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SOIL AND GEOLOGY STUDY

Meadow Lake Industrial
Section 9, Township 15 South, Range 65 West
El Paso County, Colorado

PREPARED FOR:

Meadowlake Developments LLC
455 E Pikes Peak Ave, Ste 101
Colordado Springs, CO 80903

JOB NO. 192628

July 13, 2023
Revised July 24, 2023

Respectfully Submitted,
RMG – Rocky Mountain Group

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Reviewed by,
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1.0 GENERAL SITE AND PROJECT DESCRIPTION

1.1 Project Location

The project lies in the west half of Section 09, Township 15 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is generally located north and west of the intersection of Falcon Highway and Curtis Road. The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

1.2 Existing and Proposed Land Use

The site currently consists of four parcels (per the El Paso County Assessor's website) for a combined 344.78 acres:

- **North:** Schedule No. 4300000553, currently labeled as N Curtis Rd, zoned I-3 and I-2, consists of approximately 54.51 acres and land use is classified as agricultural grazing land.
- **Central:** Schedule No. 4300000552, currently labeled as N Curtis Rd, zoned I-3 and I-2, consists of approximately 108.0 acres and land use is classified as agricultural grazing land.
- **South:** Schedule No. 4300000551, currently labeled as Falcon Highway, zoned CS, I-3, and I-2, consists of approximately 45.29 acres, and land use is classified as agricultural grazing land;
- **Southwest:** Schedule No. 4300000548, currently labeled as Falcon Highway, zoned CS and I-2, consists of approximately 136.98 acres and land use is classified as agricultural grazing land.

Note, all four parcels are included in this study. The currently proposed development only includes the eastern portion of the north, central and south parcels. The southwest parcel and the western portions of the other three parcels are to remain undeveloped at this time. If development is proposed in the future, additional investigations may be required. An unnamed drainageway transverses the site from the north to the south. The 29 subdivided lots are to be included in the preliminary plan/final plat for Meadow Lake Industrial Filing No. 1. The remaining portion of the property is to be excluded from the preliminary plan/final plan at this time. The 29 subdivided lots to be developed at this time are herein referred to the Preliminary Plan Area.

The site is currently undeveloped. An unnamed drainageway transverses the site from the north to the south.

1.3 Project Description

It is our understanding that the parcels listed above are to be combined into one and then subdivided into approximately 30 lots. The area that is currently proposed for development is to include 29 industrial lots/tracts ranging from 0.5 to 3.82 acres. Two of the lots within the 29 industrial lots are to be utilized as detention pond tracts and two additional lots (or portions of) are to be utilized as On-site Wastewater Treatment Systems (OWTS) tracts. The remaining portions

of the site are to be combined into a single larger lot. This larger lot includes the unnamed drainageway, and is to remain undeveloped at this time.

It is anticipated the 29 lots are to be accessed from the west, from a new road extending north from Falcon Highway. Additionally, interior cul-de-sacs are proposed for access to the interior lots, which will also provide fire access. Currently the lots are to utilize a shared well and two shared OWTS's. One OWTS is to service the northern portion of the site and a second OWTS is to utilize the southern portion of the site. Each OWTS is to service multiple lots. At a future date, the OWTS are to be replaced with a centralized wastewater system. Once the centralized waste system is installed, the original OWTS locations are to be properly disposed of or abandoned and designated as a no build area. The Proposed Site Plan is presented in Figure 2.

1.4 Previous Investigations

Reports of previous geotechnical engineering/geologic investigations for this site were not available for our review. However, one geologic investigation for a nearby site was reviewed and is listed below:

1. *Soil, Geology, & Geologic Hazard Study, Saddlehorn Ranch – Filing No. 2, Curtis Road & Judge Orr Road, El Paso County, Colorado*, Entech Job No. 213148, dated February 9, 2022.

2.0 QUALIFICATIONS OF PREPARERS

This Soil and Geology Study was prepared by a professional geologist as defined by Colorado Revised Statures section 34-1-201(3) and by a qualified geotechnical engineer as defined by policy statement 15, "Engineering in Designated Natural Hazards Areas" of the Colorado State Board of Registration for Professional Engineers and Professional Land Surveyors. (Ord. 96-74; Ord. 01-42)

The principle investigators for this study are Kelli Zigler P.G., and Tony Munger, P.E. Ms. Zigler is a Professional Geologist as defined by State Statute (C.R.S 34-1-201) with over 22 years of experience in the geological and geotechnical engineering field. Ms. Kelli Zigler holds a B.S. in Geology from the University of Tulsa. Ms. Zigler has supervised and performed numerous geological and geotechnical field investigations throughout Colorado.

Tony Munger, P.E. is a licensed professional engineer with over 22 years of experience in the construction engineering (residential) field. Mr. Munger holds a B.S. in Architectural Engineering from the University of Wyoming

3.0 STUDY OVERVIEW

The purpose of this investigation is to characterize the general geotechnical, geologic site conditions and present our opinions of the potential effect of these conditions on the proposed development within the Town of Peyton, El Paso County, Colorado. As such, our services exclude

evaluation of the environmental and/or human, health related work products or recommendations previously prepared, by others, for this project.

Revisions to the conclusions presented in this report may be issued based upon submission of the Development Plan. This study has been prepared in accordance with the requirements outlined in the El Paso County Land Development Code (LDC) specifically Chapter 8, last updated August 27, 2019. Applicable sections include 8.4.8 and 8.4.9, and the El Paso County Engineering Criteria Manual (ECM), specifically Appendix C last updated July 9, 2019.

3.1 Scope and Objective

The scope of this study is to include a physical reconnaissance of the site and a review of pertinent, publically available documents including, but not limited to, previous geologic and geotechnical reports, overhead and remote sensing imagery, published geology and/or hazard maps, design documents, etc.

The objectives of our study are to:

- Identify geologic conditions present on the site
- Analyze potential negative impacts of these conditions on the proposed site development
- Analyze potential negative impacts to surrounding properties and/or public services resulting from the proposed site development as it relates to existing geologic conditions
- Provide our opinion of suitable techniques that may be utilized to mitigate any potential negative impacts identified herein

This report presents the findings of the study performed by RMG-Rocky Mountain Group relating to the geologic conditions of the above-referenced site. Revisions and modifications to this report may be issued subsequently by RMG, based upon:

- Additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report
- Review of pertinent documents (development plans, plat maps, drainage reports/plans, etc.) not available at the time of this study
- Comments received from the governing jurisdiction and/or their consultants subsequent to submission of this document

3.2 Site Evaluation Techniques

The information included in this report has been compiled from several sources, including:

- Field reconnaissance
- Geologic and topographic maps
- Review of selected publicly available, pertinent engineering reports
- Available aerial photographs
- Subsurface exploration
- Geologic research and analysis

Geophysical investigations were not considered necessary for characterization of the site geology. Monitoring programs, which typically include instrumentation and/or observations for changes in groundwater, surface water flows, slope stability, subsidence, and similar conditions, are not known to exist and were not considered applicable for the scope of this report.

3.3 Additional Documents

Additional documents reviewed during the performance of this study are included in Appendix A.

4.0 SITE CONDITIONS

4.1 Existing Site Conditions

The site is currently vacant undeveloped land. The site is generally located north and west of the intersection of Falcon Highway and Curtis Road, within El Paso County, Colorado. The site is bound to the north by 5-acre lots within the Meadow Lake Estates subdivision, to the west by Meadow Lake Airport, to the east by Curtis Road, and to the south by Falcon Highway.

4.2 Topography

Based on our site reconnaissance on March 29, 2023 and USGS 2019 topographic map of the Falcon Quadrangle, the eastern portion of the site within the proposed development area generally slopes to the south and west towards the drainageway. The remaining western portion of the site contains rolling hills and generally slopes down to the south and east towards the drainageway.

The site is fairly flat in the location of the proposed lots, but does contain rolling hills and steeper slopes to the west (along the drainageway). Minor erosional features were visible along the unnamed drainageway. At the time of the site reconnaissance, the drainageway had a low flow of water. The water level in the drainageway is anticipated to vary, depending upon local precipitation events.

4.3 Vegetation

The site vegetation primarily consists of tall native grasses, cacti, weeds, and other prairie-type vegetation.

4.4 Aerial Photographs and Remote-Sensing Imagery

Personnel of RMG reviewed aerial photos available through Google Earth Pro dating back to 1985, Colorado Geological Survey (CGS) surficial geologic mapping, and historical photos by historicaerials.com dating back to 1947. Historically, the site has remained vacant, undeveloped land.

5.0 FIELD INVESTIGATION AND LABORATORY TESTING

The subsurface conditions were explored by drilling two (2) exploratory borings on March 20, 2023, extending to depths of approximately 20 feet below the existing ground surface. Three (3) test pits to depths of 8 feet were observed on March 29, 2023. The test borings and test pits were spaced to provide preliminary soil information across the site for future foundations and the proposed shared on-site wastewater treatment systems. The Test Boring/Test Pit Layout Plan is presented in Figure 3.

The test borings were drilled with a power-driven, continuous-flight auger drill rig. Samples were obtained during drilling of the test boring in general accordance with ASTM D-1586 and D-3550, utilizing a 2-inch O.D. Split Barrel Sampler. The test pits were performed with a mini-excavator, provided by others, and observed by RMG at the time of excavation. An Explanation of Test Boring Logs and the Test Boring Logs are presented in Figures 4 and 5.

5.1 Laboratory Testing

Soil laboratory testing was performed as part of this investigation. The laboratory tests included moisture content, grain-size analyses, and Atterberg Limit tests. A Summary of Laboratory Test Results is presented in Figure 6. Soils Classification Data is presented in Figure 7.

6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

The site is located within the central portion of the Great Plains Physiographic Province. The site exists within the southern portion of a large structural feature known as the Denver Basin. In general, the geology at the site consists of alluvium and eolian composed of sand, silt, clay, gravel, and occasional boulders that overlie the Dawson Arkose.

6.1 Subsurface Soil Conditions

The subsurface materials encountered in the test borings were classified visually in the field and within the laboratory using the Unified Soil Classification System (USCS). The materials were identified and classified as well-graded silty sand (SW-SM) and silty sand (SM).

Additional descriptions and the interpreted distribution (approximate depths) of the subsurface materials are presented on the Test Boring Logs. The classifications shown on the logs are based upon the visual classification of the samples at the depths indicated. Stratification lines shown on the logs represent the approximate boundaries between material types and the actual transitions may be gradual and vary with location.

6.2 Bedrock Conditions

In general, the bedrock (as mapped by Colorado Geologic Survey - CGS) beneath the site is considered to be part of the Dawson Formation. The sandstone bedrock was not encountered in two test borings, nor is it anticipated in the shallow slab-on-grade foundation excavations proposed

across the site. Overall, the on-site sands can readily be excavated with standard construction equipment such as a front-end loader or excavator.

6.3 U.S. Soil Conservation Service

The USDA/NRCS soil survey identified 5 different soils on the property. However, below are the two soils that are within the proposed buildable areas:

- 8 – Blakeland loamy sand, 1 to 9 percent slopes. The Blakeland loamy sand was mapped by the USDA to encompasses the majority of the proposed lot areas. The properties of the Blakeland loamy sand include somewhat excessively drained soil with a depth to water table of over 80 inches. Runoff is anticipated to be low and frequency of flooding or ponding is none. Landforms are flats and hills.
- 83 – Stapleton sandy loam, 3 to 8 percent slopes. The Stapleton sandy loam was mapped by the USDA to encompasses the very northwest corner and parallels the Blakeland loamy sand long the west side of the proposed lot areas. The Stapleton sandy loam was mapped by the USDA to encompasses the majority of the property. The properties of the Stapleton sandy loam include well drained soil with a depth to water table of over 80 inches. Runoff is anticipated to be low and frequency of flooding or ponding is none. Landforms are hills.

The USDA Soil Survey Map is presented in Figure 8.

6.4 General Geologic Conditions

Based on our field observations and review of relevant geologic maps, we identified the geologic conditions (listed below) affecting the development, as shown on the Engineering Geology Map, Figure 9.

The site generally consists of alluvium and eolian deposits of the Holocene and Upper Pleistocene overlying the Dawson Formation. Three geologic units were mapped at the site as:

- *Qa_2 – Alluvium two* (lower Holocene) – generally located above the lower portions of the site above the modern floodplain.
- *Qes - Eolian Sand* (Holocene to upper Pleistocene) – windblown deposits composed of sand and silt. This unit comprises the majority of the surface material across the site.
- *Fp – Floodplain* – floodplain within Unnamed Tributary, as mapped by FEMA.

6.5 Engineering Geology

Two engineering geology units were mapped at the site and are shown on the Engineering Geology Map, Figure 9.

- *2B* – Stable alluvium, colluvium and bedrock on flat to moderate slopes (0-12%)
- *7A* - Physiographic floodplain where erosion and deposition presently occurs and is generally subject to recurrent flooding. Includes the 100-year flood plain along major streams where flood plain studies have been conducted.

The map unit description for the above units were provided by Charles Robinson and Associates (1977).

6.6 Structural Features

Structural features such as schistocity, folds, zones of contortion or crushing, joints, shear zones or faults were not observed by RMG on the site or in the surrounding area.

6.7 Surficial (Unconsolidated) Deposits

Lake and pond sediments, swamp accumulations, sand dunes, marine terrace deposits, talus accumulations, and creep was not observed on the site. Slump and slide debris were also not observed on the site.

6.8 Features of Special Significance

Features of special significance such as accelerated erosion, (advancing gully head, badlands, or cliff reentrants) were not observed on the property. Features indicating settlement or subsidence such as fissures, scarplets, and offset reference features were not observed on the study site or surrounding areas.

Features indicating creep, slump, or slide masses in bedrock and surficial deposits were not observed on the property.

6.9 Groundwater and Drainage of Surface Water

The overall topography of the site slopes down from the eastern and western property boundaries to the unnamed drainageway. The unnamed drainageway generally slopes down from the north to the south. Groundwater was not encountered at the time of drilling or when in a follow-up groundwater check performed on March 28, 2023.

It should be noted that in granular soils and bedrock, some subsurface water conditions might be encountered due to the variability of the soil profile. Isolated sand and gravel layers within the soil, even those of limited thickness and width, can convey subsurface water. Subsurface water may also flow atop the interface between the upper soils and the underlying bedrock. While not indicative of a "groundwater" condition, these occurrences of subsurface water migration can (especially in times of heavy rainfall or snowmelt) result in water migration into the excavation or (once construction is complete) the building envelope. Builders and planners should be cognizant of the potential for the occurrence of subsurface water conditions during on-site construction, and be prepared to evaluate and mitigate each individual occurrence as necessary.

Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Development of the property and adjacent properties may also affect groundwater levels.

6.10 Flooding and Surface Drainage

A natural drainageway exists near the center and western portion of the three parcels. The drainageway flows from the north to the south. The drainageway contained a low level of water at the time of the site reconnaissance performed by RMG. The USGS Topo Map is presented in Figure 10.

Based on our review of the Federal Emergency Management Agency (FEMA) Community Panel No. 08041C0566G, 08041CO558G and the online ArcGIS El Paso County Risk Map, the majority of the site lies outside of a 100-year floodplain. The site is within the boundaries of Zone X and Zone A.

Zone X is defined by FEMA as an area of minimal flood hazard that is determined to be outside the Special Flood Hazard Area and higher than the elevation of the 0.2-percent-annual-chance (or 500-year) flood. Zone A is considered a special flood hazard area with a regulatory floodway. The Base Flood Elevations (BFE) for the drainageway have not been defined. All the proposed lots lie within Zone X. The FEMA Map is presented in Figure 11.

7.0 ECONOMIC MINERAL RESOURCES

Under the provision of House Bill 1529, it was made a policy by the State of Colorado to preserve for extraction commercial mineral resources located in a populous county. Review of the *El Paso Aggregate Resource Evaluation Map, Master Plan for Mineral Extraction*, *Map 2* indicates the site is identified as Upland Deposits. The deposits are composed of sand, gravel with silt and clay. These deposits are remnants of older streams deposited on topographic highs or bench like features. The tract is underlain primarily by the Dawson Arkose, a sedimentary formation of Tertiary age related to uplift and erosion of the Front Range.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*, the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped "Poor" for coal resources. In this part of the Denver coal region, coal resources are locally present within the lower part of the Laramie Formation of Upper Cretaceous age. The area contains strata that may contain coal. This area is not prospective for metallic mineral resources. No oil and gas wells are drilled in the area, or within two miles of it. Alluvial deposits are commonly mined in the region for sand and gravel. There is an active gravel pit approximately one mile to the south of the site and several within a five-mile radius of it.

8.0 IDENTIFICATION AND MITIGATION OF POTENTIAL GEOLOGIC CONDITIONS

The El Paso County Engineering Criteria Manual recognizes and delineates the difference between geologic hazards and constraints. A *geologic hazard* is one of several types of adverse geologic conditions capable of causing significant damage or loss of property and life. Geologic hazards are defined in Section C.2.2 Sub-section E.1 of the ECM. A *geologic constraint* is one of several

types of adverse geologic conditions capable of limiting or restricting construction on a particular site. Geologic constraints are defined in Section C.2.2 Sub-section E.2 of the ECM (1.15 Definitions of Specific Terms and Phrases).

The following geologic hazards and constraints were considered in the preparation of this report and are not anticipated to pose a significant risk to the entire site:

- Avalanches
- Debris Flow-Fans/Mudslides
- Ground Subsidence and Abandoned Mining Activity
- Landslides
- Rockfall
- Steeply Dipping Bedrock
- History of Landfill or Uncontrolled/Undocumented Fill Placement
- Valley Fill
- Downhill/Down-slope Creep
- Soil Slumps and Undercutting
- Corrosive Minerals

Preliminary Plan Area

The following sections present the geologic conditions that have been identified on (or anticipated to be on) the proposed 29 subdivided lots comprising the eastern portion of the property:

8.1 Expansive Soils – constraint

Expansive soils were not encountered in our test borings. However, some clay soils are anticipated to exist on the site. Occasional pockets of sandy clay could be encountered across the site and varying depths. The sandy clay generally possess low to moderate swell potential. It is anticipated expansive clay soils, if encountered during construction, can be readily mitigated with typical construction practices common to this region of El Paso County, Colorado.

Mitigation

Sporadic areas of expansive soils are anticipated. If expansive soils are encountered beneath the foundations, mitigation will be required. "Mass" subexcavation during land development is currently not proposed, nor are we proposing it at this time.

Localized overexcavation below the proposed foundations and replacement with granular, non-expansive structural fill is anticipated to be the preferred mitigation. Overexcavation is not anticipated for the majority of the lots. Where expansive soils are encountered, overexcavation depths of 3 to 4 feet are anticipated. Moisture-conditioning and recompacting the on-site clays (if desired) may also be considered for mitigation of expansive materials, but may result in differing overexcavation depths and foundation design parameters. Floor slabs bearing directly on expansive materials should be expected to experience a higher degree of movement. Overexcavation and replacement below the floor slabs has been successful in reducing slab movement.

The final determination of mitigation alternatives and foundation design criteria are to be determined in site-specific subsurface soil investigations for each lot. Provided that appropriate mitigations and/or foundation design adjustments are implemented, the presence of expansive soils or bedrock is not considered to pose a risk to the proposed structures.

8.2 Compressible Soils - constraint

Based on the test borings performed for this investigation, the well-graded silty sand and silty sand will be encountered within the majority (if not all) of the building excavations. In some cases, loose sands may be encountered in the excavations. Overexcavation and recompaction is a suitable mitigation.

Mitigation

If loose soils are encountered beneath the foundations, mitigation will be required. "Mass" subexcavation is currently not proposed, nor are we proposing it at this time.

If loose soils are encountered during the open excavation observation, they may require additional compaction to achieve the allowable bearing pressure indicated in this report. Fluctuations in material density may occur. In some cases, removal and recompaction of up to 2 feet of soil may be required. The removal and recompaction shall extend a minimum of the same distance beyond the building perimeter, and at least that same distance beyond the perimeter of counterfort and "T" wall footings. The use of track-mounted excavation equipment, or other low ground pressure equipment, is recommended on loose soils to reduce the likelihood of loss of stability during excavation.

8.3 Ponding Water, Springs and Groundwater – constraint

Based on the site observations, review of USGS topographic maps dating back to 1951, and review of Google Earth images dating back to 1999, springs do not appear to originate on the subject site. Furthermore, water and areas of seasonal shallow groundwater were not encountered during our investigation.

Ponding surface water is likely to be encountered in the low lying drainageway that is located outside the proposed lot areas.

Drilling occurred in March, generally when seasonal groundwater levels are considered slightly higher than the winter months (November through February). The presence of groundwater was not observed in the test borings or test pits performed for this investigation. Groundwater measurements are limited to the time of years measured and are considered snapshots only. The depth of groundwater is anticipated to be erratic due to the presence of the existing drainageway and the varying soil conditions on-site.

Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Groundwater information obtained at the time of the preliminary investigations performed prior to the land development phase may or may not be representative of the conditions present at the time of construction. Furthermore, the

development processes (reshaping of the ground surface, installation of buried utilities, installation of an underdrain below the roadways, etc.) can significantly alter the depth and flow paths of the subsurface water. The construction of surrounding lots can also alter the amount and depth of subsurface groundwater below a given lot. The potential exists for high groundwater levels during high moisture periods and should structures encroach on these areas, the following mitigations should be followed.

Mitigation
Currently, the proposed development is industrial type construction which could include the use of wood framed shops/garages or pre-engineered metal buildings (PEMB) with equipment storage. These types of structures are generally constructed atop a slab-on-grade foundation without crawlspaces or basements.

Seasonal variations in underground water conditions are expected due to the unnamed drainageway. It is assumed underground water beneath the subject site predominates in fractured weathered consolidated sedimentary bedrock located at depth. If shallow underground water conditions are encountered during the site-specific subsurface soil investigations and/or open excavation observations, mitigations shall be provided at that time.

Due to the limited cuts and fills proposed, groundwater is not anticipated to be encountered in the excavations or utility trenches. Foundations must have a minimum 30-inch depth for frost protection. Perimeter drains are recommended around portions of the structures (if any) which will have habitable or storage space located below the finished ground surface. This includes crawlspace areas but not the walkout trench, if applicable. Perimeter drains help prevent the intrusion of water into areas below grade. A typical perimeter drain detail is presented in Figure 13.

8.4 Faults and Seismicity - hazard

Based on review of the Earthquake and Late Cenozoic Fault and Fold Map Server provided by CGS located at http://dnrwebmapgdev.state.co.us/CGSOnline/ and the recorded information dating back to November of 1900, Colorado Springs has not experienced a recorded earthquake with a magnitude greater than 1.6 during that period. The nearest recorded earthquakes over 1.6 occurred in December of 1995 in Manitou Springs, which experienced magnitudes ranging between 2.8 to 3.5. Additional earthquakes over 1.6 occurred between 1926 and 2001 in Woodland Park, which experienced magnitudes ranging from 2.7 to 3.3. Both of these locations are located near the Ute Pass Fault, which is greater than 10 miles from the subject site. Earthquakes felt at this site will most likely result from minor shifting of the granite mass within the Pikes Peak Batholith, which includes pull from minor movements along faults found in the Denver basin. It is our opinion that ground motions resulting from minor earthquakes may affect structures (and the surrounding area) at this site if minor shifting were to occur.

Mitigation
The Pikes Peak Regional Building Code, 2017 Edition, indicates maximum considered earthquake spectral response accelerations of 0.213g for a short period (S_s) and 0.059g for a 1-second period (S_1). Based on the results of our experience with similar subsurface conditions, we recommend the

site be classified as Site Class B, with average shear wave velocities ranging from 2,500 to 5,000 feet per second for the materials in the upper 100 feet.

8.5 Radon – hazard

***"Radon Act 51** passed by Congress set the natural outdoor level of radon gas (0.4 pCi/L) as the target radon level for indoor radon levels".*

Northern El Paso County and the 80831 zip code in which the site is located, has an EPA assigned Radon Zone of *1*. A radon Zone of 1 predicts an average indoor radon screening level greater than 0.4 pCi/L (picocuries per liter), which is above the recommended levels assigned by the EPA. *The EPA recommends corrective measures to reduce exposure to radon gas.*

All of the State of Colorado is considered EPA Zone 1 based on the information provided at https://county-radon.info/CO/El_Paso.html. Elevated hazardous levels of radon from naturally occurring sources are not anticipated at this site.

Mitigation
Radon hazards are best mitigated at the building design and construction phases. Providing increased ventilation of basements, crawlspaces, creating slightly positive pressures within structures, and sealing of joints and cracks in the foundations and below-grade walls can help mitigate radon hazards. Passive radon mitigation systems are also available.

Passive and active mitigation procedures are commonly employed in this region to effectively reduce the buildup of radon gas. Measures that can be taken after the residence is enclosed during construction include installing a blower connected to the foundation drain and sealing the joints and cracks in concrete floors and foundation walls. If the occurrence of radon is a concern, it is recommended that the residence be tested after they are enclosed and commonly utilized techniques are in place to minimize the risk.

Remainder of the Site

The hazards and constraints listed above are present across the entire site. In addition to the hazards and constraints discussed above, the following are specific to the western portion of the site (not included in the currently proposed development, that may or may not be developed in the future):

8.6 Flood Prone Areas - hazard

Based on our review of the FEMA map and the online ArcGIS El Paso County Risk Map the majority of the site lies outside the 100-year floodplain. However, portions of the site surrounding the unnamed drainageway do lie within a Regulatory Floodway. Per the latest approved edition of the Pikes Peak Regional Building Code, the lowest finished floor elevation (including basement together with attendant utility and sanitary facilities) shall be elevated one-foot or more above the designated Base Floor elevation (BFE).

Mitigation
The 29 proposed subdivided lots are located outside the designated Regulatory Floodway. If new development and/or construction are proposed near the floodway, additional investigations should be performed to determine the feasibility of construction within the streamside outer buffer zone and, if necessary, develop mitigation recommendations.

The presence of the floodplain is not believed to pose a high risk if the structures and OWTS's are located appropriately on the lots Provided that the recommendations presented herein, as well as any requirements stipulated by the governing regulatory agencies, are followed, the presence of the revised floodplain/floodway is not anticipated to preclude the proposed construction

8.7 Scour, Erosion, Accelerated Erosion Along Creek Banks and Drainageways - constraint

Scour generally refers to a localized loss of soil, often around a foundation element(s). Erosion generally refers to lowering the ground surface over a wide area.

Visible evidence of ongoing erosion/scour along the drainageway was not observed. Due to the current alignment of the drainageway and the configuration of the site, the drainageway traverses the western portion of the site. As such, if the lot configuration remains as presented in Figure 2, additional drainage improvements should not be required

Note, further disturbance and/or long term exposure without vegetative cover will increase the potential for erosion across the site.

Mitigation
Significant care should be taken, both during construction and in the final grading of the overall site and the 29 subdivided lots to divert surface drainage and downspout discharge water around the structures to a location that will not significantly alter the overall drainage of the development or result in the need for additional drainage mitigation measures at the time of construction on nearby lots.

Signs of significant and ongoing surface erosion were not observed on the site. It is our understanding that silt fencing (during construction) and vegetative cover (post-construction) are generally installed along that banks to reduce the potential for erosion. Personnel of RMG have not reviewed the designs of any proposed drainage improvements for adequacy to support the anticipated design flows. However, these improvements appear to be intended to reduce the potential for significant erosion across the surface of the site.

Any landscaping in the immediate vicinity of the future structures should utilize xeriscape techniques in order to minimize needed irrigation to maintain landscaping. Further, stormwater and snowmelt runoff from parking (driveway) areas should be directed towards drainage channels and away from slopes, both during construction activities and upon completion of site development.

9.0 ON-SITE WASTEWATER TREATMENT SYSTEMS

It is our understanding two shared On-site Wastewater Treatment Systems (OWTS) are proposed for the 29 lots. Site usage on the 29 subdivided lots is primarily to consist of equipment storage, and some lots may contain structures. The structures are anticipated to include pre-engineered metal buildings (PEMB), with or without a small internal office. The site was evaluated in general accordance with the El Paso Land Development Code, specifically sections 8.4.8. Three test pits to depths of 8 feet were performed across the eastern portion of the site to obtain a general understanding of the soil and bedrock conditions. Additional test pits may be required for the remainder of the site, if and when it is proposed for development. The Test Pit Logs are presented in the Wastewater Study, Appendix B.

The United States Department of Agriculture (USDA), as discussed in section 6.3, classified the soils on site as sandy loam and loamy sand. Limiting layers was not encountered in the test pits. Signs of seasonal groundwater were not observed. The long term acceptance rates (LTAR) associated with the soils observed in the test pits range from 0.35 to 0.80 gallons per day per square foot (soil types 3 to R-1, respectively).

In reviewing the El Paso County Board of Health Regulations, Chapter 8, Table 6-2, usage is to be designed for 20/gallons per person per day. It is anticipated each structure is to have approximately 5 to 7 employees per site per day. If each OWTS system services no more than 14 sites, overall usage for each shared system is not anticipated to exceed 2,000 gallons per day. Due to the majority of lots sizes being under 2.5 acres and the anticipated low flows and usage per structure, shared OWTS systems are proposed as an alternative to minimize cost and site disturbance. If properly designed, the proposed shared systems should provide adequate wastewater treatment for the currently proposed 25 developable lots (29 subdivided lots minus 2 lots each for detention ponds and OWTS).

Contamination of surface and subsurface water resources should not occur provided the OWTS sites are evaluated and installed according to the El Paso County Board of Health Guidelines and property maintained.

Treatment areas at a minimum, must achieve the following:

- Treatment areas must be 4 feet above groundwater or bedrock as defined by the Definitions 8.3.4 of the Regulations of the El Paso County Board of Health, Chapter 8 OWTS Regulations, most recently amended May 23, 2018;
- Each shared OWTS location (after purchase but prior to construction of an OWTS) will require an OWTS site evaluation report prepared per *the Regulations of the El Paso County Board of Health, Chapter 8 OWTS Regulations*. During the site reconnaissance, a minimum of two 8-foot deep test pits will need to be excavated in the vicinity of the proposed treatment areas;
- Comply with any physical setback requirements of Table 7-1 of the El Paso County Department of Health and Environment (EPCHDE);
- Treatment areas are to be located a minimum 100 feet from any well (existing or proposed), including those located on adjacent properties per Table 7-2 per the EPCHDE;

- Each treatment area shall be designed to insure the OWTS does not fall within the restricted areas, floodplain, as identified on the Engineering and Geology Map, Figure 9.

It is our opinion that if the EPCHDE physical setback requirements (both horizontal and vertical) are met for each lot, there are no restrictions on the placement of the individual On-site Wastewater Treatment Systems.

Soil and groundwater conditions at the site are suitable for the proposed treatment systems. It should be noted that the LTAR values stated above are for the test pit locations performed for this report only. The LTAR values may change throughout the site. If an LTAR value of less than 0.35 (or soil types 3A to 5) or greater than 0.80 (soil type 0) are encountered at the time of the site specific OWTS evaluation an "engineered system" will be required. Due to the shared OWTS concept, it is anticipated that each OWTS will require an "engineered system".

10.0 BEARING OF GEOLOGIC CONDITIONS UPON PROPOSED DEVELOPMENT

Geologic hazards (as described in section 8 of this report) found to be present at this site include flood prone areas, faults, seismicity and radon. Geologic conditions (as described in section 8 of this report) found to be present at this site include potentially expansive and compressible soils, and ponding water. It is our opinion that the existing geologic and engineering conditions can be satisfactorily mitigated through proper engineering, design, and construction practices.

11.0 ANTICIPATED FOUNDATION SYSTEMS

Based on the information presented previously, conventional shallow foundation systems consisting of standard spread footings/stemwalls or conventionally-reinforced stiffened slabs-on-grade, drilled pier (caisson) foundations with or without structural floors, etc. are anticipated to be suitable for the proposed residential structures. It is assumed that the deepest excavation cuts will be approximately 3 to 4 feet below the final ground surface, not including overexcavation (if required).

Due to the swell potential of the clay and claystone lenses within the Dawson Formation, they are generally not suitable for support of spread footing foundations or floor slabs unless mitigated. Where expansive soils are encountered near spread footing foundation or floor slab levels, they should be removed. After compaction of the in-situ soil, the foundation construction should then be backfilled in compacted lifts to bottom of footing elevation with approved native soil or structural fill consisting of well-graded non-cohesive granular material. The material should not be excessively wet, should be free of organic matter and construction debris, and contain no rock fragments greater than 3-inches in any dimension. Structural fill material should be placed in 8-inch loose lifts. All fill material should be selected, moisture-conditioned, placed, and compacted as indicated in the site-specific subsurface soil investigation and/or open excavation observation. The structural fill should be density tested to verify compaction meets the specified requirements.

The foundation design should be prepared by a qualified Colorado Registered Professional Engineer using the recommendations presented in this report. This foundation system should be designed to span a minimum of 10 feet under the design loads. The bottoms of exterior foundations should be at least 30 inches below finished grade for frost protection. When prepared and properly compacted, total settlement of 1-inch or less with differential settlement of ½ inch or less is estimated. Settlement in granular material generally occurs relatively rapidly with construction loads. Long-term consolidation settlement should not be an issue if the fill materials are prepared as recommended above.

The foundation system for each lot should be designed and constructed based upon recommendations developed in a detailed subsurface soil investigation completed after site development activities are complete. The recommendations presented in the subsurface soil investigations should be verified by an open excavation observation following the excavation on each lot.

11.1 Structural Fill - General

The processed on-site sands (maximum particle size of 3 inches) is suitable for use as structural fill. Clay and/or claystone (if encountered) is not considered suitable for use as structural fill. Except as described above for foundations, areas to receive structural fill should have topsoil, organic material, and debris removed. The upper 6-inches of the exposed surface soils should be scarified and moisture conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to a minimum of 92 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D-1557).

Structural fill should be placed in thin lifts not to exceed 6 inches and moisture conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to a minimum of 92 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D-1557).

Structural fill placed on slopes should be benched into the slope. Maximum bench heights should not exceed 4 feet, and bench widths should be wide enough to accommodate compaction equipment. Structural fill should not be placed on frozen subgrade or allowed to freeze during moisture conditioning and placement. To verify the condition of the compacted soils, density tests should be performed during placement.

11.2 Exterior Backfill

Backfill should be placed in loose lifts not exceeding 8 to 12 inches, moisture conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to 85 percent of the maximum dry density as determined by the Modified Proctor test, ASTM D-1557 on exterior sides of walls in landscaped areas. In areas where backfill supports pavement and/or concrete flatwork, the materials should be compacted to 92 percent of the maximum dry density.

Fill placed on slopes should be benched into the slope. Maximum bench heights should not exceed 4 feet, and bench widths should be wide enough to accommodate compaction equipment.

The appropriate government/utility specifications should be used for fill placed in utility trenches. If material is imported for backfill, the material should be approved by the Geotechnical Engineer prior to hauling it to the site.

The backfill should not be placed on frozen subgrade or allowed to freeze during moisture conditioning and placement. Backfill should be compacted by mechanical means, and foundation walls should be braced during backfilling and compaction.

11.3 Surface Detention and Drainage

The ground surface should be sloped from structures with a minimum gradient of 10 percent for the first 10 feet. This is equivalent to 12 inches of fall across this 10-foot zone. If a 10-foot zone is not possible on the upslope side of the structure, then a well-defined swale should be created a minimum 5 feet from the foundation and sloped parallel with the wall with a minimum slope of 2 percent to intercept the surface water and transport it around and away from the structure. Roof drains should extend across backfill zones and landscaped areas to a region that is graded to direct flow away from the structure. Water should be kept from ponding near the foundations.

Landscaping should be selected to reduce irrigation requirements. Plants used close to foundation walls should be limited to those with low moisture requirements and irrigated grass should not be located within 5 feet of the foundation. To help control weed growth, geotextiles should be used below landscaped areas adjacent to foundations. Impervious plastic membranes are not recommended.

Irrigation devices should not be placed within 5 feet of the foundation. Irrigation should be limited to the amount sufficient to maintain vegetation. Excess surface water may increase the likelihood of slab and foundation movements.

11.4 Foundation Drains

A subsurface perimeter drain is required around portions of the structures (if any) which will have habitable or storage space located below the finished ground surface. This includes crawlspace areas but not the walkout trenches, if applicable.

Groundwater was not encountered during this investigation. Depending on the conditions encountered during the lot-specific subsurface soil investigation and the conditions observed at the time of the open excavation observation, additional subsurface drainage systems may be recommended.

11.5 Design Parameters

The allowable bearing pressure of the subsurface soils should be determined by a detailed site specific subsurface soil investigation and verified by and open excavation observation, as noted above.

12.0 DETENTION STORAGE CRITERIA

This section has been prepared in accordance with the requirements outlined in the El Paso County Land Development Code (LDC), the Engineering Criteria Manual (ECM) Section 2.2.6 and Appendix C.3.2.B, and the El Paso County (EPC) Drainage Criteria Manual, Volume 1 Section 11.3.3.

12.1 Soil and Rock Design Parameters

It is unknown at this time if detention ponds, retention ponds or a combination of both are proposed for the Meadow Lake Industrial development. A site grading plan with retention/retention pond specifications has not been provided to RMG.

RMG has performed laboratory tests of soil from across the proposed development. Based upon field and laboratory testing, the following soil and rock parameters are typical for the soils likely to be encountered, and are recommended for use in detention/retention pond embankment design.

Soil Description	Unit Weight (lb/ft^3)	Friction Angle (degree)	Active Earth Pressure, Ka	Passive Earth Pressure, Kp	At Rest Earth Pressure, Ko
Clay to Sandy Clay	115	17	0.548	1.826	0.708
Silty to Clayey Sand	120	28	0.361	2.770	0.531

12.2 Detention Pond Considerations

It is uncertain if above-ground embankment construction is anticipated. All pond side slopes are to be constructed with a maximum 3:1 (horizontal:vertical) slope. Side slopes should be constructed in accordance with applicable sections of the El Paso County Engineering Criteria Manual, the El Paso County Drainage Criteria Manual, and the El Paso County Land Development Code.

13.0 ADDITIONAL STUDIES

The findings, conclusions and recommendations presented in this report were provided to evaluate the suitability of the site for future development. Unless indicated otherwise, the test borings, test pits, laboratory test results, conclusions and recommendations presented in this report are not intended for use for design and construction. ***A site-specific subsurface soil investigation will be***

required for all proposed structures including (but not limited to) residences and any proposed retaining walls, etc.

To develop recommendations for construction of the proposed roadways, a pavement design investigation should be performed. This investigation should consist of additional test borings, soil laboratory testing and specific recommendations for the design and construction of roadway pavement sections.

14.0 CONCLUSIONS

Based upon our evaluation of the geologic conditions, it is our opinion that the proposed development is feasible. The geologic conditions identified are considered typical for the Front Range region of Colorado. Mitigation of geologic conditions is most effectively accomplished by avoidance. However, where avoidance is not a practical or acceptable alternative, geologic conditions should be mitigated by implementing appropriate planning, engineering, and suitable construction practices.

In addition to the previously identified mitigation alternatives, surface and subsurface drainage systems should be considered. Exterior, perimeter foundation drains should be installed around below-grade habitable or storage spaces. Surface water should be efficiently removed from the building area to prevent ponding and infiltration into the subsurface soil.

We believe the silty to clayey sand will classify as Type B material as defined by OSHA. OSHA requires that temporary excavations made in Type B materials be laid back at ratios no steeper than 1:1 (horizontal to vertical), unless the excavation is shored and braced. Excavations deeper than 20 feet, or when water is present, should always be braced or the slope designed by a professional engineer.

Long term cut slopes in the upper soil should be limited to no steeper than 3:1 (horizontal to vertical). Flatter slopes will likely be necessary should groundwater conditions occur. It is recommended that long term fill slopes be no steeper than 3:1 (horizontal to vertical).

Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction, which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

It is important for the Owner(s) of each lot read and understand this report, and to carefully familiarize themselves with the geologic hazards associated with construction in this area. This report only addresses the geologic constraints contained within the boundaries of the site referenced above.

15.0 CLOSING

This report has been prepared for the exclusive purpose of providing geotechnical engineering information and recommendations for development described in this report. RMG should be retained to review the final construction documents prior to construction to verify our findings, conclusions and recommendations have been appropriately implemented.

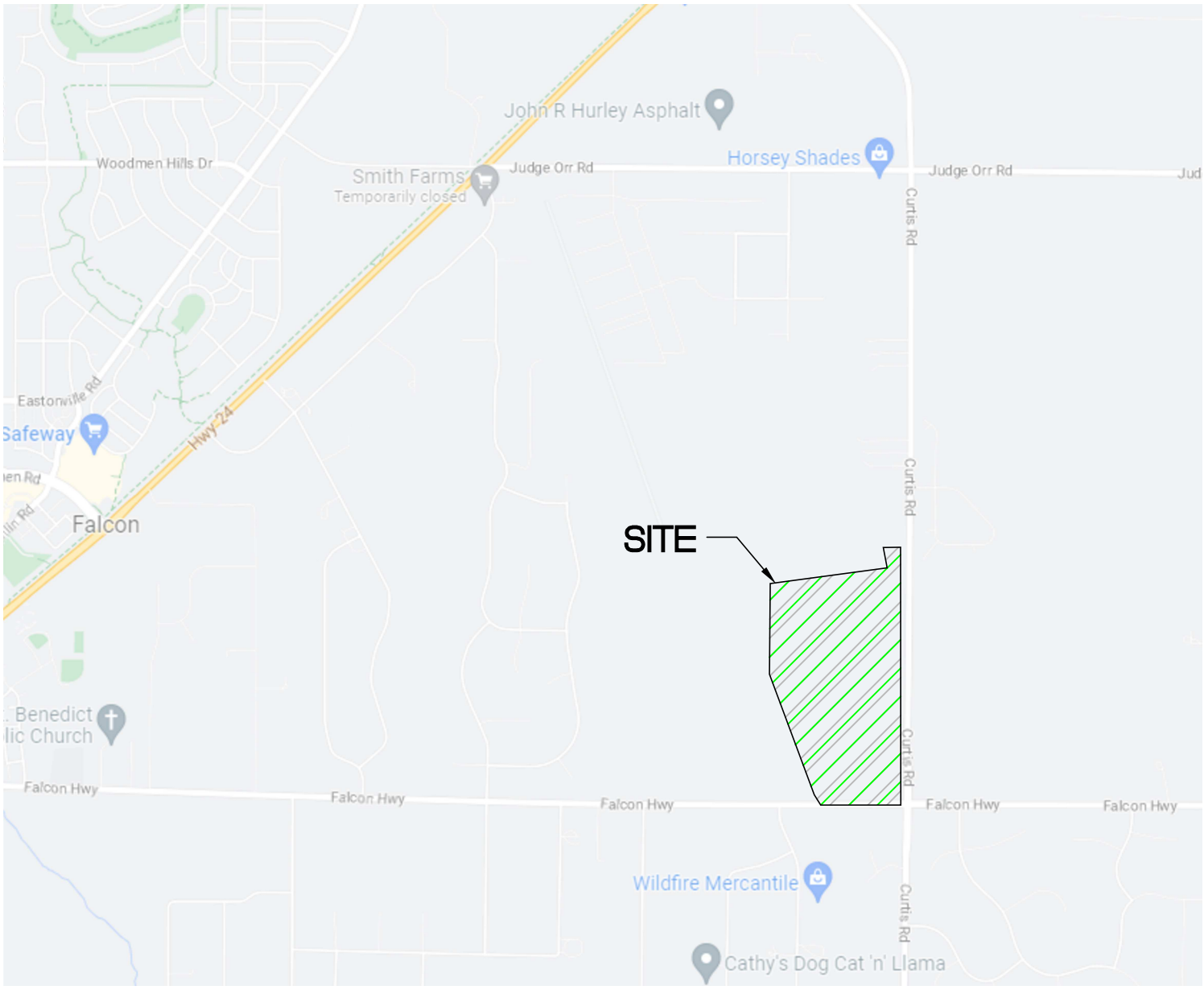
This report has been prepared for the exclusive use by **Meadowlake Developments, LLC** for application as an aid in the design and construction of the proposed development in accordance with generally accepted geotechnical engineering practices. The analyses and recommendations in this report are based in part upon data obtained from test borings, site observations and the information presented in referenced reports. The nature and extent of variations may not become evident until construction. If variations then become evident, RMG should be retained to review the recommendations presented in this report considering the varied condition, and either verify or modify them in writing.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers practicing in this or similar localities. RMG does not warrant the work of regulatory agencies or other third parties supplying information which may have been used during the preparation of this report. No warranty, express or implied is made by the preparation of this report. Third parties reviewing this report should draw their own conclusions regarding site conditions and specific construction techniques to be used on this project.

The scope of services for this project does not include, either specifically or by implication, environmental assessment of the site or identification of contaminated or hazardous materials or conditions. Development of recommendations for the mitigation of environmentally related conditions, including but not limited to biological or toxicological issues, are beyond the scope of this report. If the Client desires investigation into the potential for such contamination or conditions, other studies should be undertaken.

If we can be of further assistance in discussing the contents of this report or analysis of the proposed development, from a geotechnical engineering point-of-view, please feel free to contact us.

FIGURES



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SITE VICINITY MAP

MEADOW LAKE INDUSTRIAL
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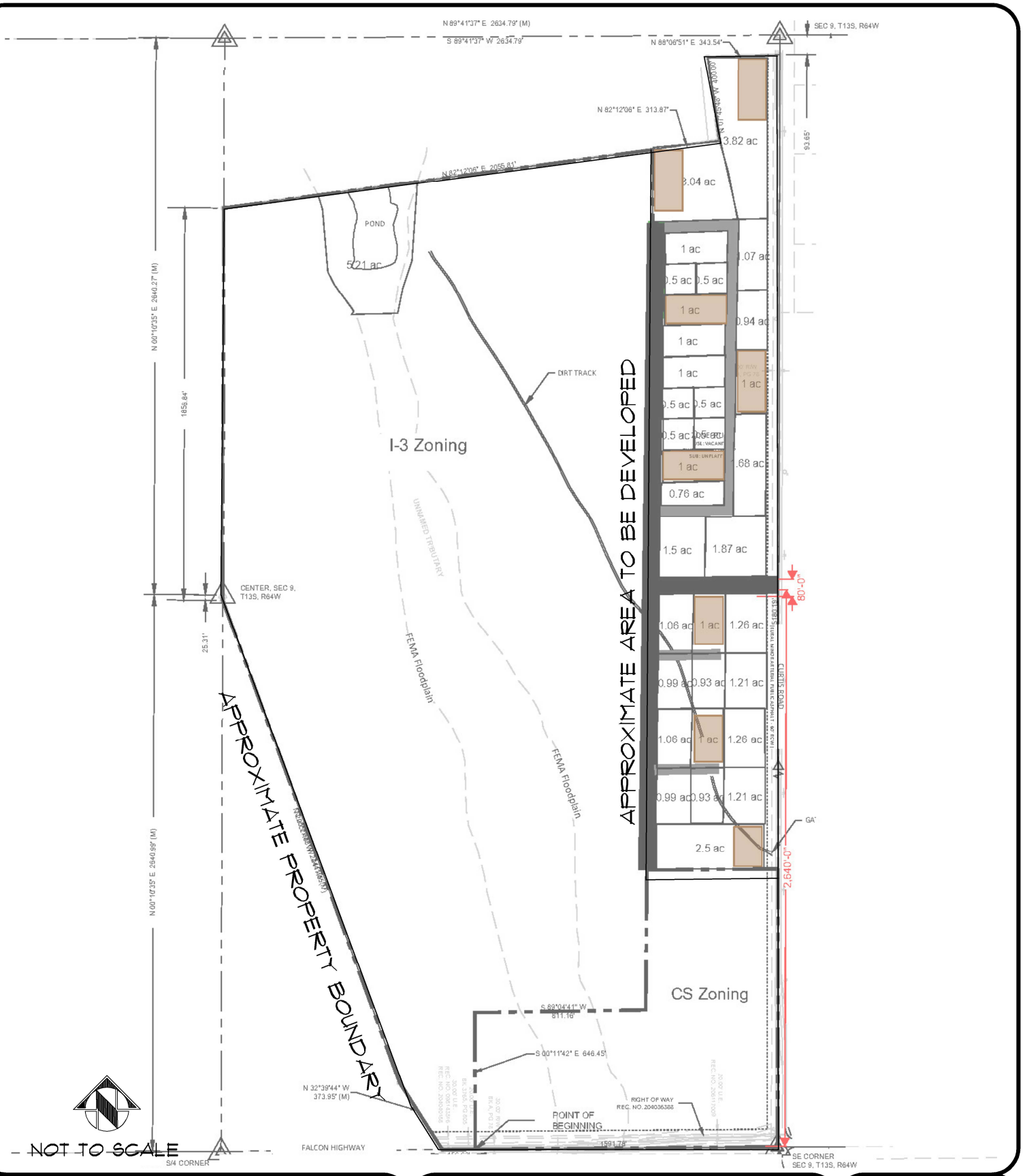
JOB No. 192628

FIG No. 1

DATE 7-13-2023



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PROPOSED SITE PLAN

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FIG No. 2

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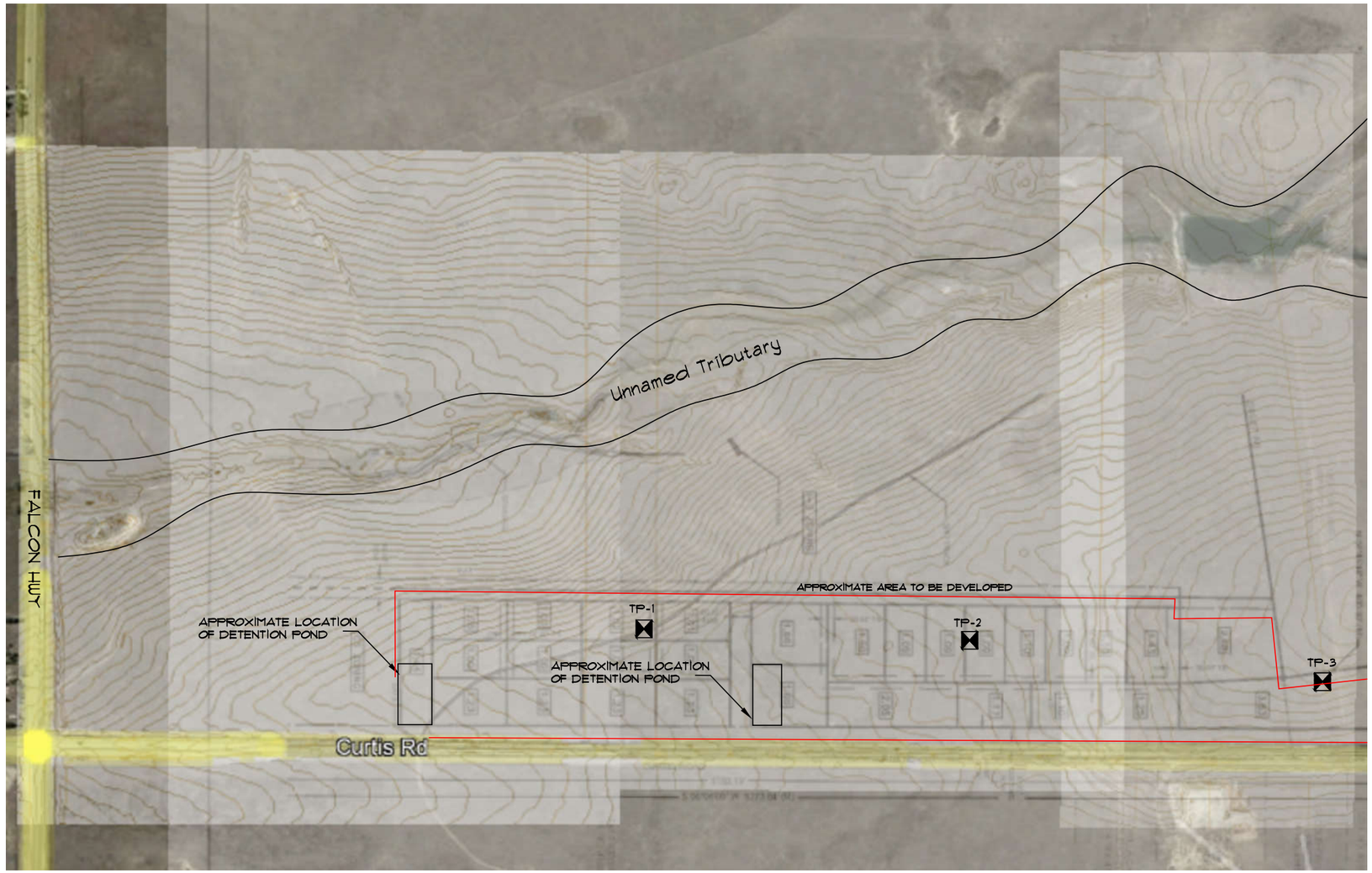

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DENOTES APPROXIMATE LOCATION OF TEST PITS

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TEST PIT
LOCATION PLAN

SHEET No.
FIG-3

SOILS DESCRIPTION

SILTY SAND

UNLESS NOTED OTHERWISE, ALL LABORATORY
TESTS PRESENTED HEREIN WERE PERFORMED BY:
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COLORADO SPRINGS, COLORADO

SYMBOLS AND NOTES

 XX	STANDARD PENETRATION TEST - MADE BY DRIVING A SPLIT-BARREL SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-1586. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).
 XX	UNDISTURBED CALIFORNIA SAMPLE - MADE BY DRIVING A RING-LINED SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-3550. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).
	FREE WATER TABLE
	DEPTH AT WHICH BORING CAVED
 BULK	DISTURBED BULK SAMPLE
 AUG	AUGER "CUTTINGS"
4.5	WATER CONTENT (%)

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EXPLANATION OF TEST BORING LOGS

JOB No. 192628

FIGURE No. 4

DATE July/13/2023

TEST BORING: **1** DATE DRILLED: 3/20/23 NO GROUNDWATER ON 3/20/23	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
SAND, SILTY, with gravel, brown, medium dense, moist	5			28	3.8
	10			26	4.7
	15			27	7.4
	20			40	7.0

TEST BORING: **2** DATE DRILLED: 3/20/23 NO GROUNDWATER ON 3/20/23	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
SAND, SILTY, with gravel, brown, medium dense, moist				26	3.7
	5			21	5.7
	10			15	3.9
	15			21	5.3
	20				

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TEST BORING LOG

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FIGURE No. 5

DATE July/13/2023

Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
1	4.0	3.8		NP	NP	8.0	10.9			SW-SM
1	9.0	4.7								
1	14.0	7.4								
1	19.0	7.0								
2	2.0	3.7		NP	NP	1.5	38.6			SM
2	7.0	5.7								
2	14.0	3.9								
2	19.0	5.3								

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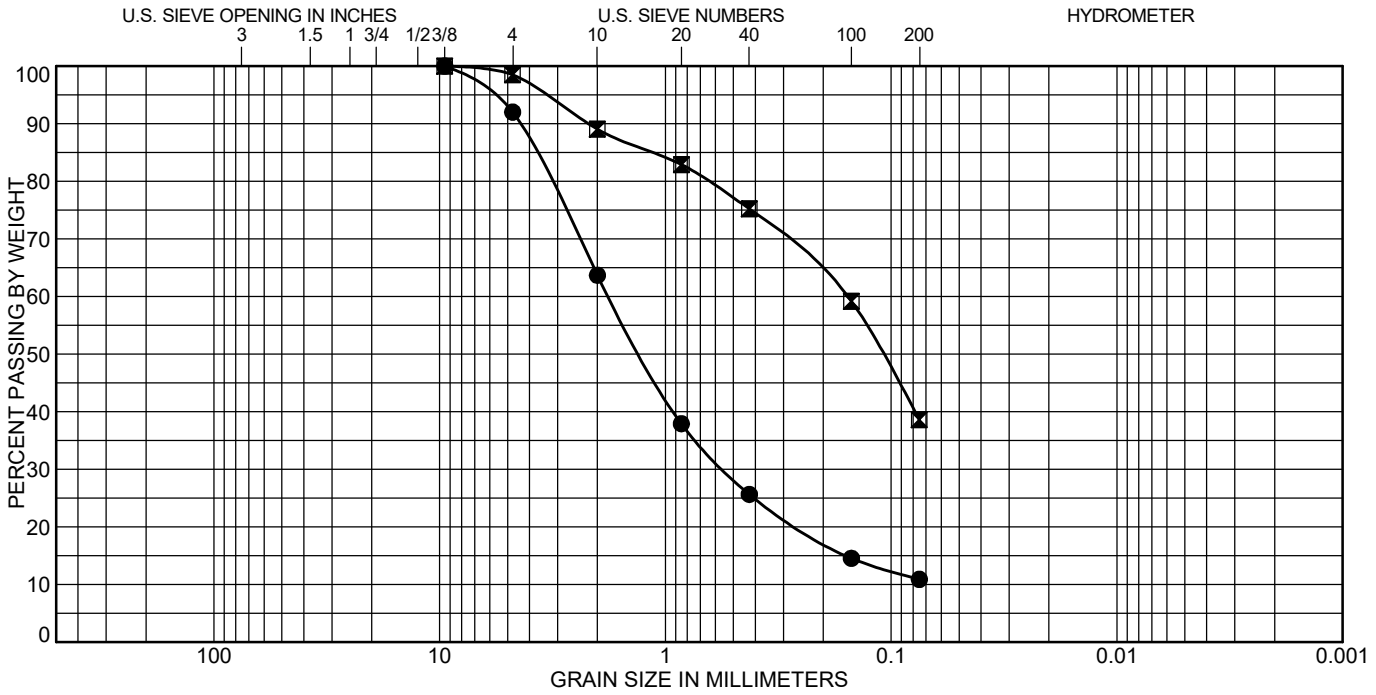
SUMMARY OF LABORATORY TEST RESULTS

JOB No. 192628
FIGURE No. 6
PAGE 1 OF 1
DATE July/13/2023



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Test Boring	Depth (ft)	Classification	LL	PL	PI
●	1	4.0	**WELL-GRADED SAND with SILT(SW-SM)**	**NP**	**NP**	**NP**
⊠	2	2.0	**SILTY SAND(SM)**	**NP**	**5**	**NP**

	Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
●	1	4.0	**8.0**	**81.1**	**10.9**	
⊠	2	2.0	**1.5**	**59.9**	**38.6**	

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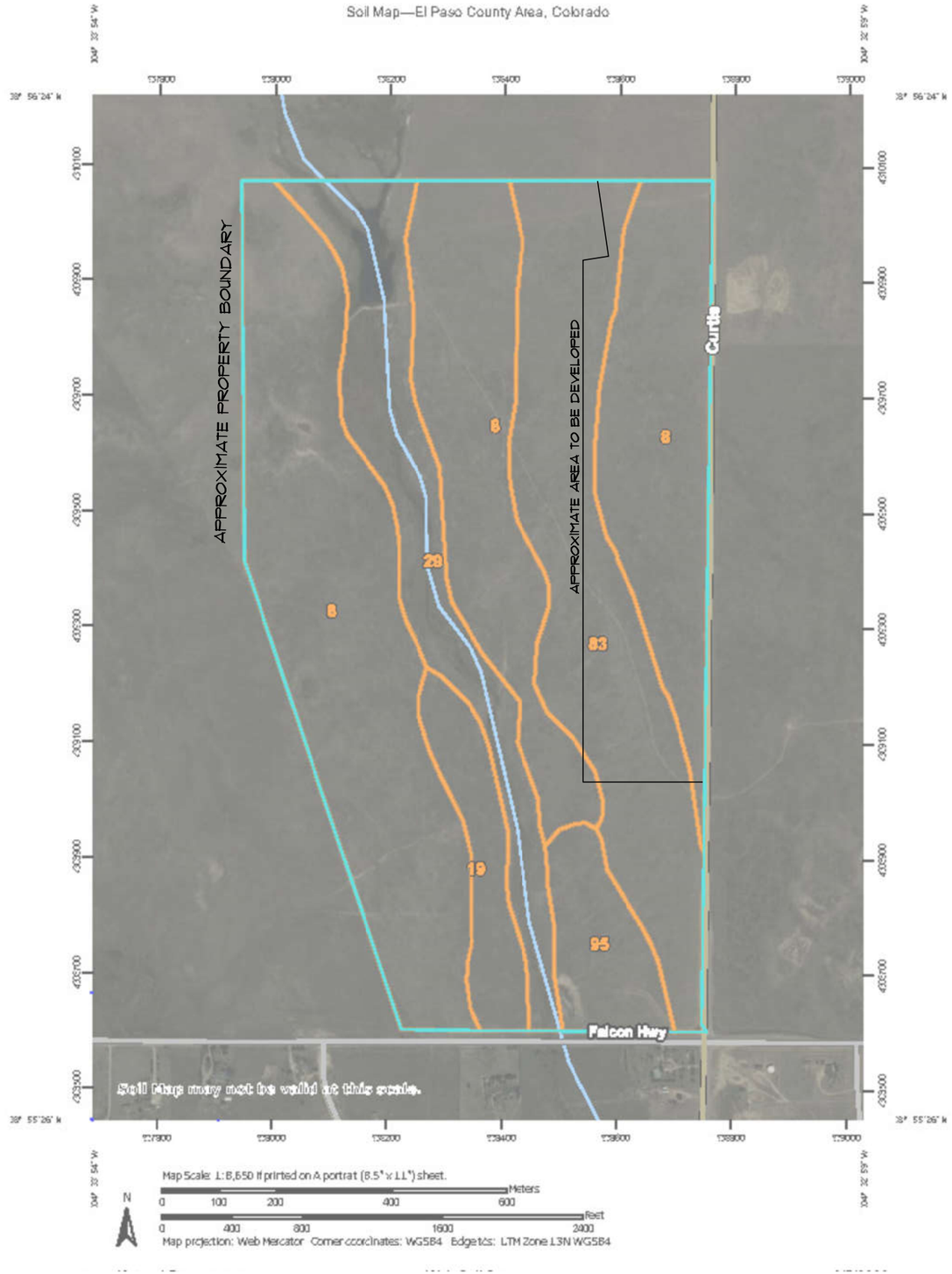
SOIL CLASSIFICATION DATA

JOB No. 192628

FIGURE No. 7

DATE July/13/2023



8 - Blakeland Loamy Sand, 1 to 9 percent slopes

83 - Stapleton sandy loam, 3 to 8 percent slopes

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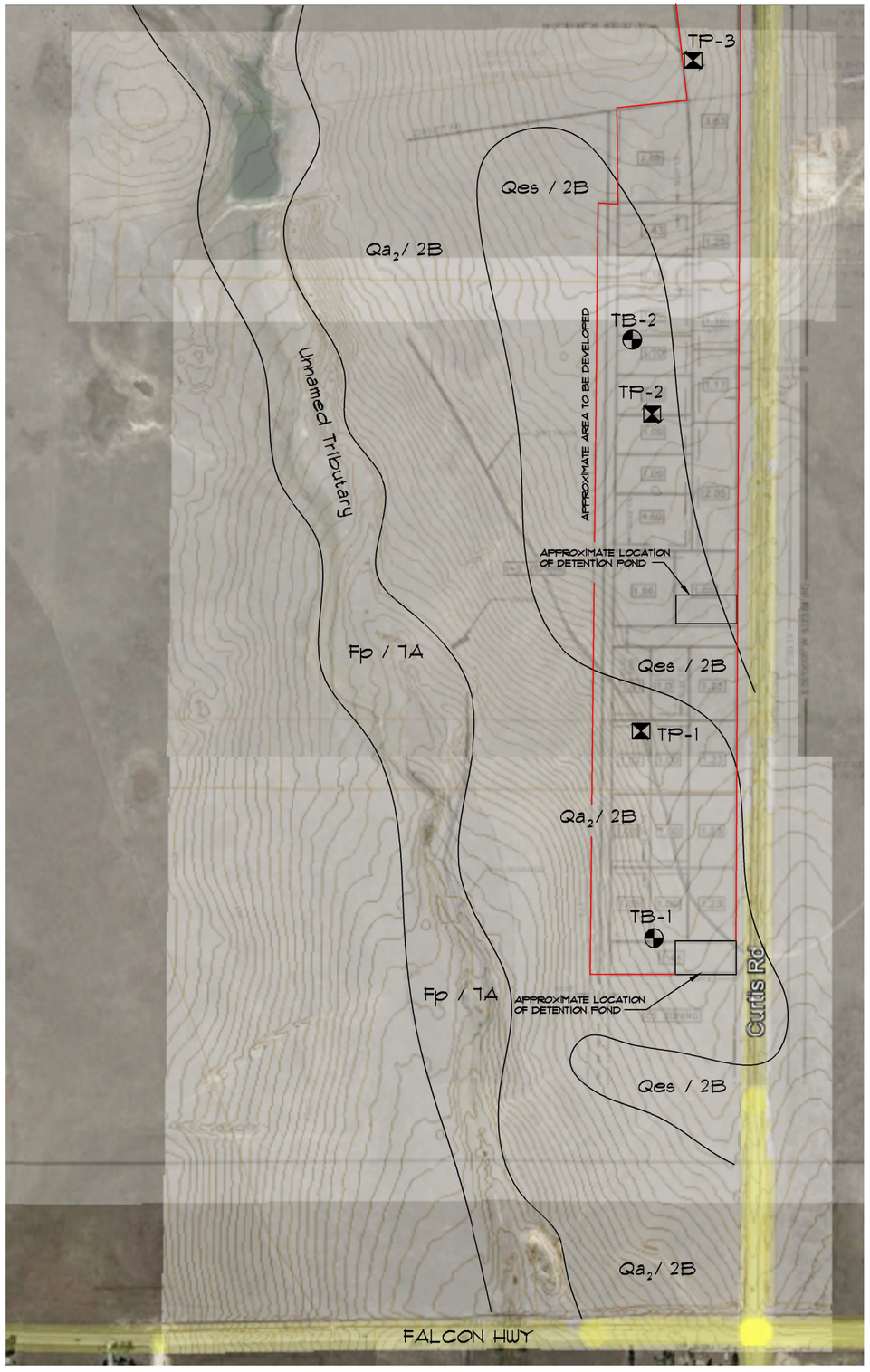
USDA SOIL SURVEY MAP

SHEET No.
FIG-8



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GEOLOGIC CONDITIONS

Qes - Eolian Sand (Holocene to upper Pleistocene) Fine to coarse grained sand. Unit is faintly stratified, non-cohesive, and drains well. Unit may exceed 5 feet in thickness

Qa_2 - Alluvium two (Lower Holocene) Moderately consolidated silt, sand, gravel, clay and occasional boulders. Units is subject to occasional flooding with a local maximum exposed thickness of over 20 feet.

Fp - floodplain as mapped by FEMA

2B - Stable alluvium, colluvium and bedrock on flat to moderate slopes (0-12%)

7A - Physiographic floodplain where erosion and deposition presently occurs and is generally subject to recurrent flooding.

DENOTES APPROXIMATE LOCATION OF TEST BORINGS

DENOTES APPROXIMATE LOCATION OF TEST PITS

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ENGINEERING GEOLOGY MAP

SHEET No.
FIG-9

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USGS TOPO MAP

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JOB No. 192628

FIG No. 10

DATE 7-13-2023

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FEMA MAP

MEADOW LAKE INDUSTRIAL
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FIG No. 11

DATE 7-13-2023

Appendix A

Additional Reviewed Documentation

1. *Final Plat, Meadowlake Industrial, Filing No. 1, El Paso County, CO*, prepared by SMH Consultants, dated March, 2023.
2. *Flood Insurance Rate Map, El Paso County, Colorado and Unincorporated Areas, Community Panel No. 08041C0566G and 08041C0558G,* Federal Emergency Management Agency (FEMA), effective December 7, 2018.
3. *Geologic Map of the Falcon Quadrangle, El Paso County, Colorado*, Morgan, M.L. and White, J.L, 2012, Colorado Geological Survey Open-File Report OF-12-05.
4. *Falcon Quadrangle, Environmental and Engineering Geologic Map for Land Use*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
5. *Falcon Quadrangle, Map of Potential Geologic Hazards and Surficial Deposits*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
6. Colorado's Decision Support Systems, CWCB, DWR, Well Permits,
7. *El Paso County, Master Plan for Mineral Extraction,* dated February 8, 1996.
8. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands Administered by the Colorado State Land Board,* prepared by Colorado Geological Survey, dated February 19, 2003, Open-file Report OF-03-07.
9. *Pikes Peak Regional Building Department:* https://www.pprbd.org/.
   https://property.spatialest.com/co/elpaso/#/property/4300000534
   Schedule No. 4300000534, 4300000537, and 4300000538.
10. *Colorado Geological Survey, USGS Geologic Map Viewer*:
    http://coloradogeologicalsurvey.org/geologic-mapping/6347-2/.
11. *Historical Aerials:* https://www.historicaerials.com/viewer, Images dated 1947, 1955, 1960, 1983, 1999, 2005, 2009, 2011, 2013, 2015, 2017, and 2019.
12. *USGS Historical Topographic Map Explorer:* http://historicalmaps.arcgis.com/usgs/ Colorado Springs, Black Forest Quadrangle dated 1893, 1909, 1952, 1969, 1977, 1981 and 1989.
13. *Google Earth Pro*, Imagery dated 1999, 2004, 2005, 2006, 2011, 2013, 2015, 2017, 2019 and 2020.

APPENDIX B

Wastewater Study

Job No. 192628

July 13, 2023
Revised????

Meadowlake Developments LLC
455 E Pikes Peak Ave, Ste 101
Colordado Springs, CO 80903

Re: Wastewater Study
Meadow Lake Industrial
Section 9, Township 15 South, Range 65 West
El Paso County, Colorado

Dear Client:

As requested, personnel of RMG – Rocky Mountain Group has performed a preliminary investigation and site reconnaissance at the above referenced address. It is our understanding the site currently consists of four parcels (per the El Paso County Assessor's website) for a combined 344.78 acres:

- **North:** Schedule No. 4300000553, currently labeled as N Curtis Rd, zoned I-3 and I-2, consists of approximately 54.51 acres and land use is classified as agricultural grazing land;
- **Central:** Schedule No. 4300000552, currently labeled as N Curtis Rd, zoned I-3 and I-2, consists of approximately 108.0 acres and land use is classified as agricultural grazing land;
- **South:** Schedule No. 4300000551, currently labeled as Falcon Highway, zoned CS, I-3, and I-2, consists of approximately 45.29 acres, and land use is classified as agricultural grazing land;
- **Southwest:** Schedule No. 4300000548, currently labeled as Falcon Highway, zoned CS and I-2, consists of approximately 136.98 acres and land use is classified as agricultural grazing land. Not included in this study.

The currently proposed development only includes the eastern portion of the north, central and south parcels. The southwest parcel and the western portions of the other three parcels are to remain undeveloped at this time. If development is proposed in the future, an additional wastewater study will be required. An unnamed drainageway transverses the site from the north to the south.

A Site Vicinity Map is presented in Figure 1.

Project Description

It is our understanding that the four parcels listed above are to be combined into one parcel and then subdivided into approximately 30 lots. Site usage on the 29 subdivided lots is primarily to consist of equipment storage, and some lots may contain structures. The structures are anticipated to include pre-engineered metal buildings (PEMB), with or without a small internal office. The area that is to be developed is to include 29 industrial lots/tracts ranging from 0.5 to 3.82 acres. Two of the 29 proposed lots are to be utilized as detention pond tracts and two additional lots (or portions of) are to be utilized as On-site Wastewater Treatment Systems (OWTS) tracts. The remainder of the site (combined into a single, larger lot that includes the drainageway) is to remain undeveloped at this time.

It is anticipated the proposed 29 lots are to be accessed from the west, from a new road extending north from Falcon Highway. Additionally, interior cul-de-sacs are proposed for access to the interior lots, which will also provide fire access. Currently the lots are to utilize a shared well and two shared OWTS's. One OWTS is to service the northern portion of the site and a second OWTS is to service the southern portion of the site. Each OWTS is to service multiple lots. At a future date, the OWTS are to be replaced with a centralized wastewater system. Once the centralized waste system is installed, the original OWTS locations are to be properly disposed of or abandoned and designated as a no build area. The Proposed Site Plan is presented in Figure 2.

This letter is to provide information for the on-site wastewater report per the On-Site Wastewater Treatment Systems (OWTS) Regulations of the El Paso County Board of Health pursuant to Chapter 8.

The following are also excluded from the scope of this report including (but not limited to) foundation recommendations, site grading/surface drainage recommendations, subsurface drainage recommendations, geologic, natural and environmental hazards such as landslides, unstable slopes, seismicity, snow avalanches, water flooding, corrosive soils, erosion, radon, wild fire protection, hazardous waste and natural resources.

Previous Studies and Field Investigation

One geotechnical engineering report was available for our review for a nearby site and one geologic investigation was completed in conjunction with this study. Both are listed below:

1. *Soil and Geology Study, Meadow Lake Industrial, Section 9, Township 15 South, Range 65 West, El Paso County, Colorado*, RMG – Rocky Mountain Group, Job No. 192628, dated July 13, 2023.
2. *Soil, Geology, & Geologic Hazard Study, Saddlehorn Ranch – Filing No. 2, Curtis Road & Judge Orr Road, El Paso County, Colorado*, Entech Job No. 213148, dated February 9, 2022.

The findings, conclusions and recommendations contained in these reports were considered during the preparation of this report.

SITE CONDITIONS

Personnel of RMG performed a reconnaissance visit on March 29, 2023. The purpose of the reconnaissance visit was to evaluate the site surface characteristics including landscape position, topography, vegetation, natural and cultural features, and current and historic land uses. Three 8-foot deep test pits were performed across the site during our reconnaissance visit. A Test Pit Location Plan is presented in Figure 3.

The site surface characteristics were observed to consist of low lying grasses and weeds across the entire site. No deciduous trees are located on the property.

The following conditions were observed with regard to the parcel:

- A well currently **does not** exist on the existing site;
- No runoff or irrigation features anticipated to cause deleterious effects to treatment systems on the site were observed;
- A minor waterway, unnamed tributary, exists through the western portion of the property. However, the portion of the site included in this study lies outside any designated floodway or floodplain;
- Slopes greater than 20 percent **do not** exist on the site; and
- Significant man-made cuts **do not** exist on the site.

Treatment Areas

In reviewing the El Paso County Board of Health Regulations, Chapter 8, Table 6-2, usage is to be designed for 20/gallons per person per day. It is anticipated each structure is to have approximately 5 to 7 employees per site per day. If each OWTS system services no more than 14 sites, overall usage for each shared system is not anticipated to exceed 2,000 gallons per day. Due to the majority of lots sizes being under 2.5 acres and the anticipated low flows and usage per structure, shared OWTS systems are proposed as an alternative to minimize cost and site disturbance. If properly designed, the proposed shared systems should provide adequate wastewater treatment for the currently proposed 25 developable lots (29 subdivided lots minus 2 lots each for detention ponds and OWTS).

Per the El Paso County Land Development Code, Chapter 8, Design Considerations and Standard 8.4.8 (B)(1)(c)
Treatment areas at a minimum must achieve the following:

- The treatment areas must be 4 feet above groundwater or bedrock as defined by the Definitions 8.3.4 of the Regulations of the El Paso County Board of Health, Chapter 8, *OWTS Regulations*, effective July 7, 2018;
- Prior to construction of an OWTS, an OWTS design prepared per *the Regulations of the El Paso County Board of Health, Chapter 8, OWTS Regulations* will need to be completed. A scaled site plan and engineered design will also be required prior to obtaining a building permit;

- Comply with any physical setback requirements of Table 7-1 of the El Paso County Department of Health and Environment (EPCHDE);
- Treatment areas are to be located a minimum 100 feet from any well (existing or proposed), including those located on adjacent properties per Table 7-2 per the EPCHDE;
- Treatment areas must also be located a minimum 50 feet from any spring, lake, water course, irrigation ditch, stream or wetland;
- Other setbacks include the treatment area to be located a minimum 10 feet from property lines, cut banks and fill areas (from the crest);
- The new lots shall be laid out to ensure that the proposed OWTS do not fall within any restricted areas, (e.g. utility easements, right of ways). Based on the test pit observations, the parcel has a minimum of two locations for the OWTS.

Contamination of surface and subsurface water resources should not occur if the treatment areas are evaluated and installed according to El Paso County Health Department and State Guidelines in conjunction with proper maintenance.

DOCUMENT REVIEW

RMG has reviewed the above referenced site plan, identified the soil conditions anticipated to be encountered during construction of the proposed OWTS for the site, which included a review of documented Natural Resource Conservation Service - NRCS data provided by websoilsurvey.nrcs.usda.gov. The Soil Survey Descriptions are presented below. A review of FEMA Map No. 08041C0566G, effective December 7, 2018 indicates that the proposed treatment areas are not located within an identified floodplain.

SOIL EVALUATION

Personnel of RMG performed a soil evaluation to include three 8-foot deep test pits, on March 29, 2023 (Test Pits TP-1 through TP-3), utilizing the visual and tactile method for the evaluation of the site soils. At the time of our field investigation, the lots which were to contain the shared OWTS were not yet identified. The test pits were located relatively evenly across the site to obtain representative information regarding the distribution of soil types across the site, to aid in determining the locations of the two shared OWTS systems. Based on the materials encountered in our test pits, it is anticipated that the any of the designated 29 lots will be suitable for use as one of the shared OWTS locations. It's our understanding that the general locations of the OWTS have been selected subsequent to our field investigation, but that the final placement is to be determined by the civil engineer completing the OWTS design. The Test Pit Logs are presented in Figures 4 and 5.

The soil conditions as indicated by the USDA web soil survey data indicated 5 soil types across the entire property. However, included in our descriptions below are the soil conditions in the area to be developed, which are anticipated to consist of loamy sand and sandy loam as described below:

- 8 – Blakeland loamy sand, 1 to 9 percent slopes. The Blakeland loamy sand was mapped by the USDA to encompasses the majority of the proposed lot areas. The properties of the

Blakeland loamy sand include somewhat excessively drained soil with a depth to water table of over 80 inches. Runoff is anticipated to be low and frequency of flooding or ponding is none. Landforms are flats and hills.

- 83 – Stapleton sandy loam, 3 to 8 percent slopes. The Stapleton sandy loam was mapped by the USDA to encompasses the very northwest corner and parallels the Blakeland loamy sand long the west side of the proposed lot areas. The Stapleton sandy loam was mapped by the USDA to encompasses the majority of the property. The properties of the Stapleton sandy loam include well drained soil with a depth to water table of over 80 inches. Runoff is anticipated to be low and frequency of flooding or ponding is none. Landforms are hills.

A USDA Soil Survey Map is presented in Figure 5.

Groundwater and bedrock were not encountered in the test pits performed by RMG.

Two shared OWTS are proposed for the lots and should conform to the recommendations of a future OWTS site evaluation, performed in accordance with the applicable health department codes prior to construction. The future report will require additional test pits in the vicinity of the proposed treatment field. A minimum separation of 4 feet shall be maintained from groundwater and bedrock to the infiltrative surface.

Redoximorphic features indicating the fluctuation of groundwater or higher groundwater levels were not observed in the test pits.

CONCLUSIONS

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems within the cited limitations. There are no foreseeable or stated construction related issues or land use changes proposed at this time.

Soil and groundwater conditions at the site are suitable for the proposed shared treatment systems. It should be noted that the LTAR values stated above are for the test pit locations performed for this report only. The LTAR values may change throughout the site. If an LTAR value of less than 0.35 (or soil types 3A to 5) or greater than 0.80 (soil type 0) are encountered at the time of the site specific OWTS evaluation, an "engineered system" will be required. Due to the shared OWTS concept, it is anticipated that each OWTS will require an "engineered system".

LIMITATIONS

The information provided in this report is based upon the subsurface conditions observed in the profile pit excavations and accepted engineering procedures. The subsurface conditions encountered in the excavation for the treatment area may vary from those encountered in the test pit excavations. Therefore, depth to limiting or restrictive conditions, bedrock, and groundwater may be different from the results reported in this letter.

An OWTS site evaluation will need to be performed in accordance with the applicable health department codes prior to construction.

I hope this provides the information you have requested. Should you have questions, please feel free to contact our office.

Cordially,

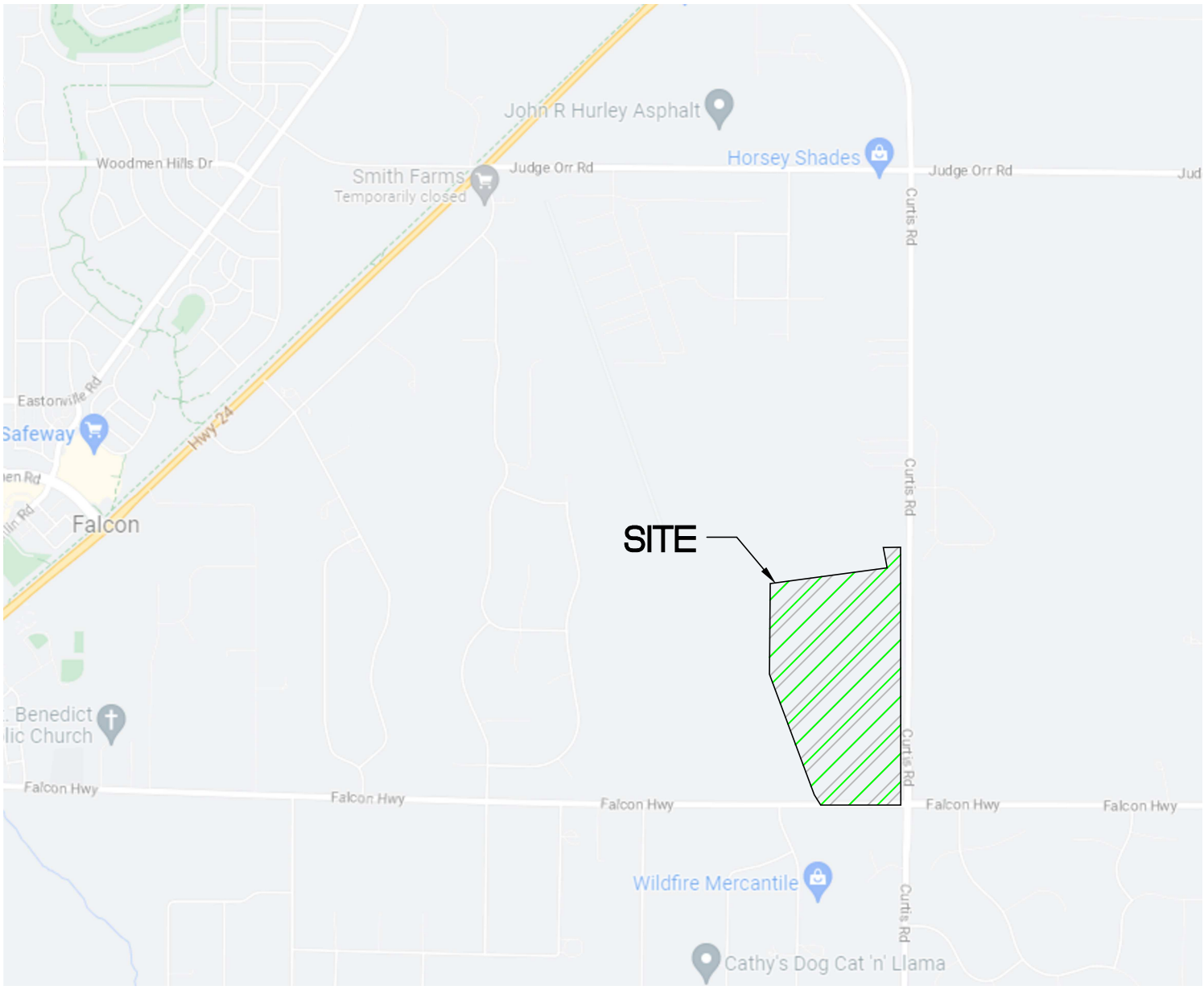
RMG – Rocky Mountain Group

Kelli Zigler
Project Geologist

Reviewed by,

RMG – Rocky Mountain Group

Tony Munger, P.E.
Sr.Geotechnical Project Manager



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(719) 548-0600 ~ WWW.RMGENGINEERS.COM
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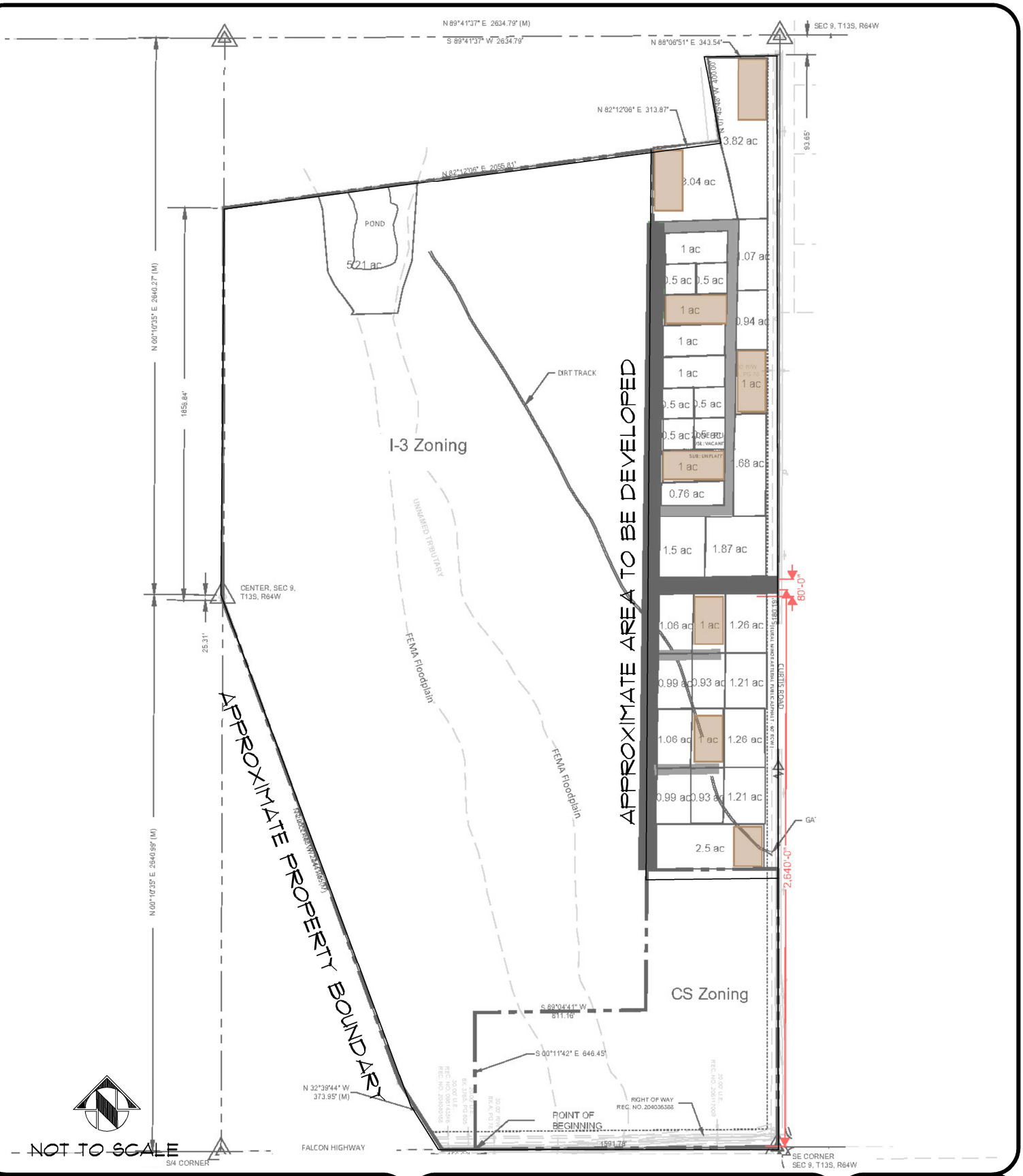
SITE VICINITY MAP

MEADOW LAKE INDUSTRIAL
FILING NO. 1
EL PASO COUNTY, CO
MEADOWLAKE DEVELOPMENTS, LLC

JOB No. 192628

FIG No. 1

DATE 7-13-2023



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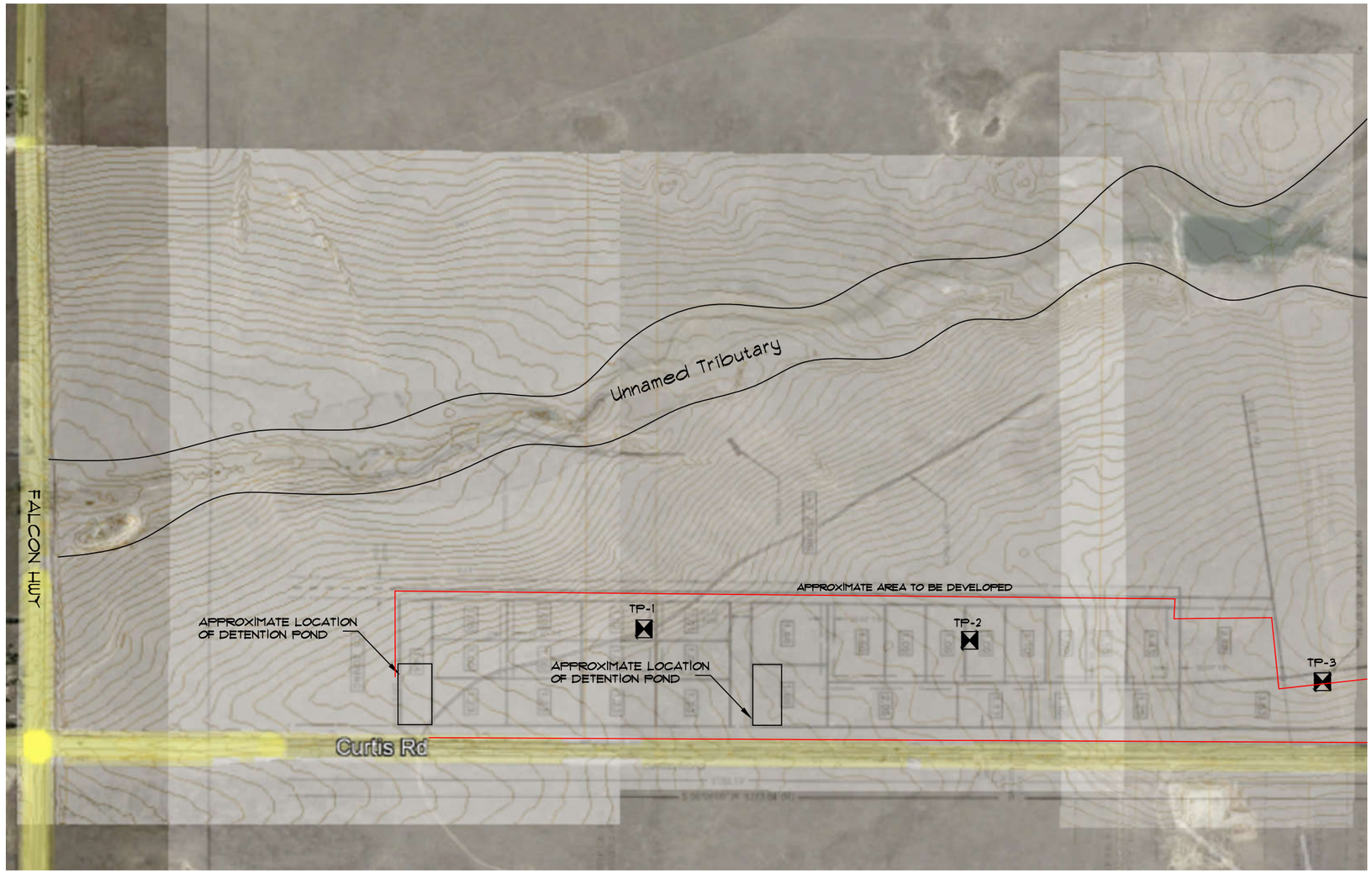
PROPOSED SITE PLAN

MEADOW LAKE INDUSTRIAL
FILING NO. 1
EL PASO COUNTY, CO
MEADOWLAKE DEVELOPMENTS, LLC

JOB No. 192628

FIG No. 2

DATE 7-13-2023



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DENOTES APPROXIMATE LOCATION OF TEST PITS

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MEADOW LAKE INDUSTRIAL
FILING NO. 1
EL PASO COUNTY, CO
MEADOWLAKE DEVELOPMENTS, LLC

ENGINEER:	TM
DRAWN BY:	NM
CHECKED BY:	TM
ISSUED:	7-13-2023

TEST PIT
LOCATION PLAN

SHEET No.
FIG-3

TEST BORING: **TP-1**

DATE DRILLED:
3/29/23
NO GROUNDWATER ON
3/29/23

0-1.5 FT: LOAMY SAND
STRUCTURE-GRADE: SINGLE GRAIN
STRUCTURE-SHAPE: STRUCTURLESS
SOIL TYPE: 1

1.5 TO 4.0 FT: SANDY CLAY
STRUCTURE-GRADE: BLOCKY
STRUCTURE-SHAPE: MODERATE
SOIL TYPE: R-1

4.0 TO 6.0 FT: SANDY LOAM
STRUCTURE-GRADE: BLOCKY
STRUCTURE-SHAPE: STRONG
SOIL TYPE: 2

6.0 TO 7.0 FT: SANDY CLAY LOAM
STRUCTURE-GRADE: BLOCKY
STRUCTURE SHAPE: MODERATE
SOIL TYPE: 2

7.0 TO 8.0 FT: SANDY LOAM
STRUCTURE-GRADE: BLOCKY
STRUCTURE-SHAPE: STRONG
SOIL TYPE: 2

NO GROUNDWATER OR LIMITING LAYERS

DEPTH (FT) | SYMBOL | SAMPLES | BLOWS PER FT. | WATER CONTENT %

5

TEST BORING: **TP-2**

DATE DRILLED:
3/29/23
NO GROUNDWATER ON
3/29/23

0-2.0 FT: LOAMY SAND
STRUCTURE-GRADE: SINGLE GRAIN
STRUCTURE-SHAPE: STRUCTURLESS
SOIL TYPE: 1

2.0 TO 3.5 FT: SANDY CLAY
STRUCTURE-GRADE: BLOCKY
STRUCTURE-SHAPE: MODERATE
SOIL TYPE: R-1

3.5 TO 5.0 FT: SANDY CLAY LOAM
STRUCTURE-GRADE: BLOCKY
STRUCTURE SHAPE: STRONG
SOIL TYPE: 3

5.0 TO 5.5 FT: CLAY
STRUCTURE-GRADE: BLOCKY
STRUTURE-SHAPE: MODERATE
SOIL TYPE: 4

5.5 TO 8.0 FT: LOAMY SAND
STRUCTURE-GRADE: STRUCTURELESS
STRUCTURE-SHAPE: GRANULAR
SOIL TYPE: R-0 (MORE THAN 35% ROCK >2mm)

NO GROUNDWATER OR LIMITING LAYER

DEPTH (FT) | SYMBOL | SAMPLES | BLOWS PER FT. | WATER CONTENT %

5

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TEST BORING LOG

JOB No. 192628

FIGURE No. 4

DATE Jul/14/2023

TEST BORING: **TP-3**

DATE DRILLED:
3/29/23
NO GROUNDWATER ON
3/29/23

DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
5				

0-2.0 FT: LOAMY SAND
STRUCTURE-GRADE: SINGLE GRAIN
STRUCTURE-SHAPE: STRUCTURLESS
SOIL TYPE: 1

2.0 TO 8.0 FT: LOAMY SAND
STRUCTURE-GRADE: SINGLE GRAIN
STRUCTURE-SHAPE: STRUCTURLESS
SOIL TYPE: R-0 (MORE THAN 35% ROCK >2mm)

NO GROUNDWATER OR LIMITING LAYER

ROCKY MOUNTAIN GROUP

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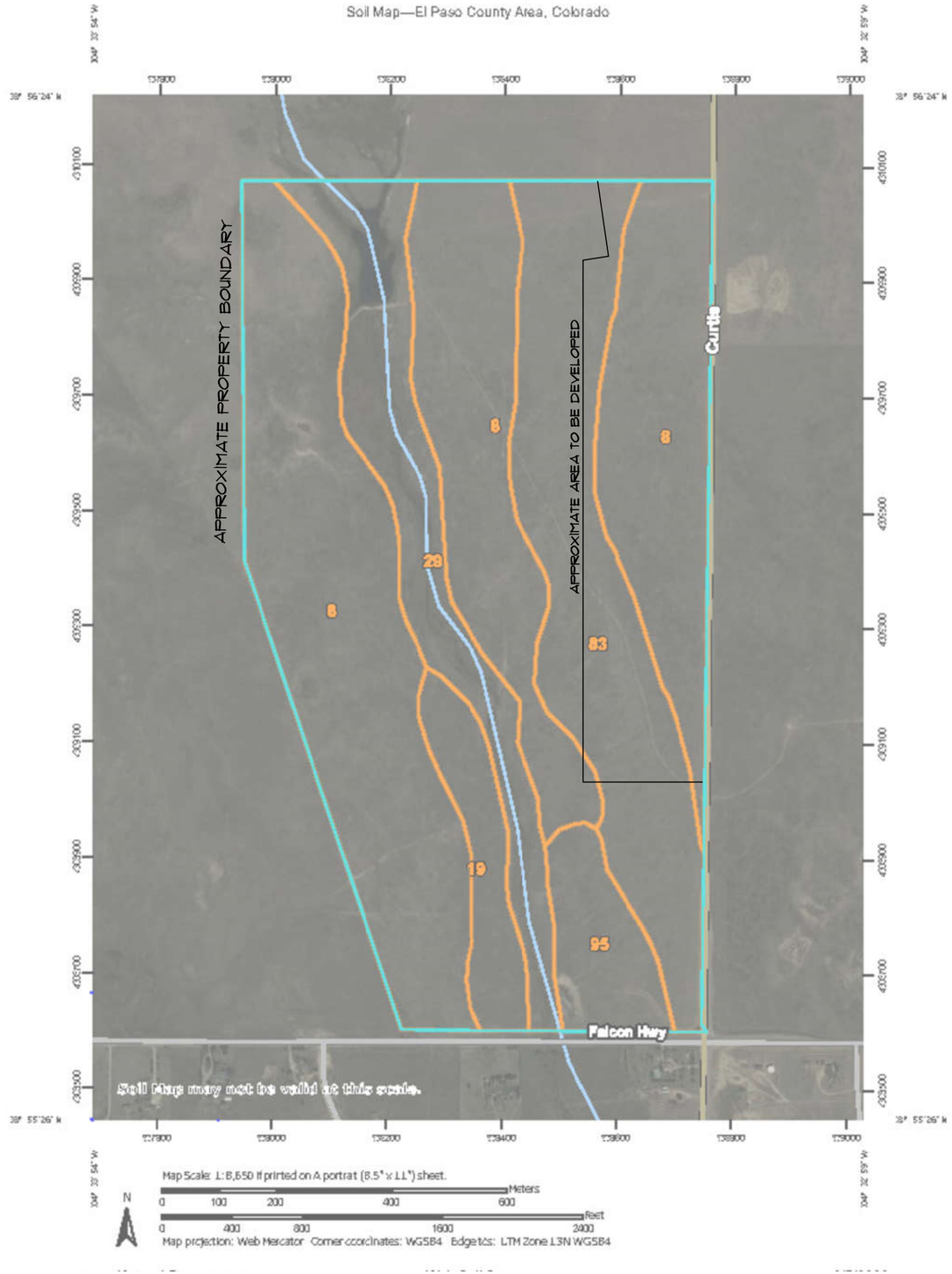
TEST BORING LOG

JOB No. 192628

FIGURE No. 5

DATE Jul/14/2023



8 - Blakeland Loamy Sand, 1 to 9 percent slopes

83 - Stapleton sandy loam, 3 to 8 percent slopes

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EL PASO COUNTY, CO
MEADOWLAKE DEVELOPMENTS, LLC

ENGINEER:	TM
DRAWN BY:	NM
CHECKED BY:	TM
ISSUED:	7-13-2023

USDA SOIL SURVEY MAP

SHEET No.
FIG-6