Master Development Drainage Plan

The Myron Stratton Home

&

Final Drainage Report

The Myron Stratton Home Phase 1
Colorado Springs, CO

Lot 1, Block 1 Myron Stratton Home Subdivision No. 1

Prepared For:

The Myron Stratton Home

555 Gold Pass Heights
Colorado Springs, CO 80906

Prepared By:

Kimley»Horn

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Kimley-Horn Project Number: 196258000
SWENT Project Number: STM-REV22-1516
Prepared: June 28, 2023

ENGINEER'S STATEMENT

This report and plan for the drainage design of *Lot 1, Block 1 Myron Stratton Home Subdivision No. 1* was prepared by me (or under my direct supervision) and is correct to the best of my knowledge and belief. Said report and plan has been prepared in accordance with the City of Colorado Springs Drainage Criteria Manual and is in conformity with the master plan of the drainage basin. I understand that the City of Colorado Springs does not and will not assume liability for drainage facilities designed by others. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report.

SIGNATURE (Affix Seal): _____ 6/28/2023

Colorado P.E. No.: 59054 Date

DEVELOPER'S STATEMENT:

The Myron Stratton Home hereby certifies that the drainage facilities for *Lot 1, Block 1 Myron Stratton Home Subdivision No. 1* shall be constructed according to the design presented in this report. I understand that (agency) does not and will not assume liability for the drainage facilities designed and/or certified by my engineer and that the City of Colorado Springs reviews drainage plans pursuant to section 7.7.906 of the City Code; but cannot, on behalf of *Lot 1, Block 1 The Myron Stratton Home Filing No. 1* guarantee that final drainage design review will absolve The Myron Stratton Home and/or their successors and/or assigns of future liability for improper design. I further understand that approval of the final plat does not imply approval of my engineer's drainage design.

Myron Stratton Home
Name of Developer

Authorized Signature 6/5/23
Date

Daniel O'Rear
Printed Name

Executive Director
Title

555 Gold Pass Heights
Colorado Springs, CO 80906
Address:

CITY OF COLORADO SPRINGS STATEMENT:

Filed in accordance with Section 7.7.906 of the Code of the City of Colorado Springs, 2001, as amended.

2023/07/13

For City Engineer Date

Conditions:

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APPENDIX

INTRODUCTION

PURPOSE AND SCOPE OF STUDY

The purpose of this report is to outline the Master Development Drainage Plan (the "MDDP") for The Myron Stratton Home located on one parcel at 2525 Highway 115 (the "Site"), City of Colorado Springs, Colorado (the "City"). This document also serves as the Final Drainage Report (the "FDR") for Phase 1 of the MDDP ("Phase 1"). Subsequent phases shown in the MDDP will be submitted as Final Drainage Reports at later dates.

The MDDP will evaluate the conceptual stormwater drainage plan for the southwest portion of Lot 1, Block 1 Myron Stratton Subdivision No. 1 (the "Subdivision"). The FDR will identify and analyze the existing and proposed drainage patterns and runoff quantities for Phase 1. The Project will be processed through the City of Colorado Springs.

GENERAL PROJECT DESCRIPTION

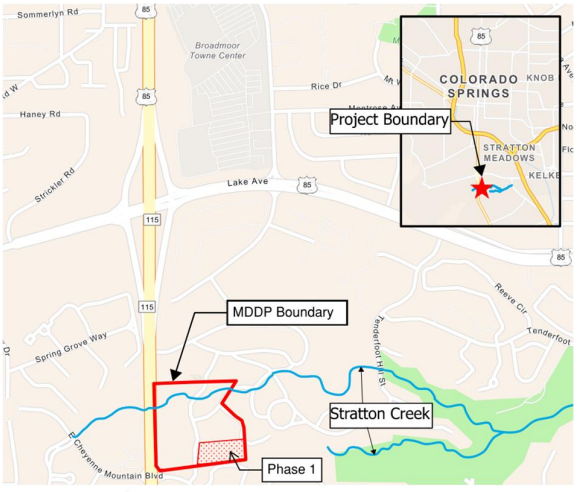
The proposed improvements for the MDDP will occur in 4 phases as outlined below:

- Phase 1: Construction of a residential building consisting of approximately 72 units, parking, and drive aisles. No storm infrastructure is being proposed with Phase 1.
- Phase 2: Construction of a residential building consisting of approximately 156-196 units.
- Phase 3: Construction of a residential building consisting of approximately 40-50 units.
- Phase 4: Construction of a central park amenity area.

The MDDP Concept Plan can be found in **Appendix A**.

The Site is 104.6 acres and is located in the Stratton and Southwest Area drainage basins. The Site is not located in a Streamside Zone.

A vicinity map is provided below.



SITE LOCATION MAP

NTS

MDDP PROJECT LOCATION

Northwest of the Site is Southgate Rd. North and east of the Site is the remaining portion of the Subdivision. South of the Site is Loup-Miller Filing #1 (Planned Unit Development) and Cheyenne Hills Filing #2 (Planned Business Center). West of the Site is Colorado State Highway 115 ("Highway 115").

The Site is currently partially developed with existing collector roads and private storm infrastructure. The portions of the Site that are undeveloped consist of natural vegetation.

FDR PROJECT LOCATION – PHASE 1

Phase 1 is located in the southwest portion of the Subdivision with South Dr. bordering to the west and Loup-Miller Filing #1 to the south. The Phase 1 watershed is approximately 3.97 acres with an anticipated total disturbance of 3.66 acres and is currently undeveloped consisting of natural vegetation.

PROJECT CHARACTERISITICS

EXISTING SITE DESCRIPTION

SOILS CONDITIONS

NRCS soil data is available for this Site and the soils map is provided in **Appendix C**. The soils onsite are generally Hydrologic Soil Group B.

FLOODPLAIN STATEMENT

The FEMA Flood Insurance Rate Map (FIRM) Panel 08041C0737G effective December 7, 2018, indicates that the Site is located in Zone X, outside of the 500-year floodplain, and that no portion of the Site is located within the 100-year floodplain. This panel is provided in **Appendix D**.

EROSION CONTROL PLANS

Erosion Control Plans will be submitted as a separate, standalone document to ProjectDox.

EXISTING DRAINAGE CONDITIONS

This Site was previously studied in the "Final Drainage Report for Myron Stratton Home-South Drive, Lot 1, Block 1, Myron Stratton Sub. Filing No. 1" by JPS Engineering, dated August 8, 2017 ("JPS FDR"). The JPS FDR defined the Myron Stratton Home Subdivision Filing No. 1 as nine sub-basins, (A, B1-B4, C1-C2, D, and OB1). Per this MDDP Site area, these basins were maintained or redefined based on current existing conditions. A basin comparison table between the two reports is provided below.

Table 1: Basin Comparison Summary

JPS FDR Proposed Sub-basins	Existing Sub-basins defined in this Report
C1	C1
C2	Portion of EX-S
B1 & B2	EX-1
Portion of B4	EX-N
B3	B3
A	Not included in Site area

D	Not included in Site area
OB1	OB1
Not defined in this report	OS

The Site is located in the Stratton and Southwest Area drainage basins and generally slopes northeast at approximately 2.5-6.0%.

The Site has been divided into seven existing sub-basins. Descriptions for each sub-basin are provided below. The existing drainage map for this MDDP/FDR and the proposed drainage map for the JPS FDR can be found in **Appendix H and Appendix G**, respectively.

EXISTING SUB-BASIN DESCRIPTIONS

Sub-basin C1:
Sub-basin C1 is 2.13 acres and consists of the southwest portion of the Site. The runoff from this sub-basin surface flows to the southeast to an existing private 24" RCP culvert beneath South Dr. (Design Point C1), which discharges onto sub-basin EX-S. The 5-year and 100-year storm event runoffs are 1.02 cfs and 5.27 cfs, respectively. The runoff within this sub-basin ultimately discharges into Stratton Creek tributary along the southern edge of the Site. An existing public 18" CMP is located on the west side of the sub-basin, but the storm sewer flows east to west towards Hwy 115 based on site observations. It is assumed this culvert does not affect onsite flows.

Sub-basin EX-1:
Sub-basin EX-1 is 12.01 acres and consists of the west portion of the Site. The runoff from this sub-basin surface flows to the northeast to existing roadside swale ES1 and southeast to existing roadside swale ES2 to an existing private detention pond (Design Point EX-1). The 5-year and 100-year storm event runoffs are 5.42 cfs and 27.18 cfs, respectively. The runoff within this sub-basin ultimately discharges to existing private detention pond B along the western edge of the Subdivision. Offsite runoff enters this sub-basin via an existing public 24" CMP culvert underneath Highway 115. This culvert is the outfall to an existing detention pond within Broadmoor Mesa Townhomes Filing #3 west of Highway 115. The JPS FDR identifies this existing detention pond west of Highway 115 to have a design discharge rate of 498 cfs for the 100-year storm event.

Sub-basin OS:
Sub-basin OS is a 0.24-acre offsite sub-basin west of the Site and east of Highway 115. The runoff from this sub-basin surface flows east onto sub-basin EX-1 to an existing private detention pond (Design Point EX-1). The 5-year and 100-year storm event runoffs are 0.10 cfs and 0.73 cfs, respectively. The runoff within this sub-basin ultimately discharges to existing private detention pond B along the western edge of the Subdivision.

Sub-basin EX-S:
Sub-basin EX-S is 2.20 acres and consists of the southeast portion of the Site. The runoff from this sub-basin surface flows to the southeast to existing swale ES7 that runs along the southern boundary of the Site (Design Point EX-S). The 5-year and 100-year storm event runoffs are 0.95 cfs and 5.22 cfs, respectively. Flows from sub-basin C1 via the existing private 24" RCP culvert underneath South Dr. discharge onto this sub-basin. The runoff within this sub-basin ultimately discharges into the Stratton Creek tributary along the southern edge of the Site.

Sub-basin EX-N:
Sub-basin EX-N is 1.03 acres and is along the eastern edge of the Site. The runoff from this sub-basin surface flows northeast to Design Point EX-N. The 5-year and 100-year storm event runoffs are 0.47 cfs and 2.52 cfs, respectively. The runoff from this sub-basin ultimately discharges to existing private detention pond B along the western edge of the Subdivision.

Sub-basin B3:
Sub-basin B3 is 7.13 acres and consists of the western portion of the Site. The runoff from this sub-basin surface flows northeast to existing roadside swales ES3, ES4, and ES5 to an existing rain garden (Design Point B3). The 5-year and 100-year storm event runoffs are 6.99 cfs and 23.36 cfs, respectively. The runoff from this sub-basin ultimately discharges to existing private detention pond B along the western edge of the Subdivision.

DRAINAGE DESIGN CRITERIA

The Project follows the City of Colorado Springs Storm Drainage Criteria Manual, Volumes 1 and 2 (the "Criteria") and the Mile High Flood District Urban Storm Drainage Criteria Manual Volumes 1, 2, and 3 (the "Manual").

HYDROLOGIC CRITERIA

Chapter 6 of the Criteria was referenced for all hydrologic calculations. Per Section 1.1, the 5-year and 100-year design storm events were used to determine runoff values. Per Section 1.4, the rational method was used to estimate design flows in the existing and proposed conditions. Composite runoff coefficients and impervious values were calculated using Table 6-6. The conveyance coefficients from Table 6-7 were used to calculate the time of concentration. Rainfall intensity was calculated using Figure 6-5.

The Final Drainage Reports for Phases 2-4 of this MDDP will adhere to the drainage design criteria outlined in the Criteria and the Manual current at the time of submittal.

Hydrologic calculations and the relevant tables and figures from the Criteria can be found in **Appendix E**.

HYDRAULIC CRITERIA

There are no proposed storm pipes or inlets with Phase 1. In conformance with the Criteria and the Manual, the proposed swale in Phase 1 has been analyzed using FlowMaster. Calculations are provided in **Appendix F**. The Final Drainage Reports for Phases 2-4 of this MDDP will adhere to the drainage design criteria outlined in the Criteria and the Manual current at the time of the submittal.

MASTER DEVELOPMENT DRAINAGE PLAN

PROPOSED DEVELOPMENT

This MDDP covers development within the southwest portion of the Subdivision. Phase 1 development is addressed in the FDR section of this report. Final Drainage Reports for Phase 2-4 addressing future development will be submitted as separate, standalone documents in the future and will be in conformance with design criteria current at the time of submittal and verify downstream capacities of existing storm infrastructure. This MDDP evaluates the water quality treatment and detention requirements for Phases 2-4. The Four Step Process for Phases 2-4 will be evaluated in future FDRs.

Per the JPS FDR, the future development of the Site was defined as eight main sub-basins, (A, B1-B4, C1-C2, and D). Per this MDDP Site area, these basins were maintained or redefined based on the proposed conditions. A basin comparison table between the two reports is provided below.

Table 2: Basin Comparison Summary

JPS FDR Proposed Sub-basins	Proposed Sub-basins defined in this Report
C1	PA2-a
C2	Portion of PA1
B1	PA2-b and portion of OS-2
B2	Portion of OS-2
B3	PA3 and portions of PA1, PA4 and OS-3
B4	Small portions of PA1 and PA4
A	Not included in Site area
D	Not included in Site area
Not defined in this report	OS-1

Sub-Basin PA4:
Sub-basin PA4 is 2.07 acres and consists of a proposed Phase 4 future park/amenity area. The current area consists of native grasses that will be designed into the future park/amenity area at a later date. The park/amenity area will consist of turfed grass, walkways, pavilions, benches, native grass, shrubs, and trees. The runoff from this basin surface flows to the existing parking area to the northeast (Design Point PA4). The 5-year and 100-year storm event runoffs are 1.42 cfs and 5.65 cfs, respectively. The runoff within this sub-basin ultimately discharges to the existing private detention pond B along the eastern edge of the Subdivision. A portio of this MDDP sub-basin will act as a receiving pervious area (RPA) for the FDR - Phase 1 development and the imperviousness will not change during any phase of this MDDP.

Sub-Basin PA3:
Sub-basin PA3 is 2.13 acres located north of Sub-Basin PA4 and consists of a proposed Phase 3 future residential development with an 85% imperviousness value. The runoff from this basin surface flows into OS-3 to the northeast (Design Point PA3). The 5-year and 100-year storm event runoffs are 8.29 cfs and 15.55 cfs, respectively. The runoff within this sub-basin is routed to an existing private rain garden before it ultimately discharges to the existing private detention pond B along the eastern edge of the Subdivision.

Sub-Basin PA2-a:
Sub-basin PA2-a is 2.16 acres located west of the Site and consists of an assumed future residential development with an 85% imperviousness value. The runoff from this basin surface flows into PA1 (Phase 1) to the east (Design Point PA2-a). The 5-year and 100-year storm event runoffs are 8.17 cfs and 15.42 cfs, respectively. The runoff within this sub-basin ultimately discharges into Stratton Creek tributary along the southeastern edge of Phase 1.

Sub-basin PA2-b
Sub-basin PA2 is 5.69 acres located west of the Site and consists of a proposed Phase 2 future residential development with an 85% imperviousness value. The runoff from this basin surface flows into OS-2 to the northeast (Design Point PA2). The 5-year and 100-year storm event runoffs are 19.27 cfs and 36.36 cfs, respectively. The runoff within this sub-basin is routed to the existing Private Detention Pond A before it ultimately discharges to the existing private detention pond B along the eastern edge of the Subdivision.

Sub-Basin PA1:
Sub-basin PA1 is 3.97 acres and is the Phase 1 area associated with the FDR portion of this report. The cumulative 5-year and 100-year storm event runoffs are 11.35 cfs and 23.66 cfs, respectively. The runoff within this sub-basin ultimately discharges to the existing private detention pond B along the eastern edge

of the Subdivision. Refer to the Proposed Sub-Basin Descriptions under the Final Drainage Report – Phase 1 section of this report for the FDR sub-basins defined within the MDDP sub-basin, PA1.

Sub-Basin OS-1:
Sub-basin OS-1 is 0.24 acres located west of PA2 and east of Highway 115. The runoff from this basin surface flows to the northeast into sub-basin PA2 (Design Point OS-1). The 5-year and 100-year storm event runoffs are 0.10 cfs and 0.73 cfs, respectively. The runoff within sub-basin this sub-basin is routed to the existing Private Detention Pond A before ultimately discharges to the existing private detention pond B along the eastern edge of the Subdivision.

Sub-Basin OS-2:
Sub-basin OS-2 is 6.18 acres located north of PA2 and south of Golden Pass Heights and Golden Ridge Grove. The runoff from this basin surface flows southeast to the existing private detention pond A (Design Point OS-2). The 5-year and 100-year storm event runoffs are 3.52 cfs and 15.71 cfs, respectively. The runoff within sub-basin is routed to the existing Private Detention Pond A, outfalls from the pond through an existing 36" RCP culvert into Stratton Creek and ultimately discharges to the existing private detention pond B along the eastern edge of the Subdivision.

Sub-Basin OS-3:
Sub-basin OS-3 is 0.24 acres located northeast of PA3 and south of Stratton Creek. The runoff from this basin surface flows north to the existing private rain garden (Design Point OS-3) before discharging into Stratton Creek. The 5-year and 100-year storm event runoffs are 3.27 cfs and 8.75 cfs, respectively. The runoff within this sub-basin is routed to an existing private rain garden before ultimately discharges to the existing private detention pond B along the eastern edge of the Subdivision.

FINAL DRAINAGE REPORT – PHASE 1

PROPOSED DRAINAGE CONDITIONS

The Site has been divided into twelve proposed sub-basins. Descriptions for each sub-basin are provided below. The proposed drainage map for this MDDP/FDR can be found in **Appendix H.**

PROPOSED SUB-BASIN DESCRIPTIONS

Sub-basin P1:
Sub-basin P1 is 0.80 acres and consists of the landscaped south portion of Phase 1. Runoff from the MDDP sub-basin PA2-a discharges into P1 via an existing private 24" CMP culvert underneath South Drive. The discharge from PA2-a is combined with P1 flows which generally surface flow to the proposed swale running along the from west to east towards an existing swale southeast of Phase 1 (Design Point P1). The 5-year and 100-year storm event runoffs are 0.39 cfs and 2.22 cfs, respectively. The runoff within this sub-basin ultimately discharges into Stratton Creek tributary along the southeastern edge of Phase 1.

Sub-basin P2:
Sub-basin P2 is 0.60 acres located west of the proposed building and consists of a private drive, parking bays, sidewalks, and landscaping. The runoff from this sub-basin surface flows through the proposed parking lot south into sub-basin P1 (Design Point P2) via flush curb. The 5-year and 100-year storm event runoffs are 1.57 cfs and 3.40 cfs, respectively. The runoff within this sub-basin flows through the proposed swale within sub-basin P1 before it ultimately discharges into Stratton Creek tributary along the southern edge of Phase 1.

Sub-basin P3:
Sub-basin P3 is 0.98 acres located north of the proposed building and consists a private drive, sidewalks, and landscaping. The runoff from this sub-basin surface flows from the Phase 1 northwestern entrance through the northern drive into the landscaping northeast of the site within the MDDP sub-basin PA4 (Design Point P3). The 5-year and 100-year storm event runoffs are 3.24 cfs and 6.52 cfs, respectively. The runoff within this sub-basin ultimately discharges to existing private detention pond B along the eastern edge of the Subdivision.

Sub-basin P4:
Sub-basin P4 is 0.31 acres and consists of the proposed courtyard south of the proposed building. The runoff from this sub-basin is routed via storm sewer and overland flow south into sub-basin P1 (Design Point P4) . The 5-year and 100-year storm event runoffs are 0.77 cfs and 1.63 cfs, respectively. The runoff within this sub-basin flows through the proposed swale within sub-basin P1 before it ultimately discharges into Stratton Creek tributary along the southern edge of Phase 1.

Sub-basin P5:
Sub-basin P5 is 0.25 acres located east of the proposed building and consists of a private drive, parking bays, sidewalks, and landscaping. The runoff from this sub-basin surface flows through the proposed parking lot southeast into sub-basin P1 (Design Point P5). The 5-year and 100-year storm event runoffs are 1.07 cfs and 1.97 cfs, respectively. The runoff from this sub-basin ultimately discharges to existing private detention pond B along the eastern edge of the Subdivision. The runoff within this sub-basin overland flows through sub-basin P1 into the existing swale along the southern edge of Phase 1 before it ultimately discharges into Stratton Creek tributary.

Sub-basin P6:
Sub-basin P6 is 0.06 acres located on the northeastern edge of Phase 1 and consists of retaining walls and landscaping. The runoff from this sub-basin surface flows east (Design Point P6) through landscaping towards an existing gravel drive. The 5-year and 100-year storm event runoffs are 0.02 cfs and 0.16 cfs, respectively. The runoff within this sub-basin ultimately discharges to existing private detention pond B along the eastern edge of the Subdivision.

Sub-basin P7:
Sub-basin P7 is 0.17 acres located on the western edge of Phase 1 and consists of the existing private road, South Drive. The runoff from this sub-basin generally surface flows east into subbasin P1 (Design Point P7). The 5-year and 100-year storm event runoffs are 1.01 cfs and 1.96 cfs, respectively. The runoff within this sub-basin flows through the proposed swale within sub-basin P1 before it ultimately discharges into Stratton Creek tributary along the southern edge of Phase 1.

Sub-basin R1:
Sub-basin R1 is 0.14 acres and consists of the the western portion of the proposed building. The runoff from this sub-basin discharges from roof drains into landscaping and surface flows west into sub-basin P2 (Design Point R1). The 5-year and 100-year storm event runoffs are 0.53 cfs and 0.98 cfs, respectively. The runoff within this sub-basin flows through the proposed swale within sub-basin P1 before it ultimately discharges into Stratton Creek tributary along the southern edge of Phase 1.

Sub-basin R2:
Sub-basin R2 is 0.15 acres and consists of the the north portion of the proposed building. The runoff from this sub-basin discharges from roof drains into the northern driveway within P3 (Design Point R2). The 5-year and 100-year storm event runoffs are 0.56 cfs and 1.05 cfs, respectively. The runoff within this sub-basin ultimately discharges to existing private detention pond B along the western edge of the Subdivision.

Sub-basin R3:
Sub-basin R3 is 0.09 acres and consists of the the northeast portion of the proposed building. The runoff from this sub-basin connects from roof drains to storm chases discharging into the western parking lot

within sub-basins P5 (Design Point R3). The 5-year and 100-year storm event runoffs are 0.33 cfs and 0.61 cfs, respectively. The runoff within this sub-basin ultimately discharges to existing private detention pond B along the western edge of the Subdivision.

Sub-basin R4:
Sub-basin R4 is 0.05 acres and consists of the the southeast portion of the proposed building. The runoff from this sub-basin connects from roof drains to storm chases discharging into the southern landscaping area within sub-basin P1 (Design Point R4). The 5-year and 100-year storm event runoffs are 0.19 cfs and 0.35 cfs, respectively. The runoff within this sub-basin flows through the proposed swale within sub-basin P1 before it ultimately discharges into Stratton Creek tributary along the southern edge of Phase 1.

Sub-basin R5:
Sub-basin R5 is 0.26 acres and consists of the portion of the proposed building adjacent to the courtyard. The runoff from this sub-basin connects to roof drains discharging into the southern landscaping area within sub-basin P1 (Design Point R5). The 5-year and 100-year storm event runoffs are 1.00 cfs and 1.85 cfs, respectively. The runoff within this sub-basin flows through the proposed swale within sub-basin P1 before it ultimately discharges into Stratton Creek tributary along the southern edge of Phase 1.

PROPOSED HYDRAULICS

INLETS

There are no proposed inlets for Phase 1.

STORM PIPES

There are no proposed storm pipes for Phase 1.

SWALES

Proposed swale capacity was analyzed using FlowMaster. During a 100-year storm event, the proposed swale will hold approximately 29.38 cfs; a combination of onsite runoff from the Phase 1 development and anticipated offsite runoff from Phase 2 development in sub-basin PA2-a. In order to maintain flow velocity below 5 ft/sec, longitudinal slopes will not exceed 7.2%. Swale capacity calculations can be found in **Appendix F**.

FOUR-STEP PROCESS

Step 1: Runoff Reduction
The proposed development for Phase 1 routes runoff through Planned Infiltration Areas (PIAs) on all sides of the proposed development to promote infiltration. Version 3.07 of the Mile High Flood District's (MHFD) UD-BMP spreadsheet for Phase 1 is included in **Appendix E**. Runoff reduction spreadsheets for Phases 2-4 will be included with their respective FDR. The runoff reduction exhibit is included in **Appendix H**.

The exhibit shows that a portion of the Site flows north to proposed flush curb. Runoff sheet flows over a grass buffer into the future Phase 4 amenity area. This grass buffer area will remain pervious in all future developments of this area. Approximately 0.40 acres (17,440 square feet) of the northern grass buffer for Phase 1 overlaps with the planned central park amenity in Phase 4. This area will not be disturbed with Phase 1 development, and therefore is not accounted for in the total area of disturbance for this FDR.

Any future development proposed with Phase 4 will maintain the use of this space as a PIA to ensure the reduction in WQCV for Phase 1 is not affected by future development in this Subdivision. If impervious areas are proposed with the Phase 4 development in the PIA section, additional calculations will be completed to show compliance with the four-step process as stepped out in this MDDP/FDR.

To the west of the proposed building, runoff from an existing sidewalk sheet flows east to the receiving PIA located west of the proposed building.

To the east of the proposed building, runoff sheet flows east to proposed flush curb. Roof drains in basin R3 are directed to adjacent pervious area east of the proposed building and sheet flows north.

The remainder of the Site flows south to curb and gutter with flush curb along the southern edge of both proposed parking lots and the eastern edge of the southeastern proposed parking lot. Roof drains are directed to level spreaders in the southern PIA. Runoff flows across a grass buffer and then into a pervious swale. The swale directs flows to an existing swale at the southeast corner of the project.

The calculations show that the total disturbed area (3.66 acres; 159,437 square feet) is accounted for in the calculations. The results of the calculations show that 89% of the water quality control volume (WQCV) is infiltrated through runoff reduction. Therefore, the Step 1 Criteria to reduce the WQCV by at least 10% is being met and the installation of storm pipe networks is not needed to direct onsite runoff to existing downstream storm infrastructure.

Step 2: Treat and Slowly Release the WQCV
Storm infrastructure is not being proposed with Phase 1. Phase 1 has a proposed percent impervious value of 48%. The UD-BMP spreadsheet in **Appendix E** shows the PIAs will infiltrate 89% of the WQCV. Therefore, per the City's MS4 Permit, Step 2 requirements are met as at least 75% of the WQCV is being infiltrated.

Step 3: Stabilize Stream Channels
The Site is located more than 500 feet away from any major drainageways so channel stabilization will not be provided with the Phase 1 development.

All new and re-development projects are required to construct or participate in the funding of channel stabilization measures. Drainage basin fees paid, at the time of platting, go towards channel stabilization within the drainage basin.

Step 4: Implement Source Controls
The Site does not require "Covering of Storage/Handling Areas" or "Spill Containment and Control" (specialized control measures) in the final constructed condition. There is no proposed material storage or other stie operations that would introduce contaminants to the City's MS4 that would require site specific control or source control measures for the proposed project.

DETENTION

Detention

Detention for sub-basins P3, P5, R2, and approximately 0.1 acres of P7 is being provided by existing private detention pond B on the eastern edge of the Subdivision. Sub-basins P1, P2, P4, P6, R1, and R3-R5 will continue to flow offsite via the proposed swale, same as in the existing condition.

The JPS FDR states the detention pond was sized assuming a runoff coefficient of 0.95 for the Phase 1 area, indicating 95% imperviousness. As Phase 1 is proposed at 58%, the developments lower imperviousness will generate less flows than assumed in the JPS FDR. Thus, the existing private detention pond B with the volume of 28.9 acre-feet, is sufficient for the proposed development in Phase 1.

FEES DEVELOPMENT

DRAINAGE AND BRIDGE FEES

The Site is located in the Stratton and Southwest Area drainage basins. The Site was previously platted and drainage and bridge fees have already been paid.

CONSTRUCTION COST OPINION

No storm infrastructure is being proposed with Phase 1, so no cost estimate is required.

CONCLUSION

The drainage design presented within this report for The Myron Stratton Home conforms to the City of Colorado Springs Storm Drainage Criteria Manual, Volumes 1 and 2 and the Mile High Flood District Manual. Furthermore, runoff will not adversely affect the downstream and surrounding developments.

This report and its findings are in general conformance with all previously approved reports and/or studies that include this Site.

REFERENCES

City of Colorado Springs Drainage Criteria Manual, January 2021, with latest revisions.

Green Infrastructure Guidance Manual, City of Colorado Springs, Colorado, March 2022.

Mile High Flood District Drainage Criteria Manual Vol. 1, prepared by Wright-McLaughlin Engineers, June 2001, with latest revisions.

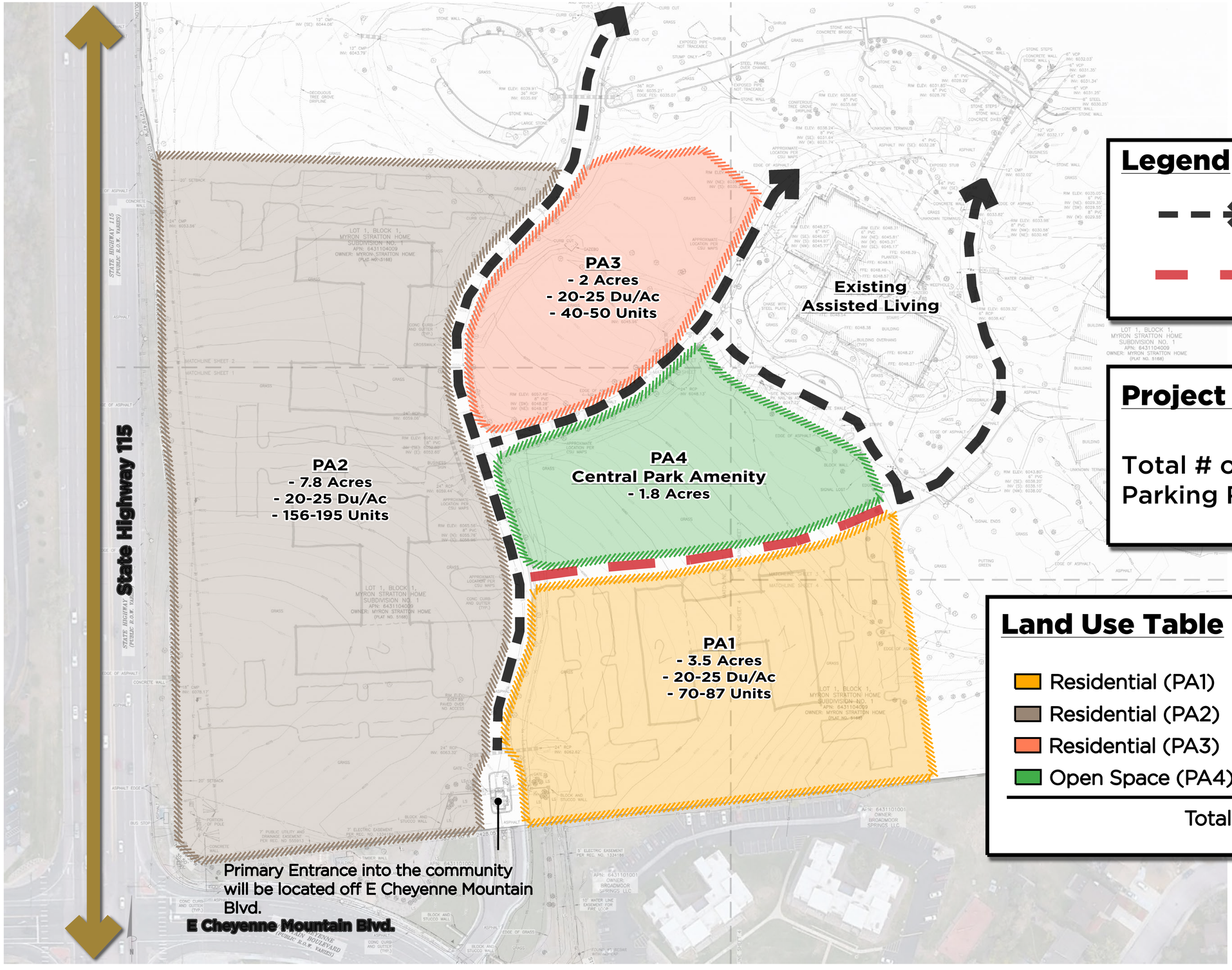
"The Final Drainage Report for Myron Stratton Home – South Drive, Lot 1, Block 1, Myron Stratton Sub. Filing No. 1," prepared by JPS Engineering, August 8, 2017.

Flood Insurance Rate Map, El Paso County, Colorado and Incorporated Areas, Map Number 08041C0737G, Effective Date December 7, 2018, prepared by the Federal Emergency Management Agency (FEMA).

"Hydrologic Group Rating for El Paso County Area, Colorado", UDSA-Natural Resources Conservation Service, National Cooperative Soil Survey. Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov. September 20, 2022.

APPENDIX

APPENDIX A – MDDP CONCEPT PLAN



Legend

- Existing Road
- Proposed Road

Project Summary

Total # of Units	236-295 Du
Parking Ratio	1.0 Sp/Du

Land Use Table

Residential (PA1)	+/- 3.4 Acres	68 - 85 Units
Residential (PA2)	+/- 6.4 Acres	128 - 160 Units
Residential (PA3)	+/- 2.0 Acres	68 - 85 Units
Open Space (PA4)	+/- 1.8 Acres	
Total	+/-13.6 Acres	263 - 295 Units

MYRON STRATTON HOME

Colorado Springs, CO

KEPHART
community ■ planning ■ architecture

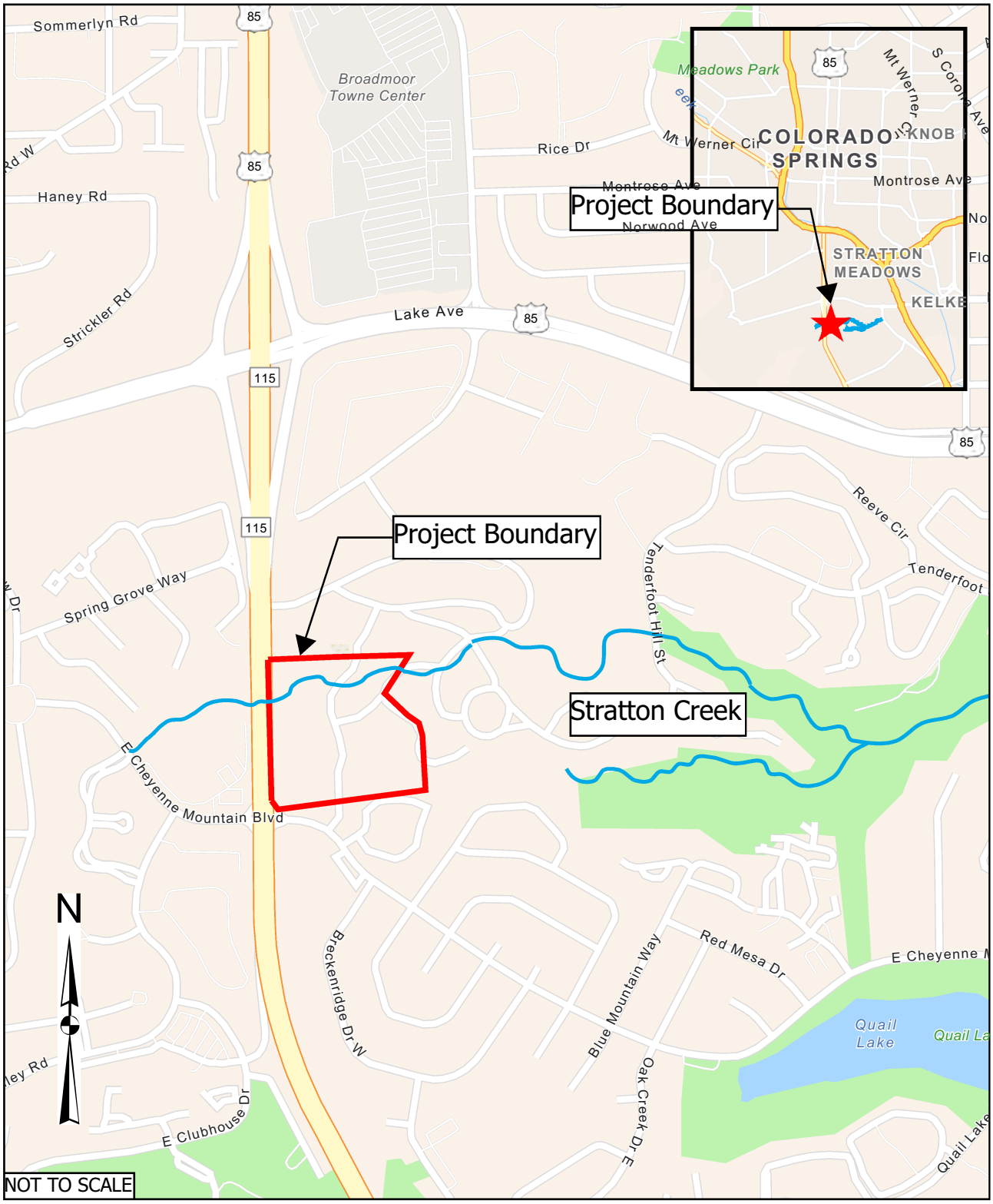
KA #221025

09.21.2022

NORTH

0 60 120

APPENDIX B – VICINITY MAP



Kimley»Horn	Myron Stratton	El Paso County, Colorado
	Figure 1. Vicinity Map	

APPENDIX C – NRCS SOIL REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for El Paso County Area, Colorado

December 12, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

Map Scale: 1:2,480 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12	Bresser sandy loam, cool, 3 to 5 percent slopes	16.1	91.0%
82	Schamber-Razor complex, 8 to 50 percent slopes	1.6	9.0%
Totals for Area of Interest		**17.7**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

El Paso County Area, Colorado

12—Bresser sandy loam, cool, 3 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2tlpd
Elevation: 6,300 to 6,800 feet
Mean annual precipitation: 13 to 19 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 140 days
Farmland classification: Prime farmland if irrigated and the product of I (soil erodibility) x C (climate factor) does not exceed 60

Map Unit Composition

Bresser, cool, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bresser, Cool

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Tertiary aged alluvium derived from arkose

Typical profile

Ap - 0 to 5 inches: sandy loam
Bt1 - 5 to 8 inches: sandy loam
Bt2 - 8 to 27 inches: sandy clay loam
Bt3 - 27 to 36 inches: sandy loam
C - 36 to 80 inches: loamy coarse sand

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.1 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: B
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Truckton

Percent of map unit: 10 percent
Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Yoder

Percent of map unit: 5 percent
Landform: Alluvial fans
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

82—Schamber-Razor complex, 8 to 50 percent slopes

Map Unit Setting

National map unit symbol: 369y
Elevation: 5,500 to 6,500 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 170 days
Farmland classification: Not prime farmland

Map Unit Composition

Schamber and similar soils: 55 percent
Razor and similar soils: 43 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Schamber

Setting

Landform: Breaks
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite and/or colluvium derived from granite and/or eolian deposits derived from granite

Typical profile

A - 0 to 5 inches: gravelly loam
AC - 5 to 15 inches: very gravelly loam
C - 15 to 60 inches: very gravelly sand

Properties and qualities

Slope: 8 to 50 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R069XY064CO - Gravel Breaks
Hydric soil rating: No

Description of Razor

Setting

Landform: Breaks
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey slope alluvium over residuum weathered from shale

Typical profile

A - 0 to 3 inches: clay loam
Bw - 3 to 9 inches: clay loam
Bk - 9 to 31 inches: clay
Cr - 31 to 35 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Moderately saline to strongly saline (8.0 to 16.0 mmhos/cm)
Sodium adsorption ratio, maximum: 15.0
Available water supply, 0 to 60 inches: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): 6e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R069XY047CO - Alkaline Plains

Other vegetative classification: ALKALINE PLAINS (069AY047CO)
Hydric soil rating: No

Minor Components

Other soils
Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

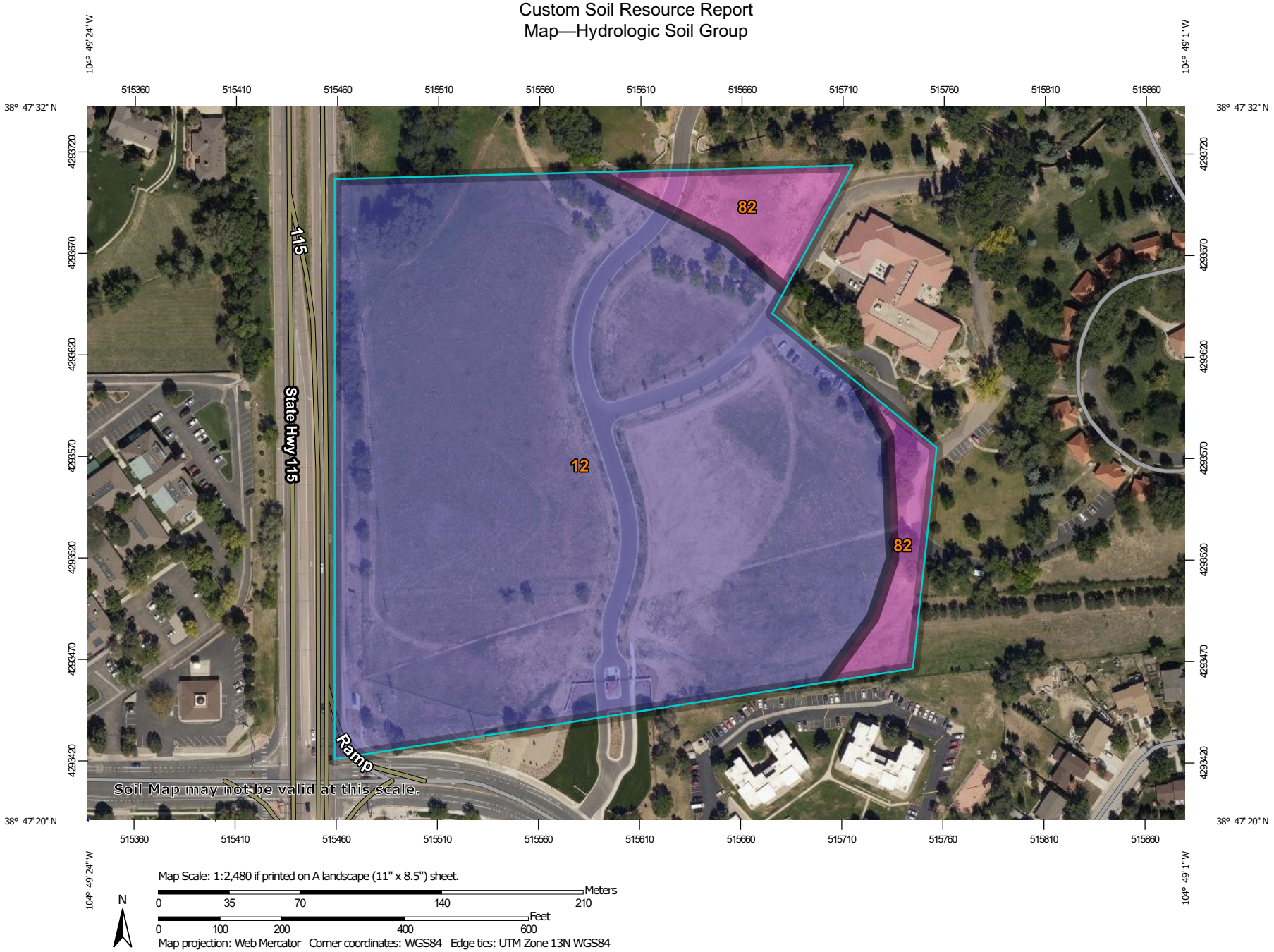
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Custom Soil Resource Report
Map—Hydrologic Soil Group



Map Scale: 1:2,480 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
12	Bresser sandy loam, cool, 3 to 5 percent slopes	B	16.1	91.0%
82	Schamber-Razor complex, 8 to 50 percent slopes	A	1.6	9.0%
Totals for Area of Interest			**17.7**	**100.0%**

Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

References

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APPENDIX D – FEMA FIRM PANEL

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 13. The **horizontal datum** was NAD83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the **North American Vertical Datum of 1988 (NAVD88)**. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242 or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was provided in digital format by El Paso County, Colorado Springs Utilities, City of Fountain, Bureau of Land Management, National Oceanic and Atmospheric Administration, United States Geological Survey, and Anderson Consulting Engineers, Inc. These data are current as of 2006.

This map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. The profile baselines depicted on this map represent the hydraulic modeling baselines that match the flood profiles and Floodway Data Tables if applicable, in the FIS report. As a result, the profile baselines may deviate significantly from the new base map channel representation and may appear outside of the floodplain.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact **FEMA Map Service Center** (MSC) via the FEMA Map Information eXchange (FMIX) 1-877-336-2627 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. The MSC may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

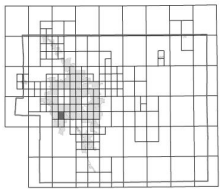
If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

El Paso County Vertical Datum Offset Table

Flooding Source	Vertical Datum Offset (ft)

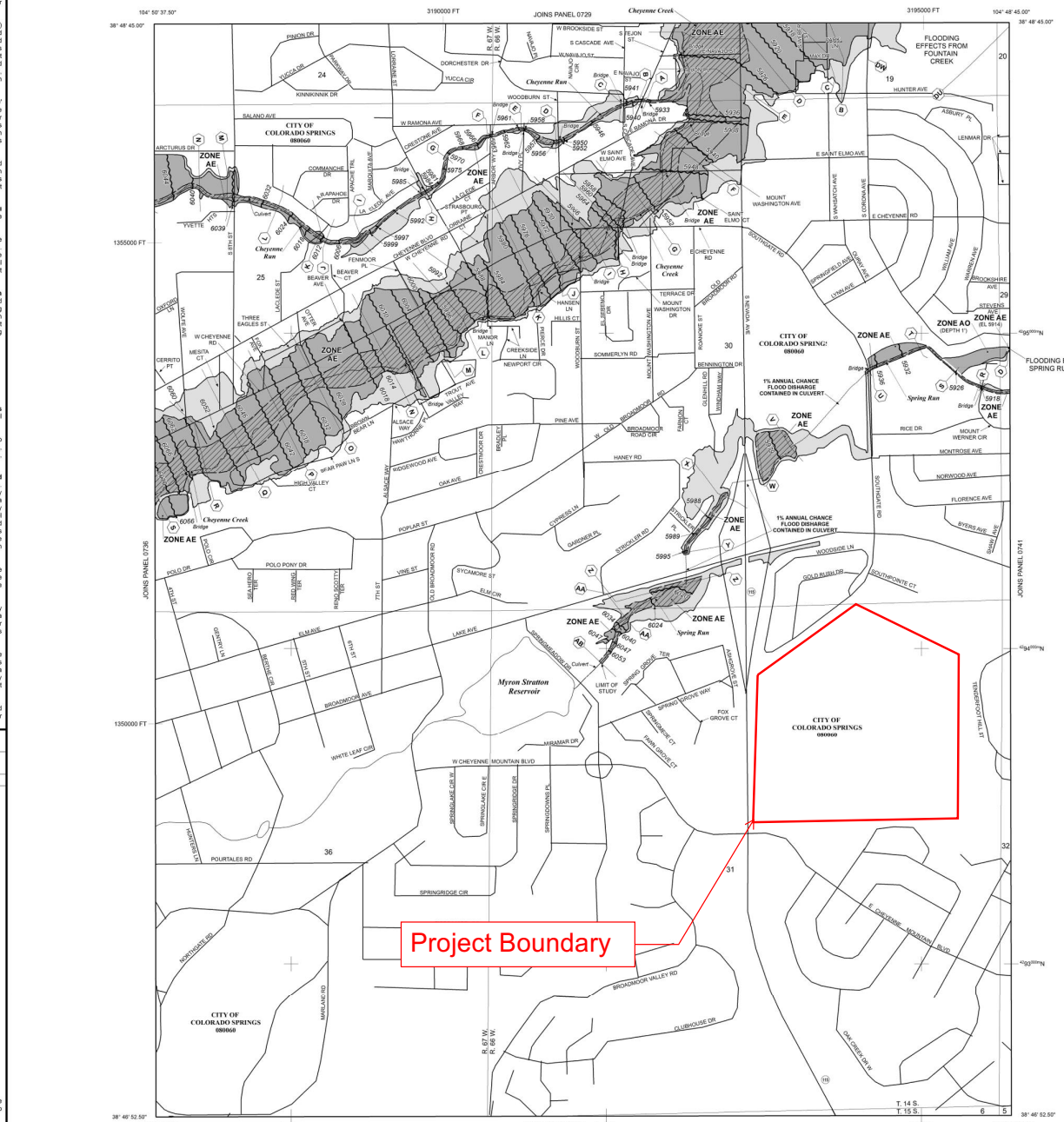
REFER TO SECTION 3.3 OF THE EL PASO COUNTY FLOOD INSURANCE STUDY FOR STREAM BY STREAM VERTICAL DATUM CONVERSION INFORMATION

Panel Location Map



This Digital Flood Insurance Rate Map (DFIRM) was produced through a Cooperating Technical Partner (CTP) agreement between the State of Colorado Water Conservation Board (CWCB) and the Federal Emergency Management Agency (FEMA).

Additional Flood Hazard information and resources are available from local communities and the Colorado Water Conservation Board.



NOTE: MAP AREA SHOWN ON THIS PANEL IS LOCATED WITHIN TOWNSHIP 14 SOUTH, RANGE 66 WEST, AND TOWNSHIP 14 SOUTH, RANGE 67 WEST, AND TOWNSHIP 15 SOUTH, RANGE 66 WEST.

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 (EL 987) Base Flood Elevation line and value; elevation in feet*
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)
4275000 FT N 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 X Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5 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.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP

PANEL 0737G

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY, COLORADO AND INCORPORATED AREAS

PANEL 737 OF 1300

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLORADO SPRINGS, CITY OF	080060	0737	G

Notice: This map was reissued on 05/15/2020 to make a correction.This version replaces any previous versions. See the Notice-to-User Letter that accompanied this correction for details.

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
08041C0737G

MAP REVISED
DECEMBER 7, 2018

Federal Emergency Management Agency

APPENDIX E – HYDROLOGIC CALCULATIONS

Table 6-6. Runoff Coefficients for Rational Method
(Source: UDFCD 2001)

Land Use or Surface Characteristics	Percent Impervious	Runoff Coefficients											
		2-year		5-year		10-year		25-year		50-year		100-year	
		HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D	HSG A&B	HSG C&D
Business													
Commercial Areas	95	0.79	0.80	0.81	0.82	0.83	0.84	0.85	0.87	0.87	0.88	0.88	0.89
Neighborhood Areas	70	0.45	0.49	0.49	0.53	0.53	0.57	0.58	0.62	0.60	0.65	0.62	0.68
Residential													
1/8 Acre or less	65	0.41	0.45	0.45	0.49	0.49	0.54	0.54	0.59	0.57	0.62	0.59	0.65
1/4 Acre	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
1/3 Acre	30	0.18	0.22	0.25	0.30	0.32	0.38	0.39	0.47	0.43	0.52	0.47	0.57
1/2 Acre	25	0.15	0.20	0.22	0.28	0.30	0.36	0.37	0.46	0.41	0.51	0.46	0.56
1 Acre	20	0.12	0.17	0.20	0.26	0.27	0.34	0.35	0.44	0.40	0.50	0.44	0.55
Industrial													
Light Areas	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Heavy Areas	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Parks and Cemeteries	7	0.05	0.09	0.12	0.19	0.20	0.29	0.30	0.40	0.34	0.46	0.39	0.52
Playgrounds	13	0.07	0.13	0.16	0.23	0.24	0.31	0.32	0.42	0.37	0.48	0.41	0.54
Railroad Yard Areas	40	0.23	0.28	0.30	0.35	0.36	0.42	0.42	0.50	0.46	0.54	0.50	0.58
Undeveloped Areas													
Historic Flow Analysis-- Greenbelts, Agriculture	2	0.03	0.05	0.09	0.16	0.17	0.26	0.26	0.38	0.31	0.45	0.36	0.51
Pasture/Meadow	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Forest	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50
Exposed Rock	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Offsite Flow Analysis (when landuse is undefined)	45	0.26	0.31	0.32	0.37	0.38	0.44	0.44	0.51	0.48	0.55	0.51	0.59
Streets													
Paved	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Gravel	80	0.57	0.60	0.59	0.63	0.63	0.66	0.66	0.70	0.68	0.72	0.70	0.74
Drive and Walks	100	0.89	0.89	0.90	0.90	0.92	0.92	0.94	0.94	0.95	0.95	0.96	0.96
Roofs	90	0.71	0.73	0.73	0.75	0.75	0.77	0.78	0.80	0.80	0.82	0.81	0.83
Lawns	0	0.02	0.04	0.08	0.15	0.15	0.25	0.25	0.37	0.30	0.44	0.35	0.50

3.2 Time of Concentration

One of the basic assumptions underlying the Rational Method is that runoff is a function of the average rainfall rate during the time required for water to flow from the hydraulically most remote part of the drainage area under consideration to the design point. However, in practice, the time of concentration can be an empirical value that results in reasonable and acceptable peak flow calculations.

For urban areas, the time of concentration (t_c) consists of an initial time or overland flow time (t_i) plus the travel time (t_t) in the storm sewer, paved gutter, roadside drainage ditch, or drainage channel. For non-urban areas, the time of concentration consists of an overland flow time (t_i) plus the time of travel in a concentrated form, such as a swale or drainageway. The travel portion (t_t) of the time of concentration can be estimated from the hydraulic properties of the storm sewer, gutter, swale, ditch, or drainageway. Initial time, on the other hand, will vary with surface slope, depression storage, surface cover, antecedent rainfall, and infiltration capacity of the soil, as well as distance of surface flow. The time of concentration is represented by Equation 6-7 for both urban and non-urban areas.

Table 6-7. Conveyance Coefficient, C_v

Type of Land Surface	C_v
Heavy meadow	2.5
Tillage/field	5
Riprap (not buried)*	6.5
Short pasture and lawns	7
Nearly bare ground	10
Grassed waterway	15
Paved areas and shallow paved swales	20

* For buried riprap, select C_v value based on type of vegetative cover.

The travel time is calculated by dividing the flow distance (in feet) by the velocity calculated using Equation 6-9 and converting units to minutes.

The time of concentration (t_c) is then the sum of the overland flow time (t_i) and the travel time (t_t) per Equation 6-7.

3.2.3 First Design Point Time of Concentration in Urban Catchments

Using this procedure, the time of concentration at the first design point (typically the first inlet in the system) in an urbanized catchment should not exceed the time of concentration calculated using Equation 6-10. The first design point is defined as the point where runoff first enters the storm sewer system.

$$t_c = \frac{L}{180} + 10 \qquad \text{(Eq. 6-10)}$$

Where:

t_c = maximum time of concentration at the first design point in an urban watershed (min)

L = waterway length (ft)

Equation 6-10 was developed using the rainfall-runoff data collected in the Denver region and, in essence, represents regional "calibration" of the Rational Method. Normally, Equation 6-10 will result in a lesser time of concentration at the first design point and will govern in an urbanized watershed. For subsequent design points, the time of concentration is calculated by accumulating the travel times in downstream drainageway reaches.

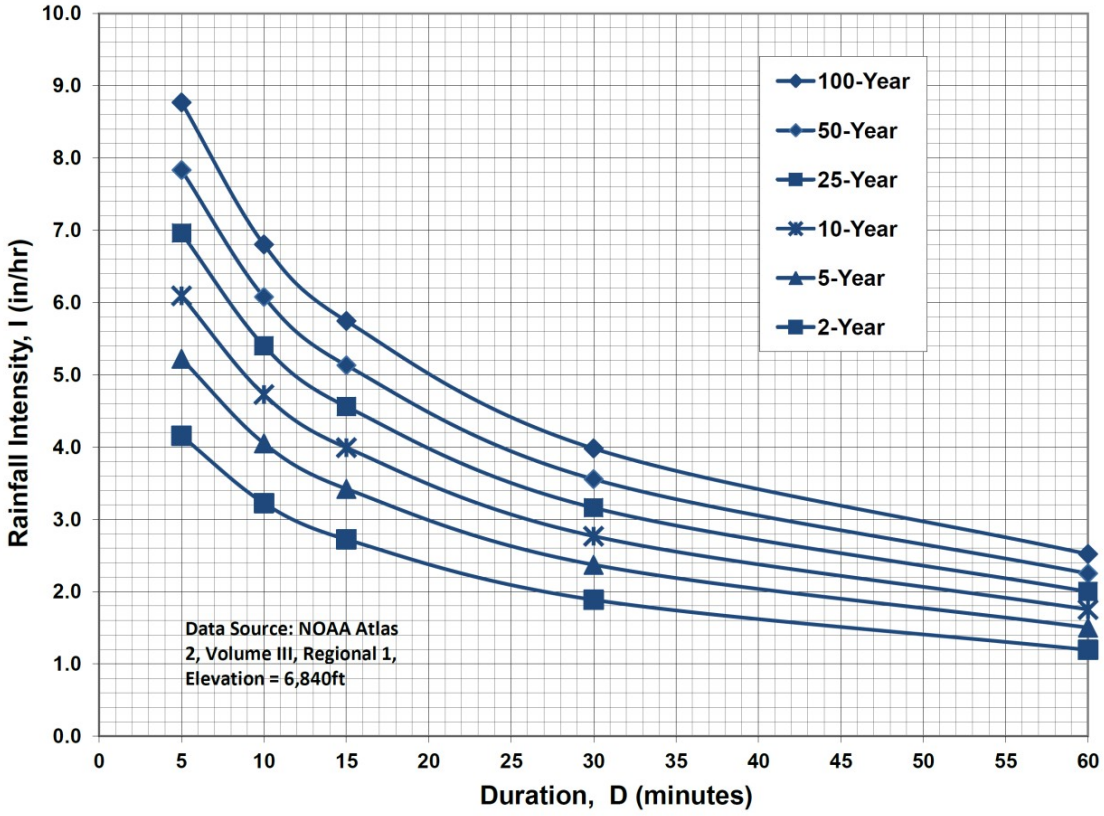
3.2.4 Minimum Time of Concentration

If the calculations result in a t_c of less than 10 minutes for undeveloped conditions, it is recommended that a minimum value of 10 minutes be used. The minimum t_c for urbanized areas is 5 minutes.

3.2.5 Post-Development Time of Concentration

As Equation 6-8 indicates, the time of concentration is a function of the 5-year runoff coefficient for a drainage basin. Typically, higher levels of imperviousness (higher 5-year runoff coefficients) correspond to shorter times of concentration, and lower levels of imperviousness correspond to longer times of

Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



IDF Equations
$I_{100} = -2.52 \ln(D) + 12.735$
$I_{50} = -2.25 \ln(D) + 11.375$
$I_{25} = -2.00 \ln(D) + 10.111$
$I_{10} = -1.75 \ln(D) + 8.847$
$I_{5} = -1.50 \ln(D) + 7.583$
$I_{2} = -1.19 \ln(D) + 6.035$
Note: Values calculated by equations may not precisely duplicate values read from figure.

Kimley»Horn

STANDARD FORM SF-1
RUNOFF COEFFICIENTS - IMPERVIOUS CALCULATION
EXISTING CONDITIONS

PROJECT NAME: Myron Stratton Home, Phase 1 DATE: 12/19/2022
PROJECT NUMBER: 196258000
CALCULATED BY: AME
CHECKED BY: HMM

SOIL: B

LAND USE:	PAVEMENT AREA	ROOF AREA	LANDSCAPE AREA
2-YEAR COEFF.	0.89	0.71	0.02
5-YEAR COEFF.	0.90	0.73	0.08
10-YEAR COEFF.	0.92	0.75	0.15
100-YEAR COEFF.	0.96	0.81	0.35
IMPERVIOUS %	100%	90%	2%

DESIGN BASIN	DESIGN POINT	PAVEMENT AREA (AC)	ROOF AREA (AC)	LANDSCAPE AREA (AC)	TOTAL AREA (AC)	C(2)	C(5)	C(10)	C(100)	Imp %
MDDP Basins										
C1	C1	0.12	0.00	2.01	**2.13**	0.07	0.12	0.19	0.38	7%
EX-1	EX-1	0.72	0.00	11.29	**12.01**	0.07	0.13	0.20	0.39	8%
OS	OS	0.00	0.00	0.24	**0.24**	0.02	0.08	0.15	0.35	2%
MDDP Basin Subtotal		**0.84**	**0.00**	**13.54**	**14.38**	**0.07**	**0.13**	**0.19**	**0.39**	**8%**
FDR Basins										
B3	B3	0.99	0.42	5.72	**7.13**	0.18	0.23	0.29	0.46	21%
EX-N	EX-N	0.05	0.00	0.98	**1.03**	0.06	0.12	0.19	0.38	7%
EX-S	EX-S	0.09	0.00	2.11	**2.20**	0.06	0.12	0.18	0.38	6%
FDR Basin Subtotal		**1.13**	**0.42**	**8.81**	**10.36**	**0.14**	**0.20**	**0.26**	**0.44**	**16%**
TOTAL - OVERALL		**1.97**	**0.42**	**22.35**	**24.74**	**0.10**	**0.16**	**0.22**	**0.41**	**11%**
		8%	**2%**	**90%**	**100%**					

Note: Land use coefficients sourced from City of Colorado Springs Drainage Criteria Manual, Volume 1, Table 6-6.

Kimley»Horn

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: **Myron Stratton Home, Phase 1**
PROJECT NUMBER: **196258000**
CALCULATED BY: **AME**
CHECKED BY: **HMM**

EXISTING CONDITIONS

DATE: 12/19/2022

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)					FINAL Tc
DESIGN BASIN (1)	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE % (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	C_v (9)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	TOTAL SLOPE (15)	TOTAL IMP. (16)	Tc Min. (17)	Min.
MDDP Basins																
C1	2.13	0.12	100	1.4%	16.2	275	3.4%	7.0	1.3	3.6	19.7	375	2.9%	7%	12.1	12.1
EX-1	12.01	0.13	100	2.3%	13.5	865	3.0%	7.0	1.2	11.9	25.4	965	2.9%	8%	15.4	15.4
OS	0.24	0.08	20	45.0%	2.4			7.0			2.4	20	45.0%	2%	10.1	5.0
FDR Basins																
B3	7.13	0.23	100	70.0%	3.9	925	3.5%	15.0	2.8	5.5	9.4	1025	10.0%	21%	15.7	9.4
EX-N	1.03	0.12	100	3.4%	12.0	275	4.0%	7.0	1.4	3.3	15.2	375	3.8%	7%	12.1	12.1
EX-S	2.20	0.12	100	2.8%	12.8	410	5.5%	7.0	1.6	4.2	17.0	510	5.0%	7%	12.8	12.8

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_0^{0.33}} \qquad t_c = \frac{L}{180} + 10 \qquad V = C_v S_w^{0.5}$$

Note: Conveyance coefficient from Table 6-7 of DCM

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 5 YEAR EVENT

PROJECT NAME: Myron Stratton Home, Phase 1
PROJECT NUMBER: 196258000
CALCULATED BY: AME
CHECKED BY: HMM

EXISTING CONDITIONS

DATE: 12/19/2022

STORM LINE		DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(max)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY	tt (min)	
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
MDDP Basins																						
		C1	C1	2.13	0.12	12.08	0.27	3.85	1.02													
		EX-1	EX-1	12.01	0.13	15.36	1.55	3.49	5.42													
		OS	OS	0.24	0.08	5.00	0.02	5.17	0.10													
FDR Basins																						
		B3	B3	7.13	0.23	9.36	1.65	4.23	6.99													
		EX-N	EX-N	1.03	0.12	12.08	0.12	3.85	0.47													
		EX-S	EX-S	2.20	0.12	12.83	0.25	3.75	0.95													

$$I_5 = -1.5 \ln(t_{c,min}) + 7.583$$

Note: Rainfall intensity from Figure 6-5 IDF Equations

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: Myron Stratton Home, Phase 1
PROJECT NUMBER: 196258000
CALCULATED BY: AME
CHECKED BY: HMM

EXISTING CONDITIONS

DATE: 12/19/2022

STORM LINE		DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
			DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(max)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY	tt (min)	
(1)		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
MDDP Basins																						
		C1	C1	2.13	0.38	12.08	0.82	6.46	5.27													
		EX-1	EX-1	12.01	0.39	15.36	4.65	5.85	27.18													
		OS	OS	0.24	0.35	5.00	0.08	8.68	0.73													
FDR Basins																						
		B3	B3	7.13	0.46	9.36	3.29	7.10	23.36													
		EX-N	EX-N	1.03	0.38	12.08	0.39	6.46	2.52													
		EX-S	EX-S	2.20	0.38	12.83	0.83	6.30	5.22													

$$I_{100} = -2.52 \ln(t_{c,min}) + 12.735$$

Note: Rainfall intensity from Figure 6-5 IDF Equations

Kimley»Horn

PROJECT NAME: Myron Stratton Home, Phase 1 12/19/2022
PROJECT NUMBER: 196258000
CALCULATED BY: AME
CHECKED BY: HMM

EXISTING CONDITIONS RATIONAL CALCULATIONS SUMMARY

DESIGN POINT	TRIBUTARY BASINS	TRIBUTARY AREA (AC)	CFS		% IMPERVIOUS
			Q5	Q100	
MDDP Basins					
C1	C1	2.13	1.02	5.27	7%
EX-1	EX-1	12.01	5.42	27.18	8%
OS	OS	0.24	0.10	0.73	2%
SUBTOTAL		**14.38**	**6.53**	**33.18**	**8%**
FDR Basins					
B3	B3	7.13	6.99	23.36	21%
EX-N	EX-N	1.03	0.47	2.52	7%
EX-S	EX-S	2.20	0.95	5.22	6%
SUBTOTAL		**3.23**	**1.42**	**7.74**	**16%**
TOTAL		**17.62**	**7.96**	**40.92**	**11%**

Kimley»Horn

STANDARD FORM SF-1
RUNOFF COEFFICIENTS - IMPERVIOUS CALCULATION
PROPOSED CONDITIONS

PROJECT NAME: Myron Stratton Home, Phase 1 DATE: 6/6/2023
PROJECT NUMBER: 196258000
CALCULATED BY: AME
CHECKED BY: HMM

SOIL: B

LAND USE:	PAVEMENT AREA	ROOF AREA	LANDSCAPE AREA
2-YEAR COEFF.	0.89	0.71	0.02
5-YEAR COEFF.	0.90	0.73	0.08
10-YEAR COEFF.	0.92	0.75	0.15
100-YEAR COEFF.	0.96	0.81	0.35
IMPERVIOUS %	100%	90%	2%

DESIGN BASIN	DESIGN POINT	PAVEMENT AREA (AC)	ROOF AREA (AC)	LANDSCAPE AREA (AC)	TOTAL AREA (AC)	C(2)	C(5)	C(10)	C(100)	Imp %
MDDP Basins										
PA1	PA1	1.65	0.69	1.63	**3.97**	0.50	0.53	0.57	0.68	58%
PA2-a	PA2-a	0.86	1.08	0.22	**2.16**	0.71	0.73	0.76	0.82	85%
PA2-b	PA2-b	2.28	2.85	0.57	**5.69**	0.71	0.73	0.76	0.82	85%
PA3	PA3	0.85	1.07	0.21	**2.13**	0.71	0.73	0.76	0.82	85%
PA4	PA4	0.25	0.00	1.82	**2.07**	0.13	0.18	0.24	0.42	14%
OS-1	OS-1	0.00	0.00	0.24	**0.24**	0.02	0.08	0.15	0.35	2%
OS-2	OS-2	0.54	0.00	5.64	**6.18**	0.10	0.15	0.22	0.40	11%
OS-3	OS-3	0.44	0.42	1.61	**2.47**	0.29	0.34	0.39	0.54	34%
MDDP Basin Subtotal		**4.36**	**4.33**	**10.09**	**18.78**	**0.38**	**0.42**	**0.47**	**0.60**	**45%**
FDR Basins										
P1	P1	0.03	0.00	0.77	**0.80**	0.05	0.11	0.18	0.37	6%
P2	P2	0.33	0.00	0.27	**0.60**	0.50	0.53	0.57	0.69	56%
P3	P3	0.67	0.00	0.31	**0.98**	0.61	0.64	0.68	0.77	69%
P4	P4	0.18	0.00	0.13	**0.31**	0.53	0.56	0.60	0.70	59%
P5	P5	0.23	0.00	0.02	**0.25**	0.82	0.83	0.86	0.91	92%
P6	P6	0.00	0.00	0.06	**0.06**	0.02	0.08	0.15	0.35	2%
P7	P7	0.21	0.00	0.07	**0.28**	0.67	0.70	0.73	0.81	76%
R1	R1	0.00	0.14	0.00	**0.14**	0.71	0.73	0.75	0.81	90%
R2	R2	0.00	0.15	0.00	**0.15**	0.71	0.73	0.75	0.81	90%
R3	R3	0.00	0.09	0.00	**0.09**	0.71	0.73	0.75	0.81	90%
R4	R4	0.00	0.05	0.00	**0.05**	0.71	0.73	0.75	0.81	90%
R5	R5	0.00	0.26	0.00	**0.26**	0.71	0.73	0.75	0.81	90%
FDR Basin Subtotal		**1.65**	**0.69**	**1.63**	**3.97**	**0.50**	**0.53**	**0.57**	**0.68**	**58%**
TOTAL - OVERALL		**6.01**	**5.02**	**11.72**	**22.75**	**0.40**	**0.44**	**0.49**	**0.61**	**47%**
		26%	**22%**	**52%**	**100%**					

Note: Land use coefficients sourced from City of Colorado Springs Drainage Criteria Manual, Volume 1, Table 6-6.

Kimley»Horn

STANDARD FORM SF-2
Time of Concentration

PROJECT NAME: **Myron Stratton Home, Phase 1**
PROJECT NUMBER: **196258000**
CALCULATED BY: **AME**
CHECKED BY: **HMM**

PROPOSED CONDITIONS

DATE: 6/6/2023

SUB-BASIN DATA			INITIAL TIME (T_i)			TRAVEL TIME (T_t)					Tc CHECK (URBANIZED BASINS)					FINAL Tc
DESIGN BASIN (1)	AREA Ac (2)	C5 (3)	LENGTH Ft (4)	SLOPE % (5)	T_i Min. (6)	LENGTH Ft. (7)	SLOPE % (8)	C_v (9)	VEL fps (11)	T_t Min. (12)	COMP. tc (13)	TOTAL LENGTH (14)	TOTAL SLOPE (15)	TOTAL IMP. (16)	Tc Min. (17)	Min.
MDDP Basins																
PA1	3.97	0.53	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PA2-a	2.16	0.73	100	3.5%		274	4.0%	20.0	4.0	1.1	1.1	374	3.9%	85%	12.1	5.0
PA2-b	5.69	0.73	100	0.9%	3.5	630	2.0%	20.0	2.8	3.7	7.2	730	1.8%	85%	14.1	7.2
PA3	2.13	0.73	27	3.5%	2.3	498	1.8%	20.0	2.7	3.1	5.4	525	1.9%	85%	12.9	5.4
PA4	2.07	0.18	26	1.0%	8.6	365	5.0%	7.0	1.6	3.9	12.5	391	4.7%	2%	12.2	12.2
OS-1	0.24	0.08	20	45.0%	2.4						2.4	20	45.0%	11%	10.1	5.0
OS-2	6.18	0.15	100	2.8%	12.3	410	3.0%	7.0	1.2	5.6	18.0	510	3.0%		12.8	12.8
OS-3	2.47	0.34	100	2.5%	10.3	300	5.0%	20.0	4.5	1.1	11.4	400	4.4%	34%	12.2	11.4
FDR Basins																
P1	0.80	0.11	95	10.0%	8.2						8.2	95	10.0%	6%	10.5	8.2
P2	0.60	0.53	100	8.0%	5.2	135	3.0%	20.0	3.5	0.6	5.9	235	5.1%	56%	11.3	5.9
P3	0.98	0.64	25	2.0%	3.3	240	5.0%	20.0	4.5	0.9	4.2	265	4.7%	69%	11.5	5.0
P4	0.31	0.56	100	2.0%	7.9	35	5.5%	20.0	4.7	0.1	8.0	135	2.9%	59%	10.8	8.0
P5	0.25	0.83	100	1.0%	4.9	50	4.0%	20.0	4.0	0.2	5.1	150	2.0%	92%	10.8	5.1
P6	0.06	0.08	25	2.0%	7.4						7.4	25	2.0%	2%	10.1	7.4
P7	0.28	0.70	15	1.0%	2.9	215	1.0%	20.0	2.0	1.8	4.7	230	1.0%	76%	11.3	5.0
R1	0.14	0.73	30	40.0%	1.1						1.1	30	40.0%	90%	10.2	5.0
R2	0.15	0.73	40	35.0%	1.3						1.3	40	35.0%	90%	10.2	5.0
R3	0.09	0.73	30	40.0%	1.1						1.1	30	40.0%	90%	10.2	5.0
R4	0.05	0.73	30	40.0%	1.1						1.1	30	40.0%	90%	10.2	5.0
R5	0.26	0.73	40	35.0%	1.3						1.3	40	35.0%	90%	10.2	5.0

$$t_i = \frac{0.395(1.1 - C_5)\sqrt{L_i}}{S_0^{0.33}} \qquad t_c = \frac{L}{180} + 10 \qquad V = C_v S_w^{0.5}$$

Note: Conveyance coefficient from Table 6-7 of DCM

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 5 YEAR EVENT

PROJECT NAME: Myron Stratton Home, Phase 1
PROJECT NUMBER: 196258000
CALCULATED BY: AME
CHECKED BY: HMM

PROPOSED CONDITIONS

DATE: 6/6/2023

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(max)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY	tt (min)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
MDDP Basins																					
		PA1	PA1	3.97	0.53	-	2.12	-	-												
		PA2-a	PA2-a	2.16	0.73	5.00	1.58	5.17	8.17												
		PA2-b	PA2-b	5.69	0.73	7.21	4.17	4.62	19.27												
		PA3	PA3	2.13	0.73	5.40	1.56	5.05	7.89												
		PA4	PA4	2.07	0.18	12.17	0.37	3.83	1.42												
		OS-1	OS-1	0.24	0.08	5.00	0.02	5.17	0.10												
		OS-2	OS-2	6.18	0.15	12.83	0.94	3.75	3.52												
		OS-3	OS-3	2.47	0.34	11.43	0.83	3.93	3.27												
FDR Basins																					
		P1	P1	0.80	0.11	8.21	0.09	4.43	0.39												
		P2	P2	0.60	0.53	5.87	0.32	4.93	1.57												
		P3	P3	0.98	0.64	5.00	0.63	5.17	3.24												
		P4	P4	0.31	0.56	8.04	0.17	4.46	0.77												
		P5	P5	0.25	0.83	5.08	0.21	5.15	1.07												
		P6	P6	0.06	0.08	7.42	0.00	4.58	0.02												
		P7	P7	0.28	0.70	5.00	0.19	5.17	1.01												
		R1	R1	0.14	0.73	5.00	0.10	5.17	0.53												
		R2	R2	0.15	0.73	5.00	0.11	5.17	0.56												
		R3	R3	0.09	0.73	5.00	0.06	5.17	0.33												
		R4	R4	0.05	0.73	5.00	0.04	5.17	0.19												
		R5	R5	0.26	0.73	5.00	0.19	5.17	1.00												

$$I_5 = -1.5 \ln(t_{c,min}) + 7.583$$

Note: Rainfall intensity from Figure 6-5 IDF Equations

Kimley»Horn

STANDARD FORM SF-3
STORM DRAINAGE DESIGN - RATIONAL METHOD 100 YEAR EVENT

PROJECT NAME: Myron Stratton Home, Phase 1
PROJECT NUMBER: 196258000
CALCULATED BY: AME
CHECKED BY: HMM

PROPOSED CONDITIONS

DATE: 6/6/2023

STORM LINE	DESIGN POINT	DIRECT RUNOFF							TOTAL RUNOFF				STREET		PIPE			TRAVEL TIME			REMARKS
		DESIGN BASIN	AREA (AC)	RUNOFF COEFF	tc (min)	C*A(ac)	I (in/hr)	Q (cfs)	tc(max)	S(C*A) (ac)	I (in/hr)	Q (cfs)	SLOPE (%)	STREET FLOW(cfs)	DESIGN FLOW(cfs)	SLOPE (%)	PIPE SIZE (in)	LENGTH (ft)	VELOCITY	tt (min)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
MDDP Basins																					
		PA1	PA1	3.97	0.68	-	2.71	-	-												
		PA2-a	PA2-a	2.16	0.82	5.00	1.78	8.68	15.42												
		PA2-b	PA2-b	5.69	0.82	7.21	4.69	7.76	36.36												
		PA3	PA3	2.13	0.82	5.40	1.76	8.49	14.90												
		PA4	PA4	2.07	0.42	12.17	0.88	6.44	5.65												
		OS-1	OS-1	0.24	0.35	5.00	0.08	8.68	0.73												
		OS-2	OS-2	6.18	0.40	12.83	2.49	6.30	15.71												
		OS-3	OS-3	2.47	0.54	11.43	1.33	6.60	8.75												
FDR Basins																					
		P1	P1	0.80	0.37	8.21	0.30	7.43	2.22												
		P2	P2	0.60	0.69	5.87	0.41	8.28	3.40												
		P3	P3	0.98	0.77	5.00	0.75	8.68	6.52												
		P4	P4	0.31	0.70	8.04	0.22	7.48	1.63												
		P5	P5	0.25	0.91	5.08	0.23	8.64	1.97												
		P6	P6	0.06	0.35	7.42	0.02	7.68	0.16												
		P7	P7	0.28	0.81	5.00	0.23	8.68	1.96												
		R1	R1	0.14	0.81	5.00	0.11	8.68	0.98												
		R2	R2	0.15	0.81	5.00	0.12	8.68	1.05												
		R3	R3	0.09	0.81	5.00	0.07	8.68	0.61												
		R4	R4	0.05	0.81	5.00	0.04	8.68	0.35												
		R5	R5	0.26	0.81	5.00	0.21	8.68	1.85												

$$I_{100} = -2.52 \ln(t_{c,min}) + 12.735$$

Note: Rainfall intensity from Figure 6-5 IDF Equations

Kimley»Horn

PROJECT NAME: Myron Stratton Home, Phase 1
PROJECT NUMBER: 196258000
CALCULATED BY: AME
CHECKED BY: HMM

PROPOSED CONDITIONS RATIONAL CALCULATIONS SUMMARY

DESIGN POINT	TRIBUTARY BASINS	TRIBUTARY AREA (AC)	CFS		% IMPERVIOUS
			Q5	Q100	
MDDP Basins					
PA1	All FDR basins	3.97	10.67	22.71	58%
PA2-a	PA2-a	2.16	8.17	15.42	85%
PA2-b	PA2-b	5.69	19.27	36.36	85%
PA3	PA3	2.13	7.89	14.90	85%
PA4	PA4	2.07	1.42	5.65	14%
OS-1	OS-1	0.24	0.10	0.73	2%
OS-2	OS-2	6.18	3.52	15.71	11%
OS-3	OS-3	2.47	3.27	8.75	34%
SUBTOTAL		**18.78**	**35.46**	**82.09**	**45%**
FDR Basins					
P1	P1	0.80	0.39	2.22	6%
P2	P2	0.60	1.57	3.40	56%
P3	P3	0.98	3.24	6.52	69%
P4	P4	0.31	0.77	1.63	59%
P5	P5	0.25	1.07	1.97	92%
P6	P6	0.06	0.02	0.16	2%
P7	P7	0.28	1.01	1.96	76%
R1	R1	0.14	0.53	0.98	90%
R2	R2	0.15	0.56	1.05	90%
R3	R3	0.09	0.33	0.61	90%
R4	R4	0.05	0.19	0.35	90%
R5	R5	0.26	1.00	1.85	90%
SUBTOTAL		**3.97**	**10.67**	**22.71**	**58%**
TOTAL		**22.75**	**46.14**	**104.80**	**47%**

Design Procedure Form: Runoff Reduction

UD-BMP (Version 3.07, March 2018) **Sheet 1 of 1**

Designer: JJM
Company: Kimley-Horn
Date: June 26, 2023
Project: The Myron Stratton Home
Location: Lot 1, Block 1 Myron Stratton home Subdivision No. 1

SITE INFORMATION (User Input in Blue Cells)

WQCV Rainfall Depth = 0.60 inches
Depth of Average Runoff Producing Storm, d_6 = 0.43 inches (for Watersheds Outside of the Denver Region, Figure 3-1 in USDCM Vol. 3)

Area Type	UIA:RPA	UIA:RPA	SPA	SPA	DCIA							
Area ID	N	S			7356							
Downstream Design Point ID	N	S	N	S	N							
Downstream BMP Type	EDB	None	EDB	None	EDB							
DCIA (ft^2)	--	--	--	--	4,581							
UIA (ft^2)	31,451	52,634	--	--	--							
RPA (ft^2)	21,659	20,438	--	--	--							
SPA (ft^2)	--	--	4,467	24,207	--							
HSG A (%)	0%	0%	0%	0%	--							
HSG B (%)	100%	100%	100%	100%	--							
HSG C/D (%)	0%	0%	0%	0%	--							
Average Slope of RPA (ft/ft)	0.020	0.020	--	--	--							
UIA:RPA Interface Width (ft)	415.00	390.00	--	--	--							

CALCULATED RUNOFF RESULTS

Area ID	N	S			7356							
UIA:RPA Area (ft^2)	53,110	73,072	--	--	--							
L / W Ratio	0.31	0.48	--	--	--							
UIA / Area	0.5922	0.7203	--	--	--							
Runoff (in)	0.00	0.05	0.00	0.00	0.50							
Runoff (ft^3)	0	308	0	0	191							
Runoff Reduction (ft^3)	1310	1885	223	1210	0							

CALCULATED WQCV RESULTS

Area ID	N	S			7356							
WQCV (ft^3)	1310	2193	0	0	191							
WQCV Reduction (ft^3)	1310	1885	0	0	0							
WQCV Reduction (%)	100%	86%	0%	0%	0%							
Untreated WQCV (ft^3)	0	308	0	0	191							

CALCULATED DESIGN POINT RESULTS (sums results from all columns with the same Downstream Design Point ID)

Downstream Design Point ID	N	S										
DCIA (ft^2)	4,581	0										
UIA (ft^2)	31,451	52,634										
RPA (ft^2)	21,659	20,438										
SPA (ft^2)	4,467	24,207										
Total Area (ft^2)	62,158	97,279										
Total Impervious Area (ft^2)	36,032	52,634										
WQCV (ft^3)	1,501	2,193										
WQCV Reduction (ft^3)	1,310	1,885										
WQCV Reduction (%)	87%	86%										
Untreated WQCV (ft^3)	191	308										

CALCULATED SITE RESULTS (sums results from all columns in worksheet)

Total Area (ft^2)	159,437
Total Impervious Area (ft^2)	88,666
WQCV (ft^3)	3,694
WQCV Reduction (ft^3)	3,196
WQCV Reduction (%)	86%
Untreated WQCV (ft^3)	499

APPENDIX F – HYDRAULIC CALCULATIONS

Worksheet for Proposed Swale

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data		
Roughness Coefficient	0.030	Q100 = 30.39 cfs
Channel Slope	0.010 ft/ft	
Normal Depth	18.0 in	
Left Side Slope	5.330 H:V	
Right Side Slope	5.330 H:V	

Results	
Discharge	48.47 cfs
Flow Area	12.0 ft²
Wetted Perimeter	16.3 ft
Hydraulic Radius	8.8 in
Top Width	15.99 ft
Critical Depth	16.6 in
Critical Slope	0.015 ft/ft
Velocity	4.04 ft/s
Velocity Head	0.25 ft
Specific Energy	1.75 ft
Froude Number	0.823
Flow Type	Subcritical

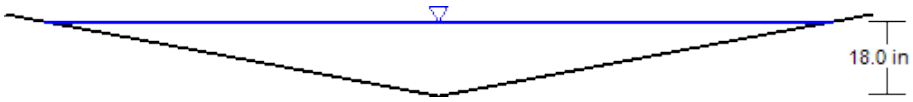
GVF Input Data	
Downstream Depth	0.0 in
Length	0.0 ft
Number Of Steps	0

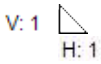
GVF Output Data	
Upstream Depth	0.0 in
Profile Description	N/A
Profile Headloss	0.00 ft
Downstream Velocity	0.00 ft/s
Upstream Velocity	0.00 ft/s
Normal Depth	18.0 in
Critical Depth	16.6 in
Channel Slope	0.010 ft/ft
Critical Slope	0.015 ft/ft

Cross Section for Proposed Swale

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Roughness Coefficient	0.030
Channel Slope	0.010 ft/ft
Normal Depth	18.0 in
Left Side Slope	5.330 H:V
Right Side Slope	5.330 H:V
Discharge	48.47 cfs





APPENDIX G – REFERENCE MATERIAL

Used only as reference material

JPS ENGINEERING

MYRON STRATTON HOME - DEVELOPED CONDITIONS

IMPERVIOUS AREAS

BASIN	TOTAL AREA (AC)	(AC)	SUB-AREA 1 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	AREA (AC)	SUB-AREA 2 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	(AC)	SUB-AREA 3 DEVELOPMENT/ COVER	PERCENT IMPERVIOUS	WEIGHTED % IMP
A	21.0	2.0	BUILDING / PAVEMENT	100.0	19.0	LANDSCAPED	0				9.524
OB1	205.0	205.0	RESIDENTIAL (1/4-AC LOTS)	40.0							40.000
B1	4.9	2.4	BUILDING / PAVEMENT	100.00	2.5	LANDSCAPED	0				49.796
B2	2.7	1.4	BUILDING / PAVEMENT	100.00	1.3	LANDSCAPED	0				52.222
B3	6.7	3.6	BUILDING / PAVEMENT	100.00	3.1	LANDSCAPED	0				53.582
B4	54.0	10.7	BUILDING / PAVEMENT	100.00	43.3	LANDSCAPED	0				19.759
B1-B4	68.3	18.0	BUILDING / PAVEMENT	100.00	50.3	LANDSCAPED	0				26.354
OB1,B1-B4	273.3										36.590
C1	2.1	1.0	BUILDING / PAVEMENT	100.0	1.1	LANDSCAPED	0				48.780
C2	11.8	2.0	BUILDING / PAVEMENT	100.0	9.8	LANDSCAPED	0				16.906
C1,C2	13.9										21.614
D	1.1	0.3	BUILDING / PAVEMENT	100.0	0.8	LANDSCAPED	0				27.273

Used only as reference material

(Volume Check Only)

DETENTION VOLUME BY THE FULL SPECTRUM METHOD

Project: Myron Stratton Home
Basin ID: DP-2 (BASIN OB1 + B)

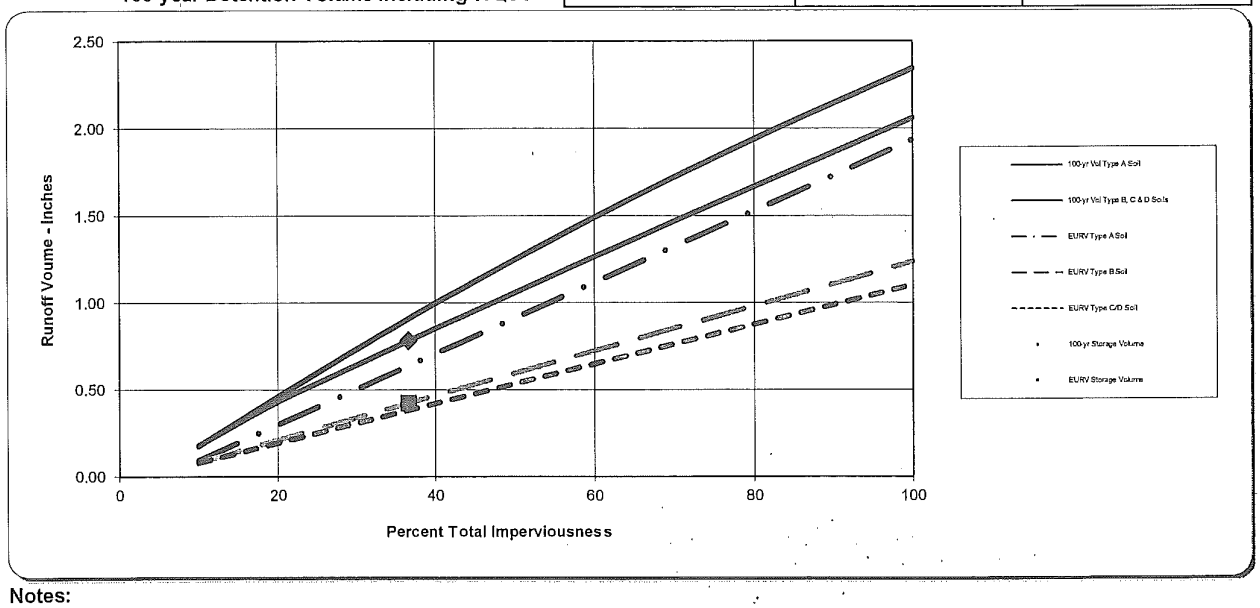
* User input data shown in blue.

Area of Watershed (acres)	273.30	
Subwatershed Imperviousness	36.6%	
Level of Minimizing Directly Connected Impervious Area (MDCIA)	0	0
Effective Imperviousness [1]	36.6%	

Hydrologic Soil Type	Percentage of Area	Area (acres)
Type A		0.0
Type B		0.0
Type C or D	100.0%	273.3

Recommended Horton's Equation Parameters for CUHP		
Infiltration (inches per hour)		Decay Coefficient–□
Initial–f_i	Final–f_o	
3	0.5	0.0018

	Detention Volumes [2,5]		
	(watershed inches)	(acre-feet)	Maximum Allowable Release Rate, cfs [3]
Excess Urban Runoff Volume [4]	0.42	9.58	Design Oulet to Empty EURV in 72 Hours
100-year Detention Volume Including WQCV [5]	0.78		273.30



Notes:

1) Effective imperviousness is based on Figure ND-1 of the Urban Storm Drainage Criteria Manual (USDCM).

2) Results shown reflect runoff reduction from Level 1 or 2 MDCIA and are plotted at the watershed's total imperviousness value; the impact of MDCIA is reflected by the results being below the curves.

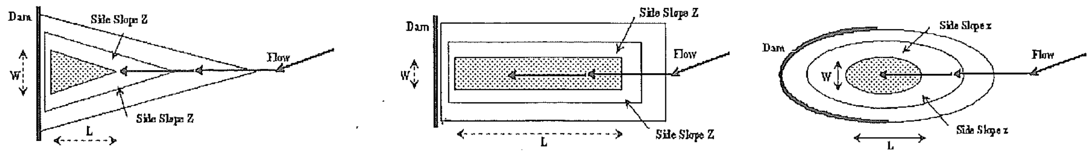
3) Maximum allowable release rates for 100-year event are based on Table SO-1. Outlet for the Excess Urban Runoff Volume (EURV) to be designed to empty out the EURV in 72 hours. Outlet design is similar to one for the WQCV outlet of an extended detention basin (i.e., perforated plate with a micro-pool) and extends to top of EURV water surface elevation.

4) EURV approximates the difference between developed and pre-developed runoff volume.

5) 100-yr detention volume includes EURV. No need to add more volume for WQCV or EURV

STAGE-STORAGE SIZING FOR DETENTION BASINS

Project: Myron Stratton Home
Basin ID: B



Design Information (Input):

Width of Basin Bottom, W =		ft
Length of Basin Bottom, L =		ft
Dam Side-slope (H:V), Z_d =		ft/ft

Check Basin Shape

Right Triangle		OR...
Isosceles Triangle		OR...
Rectangle		OR...
Circle / Ellipse		OR...
Irregular	X	(Use Overide values in cells G32:G52)

Stage-Storage Relationship:

	MINOR	MAJOR	
Storage Requirement from Sheet 'Modified FAA':			acre-ft.
Storage Requirement from Sheet 'Hydrograph':			acre-ft.
Storage Requirement from Sheet 'Full-Spectrum':	9.58	17.81	acre-ft.

Labels for WQCV, Minor, & Major Storage Stages (input)	Water Surface Elevation ft (input)	Side Slope (H:V) ft/ft Below El. (input)	Basin Width at Stage ft (output)	Basin Length at Stage ft (output)	Surface Area at Stage ft^2 (output)	Surface Area at Stage ft^2 **User Overide**	Volume Below Stage ft^3 (output)	Surface Area at Stage **acres** (output)	Volume Below Stage **acre-ft** (output)	Target Volumes for WQCV, Minor, & Major Storage Volumes (for goal seek)
BOTTOM	5980.00					77		0.002	0.000	
	5982.00		0.00	0.00		543	620	0.012	0.014	
	5984.00		0.00	0.00		13,343	14,506	0.306	0.333	
	5986.00		0.00	0.00		31,122	58,971	0.714	1.354	
	5988.00		0.00	0.00		45,681	135,774	1.049	3.117	
	5990.00		0.00	0.00		61,145	242,600	1.404	5.569	
	5992.00		0.00	0.00		75,900	379,645	1.742	8.715	
	5994.00		0.00	0.00		90,178	545,723	2.070	12.528	
	5996.00		0.00	0.00		108,116	744,017	2.482	17.080	
MAX 100-YR WSL	5998.00		0.00	0.00		129,184	981,317	2.966	22.528	
SPILLWAY	6000.00		0.00	0.00		150,179	1,260,680	3.448	28.941	
	6002.00		0.00	0.00		170,000	1,580,859	3.903	36.292	
							#N/A		#N/A	
							#N/A		#N/A	
							#N/A		#N/A	
							#N/A		#N/A	
							#N/A		#N/A	
							#N/A		#N/A	
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							#N/A		#N/A	
							#N/A		#N/A	
							#N/A		#N/A	

Used only as reference material

Worksheet Protected

Site-Level Low Impact Development (LID) Design Effective Impervious Calculator

LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input

Calculated cells

***Design Storm: 1-Hour Rain Depth	WQCV Event	0.60	inches	Designer:	JPS
***Minor Storm: 1-Hour Rain Depth	5-Year Event	1.50	inches	Company:	JPS
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches	Date:	May 25, 2017
Optional User Defined Storm	CUHP			Project:	MYRON STRATTON HOME - SOUTH DRIVE PROJECT
(CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	100-Year Event	2.52		Location:	2525 S. HIGHWAY 115, COLORADO SPRINGS, CO
Max Intensity for Optional User Defined Storm	2.51496				

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	B	C	D											
Receiving Pervious Area Soil Type	Sandy Loam	Sandy Loam	Sandy Loam											
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	68.300	13.900	1.100											
Directly Connected Impervious Area (DCIA, acres)	18.000	3.000	0.300											
Unconnected Impervious Area (UIA, acres)	0.000	0.000	0.000											
Receiving Pervious Area (RPA, acres)	0.300	0.100	0.000											
Separate Pervious Area (SPA, acres)	50.000	10.800	0.800											
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	V	C	C											

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	68.300	13.900	1.100											
Directly Connected Impervious Area (DCIA, %)	26.4%	21.6%	27.3%											
Unconnected Impervious Area (UIA, %)	0.0%	0.0%	0.0%											
Receiving Pervious Area (RPA, %)	0.4%	0.7%	0.0%											
Separate Pervious Area (SPA, %)	73.2%	77.7%	72.7%											
A_R (RPA / UIA)	0.000	0.000	0.000											
I_a Check	1.000	1.000	1.000											
f / I for WQCV Event:	1.7	1.7	1.7											
f / I for 5-Year Event:	0.5	0.5	0.5											
f / I for 100-Year Event:	0.3	0.3	0.3											
f / I for Optional User Defined Storm CUHP:	0.31	0.31	0.31											
IRF for WQCV Event:	0.00	1.00	1.00											
IRF for 5-Year Event:	1.00	1.00	1.00											
IRF for 100-Year Event:	1.00	1.00	1.00											
IRF for Optional User Defined Storm CUHP:	1.00	1.00	1.00											
Total Site Imperviousness: I_{total}	26.4%	21.6%	27.3%											
Effective Imperviousness for WQCV Event:	26.4%	21.6%	27.3%											
Effective Imperviousness for 5-Year Event:	26.4%	21.6%	27.3%											
Effective Imperviousness for 100-Year Event:	26.4%	21.6%	27.3%											
Effective Imperviousness for Optional User Defined Storm CUHP:	26.4%	21.6%	27.3%											

LID / EFFECTIVE IMPERVIOUSNESS CREDITS

WQCV Event CREDIT: Reduce Detention By:	N/A	0.0%	0.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
This line only for 10-Year Event	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	0.0%	0.0%	0.1%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:	0.0%	0.0%	0.0%											

Total Site Imperviousness:	25.6%
Total Site Effective Imperviousness for WQCV Event:	25.6%
Total Site Effective Imperviousness for 5-Year Event:	25.6%
Total Site Effective Imperviousness for 100-Year Event:	25.6%
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:	25.6%

Notes:

* Use Green-Ampt average infiltration rate values from Table 3-3.
** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.
*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

Used only as reference material

Watermark Protected

Site-Level Low Impact Development (LID) Design Effective Impervious Calculator

LID Credit by Impervious Reduction Factor (IRF) Method

UD-BMP (Version 3.06, November 2016)

User Input

Calculated cells

***Design Storm: 1-Hour Rain Depth	WQCV Event	0.60	inches	Designer:	JPS
***Minor Storm: 1-Hour Rain Depth	5-Year Event	1.50	inches	Company:	JPS
***Major Storm: 1-Hour Rain Depth	100-Year Event	2.52	inches	Date:	August 8, 2017
Optional User Defined Storm (CUHP) NOAA 1 Hour Rainfall Depth and Frequency for User Defined Storm	CUHP 100-Year Event			Project:	MYRON STRATTON HOME - SOUTH DRIVE
				Location:	BASINS B1-B3; GRASS SWALES ALONG DRIVEWAYS
Max Intensity for Optional User Defined Storm	0				

SITE INFORMATION (USER-INPUT)

Sub-basin Identifier	B1	B2	B3											
Receiving Pervious Area Soil Type	Sandy Loam	Sandy Loam	Sandy Loam											
Total Area (ac., Sum of DCIA, UIA, RPA, & SPA)	4.900	2.700	6.700											
Directly Connected Impervious Area (DCIA, acres)	2.440	1.410	3.480											
Unconnected Impervious Area (UIA, acres)	0.000	0.000	0.000											
Receiving Pervious Area (RPA, acres)	2.460	1.290	3.220											
Separate Pervious Area (SPA, acres)	0.000	0.000	0.000											
RPA Treatment Type: Conveyance (C), Volume (V), or Permeable Pavement (PP)	C	C	V											

CALCULATED RESULTS (OUTPUT)

Total Calculated Area (ac, check against input)	4.900	2.700	6.700											
Directly Connected Impervious Area (DCIA, %)	49.8%	52.2%	51.9%											
Unconnected Impervious Area (UIA, %)	0.0%	0.0%	0.0%											
Receiving Pervious Area (RPA, %)	50.2%	47.8%	48.1%											
Separate Pervious Area (SPA, %)	0.0%	0.0%	0.0%											
A_R (RPA / UIA)	0.000	0.000	0.000											
I_a Check	1.000	1.000	1.000											
f / I for WQCV Event:	1.7	1.7	1.7											
f / I for 5-Year Event:	0.5	0.5	0.5											
f / I for 100-Year Event:	0.3	0.3	0.3											
f / I for Optional User Defined Storm CUHP:														
IRF for WQCV Event:	1.00	1.00	0.00											
IRF for 5-Year Event:	1.00	1.00	1.00											
IRF for 100-Year Event:	1.00	1.00	1.00											
IRF for Optional User Defined Storm CUHP:														
Total Site Imperviousness: I_{total}	49.8%	52.2%	51.9%											
Effective Imperviousness for WQCV Event:	49.8%	52.2%	51.9%											
Effective Imperviousness for 5-Year Event:	49.8%	52.2%	51.9%											
Effective Imperviousness for 100-Year Event:	49.8%	52.2%	51.9%											
Effective Imperviousness for Optional User Defined Storm CUHP:														

LID / EFFECTIVE IMPERVIOUSNESS CREDITS

WQCV Event CREDIT: Reduce Detention By:	0.0%	0.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
This line only for 10-Year Event	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
100-Year Event CREDIT**: Reduce Detention By:	0.0%	0.0%	0.0%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
User Defined CUHP CREDIT: Reduce Detention By:														

Total Site Imperviousness:	51.3%
Total Site Effective Imperviousness for WQCV Event:	51.3%
Total Site Effective Imperviousness for 5-Year Event:	51.3%
Total Site Effective Imperviousness for 100-Year Event:	51.3%
Total Site Effective Imperviousness for Optional User Defined Storm CUHP:	

Notes:

* Use Green-Ampt average infiltration rate values from Table 3-3.

** Flood control detention volume credits based on empirical equations from Storage Chapter of USDCM.

*** Method assumes that 1-hour rainfall depth is equivalent to 1-hour intensity for calculation purposed

Used only as reference material

Design Procedure Form: Rain Garden (RG)

UD-BMP (Version 3.06, November 2016) Sheet 1 of 2

Designer: JPS
Company: JPS
Date: July 20, 2017
Project: Myron Stratton Home - South Drive
Location: B3

1. Basin Storage Volume	
A) Effective Imperviousness of Tributary Area, I_a (100% if all paved and roofed areas upstream of rain garden)	I_a = 52.0 %
B) Tributary Area's Imperviousness Ratio ($i = I_a/100$)	i = 0.520
C) Water Quality Capture Volume (WQCV) for a 12-hour Drain Time ($WQCV = 0.8 * (0.91 * i^3 - 1.19 * i^2 + 0.78 * i)$)	WQCV = 0.17 watershed inches
D) Contributing Watershed Area (including rain garden area)	Area = 291,852 sq ft
E) Water Quality Capture Volume (WQCV) Design Volume Vol = (WQCV / 12) * Area	V_{WQCV} = 4,121 cu ft
F) For Watersheds Outside of the Denver Region, Depth of Average Runoff Producing Storm	d_6 = ____ in
G) For Watersheds Outside of the Denver Region, Water Quality Capture Volume (WQCV) Design Volume	$V_{WQCV\ OTHER}$ = ____ cu ft
H) User Input of Water Quality Capture Volume (WQCV) Design Volume (Only if a different WQCV Design Volume is desired)	$V_{WQCV\ USER}$ = ____ cu ft
2. Basin Geometry	
A) WQCV Depth (12-inch maximum)	D_{WQCV} = 12 in
B) Rain Garden Side Slopes (Z = 4 min., horiz. dist per unit vertical) (Use "0" if rain garden has vertical walls)	Z = 4.00 ft / ft
C) Mimimum Flat Surface Area	A_{Min} = 3035 sq ft
D) Actual Flat Surface Area	A_{Actual} = 3840 sq ft
E) Area at Design Depth (Top Surface Area)	A_{Top} = 5248 sq ft
F) Rain Garden Total Volume ($V_T = ((A_{Top} + A_{Actual}) / 2) * Depth$)	V_T = 4,544 cu ft
3. Growing Media	Choose One: ◉18" Rain Garden Growing Media; ○Other (Explain): ____
4. Underdrain System	
A) Are underdrains provided?	Choose One: ◉YES; ○NO
B) Underdrain system orifice diameter for 12 hour drain time	
i) Distance From Lowest Elevation of the Storage Volume to the Center of the Orifice	y = 2.0 ft
ii) Volume to Drain in 12 Hours	Vol_{12} = 4,121 cu ft
iii) Orifice Diameter, 3/8" Minimum	D_O = 1 1/2 in

Design Procedure Form: Rain Garden (RG)

Designer: JPS
Company: JPS
Date: July 20, 2017
Project: Myron Stratton Home - South Drive
Location: B3

5. Impermeable Geomembrane Liner and Geotextile Separator Fabric A) Is an impermeable liner provided due to proximity of structures or groundwater contamination?	Choose One ○YES ◉NO
6. Inlet / Outlet Control A) Inlet Control	Choose One ○Sheet Flow- No Energy Dissipation Required ◉Concentrated Flow- Energy Dissipation Provided
7. Vegetation	Choose One ○Seed (Plan for frequent weed control) ◉Plantings ○Sand Grown or Other High Infiltration Sod
8. Irrigation A) Will the rain garden be irrigated?	Choose One ◉YES ○NO

Notes:

Used only as reference material

NOTE: STORMWATER DETENTION IS PROVIDED IN THE EXISTING ON-SITE DETENTION POND

WILDRIDGE APARTMENTS
SOUTHGATE RD
BROADMOOR MESA TOWNHOMES
STATE HWY 115
GOLD PASS HEIGHTS (PRIVATE)
FUTURE OFFICE
FUTURE OFFICE
A 21.0 AC
LOT 1, BLOCK 1, MYRON STRATTON HOME SUB. FILING NO. 1
EXISTING DETENTION POND
BOT EL=5980.0
100-YR WSL=5998.0
TOP EL=6000.0
VOL=28.9 AF
EXISTING OUTLET STRUCTURE
TENDERFOOT HILL RD
TENDERFOOT HILL ST
EXISTING 60" RCP STORM SEWER
LOT 1 TENDERFOOT HILLS MED. INVESTORS
QUAIL LAKE PARK
B2 2.7 AC
FUTURE APARTMENTS
DEERHORN RIDGE GROVE
EXISTING ADMIN. BUILDING
AREA OF FLOOD INUNDATION (PER KARCICH REPORT)
SOUTH DRIVE
EXISTING POND
EXISTING CHANNEL
HIDDEN TREASURE POINT
PROPOSED 36" CULVERT OB1
B3 6.7 AC
PROPOSED RAIN GARDEN B3
EXISTING 24" CULVERT
OB1 205.0 AC
EXISTING DETENTION POND
B1 4.9 AC
FUTURE APARTMENTS
EAST DRIVE
WINFIELD HOUSE
PROPOSED BUILDING ADDITION
FUTURE OFFICE BUILDINGS
PROPOSED 18" CULVERT B1
PROPOSED 18" CULVERT B3
PARCEL #64311-04-009 MYRON STRATTON HOME 104.6 AC
EXISTING TRICKLE CHANNEL
EXISTING DETENTION POND B
OAKMONT TOWNHOMES
TENDERFOOT HILLS DR
TENDERFOO
SOUTH DRIVE
FUTURE APARTMENTS
EXISTING CABINS
C2 11.83 AC
FUTURE CABINS
C1 2.05 AC
M.J. BROCK UNIT NO. 6 SUBDIVISION
PROPOSED 18" CULVERT C1
EXISTING PROPERTY LINE
WESTCLIFF CIR
CHEYENNE MOUNTAIN BLVD
D 1.11 AC
EXISTING APARTMENTS
LOT 1, BLOCK 1, CHEYENNE HILLS FILING NO. 2
GILCREST RD
QUAIL LAKE PARK

N

120 0 120 240

Original Scale: 1"=120'
Contour Interval = 2 ft.

DRAINAGE LEGEND

- FLOW DIRECTION ARROW
- FLOWLINE
- DRAINAGE BASIN BOUNDARY
- 1 — DESIGN POINT
- C14 23.21 AC — DEVELOPED BASIN DESIGNATION
- DEVELOPED BASIN AREA (ACRES)

SUMMARY HYDROLOGY TABLE

DESIGN POINT	Q5 (CFS)	Q100 (CFS)
1	17.3	71.4
B1	9.8	22.9
B2	5.8	13.3
B3	14.7	33.2
C1	4.3	10.1
2	137.5	389.8
3	14.5	46.8
4	2.0	5.8

MYRON STRATTON HOME - SOUTH DRIVE
LOT 1, BLOCK 1, MYRON STRATTON HOME SUBDIVISION FILING NO. 1

JPS ENGINEERING
19 E. Willamette Ave.
Colorado Springs, CO 80903
PH: 719-477-9429
FAX: 719-471-0766
www.jpsengr.com

CALL UTILITY NOTIFICATION CENTER OF COLORADO
1-800-922-1987
CALL 2-BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

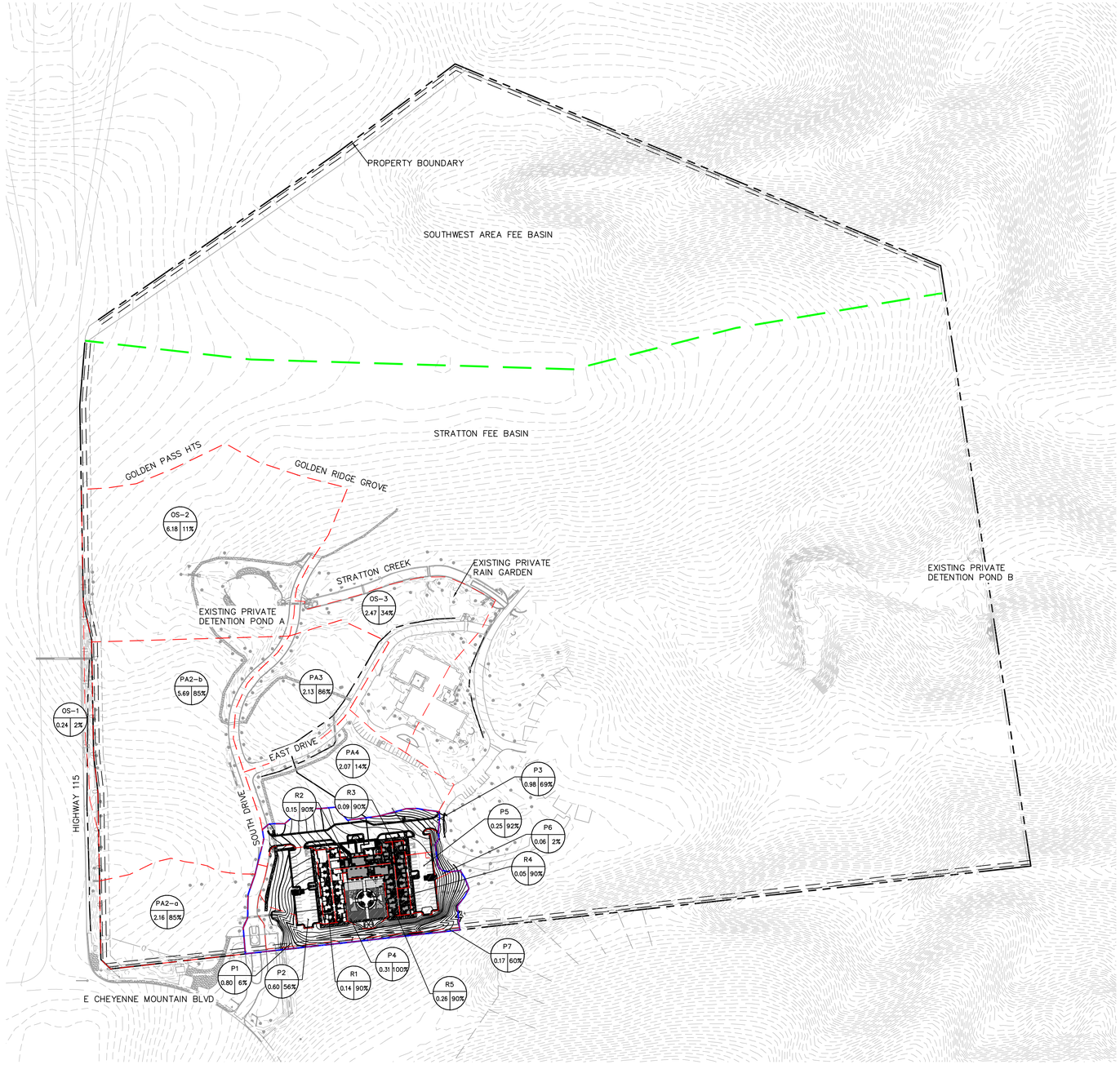
No.	REVISION	BY	DATE

DEVELOPED DRAINAGE PLAN

HORZ. SCALE: 1"=120'	DRAWN: BJJ
VERT. SCALE: N/A	DESIGNED: JPS
SURVEYED: LWA	CHECKED: JPS
CREATED: 11/07/16	LAST MODIFIED: 8/08/17
PROJECT NO: 101602	MODIFIED BY: 1"=120'
SHEET: D1	

J:\jpsprojects\101602.MSH\dwg\civil\D1.dwg Aug 08, 2017 - 11:32am

APPENDIX H – DRAINAGE MAPS



LEGEND

- PROPERTY LINE
- EASEMENT LINE
- EXISTING MAJOR CONTOURS
- EXISTING MINOR CONTOURS
- DRAINAGE BASIN BOUNDARY
- EXISTING CURB AND GUTTER
- A = BASIN DESIGNATION
B = AREA IN ACRES
C = IMPERVIOUSNESS
- DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- PROPOSED CURB AND GUTTER
- PROPOSED MAJOR CONTOURS
- PROPOSED MINOR CONTOURS
- EXISTING SIDEWALK
- MDDP SUB-BASIN PA1 (FDR SUB-BASIN BOUNDARY)
- PROPOSED ROOF DRAIN
- FEE BASIN BOUNDARY

NOTES

1. CONTRACTOR TO TIE IN PROPOSED SWALE TO EXISTING SWALE.

GRAPHIC SCALE IN FEET
0 75 150 300

NORTH

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2023 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue, Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: AME
DRAWN BY: AME
CHECKED BY: HMM
DATE: 5/1/2023

MYRON STRATTON HOME
PROPOSED DRAINAGE MAP
DRAINAGE PLANS

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
196258000

SHEET

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

PROPOSED CONDITIONS RATIONAL CALCULATIONS SUMMARY					
DESIGN POINT	TRIBUTARY BASINS	TRIBUTARY AREA (AC)	CFS		% IMPERVIOUS
			Q5	Q100	
MDDP Basins					
PA1	All FDR basins	3.97	10.67	22.71	58%
PA2-a	PA2-a	2.16	8.17	15.42	85%
PA2-b	PA2-b	5.69	19.27	36.36	85%
PA3	PA3	2.13	7.89	14.90	85%
PA4	PA4	2.07	1.42	5.65	14%
OS-1	OS-1	0.24	0.10	0.73	2%
OS-2	OS-2	6.18	3.52	15.71	11%
OS-3	OS-3	2.47	3.27	8.75	34%
SUBTOTAL		**18.78**	**35.46**	**82.09**	**45%**
FDR Basins					
P1	P1	0.80	0.39	2.22	6%
P2	P2	0.60	1.57	3.40	56%
P3	P3	0.98	3.24	6.52	69%
P4	P4	0.31	0.77	1.63	59%
P5	P5	0.25	1.07	1.97	92%
P6	P6	0.06	0.02	0.16	2%
P7	P7	0.28	1.01	1.96	76%
R1	R1	0.14	0.53	0.98	90%
R2	R2	0.15	0.56	1.05	90%
R3	R3	0.09	0.33	0.61	90%
R4	R4	0.05	0.19	0.35	90%
R5	R5	0.26	1.00	1.85	90%
SUBTOTAL		**3.97**	**10.67**	**22.71**	**58%**
TOTAL		**22.75**	**46.14**	**104.80**	**47%**

LEGEND

- PROPERTY LINE
- EASEMENT LINE
- XXXX EXISTING MAJOR CONTOURS
- XXXX EXISTING MINOR CONTOURS
- DRAINAGE BASIN BOUNDARY
- EXISTING CURB AND GUTTER
- A / B C = A = BASIN DESIGNATION, B = AREA IN ACRES, C = IMPERVIOUSNESS
- A = DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- PROPOSED CURB AND GUTTER
- XXXX PROPOSED MAJOR CONTOURS
- XXXX PROPOSED MINOR CONTOURS
- EXISTING SIDEWALK
- MDDP SUB-BASIN PA1 (FDR SUB-BASIN BOUNDARY)
- PROPOSED ROOF DRAIN

NOTES

1. CONTRACTOR TO TIE IN PROPOSED SWALE TO EXISTING SWALE.

MATCHLINE SEE SHEET 6

HIGHWAY 115

SOUTH DR

OS-1 0.24 2%

PA4 2.07 14%

P3 0.98 69%

PROPOSED FLUSH CURB

EXISTING GRAVEL SIDEWALK TO BE UPGRADED TO A CONCRETE SIDEWALK

PROP. TYPE 2 C&G

P2 0.60 56%

PA2-a 2.16 85

EXISTING PUBLIC 18" CMP CULVERT FLOWING E TO W

EXISTING PRIVATE 24" RCP CULVERT

P1 0.80 6%

P7 0.17 60%

EXISTING FENCE

P6 0.06 2%

R3 0.09 90%

R2 0.15 90%

R1 0.14 90%

R5 0.26 90%

P4 0.31 59%

P5 0.25 92%

ROCK MULCH

PRECAST PAVER

R4 0.05 90%

COBBLE

SYNTHETIC TURF

PROPOSED SWALE SEE NOTE 1

PROPOSED FLUSH CURB

EXISTING SWALE ES9 SEE NOTE 1

OWNER: MYRON STRATTON HOME
340 E CHEYENNE MOUNTAIN BLVD
PARCEL: 6431101002

OWNER: PRCP-CS BROADMOOR LLC
410 E CHEYENNE MOUNTAIN BLVD
PARCEL: 6431101001

E CHEYENNE MOUNTAIN BLVD

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2023 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue, Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: AME
DRAWN BY: AME
CHECKED BY: HMM
DATE: 5/1/2023

MYRON STRATTON HOME
PROPOSED DRAINAGE MAP
DRAINAGE PLANS

PRELIMINARY
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
196258000

SHEET
5

K:\COS_Civil\196258000_Myron Stratton Home\CADD\PlanSheets\PROP_DRN.dwg McCallum, Jessica 6/28/2023 1:04 PM

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

PROPOSED CONDITIONS RATIONAL CALCULATIONS SUMMARY

DESIGN POINT	TRIBUTARY BASINS	TRIBUTARY AREA (AC)	CFS		% IMPERVIOUS
			Q5	Q100	
MDDP Basins					
PA1	All FDR basins	3.97	11.35	23.66	61%
PA2-a	PA2-a	2.16	8.17	15.42	85%
PA2-b	PA2-b	5.69	19.27	36.36	85%
PA3	PA3	2.13	7.89	14.90	85%
PA4	PA4	2.07	1.42	5.65	14%
OS-1	OS-1	0.24	0.10	0.73	2%
OS-2	OS-2	6.18	3.52	15.71	11%
OS-3	OS-3	2.47	3.27	8.75	34%
SUBTOTAL		**18.78**	**35.46**	**82.09**	**45%**
FDR Basins					
P1	P1	0.80	0.39	2.22	6%
P2	P2	0.60	1.57	3.40	56%
P3	P3	0.98	3.24	6.52	69%
P4	P4	0.31	1.44	2.58	100%
P5	P5	0.25	1.07	1.97	92%
P6	P6	0.06	0.02	0.16	2%
P7	P7	0.28	1.01	1.96	76%
R1	R1	0.14	0.53	0.98	90%
R2	R2	0.15	0.56	1.05	90%
R3	R3	0.09	0.33	0.61	90%
R4	R4	0.05	0.19	0.35	90%
R5	R5	0.26	1.00	1.85	90%
SUBTOTAL		**3.97**	**11.35**	**23.66**	**61%**
TOTAL		**22.75**	**46.81**	**105.75**	**48%**

LEGEND

- PROPERTY LINE
- EASEMENT LINE
- XXXX EXISTING MAJOR CONTOURS
- XXXX EXISTING MINOR CONTOURS
- DRAINAGE BASIN BOUNDARY
- EXISTING CURB AND GUTTER
- A = BASIN DESIGNATION; B = AREA IN ACRES; C = IMPERVIOUSNESS
- DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- PROPOSED CURB AND GUTTER
- XXXX PROPOSED MAJOR CONTOURS
- XXXX PROPOSED MINOR CONTOURS
- EXISTING SIDEWALK
- MDDP SUB-BASIN PA1 (FDR SUB-BASIN BOUNDARY)

NOTES

1. CONTRACTOR TO TIE IN PROPOSED SWALE TO EXISTING SWALE.

MATCHLINE SEE SHEET 7

EXISTING PRIVATE 12" CMP
EXISTING SWALE ES2
EXISTING PRIVATE DETENTION POND A
EXISTING PRIVATE TYPE D INLET
EXISTING BRIDGE
EXISTING CHANNEL
EXISTING PRIVATE 6" CMP
EXISTING PRIVATE RAIN GARDEN
EXISTING OUTLET STRUCTURE
EXISTING PRIVATE 6" PVC
EXISTING PRIVATE 36" RCP CULVERT
EXISTING SWALE ES7
EXISTING PRIVATE 12" CMP
EXISTING SWALE ES8
EXISTING PUBLIC 24" CMP CULVERT
EXISTING SWALE ES1
HIGHWAY 115
SOUTH DR
EXISTING GRAVEL SIDEWALK
EXISTING SWALE ES6
EXISTING PRIVATE 24" RCP CULVERT
EXISTING SWALE ES5
EAST DR
EXISTING PRIVATE 24" RCP CULVERT
EXISTING SWALE ES4

OS-1 0.24 2%
OS-2 6.18 11%
OS-3 2.47 34%
PA2-b 5.69 85%
PA3 2.13 86%
PA4 2.07 14%

MATCHLINE SEE SHEET 5

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NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2023 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: AME
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CHECKED BY: HMM
DATE: 5/1/2023

MYRON STRATTON HOME
PROPOSED DRAINAGE MAP
DRAINAGE PLANS

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Kimley»Horn
Kimley-Horn and Associates, Inc.

PROJECT NO.
196258000

SHEET
6

NORTH

GRAPHIC SCALE IN FEET
0 20 40 80

PROPOSED CONDITIONS RATIONAL CALCULATIONS SUMMARY					
DESIGN POINT	TRIBUTARY BASINS	TRIBUTARY AREA (AC)	CFS		% IMPERVIOUS
			Q5	Q100	
MDDP Basins					
PA1	All FDR basins	3.97	11.35	23.66	61%
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SUBTOTAL		**18.78**	**35.46**	**82.09**	**45%**
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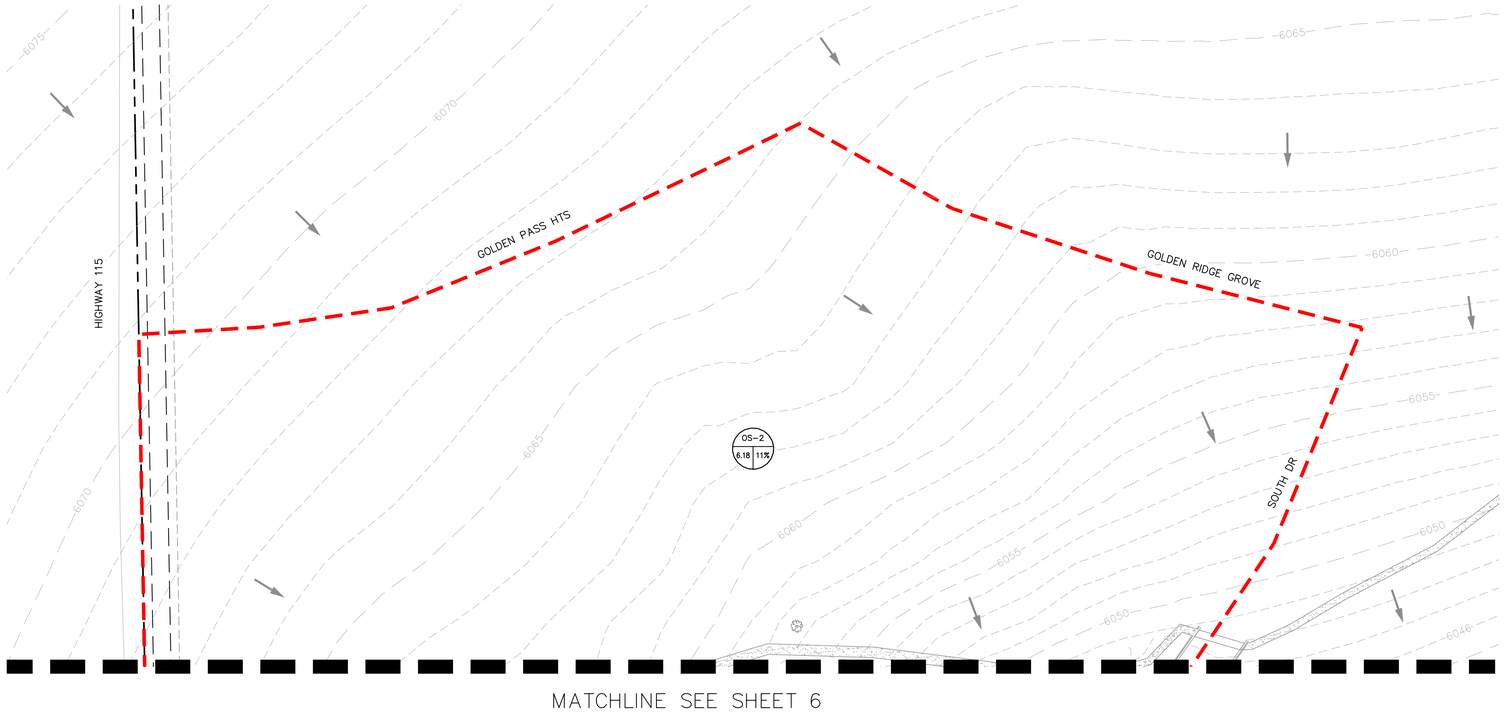
P2	P2	0.60	1.57	3.40	56%
P3	P3	0.98	3.24	6.52	69%
P4	P4	0.31	1.44	2.58	100%
P5	P5	0.25	1.07	1.97	92%
P6	P6	0.06	0.02	0.16	2%
P7	P7	0.28	1.01	1.96	76%
R1	R1	0.14	0.53	0.98	90%
R2	R2	0.15	0.56	1.05	90%
R3	R3	0.09	0.33	0.61	90%
R4	R4	0.05	0.19	0.35	90%
R5	R5	0.26	1.00	1.85	90%
SUBTOTAL		**3.97**	**11.35**	**23.66**	**61%**
TOTAL		**22.75**	**46.81**	**105.75**	**48%**

LEGEND

- PROPERTY LINE
- EASEMENT LINE
- XXXX EXISTING MAJOR CONTOURS
- XXXX EXISTING MINOR CONTOURS
- DRAINAGE BASIN BOUNDARY
- EXISTING CURB AND GUTTER
- A / B / C — A = BASIN DESIGNATION, B = AREA IN ACRES, C = IMPERVIOUSNESS
- A — DESIGN POINT
- EXISTING FLOW ARROW
- PROPOSED FLOW ARROW
- PROPOSED CURB AND GUTTER
- XXXX PROPOSED MAJOR CONTOURS
- XXXX PROPOSED MINOR CONTOURS
- EXISTING SIDEWALK
- MDDP SUB-BASIN PA1 (FDR SUB-BASIN BOUNDARY)
- PROPOSED ROOF DRAIN

NOTES

1. CONTRACTOR TO TIE IN PROPOSED SWALE TO EXISTING SWALE.



MATCHLINE SEE SHEET 6

NO.	REVISION	BY	DATE	APPR.

Kimley»Horn
2023 KIMLEY-HORN AND ASSOCIATES, INC.
2 North Nevada Avenue, Suite 900
Colorado Springs, Colorado 80903 (719) 453-0180

DESIGNED BY: AME
DRAWN BY: AME
CHECKED BY: HMM
DATE: 5/1/2023

MYRON STRATTON HOME
PROPOSED DRAINAGE MAP
DRAINAGE PLANS

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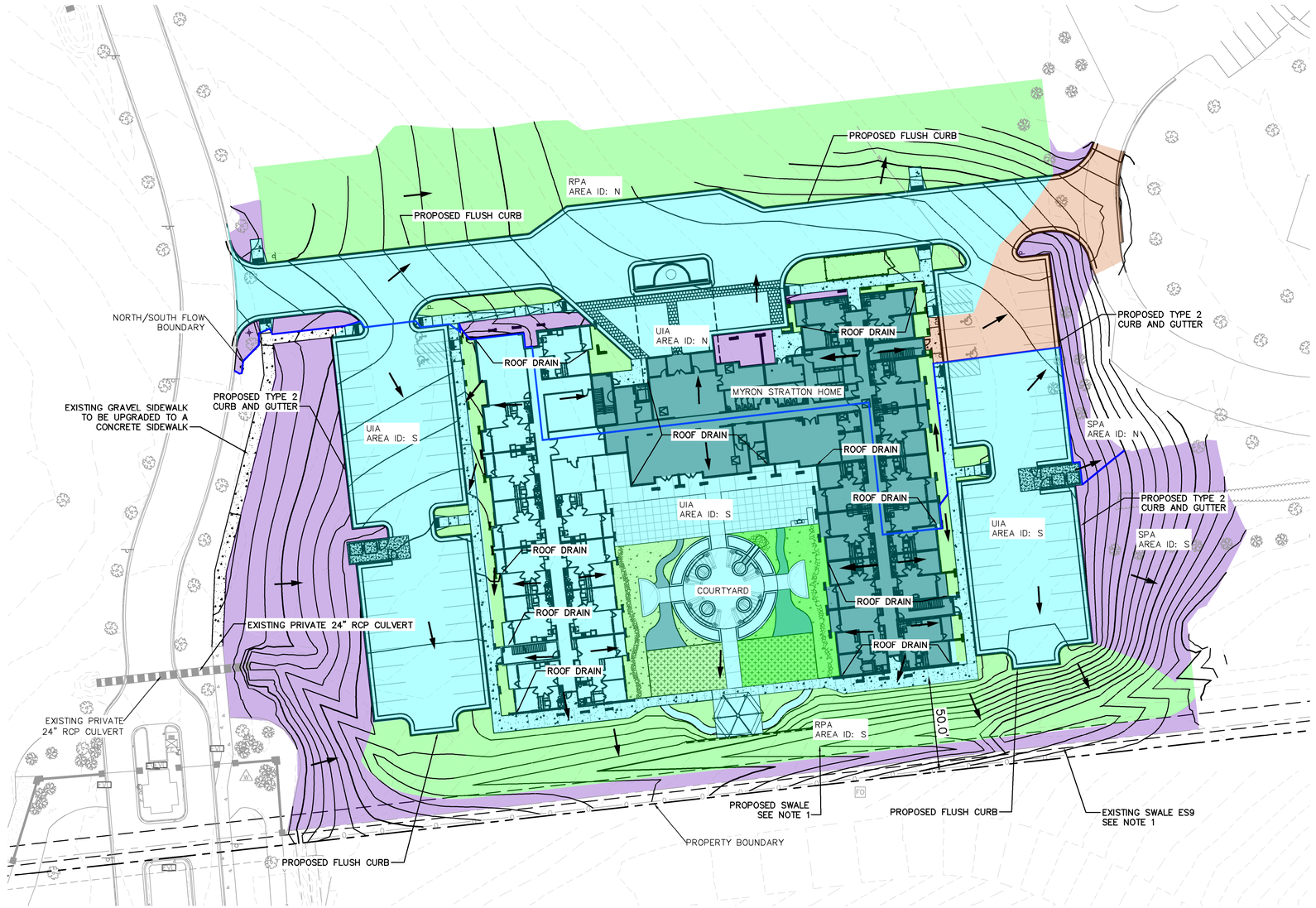
PROJECT NO.
196258000

SHEET
7



LEGEND

- PROPERTY LINE
- EASEMENT LINE
- 6050 — EXISTING MAJOR CONTOURS
- 6051 — EXISTING MINOR CONTOURS
- EXISTING CURB AND GUTTER
- PROPOSED FLOW ARROW
- PROPOSED CURB AND GUTTER
- 6050 — PROPOSED MAJOR CONTOURS
- 6051 — PROPOSED MINOR CONTOURS
- UNCONNECTED IMPERVIOUS AREAS (UIA)
- RECEIVING PERVIOUS AREAS (RPA)
- SEPARATE PERVIOUS AREA (SPA)
- DIRECTLY CONNECTED IMPERVIOUS AREAS (DCIA)
- COBBLE
- SYNTHETIC TURF
- ROCK MULCH
- PRE-CAST PAVER WALKWAY

SUMMARY

TOTAL SITE AREA (SF)	159,437
TOTAL IMPERVIOUS AREA (SF)	88,666
TOTAL SITE PERCENT IMPERVIOUS	58%
UNCONNECTED IMPERVIOUS AREA (BLUE) (SF)	84,085
RECEIVING PERVIOUS AREAS (GREEN) (SF)	42,097
SEPARATE PERVIOUS AREA (PURPLE) (SF)	28,674
DIRECTLY CONNECTED IMPERVIOUS AREA (ORANGE) (SF)	4,581
WQCV (CF)	3,694
STORMWATER VOLUME REDUCTION (CF)	3,196
STORMWATER VOLUME REDUCTION AS % OF WQCV)	86%

Kimley»Horn

2 NORTH NEVADA AVENUE, SUITE 900
COLORADO SPRINGS, COLORADO 80903 (719) 453-0180

PLANNER / LANDSCAPE ARCHITECT

NES

N.E.S. Inc.
619 N. Cascade Avenue, Suite 200
Colorado Springs, CO 80903

Tel. 719.471.0073
Fax 719.471.0267

www.nescolorado.com

IN ASSOCIATION WITH

MYRON STRATTON HOME

DEVELOPMENT PLAN

2525 CO-115, COLORADO SPRINGS, CO 80906

PROJECT INFO

DATE: 12.20.22
PROJECT MGR: C. LIEBER
PREPARED BY: T. KNAB

STAMP

ISSUE INFO

ENTITLEMENT

ISSUE / REVISION

DATE:	BY:	DESCRIPTION:
04.05.23	---	PER CITY COMMENTS
06.28.23	---	PER CITY COMMENTS

SHEET TITLE

GREEN INFRASTRUCTURE EXHIBIT

SHEET NUMBER

G.1

1 OF 1

PLAT FILE #

DEPN-22-0232