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Drainage Conformance Letter

for

Maverik Convenience Store & Fuel Station
Referencing Cheyenne View Apartments, Filing No. 1
Conditional Use Development Plan
Colorado Springs, Colorado
Colorado Springs # _____

Prepared for:

Maverik, Inc.
Cassie Younger
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Salt Lake City, Utah 84111
(801) 936-9155

Prepared by:

DCI Engineers
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DCI Job No. 20-122-0013
1st Submittal October 2021

Engineer's Statement:

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

By: Damon A. Smith, PE
Licensed Professional Engineer
State of Colorado
No. 59516



Developer's Statement:

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

Maverik, Inc.

By: _____

Cassie Younger
Entitlements Manager
185 S State Street, Suite 800
Salt Lake City, Utah 84111

SECTION A: GENERAL LOCATION AND DESCRIPTION



The proposed Maverik Convenience Store and Fuel Station is located in the City of Colorado Springs, within El Paso County. The proposed 1.50-acre plot of land is comprised of a single parcel within the larger Cheyenne View Apartments Filing No. 1 Conditions Use Development Plan, submitted by Classic Consulting Engineers in January of 2021. The parcel is located on the southeast corner of Fountain Boulevard and Union Boulevard and is currently undeveloped.



The Colorado State Land Board maintains records of the Cadastral Survey of the state for purposes of establishing legal property boundaries in proposed land subdivisions. The proposed property is located in the SW $\frac{1}{4}$ of Section 21, Township 14S, Range 66W of the 6th Principal Meridian. This Drainage Letter accompanies the proposed Site Plan Application, dated September 2021.

The proposed legal description, as identified by Altura Land Consultants, is as follows:

A Parcel of land being a portion of Lot 1, Block 1, Prospect Park Subdivision No. 6, in the City of Colorado Springs, County of El Paso, State of Colorado, per the plat recorded April 4, 1978 at Reception No. 419755 in the Office of the Clerk and Recorder for said county, Lying within the SW $\frac{1}{4}$ of Section 21, Township 14S, Range 66W of the 6th Principal Meridian.



The proposed development is located within the city limits of Colorado Springs. The site is bordered by Fountain Blvd to the north and Union Boulevard on the west, both of which are operated and maintained by the City of Colorado Springs. Highway 24 is located just ½ mile south of the project site, while Interstate 25, a major thorough fare for the state of Colorado, is located just 1 mile to the west of the site.

The proposed Maverik store will comprise the upper northwest corner of a larger master developed mixed use property. The overall property is approximately 19 acres and consists of multifamily residential with two commercial lots (one of them being the Maverik site). Near the northwest corner of the property, an existing stand-alone restaurant will remain in place and will be surrounded on three sides by the residential structures. The master development includes onsite utilities and drainage in conformance with the City of Colorado Springs requirements.

SECTION B: DESCRIPTION OF PROPERTY

The proposed development consists of 1.50 acres of previously un-developed property within a larger planned mixed-use development. The existing site is completely undeveloped but will be mass-graded as a part of the larger overall development plan. The site slopes from north to south and west to east at an approximate slope of 4.3%.

The proposed Maverik site is primarily paved with asphalt and typical landscape improvements surrounding a 4,425 SF convenience store and fuel canopy. The site will contain 30 parking spaces to serve the store, not including the fuel pump spaces. Due to the size and nature of the proposed store, we do not anticipate commercial use of the fuel islands.

Proposed flow from the property travels over the surface of the parking lot in a series of concrete ribbon gutters and channels. Contrary to the pre-developed condition, the flow on the site will travel north and west into a series of Type R catch basins before it is piped underground to an outfall point on the southwest corner of the property. Flows from the Maverik site will then combine with flows from the remaining portion of the commercial and residential properties before discharging to a regional full spectrum detention pond located on the southeast corner of the larger 19-acre development. Design for the regional pond was completed by Classic Consulting Engineers & Surveyors in 2021 under the Conditional Use Development Permit Application _____.

Slopes within the proposed site are mild with an approximate slope of 2-3% across the parking lot (south to north and east to west). Drainage for the canopies and roof structures will be captured via a system of roof drains on downspouts and will be conveyed into the underground drainage system for the site. Careful consideration has been taken to ensure ADA accessibility across the site is still permitting for proper overland drainage flow over the asphalt surfaces. Surrounding the fuel canopy on the south side is a proposed crossspan

designed to capture runoff from the south before it can co-mingle with any potential spills or leaks from the fuel islands. Additionally, a trench drain on the north side of the canopies has been designed to capture any potential “nuisance flows” from the islands and pass them through a designed spill containment vault before discharging into the downstream storm system.

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													
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													
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

An analysis by DCI Engineers indicates a weighted impervious percentage of 76% for the final buildout of the Maverik site. Under the criteria of Table 6-6 from Chapter 6 of the Drainage Manual, areas within the development were separated into categories. Roofs were assigned an impervious percentage of 90%, sidewalks and asphalt pavements received a 100% percent categorization, and lawn and landscaped areas were assigned a 2% weighted impervious percentage. The resulting calculations can be found in Appendix A.



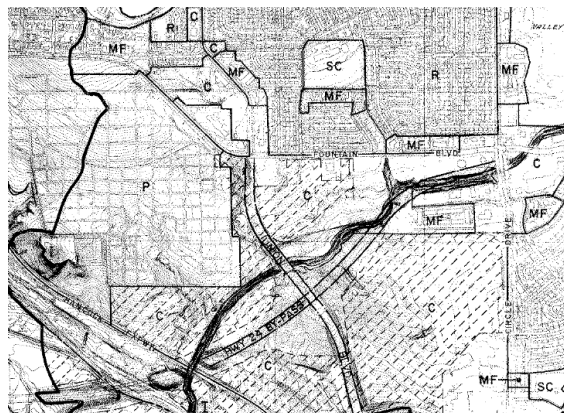
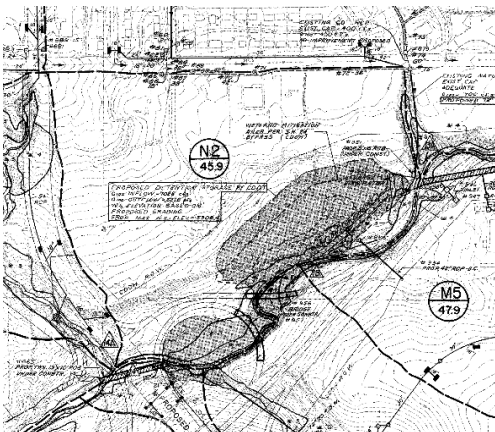
Image 1: Existing Project site facing north from Union Blvd



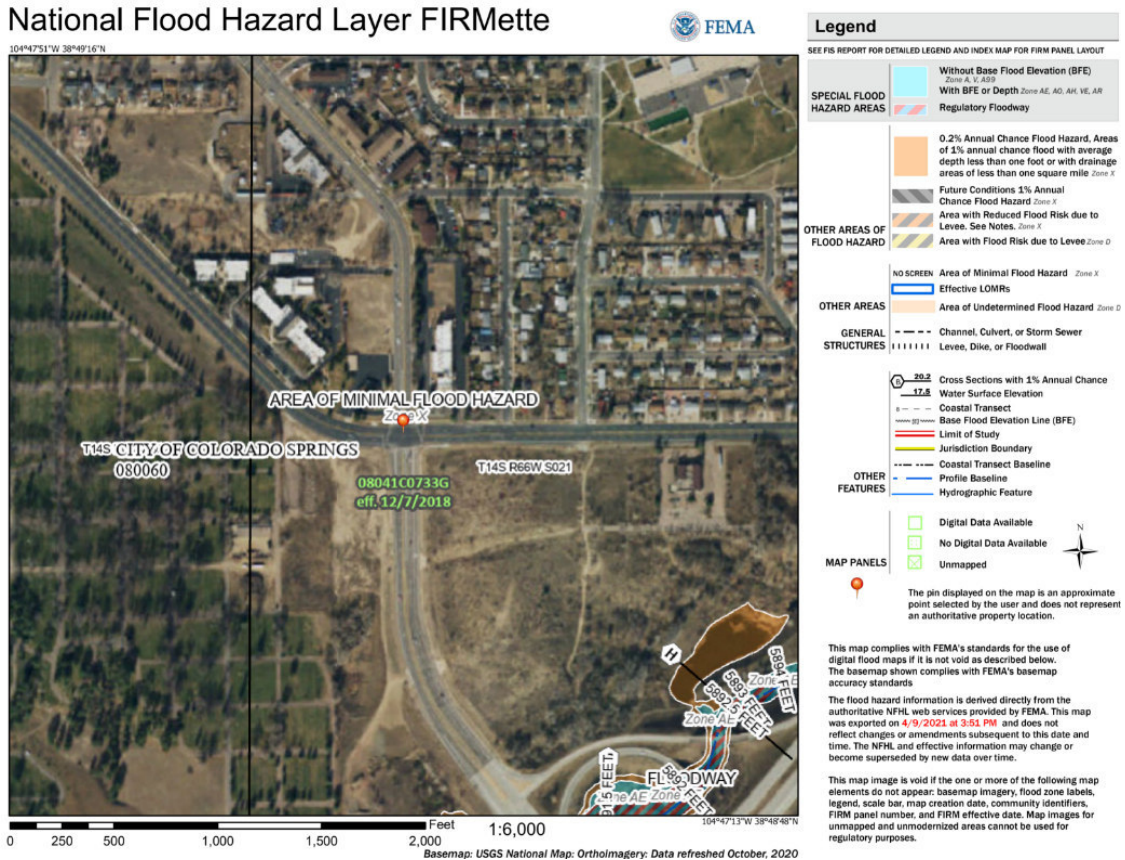
Image 2: Existing site facing east from Fountain Blvd

DCI consulted the Natural Resources Conservation Service’s (NRCS) Web Soil Survey for a description of local soil types in the area. The soil type across the site is Blakeland Loamy Sand with slopes in the 1-9% range. The soils have a low erosion potential, with a high saturated infiltration capacity and are classified as belonging to Hydrologic Group A.

The site lies within the Spring Creek Catchment of the greater Fountain Creek Drainage Basin. Flows from the site will be conveyed underground into a full spectrum detention basin on the southeast corner of the master development. After detention, the outfall is discharged into Spring Creek which flows southwesterly towards a confluence with Fountain Creek just south of our project. A Spring Creek Master Planning Study was prepared by URS Consultants in 1993 for the City of Colorado Springs and El Paso County. In that study, this development was included within Basin N2, a 45.9-acre sub-basin within the Spring Creek Major Basin. At the time of the study, this basin was assumed to be zoned Commercial and we do not anticipate a significant deviation in the total flows from that original study.



The proposed Maverik is located completely outside of a designated FEMA Floodplain as determined by FEMA Flood Insurance Rate Map No. 08041C0733G. The map was last modified on December 7, 2018.

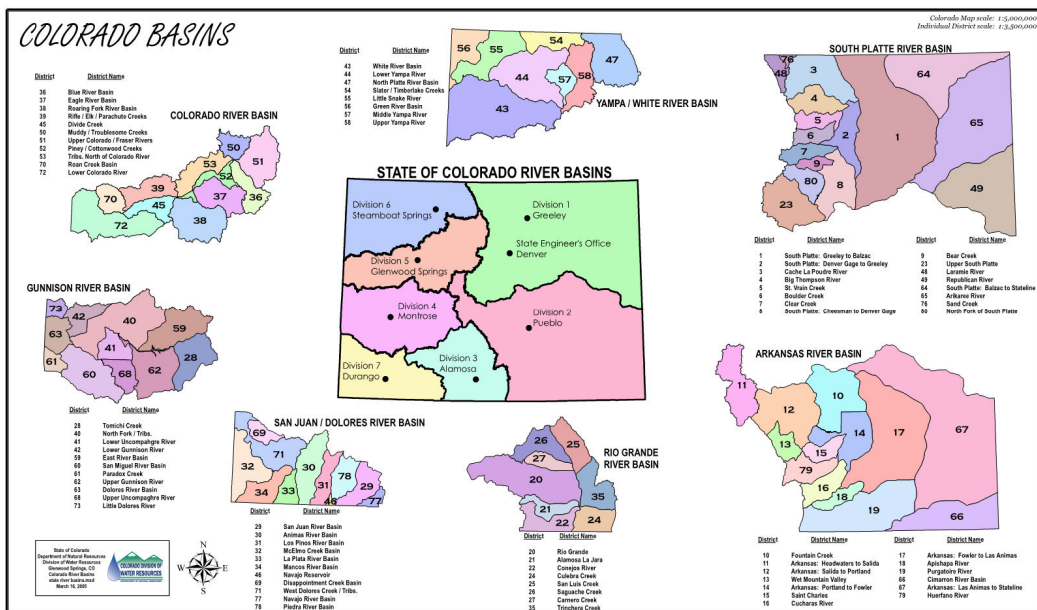


The nearest designated floodplain is located southeast of the project site and outside of the boundaries of the master development. We do not anticipate any development within a flood plain or any negative effects to the existing floodplain delineations. No additional floodplain permits are required for projects occurring fully outside of the designated floodplain boundaries.

An analysis of the site by DCI Engineers in March of 2021 revealed no signs of current or former irrigation canals or ditches serving the proposed property. This portion of Colorado Springs was planned for future commercial development. As a result, we do not anticipate any signs of significant geologic features within the limited area of development.



SECTION C: DRAINAGE BASINS AND SUB-BASINS

The State of Colorado is comprised of seven major river basins that are governed by separate divisions within the Colorado Department of Water Resources. The City of Colorado Springs and El Paso County make up the largest metropolitan city within the Arkansas River Basin. The River Basin covers approximately 22,000 square miles in eastern Colorado and accounts for a large portion of the state’s gross municipal and industrial water demand (South Platte being the largest demand). Estimates of the total demand for the South Platte River Basin fall between 324,000 and 467,000 acre-feet of water per year.



The Arkansas River Basin supports a wide range of water needs including municipal, industrial, agricultural as well as important water-dependent ecological and recreational attributes. Coloradans and tourists regularly enjoy the recreational opportunities provided by the many environmental features of the basin. An Arkansas River Implementation Plan was developed by CH2MHill in 2015 to identify the unique challenges associated within this river basin.

Within the Arkansas River Basin, the site is located within the Fountain Creek sub-basin. The Fountain Creek sub-basin is 24,000 acres in size and is comprised mostly of a highly urbanized land use with a mix of commercial and residential projects. DCI Engineers analyzed the existing stormwater catchment area using available data from the U.S. Environmental Protection Agency’s GeoWaters Viewer. The facility is located within a larger 1,600-acre catchment that drains into a CDOT regional pond and eventually into Spring Creek. Based on Land Use data provided from 2011, this area included approximately 42% Low Density Development, 24% Medium Density Development, and less than 5% High



Density Development. The remaining land uses include a mix of open space, natural waterways, and grasslands.

SECTION D: MINOR DRAINAGE BASINS

Under the proposed improvement plan, this parcel will remain designated for commercial use as a convenience store with fuel sales. The proposed project will add a 4,425 SF convenience store, seven fuel islands under a 4,940 SF canopy, and up to 27,235 SF of asphalt surface parking. The site will feature decorative landscaping and a landscaped area to the east of the store.



The existing site was designed to surface flow over the undeveloped land towards the southeast. Runoff would travel into a CDOT pond that detained flows before discharging into Spring Creek. As a result of the master development of the site, DCI proposes a change to the overland flow patterns, but with a similar discharge point at Spring Creek.

The proposed conditions will grade the land at an elevation below the current intersection of Fountain and Union Boulevard. The Maverik store will be situated along the southern edge of the proposed parcel with the fuel canopy more or less centered on the site. At full build-out, runoff will travel over the surface of the asphalt parking lot towards a Type R Catch basin designed in the northwest corner of the site. Similarly, flows originating on the west side of the building will travel towards a second Type R catch basin located on the southwest corner of the building parking. From each inlet, stormwater will be conveyed through a system of underground large diameter piping to the south of the parcel, where it will combine with flows from the remainder of the master planned development. Though the overland travel is a deviation from the existing flow path, the ultimate flow of the underground storm drain remains southeasterly towards a regional full spectrum detention pond.

The off-site flow patterns and paths will not be impacted by the proposed development on the property. The proposed development will be graded below the current street level of Fountain and Union Boulevard. Flow from those major streets will continue to be captured and conveyed in City Drainage Structures and is not anticipated to impact this development.

SECTION E: DRAINAGE DESIGN CRITERIA

The proposed development is located within the boundaries of the City of Colorado Springs and is thus subject to the latest stormwater standards of the Colorado Springs Drainage Manual. In accordance with the latest guideline revisions dated May 2014, this project was analyzed for the 5-yr and 100-year recurrence intervals.



Due to the limited scope of work proposed by this project (reduction in total impervious percentage with no change to the existing drainage patterns or quantities), a simplified analysis was employed. The project area, totaling 1.50 acres, was analyzed using the Rational Method Analysis for the purposes of this drainage letter.

The rational method is based on the direct relationship between rainfall and runoff and can be expressed by the equation:

$$Q = CIA$$

In which:

Q = the maximum rate of runoff (cubic feet per second [cfs])

C = the runoff coefficient that is the ratio between the runoff volume from an area and the average rainfall depth over a given duration for that area



I = the average intensity of rainfall for a duration equal to the time of concentration (inches/hour) A = basin area (acres)

The runoff coefficients for each sub-watershed were developed using the UD-Rational Spreadsheet produced by the Mile High Flood District (MHFD/UDFCD) and land use coefficients from Table 6-6 of the Drainage Manual. A copy of the Spreadsheet is available in the Appendix.

This particular property is a part of a larger master planned development that has been designed to drain to regional detention systems that serve multiple properties. We have assumed that drainage from the regional sub-basins travel into a full spectrum detention pond that treats and detains flows from the entire master development prior to discharging downstream. Full spectrum detention involves the storage of runoff volumes into three separate volumes. Volume one is defined as the Water Quality Control Volume, as described in Section E of this report. In addition, Volume 2 consists of the Excess Urban Runoff Volume (EURV) minus the WQCV. The third and final volume reflects the 100-year runoff volume, exclusive of the EURV. This project does not propose any modifications to the existing drainage patterns on the site that would necessitate revisions or improvements to the regional detention system. As a part of the project the outfall from this particular site will be cleaned of sediment and trimmed to ensure adequate flow into the regional system.

SECTION F: DRAINAGE STUDIES, OUTFALL SYSTEMS PLANS, SITE CONSTRAINTS

This site lies within a larger planned commercial development that is served by a regional full spectrum detention system designed to capture, convey, and treat stormwater flows for the retail parcels prior to discharge into the Spring Creek system. This property is part of a larger 19- acre master development that was designed by Classic Consulting Engineers & Surveyors in January 2021.



Under the Conditional Use Development Plan, Classic Consulting proposed the use of a full spectrum detention facility with water quality that serves this property as well as the proposed multifamily residential apartments to the east. DCI's rational method analysis of the Maverik site was provided to Classic Consulting as a part of the coordination process.

SECTION G: HYDROLOGY

The proposed development is subject to the latest stormwater standards of Colorado Springs Drainage Manual. The project's contributing area, totaling 1.50 acres is well under the five-acre threshold for the use of the Colorado Urban Hydrograph Procedure. In accordance with the latest guidelines, this project was analyzed for the 5-yr and 100-year recurrence intervals using the Rational Method.

The runoff coefficients for the parcel were developed using the UD-Rational Spreadsheet produced by the MHFD/UDFCD. The spreadsheet analyzes the existing and proposed conditions at the site relative to sub-watershed size, soil types, site slopes, flow paths, and time of concentrations. A copy of the Spreadsheet is available in the Appendix.

The existing parcel is currently undeveloped and consists of silty soils with slopes between 1 and 9%. At full development, we anticipate that the site will be 73.3% impervious with the majority of that being flat roofs and asphalt pavements.

The existing condition was modeled as a single sub-basin with overland travel in the southeasterly direction. Due to the soil types and high permeability of the soil, the pre-developed flows from the site were insignificant relative to the fully developed flows. The Runoff Summary Table for Post-Developed Conditions can be found in the Appendix.

The hydrological analysis for the site was conducted in accordance with the methodology listed in the Colorado Springs Drainage Manual. The project was analyzed for both minor and major storms for commercial projects. A 5 year-1 hour recurrence interval was selected for use as the minor storm event. For purposes of major storm events, the site was analyzed using the rational method for a 100 year-1 hour recurrence interval.

For the purpose of small urban watersheds less than 130 acres in size, a rainfall intensity duration frequency curve can be used in association with the Rational Method, to determine rainfall intensity distribution over the period of the 1 hour duration. Equation 5.1 from the SDDTC describes the Intensity with the following equation:

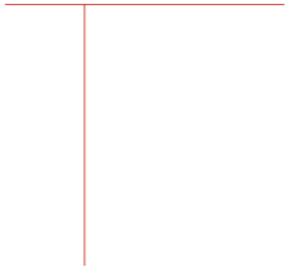
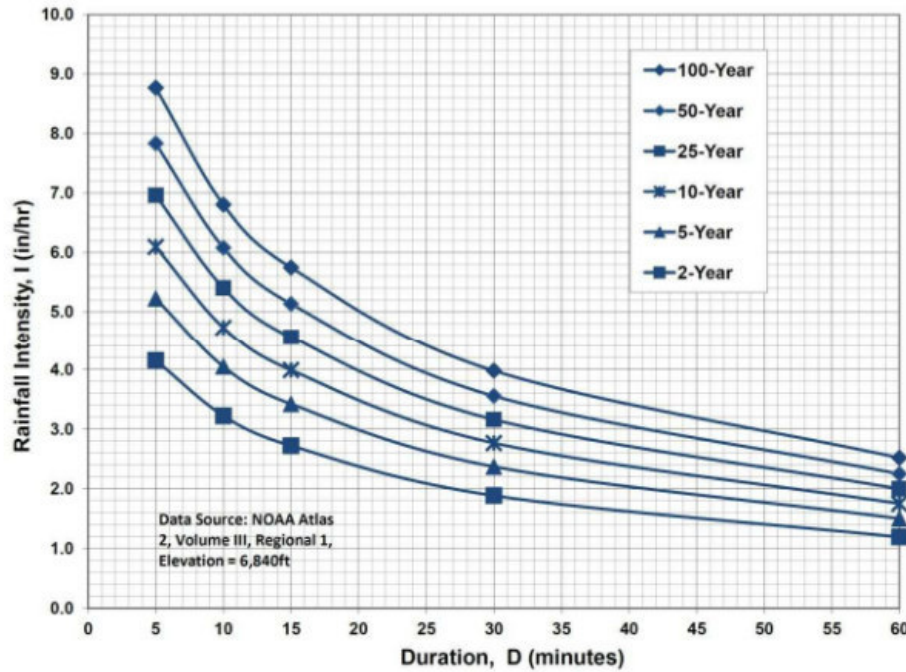


Figure 6-5. Colorado Springs Rainfall Intensity Duration Frequency



Data Source: NOAA Atlas
2, Volume III, Regional 1,
Elevation = 6,840ft

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.



Colorado Springs utilizes full spectrum detention to reduce flooding associated with urban development by reducing peak flows across an entire range of storm events up to the 100-year flood event. Full spectrum detention involves the storage of runoff volumes into three separate volumes, depending on the design of the facility. Volume one is defined as the Water Quality Control Volume, as described in Section E of this report. In addition, Volume 2 consists of the Excess Urban Runoff Volume (EURV) minus the WQCV. The third and final volume reflects the 100-year runoff volume, exclusive of the EURV.

New development and significant redevelopment in the County are governed by the latest version of the Colorado Springs Drainage Manual. The drainage system shall account for runoff from both minor and major storm events. The 5-year recurrence interval is utilized as the basis for minor storm events. The design capacity for the development for the major and minor storm events does not include the effects of onsite detention on the peak flows. In all cases, the onsite system has been designed to protect the existing and proposed structures and inhabitants from hazards associated with the 100-year storm event.

This project was previously designed as a part of a greater regional detention system for the Cheyenne View Apartments Filing No. 1. The design of the full spectrum facility was prepared by Classic Consulting Engineers in January 2021 under the Conditional Used Development Plan.



SECTION H: HYDRAULICS

Typical design of storm drain systems within Colorado Springs utilize the hydraulic loss method to ensure sufficient capacity in the underground systems. Both inlets and piping are sized to adequately convey the 5-year and 100-year storms with a minimum of 1 foot of freeboard between the maximum Hydraulic Grade Line and the finished surface.

The project storm drain system was analyzed using AutoDesk Storm and Sewer Analysis to determine the Hydraulic Grade Line and Energy Grade Line for both the Major (100-Yr) and Minor (5-Yr) storm events. Inlets were examined for both the major and minor events with minimum spread. Each of the two proposed inlets has been designed as a Type R catch basin in a sump condition. A clogging factor of 50% was applied to each inlet to prevent flooding concerns due to potential lack of maintenance.

SECTION I: WATER QUALITY ENHANCEMENT

The project proposes the continuation of the use of the regional detention pond that currently serves the master commercial development. The detention basin was designed according to the City's standards for water quality treatment, as of 2021.



El Paso County falls under the purview of the Phase I Traditional Municipal Separate Storm Sewer System (MS4) Permit as administered by the Colorado Water Quality Control Division. The permit coverage, under Permit No. COR-070000, requires the management of stormwater runoff from urban development. The Criteria Manual aims to promote a reduction in runoff volume while requiring the treatment of the Water Quality Control Volume prior to the discharge into the municipal storm system.

In addition to the requirements of the Phase I MS4, this project is also subject to the City of Colorado Springs requirements for Grading, Erosion, and Sediment Control as outlined in the City's GEC Permit. A separate GEC Plan and CSWMP has been prepared by DCI Engineers to establish the proposed plan for the protection of the storm drain system from construction sediment loss



SECTION J: STORMWATER CONVEYANCE FACILITIES

The proposed storm drainage for the site has been designed to maintain compliance with the existing drainage patterns on the site. The proposed improvements have been analyzed as a part of a larger master development with a drainage plan that was prepared by Classic Consulting Engineers and Surveyors in January 2021.

The general drainage pattern for this site follows the pre-developed flow-path from north to south and east to west, though in the case of the developed condition, these patterns are achieved through underground piping as opposed to overland flow.

The existing undeveloped site contains no storm drain conveyances to channelize flows towards Spring Creek. Runoff travels overland across bare dirt and native vegetation towards the southwest where it collects at a CDOT detention basin near Spring Creek.

At full build out, the proposed project will mimic the existing drainage conditions by conveying flows into an engineered full spectrum detention facility in the southeast corner of the master site. At this particular parcel, flows have been designed to travel within underground piping to a connection point provided by the master drainage system on the southwest corner of this site. Prior to hitting the underground conveyance system, runoff has been designed to flow north and west, over the asphalt surface, before entering a 10' wide Type R catch basin in the northwest corner of the property. While the proposed improvements significantly increase the total impervious percentage of the site, the master drainage of the development will utilize full spectrum regional detention to mimic the predeveloped flow rates and discharge point. The site was analyzed using the Rational Method in the pre and post developed condition as a part of the master drainage study. DCI analyzed the proposed runoff conditions for this parcel to show general conformance with the master drainage report. A summary of the post developed runoff is included below. The site was broken up into three separate drainage basins, each contributing flows into the



underground drainage system. Basin B was further divided into sub-basins to account for flows from canopy roof drains and roof downspouts for the purpose of hydraulic design of the piping systems. The sub-basins for the roof downspouts were only used to size the pipe used to convey the runoff from the canopy. The Land Use Summary Table for Post-Developed Conditions can be found in the Drainage Plan and Appendix.

SECTION K: STORMWATER STORAGE FACILITIES

As discussed previously, stormwater detention for this site is being handled by a regional full spectrum detention pond that has been designed as a part of the Conditional Use Development Permit Application submitted by Classic Consulting Engineers and Surveyors in 2021. This letter serves as an indication that the developed property is in general conformance with the assumptions made in that study.

SECTION L: WATER QUALITY ENHANCEMENT BMPs

In order to protect the quality of downstream water bodies, the owner shall implement a comprehensive plan for education and outreach to the individual tenants to promote the benefits of enhanced water quality. An operations and maintenance plan has been developed to outline the goals, procedures, and processes through which the site shall ensure the protection of water quality for downstream users.

SECTION M: FLOODPLAIN MODIFICATIONS



The proposed Maverik is located completely outside of a designated FEMA Floodplain as determined by FEMA Flood Insurance Rate Map No. 08041C0733G. The map was last modified on December 7, 2018.

As a result, there is no modifications to existing floodplains being requested, nor is there any proposed work within a regulatory floodway that would require a floodplain development permit.

SECTION N: ADDITIONAL PERMITTING REQUIREMENTS

In addition to permitting through the City of Colorado Springs Development Process, projects within the city limits may be subject to additional permit requirements depending on anticipated scope and location.

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into *waters of the United States*, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports) and mining projects. Section 404 requires a permit before dredged or fill



material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities).

This project is located outside of the established floodplain and there are no signs of established waters of the United States within the project boundaries. DCI analyzed the National Wetland Inventory database provided by the US Fish and Wildlife Service. The nearest emergent wetland is located just beyond the southeastern limits of the master development, where the existing CDOT detention pond is located. Construction of this project and the master development are outside of the delineated wetland area.



The proposed development is located within the highly urbanized Fountain Creek watershed that encompasses a large portion of the City of Colorado Springs. The proposed site is fully developed and is surrounded by previously constructed roadways, structures, and utility infrastructure. We do not anticipate the need for any additional permitting or monitoring as a result of the Endangered Species Act.

During the construction phase, the project shall be subject to the GESC requirements of the City of Colorado Springs. The contractor shall implement best management practices designed to minimize the potential for pollution of waterways from erosion, sedimentation, or non-storm water pollutants. The proposed disturbance of 1.5 acres is over the threshold for the requirement of a Stormwater General Construction Permit as administered by the Colorado Department of Public Health under the federal National Pollutant Discharge Elimination System. As such a separate Stormwater Management Plan will be prepared and submitted for adherence to the NPDES permit program.

SECTION O: CONCLUSIONS

The proposed Drainage Letter for the Maverik Store has been designed to comply with the requirements of the Colorado Springs Drainage Criteria Manual.

In accordance with the city's standards, the site was analyzed by DCI Engineers using a Rational Method analysis for the 5year, 1-hour storm event as well as the 100 year-1 hour major storm event. Rainfall intensities were calculated using Table 6-5 of the Criteria Manual. The resulting analysis indicates that the overall development will reduce the total runoff from the 1.50 acre site in both the minor and major storm events increase the total runoff from this parcel, however, the increased flows are attenuated through the use of a regional detention pond in the southeast corner of the property. A summary of the rational method analysis is included in the Appendix.



SECTION P: VARIANCES

DCI does not anticipate the need for any variances from City of Colorado Springs standards for this development. The project scope is a small portion of a larger master development that includes subdivision and conditional uses as proposed in this development plan.

SECTION Q: DRAINAGE CONCEPT

The overall drainage concept for the proposed project will not have a significant or detrimental impact to the overall drainage concept for the master development. While localized grades have been adjusted and total impervious areas have been increased from the existing conditions, the ultimate conveyance of flows will continue on the southeasterly direction towards Spring Creek. The full spectrum detention facility designed by Classic Consulting Engineers will mitigate the effects of the development, reducing the flows to match the pre-developed conditions. As a part of this drainage study, DCI has conformed that the proposed project is in general conformance with the assumptions made in that master drainage study.



REFERENCES

FEMA DFIRM Map No No. 08041C0733G. Federal Emergency Management Agency, December 7, 2018.

Colorado Springs Drainage Criteria Manual, Volume 1; City of Colorado Springs; Revised May 2014.

National Wetlands Inventory Online Mapper; US Fish and Wildlife Service; April 2021

Urban Storm Drainage Criteria Manual-Volumes 1-3; Urban Drainage and Flood Control District (UDFCD); Revised March 2017.

APPENDICES

Please refer to the attached Appendices for additional information/ reference documents.

HYDROLOGIC COMPUTATIONS

Appendix A

Drainage Plan

NOTE: Bid documents should not be separated or issued as partial sets to subcontractors. Bidders are responsible for all portions of the documents that pertain to work covered by sub-bids. Bidder assumes full responsibility for error or misinterpretations resulting from partial sets of Bidding Documents by itself or any sub-bidder.

Conflicting information or errors found in the construction documents should be brought to the attention of the architect immediately. In the event of a conflict in the drawings, bidder should not assume the least expensive option will meet the project requirements.



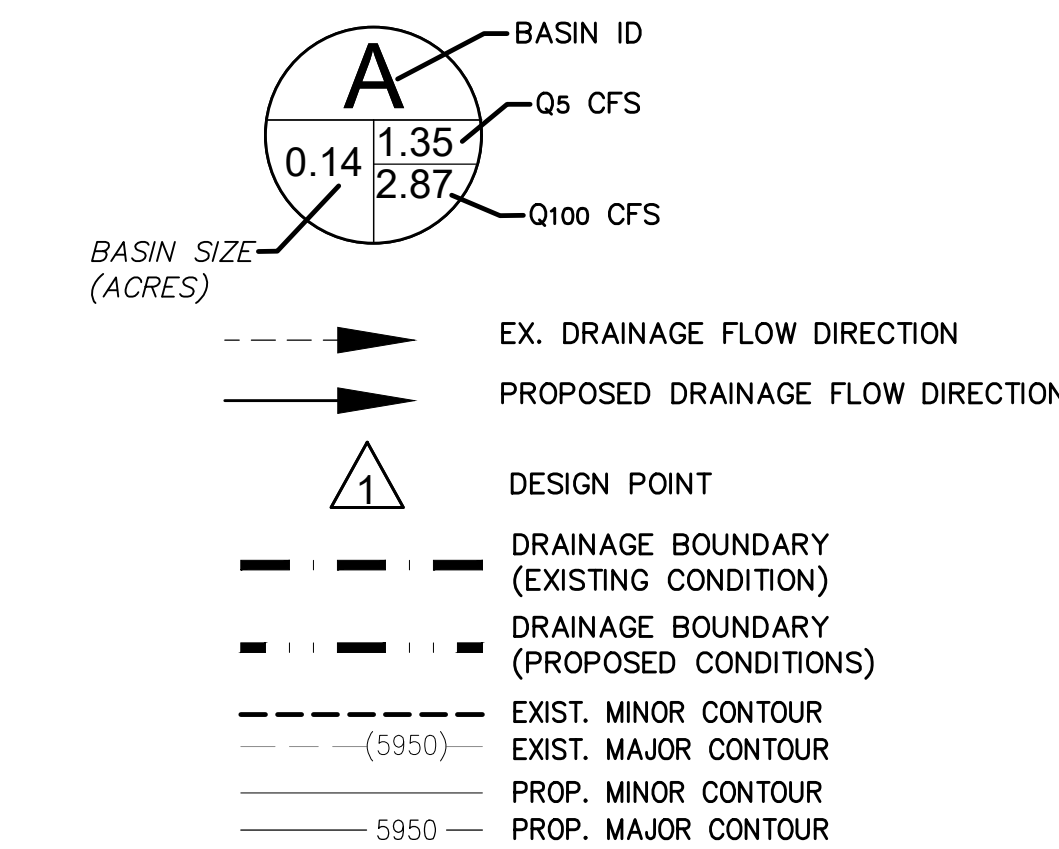
MAVERIK INC. STORE
FOUNTAIN BLVD. AND UNION BLVD.
COLORADO SPRINGS, CO

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PHONE: (720) 439-4700
WEBSITE: www.edci-engineers.com
CIVIL / STRUCTURAL
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POST-DEVELOPED
DRAINAGE
CONDITIONS

DRAINAGE LEGEND



VERTICAL DATUM/BENCHMARK:

VERTICAL RELIEF WITH THE SOURCE OF INFORMATION (GROUND SURVEY), CONTOUR INTERVAL = 1 FOOT, DATUM, BENCHMARK IS A 1" ALUMINUM CAP (LS 28658)

ELEVATION = 5973.05 FEET

NOTE:

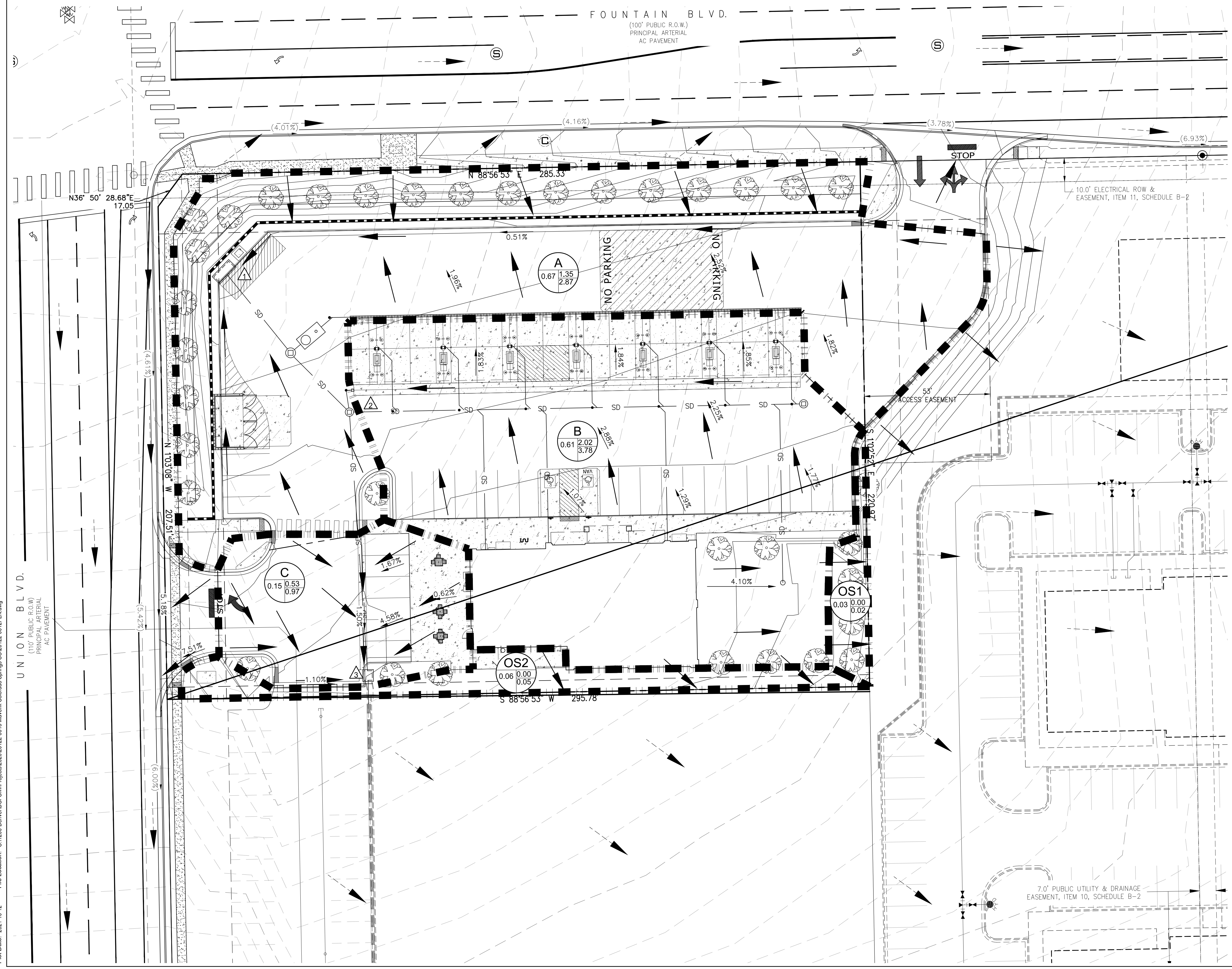
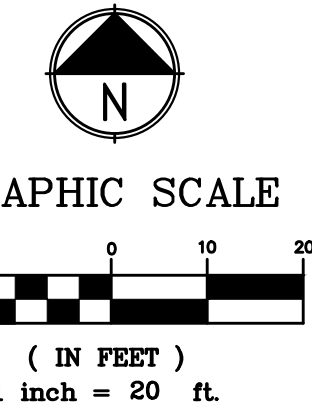
PLAN REVIEW BY THE CITY OF COLORADO SPRINGS IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH DESIGN CRITERIA. THE CITY OF COLORADO SPRINGS IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE CITY OF COLORADO SPRINGS, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY FOR COMPLETENESS AND/OR ACCURACY OF THIS DOCUMENT.

CONTRACTOR NOTE:

ALL EXISTING UTILITIES SHOWN ON PLANS ARE TO BE VERIFIED HORIZONTALLY AND VERTICALLY PRIOR TO ANY CONSTRUCTION. ALL EXISTING FEATURES INCLUDING BURIED UTILITIES ARE SHOWN AS INDICATED ON RECORD MAPS AND SURVEYS FURNISHED BY OTHERS. WE ASSUME NO LIABILITY FOR THE ACCURACY OF THOSE RECORDS AND SURVEYS. CONTACT THE UTILITY OWNER/AGENCY FOR THE FINAL LOCATION OF EXISTING UTILITIES IN AREAS CRITICAL TO CONSTRUCTION.

PROPOSED RUNOFF SUMMARY

DESIGN POINT	BASIN	AREA (AC)	IMP (%)	C _s	Q _s (cfs)	C ₁₀₀	Q ₁₀₀ (cfs)
1	A	0.68	62.0	0.47	1.35	0.59	2.87
2	B	0.61	83.0	0.68	2.02	0.76	3.78
3	C	0.15	86.8	0.72	0.53	0.79	0.97
-	OS1	0.03	2.0	0.01	0.00	0.13	0.02
-	OS2	0.06	2.0	0.01	0.00	0.13	0.05



Appendix B

Hydrology Calculations



PROJECT: Maverik - Colorado Springs
 SUBJECT: COMPOSITE RUNOFF FACTORS
 JOB #: 20-122-0013
 DATE: 10/13/2021
 BY: SDK



Basin Name	Square Footage	Acres	Landscaped sf	Landscaped Acres	Gravel sf	Gravel Acres	Asphalt sf	Asphalt Acres	Roof sf	Roof Acres	Composite Runoff Factors			
											C ₅	C ₁₀	C ₁₀₀	I %
A	29444	0.68	9839	0.23		0.00	19008	0.44	0	0.00	0.70	0.70	0.87	62.0
B	26408	0.61	3274	0.08		0.00	13507	0.31	9508	0.22	0.86	0.86	1.00	83.0
C	6469	0.15	569	0.01		0.00	5900	0.14		0.00	0.89	0.89	1.00	86.8
OS-1	1141	0.03	1141	0.03		0.00	0	0.00		0.00	0.25	0.25	0.31	2.0
OS-2	2767	0.06	2767	0.06		0.00	0	0.00			0.25	0.25	0.31	2.0
Totals:	66229	2.13	20836.00	0.48		0.00	51824	1.19	19155	0.44	1.02	1.02	1.28	73.3



PROJECT: Maverik - Colorado Springs
 SUBJECT: TIME OF CONCENTRATION
 JOB #: 20-122-0013
 DATE: 10/13/2021
 BY: SDK



TIME OF CONCENTRATION

Basin No.	Area (acres)	2Yr. C VALUE	TIME (Ti) [Max. 500']					TRAVEL TIME (Tt)							Tc CHECK (Urbanized Basins)			FINAL Tc	Time to Peak**	Remarks
			Elevations		Dist. (ft)	Slope (%)	Ti (min)	Elevations		Dist. (ft)	Slope (%)	*	Vel. (fps)	Tt (min)	Tc	Length (ft)	Tc (min)	Tc (min)	Peak** Flow	
			Upstream	Downstream				Upstream	Downstream											
A	0.68	0.70	4884.2	4884	10	2.0	1.9	4884	4878.25	231	2.5	6	3.0	1.3	3.2	241	11.3	3.2	5.0	Developed
B	0.61	0.86	4886	4885.9	2	5.0	0.4	4885.9	4878.25	385	2.0	6	2.7	2.4	2.7	387	12.2	2.7	5.0	Developed
C	0.15	0.89	4886	4885.9	1	10.0	0.2	4885.9	4878.25	180	4.2	5	3.4	0.9	1.1	181	11.0	1.1	5.0	Developed
OS-1	0.03	0.25	4886	4885.9	1	10.0	0.7	4885.9	4878.25	440	1.7	5	1.9	3.9	4.6	441	12.5	4.6	5.0	Developed
OS-2	0.06	0.25	4886	4885.9	1	10.0	0.7	4885.9	4878.25	550	1.4	6	2.0	4.6	5.3	551	13.1	5.3	5.3	Developed

**NOTE: FORT COLLINS REQUIRES MIN. Tc=5 MIN.

A MAX. Tc OF 5 MIN. IS TYP.

Calculation of Peak Runoff using Rational Method

Designer: Shawn Krieger
 Company: DCI-Engineers
 Date: 10/13/2021
 Project: Maverik Convenience Store
 Location: Colorado Springs

Version 2.00 released May 2017

Cells of this color are for required user-input
 Cells of this color are for optional override values
 Cells of this color are for calculated results based on overrides

$$t_t = \frac{0.395(1.1 - C_5)\sqrt{L_t}}{S^{0.33}}$$

$$t_t = \frac{L_t}{60K\sqrt{S_t}} = \frac{L_t}{60V_t}$$

Computed $t_c = t_t + t_t$

$t_{\text{minimum}} = 5$ (urban)
 $t_{\text{minimum}} = 10$ (non-urban)

Regional $t_c = (26 - 17i) + \frac{L_t}{60(14i + 9)\sqrt{S_t}}$

Selected $t_c = \max\{t_{\text{minimum}}, \min(\text{Computed } t_c, \text{Regional } t_c)\}$

Select UDFCD location for NOAA Atlas 14 Rainfall Depths from the pulldown list OR enter your own depths obtained from the NOAA website (click this link)

1-hour rainfall depth, P1 (in) =

2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
1.16	1.44	1.68	1.92	2.16	2.42	

Rainfall Intensity Equation Coefficients =

a	b	c
28.50	10.00	0.786

$I(\text{in/hr}) = \frac{a + P_1}{(b + t_c)^c}$

$Q(\text{cfs}) = CIA$

Subcatchment Name	Area (ac)	NRCS Hydrologic Soil Group	Percent Imperviousness	Runoff Coefficient, C							Overland (Initial) Flow Time					Channelized (Travel) Flow Time					Time of Concentration			Rainfall Intensity, I (in/hr)							Peak Flow, Q (cfs)								
				2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	Overland Flow Length L _t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Overland Flow Slope S _t (ft/ft)	Overland Flow Time t _t (min)	Channelized Flow Length L _t (ft)	U/S Elevation (ft) (Optional)	D/S Elevation (ft) (Optional)	Channelized Flow Slope S _t (ft/ft)	NRCS Conveyance Factor K	Channelized Flow Velocity V _t (ft/sec)	Channelized Flow Time t _t (min)	Computed t _c (min)	Regional t _c (min)	Selected t _c (min)	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr	500-yr
A	0.68	A	62.0	0.45	0.47	0.48	0.52	0.55	0.59	0.65	24.15	5965.15	5964.73	0.017	4.67	279.00	5964.73	5963.33	0.005	20	1.42	3.28	7.95	19.17	7.95	3.42	4.24	4.95	5.66	6.37	7.12			1.05	1.35	1.63	1.99	2.40	2.87
B	0.61	A	83.0	0.66	0.68	0.69	0.72	0.73	0.76	0.79	7.58	5966.78	5966.63	0.020	1.67	251.00	5966.13	5964.85	0.005	20	1.43	2.93	4.60	14.73	5.00	3.94	4.89	5.71	6.52	7.34	8.20			1.59	2.02	2.41	2.85	3.28	3.78
C	0.15	A	86.8	0.70	0.72	0.73	0.75	0.77	0.79	0.81	39.00	5966.89	5965.71	0.030	2.98	53.92	5965.71	5964.95	0.014	20	2.37	0.38	3.36	11.60	5.00	3.94	4.89	5.71	6.52	7.34	8.20			0.41	0.53	0.63	0.74	0.84	0.97
OS-1	0.03	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27	22.00	5966.69	5960.00	0.304	3.00	0.00	5960.00	5960.00	0.100	7	2.21	0.00	3.00	25.66	10.00	3.15	3.90	4.55	5.20	5.85	6.54			0.00	0.00	0.00	0.00	0.01	0.02
OS-2	0.06	A	2.0	0.01	0.01	0.01	0.01	0.04	0.13	0.27	18.00	5966.50	5964.00	0.139	3.52	0.00	5964.00	5964.00	1.000	7	7.00	0.00	3.52	25.66	10.00	3.15	3.90	4.55	5.20	5.85	6.54			0.00	0.00	0.00	0.00	0.01	0.05

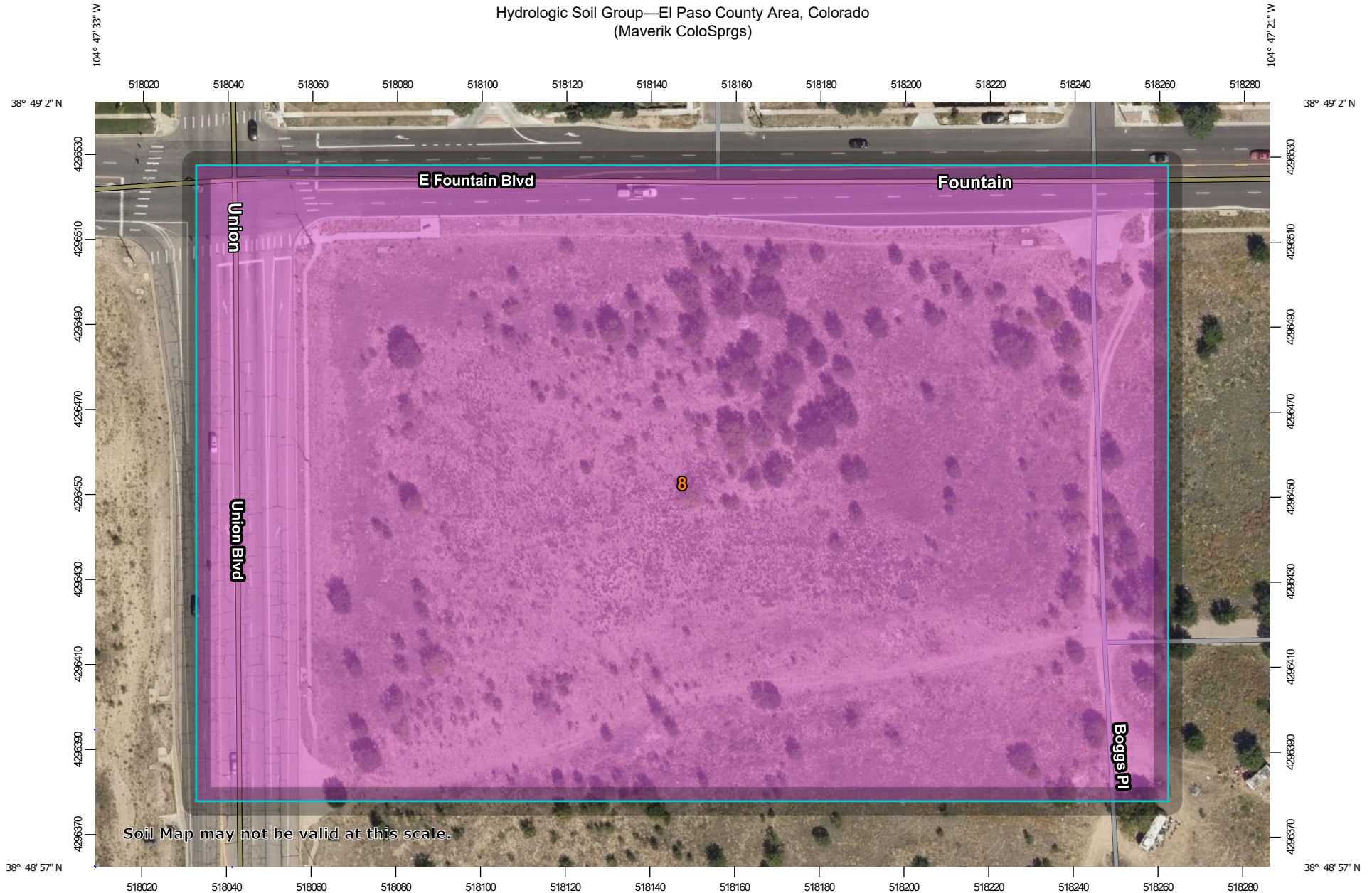
PROPOSED RUNOFF SUMMARY

DESIGN POINT	BASIN	AREA (AC)	IMP. (%)	C_5	Q_5 (cfs)	C_{100}	Q_{100} (cfs)
1	A	0.68	62.0	0.47	1.35	0.59	2.87
2	B	0.61	83.0	0.68	2.02	0.76	3.78
3	C	0.15	86.8	0.72	0.53	0.79	0.97
.	OS1	0.03	2.0	0.01	0.00	0.13	0.02
.	OS2	0.06	2.0	0.01	0.00	0.13	0.05

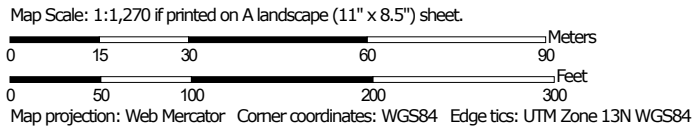
Appendix C

Hydrologic Soils Group

Hydrologic Soil Group—El Paso County Area, Colorado
(Maverik ColoSprgs)




Soil Map may not be valid at this scale.



Hydrologic Soil Group—El Paso County Area, Colorado
(Maverik ColoSprgs)

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 18, Jun 5, 2020

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
8	Blakeland loamy sand, 1 to 9 percent slopes	A	8.5	100.0%
Totals for Area of Interest			8.5	100.0%

Description

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.

Rating Options

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

National Flood Hazard Layer FIRMette

104°47'51"W 38°49'16"N



Legend

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

SPECIAL FLOOD HAZARD AREAS

- Without Base Flood Elevation (BFE)
Zone A, V, A99
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*

Future Conditions 1% Annual Chance Flood Hazard *Zone X*

Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*

Area with Flood Risk due to Levee *Zone D*

OTHER AREAS OF FLOOD HAZARD

NO SCREEN *Zone X*

Area of Minimal Flood Hazard *Zone X*

Effective LOMRS *Zone D*

Area of Undetermined Flood Hazard *Zone D*

OTHER AREAS

GENERAL STRUCTURES

- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

Cross Sections with 1% Annual Chance Water Surface Elevation

- Coastal Transsect
- Base Flood Elevation Line (BFE)
- Limit of Study

OTHER FEATURES

- Coastal Transsect Baseline
- Profile Baseline
- Hydrographic Feature

Digital Data Available

No Digital Data Available

Unmapped

MAP PANELS

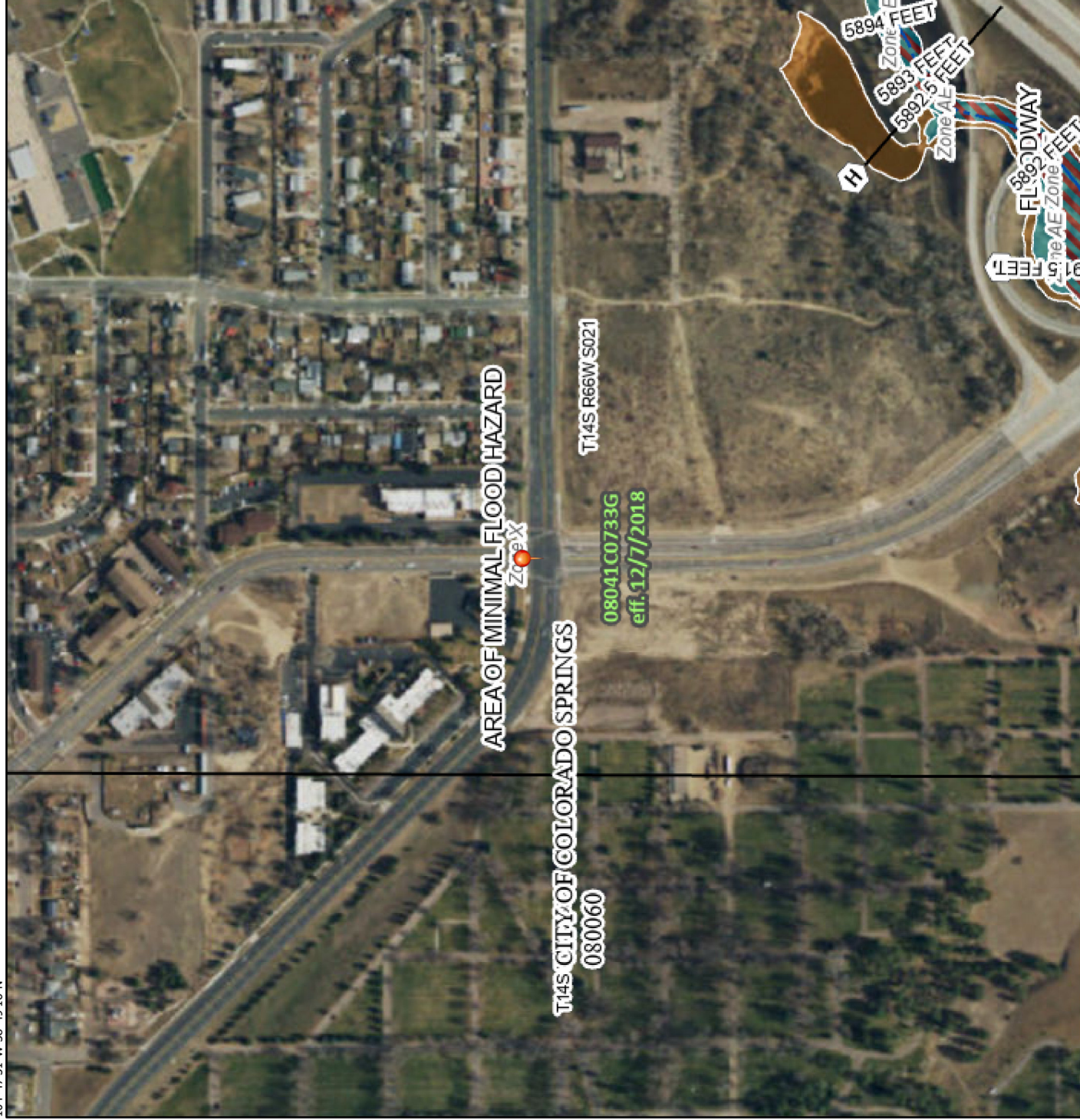


The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/9/2021 at 3:51 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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



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

Basemap: USGS National Map; Orthoimagery: Data refreshed October, 2020