

FINAL DRAINAGE REPORT

SPACE VILLAGE FILING NO. 4 EL PASO COUNTY, COLORADO

Refer to comments provided on the
Final Drainage Report in MS227. Please
submit revised report.

PREPARED FOR:

COMMERCIAL BUILDING SERVICES
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PCD FILE NO. MS-22-007

SEPTEMBER, 2022

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 applicable criteria established by the county for drainage reports and said report is in conformity with the master plan of the drainage basin as described within said report. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparing this report for and on behalf of Sterling Design Associates, llc.

Jay M. Newell, PE (CO #35219)
For and on behalf of Sterling Design Associates, llc



DEVELOPER'S STATEMENT

10 / 10 / 22

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

Business Name

By: _____

Title: _____

Address: _____

EL PASO COUNTY ONLY

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

Director of Public Works

Date

Conditions:

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1) GENERAL LOCATION AND DESCRIPTION

A) LOCATION

1. CITY AND COUNTY, AND LOCAL STREETS

The subject development is in unincorporated El Paso County. The Space Village Avenue right-of-way is immediate to the north property line. Intersection with Peterson Boulevard is one-quarter mile to the west while the Marksheffel Road intersection is a half mile to the east.

2. TOWNSHIP, RANGE, SECTION, 1/4 SECTION

Space Village Filing No. 4 is a parcel of land situated in the Northwest 1/4 of Section 17, Township 14 South, Range 65 West of the 6th Principal Meridian, in El Paso County, Colorado.

VICINITY MAP



3. MAJOR DRAINAGEWAYS AND EXISTING FACILITIES

No major drainageways nor existing facilities are described within the *Peterson Field Drainage Basin Master Plan Update* prepared by URS/NES and dated August 1984 (PETERSON FIELD DBPS) as being located either on or immediately adjacent to the site.

4. SURROUNDING DEVELOPMENTS

The property to the west is, except for a partial access road, an undeveloped portion of commercial Lot 1, Cowperwood SAIC. To the south is Peterson Air Force Base (PAFB). To the east is open space belonging to the City of Colorado Springs. Several commercial developments exist north of

the adjacent Space Village Avenue R.O.W. including Winwater's Colorado Springs wholesale yard and warehouse, Storage Sense's Colorado Springs/Peterson Air Force Base interior and exterior storage facilities, A Better R.V. Storage's exterior and covered storage facilities, and various other smaller retail, office, and related uses.

B) DESCRIPTION OF PROPERTY

1. AREA

The site is 22.8 acres.

2. GROUND COVER

The east half of the site is covered with native grasses and a handful of widely spaced trees. The west half is largely denuded of significant vegetation.

3. GENERAL TOPOGRAPHY

The terrain within the site generally falls north to south at 1.0 to 4.5 percent grades.

4. GENERAL SOIL CONDITIONS

The United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey referenced for this site indicates Blakeland loamy sand, 1 to 9 percent slopes soil (8) with a Hydrologic Soil Group A rating. Where native grasslands remain, the soil is suspected to be in good condition and remain highly porous. In areas currently being used for storage there is evidenced loss of infiltration due to compaction by vehicle loading.

5. MAJOR DRAINAGEWAYS

No major drainageways nor existing facilities are described within the PETERSON FIELD DBPS as being located either on or immediately adjacent to the site.

6. IRRIGATION FACILITIES

There are no irrigation facilities on or adjacent to the site that Sterling Design Associates, llc (SDA) is aware of.

7. UTILITIES AND OTHER ENCUMBRANCES

A dual 30-inch CMP culvert under Space Village Avenue discharges onto the site approximately 260 feet from the east property line. It appears there is an offsite basin (Basin OS-E) of approximately 52 acres contributing to this facility. There is a shallow area onsite where, it is assumed, most runoff events have ponded and infiltrated as there is no evidence of a significant low flow channel or rill that would be caused by frequent subjection to flowing water further downstream.

There are three 30-foot utility easements on the property adjacent to Space Village Avenue, the alignments for two of which are identical. The north most is dedicated to the Cherokee Metropolitan District according to the *ALTA/NSPS Land Title Survey* prepared by Altura Land Consultants and dated April 28, 2022 (ALTA). The south most two are dedicated to Colorado Springs Utilities (CSU) and the Cherokee Metropolitan District according to the ALTA. As shown on the ALTA, maps provided by the CSU's online GIS Mapping Services, and information provided by

the Cherokee Metropolitan District, these easements contain an 8-inch PVC sanitary sewer main, a 12-inch steel waterline, and a 42-inch steel waterline. These utilities and their easements are not expected to be significantly disturbed or displaced by the proposed development, although an extension of conveyance facilities downstream of the dual 30-inch CMP is proposed across them as are two drive entrances off Space Village Avenue into the site.

The ALTA identifies two other easements along the site's southern property line. The north most is identified as a 30-foot temporary construction easement granted to the Cherokee Metropolitan District. The easement document, as linked to by the titlework provided by Land Title Guarantee Company dated November 24, 2021, states that..."The temporary construction easement described in Exhibit A shall expire and become void 60 days after acceptance of construction." The south most is identified as a 15-foot utility easement for the "...construction, reconstruction, maintenance and operation of a sanitary sewer force main..." which the ALTA does not include evidence of, but information provided by the Cherokee Metropolitan District does. Proposed drainage facilities described herein are intended to avoid significant disturbance or displacement of the south most easement and any utilities therein.

2) DRAINAGE BASINS AND SUB-BASINS

A) MAJOR BASIN DESCRIPTIONS

1. MAJOR DRAINAGEWAY PLANNING STUDIES

As shown within the PETERSON FIELD DBPS, the site is included in the far upper reaches of the Peterson Field Drainage Basin. The PETERSON FIELD DBPS states that..."Peterson Field Basin outfalls to Sand Creek which in turn outfalls to Fountain Creek." There are no existing deficiencies or proposed improvements within the site or immediate thereto identified in the PETERSON FIELD DBPS.

The site is identified as Zone X, "Areas determined to be outside the 0.2% annual chance floodplain," by the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for El Paso County, Colorado and Incorporated Areas, Map Number 08041C0754G with an effective date of December 7, 2018.

2. MAJOR BASIN DRAINAGE CHARACTERISTICS

As described in the PETERSON FIELD DBPS, Peterson Field Drainage Basin encompasses approximately 8.6-square miles and is approximately 9-miles in overall length at elevations between 5750-feet and 5990-feet above sea level. In addition, the basin is predominantly comprised of Hydrologic Soil Group A rated soils with some Group B rated soils. Review of aerial imagery available online indicates the basin includes portions of PAFB, the Colorado Springs Airport, residential, commercial and light industrial land uses as well undeveloped land.

The subject development conveys surface runoff as sheet flow generally from north to south; however, likely due to the highly pervious soils there is no indication of continuous storm runoff flows either in low flow channels or rill on the site. Existing discharge of runoff from the site is similarly likely into the ground, as conveyance of flow onto PAFB to the south is not readily evident. It is intended that the 22.8 acre site be re-purposed as an outdoor storage yard.

3. IRRIGATION FACILITIES

As there are no irrigation facilities on or adjacent to the site that SDA is aware of; no irrigation facilities are expected to be impacted by runoff from the proposed development.

B) SUB-BASIN DESCRIPTION

1. HISTORIC DRAINAGE PATTERN

There are two low areas and a ridge that generally divide the site into an east (Basin H2; $Q_{10} = 7.31$ cfs, $Q_{100} = 19.34$ cfs) and west (Basin H1; $Q_{10} = 7.97$ cfs, $Q_{100} = 20.54$ cfs) basin for drainage consideration. Grades within both direct any excess rainfall runoff not infiltrated into the pervious native soil to the south toward, if not onto PAFB. Lack of evidence of past erosion or channel formation indicates this has been accomplished primarily as sheet flow up to now with limited runoff flowing through to PAFB as described in section 2.A.2 above.

2. OFFSITE DRAINAGE

The large shallow open space on the property to which the dual 30-inch CMP culverts under Space Village Avenue contribute, will become a part of the proposed storage yard. As such, it will become necessary to pass the associated offsite flow from Basin OS-E ($Q_{10} = 89.48$ cfs, $Q_{100} = 146.46$ cfs) around the yard. Basin OS-E is comprised of a variety of commercially developed properties including those described in section I.A.4 above which generally flow north to south across the basin. A second area, Basin OS-W ($Q_{10} = 16.87$ cfs, $Q_{100} = 27.77$ cfs) approximately 6.8 acres, north of Space Village Avenue and west of the larger basin (Basin OS-E) described above and comprised of similar commercially developed properties as described in section 1.A.4, could contribute discharge over the road and onto the western property boundary in very large rain events. There is no evidence this has occurred; however, there is no apparent means for water accumulating at that location to discharge other than into the ground or over the road and onto the site. A perimeter swale can provide for conveyance of such flows, in this eventuality.

3) DRAINAGE DESIGN CRITERIA

A) DEVELOPMENT CRITERIA REFERENCE

1. CRITERIA, MASTER PLANS, AND TECHNICAL INFORMATION

This report references Volumes 1 and 2 of the El Paso County *Drainage Criteria Manual*, as well as the Volume 1 Update (MANUAL); Volume 2 of the City of Colorado Springs *Drainage Criteria Manual* as adopted by El Paso County (DCMV2); Volumes 1, 2 and 3 of the Mile High Flood District (MHFD) Urban Storm Drainage Criteria Manual (USDCM); and the county *Engineering Criteria Manual* (ECM) where applicable for the needed technical information to make estimation of rate and volumetric stormwater considerations presented herein.

2. PRIOR STUDIES

As mentioned previously, the area of proposed development is a part of the upper reaches of the Peterson Field Drainage Basin presented in the PETERSON FIELD DBPS. The PETERSON FIELD DBPS does not particularly address the area in question or describe any problems or drainage improvements that may be associated with it.

The site was, most recently, included in the *Preliminary Drainage Report for First Wing Development* prepared by JR Engineering and dated as revised July 2005 (FIRST WING PDR). In that report the subject site is referenced as Filing No. 2 of the First Wing Development. It is generally described as existing Basins EX-3 and EX-4, and as proposed Basin E; and is summarized as having an allowed, detained 100-year release onto PAFB of a total of 36 cfs. Two existing minor basins, OS-3 and OS-4, are shown to contribute to the site from areas of Space Village Avenue south of the road centerline. For the purposes of this report, these offsite basins (OS-3 and OS-4) are included in their respective downstream onsite basins (existing H1 and H2; and proposed A and B). The inclusion of these offsite basins increases the FIRST WING PDR allowable 100-year release onto PAFB to a total of 54 cfs (i.e. $18 + 18 + 9 + 9 = 54$ cfs). The FIRST WING PDR does not account for runoff from any other offsite basin(s).

B) HYDROLOGIC CRITERIA

1. DESIGN RAINFALL

In accordance with the MANUAL Volume 1 Update, Chapter 6 – Hydrology, § 3.3 – Rainfall Intensity (I); design rainfall was determined using Figure 6-5. Times of concentration have been determined in accordance with the same criteria's § 3.2 – Time of Concentration; Equations 6.7, 6.8, and 6.9, and Table 6-7.

2. RUNOFF CALCULATION METHOD

Onsite and offsite basin runoff was determined through the use of the Rational Formula in accordance with the MANUAL Volume 1, Chapter 2 – Drainage Criteria, § 2.1 – Design Storm Water Runoff Determination; and the MANUAL Volume 1 Update, Chapter 6 – Hydrology, § 1.4 – Selecting Methods for Estimating Design Flows. In accordance with the MANUAL Volume 1 Update, Chapter 6 – Hydrology, § 3.1 – Rational Method Runoff Coefficient (C); Rational Formula coefficients were determined using Table 6-6.

3. DESIGN STORM RECURRENCE INTERVALS

In accordance with the MANUAL Volume 1, Chapter 1 – Drainage Policy, § 1.2.1 – Planning Process; § 1.2.3 – Drainage Systems; Chapter 2 – Drainage Criteria, § 2.1 – Design Storm Water Runoff Determination; and more specifically for detention storage in accordance with the same criteria's Chapter 2, § 2.5.3 – Volume and Release Requirements; and Chapter 6 – Design Criteria, § 6.6.4 – Non-Jurisdictional Dams; 10-year and 100-year storm recurrence intervals have been used as the minor and major events respectively.

4. DETENTION DISCHARGE AND STORAGE CALCULATION METHOD

The MANUAL Volume 1, Chapter 11 – Detention Storage, § 11.4 – Hydraulic Design Methods includes two detention pond sizing methods as suggestions; the Rational Stored Rate Method and the SCS Hydrograph Procedure. However, the MANUAL Volume 1 Update, Chapter 6 – Hydrology, § 13.0 – References, includes reference to MHFD's Full Spectrum design concept. In addition, the Volume 1 Update, § 2.3 – Hydrologic Basis of Design for Water Quality – Water Quality Capture Volume, states that "...the UDFCD...methods for the WQCV are acceptable for determining the WQCV..." Further, the DCMV2, Chapter 2 – Control Measure Selection, § 1.9 – Integration with Flood Control, recommends "...WQCV facilities be incorporated into flood control detention facilities..." and states, "Full spectrum detention shows more promise in controlling the peak flow rates in receiving waterways than...multi-stage designs..." Finally, the DCMV2 Chapter 3 – Calculating the WQCV and Volume Reduction, § 2.4 – Excess Urban Runoff Volume (EURV) and Full Spectrum Detention, indicates that "Capture and treatment of the EURV is required as a part

of...Full spectrum Detention..." and references its companion criteria's (the *Design Criteria Manual Volume 1*) Chapter 13 – Storage, as well as the MHFD USDCM Volume 3 for additional information including "...sizing and design criteria, and design procedures for...control measures...provided in the USDCM...Treatment BMP Fact Sheets."

Therefore, use of the design tool MHFD-Detention_v4.03.xlsm Excel worksheet (WORKSHEET) provided by the MHFD was relied upon to determine the various volumes incorporated into the drainage facility design for the site. In conjunction with the use of this design tool, and because the tool does not include point rainfall data for El Paso County required for use of the worksheet; 1-hour rainfall depths were excerpted from Table 6-2 of Volume 1 of the City of Colorado Springs *Drainage Criteria Manual* (2014) as adopted by El Paso County (DCMV1). In addition, the MANUAL, Volume 2, Chapter 4 – New development Stormwater Management, § 4.1 – New Development Planning, stipulates that Sand Filter Extended Detention Basins (SFBs), which are the chosen control measure for the site development's stormwater quality management method in general, be sized based on a 40-hour drain time as opposed to the MHFD's 12-hour drain time for Sand Filters. Subsequently, although the WORKSHEETS included in the appendices of this report indicate design of Extended Detention Basins (EDBs) as the associated SFB WORKSHEET defaults to a 12-hour drain time; the proposed ponds for the site are not intended to function as such (EDBs), but more generally, as SFBs as described in more detail below.

4) DRAINAGE FACILITY DESIGN

A) GENERAL CONCEPT

1. OFFSITE RUNOFF CONSIDERATIONS

Offsite runoff coming into the site from the northeast via the dual 30-inch culverts will be intercepted in a grass lined channel which will route flows to the proposed detention and stormwater quality facility serving the eastern portion of the site. Potential offsite runoff coming into the site from the northwest over Space Village Road will be intercepted in a grass lined swale which will route flows to the proposed detention and stormwater quality facility serving the western portion of the site.

2. ANTICIPATED AND PROPOSED DRAINAGE PATTERNS

Site drainage patterns are not anticipated to change with development as a storage yard. Runoff will be conveyed as surface flow to one of two proposed detention and stormwater quality facilities described in more detail in sections 4.B.2 and 4.B.4 below.

3. TABLES, CHARTS, FIGURES, ETC.

All tables, charts, figures, etc. are sourced where they appear herein and are included in the appendices of this report for reference.

B) SPECIFIC DETAILS

1. EXISTING AND PROPOSED HYDROLOGIC CONDITIONS

Existing and proposed on and offsite basins are delineated on the included maps. Basin characteristics are noted on the same maps, described in sections 2.B.1 and 2.B.2 above, or described below. Additional information is included in the calculations within the appendices of this report. The historic east basin (Basin H2) will be developed as gravel storage lot (Basin B; $Q_{10} = 23.87$ cfs, $Q_{100} = 40.88$ cfs). The historic west basin (Basin H1) will also be developed as a gravel storage lot (Basin A; $Q_{10} = 25.93$ cfs, $Q_{100} = 43.52$ cfs).

Table 1 below summarizes existing and proposed runoff at significant Design Points.

Table 1

| Design Point | Q ₁₀ (cfs) | | Q ₁₀₀ (cfs) | |
|----------------|-----------------------|----------|------------------------|----------|
| | Existing | Proposed | Existing | Proposed |
| 1 | 89.5 | 89.5 | 146.5 | 146.5 |
| 2 | 16.9 | 16.9 | 27.8 | 27.8 |
| 3 | 7.3 | 23.9 | 19.3 | 40.9 |
| 4 | 8.0 | 25.9 | 20.5 | 43.5 |
| ¹ 5 | 96.8 | 89.5 | 165.8 | 146.5 |
| ¹ 6 | 24.9 | 16.9 | 48.3 | 27.8 |

¹Design Points 5 and 6 are the accumulated tributary flow including offsite basins (OS-E and OS-W). Without accounting for excess capacity in the East Pond and West Pond described in Section 4.B.4 below, the infiltration ponds effectively eliminate onsite runoff contribution (Basins A and B) and limit the discharge of runoff to PAFB to the historic offsite flows from Basins OS-E and OS-W. As described in Section 4.B.4, due to excess capacity in the ponds actual discharge may be less than this historic flow.

2. APPROACH TO ACCOMMODATE DRAINAGE IMPACTS

Two detention and stormwater quality ponds are proposed to mitigate any increase in minor and major storm event runoff as a result of the increase in imperviousness due to development. These ponds are also intended to address the stormwater quality of any runoff conveyed downstream through provision of a Water Quality Capture Volume (WQCV), itself a part of the “Four Step Process” outlined within the MANUAL for addressing stormwater quality.

The four steps include: (1) Employ Runoff Reduction Practices, met for this site by employing Minimizing Directly Connected Impervious Areas (MDCIA) through the use of pavement materials (e.g. asphalt millings, recycled concrete, gravel, or similar) that are more porous than typical asphalt or Portland cement concrete across the majority of the site, and conveying all runoff across perimeter landscape areas prior to capture within the proposed ponds.

(2) Stabilize Drainageways, met for this site by constructing a native grass lined channel and swale to convey offsite runoff across the site.

(3) Provide WQCV, met by this site by inclusion of the required volume within the proposed detention ponds.

(4) Consider Need for Industrial and Commercial BMPs, met for this site by recommending the Covering of Storage/Handling Areas which are anticipated as temporary, if at all. If such areas are incorporated, coverings may consist of tarpaulins, plastic sheeting, or other treatments that prevent rain and wind from spreading pollutants. In addition, although not anticipated, Spill Containment and Control is recommended at such times as contaminated material may be spilled onsite. Containment may be met by the installation of temporary berms that prevent spilled material from entering surface waters or downstream storm sewer systems. The proposed detention and stormwater quality ponds act similarly by collecting and containing site runoff prior to any potential discharge offsite.

3. PROPOSED FACILITIES

Proposed drainage facilities include the channel and swale designed to convey potential upstream offsite runoff around the developed area of the site, and the two detention and stormwater quality ponds situated across the site’s southern boundary. All of these facilities are designed to be lined with native grasses.

4. SITE CONSTRAINTS

The site's most significant constraint is its lack of any downstream conveyance facility. This deficiency makes the discharge of runoff from any typical pond, channel, swale, or storm sewer difficult for several reasons. The first difficulty is designing proposed facilities to discharge to the existing surface elevation(s). Such a constraint requires any pond or conveyance facility to hold and/or include capacity for runoff above existing grades subsequently requiring any tributary area(s) normally located above such facilities to be located corresponding heights above existing grades. The result, particularly on flat sites such as the subject site, is an undue increase in the amount of fill to "lift" the site above the depths necessary for required capacities and gravity flow. The second difficulty is designing proposed facilities, which typically concentrate flow, to discharge in a historic manner as sheet flow.

In addition, the site is constrained by its location adjacent to PAFB. PAFB staff have indicated their interest in mitigating the creation of habitat which might encourage the aggregating of birds adjacent to the base.

These constraints are addressed by the proposed detention and stormwater quality ponds' design to discharge all volumes by means of infiltration. This design allows lowering of the drainage facilities' discharge elevation below existing grades, minimizing necessary fill and minimizing excess overlot grading (a temporary erosion and sediment control strategy in itself). This design also eliminates concentrated discharge. The ponds are designed to provide one half the WQCV plus the 100-year volume in accordance with criteria. Discharge by infiltration effectively eliminates all discharge (and thus concentrated discharge) from onsite basins for these and lesser storm events. Additionally, although the FIRST WING PDR and the calculations within this report indicate an allowable historic release of 54 to 40 cfs respectively to PAFB when considering onsite basins only (Basins H1 and H2 and their respective FIRST WING PDR equivalents), and as much as 214 cfs when including upstream offsite basins (Basins OS-E and OS-W); the ponds are designed to provide additional volume (East Pond additional volume = 30,092 cf / ± 2 to ± 5 -year event volume; West Pond additional volume = 30,396 cf / ± 2 -year event volume) below the typical one foot of freeboard as an emergency measure which would infiltrate similar to the WQCV and 100-year volumes, further limiting the discharge of runoff downstream (particularly from upstream offsite basins as reported in Table 1 in Section 4.B.1), to PAFB. Calculations included in the appendices of this report also indicate compliance of the proposed ponds with Colorado Senate Bill 15-212, codified in the Colorado Revised Statutes (C.R.S.) Section 37-92-602(8).

The Geotechnical Engineering Report, Proposed Storage Yards, 0 Space Village Avenue, El Paso County, Colorado, CGG Project No. 22.22.155 prepared by Cole Gardner Geotechnical and dated August 16, 2022, (GEOTECHNICAL REPORT) includes field infiltration test results for various locations within the site. The locations of infiltration test holes L1-IF3 and L2-IF3 are in close proximity to the proposed West and East Ponds respectively. Test results for these locations (19.90 in/hr and 6.30 in/hr respectively) were used to model the proposed ponds infiltration rates. The West and East Ponds included in this report's plans and calculations are designed to hold their volumes at a depth of approximately 3-feet, and should therefore empty in less than 2-hours and less than 6-hours respectively; minimizing habitat creation as well.

Without existing downstream conveyance facilities, routing of the site's upstream offsite flows is also problematic. Therefore the proposed channel and swale along the site's respective east and west boundaries are designed to discharge to the corresponding proposed pond. The pond design described herein provides excess capacity as explained above which may detain these flows or a portion thereof. In the event that the ponds are full and operating under emergency conditions, the ponds' southern side berms will act as level spreaders, dispersing emergency flows and/or the offsite runoff as bypass sheet flow to PAFB comparable to the historic condition.

The channel design includes centerline radii of curvature in excess of two times the top width of the channel in accordance with ECM Section 3.3.3.E. Channel freeboard in excess of 1.17-feet is also provided in accordance with MANUAL Section 10.5.5 Equation 10-3 and Section 10.5.6 Equation 10-4. Calculations included within the appendices of this report indicate both the channel on the east and the swale on the west are designed to flow at non-erosive velocities (3.32 ft/s and 3.34 ft/s respectively) for a variety of vegetative linings in accordance with MANUAL Table 10-4.

5. ENVIRONMENTAL FEATURES

There are no specific environmental features or issues that SDA is aware of.

6. MAINTENANCE

The proposed channel, swale, and ponds described in this report will be privately owned and maintained. County access to the facilities will be provided by the dedication of an easement(s) adjacent to and including the facilities. A *Standard Operation Procedures for Inspection and Maintenance* manual has been prepared under separate cover to guide the owner and operator of the facilities on how to maintain them which includes guidance on mosquito control responsibilities.

7. DOWNSTREAM DRAINAGE FACILITIES

There are no proposed drainage facilities downstream of the detention and stormwater quality ponds described within this report. Existing downstream facilities include only the topography of PAFB which conveys runoff toward the PAFB Municipal Separate Storm Sewer System (MS4).

8. CONCLUSIONS

The proposed drainage facilities including the detention and stormwater quality ponds are intended to eliminate runoff tributary to the PAFB drainage facilities or to convey runoff to the PAFB facilities in a manner which said facilities have experienced historically thereby not adversely affecting downstream or surrounding properties. Drainage fees (Drainage = \$208,524; Bridge = \$15,814) and an opinion of probable costs is included in the appendices of this report.

5) LIST OF REFERENCES

1. *Peterson Field Drainage Basin Master Plan Update*, URS / NES, August 1984.
2. *Soil Map – El Paso County Area, Colorado*, USDA NRCS Web Soil Survey, current online edition.
3. *ALTA/NSPS Land Title Survey*, Altura Land Consultants, April 28, 2022.
4. *Colorado Springs Utilities Public Map Viewer*, Colorado Springs Utilities, current online edition.
5. *Flood Insurance Rate Map, Map Number 08041C0754G*, FEMA, effective date December 7, 2018.
6. *Drainage Criteria Manual, Volumes 1 and 2, Volume 1 Update*, El Paso County, current online edition (October 31, 2018).
7. *Drainage Criteria Manual, Volume 2*, City of Colorado Springs, current online edition (revised December 2020).
8. *Urban Storm Drainage Criteria Manual, Volumes 1 through 3*, Mile High Flood District, current online edition.

9. *Preliminary Drainage Report for First Wing Development*, JR Engineering, Revised July 2005.
10. *NOAA Atlas 14, Volume 8, Version 2*, current online edition.
11. *Engineering Criteria Manual*, El Paso County, current online edition (October 14, 2020).
12. *Geotechnical Engineering Report, Proposed Storage Yards, 0 Space Village Avenue, El Paso County, Colorado*, CGG Project No. 22.22.155, Cole Gardner Geotechnical, August 16, 2022.

APPENDIX A

- Flood Insurance Rate Map
- NRCS Web Soil Survey Soil Maps

National Flood Hazard Layer FIRMMette



104°41'53"W 38°50'34"N



Legend

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

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

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

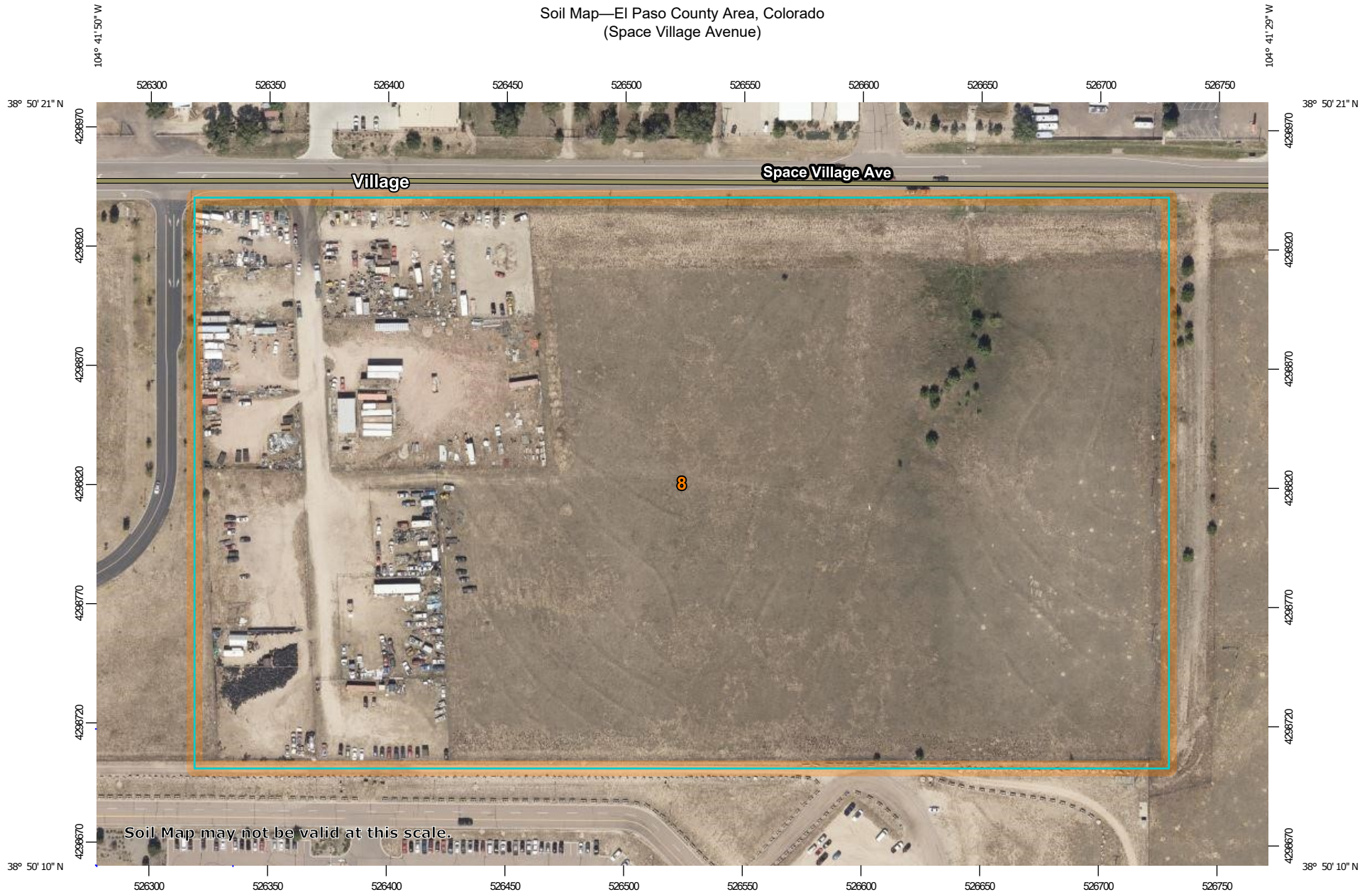


This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

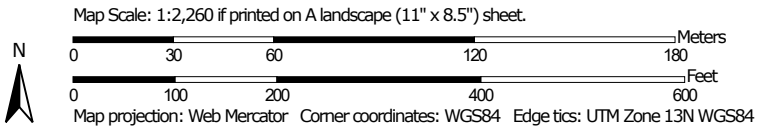
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 5/4/2022 at 6:52 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new 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.

Soil Map—El Paso County Area, Colorado
(Space Village Avenue)



Soil Map may not be valid at this scale.



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 19, Aug 31, 2021

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

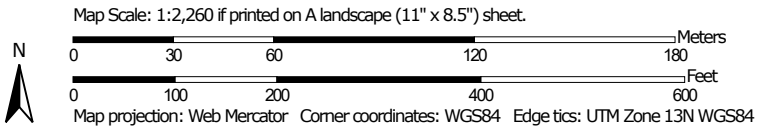
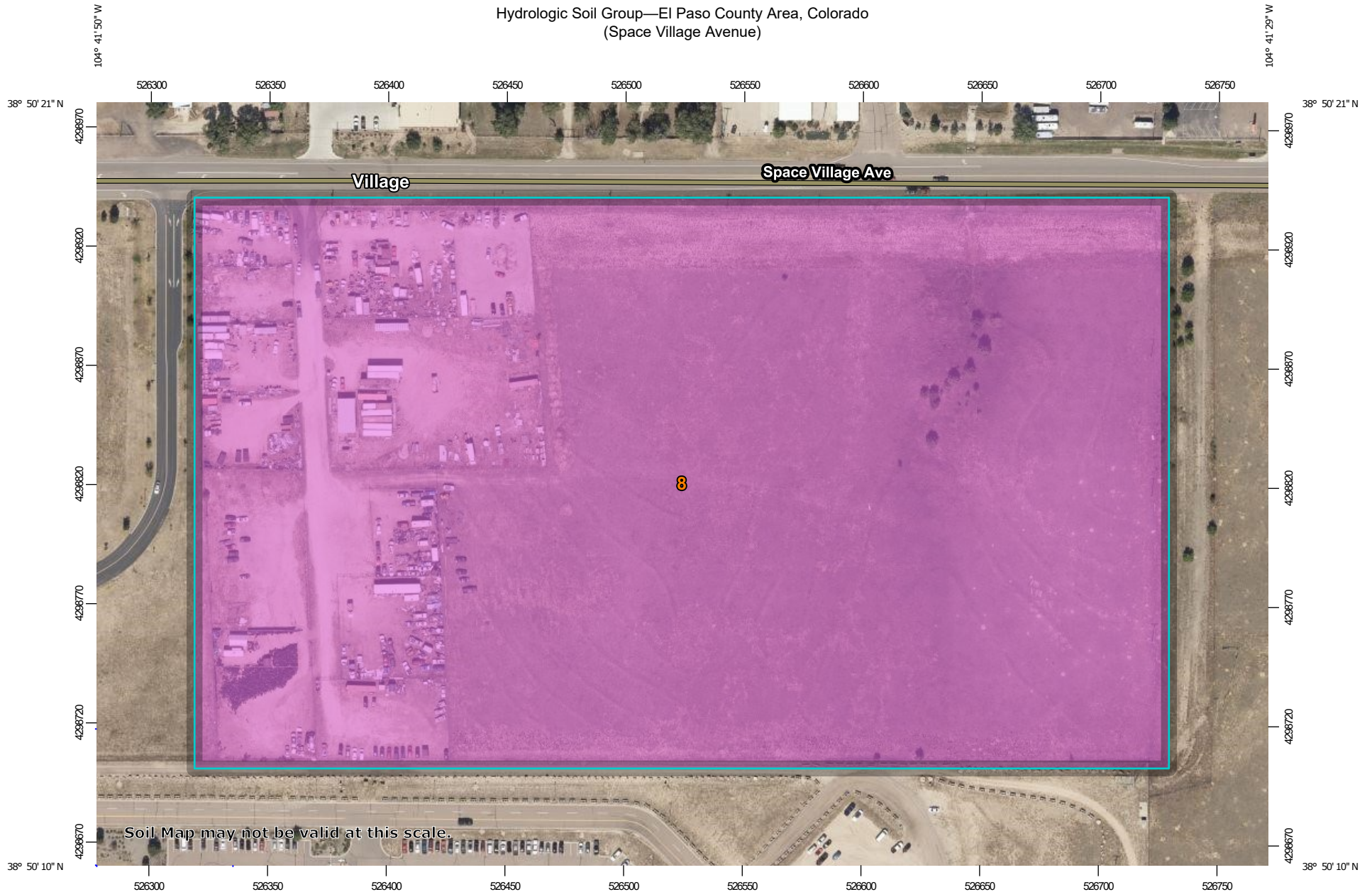
Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

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 |
|------------------------------------|---|--------------|----------------|
| 8 | Blakeland loamy sand, 1 to 9 percent slopes | 24.4 | 100.0% |
| Totals for Area of Interest | | 24.4 | 100.0% |

Hydrologic Soil Group—El Paso County Area, Colorado
(Space Village Avenue)



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 19, Aug 31, 2021

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 | 24.4 | 100.0% |
| Totals for Area of Interest | | | 24.4 | 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

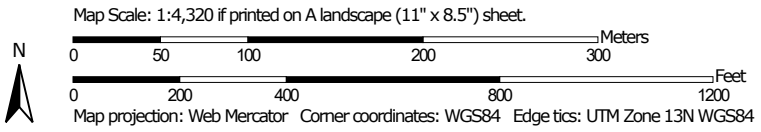
Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Soil Map—El Paso County Area, Colorado
(SV - Off Site)



Soil Map may not be valid at this scale.



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.

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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.

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Survey Area Data: Version 19, Aug 31, 2021

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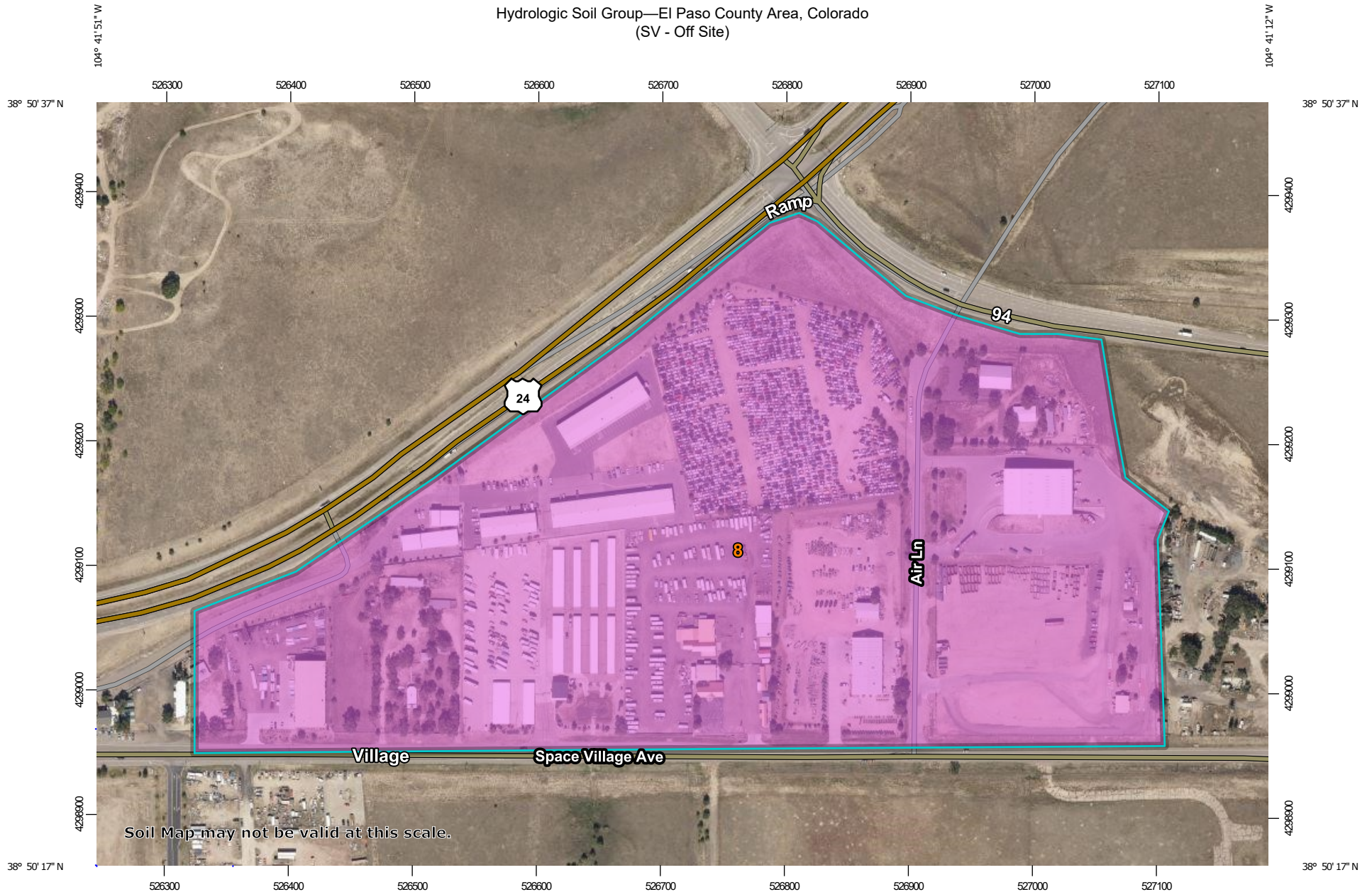
Date(s) aerial images were photographed: Aug 19, 2018—Sep 23, 2018

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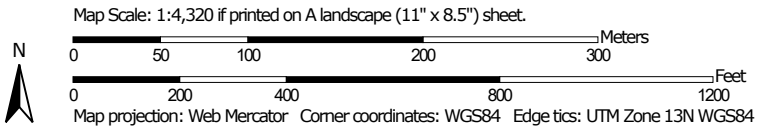
Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|------------------------------------|---|--------------|----------------|
| 8 | Blakeland loamy sand, 1 to 9 percent slopes | 56.1 | 100.0% |
| Totals for Area of Interest | | 56.1 | 100.0% |

Hydrologic Soil Group—El Paso County Area, Colorado
(SV - Off Site)



Soil Map may not be valid at this scale.




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.

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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.

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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 | 56.1 | 100.0% |
| Totals for Area of Interest | | | 56.1 | 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:

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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

Component Percent Cutoff: None Specified

APPENDIX B

- Hydrologic & Hydraulic Calculations and Analysis

Weighted Imperviousness
Job Name: Space Village Filing No. 4

Date: 10/11/22
By: JMN

| | ¹ I | ¹ C ₁₀ | ¹ C ₁₀₀ |
|--|----------------|------------------------------|-------------------------------|
| Commercial Areas | 95 | 0.83 | 0.88 |
| Residential, 1 Acre | 20 | 0.27 | 0.44 |
| Industrial, Light | 80 | 0.63 | 0.70 |
| Industrial, Heavy | 90 | 0.75 | 0.81 |
| Historic Flow Analysis - Greenbelts, Agriculture | 2 | 0.17 | 0.36 |
| Pasture/Meadow | 0 | 0.15 | 0.35 |
| Offsite Flow (when landuse is undefined) | 45 | 0.38 | 0.51 |
| Streets, Paved | 100 | 0.92 | 0.96 |
| Streets, Gravel | 80 | 0.63 | 0.70 |
| Lawns | 0 | 0.15 | 0.35 |
| Drive and Walks | 100 | 0.92 | 0.96 |
| Roofs | 90 | 0.75 | 0.81 |

¹Drainage Criteria Manual, Volume 1 Update, EL Paso County, Table 6-6

OFFSITE

| | Basin | Comm. | Residential | Ind. Light | Ind. Heavy | Paved | Historic | Total | Weighted Runoff Coeff | | |
|--------------|-------|-------|-------------|------------|------------|-------|----------|-------|-----------------------|-----------------|------------------|
| | | | | | | | | | I | C ₁₀ | C ₁₀₀ |
| ² | OS-E | 13.09 | 0.59 | 12.60 | 14.10 | 3.85 | 7.85 | 52.08 | 76 | 0.66 | 0.74 |
| ² | OS-W | 4.06 | 2.76 | 0.00 | 0.00 | 0.00 | 0.00 | 6.82 | 65 | 0.60 | 0.70 |
| | Total | 17.15 | 3.35 | 12.60 | 14.10 | 3.85 | 7.85 | 58.90 | 74 | 0.65 | 0.74 |

Hydrologic Soil Group = A (NRCS Web Soil Survey)

²Zone Map 542, El Paso County, Development Services Department

EXISTING ONSITE

| | Basin | Comm. | Residential | Ind. Light | Ind. Heavy | Paved | Historic | Total | Weighted Runoff Coeff | | |
|--|-------|-------|-------------|------------|------------|-------|----------|-------|-----------------------|-----------------|------------------|
| | | | | | | | | | I | C ₁₀ | C ₁₀₀ |
| | H2 | 0.00 | 0.00 | 0.00 | 0.00 | 0.70 | 11.57 | 12.27 | 8 | 0.21 | 0.39 |
| | H1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.90 | 11.86 | 12.76 | 9 | 0.22 | 0.40 |
| | Total | 0.00 | 0.00 | 0.00 | 0.00 | 1.60 | 23.43 | 25.03 | 8 | 0.22 | 0.40 |

Hydrologic Soil Group = A (NRCS Web Soil Survey)

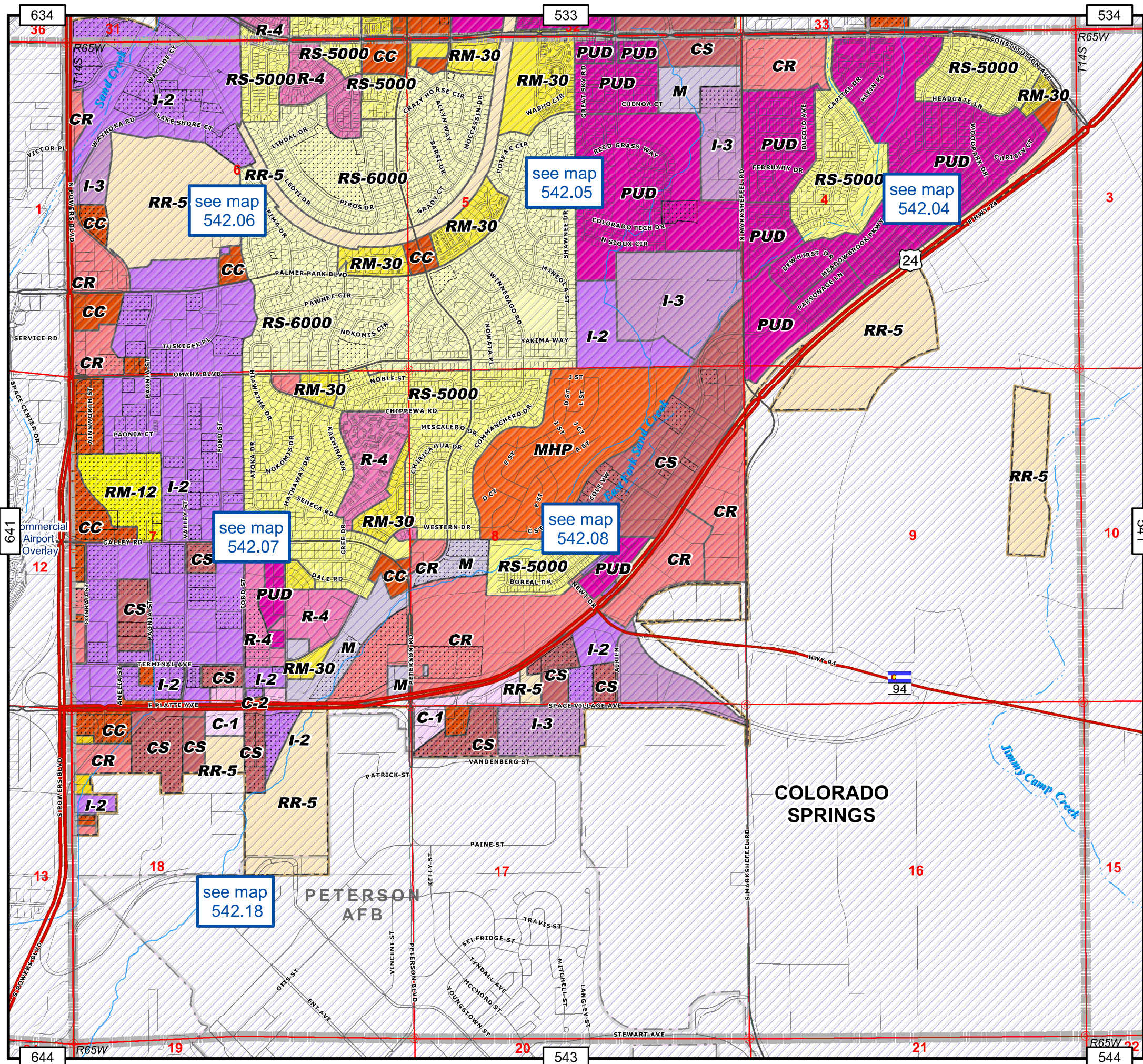
PROPOSED ONSITE

| | Basin | Comm. | Residential | Ind. Light | Gravel | Paved | Lawns | Total | Weighted Runoff Coeff | | |
|--|-------|-------|-------------|------------|--------|-------|-------|-------|-----------------------|-----------------|------------------|
| | | | | | | | | | I | C ₁₀ | C ₁₀₀ |
| | B | 0.00 | 0.00 | 0.00 | 8.00 | 0.78 | 3.49 | 12.27 | 59 | 0.51 | 0.62 |
| | A | 0.00 | 0.00 | 0.00 | 9.47 | 0.97 | 2.32 | 12.76 | 67 | 0.56 | 0.66 |
| | Total | 0.00 | 0.00 | 0.00 | 17.47 | 1.74 | 5.81 | 25.03 | 63 | 0.54 | 0.64 |

Hydrologic Soil Group = A (NRCS Web Soil Survey)

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

| Land Use or Surface Characteristics | Percent Impervious | Runoff Coefficients | | |
|---|--------------------|---------------------|-----------------|------------------|
| | | 5-year HSG A&B | 10-year HSG A&B | 100-year HSG A&B |
| Business | | | | |
| Commercial Areas | 95 | 0.81 | 0.83 | 0.88 |
| Neighborhood Areas | 70 | 0.49 | 0.53 | 0.62 |
| Residential | | | | |
| 1/8 Acre or less | 65 | 0.45 | 0.49 | 0.59 |
| 1/4 Acre | 40 | 0.30 | 0.36 | 0.50 |
| 1/3 Acre | 30 | 0.25 | 0.32 | 0.47 |
| 1/2 Acre | 25 | 0.22 | 0.30 | 0.46 |
| 1 Acre | 20 | 0.20 | 0.27 | 0.44 |
| Industrial | | | | |
| Light Areas | 80 | 0.59 | 0.63 | 0.70 |
| Heavy Areas | 90 | 0.73 | 0.75 | 0.81 |
| Parks and Cemeteries | 7 | 0.12 | 0.20 | 0.39 |
| Playgrounds | 13 | 0.16 | 0.24 | 0.41 |
| Railroad Yard Areas | 40 | 0.30 | 0.36 | 0.50 |
| Undeveloped Areas | | | | |
| Historic Flow Analysis - Greenbelts, Agriculture | 2 | 0.09 | 0.17 | 0.36 |
| Pasture/Meadow | 0 | 0.08 | 0.15 | 0.35 |
| Forest | 0 | 0.08 | 0.15 | 0.35 |
| Esposed Rock | 100 | 0.90 | 0.92 | 0.96 |
| Offsite Flow Analysis (when landuse is undefined) | 45 | 0.32 | 0.38 | 0.51 |
| Streets | | | | |
| Paved | 100 | 0.90 | 0.92 | 0.96 |
| Gravel | 80 | 0.59 | 0.63 | 0.70 |
| Drives and Walks | 100 | 0.90 | 0.92 | 0.96 |
| Roofs | 90 | 0.73 | 0.75 | 0.81 |
| Lawns | 0 | 0.08 | 0.15 | 0.35 |



Zone Map 542

- El Paso County - Development Services Department

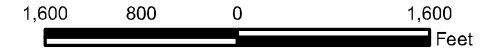
Zoning Designations

- | | | | |
|--|---|--|------------------------------------|
| | RS-20000: Residential Suburban (20,000 sq. ft.) | | F-5: Forest & Recreation (5 acres) |
| | RS-6000: Residential Suburban (6,000 sq. ft.) | | PUD: Planned Unit Development |
| | RS-5000: Residential Suburban (5,000 sq. ft.) | | CC: Commercial Community |
| | RM-12: Residential Multi-Dwelling (12 DU/acre) | | CR: Commercial Regional |
| | RM-30: Residential Multi-Dwelling (30 DU/acre) | | CS: Commercial Service |
| | RR-0.5: Residential Rural (0.5 acres) | | I-2: Limited Industrial |
| | RR-2.5: Residential Rural (2.5 acres) | | I-3: Heavy Industrial |
| | RR-5: Residential Rural (5 acres) | | A-5: Agricultural (5 acres) |
| | R-T: Residential - Topographic | | A-35: Agricultural (35 acres) |
| | MHP: Mobile Home Park | | C-1: ** Commercial |
| | MHP-R: Mobile Home Park, Rural | | C-2: ** Commercial |
| | MHS: Mobile Home Subdivision | | M: ** Industrial |
| | RVP: Recreational Vehicle Park | | R-4: ** Planned Development |

** Indicates an obsolete designation

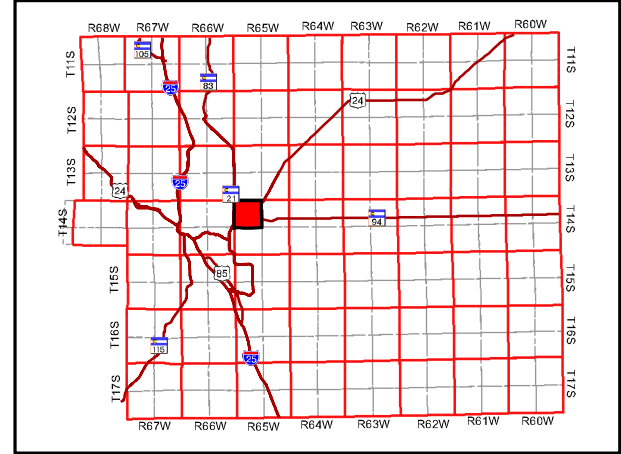
Supporting Data

- | | | | | | |
|--|-----------------------|--|----------------------|--|---------------------|
| | Highways | | Sections | | Incorporated Cities |
| | Major Roadways | | Parcels | | Zone Map Boundary |
| | Creeks - Perennial | | Military | | Zoning Overlay |
| | Creeks - Intermittent | | Pike National Forest | | Special Uses |
| | Section Corner Nodes | | | | |



February 08, 2022

Vicinity Map



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Time of Concentration

Job Name: Space Village Filing No. 4

Date: 10/11/22

Calculated by: JMN

| Sub-Basin Data | | | ¹ Initial/Overland Time (Ti) | | | Travel Time Tt | | | | | ***Tc Check Urbanized Basin | | Final Tc | Remarks |
|----------------|------|---------|---|-------------|--------|----------------|---------|-----------------|---------------------|--------|-----------------------------|--------|----------|---------|
| Desig | C5 | Area Ac | Length Ft | Slope Ft/Ft | Ti Min | Length Ft | Slope % | ³ Cv | ² V Ft/s | Tt Min | Tot Len Ft | Tc Min | Min | |
| HISTORIC | | | | | | | | | | | | | | |
| OS-E | 0.63 | 52.08 | 100 | 0.020 | 6.8 | 130 | 0.330 | 7 | 4.0 | 0.5 | | | | |
| | | | | | | 100 | 0.020 | 20 | 2.8 | 0.6 | | | | |
| | | | | | | 900 | 0.014 | 10 | 1.2 | 12.7 | | | | |
| | | | | | | 900 | 0.014 | 10 | 1.2 | 12.7 | | | 33 | |
| OS-W | | | | | | | | | | | | | | |
| | 0.56 | 6.82 | 100 | 0.020 | 7.7 | 80 | 0.020 | 20 | 2.8 | 0.5 | | | | |
| | | | | | | 465 | 0.017 | 10 | 1.3 | 5.9 | | | 14 | |
| EXISTING | | | | | | | | | | | | | | |
| H2 | 0.14 | 12.27 | 300 | 0.023 | 22.9 | 565 | 0.025 | 10 | 1.6 | 6.0 | | | 29 | |
| H1 | 0.15 | 12.76 | 300 | 0.020 | 23.7 | 465 | 0.011 | 10 | 1.0 | 7.4 | | | 31 | |
| PROPOSED | | | | | | | | | | | | | | |
| B | 0.46 | 12.27 | 100 | 0.023 | 8.7 | 765 | 0.025 | 10 | 1.6 | 8.1 | | | 17 | |
| A | 0.52 | 12.76 | 100 | 0.020 | 8.3 | 665 | 0.011 | 10 | 1.0 | 10.6 | | | 19 | |

¹Drainage Criteria Manual, Volume 1 Update, EL Paso County, Equation 6-8

²Drainage Criteria Manual, Volume 1 Update, EL Paso County, Equation 6-9

³Drainage Criteria Manual, Volume 1 Update, EL Paso County, Table 6-7

Table 6-7. Conveyance Coefficient, Cv

| Type of Land Surface | Cv |
|--|------|
| Heavy meadow | 2.5 |
| Tillage / field | 5.0 |
| Riprap (not buried) * | 6.5 |
| Short pasture and lawns | 7.0 |
| Nearly bare ground | 10.0 |
| Grassed waterway | 15 |
| Paved areas and shallow paved swales | 20.0 |
| *For buried riprap, select Cv value based on type of vegetative cover. | |

Existing Stormwater Runoff

Job Name: Space Village Filing No. 4

Date: 10/12/22

Calculated by: JMN

Design Storm: 5-yr

| Design Point | Direct Runoff | | | | | | | Total Runoff | | | | Street | | Pipe | | | Travel Time | | | Remarks | |
|--------------|---------------|-----------|--------------|----------|-------|------------------------|---------|--------------|----------|------------------------|---------|---------|-------------|-------------|---------|-----------|-------------|-----------|----------|------------|--|
| | Area Desig | Area (Ac) | Runoff Coeff | Tc (min) | CA | ¹ I (in/hr) | Q (cfs) | Tc (min) | Total CA | ¹ I (in/hr) | Q (cfs) | Slope % | Street Flow | Design Flow | Slope % | Pipe Size | Length (Ft) | Vel (fps) | Tt (min) | | |
| 1 | OS-E | 52.08 | 0.63 | 33 | 32.62 | 2.20 | 71.77 | | | | | | | | | | | | | to H2 | |
| 2 | OS-W | 6.82 | 0.56 | 14 | 3.84 | 3.50 | 13.44 | | | | | | | | | | | | | to H1 | |
| 3 | H2 | 12.27 | 0.14 | 29 | 1.67 | 2.40 | 4.01 | | | | | | | | | | | | | to DP 5 | |
| 4 | H1 | 12.76 | 0.15 | 31 | 1.88 | 2.40 | 4.51 | | | | | | | | | | | | | to DP 6 | |
| 5 | | | | | | | 75.77 | | | | | | | | | | | | | to Offsite | |
| 6 | | | | | | | 17.96 | | | | | | | | | | | | | to Offsite | |
| | | | | | | | | | | | | | | | | | | | | | |
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¹Drainage Criteria Manual, Volume 1 Update, EL Paso County, Figure 6-5

Proposed Stormwater Runoff
Job Name: Space Village Filing No. 4

Date: 10/12/22
Calculated by: JMN
Design Storm: 5-yr

| Design Point | Direct Runoff | | | | | | | Total Runoff | | | | Street | | Pipe | | | Travel Time | | | Remarks |
|--------------|---------------|-----------|--------------|----------|-------|------------------------|---------|--------------|----------|------------------------|---------|---------|-------------|-------------|---------|-----------|-------------|-----------|----------|------------|
| | Area Desig | Area (Ac) | Runoff Coeff | Tc (min) | CA | ¹ I (in/hr) | Q (cfs) | Tc (min) | Total CA | ¹ I (in/hr) | Q (cfs) | Slope % | Street Flow | Design Flow | Slope % | Pipe Size | Length (Ft) | Vel (fps) | Tt (min) | |
| 1 | OS-E | 52.08 | 0.63 | 33 | 32.62 | 2.20 | 71.77 | | | | | | | | | | | | | to Pond |
| 2 | OS-W | 6.82 | 0.56 | 14 | 3.84 | 3.50 | 13.44 | | | | | | | | | | | | | to Pond |
| 3 | B | 12.27 | 0.46 | 17 | 5.70 | 3.20 | 18.24 | | | | | | | | | | | | | to Pond |
| 4 | A | 12.76 | 0.52 | 19 | 6.64 | 3.00 | 19.93 | | | | | | | | | | | | | to Pond |
| 5 | | | | | | | 71.77 | | | | | | | | | | | | | to Offsite |
| 6 | | | | | | | 13.44 | | | | | | | | | | | | | to Offsite |
| | | | | | | | | | | | | | | | | | | | | |
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¹Drainage Criteria Manual, Volume 1 Update, EL Paso County, Figure 6-5

Existing Stormwater Runoff

Job Name: Space Village Filing No. 4

Date: 10/12/22

Calculated by: JMN

Design Storm: 10-yr

| Design Point | Direct Runoff | | | | | | | Total Runoff | | | | Street | | Pipe | | | Travel Time | | | Remarks | |
|--------------|---------------|-----------|--------------|----------|-------|------------------------|---------|--------------|----------|------------------------|---------|---------|-------------|-------------|---------|-----------|-------------|-----------|----------|------------|--|
| | Area Desig | Area (Ac) | Runoff Coeff | Tc (min) | CA | ¹ I (in/hr) | Q (cfs) | Tc (min) | Total CA | ¹ I (in/hr) | Q (cfs) | Slope % | Street Flow | Design Flow | Slope % | Pipe Size | Length (Ft) | Vel (fps) | Tt (min) | | |
| 1 | OS-E | 52.08 | 0.66 | 33 | 34.42 | 2.60 | 89.48 | | | | | | | | | | | | | to H2 | |
| 2 | OS-W | 6.82 | 0.60 | 14 | 4.12 | 4.10 | 16.87 | | | | | | | | | | | | | to H1 | |
| 3 | H2 | 12.27 | 0.21 | 29 | 2.61 | 2.80 | 7.31 | | | | | | | | | | | | | to DP 5 | |
| 4 | H1 | 12.76 | 0.22 | 31 | 2.85 | 2.80 | 7.97 | | | | | | | | | | | | | to DP 6 | |
| 5 | | | | | | | 96.79 | | | | | | | | | | | | | to Offsite | |
| 6 | | | | | | | 24.85 | | | | | | | | | | | | | to Offsite | |
| | | | | | | | | | | | | | | | | | | | | | |
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¹Drainage Criteria Manual, Volume 1 Update, EL Paso County, Figure 6-5

Proposed Stormwater Runoff
Job Name: Space Village Filing No. 4

Date: 10/12/22
Calculated by: JMN
Design Storm: 10-yr

| Design Point | Direct Runoff | | | | | | | Total Runoff | | | | Street | | Pipe | | | Travel Time | | | Remarks | |
|--------------|---------------|-----------|--------------|----------|-------|------------------------|---------|--------------|----------|------------------------|---------|---------|-------------|-------------|---------|-----------|-------------|-----------|----------|------------|--|
| | Area Desig | Area (Ac) | Runoff Coeff | Tc (min) | CA | ¹ I (in/hr) | Q (cfs) | Tc (min) | Total CA | ¹ I (in/hr) | Q (cfs) | Slope % | Street Flow | Design Flow | Slope % | Pipe Size | Length (Ft) | Vel (fps) | Tt (min) | | |
| 1 | OS-E | 52.08 | 0.66 | 33 | 34.42 | 2.60 | 89.48 | | | | | | | | | | | | | to Pond | |
| 2 | OS-W | 6.82 | 0.60 | 14 | 4.12 | 4.10 | 16.87 | | | | | | | | | | | | | to Pond | |
| 3 | B | 12.27 | 0.51 | 17 | 6.28 | 3.80 | 23.87 | | | | | | | | | | | | | to Pond | |
| 4 | A | 12.76 | 0.56 | 19 | 7.20 | 3.60 | 25.93 | | | | | | | | | | | | | to Pond | |
| 5 | | | | | | | 89.48 | | | | | | | | | | | | | to Offsite | |
| 6 | | | | | | | 16.87 | | | | | | | | | | | | | to Offsite | |
| | | | | | | | | | | | | | | | | | | | | | |
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¹Drainage Criteria Manual, Volume 1 Update, EL Paso County, Figure 6-5

Existing Stormwater Runoff
Job Name: Space Village Filing No. 4

Date: 10/12/22
Calculated by: JMN
Design Storm: 100-yr

| Design Point | Direct Runoff | | | | | | | Total Runoff | | | | Street | | Pipe | | | Travel Time | | | Remarks | |
|--------------|---------------|-----------|--------------|----------|-------|------------------------|---------|--------------|----------|------------------------|---------|---------|-------------|-------------|---------|-----------|-------------|-----------|----------|------------|--|
| | Area Desig | Area (Ac) | Runoff Coeff | Tc (min) | CA | ¹ I (in/hr) | Q (cfs) | Tc (min) | Total CA | ¹ I (in/hr) | Q (cfs) | Slope % | Street Flow | Design Flow | Slope % | Pipe Size | Length (Ft) | Vel (fps) | Tt (min) | | |
| 1 | OS-E | 52.08 | 0.74 | 33 | 38.54 | 3.80 | 146.46 | | | | | | | | | | | | | to H2 | |
| 2 | OS-W | 6.82 | 0.70 | 14 | 4.79 | 5.80 | 27.77 | | | | | | | | | | | | | to H1 | |
| 3 | H2 | 12.27 | 0.39 | 29 | 4.84 | 4.00 | 19.34 | | | | | | | | | | | | | to DP 5 | |
| 4 | H1 | 12.76 | 0.40 | 31 | 5.14 | 4.00 | 20.54 | | | | | | | | | | | | | to DP 6 | |
| 5 | | | | | | | 165.81 | | | | | | | | | | | | | to Offsite | |
| 6 | | | | | | | 48.32 | | | | | | | | | | | | | to Offsite | |
| | | | | | | | | | | | | | | | | | | | | | |
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¹Drainage Criteria Manual, Volume 1 Update, EL Paso County, Figure 6-5

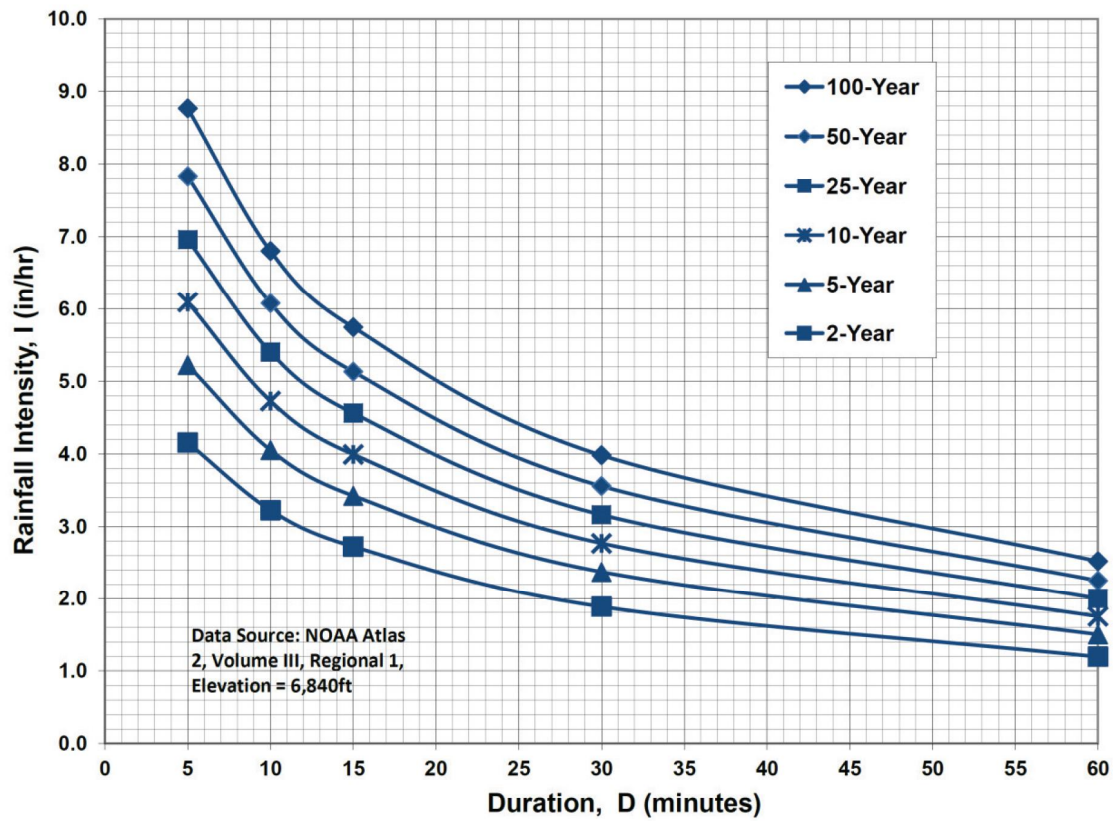
Proposed Stormwater Runoff
Job Name: Space Village Filing No. 4

Date: 10/12/22
Calculated by: JMN
Design Storm: 100-yr

| Design Point | Direct Runoff | | | | | | | Total Runoff | | | | Street | | Pipe | | | Travel Time | | | Remarks |
|--------------|---------------|-----------|--------------|----------|-------|------------------------|---------|--------------|----------|------------------------|---------|---------|-------------|-------------|---------|-----------|-------------|-----------|----------|------------|
| | Area Desig | Area (Ac) | Runoff Coeff | Tc (min) | CA | ¹ I (in/hr) | Q (cfs) | Tc (min) | Total CA | ¹ I (in/hr) | Q (cfs) | Slope % | Street Flow | Design Flow | Slope % | Pipe Size | Length (Ft) | Vel (fps) | Tt (min) | |
| 1 | OS-E | 52.08 | 0.74 | 33 | 38.54 | 3.80 | 146.46 | | | | | | | | | | | | | to Pond |
| 2 | OS-W | 6.82 | 0.70 | 14 | 4.79 | 5.80 | 27.77 | | | | | | | | | | | | | to Pond |
| 3 | B | 12.27 | 0.62 | 17 | 7.57 | 5.40 | 40.88 | | | | | | | | | | | | | to Pond |
| 4 | A | 12.76 | 0.66 | 19 | 8.37 | 5.20 | 43.52 | | | | | | | | | | | | | to Pond |
| 5 | | | | | | | 146.46 | | | | | | | | | | | | | to Offsite |
| 6 | | | | | | | 27.77 | | | | | | | | | | | | | to Offsite |
| | | | | | | | | | | | | | | | | | | | | |
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¹Drainage Criteria Manual, Volume 1 Update, EL Paso County, Figure 6-5

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.

Channel (5-yr)

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | | |
|-----------------------|---------|----------------------|
| Roughness Coefficient | 0.040 | (MANUAL, Table 10-4) |
| Channel Slope | 0.00500 | ft/ft |
| Left Side Slope | 4.00 | ft/ft (H:V) |
| Right Side Slope | 4.00 | ft/ft (H:V) |
| Bottom Width | 15.00 | ft |
| Discharge | 71.77 | ft ³ /s |

Results

| | | |
|------------------|-------------|-----------------|
| Normal Depth | 1.32 | ft |
| Flow Area | 26.73 | ft ² |
| Wetted Perimeter | 25.87 | ft |
| Hydraulic Radius | 1.03 | ft |
| Top Width | 25.55 | ft |
| Critical Depth | 0.83 | ft |
| Critical Slope | 0.02659 | ft/ft |
| Velocity | 2.68 | ft/s |
| Velocity Head | 0.11 | ft |
| Specific Energy | 1.43 | ft |
| Froude Number | 0.46 | |
| Flow Type | Subcritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|---------------------|----------|-------|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 1.32 | ft |
| Critical Depth | 0.83 | ft |
| Channel Slope | 0.00500 | ft/ft |

Channel (100-yr)

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | | |
|-----------------------|---------|----------------------|
| Roughness Coefficient | 0.040 | (MANUAL, Table 10-4) |
| Channel Slope | 0.00500 | ft/ft |
| Left Side Slope | 4.00 | ft/ft (H:V) |
| Right Side Slope | 4.00 | ft/ft (H:V) |
| Bottom Width | 15.00 | ft |
| Discharge | 146.46 | ft ³ /s |

Results

| | | |
|------------------|-------------|-----------------|
| Normal Depth | 1.94 | ft |
| Flow Area | 44.08 | ft ² |
| Wetted Perimeter | 30.98 | ft |
| Hydraulic Radius | 1.42 | ft |
| Top Width | 30.50 | ft |
| Critical Depth | 1.27 | ft |
| Critical Slope | 0.02357 | ft/ft |
| Velocity | 3.32 | ft/s |
| Velocity Head | 0.17 | ft |
| Specific Energy | 2.11 | ft |
| Froude Number | 0.49 | |
| Flow Type | Subcritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|---------------------|----------|-------|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 1.94 | ft |
| Critical Depth | 1.27 | ft |
| Channel Slope | 0.00500 | ft/ft |

Channel Calculations

Job Name: Space Village Filing No. 4

Date: 10/12/22

By: JMN

FREEBOARD

$$H = 1.0 + 0.025vd^{0.33}$$

(MANUAL: Equation 10-3)

$$v = 3.32 \text{ (ft/s)}$$

$$d = 1.94 \text{ (ft)}$$

$$H = 1.10 \text{ (ft)}$$

SUPERELEVATION

$$H = (Cv^2w) / (gR)$$

(MANUAL: Equation 10-4)

$$C = 0.50$$

$$v = 3.32 \text{ (ft/s)}$$

$$w = 30.50 \text{ (ft)}$$

$$g = 32.20 \text{ (ft/s}^2\text{)}$$

$$R = 75.00 \text{ (ft)}$$

$$(R = 2w \text{ minimum; } = 61 \text{ ft minimum)}$$

(MANUAL: Section 10.5.6)

(ECM: Section 3.3.3)

$$H = 0.07 \text{ (ft)}$$

TOTAL

$$H = 1.17 \text{ (ft)}$$

Swale

Project Description

| | |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For | Normal Depth |

Input Data

| | | |
|-----------------------|---------|--------------------|
| Roughness Coefficient | 0.040 | |
| Channel Slope | 0.01300 | ft/ft |
| Left Side Slope | 4.00 | ft/ft (H:V) |
| Right Side Slope | 4.00 | ft/ft (H:V) |
| Discharge | 27.77 | ft ³ /s |

Results

| | | |
|------------------|-------------|-----------------|
| Normal Depth | 1.44 | ft |
| Flow Area | 8.32 | ft ² |
| Wetted Perimeter | 11.89 | ft |
| Hydraulic Radius | 0.70 | ft |
| Top Width | 11.54 | ft |
| Critical Depth | 1.25 | ft |
| Critical Slope | 0.02843 | ft/ft |
| Velocity | 3.34 | ft/s |
| Velocity Head | 0.17 | ft |
| Specific Energy | 1.62 | ft |
| Froude Number | 0.69 | |
| Flow Type | Subcritical | |

GVF Input Data

| | | |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length | 0.00 | ft |
| Number Of Steps | 0 | |

GVF Output Data

| | | |
|---------------------|----------|-------|
| Upstream Depth | 0.00 | ft |
| Profile Description | | |
| Profile Headloss | 0.00 | ft |
| Downstream Velocity | Infinity | ft/s |
| Upstream Velocity | Infinity | ft/s |
| Normal Depth | 1.44 | ft |
| Critical Depth | 1.25 | ft |
| Channel Slope | 0.01300 | ft/ft |
| Critical Slope | 0.02843 | ft/ft |

TABLE 10-2

TYPICAL ROUGHNESS COEFFICIENTS FOR OPEN CHANNELS

| Type of Channel and Description | Minimum | Normal | Maximum |
|---|---------|--------|---------|
| 8. Very weedy reaches, deep pools, or floodways with heavy stand of timber and underbrush | 0.075 | 0.100 | 0.150 |
| LINED OR BUILT-UP CHANNELS | | | |
| a. Corrugated Metal | 0.021 | 0.025 | 0.030 |
| b. Concrete | | | |
| 1. Trowel finish | 0.011 | 0.013 | 0.015 |
| 2. Float finish | 0.013 | 0.015 | 0.016 |
| 3. Finished, with gravel on bottom | 0.015 | 0.017 | 0.020 |
| 4. Unfinished | 0.014 | 0.017 | 0.020 |
| 5. Gunite, good section | 0.016 | 0.019 | 0.023 |
| 6. Gunite, wavy section | 0.018 | 0.022 | 0.025 |
| 7. On good excavated rock | 0.017 | 0.020 | |

| Type of Channel and Description | Minimum | Normal | Maximum |
|---|---------|--------|---------|
| 8. On irregular excavated rock | 0.022 | 0.027 | |
| c. Concrete bottom float finished with sides of | | | |
| 1. Dressed stone in mortar | 0.015 | 0.017 | 0.020 |
| 2. Random stone in mortar | 0.017 | 0.020 | 0.024 |
| 3. Cement rubble masonry, plastered | 0.016 | 0.020 | 0.024 |
| 4. Cement rubble masonry | 0.020 | 0.025 | 0.030 |
| 5. Dry rubble or riprap | 0.020 | 0.030 | 0.035 |
| d. Gravel bottom with sides of | | | |
| 1. Formed concrete | 0.017 | 0.020 | 0.025 |
| 2. Random stone in mortar | 0.020 | 0.023 | 0.026 |
| 3. Dry rubble or riprap | 0.023 | 0.033 | 0.036 |
| e. Asphalt | | | |

| Type of Channel and Description | Minimum | Normal | Maximum |
|---------------------------------|---------|--------|---------|
| 1. Smooth | | 0.013 | |
| 2. Rough | | 0.016 | |
| f. Grassed | 0.030 | 0.040 | 0.050 |

¹EL PASO COUNTY DRAINAGE CRITERIA MANUAL , VOLUME 1, CHAPTER 10, SECTION 10.5
CHANNEL CROSS SECTIONS

²(REFERENCE: CHOW, VEN TE, 1959; OPEN-CHANNEL HYDRAULICS)

TABLE 10-4

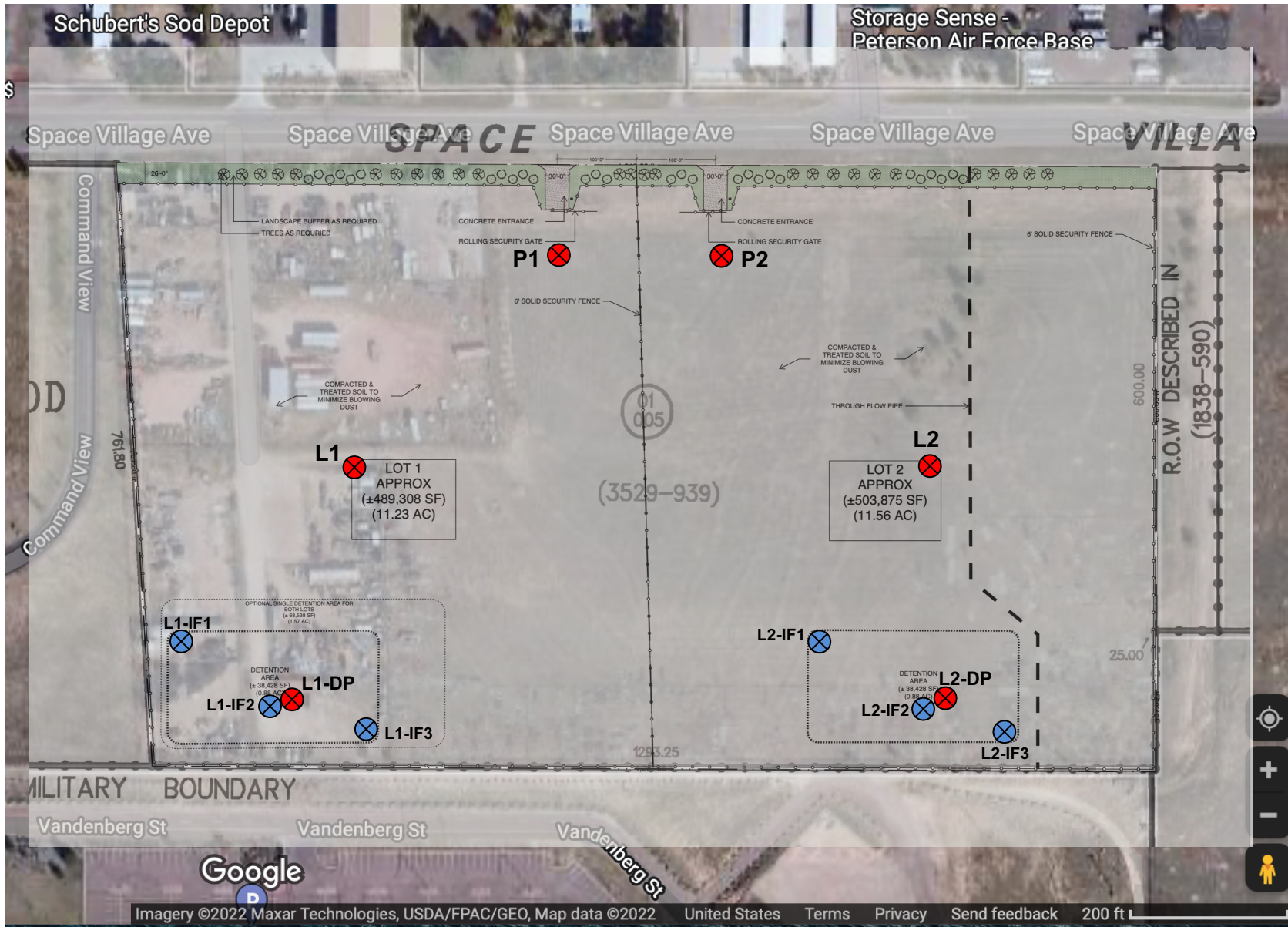
MAXIMUM PERMISSIBLE VELOCITIES FOR EARTH CHANNELS WITH GRASS LININGS AND SLOPES

| Channel Slope | Lining | Permissible Mean Channel Velocity* (ft/sec) |
|---------------|--------------------------|---|
| 0 - 5% | Sodded grass | 7 |
| | Bermudagrass | 6 |
| | Reed canarygrass | 5 |
| | Tall fescue | 5 |
| | Kentucky bluegrass | 5 |
| | Grass-legume mixture | 4 |
| | Red fescue | 2.5 |
| | Redtop | 2.5 |
| | Sericea lespedeza | 2.5 |
| | Annual lespedeza | 2.5 |
| | Small grains (temporary) | 2.5 |
| 5 - 10% | Sodded grass | 6 |
| | Bermudagrass | 5 |
| | Reed canarygrass | 4 |
| | Tall fescue | 4 |
| | Kentucky bluegrass | 4 |

| Channel Slope | Lining | Permissible Mean Channel Velocity* (ft/sec) |
|------------------|----------------------|---|
| | Grass-legume mixture | 3 |
| Greater than 10% | Sodded grass | 5 |
| | Bermudagrass | 4 |
| | Reed canarygrass | 3 |
| | Tall fescue | 3 |
| | Kentucky bluegrass | 3 |

*For highly erodible soils, decrease permissible velocities by 25%.

*Grass lined channels are dependent upon assurances of continuous growth and maintenance of grass.



- ⊗ APPROXIMATE BORING LOCATIONS
- ⊗ APPROXIMATE INFILTRATION TEST HOLE LOCATIONS

FIGURE 1 - BORING LOCATION DIAGRAM
PROPOSED STORAGE YARDS
0 SPACE VILLAGE AVENUE
EL PASO COUNTY, COLORADO
CGG PROJECT NO. 22.22.155



Cole Garner Geotechnical
 1070 W. 124th Ave., Suite 300
 Westminster, CO 80234
 (303) 996-2999

Cole Garner Geotechnical

1070 West 124th Avenue, Ste. 300
Westminster, CO 80234
(303) 996-2999



Field Infiltration Rate Test No. L1-IF1

| | | | |
|--------------------------|---------------------|--------------------------|----------|
| Project Name: | 0 Space Village Ave | Date: | 8/8/2022 |
| Cole Garner Project No.: | 22.22.155 | Hole diameter (in): | 6 |
| Eng./Tech.: | T.M.C. | Approx. Test Depth (in): | 60 |

| Interval Start Time (hh:mm) | Interval End Time (hh:mm) | Length of Interval (min) | Water Level Drop (in) | Infiltration Rate During Interval (min/in) | Infiltration Rate During Interval (in/hr) |
|--------------------------------|------------------------------|-----------------------------|--------------------------|---|--|
| 16:50 | 17:05 | 15 | 2 13/16 | 5.33 | 11.25 |
| 17:05 | 17:20 | 15 | 2 1/4 | 6.67 | 9.00 |
| 17:20 | 17:35 | 15 | 2 | 7.50 | 8.00 |
| 17:35 | 17:50 | 15 | 1 3/8 | 10.91 | 5.50 |
| 17:50 | 18:05 | 15 | 7/8 | 17.14 | 3.50 |
| 18:05 | 18:20 | 15 | 5/8 | 24.00 | 2.50 |
| 18:20 | 18:35 | 15 | 11/16 | 21.82 | 2.75 |
| 18:35 | 18:50 | 15 | 5/8 | 24.00 | 2.50 |
| | | | | | |
| | | | | | |

REMARKS: Modified infiltrometer test (cased borehole; 4-inch solid pipe) performed in the silty sand soils at a depth of about 5 feet below existing site grade.

| | |
|-----------------------------------|-------------|
| Final Infiltration Rate: | 2.50 |
| Average Infiltration Rate: | 7.45 |

Cole Garner Geotechnical

1070 West 124th Avenue, Ste. 300
Westminster, CO 80234
(303) 996-2999



Field Infiltration Rate Test No. L1-IF2

| | | | |
|--------------------------|---------------------|--------------------------|----------|
| Project Name: | 0 Space Village Ave | Date: | 8/8/2022 |
| Cole Garner Project No.: | 22.22.155 | Hole diameter (in): | 6 |
| Eng./Tech.: | T.M.C. | Approx. Test Depth (in): | 60 |

| Interval Start Time (hh:mm) | Interval End Time (hh:mm) | Length of Interval (min) | Water Level Drop (in) | Infiltration Rate During Interval (min/in) | Infiltration Rate During Interval (in/hr) |
|--------------------------------|------------------------------|-----------------------------|--------------------------|---|--|
| 16:50 | 17:05 | 15 | 2 1/8 | 7.06 | 8.50 |
| 17:05 | 17:20 | 15 | 2 | 7.50 | 8.00 |
| 17:20 | 17:35 | 15 | 2 5/16 | 6.49 | 9.25 |
| 17:35 | 17:50 | 15 | 1 3/4 | 8.57 | 7.00 |
| 17:50 | 18:05 | 15 | 1 1/2 | 10.00 | 6.00 |
| 18:05 | 18:20 | 15 | 1 1/4 | 12.00 | 5.00 |
| 18:20 | 18:35 | 15 | 1 3/8 | 10.91 | 5.50 |
| 18:35 | 18:50 | 15 | 1 1/8 | 13.33 | 4.50 |
| | | | | | |
| | | | | | |

REMARKS: Modified infiltrometer test (cased borehole; 4-inch solid pipe) performed in the silty sand soils at a depth of about 5 feet below existing site grade.

| | |
|-----------------------------------|-------------|
| Final Infiltration Rate: | 4.50 |
| Average Infiltration Rate: | 7.75 |

Cole Garner Geotechnical

1070 West 124th Avenue, Ste. 300
Westminster, CO 80234
(303) 996-2999



Field Infiltration Rate Test No. L1-IF3

| | | | |
|--------------------------|---------------------|--------------------------|----------|
| Project Name: | 0 Space Village Ave | Date: | 8/8/2022 |
| Cole Garner Project No.: | 22.22.155 | Hole diameter (in): | 6 |
| Eng./Tech.: | T.M.C. | Approx. Test Depth (in): | 60 |

| Interval Start Time (hh:mm) | Interval End Time (hh:mm) | Length of Interval (min) | Water Level Drop (in) | Infiltration Rate During Interval (min/in) | Infiltration Rate During Interval (in/hr) |
|--------------------------------|------------------------------|-----------------------------|--------------------------|---|--|
| 16:50 | 17:05 | 15 | 6 11/16 | 2.24 | 26.75 |
| 17:05 | 17:20 | 15 | 5 11/16 | 2.64 | 22.75 |
| 17:20 | 17:35 | 15 | 5 5/16 | 2.82 | 21.25 |
| 17:35 | 17:50 | 15 | 4 3/16 | 3.58 | 16.75 |
| 17:50 | 18:05 | 15 | 3 | 5.00 | 12.00 |
| 18:05 | 18:20 | 15 | 3 11/16 | 4.07 | 14.75 |
| 18:20 | 18:35 | 15 | 1 3/8 | 10.91 | 5.50 |
| 18:35 | 18:50 | 15 | 2 3/8 | 6.32 | 9.50 |
| | | | | | |
| | | | | | |

REMARKS: Modified infiltrometer test (cased borehole; 4-inch solid pipe) performed in the silty sand soils at a depth of about 5 feet below existing site grade.

| | |
|-----------------------------------|--------------|
| Final Infiltration Rate: | 9.50 |
| Average Infiltration Rate: | 19.90 |

Cole Garner Geotechnical

1070 West 124th Avenue, Ste. 300
Westminster, CO 80234
(303) 996-2999



Field Infiltration Rate Test No. L2-IF1

| | | | |
|--------------------------|---------------------|--------------------------|----------|
| Project Name: | 0 Space Village Ave | Date: | 8/8/2022 |
| Cole Garner Project No.: | 22.22.155 | Hole diameter (in): | 6 |
| Eng./Tech.: | T.M.C. | Approx. Test Depth (in): | 60 |

| Interval Start Time (hh:mm) | Interval End Time (hh:mm) | Length of Interval (min) | Water Level Drop (in) | Infiltration Rate During Interval (min/in) | Infiltration Rate During Interval (in/hr) |
|--------------------------------|------------------------------|-----------------------------|--------------------------|---|--|
| 16:50 | 17:05 | 15 | 2 3/8 | 6.32 | 9.50 |
| 17:05 | 17:20 | 15 | 1 15/16 | 7.74 | 7.75 |
| 17:20 | 17:35 | 15 | 2 | 7.50 | 8.00 |
| 17:35 | 17:50 | 15 | 1 15/16 | 7.74 | 7.75 |
| 17:50 | 18:05 | 15 | 1 13/16 | 8.28 | 7.25 |
| 18:05 | 18:20 | 15 | 1 3/8 | 10.91 | 5.50 |
| 18:20 | 18:35 | 15 | 1 7/16 | 10.43 | 5.75 |
| 18:35 | 18:50 | 15 | 1 1/2 | 10.00 | 6.00 |
| | | | | | |
| | | | | | |

REMARKS: Modified infiltrometer test (cased borehole; 4-inch solid pipe) performed in the silty sand soils at a depth of about 5 feet below existing site grade.

| | |
|-----------------------------------|-------------|
| Final Infiltration Rate: | 6.00 |
| Average Infiltration Rate: | 8.05 |

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1070 West 124th Avenue, Ste. 300
Westminster, CO 80234
(303) 996-2999



Field Infiltration Rate Test No. L2-IF2

| | | | |
|--------------------------|---------------------|--------------------------|----------|
| Project Name: | 0 Space Village Ave | Date: | 8/8/2022 |
| Cole Garner Project No.: | 22.22.155 | Hole diameter (in): | 6 |
| Eng./Tech.: | T.M.C. | Approx. Test Depth (in): | 60 |

| Interval Start Time (hh:mm) | Interval End Time (hh:mm) | Length of Interval (min) | Water Level Drop (in) | Infiltration Rate During Interval (min/in) | Infiltration Rate During Interval (in/hr) |
|--------------------------------|------------------------------|-----------------------------|--------------------------|---|--|
| 16:50 | 17:05 | 15 | 1 1/4 | 12.00 | 5.00 |
| 17:05 | 17:20 | 15 | 7/8 | 17.14 | 3.50 |
| 17:20 | 17:35 | 15 | 1 | 15.00 | 4.00 |
| 17:35 | 17:50 | 15 | 1 | 15.00 | 4.00 |
| 17:50 | 18:05 | 15 | 7/8 | 17.14 | 3.50 |
| 18:05 | 18:20 | 15 | 3/4 | 20.00 | 3.00 |
| 18:20 | 18:35 | 15 | 3/4 | 20.00 | 3.00 |
| 18:35 | 18:50 | 15 | 3/4 | 20.00 | 3.00 |
| | | | | | |
| | | | | | |

REMARKS: Modified infiltrometer test (cased borehole; 4-inch solid pipe) performed in the silty sand soils at a depth of about 5 feet below existing site grade.

| | |
|-----------------------------------|-------------|
| Final Infiltration Rate: | 3.00 |
| Average Infiltration Rate: | 4.00 |

Cole Garner Geotechnical

1070 West 124th Avenue, Ste. 300
Westminster, CO 80234
(303) 996-2999



Field Infiltration Rate Test No. L2-IF3

| | | | |
|--------------------------|---------------------|--------------------------|----------|
| Project Name: | 0 Space Village Ave | Date: | 8/8/2022 |
| Cole Garner Project No.: | 22.22.155 | Hole diameter (in): | 6 |
| Eng./Tech.: | T.M.C. | Approx. Test Depth (in): | 60 |

| Interval Start Time (hh:mm) | Interval End Time (hh:mm) | Length of Interval (min) | Water Level Drop (in) | Infiltration Rate During Interval (min/in) | Infiltration Rate During Interval (in/hr) |
|--------------------------------|------------------------------|-----------------------------|--------------------------|---|--|
| 16:50 | 17:05 | 15 | 2 5/8 | 5.71 | 10.50 |
| 17:05 | 17:20 | 15 | 1 5/8 | 9.23 | 6.50 |
| 17:20 | 17:35 | 15 | 1 3/4 | 8.57 | 7.00 |
| 17:35 | 17:50 | 15 | 15/16 | 16.00 | 3.75 |
| 17:50 | 18:05 | 15 | 15/16 | 16.00 | 3.75 |
| 18:05 | 18:20 | 15 | 9/16 | 26.67 | 2.25 |
| 18:20 | 18:35 | 15 | 13/16 | 18.46 | 3.25 |
| 18:35 | 18:50 | 15 | 9/16 | 26.67 | 2.25 |
| | | | | | |
| | | | | | |

REMARKS: Modified infiltrometer test (cased borehole; 4-inch solid pipe) performed in the silty sand soils at a depth of about 5 feet below existing site grade.

| | |
|-----------------------------------|-------------|
| Final Infiltration Rate: | 2.25 |
| Average Infiltration Rate: | 6.30 |

Detention Pond Calculations
Job Name: Space Village Filing No. 4

Date: 10/11/22
By: JMN

EAST POND VOLUME PROVIDED

| Elevation | Area (sq-ft) | Volume (cu-ft) | Cumulative (cu-ft) |
|-----------|--------------|----------------|--------------------|
| 70 | 16,371 | | |
| | | 18,066 | 18,066 |
| 71 | 19,815 | | |
| | | 21,542 | 39,607 |
| 72 | 23,316 | | |
| | | 25,073 | 64,681 |
| 73 | 26,873 | | |
| | | 28,661 | 93,341 |
| 74 | 30,486 | | |

WEST POND VOLUME PROVIDED

| Elevation | Area (sq-ft) | Volume (cu-ft) | Cumulative (cu-ft) |
|-----------|--------------|----------------|--------------------|
| 67 | 16,129 | | |
| | | 17,799 | 17,799 |
| 68 | 19,524 | | |
| | | 21,272 | 39,071 |
| 69 | 23,069 | | |
| | | 25,008 | 64,080 |
| 70 | 26,999 | | |
| | | 29,157 | 93,237 |
| 71 | 31,370 | | |
| | | 12,234 | 105,471 |
| 71.38 | 33,027 | | |

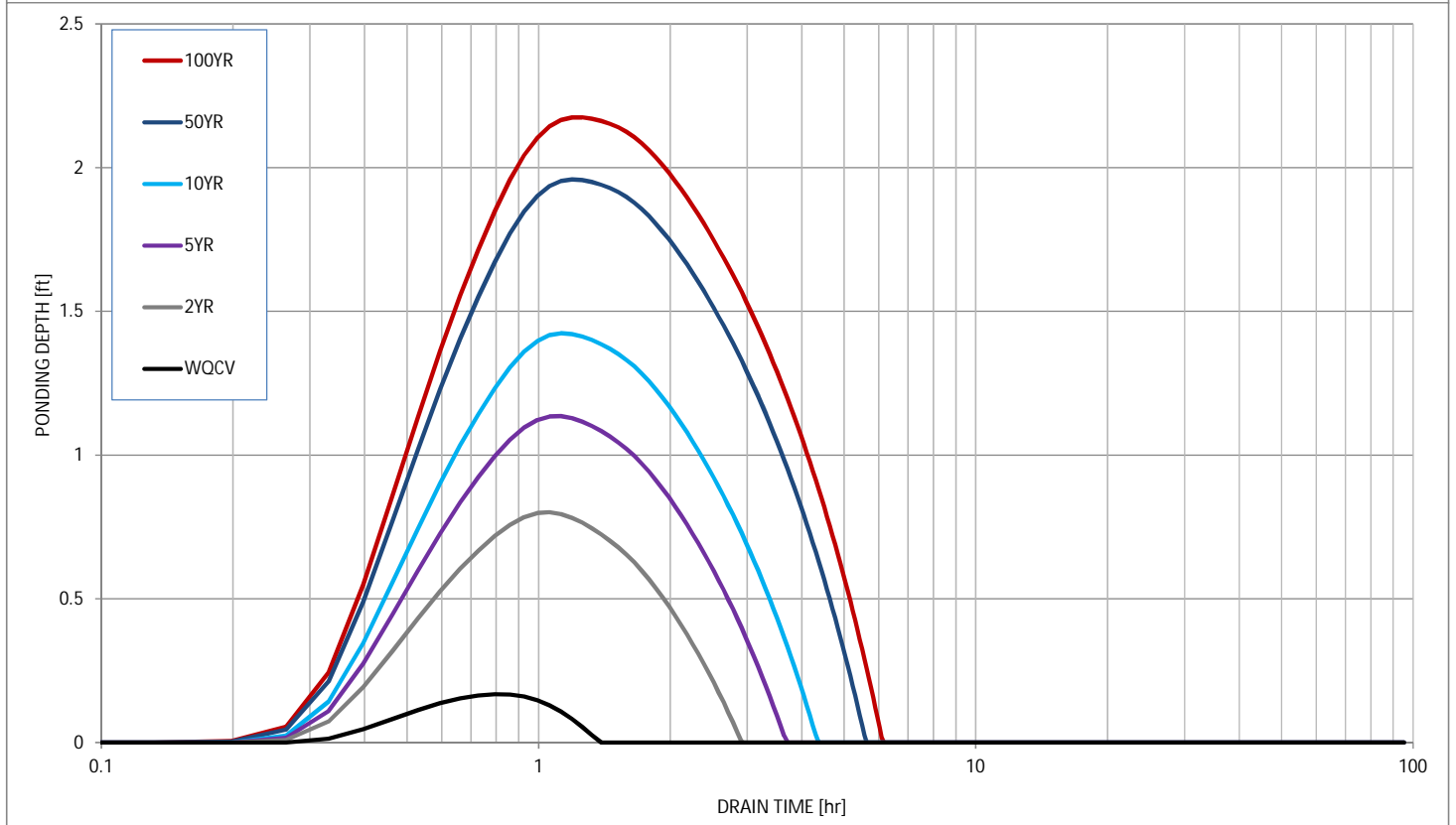
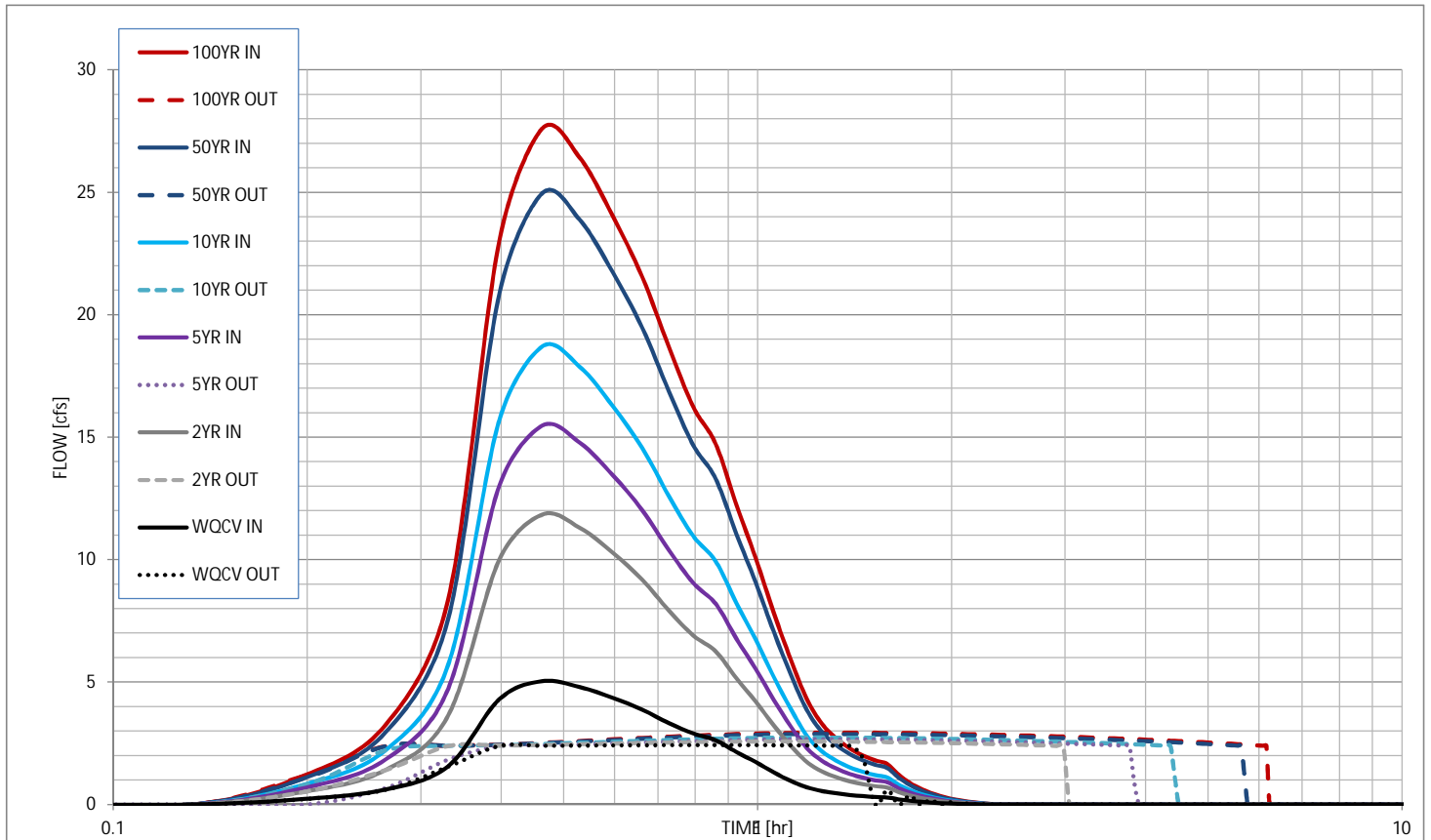
WATER SURFACE ELEVATIONS

| Event | Req'd Volume (cf) | Water Surface Elevation (acft) | Water Surface Elevation |
|----------|-------------------|--------------------------------|-------------------------|
| WQCV | 10,367 | 0.238 | 70.57 |
| EURV | 38,071 | 0.874 | |
| 100-year | 58,065 | 1.333 | 72.74 |
| Total | 63,249 | 1.452 | 72.94 |
| | 93,341 | 2.143 | 74.00 |
| Excess | 30,092 | 0.691 | 74.00 |

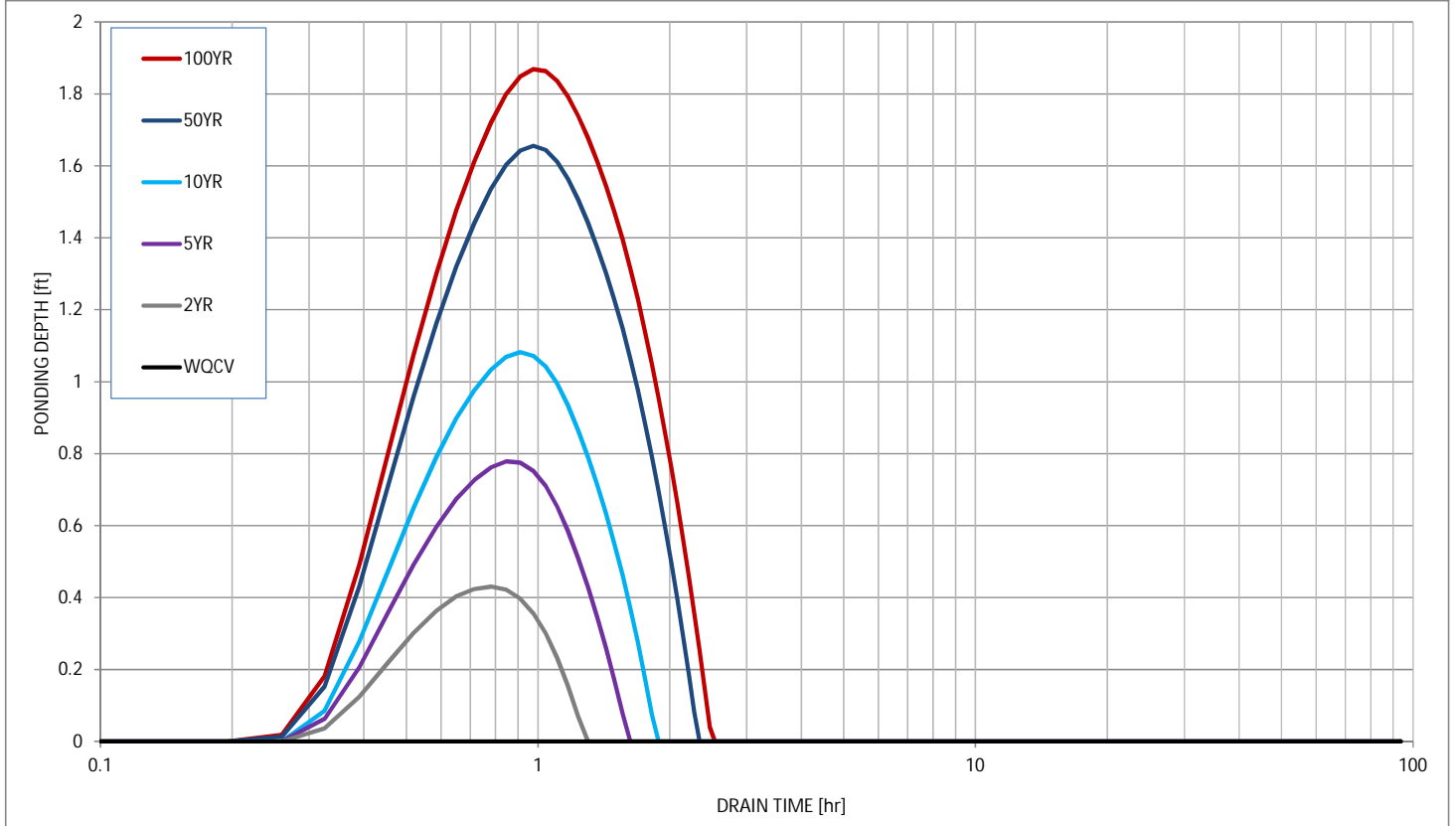
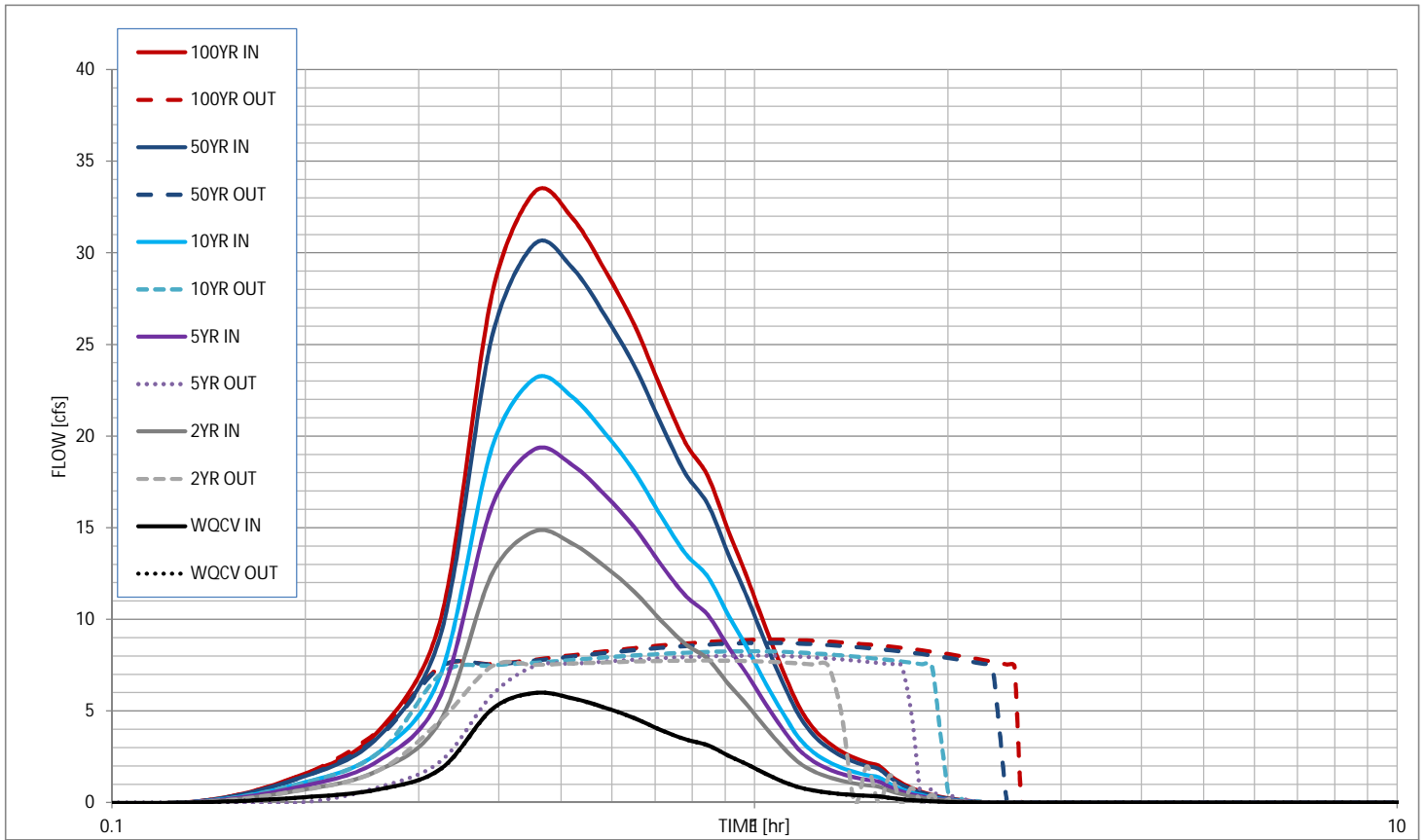
WATER SURFACE ELEVATIONS

| Event | Req'd Volume (cf) | Water Surface Elevation (acft) | Water Surface Elevation |
|----------|-------------------|--------------------------------|-------------------------|
| WQCV | 12,153 | 0.279 | 67.68 |
| EURV | 46,609 | 1.070 | |
| 100-year | 68,999 | 1.584 | 70.17 |
| Total | 75,075 | 1.723 | 70.38 |
| | 105,471 | 2.421 | 71.38 |
| Excess | 30,396 | 0.698 | 71.38 |

Stormwater Detention and Infiltration Design Data Sheet



Stormwater Detention and Infiltration Design Data Sheet



APPENDIX C

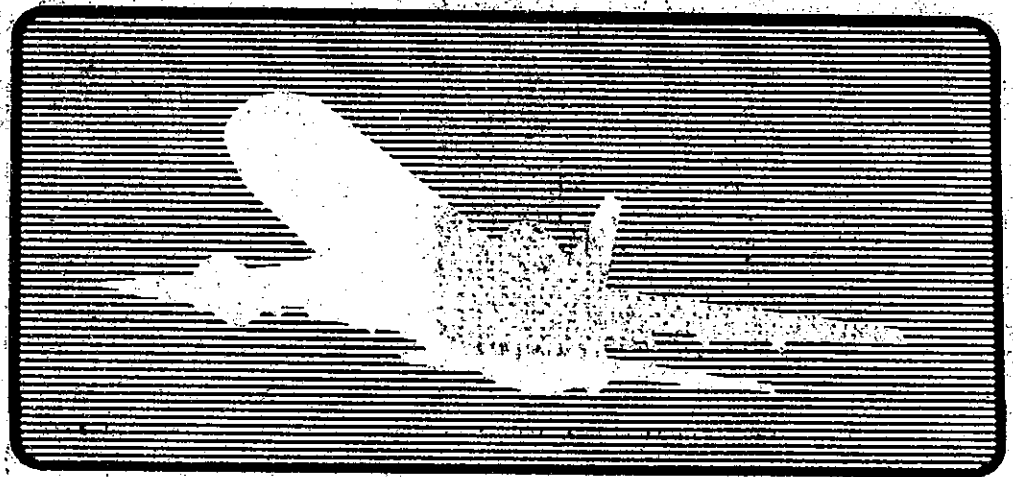
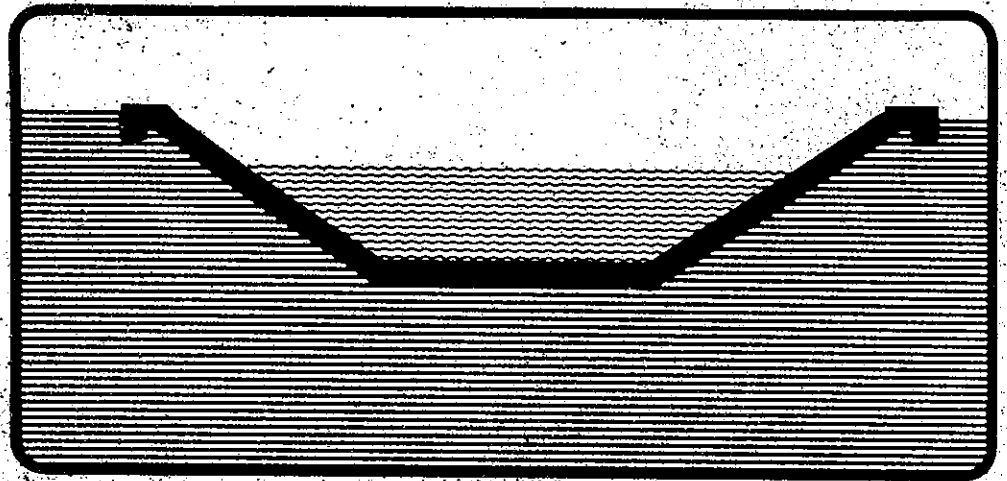
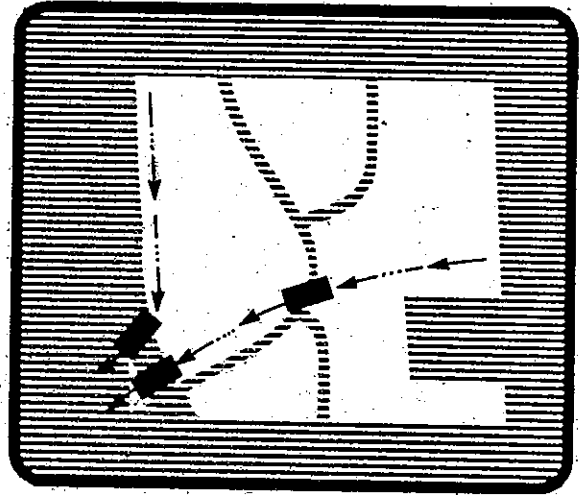
- Excerpts of Existing Reports and Documents
 - Peterson Field Drainage Basin Master Plan Update
 - Preliminary Drainage Report for First Wing Development
 - ALTA/NSPS Land Title Survey
 - Colorado Springs Utilities Public Utility Map
 - Cherokee Metropolitan District Map

RETURN WITHIN 2 WEEKS TO:
CITY OF COLORADO SPRINGS
STORM WATER & SUBDIVISION
101 W. COSTILLA, SUITE 113
COLORADO SPRINGS, CO 80903
(719) 578-6212

RETURN TO:
Land Development
101 West Costilla, Suite 122
Colorado Springs, CO 80903

*Return to
Ariel Rev.
105. W Costilla
C.S. Colorado
578-6564*

**Peterson Field Drainage Basin
Master Plan Update**
City of Colorado Springs, Co.
August 1984



URS

Approved by City Council
December 11, 1984

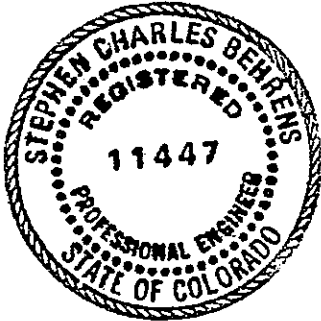
PETERSON FIELD DRAINAGE MASTER PLAN
COLORADO SPRINGS, COLORADO
SEPTEMBER 28, 1984

PREPARED BY:

URS/NES 911 South 8th Street
Colorado Springs, Colorado 80906
(303) 471-0073

C E R T I F I C A T I O N

I, Stephen C. Behrens, a Registered Engineer in the State of Colorado, hereby certify that the attached Drainage Study for the Peterson Field Drainage Basin was prepared under my direction and supervision and is correct to the best of my knowledge and belief. I further certify that said Drainage Study is in accordance with all City of Colorado Springs Ordinances, Specifications, and Criteria.



Stephen C. Behrens
Stephen C. Behrens, P.E.

A P P R O V A L

The City of Colorado Springs City Council and Department of Public Works do hereby approve the contents of the attached Peterson Field Drainage Study. The Study shall be used as a guide for development of all drainage facilities within the study area.

Department of Public Works
(SEE ALSO ATTACHED MINUTES
OF THE CITY OF COLORADO
SPRINGS DRAINAGE BOARD)

(SEE ATTACHED RESOLUTION)
City Council

Haynes
Raider
Hauk

CITY OF COLORADO SPRINGS

December 13, 1984

TO: Bob Gordon
✓ DeWitt Miller
Jim Phillips
Jim Ringe
Larry Schenk
Chief Smith
Chief Stratton
Jim Wilson
Jim Colvin
Bob Parker
Johnnie Rogers
Larry Allison
Sterling Campbell
Ann Altier
Pauline Knopp
Bud Owsley
Dick Zickefoose
Bob Wilder
Jim Alice Scott
Rolf Philipsen
Dave Nickerson

FROM: City Manager

SUBJECT: Council Actions of December 11, 1984

At its regular meeting of December 11, 1984, City Council took the following actions with regard to contracts, agreements, ordinances and other fiscal matters.

PARK AND RECREATION

- 1) Approved a resolution accepting gifts to the Park and Recreation Department and expressing gratitude to the donors for their generous gifts.
- 2) Approved 1985 Budgeted and approved annual Contracts for the Park and Recreation Department sundry services.

RECEIVED
PUBLIC WORKS
COLORADO SPRINGS, COLO

DEC 17 1984

AM 7 8 9 10 11 12 1 2 3 4 5 6 PM

UTILITIES (Cont'd.)

- 10) Tabled until the first meeting in January a request for water and wastewater service to Lots 1 - 6, Block 2 and Lot 23, Park Vista Addition by John R. Manus on behalf of Jon R. Staples.

PUBLIC WORKS

- ✓ 1) Tabled approval of Dry Creek Drainage Basin Master Study and establishment of a new drainage fee for the Dry Creek Drainage Basin equal to \$6,364.00 per acre.
- ✓ 2) Approved Peterson Field Drainage Basin Master Plan Update and establishment of a new drainage fee in the amount of \$3,612.00 per acre for a new bridge fee in the amount of \$209.00 per acre.
- 3) See Park and Recreation No. 4.
- 4) Approved award of contract in the amount of \$2,353,974.00 to Schmidt-Tiago Construction Company for 1985 asphaltic materials, with permission to extend the contract amount to the budgeted amount of \$2,505,000.00.
- 5) See Utilities No. 10.
- 6) Authorized the proper City officials to enter into contracts with MRC and the Health Association of the Pikes Peak Region for transportation of the handicapped for 1985.
- 7) See Attorney No. 1 and 2.
- ✓ 8) Approved expenditure of \$90,000.00 from Projects to be Determined Fund for engineering services for Centennial Boulevard - Fillmore to Fontanero.

POLICE

- 1) Approved Ordinance No. 84-310 on second reading amending the Code of the City of Colorado Springs 1980, as amended, relating to contributions to the Police and Fire Pension Funds.
- 2) Approved request by Silver Key Senior Services of donating the van frequently used by Silver Key as an extension of its contract for services.

CITY OF COLORADO SPRINGS

The "America the Beautiful" City

DEPARTMENT OF PUBLIC WORKS CITY ENGINEERING DIVISION (303) 578-6606
30 S. NEVADA SUITE 403 P.O. BOX 1575
COLORADO SPRINGS, COLORADO 80901

M I N U T E S

COLORADO SPRINGS/EL PASO COUNTY DRAINAGE BOARD

of November 15, 1984

The Colorado Springs/El Paso County Drainage Board met at 2:00 P.M. on Thursday, November 15, 1984 in the City Council Chambers, City Administration Building, 30 S. Nevada Avenue.

Members Present

William Weber, Chairman
Leigh Whitehead
Richard Dailey
George Jury
Mike Mallon

Members Absent

Rick Brown
Fred Gibson

Others Present

DeWitt Miller, Dir Public Works
Gary Haynes, City Engineer
Jack Smith, Asst City Attorney
Chris Smith, Subdivision Admin
Ken Jorgensen
Roger Sams
Laurence Schenk
Others

The meeting was called to order at 2:00 P.M.

Item 1

Approval of the minutes of the October 18, 1984 Board Meeting. (The minutes were previously mailed.) The motion to accept the minutes was made by Mr. Jury. Mr. Whitehead seconded the motion and the motion was passed with a unanimous vote.

Items 2, 3 and 4

Items 2, 3 and 4 were acted upon by the Board with one motion. The items were treated as Consent Items.

A motion was made by Mr. Jury to accept the City Engineer's recommendations on Items 2, 3 and 4 (see Drainage Board Agenda, November 15th). The motion was seconded by Mr. Dailey. The motion passed with a unanimous vote.

Item 5

Request for credits for construction of drainage facilities within the Spring Creek Drainage Basin, Greystone Subdivision, Fountain and Academy Associates, Developer.

After review of the item by the City Engineer, the Board heard a motion by Mr. Whitehead to approve the staff's recommendation (see Drainage Board Agenda, November 15th). Mr. Mallon seconded the motion. The vote was unanimous in favor of the motion.

Item 6

Request for cash reimbursement for construction of drainage facilities within the Cottonwood Creek Drainage Basin, Dublin Business Park Subdivision Filing No. 1, Gibraltar Development Corporation, Developer.

The item was reviewed by the City Engineer. The Board heard a motion by Mr. Dailey to accept the staff's recommendation (see Drainage Board Agenda, November 15th). The motion received a second by Mr. Whitehead. The motion passed with a unanimous vote.

Item 7

Establishment of drainage and bridge fees for the Peterson Field Drainage Basin.

The City Engineer presented the Board with the revised proposed basin fees. The proposed fee included the Basin Fund Balance as of September 1984, as well as the basin deficit per the Board's motion of October 18, 1984 (see Drainage Board Agenda, November 15th).

Mr. Miller stated that it was his opinion that the Board should rescind their previous action of the October 18, 1984 meeting. The Board was in agreement and heard a motion by Mr. Whitehead to rescind the Board action of October 18, 1984. The motion was seconded by Mr. Dailey. The vote was unanimous in favor of the motion.

During discussion of this item, Mr. Jury stated that he was in opposition to the new fee. Mr. Jury expressed concern that the new fee would have a negative impact on the potential for development of the unplatted acreage in the basin.

Mr. Whitehead also expressed Mr. Jury's concern but felt that the new fees established in conjunction with a basin restudy must address fund deficits to make the basin fund balance out at build out.

The Board heard a motion by Mr. Whitehead to approve the staff's recommendation that a drainage fee of \$3,612.00 per acre and a bridge fee of \$209.00 per acre be established for the Peterson Field Basin. The motion was seconded by Mr. Dailey. The vote was 4 - 1 in favor of the motion with Mr. Jury voting in opposition to the motion.

Item 8

Request by City Engineer to revise the cash reimbursement for construction of drainage facilities for Columbine Indust-Rail Center, Miscellaneous Drainage Basin, Columbine Industrail Development, Mr. Kenneth B. Jorgensen, Developer.

Mr. Whitehead excused himself for this item.



AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

URS COMPANY

3955 EAST EXPOSITION AVENUE
DENVER, COLORADO 80209
TEL: (303) 744-1861

ANCHORAGE
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BUFFALO
CLEVELAND
COLOMBIA
COLORADO SPRINGS
DALLAS
DENVER
JEDDAH
KANSAS CITY
LAS VEGAS
MONTVALE

NEW ORLEANS
NEW YORK
PARIS
SALT LAKE CITY
SAN BERNARDINO
SAN FRANCISCO
SAN MATEO
SANTA BARBARA
SANTA FE
SEATTLE
TAMPA
WASHINGTON, D.C.

October 10, 1984

Mr. Gary Haynes, City Engineer
City of Colorado Springs, Colorado
30 South Nevada, Suite 402
P.O. Box 1575
Colorado Springs, Colorado 80901

Re: Peterson Field Drainage Basin
Master Plan Update

Dear Mr. Haynes:

As you are aware, URS has been retained by the Crestone Development Corporation of Colorado Springs to prepare update recommendations to the 1976 Peterson Field Drainage Masterplan to reflect existing and planned changes which have developed over the last several years.

On August 23, 1984 URS met with the Airport Advisory Commission and received the Commission's approval to abandon the 1976 masterplanned storm water detention area proposed immediately east of planned Powers Boulevard. The Commission's approval was granted based on the following information:

- a) The existing two large storm water detention ponds within Peterson Field reduce the future fully developed peak 100-year storm runoff west of Powers Boulevard to a level below that proposed in the 1976 Masterplan.
- b) The masterplanned storm drainage facilities identified in the 1984 update are adequate to convey future fully developed 100-year peak flood flows without having to provide additional storm water detention within Peterson Field proper.
- c) Airport operators are solely responsible for the construction of any and all drainage storm drainage improvements required within Peterson Field proper.

The report includes a basin description, hydrology, hydraulics, design criteria, and a cost estimate for the remaining improvements for the basin. The report utilizes information obtained from previous studies for the Peterson Field drainage basin. A map has been prepared as a Master Drainage Plan showing existing and proposed improvements for the basin.



AN INTERNATIONAL PROFESSIONAL SERVICES ORGANIZATION

Mr. Gary Haynes
October 10, 1984
Page 2

The study has been prepared as a Master Plan guide for coordinated drainage facility construction as development occurs in the study area. The recommended improvements are often general in nature as to size and location. The intent of the preliminary facility design has been to include enough construction costs in the basin fee to insure a fund for reimbursement that will theoretically "zero out" after all facilities are in place. The recommendations included herein should therefore be used as a guide in planning future development in Peterson Field Drainage Basin.

Very truly yours,

URS COMPANY

A handwritten signature in cursive script that reads "Stephen C. Behrens".

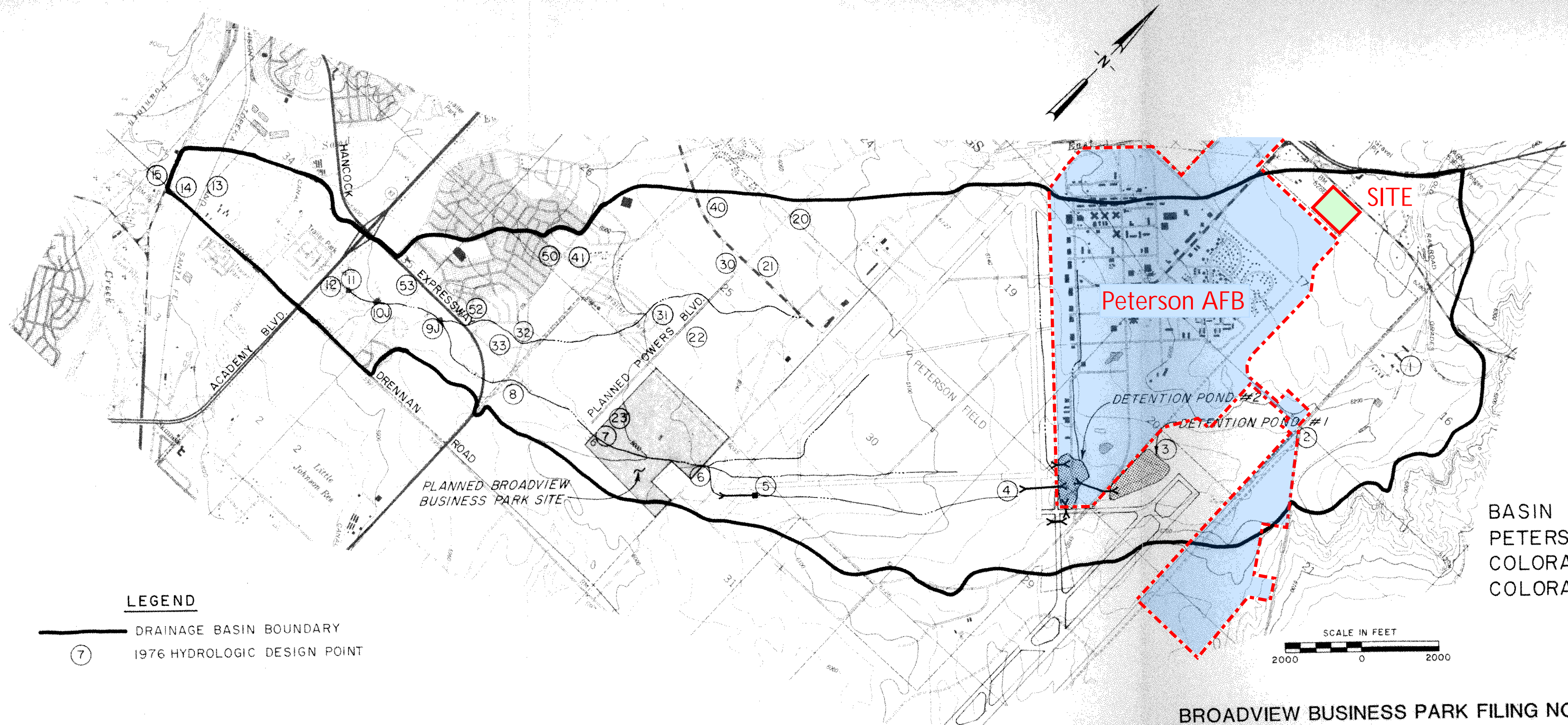
Stephen C. Behrens, P.E.
Vice President

SCB/pk



2. BASIN DESCRIPTION

The Project Study Area encompasses that portion of Peterson Field Drainage Basin located east of planned Powers Boulevard as shown on Figure 1. Features of interest within the Study Area include planned Powers Boulevard, planned Hancock Expressway, Fountain Boulevard, Peterson Field, Colorado Highway 94, and U.S. Highway 24. The central portion of the Study Area is within the City of Colorado Springs, Colorado. The eastern and western portions of the Study Area are within unincorporated El Paso County.

Peterson Field Basin outfalls to Sand Creek which in turn outfalls to Fountain Creek. Sand Creek Basin is a major drainage planning basin located north of the Peterson Field Basin. Chandelle and Windmill Gulch basins are major drainageway planning basins located south of the Peterson Field Basin. Peterson Field Basin encompasses a total of approximately 8.6 square miles above Fountain Creek of which the Project Study Area encompasses a total of approximately 7.2 square miles. Peterson Field proper occupies approximately 3.9 square miles of the Project Study Area. Peterson Field Basin has a total length of approximately nine miles of which approximately six miles are within the Project Study Area. Elevations within



LEGEND

-  DRAINAGE BASIN BOUNDARY
-  1976 HYDROLOGIC DESIGN POINT

BASIN MAP
 PETERSON FIELD BASIN
 COLORADO SPRINGS,
 COLORADO

BROADVIEW BUSINESS PARK FILING NO. 1

Peterson Field Basin are approximately 5750 at Fountain Creek, 5990 at planned Powers Boulevard, and 6440 at the upper end of the Basin.

Basin soil and land use characteristics directly affect the relationship between rainfall and runoff within a basin. The U.S. Soil Conservation Service classifies soils into four hydrologic groups (A, B, C and D) according to a soil's runoff potential. Group A soils exhibit high infiltration rates when thoroughly wetted and are considered to have low runoff potential. Group B soils exhibit moderate infiltration rates when thoroughly wetted. Group C soils exhibit slow infiltration rates when thoroughly wetted. Group D soils exhibit very slow infiltration rates when thoroughly wetted and are considered to have high runoff potential.

Soil types within the Peterson Field Basin are listed in Table 1 and delineated in Figure 2. The Peterson Field Basin encompasses approximately 2.5 square miles of group 'B' hydrologic soils and the remainder are group 'A' soils. Most of the soils in the Peterson Field Basin have a high infiltration rate, are excessively drained, and are easily erodible. Reservoir embankments, dikes and levees constructed of Peterson Field Basin soils may be subject to piping and seepage. Water storage reservoirs constructed in Peterson Field Basin soils may experience

excessive seepage. Group 'A' hydrologic soils in the Peterson Field Basin are expected to have relatively low potential for frost action. Group 'B' hydrologic soils in the Peterson Field Basin are expected to have moderate potential for frost action.

7. MASTER PLAN RECOMMENDATIONS

Elements of the recommended drainage Master Plan are shown on the attached drawing and are listed in Table 4.

Peterson Field storm water detention ponds #1 and #2 have approximately twice the storage capacity of the detention ponds recommended in the 1976 Master Drainage Report. These existing detention ponds result in future fully developed peak flood flow less than or equal to the peak flood flows estimated in the 1976 Basin Master Drainage Report. The existing major drainageway improvements between the basin outfall and the west side of Hancock Expressway are adequate to convey presently anticipated future fully developed design flood flows.

Concrete channels are recommended to provide durable improvements which minimize the area within the basin committed to drainage improvements. These channels were sized based on a maximum allowable average flow velocity of twenty feet per second with freeboard of at least 25 percent of design depth of flow. Drop structures will probably be required in most master planned channels to limit average flow velocities to twenty feet per second. The location and height of these drop structures are to be determined during final design.

Required secondary drainage improvements within Peterson Field proper are presented in the 1973 Peterson Field Drainage Report prepared by R. Keith Hook and Associates. Construction of drainage facilities within Peterson Field proper is the sole responsibility of the Airport.

Drainage facilities should be provided along the west side of Peterson Field to intercept and convey storm runoff to the main stem. These drainage improvements are the sole responsibility of the Airport.

The proposed secondary channel along the east side of planned Powers Boulevard is to be constructed within the 210 foot wide roadway right-of-way.

Storm runoff intercepted by the proposed channel along the east side of planned Powers Boulevard should join the main stem west of planned Powers Boulevard; that is separate crossing should be provided under planned Powers Boulevard for storm runoff intercepted along the east side of Powers Boulevard due to the uncertainties and possible adverse effects of combining high velocity flows of the same order of magnitude of near right angles.

Guardrail is recommended along planned Powers Boulevard and Hancock Expressway in conjunction with the planned major and secondary channels along these roadways.

Maintenance access to all drainage facilities is required. A 12 foot wide maintenance access road is required along all channels unless located adjacent to and parallel to roadways. Planned channels along Hancock Expressway (extended) and planned Powers Boulevard do not require a 12 foot maintenance access road as they can be accessed from the adjacent roadways.

Because all of the concrete lined channels proposed herein are supercritical, planned roadway crossing should be carefully designed to assure that backwater associated with such a constriction does not result in upstream flow depths greater than critical depth which would result in a hydraulic jump.

A storm water detention facility is not required within the planned Broadview Business Park Site because the existing Peterson Field storm water detention ponds #1 and #2 have twice the storage capacity of the master planned storm water detention ponds recommended in the 1976 report. Our analysis indicates that the 100-year future fully developed peak flood flow on the east side of Powers Boulevard (given the existing Peterson Field storm water detention ponds #1 and #2) (2615 cfs) is less than the 1976 master planned 100-year peak flow rate (3590 cfs).

Additional major detention facilities within Peterson Field to reduce the cost of required drainage improvements west of Peterson Field are economically unwarranted (Appendix B for information).

On August 23, 1984, URS met with the Airport Advisory Commission and received the Commission's approval to abandon the 1976 master planned storm water detention area proposed immediately east of planned Powers Boulevard. The Commission's approval was granted based on the following information:

- (a) Existing Peterson Field Detention Ponds #1 and #2 reduce the future fully developed peak 100-year storm runoff west of Powers Boulevard to a level below that proposed in the 1976 Report.
- (b) The storm drainage facilities identified in the drainage Master Plan are adequate to convey future fully developed 100-year peak flood flows without having to provide additional storm water detention within Peterson Field proper.
- (c) Airport operators are solely responsible for the construction of any and all drainage storm drainage improvements required within Peterson Field proper.

No additional major storm water detention facilities are required or recommended within Peterson Field Basin as part of this Basin Master Plan Report.

Presently anticipated reimbursable storm drainage improvements within the planned Broadview Business Park site are shown in Figure 4. Drainage facilities in addition to those specifically identified in this Drainage Master Plan will be required in conjunction with future development of the basin. These additional non-specified drainage facilities will consist of minor drainage facilities such as inlets, manholes, storm sewer conduits and small open channels. Actual costs for these additional drainage facilities cannot be estimated without detailed site specific development plans. A line item cost allowance was however included in the Drainage Master Plan cost estimate for these additional non-specified drainage facilities. The magnitude of this line item cost allowance was estimated based on consideration of projected land use, topography and associated design storm runoff.

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HNTB

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Sheets 1-37 of 37
Gilbert, Meyer and Sams
August 15, 1983



J·R ENGINEERING
A Westrian Company

**PRELIMINARY DRAINAGE REPORT
FOR
FIRST WING DEVELOPMENT**

May 2005
Revised July 2005

Prepared For:

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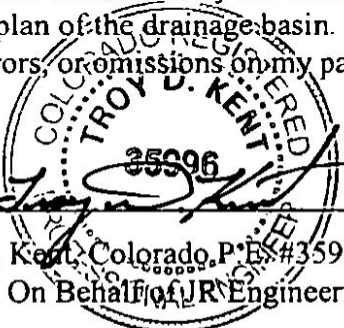
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**PRELIMINARY DRAINAGE REPORT
FOR
FIRST WING DEVELOPMENT
DRAINAGE REPORT STATEMENT**



ENGINEER'S STATEMENT:

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



Troy D. Kent, Colorado, P.E. #35996
For and On Behalf of J-R Engineering

7-29-05
Date

DEVELOPER'S STATEMENT:

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

Business Name: Cowperwood Company

By: 
K. WADE GIDDENS

By: VICE PRESIDENT

Address: 6102 Broadway, Suite B-2

San Antonio, TX 78209

EL PASO COUNTY ONLY:

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



John McCarty
County Engineer

8-11-05
Date

Conditions:

PRELIMINARY DRAINAGE REPORT FOR FIRST WING

DEVELOPMENT

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PRELIMINARY DRAINAGE REPORT FOR FIRST WING DEVELOPMENT

PURPOSE

The purpose of this preliminary drainage report is to identify and estimate existing and proposed drainage patterns, determine storm water runoff quantities resulting from First Wing Development Filings No. 1 and 2, and to recommend proposed drainage facilities within the development. Additionally, this report will show that there will be no impacts from this development downstream.

GENERAL DESCRIPTION

The proposed First Wing Development occupies a 37.0-acre site in El Paso County in the north half of the northwest quarter of Section 17, Township 14 South, Range 65 West of the Sixth Principal Meridian in the County of El Paso. The site is bounded on the northwest by an existing retail development, on the north by Space Village Road, on the west by Peterson Road, and on the east by undeveloped land owned by the city of Colorado Springs. Peterson Air Force Base borders the south side of this site. First Wing Development has been planned in two filings; Filing No. 1 occupies the western-most 14 acres of the site and will be developed in two phases. The first phase will be the 6.9-acre Cowperwood SAIC site that will be developed immediately; the remaining second phase will be developed at some indefinite point in the future. Filing No. 2 occupies the eastern-most 23 acres and will be developed at some indefinite point in the future. (See VICINITY MAP in the Appendix).

EXISTING DRAINAGE CONDITIONS

The First Wing Development site drains into two basins. The western-most 10 acres currently drain towards Sand Creek Basin while the remaining 27 acres drain to Peterson Air Field Basin. Existing drainage flows overland to the southern boundary of the site and onto Peterson Air Force Base. There are no existing drainage facilities on-site. (See EXISTING DRAINAGE MAP in the Appendix).

The portions of this site that drain to Sand Creek Basin were included in the Sand Creek Drainage Basin Planning Study prepared by Kiowa Engineering in 1993 and revised as recently as March 1996. For planning purposes, it was assumed that this area would be developed as industrial property. According to the impervious values used in that model, office uses are less impervious, therefore slightly reducing developed flows from this area that might impact the Sand Creek Basin.

Existing vegetation on the proposed site consists primarily of native grasses. The terrain is sloped generally from north to south and ranges at 2%. Overland flow currently drains to the southern boundary of the site and onto Peterson Air Force Base. The soil types on-site are Blakeland Loamy Sand, with a small amount of Truckton Sandy Loam along the western edge of Filing No. 1, of the S.C.S. Hydrologic Soils Group Classification. Blakeland Loamy Sand is an AASHTO type A-2 soil, as is Truckton Sandy Loam. These soil types indicate a well draining soil with moderate erosion potential. (See the USGS MAP in the Appendix).

Basin OS-1 encompasses the 0.6 acres along the east and south boundaries of hotel site north of Filing No. 1 that drain into our site. Drainage from this area flows overland onto Filing No. 1. Historic flows from this off-site basin are 3 cfs in the 5-year storm and 6 cfs in the 100-year storm. (See the EXISTING BASIN PARAMETERS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix).

Basin OS-2 consists of the 9.8 acres of developments to the north of Filing No. 1 that contribute flows to the Peterson Road right-of-way. Areas which contribute to this include the Space Village mall on the southeast corner of Space Village and Peterson, Value Inn Motel east of Peterson along Space Village the single-family residence just north of the Filing No. 1 entrance from Space Village, and the southern side of Space Village from its high point and south along Peterson Road in front of the Space Village mall. Flows in this basin are carried in the street section west along Space Village and then south along Peterson Road onto Peterson Air Force Base. Existing flows from this off-site basin are 31 cfs in the 5-year storm and 61 cfs in the 100-year storm. These flows will not change with the road realignment. Design of the road improvements in this area will include capacity to carry this existing flow. (See the EXISTING BASIN PARAMETERS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix).

Basin OS-3 encompasses the 0.7 acres of Space Village from the high point north of Filing No. 1 to the ridgeline that divides Filing No. 2. Drainage from this area flows south across the street section onto Filing No. 2. Properties north of Space Village drain to the north side of the road where they are conveyed in roadside ditches away from our site. Historic flows from this off-site basin are 5 cfs in the 5-year storm and 9 cfs in the 100-year storm. (See the EXISTING BASIN PARAMETERS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix).

The 0.8 acres of Space Village from the ridgeline that divides Filing No. 2 to its eastern boundary comprise Basin OS-4. Drainage from this area flows south across the street section onto Filing No. 2. Properties north of Space Village drain to the north side of the road where they are conveyed in roadside ditches away from our site. Historic flows from this off-site basin are 5 cfs in the 5-year storm and 9 cfs in the 100-year storm. (See the EXISTING BASIN PARAMETERS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix).

Basin EX-1 is comprised of the western 10.3 acres of Filing No. 1 and drains to the Sand Creek Drainage Basin. The land in this basin is currently undeveloped. All storm runoff flows overland to the southern boundary of the site and onto Peterson Air Force Base. (See the EXISTING BASIN PARAMETERS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix).

Along the boundary of Filing No. 1, 4.4 acres make up Basin EX-2. This basin drains to the Peterson Drainage Basin, specifically to the low point in the southwest corner of Filing No. 1. The land in this basin is currently undeveloped. All storm runoff flows overland to the low point and onto Peterson Air Force Base. (See the EXISTING BASIN PARAMETERS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix).

Basin EX-3 includes 11.4 acres along the boundary between the filings and the western half of Filing No. 2. This basin drains to the Peterson Drainage Basin. The land in this basin is currently undeveloped. All storm runoff flows overland to southwest corner of Filing No. 2 and onto Peterson Air Force Base. (See the EXISTING BASIN PARAMETERS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix).

The eastern half of Filing No. 2 comprises Basin EX-4 (11.0 acres). This basin drains to the Peterson Drainage Basin. The land in this basin is currently undeveloped. All storm runoff flows overland to the lowpoint along the southern boundary of the site in the middle of the basin and onto Peterson Air Force Base. (See the EXISTING BASIN PARAMETERS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix).

The hydrologic calculations shown in the Appendix for the existing conditions calculate the historic drainage rates of the existing drainage basins. These rates are 6 cfs for the 5-year storm and 16 cfs for the 100-year storm for basin EX-1; basin EX-2 runoff is $Q_5 = 3$ cfs and $Q_{100} = 7$ cfs; historic rates for basin EX-3 are 7 cfs and 18 cfs for the 5 and 100-year storms respectively; and basin EX-4 runoff is $Q_5 = 7$ cfs and $Q_{100} = 18$ cfs.

PROPOSED DRAINAGE CONDITIONS

First Wing Development Filing No. 1 is a 14-acre proposed business development. The 6.9-acre Cowperwood SAIC site will be developed immediately including one 85,000 square foot office building and the road through phase two which provides access to Space Village Drive. Development of phase two will include one 120,000 square foot office building and required parking. There are currently no plans to develop this portion of the site.

Runoff from 3.6-acre Basin A will be directed to the west pond as surface runoff and through gutter pans. These flows will enter the west pond through a curb chase located along the eastern boundary of the pond at Design Point 1 ($Q_5 = 14$ cfs, $Q_{100} = 27$ cfs). Drainage from the pond will flow offsite into the Sand Creek Basin. (See PROPOSED DRAINAGE MAP and PROPOSED HYDROLOGIC CALCULATIONS in Appendix.)

Draining flows from proposed Basin B will collect in an inlet directly south of the phase 1 building (at design point 2) and will flow overland into Pond 1 along the western boundary of the site ($Q_5 = 10$ cfs, $Q_{100} = 19$ cfs). (See PROPOSED DRAINAGE MAP and HYDROLOGIC CALCULATIONS in Appendix.)

Flows from Basin C ($Q_5 = 4$ cfs, $Q_{100} = 8$ cfs) will flow via curb and gutter to the west onto Peterson Road at DP 4.

Basin D is comprised of 6.7 acres along the eastern boundary of the site and will have developed flows of $Q_5 = 27$ cfs, $Q_{100} = 51$ cfs. This area will be developed in the second phase of development.

Developed storm runoff will drain via surface flow to pond 2, the pond in the southeast corner of Filing No. 1.

Two detention ponds will be built in Filing No. 1. Pond 1 will be built in conjunction with Phase 1; Pond 2 will be built with Phase 2. Runoff will be conveyed to the detention ponds via overland flow, channelized flows in gutter pans and swales. (See PROPOSED DRAINAGE MAP in the Appendix.) The detention ponds will restrict flows to historic rates and were sized using Haestad Methods Pond Pack software. (See Detention Pond Design below.)

The remaining 23 acres, which form Filing No. 2, will remain zoned for a heavy industrial district (PHID) including a maximum of 400,000 square feet of industrial space. There are currently no plans to plans to develop this portion of the site. Storm runoff from Filing No. 2 (Basin E) will continue to flow into Peterson Drainage Basin. A detention pond will be built in the southeast corner of the site. Runoff ($Q_5 = 95$ cfs, $Q_{100} = 178$ cfs) will be conveyed to the detention pond (Design Point 8) via overland flows and channelized flows in gutter pans. (See PROPOSED DRAINAGE MAP and HYDROLOGIC CALCULATIONS in Appendix.) This detention pond will restrict flows to historic rates (Design Point 9) and was sized using Haestad Methods Pond Pack software. (See Detention Pond Design below.)

DRAINAGE BASIN TRANSFERS

Existing on-site basins EX-2, EX-3 and EX-4 flow to Peterson Drainage Basin for a total area of 26.8 acres. Only basin EX-1, area of 10.3 acres, currently flows to Sand Creek Drainage Basin. Once development of Filing No. 1 occurs, proposed basins D and E will flow to Peterson Drainage Basin. This will be a total area of 29.5 acres, for an increase of 2.7 acres from the existing tributary area. This 2.7-acre increase in tributary area will not affect the basin downstream because the detention ponds being proposed for basins D and E will restrict flows to

historic rates, regardless of the increase in area. (See PROPOSED and EXISTING DRAINAGE MAPS in the Appendix.)

DETENTION POND DESIGN

The southwest detention pond will receive flows from the proposed Basin A and B. The flows resulting from development on this basin are $Q_5 = 24$ cfs and $Q_{100} = 46$ cfs. The pond was sized using the Haestad Methods Pond Pack software and requires 0.8 acre-ft storage to restrict flows offsite to the historic levels of $Q_5 = 8$ cfs and $Q_{100} = 18$ cfs (DP 5). The actual size of this detention basin is 1.46 acre-ft and the 100-year water surface elevation is 6194.3'. The pond bottom elevation is 6192.0' and the top of the berm is 6195.6'. Water will flow to this detention pond via overland flows. (See PROPOSED DRAINAGE MAP in the Appendix.) The flows from design points 3 and 4 will exit the site at design point 5, combining with flows along the east side of Peterson Road.

In order to keep the developed flows exiting the site at design point 5 at historic rates, without restricting the flows from design point 4, flows exiting the pond at the outlet structure will be restricted to $Q_5 = 2$ cfs and $Q_{100} = 8$ cfs. The outlet structure consists of two parts. The first part is an 18" RCP culvert that conveys low flows (including the 5-year) through the pond wall to an 18" RCP flared end section (FES) to release the water at historic rates to Peterson Road. There is also a concrete standpipe, to be detailed in the construction drawings, which conveys additional flows from larger storms (including the 100-year) into the 18" RCP culvert for outlet through the FES. An emergency spillway is located on the south side of the pond.

The southeast detention pond will collect drainage from proposed Basin D to be developed as part of the second phase. (See the PROPOSED DRAINAGE MAP in the Appendix.) This pond was sized using Haestad Methods Pond Pack software. The necessary capacity is 1.0 acre-ft to store the developed flows of $Q_5 = 27$ cfs and $Q_{100} = 51$ cfs (DP 6). The bottom elevation of the pond will be 6197.00 and the top of berm elevation is 6200.00. The 100-year water surface elevation is 6198.3'. Flows from the pond will outfall through a triangular weir on the south side of the pond. The flow through this weir will be restricted to the historic flows of $Q_5 = 3$ cfs and $Q_{100} = 7$ cfs (DP 7).

The detention pond in Filing No. 2 will collect drainage from proposed Basin E to be developed as part of Filing No. 2. (See the PROPOSED DRAINAGE MAP in the Appendix.) This pond was sized using Haestad Methods Pond Pack software. The necessary capacity is 3.4 acre-ft to store the developed flows of $Q_5 = 95$ cfs and $Q_{100} = 178$ cfs (DP 8). The bottom elevation of the pond will be 6100.00 and the top of berm elevation is 6106.00. The 100-year water surface elevation is 6105.2'. Flows from the pond will outfall through an outfall structure on the south side of the pond. The flow through this structure will be restricted to the historic flows of $Q_5 = 14$ cfs and $Q_{100} = 36$ cfs (DP 10). These flow rates represent a combination of the historic flows at design points 9 and 10. Since there will be no water exiting Filing No. 2 at design point 9, flows equal to the historic flows from Filing No. 2 onto Peterson Air Force Base will be released at design point 10.

Erosion control for flows exiting the First Wing Development and flowing onto Peterson Air Force Base will be addressed in the Final Drainage Report.

DRAINAGE DESIGN CRITERIA

This report has been prepared in accordance with the 1991 County Drainage Criteria Manual, revised October 1994. All proposed and existing basin flows were determined using the Rational Method. (See PROPOSED HYDROLOGIC CALCULATIONS and EXISTING HYDROLOGIC CALCULATIONS in the Appendix). All proposed drainage systems were designed to handle runoff from both the initial design storm (5 year event) and the major design storm (100 year event). All proposed culverts are 18" or greater in diameter, per El Paso County standards. Preliminary detention ponds were sized using Haestad Methods Pond Pack software.

FLOODPLAIN STATEMENT

The First Wing Development site is not within a designated F.E.M.A. Floodplain as determined by the Flood Insurance Rate Map, Community Panel Number 02041 CO754 F, effective date March 17, 1997. (See FLOOD INSURANCE RATE MAP OF EL PASO COUNTY in the Appendix).

EROSION AND SEDIMENT CONTROL

Proposed erosion control measures will be shown on the grading plan for this site to be submitted and approved and with the construction documents for each filing of this development.

MAINTENANCE OF PRELIMINARY DESIGN

All of the proposed on-site storm sewer system is private and will be maintained by the parcel owners. Easements through this area will be written to include use for drainage system and maintenance.

SUMMARY

Drainage runoff will be conveyed through this site by means of overland flow, proposed storm sewers and swales as discussed in this report. Development of the site will increase flows. To accommodate for increased development flows, three private detention ponds will detain developed discharges to below historic levels for the required design storms.

PREPARED BY:

JR Engineering

Angela Howard, E.I.
Project Engineer

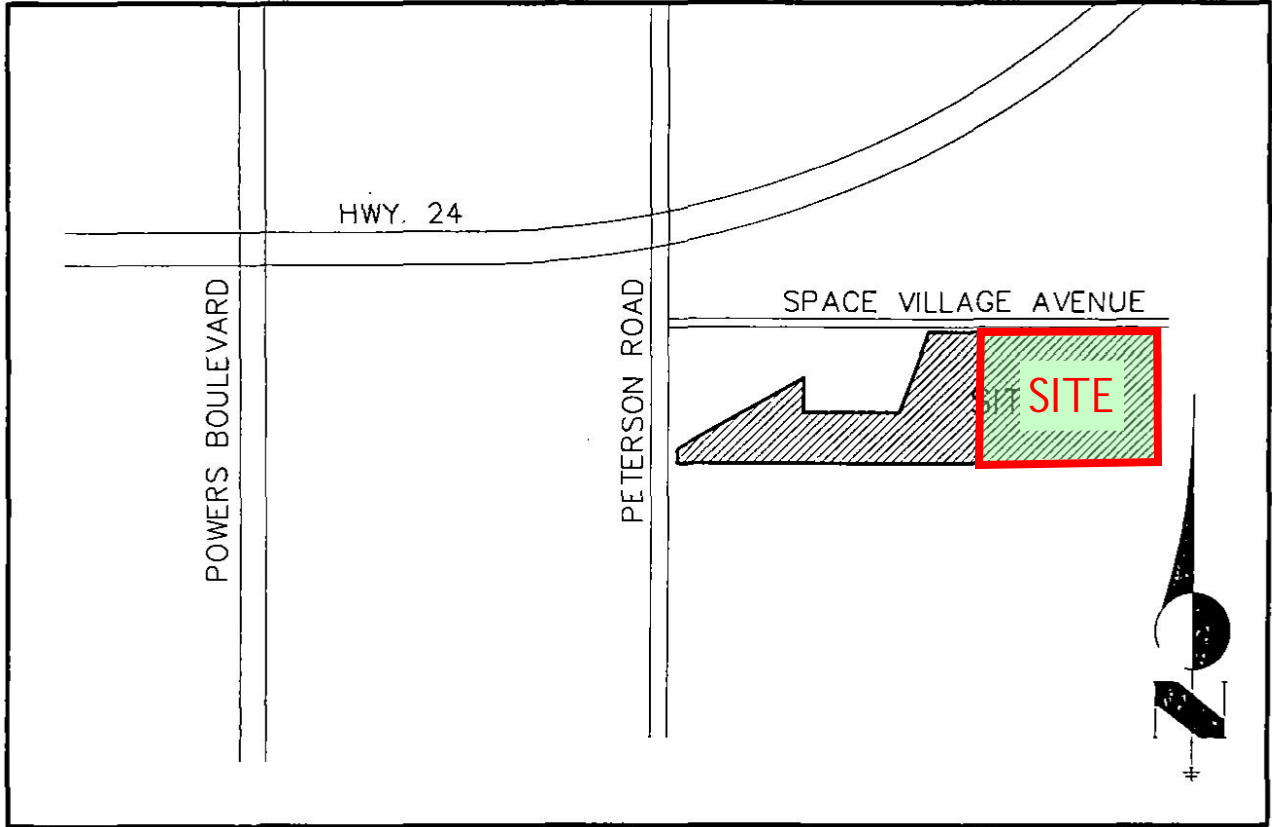
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1. City of Colorado Springs/County of El Paso Drainage Criteria Manual, dated November 1991.
2. FIRM Flood Insurance Rate Map, El Paso County Colorado and Incorporated Areas, Map No. 08041C0754 F, dated March 17, 1997.
3. Sand Creek Drainage Basin Planning Study, Kiowa Engineering, revised March 1996.
4. Peterson Drainage Basin Planning Study.

APPENDIX

VICINITY MAP



VICINITY MAP
N.T.S.

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EXISTING BASIN PARAMETERS

**FIRST WING
PRELIMINARY DRAINAGE REPORT
(Area Runoff Summary)**

| BASIN | TOTAL AREA (Acres) | Historic Weighted | | Historic Weighted | |
|-------|-----------------------|-------------------|--------|-------------------|---------|
| | | C(S) | G(100) | CA(S) | CA(100) |
| EX-1 | 10.3 | 0.25 | 0.35 | 2.57 | 3.60 |
| EX-2 | 4.4 | 0.25 | 0.35 | 1.11 | 1.55 |
| EX-3 | 11.4 | 0.25 | 0.35 | 2.86 | 4.00 |
| EX-4 | 11.0 | 0.25 | 0.35 | 2.76 | 3.86 |
| OS-1 | 0.6 | 0.90 | 0.95 | 0.53 | 0.56 |
| OS-2 | 9.8 | 0.71 | 0.78 | 7.01 | 7.64 |
| OS-3 | 0.7 | 0.90 | 0.95 | 0.67 | 0.71 |
| OS-4 | 0.8 | 0.90 | 0.95 | 0.71 | 0.75 |

PROPOSED BASIN PARAMETERS

FIRST WING PRELIMINARY DRAINAGE REPORT
(Proposed Area Runoff Summary)

| BASIN | TOTAL AREA (Acres) | WEIGHTED C(5) | WEIGHTED C(100) | WEIGHTED CA(5) | WEIGHTED CA(100) | Historic Weighted C(5) | Historic Weighted C(100) | Historic Weighted CA(5) | Historic Weighted CA(100) |
|----------|--------------------|---------------|-----------------|----------------|------------------|------------------------|--------------------------|-------------------------|---------------------------|
| <i>A</i> | 3.6 | 0.77 | 0.83 | 2.79 | 3.00 | 0.25 | 0.35 | 0.90 | 1.26 |
| <i>B</i> | 2.6 | 0.74 | 0.80 | 1.92 | 2.08 | 0.25 | 0.35 | 0.65 | 0.91 |
| <i>C</i> | 1.4 | 0.76 | 0.82 | 1.06 | 1.15 | 0.25 | 0.35 | 0.35 | 0.49 |
| <i>D</i> | 6.7 | 0.78 | 0.84 | 5.25 | 5.65 | 0.25 | 0.35 | 1.68 | 2.35 |
| <i>E</i> | 22.8 | 0.90 | 0.95 | 20.54 | 21.68 | 0.25 | 0.35 | 5.71 | 7.99 |

EXISTING HYDROLOGIC CALCULATIONS

FIRST WING PRELIMINARY DRAINAGE REPORT (Area Drainage Summary)

| BASIN | AREA TOTAL (Acres) | WEIGHTED | | | | OVERLAND | | | STREET / CHANNEL FLOW | | | TOTAL | | INTENSITY | | TOTAL FLOWS | |
|-------|--------------------------|----------|--------|------|--------|----------------|----------------|---------------|-----------------------|--------------|--------------------|---------------|---------------------------------|---------------------------------|-----------------------------------|---------------------------------|-----------------------------------|
| | | C(S) | C(100) | C(S) | C(100) | Length (ft) | Height (ft) | Time (min) | Length (ft) | Slope (%) | Velocity (ft/s) | Time (min) | TOTAL (ft ³ /min) | (C(S)) (ft ³ /hr) | (C(100)) (ft ³ /hr) | (C(S)) (ft ³ /hr) | (C(100)) (ft ³ /hr) |
| EX-1 | 10.3 | 0.25 | 0.35 | 0.25 | 825 | 32 | 29.2 | 0 | 10.0% | 11.1 | 0.0 | 29.2 | 2.5 | 4.4 | 6 | 16 | |
| EX-2 | 4.4 | 0.25 | 0.35 | 0.25 | 765 | 32 | 27.4 | 0 | 12.0% | 12.1 | 0.0 | 27.4 | 2.5 | 4.5 | 3 | 7 | |
| EX-3 | 11.4 | 0.25 | 0.35 | 0.25 | 765 | 32 | 27.4 | | | | | 27.4 | 2.5 | 4.5 | 7 | 18 | |
| EX-4 | 11.0 | 0.25 | 0.35 | 0.25 | 765 | 32 | 27.4 | | | | | 27.4 | 2.5 | 4.5 | 7 | 18 | |
| OS-1 | 0.6 | 0.90 | 0.95 | | | | | 450 | 3.1% | 6.2 | 1.2 | 1.2 | 6.4 | 11.3 | 3 | 6 | |
| OS-2 | 9.8 | 0.71 | 0.78 | | | | | 1750 | 1.1% | 3.7 | 7.9 | 7.9 | 4.5 | 7.9 | 37 | 61 | |
| OS-3 | 0.7 | 0.90 | 0.95 | | | | | 50 | 2.0% | 4.9 | 0.2 | 0.2 | 6.9 | 12.2 | 5 | 9 | |
| OS-4 | 0.8 | 0.90 | 0.95 | | | | | 50 | 2.0% | 4.9 | 0.2 | 0.2 | 6.9 | 12.2 | 5 | 9 | |

PROPOSED HYDROLOGIC CALCULATIONS

FIRST WING PRELIMINARY DRAINAGE REPORT (Area Drainage Summary)

| BASIN | AREA TOTAL (Acres) | WEIGHTED (CFS) | Q (100) | OVERLAND Length (ft) | OVERLAND Height (ft) | OVERLAND Time (min) | STREET / CHANNEL FLOW Length (ft) | Slope (%) | Velocity (ft/s) | TC (min) | TC (min) | TOTAL INTENSITY (1/s) | INTENSITY (100) | TOTAL FLOWS (CFS) | TOTAL FLOWS Q (100) |
|-------------|--------------------|----------------|---------|----------------------|----------------------|---------------------|-----------------------------------|-----------|-----------------|----------|----------|-----------------------|-----------------|-------------------|---------------------|
| A. NW | 3.6 | 0.77 | 0.83 | 575 | 1.6% | 4.4 | 2.2 | 5.0 | 5.1 | 9.1 | 14.3 | 27 | 19 | 14.3 | 27 |
| B. SE | 2.6 | 0.74 | 0.80 | 460 | 1.5% | 4.3 | 1.8 | 5.0 | 5.1 | 9.1 | 10 | 19 | 10 | 19 | |
| C. SOUTH | 1.4 | 0.76 | 0.82 | 300 | 1.0% | 3.5 | 1.4 | 5.0 | 5.1 | 9.1 | 5 | 10 | 5 | 10 | |
| D. PHASE 2 | 6.7 | 0.78 | 0.84 | 300 | 1.0% | 3.5 | 1.4 | 5.0 | 5.1 | 9.1 | 27 | 51 | 27 | 51 | |
| E. FILING 2 | 22.8 | 0.90 | 0.95 | 1500 | 1.0% | 3.5 | 7.1 | 7.1 | 4.6 | 8.2 | 95 | 178 | 95 | 178 | |

EXISTING DESIGN POINTS

FIRST WING PRELIMINARY DRAINAGE REPORT

(Existing Flows at Design Points)

| Historic Flows | | Equivalent CA(5) | Equivalent CA(100) | Maximum Tc | I(5) | I(100) | Q(5) | Q(100) |
|-----------------|---------------------|------------------|--------------------|------------|------|--------|------|--------|
| Design Point(s) | Contributing Basins | | | | | | | |
| 5 | OS-1, EX-1 | 3.10 | 4.15 | 29.19 | 2.5 | 4.4 | 8 | 18 |
| 7 | EX-2 | 1.11 | 1.55 | 27.4 | 2.5 | 4.5 | 3 | 7 |
| 9 | EX-3 | 2.86 | 4.00 | 27.4 | 2.5 | 4.5 | 7 | 18 |
| 10 | EX-4 | 2.76 | 3.86 | 27.4 | 2.5 | 4.5 | 7 | 18 |
| 11 | OS-2 | 7.01 | 7.64 | 7.9 | 4.5 | 7.9 | 31 | 61 |

PROPOSED DESIGN POINTS

FIRST WING PRELIMINARY DRAINAGE REPORT

(Developed Flows at Design Points)

| Developed Flows | | Equivalent CA(5) | Equivalent CA(100) | Maximum Tc | Intensity I(5) | Intensity I(100) | Flow Q(5) | Flow Q(100) |
|-----------------|---------------------------------|------------------|--------------------|------------|----------------|------------------|-----------|-------------|
| 1 | A | 2.79 | 3.00 | 5.00 | 5.1 | 9.1 | 14 | 27 |
| 2 | B | 1.92 | 2.08 | 5.00 | 5.1 | 9.1 | 10 | 19 |
| 3 | Phase 1 Detention Pond | | | | | | 2 | 8 |
| 4 | C | 1.06 | 1.15 | 5.00 | 5.1 | 9.1 | 5 | 10 |
| 5 | Design points 3 & 4 | | | | | | 8 | 18 |
| 6 | D | 5.25 | 5.65 | 5.00 | 5.1 | 9.1 | 27 | 51 |
| 7 | Phase 2 Detention Pond | | | | | | 3 | 7 |
| 8 | E | 20.54 | 21.68 | 7.14 | 4.6 | 8.2 | 95 | 178 |
| 10 | Filing No. 2 Detention Pond | | | | | | 14 | 36 |
| 11 | OS-2: Flows along Peterson Road | 7.01 | 7.64 | 7.95 | 4.5 | 7.9 | 31 | 61 |

**EXISTING AND PROPOSED
ON-SITE DRAINAGE MAPS**

LEGAL DESCRIPTION

A TRACT OF LAND BEING A PORTION OF THE NORTHWEST QUARTER OF SECTION 17, TOWNSHIP 14 SOUTH, RANGE 65 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO, BEING DESCRIBED AS FOLLOWS:

BASIS OF BEARINGS: THE EASTERLY BOUNDARY LINE OF LOT 1, AS PLATTED IN COWPERWOOD SAIC, AS RECORDED UNDER RECEPTION NO. 205122346, RECORDS OF EL PASO COUNTY, COLORADO, BEING MONUMENTED AT THE SOUTHERLY END BY A NO. 5 REBAR WITH A 2-1/2" ALUMINUM SURVEYOR'S CAP STAMPED "JR ENG PLS 31161" AND BEING MONUMENTED AT THE NORTHERLY END BY A NO. 5 REBAR WITH A 2-1/2" ALUMINUM SURVEYOR'S CAP STAMPED "JR ENG PLS 31161", BEING ASSUMED TO BEAR N03°02'00"W, A DISTANCE OF 761.80 FEET.

COMMENCING AT THE NORTHEASTERLY CORNER OF LOT 1 AS PLATTED IN COWPERWOOD SAIC, AS RECORDED UNDER RECEPTION NO. 205122346, RECORDS OF EL PASO COUNTY, COLORADO, SAID POINT BEING ON THE SOUTHERLY RIGHT-OF-WAY LINE OF SPACE VILLAGE AVENUE, SAID POINT ALSO BEING THE POINT OF BEGINNING;

THENCE S89°53'54"E ON SAID SOUTHERLY RIGHT-OF-WAY LINE, A DISTANCE OF 1327.50 FEET TO A POINT ON THE EAST LINE OF THE NORTHWEST QUARTER OF SECTION 17, TOWNSHIP 14 SOUTH, RANGE 65 WEST OF THE SIXTH PRINCIPAL MERIDIAN, EL PASO COUNTY, COLORADO;

THENCE S00°12'31"E ON SAID EAST LINE, A DISTANCE OF 757.08 FEET;

THENCE S89°56'31"W, A DISTANCE OF 1289.94 FEET TO THE SOUTHEASTERLY CORNER OF SAID LOT 1;

THENCE N03°02'00"W ON THE EASTERLY BOUNDARY LINE OF SAID LOT 1, A DISTANCE OF 761.80 FEET TO THE POINT OF BEGINNING.

NOTES CORRESPONDING TO SCHEDULE B-2 ITEMS

9. ANY TAX, LIEN, FEE, OR ASSESSMENT BY REASON OF INCLUSION OF SUBJECT PROPERTY IN THE CIMARRON HILLS FIRE PROTECTION DISTRICT, AS EVIDENCED BY INSTRUMENT RECORDED DECEMBER 13, 1972, UNDER RECEPTION NO. 941974. **(BLANKET IN NATURE).**
10. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN RESOLUTION NO. 79-39, LAND USE-19 REGARDING EXTRACTION OF COMMERCIAL MINERAL DEPOSITS, RECORDED OCTOBER 19, 1979 IN BOOK 3242 AT PAGE 141. **(BLANKET IN NATURE).**
11. TERMS, CONDITIONS, PROVISIONS, BURDENS, OBLIGATIONS AND EASEMENTS AS SET FORTH AND GRANTED IN AGREEMENT AND EASEMENT "AS BUILT" RECORDED NOVEMBER 22, 1994 IN BOOK 6566 AT PAGE 682. **(DOES NOT AFFECT SUBJECT PROPERTY).**
12. RIGHT OF WAY EASEMENT AS GRANTED TO THE UNITED STATES OF AMERICA IN INSTRUMENT RECORDED FEBRUARY 27, 1995, IN BOOK 6609 AT PAGE 61. **(DOES NOT AFFECT SUBJECT PROPERTY).**
13. RIGHT OF WAY EASEMENT AS GRANTED TO THE CHEROKEE METROPOLITAN DISTRICT IN INSTRUMENT RECORDED DECEMBER 07, 1995, IN BOOK 6779 AT PAGE 2. **(PLOTTED HEREON).**
14. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN LEASE DATED OCTOBER 14, 1996 BY AND BETWEEN DONALD KVOLS AND EILEEN KVOLS, AS LANDLORD, AND WESTERN PCS III LICENSE CORPORATION, AS TENANT, AS MEMORIALIZED BY MEMORANDUM OF LEASE RECORDED JANUARY 13, 1997 UNDER RECEPTION NO. 97004020.
A LEASE AND MANAGEMENT AGREEMENT DATED AUGUST 29, 2013 BY AND BETWEEN T-MOBILE WEST TOWER LLC, A DELAWARE LIMITED LIABILITY COMPANY, LESSOR, AND COTMO LLC, A DELAWARE LIMITED LIABILITY COMPANY, LESSEE, AS MEMORIALIZED BY MEMORANDUM OF MASTER PREPAID LEASE AND MANAGEMENT AGREEMENT RECORDED SEPTEMBER 19, 2013 UNDER RECEPTION NO. 213119122. **(BLANKET IN NATURE).**
NOTE: THE PRESENT OWNERSHIP OF THE LEASEHOLD CREATED BY SAID LEASE AND OTHER MATTERS AFFECTING THE INTEREST OF THE LESSEE ARE NOT SHOWN HEREIN.
15. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN COVENANT AND AGREEMENT RECORDED FEBRUARY 26, 1997 UNDER RECEPTION NO. 97021340. **(BLANKET IN NATURE).**
16. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN RESOLUTION NO. 97-78, LAND USE-30 REGARDING USE SUBJECT TO SPECIAL REVIEW, RECORDED APRIL 04, 1997, UNDER RECEPTION NO. 97038656. **(DOES NOT AFFECT SUBJECT PROPERTY).**
17. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN NOTICE OF CHEROKEE METROPOLITAN DISTRICT WATER DISTRIBUTION SYSTEM AND SEWAGE COLLECTION SYSTEM RECOVERY AGREEMENT RECORDED JUNE 19, 2001 UNDER RECEPTION NO. 201084507. **(BLANKET IN NATURE).**
18. RIGHT OF WAY EASEMENT AS GRANTED TO THE CHEROKEE METROPOLITAN DISTRICT IN INSTRUMENT RECORDED JULY 06, 2001, UNDER RECEPTION NO. 201095053. **(PLOTTED HEREON).**
19. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN COMMUNICATIONS SITE LEASE AGREEMENT AS DATED MAY 8, 2003 BY AND BETWEEN K VENTURES, LLLP, A COLORADO LIMITED LIABILITY LIMITED PARTNERSHIP, LANDLORD, AND NEXTEL WEST CORP., A DELAWARE CORPORATION, D/B/A NEXTEL COMMUNICATIONS, TENANT, AS MEMORIALIZED BY MEMORANDUM OF AGREEMENT RECORDED JUNE 09, 2003 AT RECEPTION NO. 203126317.
ASSIGNMENT AND ASSUMPTION OF GROUND LEASE RECORDED OCTOBER 6, 2008 UNDER RECEPTION NO. 208109347. **(DOES NOT AFFECT SUBJECT PROPERTY).**
NOTE: THE PRESENT OWNERSHIP OF THE LEASEHOLD CREATED BY SAID LEASE AND OTHER MATTERS AFFECTING THE INTEREST OF THE LESSEE ARE NOT SHOWN HEREIN.
20. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN RESOLUTION NO. 03-391 REGARDING USE SUBJECT TO SPECIAL REVIEW, RECORDED MARCH 08, 2004, UNDER RECEPTION NO. 204038525. **(BLANKET IN NATURE).**
21. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN LEASE BETWEEN K VENTURES LLLP, A COLORADO LIMITED LIABILITY LIMITED PARTNERSHIP, LESSOR, AND AT&T WIRELESS PCS, LLC, A DELAWARE LIMITED LIABILITY COMPANY, D/B/A AT&T WIRELESS, LESSEE, AS MEMORIALIZED BY MEMORANDUM OF LEASE RECORDED JUNE 30, 2004, UNDER RECEPTION NO. 204108944. **(DOES NOT AFFECT SUBJECT PROPERTY).**
NOTE: THE PRESENT OWNERSHIP OF THE LEASEHOLD CREATED BY SAID LEASE AND OTHER MATTERS AFFECTING THE INTEREST OF THE LESSEE ARE NOT SHOWN HEREIN.
22. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN AND IMPOSED BY ZONING RESOLUTION NO. 05-207 RECORDED JUNE 23, 2005, UNDER RECEPTION NO. 205093750. **(BLANKET IN NATURE).**
23. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN RESOLUTION NO. 05-208 APPROVING PRELIMINARY PLAN FOR FIRST WING DEVELOPMENT, RECORDED JUNE 23, 2005, UNDER RECEPTION NO. 205093751. **(BLANKET IN NATURE).**
24. EASEMENT GRANTED TO THE CITY OF COLORADO SPRINGS ON BEHALF OF ITS ENTERPRISE, COLORADO SPRINGS UTILITIES, FOR UTILITY LINES, APPURTENANCES, AND INCIDENTAL PURPOSES, BY INSTRUMENT RECORDED JANUARY 07, 2013, UNDER RECEPTION NO. 213002461. **(PLOTTED HEREON).**
25. TERMS, CONDITIONS, PROVISIONS, BURDENS AND OBLIGATIONS AS SET FORTH IN ADMINISTRATIVELY APPROVED PERMIT ISSUED TO CONDUCT A DESIGNATED ACTIVITY OF STATE INTEREST OR TO ENGAGE IN DEVELOPMENT IN A DESIGNATED AREA OF STATE INTEREST RECORDED FEBRUARY 19, 2014 UNDER RECEPTION NO. 214013392. **(NOT A PLOTTABLE ITEM).**

VICINITY MAP



GENERAL NOTES

- 1) THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY ALTURA LAND CONSULTANTS, LLC. TO DETERMINE RECORD TITLE, EASEMENTS OR RIGHTS-OF WAY, TITLE COMMITMENT NO. SC55101684, WITH AN EFFECTIVE DATE OF NOVEMBER 16, 2021, PREPARED BY LAND TITLE GUARANTEE COMPANY WAS RELIED UPON FOR ALL INFORMATION REGARDING TITLE OF RECORD, EASEMENTS OF RECORD AND RIGHTS-OF-WAY.
- 2) THE WORD "CERTIFY" AS SHOWN AND USED HEREON MEANS AN EXPRESSION OF PROFESSIONAL OPINION REGARDING THE FACTS OF THIS SURVEY AND DOES NOT CONSTITUTE A GUARANTEE OR WARRANTY, EITHER EXPRESSED OR IMPLIED.
- 3) THIS SURVEY WAS PREPARED FOR THE EXCLUSIVE USE OF THE ENTITIES NAMED IN THE SURVEYOR'S CERTIFICATE HEREON. SAID CERTIFICATE DOES NOT EXTEND TO ANY UNNAMED PERSON OR ENTITY WITHOUT AN EXPRESS WRITTEN RECERTIFICATE BY THE SURVEYOR OF RECORD NAMING SAID PERSON OR ENTITY.
- 4) THIS SURVEY DOES NOT SHOW THE LOCATION OF, OR ENCROACHMENTS BY, SUBSURFACE FOOTINGS AND/OR FOUNDATIONS OF ANY BUILDINGS SHOWN HEREON. IF FLOOD ZONE DATA, ZONING AND SETBACK DATA, OR BUILDING RESTRICTION LINES ARE SHOWN HEREON, IT IS FOR INFORMATIONAL PURPOSES ONLY, HAVING BEEN OBTAINED FROM RELIABLE AND RESPONSIBLE SOURCES NOT CONNECTED WITH ALTURA LAND CONSULTANTS, LLC. NO GUARANTEE OR WARRANTY, EITHER EXPRESSED OR IMPLIED, IS MADE AS TO THE ACCURACY OR THOROUGHNESS OF SUCH INFORMATION.
- 5) BURIED UTILITIES AND/OR PIPELINES SHOWN HEREON ARE PER VISIBLE AND APPARENT SURFACE EVIDENCE, RECORD DRAWINGS OF THE CONSTRUCTED UTILITY LINES OBTAINED FROM RELIABLE AND RESPONSIBLE SOURCES NOT CONNECTED WITH ALTURA LAND CONSULTANTS, LLC. OR MARKINGS PROVIDED BY AN INDEPENDENT LOCATING CONTRACTOR. NO GUARANTEE OR WARRANTY, EITHER EXPRESSED OR IMPLIED, IS MADE AS TO THE ACCURACY OR THOROUGHNESS OF SUCH INFORMATION. IF MORE ACCURATE LOCATIONS OF UNDERGROUND UTILITIES OR PIPE LINES ARE REQUIRED, THE UTILITY OR PIPELINE WILL HAVE TO BE VERIFIED BY FIELD POT-HOLING. ALTURA LAND CONSULTANTS, LLC. AND THE SURVEYOR OF RECORD SHALL NOT BE HELD LIABLE FOR THE LOCATION OF OR THE FAILURE TO NOTE THE LOCATION OF NON-VISIBLE UTILITIES OR PIPELINES.
- 6) FIELD WORK FOR THIS SURVEY WAS PERFORMED ON APRIL 22, 2022.
- 7) THE LINEAL UNITS OF MEASURE SHOWN ON THIS SURVEY ARE BASED UPON THE U.S. SURVEY FOOT.
- 8) ALL STREETS AND/OR ALLEYS SHOWN HEREON ARE DULY DEDICATED AND MAINTAINED PUBLIC ROADWAYS.
- 9) THERE IS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION OR BUILDING ADDITIONS WITHIN THE RECENT MONTHS.
- 10) THERE ARE NO CHANGES IN STREET RIGHT OF WAY LINES EITHER COMPLETED OR PROPOSED, AND AVAILABLE FROM THE CONTROLLING JURISDICTION. THERE IS NO OBSERVATION EVIDENCE OF RECENT STREET OR SIDEWALK CONSTRUCTION OR REPAIRS.

BENCH MARK

NGS BENCH MARK "R 76"

LOCATED 0.2 MILE EAST ALONG HIGHWAY 94 FROM PETERSON ROAD, 22 FEET SOUTH-SOUTHEAST OF THE SOUTHEAST CORNER OF AN ADDITION TO THE BUILDING (SANDY'S RESTAURANT), 48 FEET NORTH OF THE CENTERLINE OF THE HIGHWAY, 3.5 FEET SOUTH OF A POWER POLE AND 3 FEET SOUTH OF A FIBERGLASS WITNESS POST.

ELEVATION = 6289.86 FEET (NAVD 1988)

LAND AREA

SUBJECT PROPERTY CONTAINS: 994,018 SQUARE FEET OR 22.820 ACRES, MORE OR LESS.

ZONING INFORMATION

NO ZONING REPORT OR ZONING LETTER HAS BEEN RECEIVED BY ALTURA LAND CONSULTANTS, LLC AT THE TIME OF SURVEY.

ZONING ORDINANCES IN EFFECT AS OF THE DATE OF THIS SURVEY. ZONING REPORT NOT PROVIDED

SETBACKS:

FRONT:

BACK:

SIDE:

ZONING:

BASIS OF BEARINGS

BEARINGS SHOWN HEREON ARE BASED UPON THE EAST LINE OF LOT 1, COWPERWOOD SAIC, WHICH BEARS N03°02'00"W BETWEEN THE MONUMENTS SHOWN HEREON, PER COWPERWOOD SAIC RECORDED AS RECEPTION NO. 205122346 IN THE RECORDS OF THE EL PASO COUNTY CLERK AND RECORDER'S OFFICE.

SURVEYOR'S STATEMENT

TO: HAMPTON YARDS, LLC, A COLORADO LIMITED LIABILITY COMPANY
FIRST WING DEVELOPMENT, LLP, A COLORADO LIMITED LIABILITY LIMITED PARTNERSHIP
LAND TITLE GUARANTEE COMPANY.

THIS IS TO CERTIFY THAT THIS MAP OR PLAT AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2021 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 1, 2, 3, 4, 5, 6(b), 7(a), 8, 9, 11, 13, 14, 16, 17, 18 AND 19 OF TABLE THEREOF. THE FIELD WORK WAS COMPLETED ON APRIL 22, 2022.

JESUS A. LUGO, PLS 38081
COLORADO LICENSED PROFESSIONAL LAND SURVEYOR
FOR AND ON THE BEHALF OF ALTURA LAND CONSULTANTS, LLC.

NOTE:

ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT, MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.

DEPOSITING CERTIFICATE

DEPOSITED THIS _____ DAY OF _____, 20____, IN
BOOK _____, PAGE _____ OF THE COUNTY SURVEYOR'S LAND SURVEY
PLATS/RIGHT-OF-WAY SURVEYS, RECEPTION NO. _____

PREPARED FOR:

BY: PREPARED BY:

REVISION DESCRIPTION:

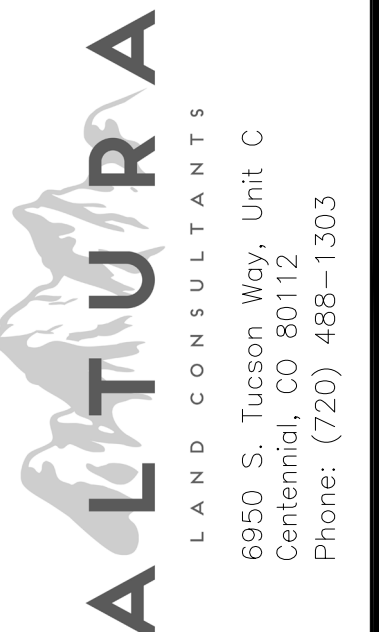
DATE:

NO.

PROJECT INFORMATION:

ALTA/NSPS LAND TITLE SURVEY

SPACE VILLAGE AVE.
A PORTION OF THE NW 1/4 OF SEC. 17
T14S, R65W, OF THE 6TH P.M.
CITY OF COLORADO SPRINGS, COUNTY OF EL PASO



SCALE:

DATE: APRIL 28, 2022

BY: JT

JOB NO. 22032

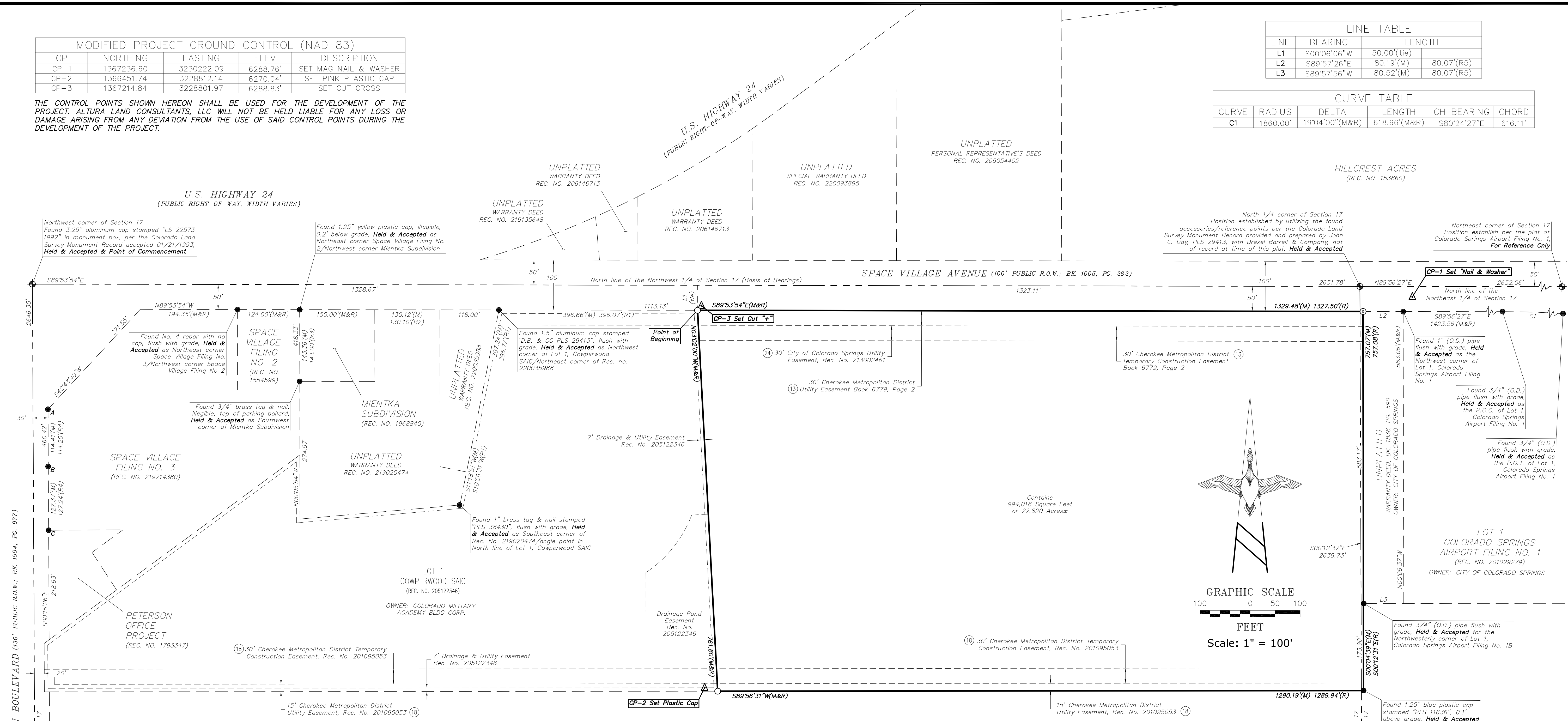
SHEET 1 OF 6

| MODIFIED PROJECT GROUND CONTROL (NAD 83) | | | | |
|--|------------|------------|----------|-----------------------|
| CP | NORTHING | EASTING | ELEV | DESCRIPTION |
| CP-1 | 1367236.60 | 3230222.09 | 6288.76' | SET MAG NAIL & WASHER |
| CP-2 | 1366451.74 | 3228812.14 | 6270.04' | SET PINK PLASTIC CAP |
| CP-3 | 1367214.84 | 3228801.97 | 6288.83' | SET CUT CROSS |

THE CONTROL POINTS SHOWN HEREON SHALL BE USED FOR THE DEVELOPMENT OF THE PROJECT. ALTURA LAND CONSULTANTS, LLC WILL NOT BE HELD LIABLE FOR ANY LOSS OR DAMAGE ARISING FROM ANY DEVIATION FROM THE USE OF SAID CONTROL POINTS DURING THE DEVELOPMENT OF THE PROJECT.

| LINE TABLE | | | |
|------------|-------------|-------------|------------|
| LINE | BEARING | LENGTH | |
| L1 | S00°06'06"W | 50.00'(tie) | |
| L2 | S89°57'26"E | 80.19'(M) | 80.07'(R5) |
| L3 | S89°57'56"W | 80.52'(M) | 80.07'(R5) |

| CURVE TABLE | | | | | |
|-------------|----------|----------------|--------------|-------------|---------|
| CURVE | RADIUS | DELTA | LENGTH | CH BEARING | CHORD |
| C1 | 1860.00' | 19°04'00"(M&R) | 618.96'(M&R) | S80°24'27"E | 616.11' |



SYMBOL & ABBREVIATION LEGEND

| | | | |
|--|--------------------------|--|-----------------------|
| | CONCRETE PAVEMENT | | LIGHT POLE |
| | CONIFEROUS TREE | | NATURAL GROUND |
| | DIAMETER | | PARKING BOLLARD |
| | DECIDUOUS TREE | | POWER POLE |
| | EDGE OF ASPHALT | | RIGHT OF WAY |
| | FINISHED FLOOR | | SEWER MANHOLE |
| | FINISH SURFACE | | SIGN POST |
| | FIRE HYDRANT | | STREET LIGHT STANDARD |
| | FLOW LINE | | TELEPHONE PEDESTAL |
| | GAS METER | | TYPICAL |
| | GAS VALVE | | WATER METER |
| | IRRIGATION CONTROL VALVE | | WATER VALVE |

LINE LEGEND

| | |
|--|----------------------------------|
| | SUBJECT PARCEL BOUNDARY LINES |
| | SECTION LINES |
| | ADJOINING PARCEL BOUNDARY LINES |
| | EASEMENT LINES |
| | RIGHT OF WAY LINES |
| | FLOOD PLANE LINES |
| | BARBED WIRE FENCE |
| | CHAINLINK FENCE |
| | UNDERGROUND ELECTRIC LINES |
| | UNDERGROUND GAS LINES |
| | OVERHEAD ELECTRIC LINES |
| | UNDERGROUND SANITARY SEWER LINES |
| | UNDERGROUND TELEPHONE LINES |
| | UNDERGROUND WATER LINES |

UNDERGROUND UTILITY NOTE

BURIED UTILITIES AND/OR PIPELINES SHOWN HEREON ARE PER VISIBLE AND APPARENT SURFACE EVIDENCE, RECORD DRAWINGS OF THE CONSTRUCTED UTILITY LINES OBTAINED FROM RELIABLE AND RESPONSIBLE SOURCES NOT CONNECTED WITH ALTURA LAND CONSULTANTS, LLC. OR MARKINGS PROVIDED BY AN INDEPENDENT LOCATING CONTRACTOR. NO GUARANTEE OR WARRANTY, EITHER EXPRESSED OR IMPLIED, IS MADE AS TO THE ACCURACY OR THOROUGHNESS OF SUCH INFORMATION. IF MORE ACCURATE LOCATIONS OF UNDERGROUND UTILITIES OR PIPE LINES ARE REQUIRED, THE UTILITY OR PIPELINE WILL HAVE TO BE VERIFIED BY FIELD POT-HOLING. ALTURA LAND CONSULTANTS, LLC AND THE SURVEYOR OF RECORD SHALL NOT BE HELD LIABLE FOR THE LOCATION OF OR THE FAILURE TO NOTE THE LOCATION OF NON-VISIBLE UTILITIES OR PIPELINES.

MONUMENT NOTES

- INDICATES FOUND MONUMENT AS NOTED
- _A INDICATES FOUND 1.25" RED PLASTIC CAP STAMPED "M.V.E. PLS 37928", FLUSH WITH GRADE, HELD & ACCEPTED AS NORTHERLY, WEST CORNER OF SPACE VILLAGE FILING NO. 3.
- _B INDICATES FOUND NO. 4 REBAR WITH NO CAP, FLUSH WITH GRADE, HELD FOR WESTERLY LINE OF SPACE VILLAGE FILING NO. 3.
- _C INDICATES FOUND 1.25" YELLOW PLASTIC CAP STAMPED "M.V.E. PLS 17665", FLUSH WITH GRADE, HELD & ACCEPTED AS SOUTHWEST CORNER OF SPACE VILLAGE FILING NO. 3/NORTHWEST CORNER OF PETERSON OFFICE PROJECT.
- INDICATES SET MONUMENT BEING AN 18" LONG NO. 5 REBAR WITH 1.25" GREEN PLASTIC CAP STAMPED "ALTURA LAND PLS 38081"
- ⊕ INDICATES FOUND SECTION MONUMENT AS NOTED

MISCELLANEOUS NOTES

- (R) INDICATES RECORD INFORMATION PER THE SPECIAL WARRANTY DEED RECORDED MARCH 27, 2008 AT RECEPTION NO. 208034949.
- (R1) INDICATES RECORD INFORMATION PER THE PLAT OF COWPERWOOD SAIC RECORDED AUGUST 9, 2005 AT RECEPTION NO. 205122346.
- (R2) INDICATES RECORD INFORMATION PER THE SPECIAL WARRANTY DEED RECORDED FEBRUARY 27, 2019 AT RECEPTION NO. 219020474.
- (R3) INDICATES RECORD INFORMATION PER THE PLAT OF MIENKA SUBDIVISION RECORDED OCTOBER 4, 1990 AT RECEPTION NO. 1968840.
- (R4) INDICATES RECORD INFORMATION PER THE PLAT OF SPACE VILLAGE FILING NO. 3 RECORDED AUGUST 8, 2019 AT RECEPTION NO. 219714380.
- (R5) INDICATES RECORD INFORMATION PER THE PLAT OF COLORADO SPRINGS AIRPORT FILING NO. 1 RECORDED MARCH 9, 2001 AT RECEPTION NO. 201029279.
- (M) INDICATES MEASURED BEARINGS AND DISTANCES
- (M&R) INDICATES MEASURED AND RECORD BEARINGS AND DISTANCES

PREPARED FOR:

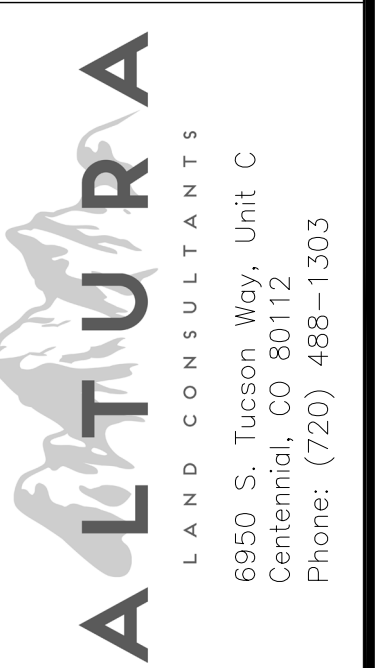
BY: PREPARED BY:

REVISION DESCRIPTION:

DATE:

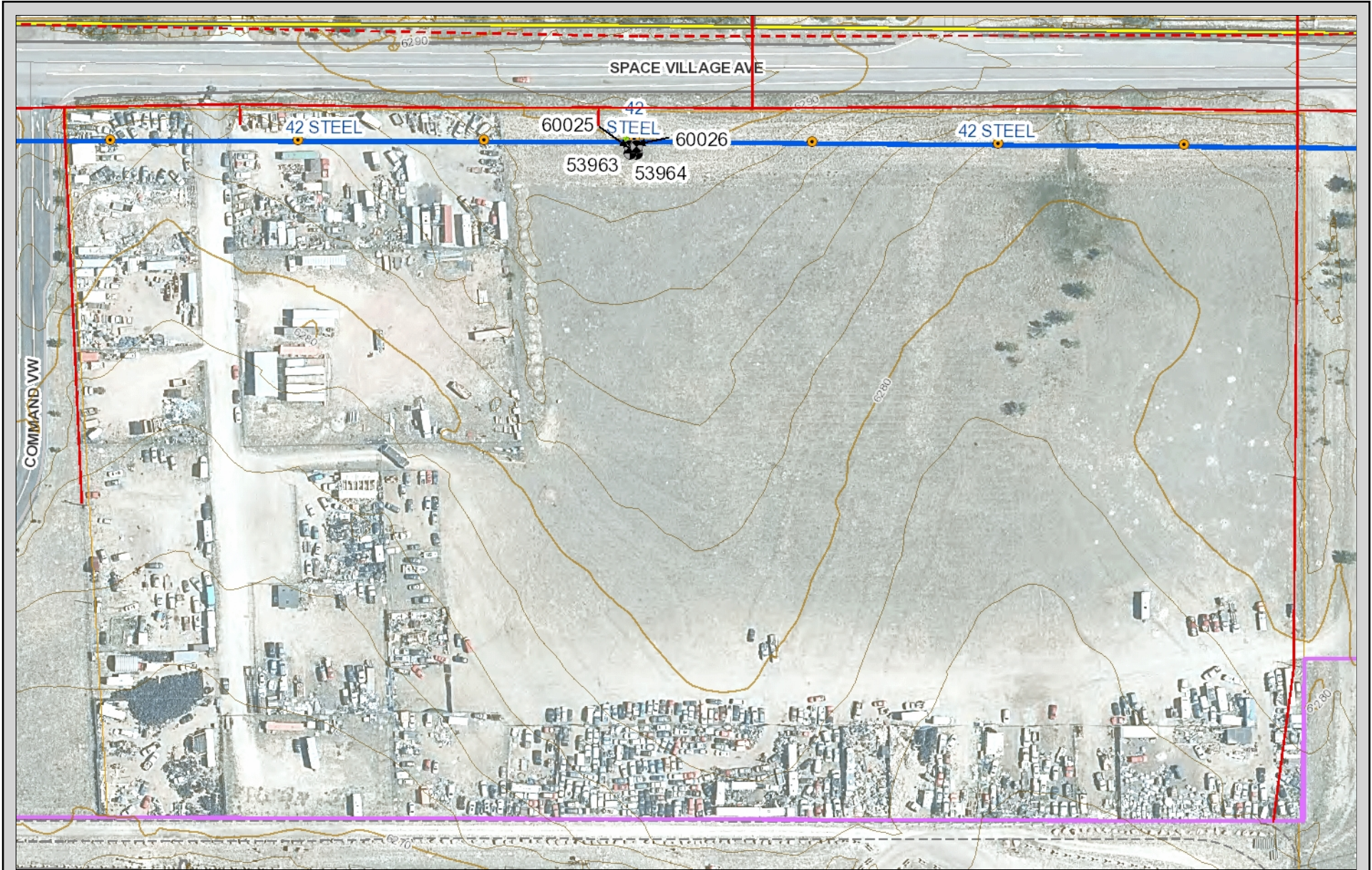
PROJECT INFORMATION:

| | |
|----------|----------------|
| SCALE: | 1" = 100' |
| DATE: | APRIL 28, 2022 |
| BY: | JT |
| JOB NO.: | 22032 |
| SHEET | 2 OF 6 |



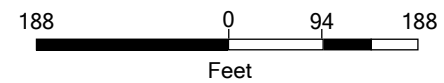
ALTA/NSPS LAND TITLE SURVEY
 SPACE VILLAGE AVE.
 A PORTION OF THE NW 1/4 OF SEC. 17
 T14S, R65W, OF THE 6TH P.M.
 CITY OF COLORADO SPRINGS, COUNTY OF EL PASO

BOUNDARY DETAIL



Colorado Springs Utilities Public Map Viewer

1:2,257



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Map Created: 12/26/2021





APPENDIX D

- Fees & Cost(s)

Engineer's Opinion of Probable Costs
Space Village Filing No. 4

| Item # | Description | Quantity | Unit | Unit Cost | Total Cost |
|--------|---|----------|------|-----------|--------------|
| | Drainage Fees | | | | |
| | Drainage (60% impervious x 22.8 ac) | 14.36 | ac | 15,243.00 | \$218,889.48 |
| | Bridge (60% impervious x 22.8 ac) | 14.36 | ac | 1,156.00 | \$16,600.16 |
| | Total Drainage Fees | | | | \$235,489.64 |
| | Detention & Stormwater Quality Facilities | | | | |
| | Earthwork (East & West Pond(s)) | 11570 | cy | 5.00 | \$57,850.00 |
| | Total | | | | \$57,850.00 |

¹Refer to Weighted Imperviouness calculations for site imperviouness = 63%

²Lot 1 and Lot 2, Block 1, Space Village Filing No. 4 = 22.8 acres

³2022 Drainage and Bridge Fee(s) from El Paso County webiste; El Paso County Drainage Basin Fees (Resolution No. 21-468)

El Paso County Drainage Basin Fees

Resolution No. 21-468

| Basin Number | Receiving Waters | Year Studied | Drainage Basin Name | 2022 Drainage Fee (per Impervious Acre) | 2022 Bridge Fee (per Impervious Acre) |
|---|------------------|--------------|--------------------------------|--|--|
| <u>Drainage Basins with DBPS's:</u> | | | | | |
| CHMS0200 | Chico Creek | 2013 | Haegler Ranch | \$11,891 | \$1,755 |
| CHWS1200 | Chico Creek | 2001 | Bennett Ranch | \$13,312 | \$5,106 |
| CHWS1400 | Chico Creek | 2013 | Falcon | \$34,117 | \$4,687 |
| FOFO2000 | Fountain Creek | 2001 | West Fork Jimmy Camp Creek | \$14,470 | \$4,281 |
| FOFO2600 | Fountain Creek | 1991* | Big Johnson / Crews Gulch | \$21,134 | \$2,729 |
| FOFO2800 | Fountain Creek | 1988* | Widefield | \$21,134 | \$0 |
| FOFO2900 | Fountain Creek | 1988* | Security | \$21,134 | \$0 |
| FOFO3000 | Fountain Creek | 1991* | Windmill Gulch | \$21,134 | \$317 |
| FOFO3100 / FOFO3200 | Fountain Creek | 1988* | Carson Street / Little Johnson | \$12,891 | \$0 |
| FOFO3400 | Fountain Creek | 1984* | Peterson Field | \$15,243 | \$1,156 |
| FOFO3600 | Fountain Creek | 1991* | Fisher's Canyon | \$21,134 | \$0 |
| FOFO4000 | Fountain Creek | 1996 | Sand Creek | \$21,814 | \$8,923 |
| FOFO4200 | Fountain Creek | 1977 | Spring Creek | \$10,961 | \$0 |
| FOFO4600 | Fountain Creek | 1984* | Southwest Area | \$21,134 | \$0 |
| FOFO4800 | Fountain Creek | 1991 | Bear Creek | \$21,134 | \$1,156 |
| FOFO5800 | Fountain Creek | 1964 | Camp Creek | \$2,342 | \$0 |
| FOMO1000 | Monument Creek | 1981 | Douglas Creek | \$13,291 | \$294 |
| FOMO1200 | Monument Creek | 1977 | Templeton Gap | \$13,644 | \$317 |
| FOMO2000 | Monument Creek | 1971 | Pulpit Rock | \$7,008 | \$0 |
| FOMO2200 | Monument Creek | 1994 | Cottonwood Creek / S. Pine | \$21,134 | \$1,156 |
| FOMO2400 | Monument Creek | 1966 | Dry Creek | \$16,684 | \$604 |
| FOMO3600 | Monument Creek | 1989* | Black Squirrel Creek | \$9,595 | \$604 |
| FOMO3700 | Monument Creek | 1987* | Middle Tributary | \$17,636 | \$0 |
| FOMO3800 | Monument Creek | 1987* | Monument Branch | \$21,134 | \$0 |
| FOMO4000 | Monument Creek | 1996 | Smith Creek | \$8,616 | \$1,156 |
| FOMO4200 | Monument Creek | 1989* | Black Forest | \$21,134 | \$575 |
| FOMO5200 | Monument Creek | 1993* | Dirty Woman Creek | \$21,134 | \$1,156 |
| FOMO5300 | Fountain Creek | 1993* | Crystal Creek | \$21,134 | \$1,156 |
| <u>Miscellaneous Drainage Basins: ¹</u> | | | | | |
| CHBS0800 | Chico Creek | | Book Ranch | \$19,830 | \$2,871 |
| CHEC0400 | Chico Creek | | Upper East Chico | \$10,803 | \$313 |
| CHWS0200 | Chico Creek | | Telephone Exchange | \$11,870 | \$278 |
| CHWS0400 | Chico Creek | | Livestock Company | \$19,552 | \$233 |
| CHWS0600 | Chico Creek | | West Squirrel | \$10,192 | \$4,229 |
| CHWS0800 | Chico Creek | | Solberg Ranch | \$21,134 | \$0 |
| FOFO1200 | Fountain Creek | | Crooked Canyon | \$6,381 | \$0 |
| FOFO1400 | Fountain Creek | | Calhan Reservoir | \$5,327 | \$310 |
| FOFO1600 | Fountain Creek | | Sand Canyon | \$3,849 | \$0 |
| FOFO2000 | Fountain Creek | | Jimmy Camp Creek ³ | \$21,134 | \$989 |
| FOFO2200 | Fountain Creek | | Fort Carson | \$16,684 | \$604 |
| FOFO2700 | Fountain Creek | | West Little Johnson | \$1,392 | \$0 |
| FOFO3800 | Fountain Creek | | Stratton | \$10,137 | \$453 |
| FOFO5000 | Fountain Creek | | Midland | \$16,684 | \$604 |
| FOFO6000 | Fountain Creek | | Palmer Trail | \$16,684 | \$604 |
| FOFO6800 | Fountain Creek | | Black Canyon | \$16,684 | \$604 |
| FOMO4600 | Monument Creek | | Beaver Creek | \$12,635 | \$0 |
| FOMO3000 | Monument Creek | | Kettle Creek | \$11,413 | \$0 |
| FOMO3400 | Monument Creek | | Elkhorn | \$1,917 | \$0 |
| FOMO5000 | Monument Creek | | Monument Rock | \$9,160 | \$0 |
| FOMO5400 | Monument Creek | | Palmer Lake | \$14,647 | \$0 |
| FOMO5600 | Monument Creek | | Raspberry Mountain | \$4,927 | \$0 |
| PLPL0200 | Monument Creek | | Bald Mountain | \$10,500 | \$0 |
| <u>Interim Drainage Basins: ²</u> | | | | | |
| FOFO1800 | Fountain Creek | | Little Fountain Creek | \$2,702 | \$0 |
| FOMO4400 | Monument Creek | | Jackson Creek | \$8,365 | \$0 |
| FOMO4800 | Monument Creek | | Teachout Creek | \$5,809 | \$873 |

1. The miscellaneous drainage fee previous to September 1999 resolution was the average of all drainage fees for basins with Basin Planning Studies performed within the last 14 years.

2. Interim Drainage Fees are based upon draft Drainage Basin Planning Studies or the Drainage Basin Identification and Fee Estimation Report. (Best available information suitable for setting a fee.)

3. This is an interim fee and will be adjusted when a DBPS is completed. In addition to the Drainage Fee a surety in the amount of \$7,285 per impervious acre shall be provided to secure payment of additional fees in the event that the DBPS results in a fee greater than the current fee. Fees paid in excess of the future revised fee will be reimbursed. See Resolution 06-326 (9/14/06) and Resolution 16-320 (9/07/16).

APPENDIX E

- Drainage Plans

NOTE

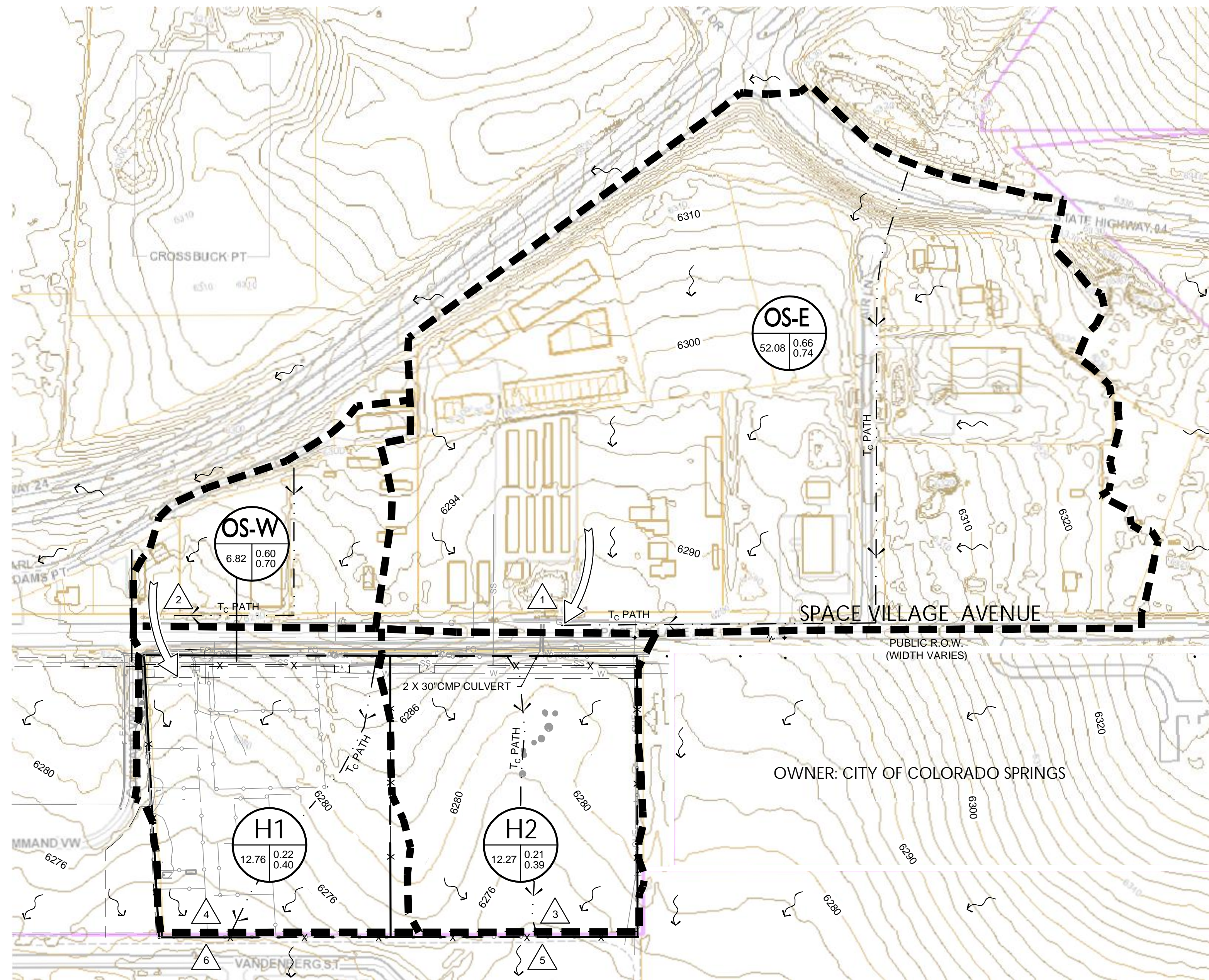
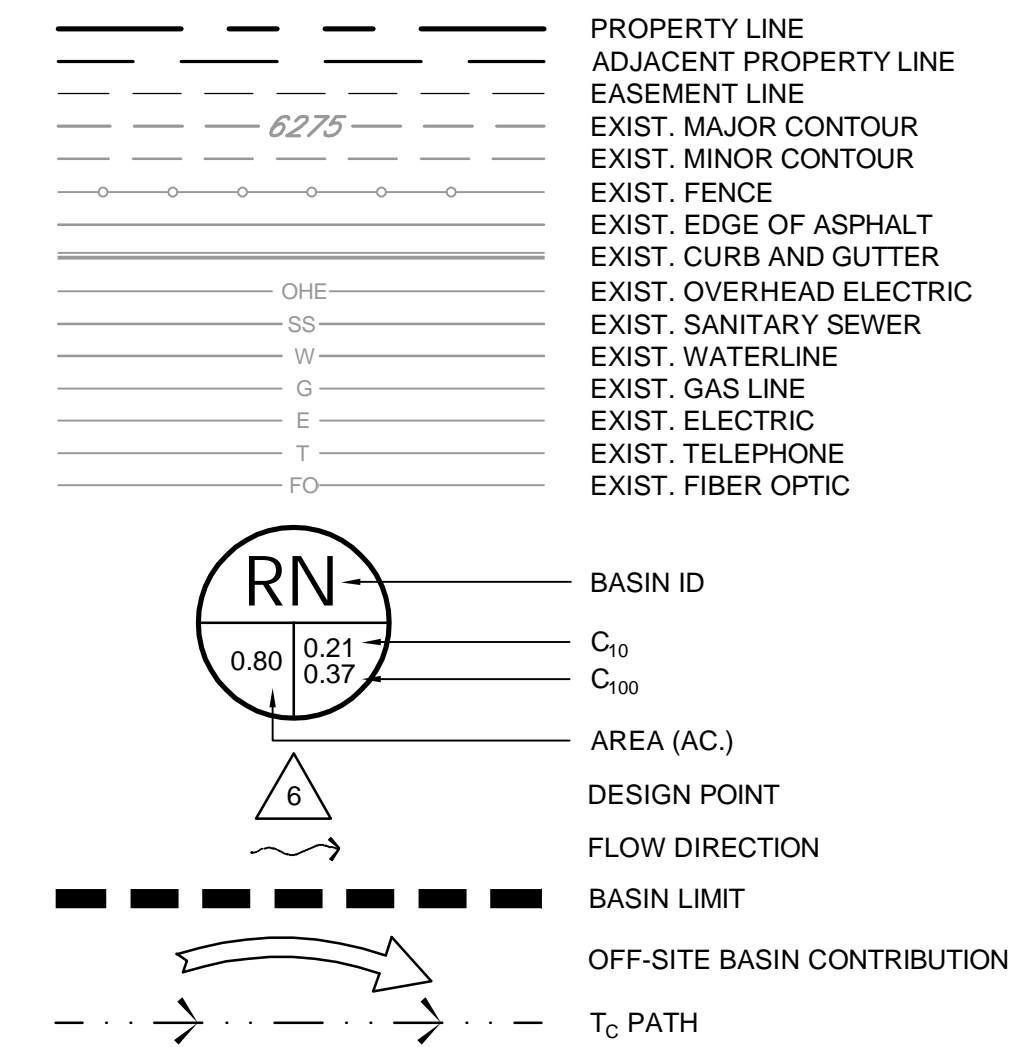
COUNTY PLAN REVIEW IS PROVIDED ONLY FOR GENERAL CONFORMANCE WITH COUNTY DESIGN CRITERIA. THE COUNTY IS NOT RESPONSIBLE FOR THE ACCURACY AND ADEQUACY OF THE DESIGN, DIMENSIONS, AND/OR ELEVATIONS WHICH SHALL BE CONFIRMED AT THE JOB SITE. THE COUNTY, THROUGH THE APPROVAL OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY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

SPACE VILLAGE FILING NO. 4
 A PORTION OF THE NW 1/4 OF SEC. 17, T14S,
 R65W, OF THE 6th P.M., EL PASO COUNTY, COLORADO
 FINAL DRAINAGE PLAN

SUMMARY RUNOFF TABLE

| DESIGN POINT | BASIN | AREA (AC) | IMP. (%) | C ₁₀ | C ₁₀₀ | Q ₁₀ (CFS) | Q ₁₀₀ (CFS) | REMARKS |
|--------------|-------|-----------|----------|-----------------|------------------|-----------------------|------------------------|------------|
| 1 | OS-E | 52.08 | 76 | 0.66 | 0.74 | 89.48 | 146.46 | TO H2 |
| 2 | OS-W | 6.82 | 65 | 0.60 | 0.70 | 16.87 | 27.77 | TO H1 |
| 3 | H2 | 12.27 | 8 | 0.21 | 0.39 | 7.31 | 19.34 | TO DP 5 |
| 4 | H1 | 12.76 | 9 | 0.22 | 0.40 | 7.97 | 20.54 | TO DP 6 |
| 5 | | | | | | 96.79 | 165.81 | TO OFFSITE |
| 6 | | | | | | 24.85 | 48.32 | TO OFFSITE |

LEGEND



LOT 1, COWPERWOOD SAIC
 EL PASO COUNTY
 OWNER: COLORADO MILITARY
 ACADEMY BUILDING CORPORATION

OWNER: CITY OF COLORADO SPRINGS

PETERSON AFB
 OWNER: UNITED STATES OF AMERICA

STERLING DESIGN ASSOCIATES, LLC

ISSUES & REVISIONS

| NO. | DATE | DESCRIPTION | BY |
|-------|---------|----------------|-------|
| NO: 1 | DATE: - | DESCRIPTION: - | BY: - |
| NO: 2 | DATE: - | DESCRIPTION: - | BY: - |
| NO: 3 | DATE: - | DESCRIPTION: - | BY: - |
| NO: 4 | DATE: - | DESCRIPTION: - | BY: - |
| NO: 5 | DATE: - | DESCRIPTION: - | BY: - |
| NO: 6 | DATE: - | DESCRIPTION: - | BY: - |

DATE: 10/2022 SCALE: 1" = 200'-0"

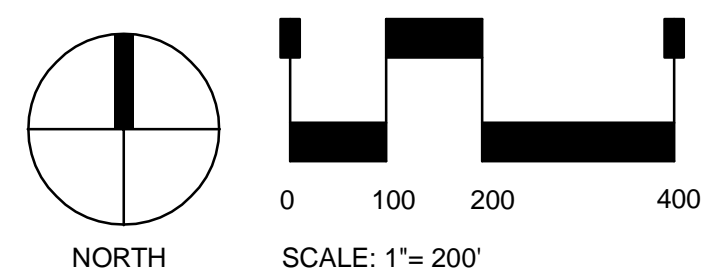
PROJECT MANAGER: JS PROJECT NO:

DRAWN BY: JN DRAWING FILE:

PROJECT:

FLOODPLAIN

ZONE X, "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN," AS SHOWN ON FEMA FIRM MAP NO. 08041C0754G, EFFECTIVE DATE, DECEMBER 7, 2018.



SPACE VILLAGE FILING NO. 4
 EL PASO COUNTY, CO

CLIENT:
 COMMERCIAL BUILDING SERVICES
 7561 S. GRANT STR., SUITE A-4
 LITTLETON, COLORADO 80122

TEL: (303) 730-3001

SHEET TITLE:
FINAL DRAINAGE PLAN
(EXISTING)

SHEET NUMBER:

SPACE VILLAGE FILING NO. 4

A PORTION OF THE NW 1/4 OF SEC. 17, T14S, R65W, OF THE 6th P.M., EL PASO COUNTY, COLORADO

FINAL DRAINAGE PLAN

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

SUMMARY RUNOFF TABLE

| DESIGN POINT | BASIN | AREA (AC) | IMP. (%) | C ₁₀ | C ₁₀₀ | Q ₁₀ (CFS) | Q ₁₀₀ (CFS) | REMARKS |
|--------------|-------|-----------|----------|-----------------|------------------|-----------------------|------------------------|------------|
| 1 | OS-E | 52.08 | 76 | 0.66 | 0.74 | 89.48 | 146.46 | TO POND |
| 2 | OS-W | 6.82 | 65 | 0.60 | 0.70 | 16.87 | 27.77 | TO POND |
| 3 | B | 12.27 | 59 | 0.51 | 0.62 | 23.87 | 40.88 | TO POND |
| 4 | A | 12.76 | 67 | 0.56 | 0.66 | 25.93 | 43.52 | TO POND |
| 5 | | | | | | 89.48 | 146.46 | TO OFFSITE |
| 6 | | | | | | 16.87 | 27.77 | TO OFFSITE |

LEGEND

| | |
|--|------------------------|
| | PROPERTY LINE |
| | ADJACENT PROP. LINE |
| | EASEMENT LINE |
| | EXIST. MAJOR CONTOUR |
| | EXIST. MINOR CONTOUR |
| | PROP. CONTOUR |
| | EXIST. FENCE |
| | EXIST. EDGE OF ASPHALT |
| | EXIST. CURB & GUTTER |
| | EXIST. OVERHEAD ELEC. |
| | EXIST. SAN. SEWER |
| | EXIST. WATERLINE |
| | EXIST. GAS LINE |
| | EXIST. ELECTRIC |
| | EXIST. TELEPHONE |
| | EXIST. FIBER OPTIC |
| | PROP. CONCRETE |

| | |
|--|-----------------------------|
| | BASIN ID |
| | C ₁₀ |
| | C ₁₀₀ |
| | AREA (AC.) |
| | DESIGN POINT |
| | FLOW DIRECTION |
| | BASIN LIMIT |
| | OFF-SITE BASIN CONTRIBUTION |
| | T _c PATH |

PBMP SUMMARY TABLE

| BASIN | PBMP TRIBUTARY AREA (AC) | PBMP |
|-------|--------------------------|-----------|
| OS-E | 52.08 | N/A |
| OS-W | 6.82 | N/A |
| B | 12.27 | EAST POND |
| A | 12.76 | WEST POND |

*OFFSITE BASIN. TREATMENT OF RUNOFF IS NOT REQUIRED. RUNOFF TRIBUTARY TO POND ONLY AS MEANS TO BYPASS SITE AND DISCHARGE IN HISTORIC MANNER.



STERLING DESIGN ASSOCIATES, LLC

| | | |
|--------------------|-------------|-----|
| ISSUES & REVISIONS | NO. 1 DATE: | BY: |
| DESCRIPTION: | | |
| NO. 2 DATE: | | BY: |
| DESCRIPTION: | | |
| NO. 3 DATE: | | BY: |
| DESCRIPTION: | | |
| NO. 4 DATE: | | BY: |
| DESCRIPTION: | | |
| NO. 5 DATE: | | BY: |
| DESCRIPTION: | | |
| NO. 6 DATE: | | BY: |
| DESCRIPTION: | | |

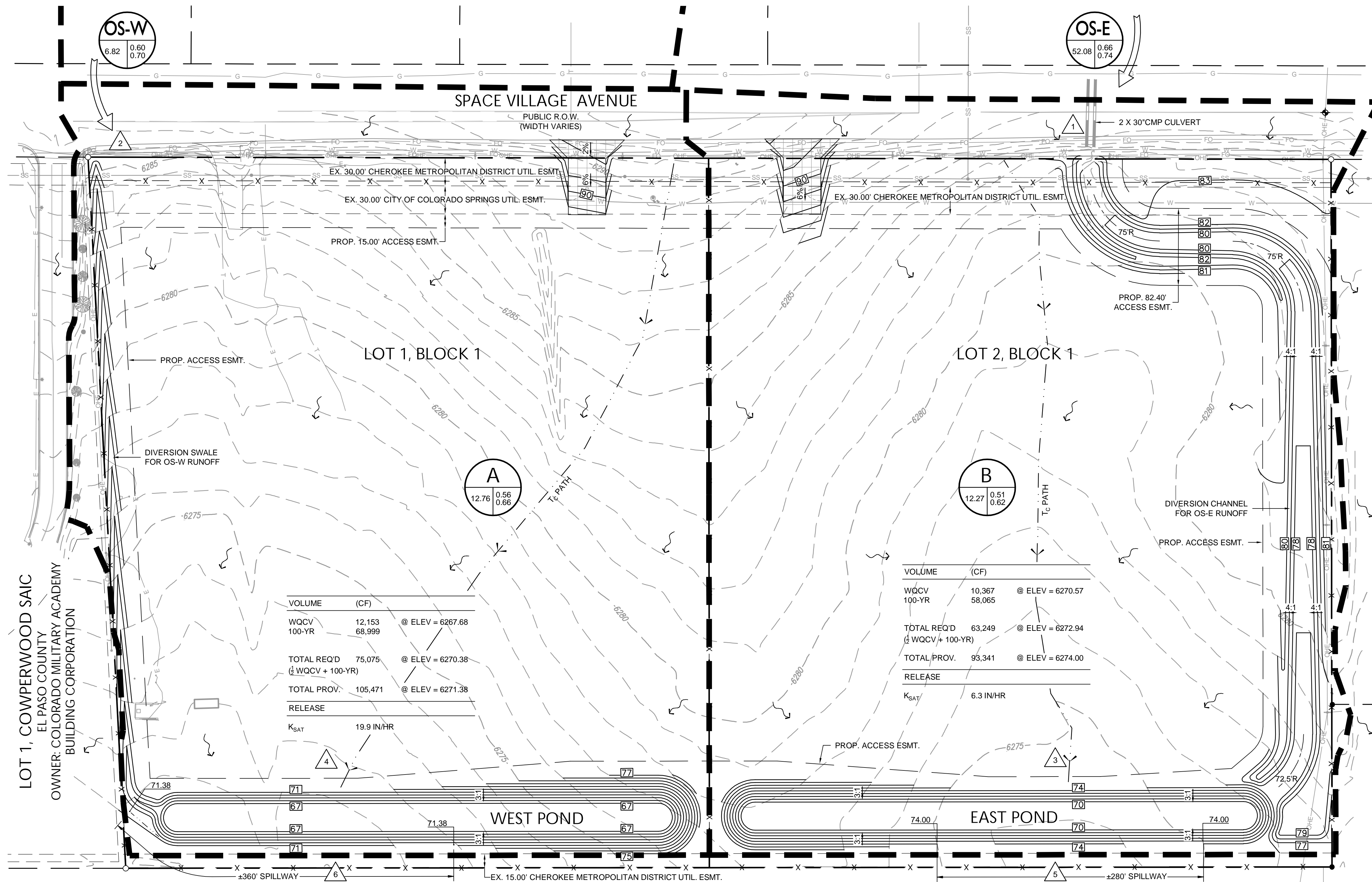
SPACE VILLAGE FILING NO. 4
 EL PASO COUNTY, CO

CLIENT:
 COMMERCIAL BUILDING SERVICES
 7561 S. GRANT STR., SUITE A-4
 LITTLETON, COLORADO 80122

TEL: (303) 730-3001

SHEET TITLE:
FINAL DRAINAGE PLAN (PROPOSED)

SHEET NUMBER:
2 OF 2



VOLUME (CF)

| | | |
|---------------------|------------|------------------|
| WQCV | 12,153 | @ ELEV = 6267.68 |
| 100-YR | 68,999 | |
| TOTAL REQ'D | 75,075 | @ ELEV = 6270.38 |
| (1/2 WQCV + 100-YR) | | |
| TOTAL PROV. | 105,471 | @ ELEV = 6271.38 |
| RELEASE | | |
| K _{SAT} | 19.9 IN/HR | |

VOLUME (CF)

| | | |
|---------------------|-----------|------------------|
| WQCV | 10,367 | @ ELEV = 6270.57 |
| 100-YR | 58,065 | |
| TOTAL REQ'D | 63,249 | @ ELEV = 6272.94 |
| (1/2 WQCV + 100-YR) | | |
| TOTAL PROV. | 93,341 | @ ELEV = 6274.00 |
| RELEASE | | |
| K _{SAT} | 6.3 IN/HR | |

FLOODPLAIN

ZONE X, "AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN," AS SHOWN ON FEMA FIRM MAP NO. 08041C0754G, EFFECTIVE DATE, DECEMBER 7, 2018.

