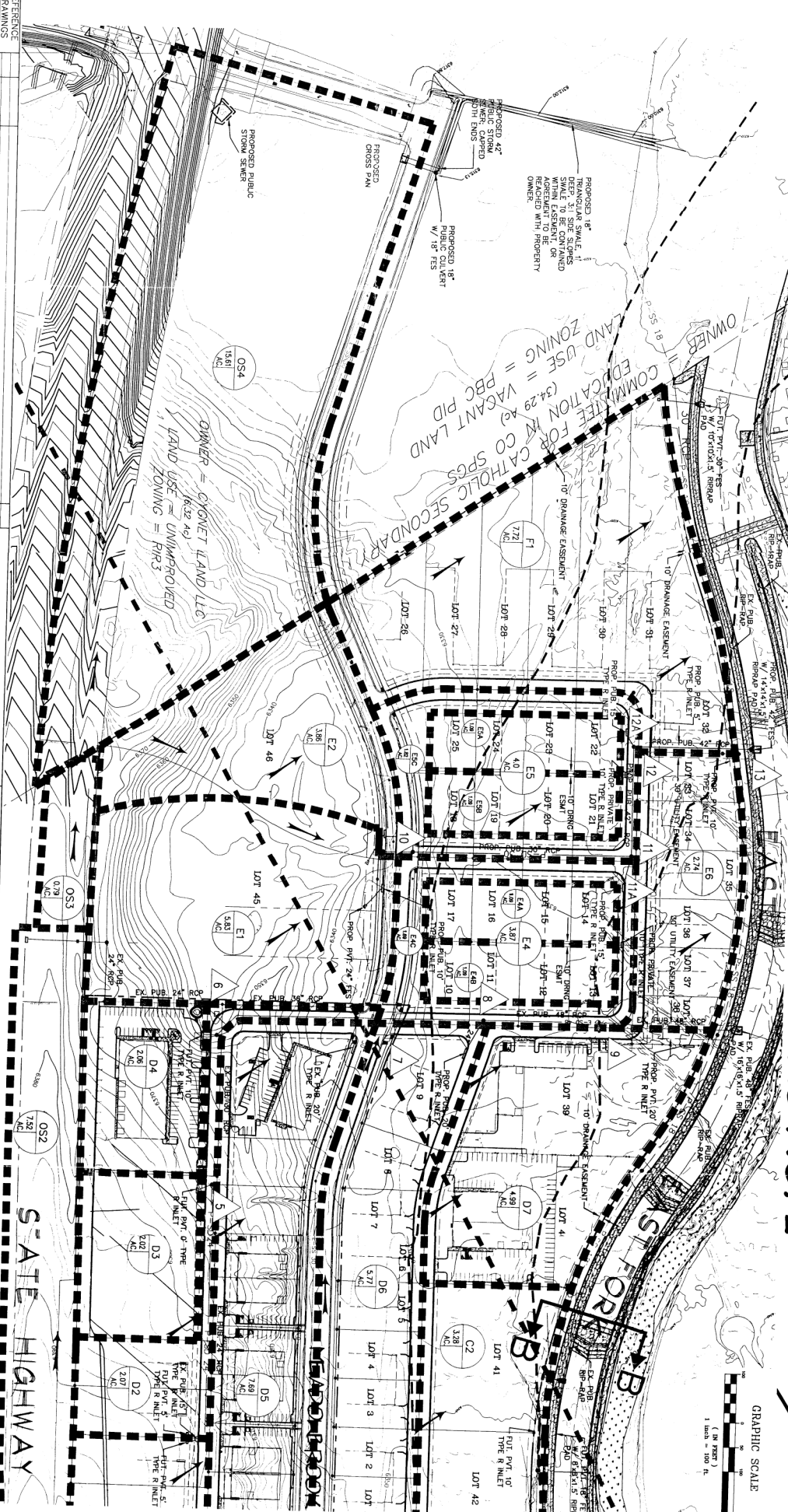
LEGEND

SYMBOL	DESCRIPTION
(Solid line)	PROPOSED CONTOUR
(Dashed line)	PASTURE CORNER DRAIN PIPE
(Dotted line)	EXISTING STORM DRAIN PIPE
(Thick solid line)	DRAINAGE CHANNEL
(Circle with cross)	PROPOSED TYPE 'R' INLET
(Arrow)	FLOW ARROW
(Circle with 'C')	BASIN DESIGNATION
(Circle with 'C' and '100')	"C" COEFFICIENT (100 FR)
(Circle with 'C' and '1000')	BASIN AREA (ACRES)
(Circle with 'C' and '10000')	FILING 1 LIMITS
(Circle with 'C' and '100000')	DRAINAGE BASIN BOUNDARY
(Circle with 'C' and '1000000')	FILING NO. 2

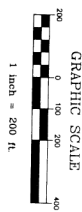
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99	01/01/01	99	01/01/01	99	01/01/01
100	01/01/01	100	01/01/01	100	01/01/01

DESIGN POINT SUMMARY			
D.P.	SUB-BASINS	(Q ₅)	(Q ₁₀₀)
11A	E4A, E4B, E4C	11.5	21.0
11	DP10, DP11A	27.7	57.1
12A	F3A, E5B, E5C	11.7	21.5
12	DP11, DP12A	36.3	74.3

DRAINAGE PLAN
CLAREMONT BUSINESS PARK FILING NO. 2

[illegible]

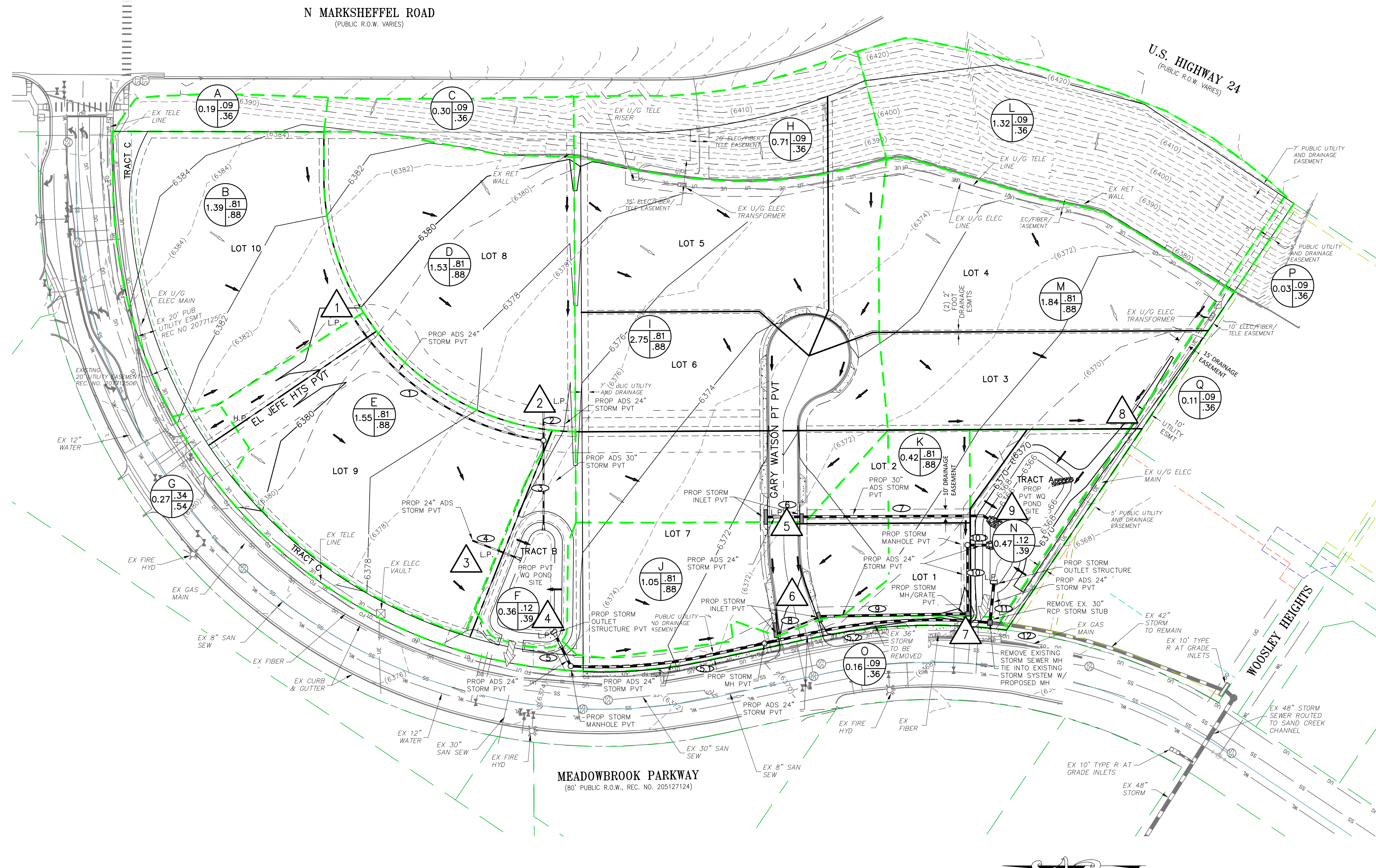
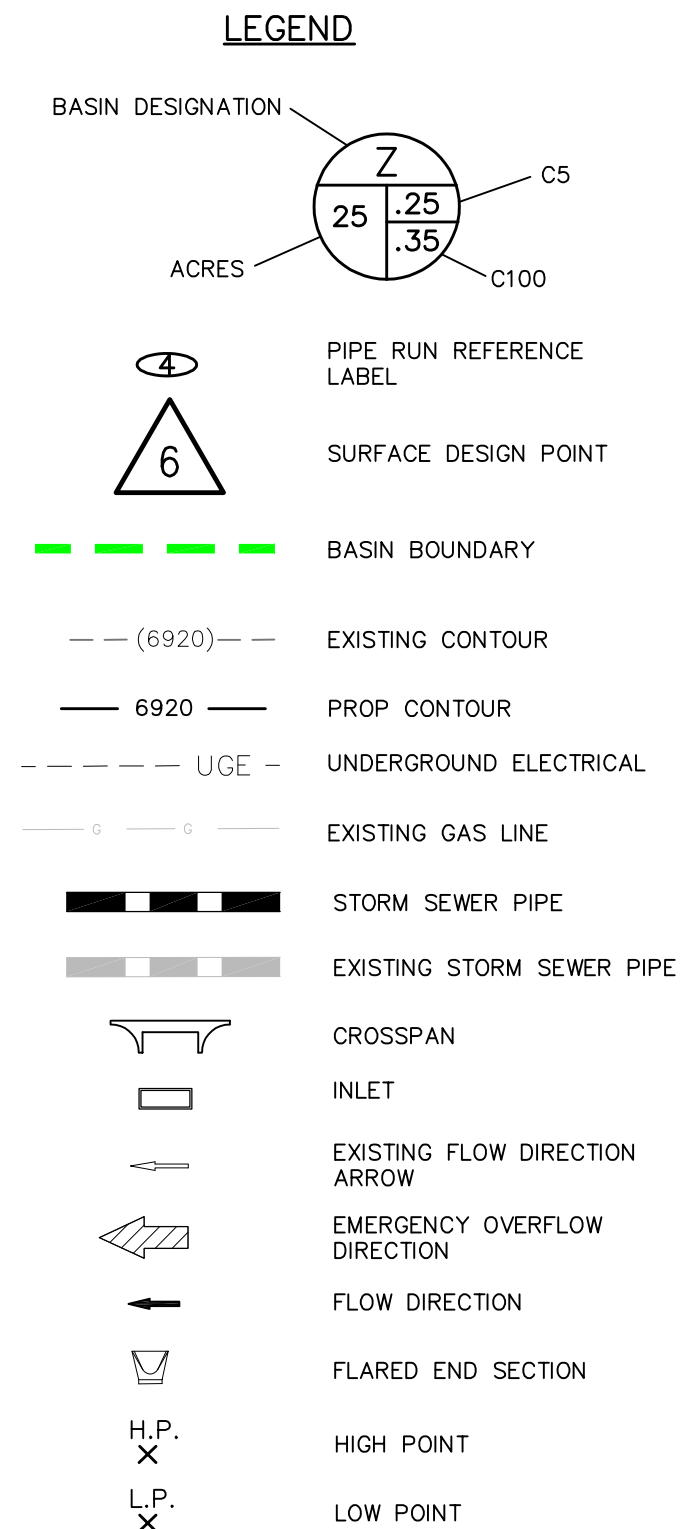
1

EXH01

PROPOSED DRAINAGE MAP

CLAREMONT BUSINESS PARK 2 FIL. NO. 1
"AMENDMENT" TO THE PRELIMINARY DRAINAGE REPORT FOR CLAREMONT
COMMERCIAL FILING NO. 2
COUNTY OF EL PASO, STATE OF COLORADO
PROPOSED DRAINAGE MAP

JULY 2020



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	3.7	
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, I, J	WO POND 1
5	10.1	19.8	H, I	CDOT TYPE R
6	4.4	11.2	J, FBOP5	CDOT TYPE R
7	1.8	3.2	K	MH W/GRATE
8	7.2	15.7	L, M	24" PP OR SWALE
9	23.0	46.3	N, DP8, PR 7 & 10.1	WO POND 2

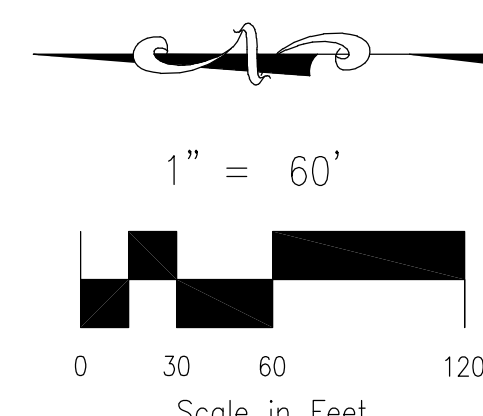
SF WQCV POND 1 SUMMARY		
EPC/URBAN DRAINAGE SAND FILTER BASIN-SEE STD. DET.		
AREA REQUIRED	2,335 SF	
AREA PROVIDED	3,690 SF	

SF ELEV = 6373.00
WQCV WSE = 6374.26
100 YR SPILLWAY ELEV = 6375.00
100 YR WSE = 6374.94

SF WQCV POND 2 SUMMARY		
EPC/URBAN DRAINAGE SAND FILTER BASIN-SEE STD. DET.		
AREA REQUIRED	2,962 SF	
AREA PROVIDED	3,907 SF	

SF ELEV = 6365.50
WQCV WSE = 6366.81
100 YR SPILLWAY ELEV = 6368.00
100 YR WSE = 6367.97

STORM SEWER SUMMARY				
PIPE RUN	Q ₅	Q ₁₀₀	PIPE SIZE	CONTRIBUTING DP/BASIN/PIPES
1	5.6	10.6	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"	PR6, 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	12.8	23.3	24"	POND 2 OUTFALL
12	17.6	33.8	EX42"	PR5.2, PR11



102 E. PIKES PEAK AVE., 5TH FLOOR
COLORADO SPRINGS, CO 80903
PHONE: 719.955.5485

CLAREMONT BUSINESS PARK 2 FIL. NO.1

PROPOSED DRAINAGE MAP

PROJECT NO. 44-037A	FILE: \dwg\Eng Exhibits\44037-PDRM.dwg	DATE: 07-30-2020	
DESIGNED BY: GW	SCALE: HORIZ: 1"=60'		
DRAWN BY: CLP	VERT: N/A		
CHECKED BY: VAS		SHEET 1 OF 1	PDM01

FOR LOCATING & MARKING GAS, ELECTRIC, WATER & TELEPHONE LINES

FOR BURIED UTILITY INFORMATION 48 HRS BEFORE YOU DIG CALL 1-800-922-1987