NorthWest Colorado Consultants, Inc.

Geotechnical / Environmental Engineering • Materials Testing

January 7, 2026

Steamboat Springs Winter Sports Club
c/o Native Excavating
Charlie MacArthur
1878 13th Street
Steamboat Springs, CO 80487

Job Number: 25-13834

Subject: Geotechnical Investigation,
SSRC Water Ramp Facility, Steamboat
Ski Area, Steamboat Springs, Colorado.

Charlie,

This report presents the results of a Geotechnical Investigation for the proposed SSRC Water Ramp Facility to be constructed within the Steamboat Ski Area in Steamboat Springs, Colorado. The approximate location of the project site is shown in Figure #1.

The scope of our work included obtaining data from cursory observations made at the site, the excavation and logging of two test pits, sampling of the probable foundation soils and laboratory testing of the samples obtained. This report presents recommendations for economically feasible and safe type foundations, as well as allowable soil pressures and other design and construction considerations that are advisable, but not necessarily routine to quality design and building practices in this area.

Proposed Construction: The project will include the construction of a jump structure that will consist of a wooden deck supported by steel beams, which may be as high as 14 feet above the design surface. The type of foundation system has yet to be determined.

A PVC lined pond with a volume of approximately 1.23 acre-feet, and an earthen embankment will be constructed below the jump structure. The embankment that will be constructed on the downhill side of the pond will have an Agri-Drain low level discharge system and a riprap lined spillway.

The interior side slopes for the pond and pond embankment will be constructed with a slope configuration of 3 (Horizontal) to 1 (Vertical) or flatter. The remaining embankment fill slopes will be constructed to a 2 (Horizontal) to 1 (Vertical) slope configuration and the unretained cut slopes located along the east/uphill side of the facility will be constructed to a 2 (Horizontal) to 1 (Vertical) slope configuration.

Three to four trampoline pits will be constructed to the west of the ramp structure. Two small storage sheds, on skids, will be located immediately east of the trampoline pits.

A gravel surfaced access road, parking area and footpaths, and stacked boulder retaining walls will be constructed downhill and west/southwest of the ramp structure and pond.

For design purposes, NWCC has assumed the structure loadings to be relatively light typical of this type of construction. If loadings or conditions are significantly different from those described above, NWCC should be notified to reevaluate the recommendations contained in this report.

Site Conditions: The project site is located within the Steamboat Ski Area and is situated near the bottom of the Vogue and Voodoo runs, and immediately west of the existing Big Air Landing on Voodoo.

The topography of the project site is variable and consists of strong to steep slopes that generally slope down to the west towards Shortcut, the existing access road. Some site grading consisting of cut and fill slopes appears to have been completed during the development of the ski runs.

The project site is generally vegetated with grasses and weeds with deciduous brush and aspens located above the proposed facility and to the north.

Subsurface Conditions: To investigate the subsurface conditions at the site, two test pits were advanced at the site on October 30, 2025 with a Cat 305 trackhoe. The approximate test pit locations are shown on Figure #2.

The subsurface conditions encountered generally consisted of a layer of topsoil fill materials overlying highly weathered/decomposed bedrock that extended to the maximum depth investigated in Test Pit 1, 8 feet below the existing ground surface (bgs). It should be noted that rig refusal was encountered in Test Pit 2 at a depth of 6 feet bgs. Graphic logs of the test pits, along with the associated Legend and Notes, are presented in Figure #3.

Topsoil fill materials mixed with sands, gravels and clays were encountered at the ground surface in both test pits and ranged from 1 to 2 ½ feet in thickness. The highly weathered/decomposed bedrock materials encountered below the topsoil fill materials consisted of granitic sands that were clayey to silty, fine to coarse grained with gravels, very low to non plastic, medium dense to hard, slightly moist to moist and brown to light brown in color. Samples of the highly weathered/decomposed bedrock materials classified as SC to SM soils in accordance with the Unified Soil Classification System.

A swell-consolidation test conducted on a sample of the highly weathered/decomposed bedrock materials indicates this material exhibited a very low swell potential when wetted under a constant

load. The swell-consolidation test results are shown in Figure #4, and all of the laboratory test results are summarized in the attached Table 1.

Groundwater was not encountered nor were there any signs of a seasonal high groundwater table in the test pits at the time of test pit excavation. It should be noted that the near surface runoff conditions at the site can be expected to fluctuate with changes in precipitation, snow making and runoff.

Foundation Recommendations: Based on the subsurface conditions encountered in the test pits, the results of the field and laboratory and our understanding of the proposed construction, we believe the proposed structures may be placed on footings placed over the undisturbed weathered/decomposed bedrock or on properly compacted structural fill materials, or on helical piles advanced into the highly weathered/decomposed bedrock materials.

Based on the subsurface conditions encountered at the site and the laboratory test results, we recommend a Site Class BC be used for the foundation designs in accordance with Table 20.2.4 in Chapter 20, ASCE 7.

Recommendations for both of these foundation systems are provided below.

Footings: Foundation movement should be within tolerable limits if the following design and construction precautions are observed for the footings.

1) Footings placed on the natural, highly weathered/decomposed bedrock materials or on properly compacted structural fill materials placed over the highly weathered/decomposed bedrock materials should be designed using an allowable soil bearing pressure of 2,500 psf.

2) Footings or pad sizes should be computed using the above soil pressure and be placed on the undisturbed highly weathered/decomposed bedrock materials found below the existing fill materials and/or any natural topsoil and organic materials, or on properly compacted structural fill materials placed over the highly weathered/decomposed bedrock materials after the existing fill and topsoil and organic materials are removed.

3) Any fill materials placed beneath the footings should be a non-expansive granular soil approved by NWCC prior to placement. The fill materials placed under the footings should be uniformly placed and compacted in 6 to 8 inch loose lifts and compacted to at least 100% of the maximum standard Proctor density and within 2% of the optimum moisture content determined in accordance with ASTM D-698. The structural fill materials should extend out from the edge of the footings on a 1(horizontal) to 1(vertical) or flatter slope. The on-site highly weathered/decomposed bedrock materials may be used for structural fill materials after any cobbles and/or boulders are removed and they are moisture conditioned (wetted or dried) prior to placement.

4) Footings or pads should be placed well enough below final backfill grades to protect them from frost heave. Forty-eight (48) inches is typical for this location considering normal snow cover and other winter factors.

5) Based on experience, NWCC estimates total settlement for footings designed and constructed as discussed in this section will be approximately 1 inch.

7) NWCC should be retained by the client to observe the foundation excavations and test the fill materials placed under the foundations for compaction.

Helical Piles: NWCC believes a foundation system consisting of helical screw piles advanced into the highly weathered/decomposed bedrock materials may be a feasible foundation system for the proposed structures.

Utilizing this type of foundation, each column is supported on a single or group of screw piles and the structures are founded on grade beams or pier caps that are supported by a series of piles. Load applied to the piles is transmitted to the natural soils and bedrock through the end bearing pressure at the helices of the screw pile. Foundation movement should be less than ½-inch if the following design and construction conditions are observed.

The helical screw pile foundation system should be designed by a qualified engineer, using industry standards and be installed by a licensed/certified installer. If pile groups are required, we recommend a minimum pile spacing of 3 times the largest helix to achieve the maximum capacity of each individual pile. Lateral loads should be resisted by the use of battered piles or tiebacks or through passive soil pressures against foundation walls or grade beams.

We strongly recommend that at least two test piles be advanced at the site so that the torque versus depth relationships can be established and the proper shaft and helix size and type can be determined. A representative of this office should observe the test pile installation, as well as observe the helical screw pile installations for the foundation system.

NWCC also recommends the following:

- Refusal conditions in the existing fill materials will not be acceptable;
- Minimum 6-inch diameter helix;
- Minimum installation torque of 4,000 ft-lbs;
- Full-time installation observation by a qualified special inspector;
- Review of the Contractor's quality control plan regarding instrumentation calibration and testing, materials QC, and pile installation procedures.

Site Grading Recommendations: Slopes on which the proposed structures are proposed could become unstable as a result of the proposed construction. Design and construction considerations must be addressed to avoid and/or limit the potential for slope instability at the site. Although a detailed slope stability analysis is beyond the scope of this report, some general guidelines are provided below for initial planning and design. Our office should review the construction plans as they are being prepared so that we can verify that our recommendations are being properly incorporated into the plans.

1) Temporary cuts should be constructed to OSHA standards for temporary excavations. Permanent, unretained cuts should be kept as shallow as possible and should not exceed a 3(Horizontal) to 1(Vertical) configuration for any topsoil and organic or fill materials and a 2(Horizontal) to 1(Vertical) configuration for the natural soils, apart from the topsoil and organic materials, and bedrock materials. We recommend these cuts be limited to 15 feet in height or less, unless competent bedrock materials are encountered. The risk of slope instability will be significantly increased if groundwater seepage is encountered in the cuts and beneath the embankment fills. NWCC office should be notified immediately to evaluate the site, if seepage is encountered or deeper cuts are planned and determine if additional investigations and/or stabilization measures are warranted.

2) Excavating during periods of low runoff at the site can reduce potential slope instability during excavation. Excavations should not be attempted during the spring or early summer when seasonal runoff and groundwater levels are typically high.

3) Fills up to 15 feet in height can be constructed at the site and should be constructed to a 2(Horizontal) to 1(Vertical) or flatter configuration. The fill areas should be prepared by removing any existing fill materials and/or topsoil and organics, scarification and compaction to at least 95% of the maximum standard Proctor density and within 3% of optimum moisture content as determined by ASTM D698. The fills should be properly benched/keyed into the natural hillsides after the natural topsoil and organic materials and any existing fill materials have been removed. The fill materials should consist of the on-site natural soils or bedrock materials (exclusive of topsoil, organics or fills) and be uniformly placed and compacted in 6 to 12-inch loose lifts to at least 95% of the maximum standard Proctor density and within 3% of the optimum moisture content determined in accordance with ASTM D698.

4) Proper surface drainage features should be provided around all permanent cuts and fills and steep natural slopes to direct surface runoff away from these areas. Cuts, fills and other stripped areas should be protected against erosion by revegetation or other methods. It is strongly recommended that that the finished slopes be protected using an erosion control geotextile or turf reinforcement to protect the slopes until vegetation is established. Areas of concentrated drainage should be avoided and may require the use of riprap for erosion control. NWCC recommends that a maximum of 4 inches of topsoil be placed over the new cut and fill slopes. It should be noted that the newly placed topsoil materials may slough/slide off the slopes during the spring runoff seasons until the root zone in the vegetated cover establishes.

5) NWCC recommends the finished surface of the access road and parking areas be constructed with a minimum of 12 inches of Class 5 or 6 aggregate base course (ABC) materials compacted to at least 95% of the maximum modified Proctor density and within 3% of the optimum moisture content determined in accordance with ASTM D1557.

We strongly recommend that NWCC be retained to observe excavations when they are near completion to identify bearing soils and confirm the recommendations in this report, as well as test the fill materials placed within the embankments and under and around the structures for compaction.

Stacked Boulder Walls: Based on our experience with the design and construction of similar retaining wall projects at the ski area and within this part of Steamboat Springs, NWCC has developed the following recommendations for the design and construction of stacked boulder retaining walls to be constructed at the project site. It should be noted that this report does not address the elevation and layout of the retaining walls. We have assumed the proposed walls will be 8 feet or less in height.

Based on NWCC's experience with similar walls, we have developed the following design and construction recommendations for stacked boulder retaining walls:

- Boulders shall have a minimum diameter of 2 to 3 feet;
- Boulders shall consist of hard, durable granite, gneiss or other approved rock materials;
- Boulder walls shall be constructed to a maximum height of 8 feet or less with materials placed in a stable configuration that maximizes rock-to-rock contact. Finished slope face shall be constructed at a 0.5 (Horizontal) to 1(Vertical) or flatter slope;
- Base width of boulders shall be at least one-half of total wall height;
- Base layer of boulders shall be keyed into competent, natural soils, bedrock or properly compacted fill materials a minimum of 1 foot;
- A drainage system should be incorporated into wall construction. The drainage shall consist of washed or screened rock materials placed at the back and base of the wall. A drainage system consisting of a 4-inch diameter perforated PVC pipe covered with a layer of free draining gravel shall be placed at the base of the walls. The drain should be uniformly graded to a daylighted outfall with at least a 1 percent slope.

It should be noted that there is a risk of rockfall associated with this type of wall system. Stacked boulders can be undermined due to excessive runoff or other disturbance, and there is a risk of rockfall resulting in damage to downslope areas. Therefore, a qualified engineer should periodically inspect the walls after completion to verify drainage and wall bearing conditions. The

owner should also periodically monitor the site. Any indications of wall movement or groundwater seepage should be immediately brought to the attention of NWCC.

Please note NWCC should observe the stacked boulder wall construction to verify subsurface conditions and wall construction.

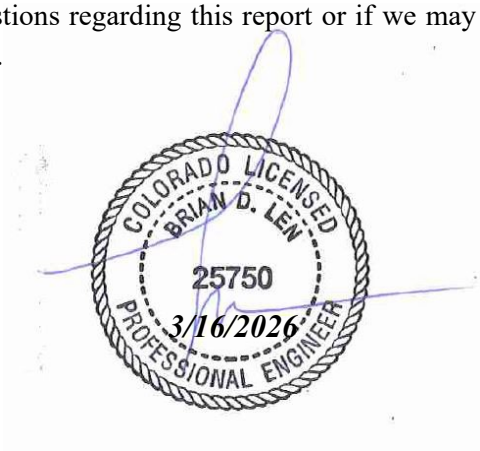
Limitations: The recommendations given in this report are based on the soils and bedrock materials encountered at this site and our understanding of the proposed construction. We believe that this information gives a high degree of reliability for anticipating the behavior of the proposed structures; however, our recommendations are professional opinions and cannot control nature, nor can they assure the soil profiles beneath those or adjacent to those observed. No warranties expressed or implied are given on the content of this report.

This report is based on the investigation at the site described and on the specific anticipated construction as stated herein. If either of these conditions is changed, the results would also most likely change. Man-made or natural changes in the conditions of a property can also occur over a period of time. In addition, changes in requirements due to state of the art knowledge and/or legislation do from time to time occur. As a result, the findings of this report may become invalid due to these changes. Therefore, this report is subject to review and not considered valid after a period of 3 years or if conditions as stated above are altered.

It is the responsibility of the owner or their representative to ensure that the information in this report is incorporated into the plans and/or specifications and construction of the project. It is advisable that a contractor familiar with construction details typically used to dealing with the local subsoils and climatic conditions be retained to build the structures.

If you have any questions regarding this report or if we may be of further service, please do not hesitate to contact us.

Sincerely,
NWCC, INC.



Brian D. Len, P.E.
Principal Engineer

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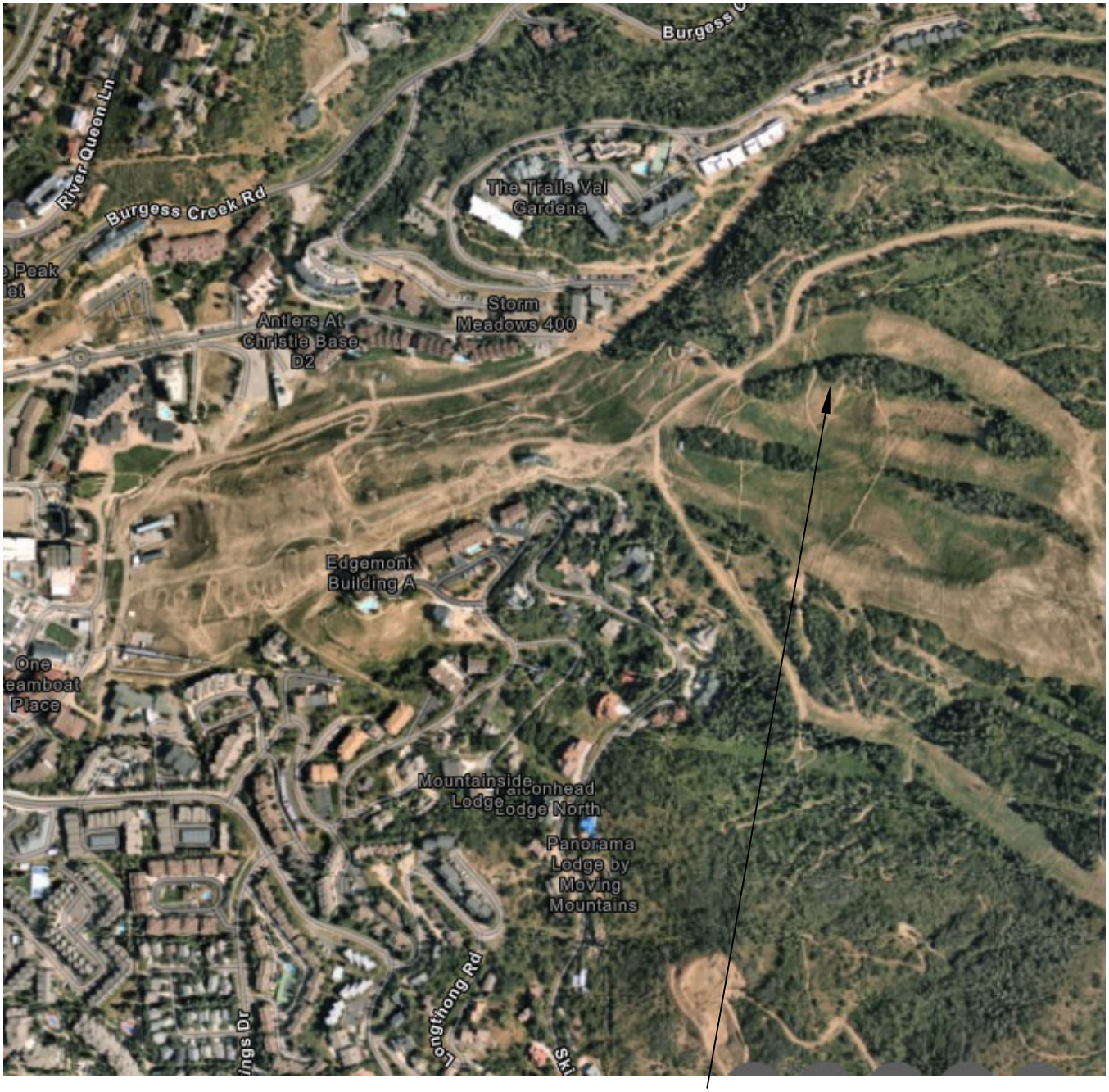

PROJECT SITE

Title: VICINITY MAP		**Date:** 1/6/2025	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
Job Name: SSRC Water Ramp Facility		**Job No.:** 25-13834	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Steamboat Ski Area, Steamboat Springs, Colorado		**Figure:** #1	

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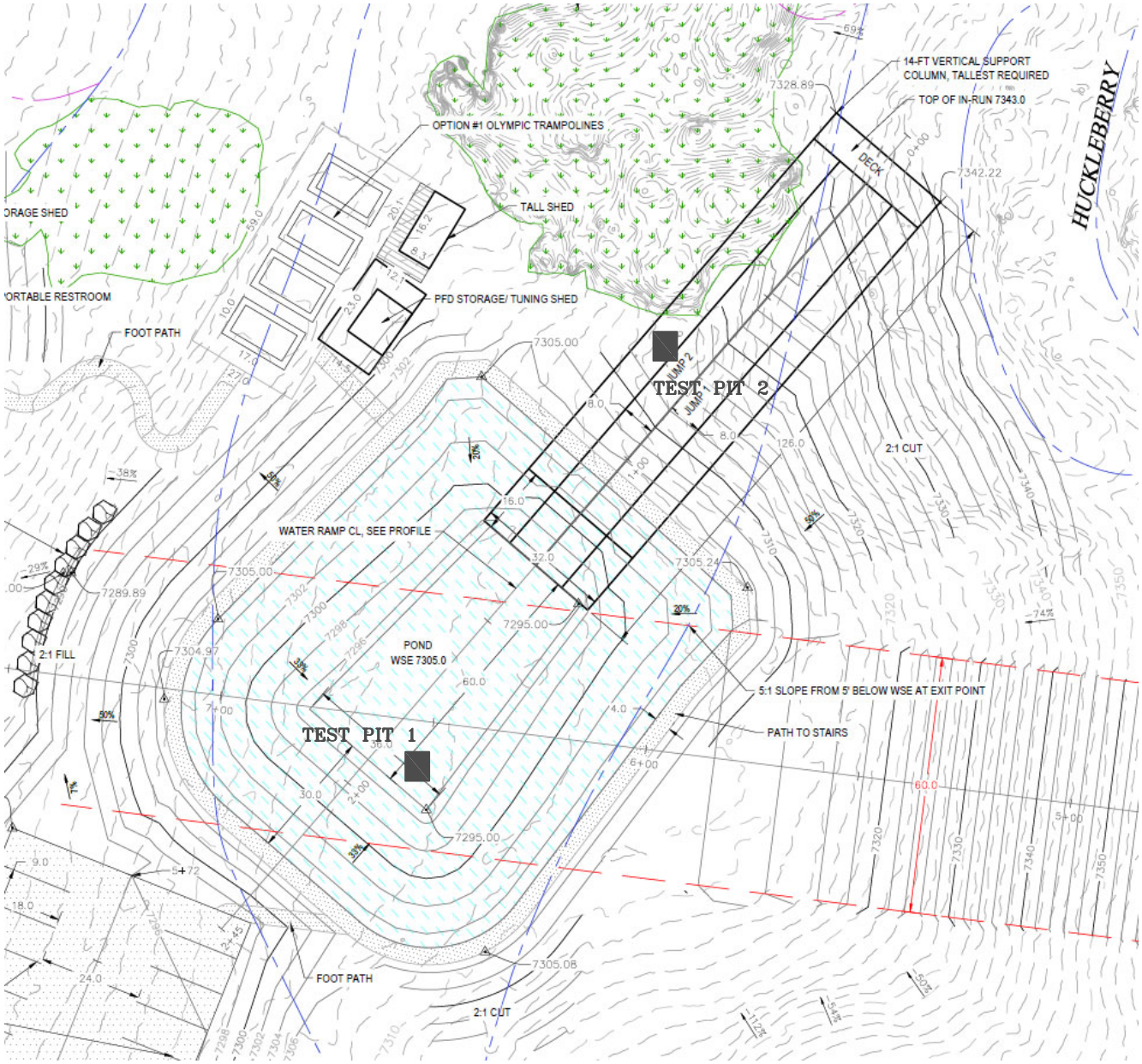
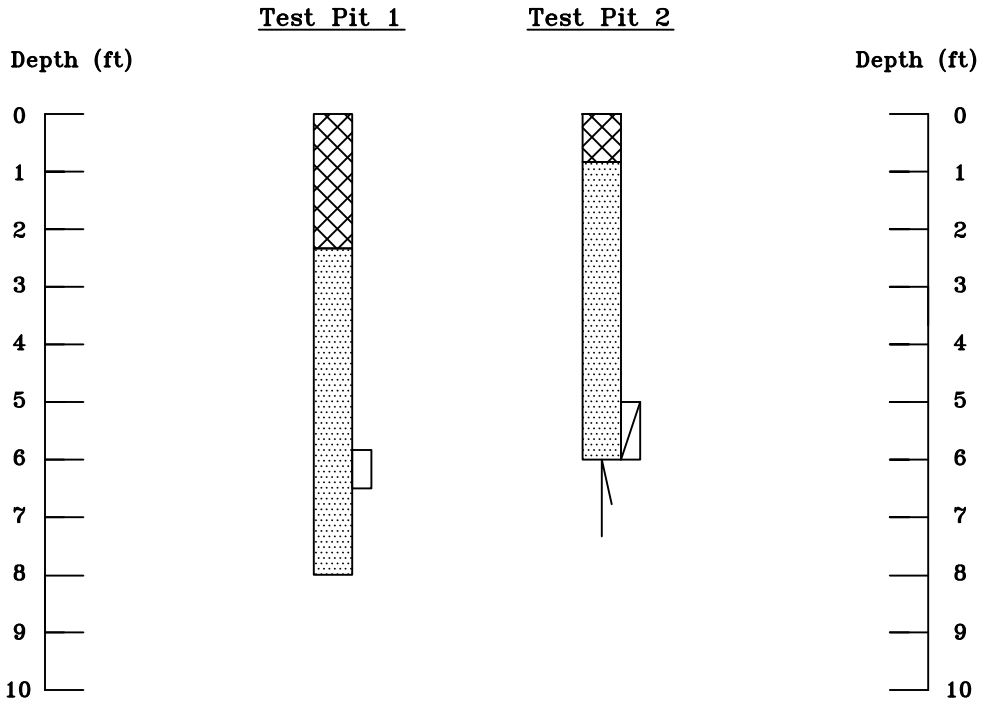
(NOT-TO-SCALE)



Title: SITE PLAN – APPROXIMATE TEST PIT LOCATIONS		**Date:** 1/6/2025	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
Job Name: SSRC Water Ramp Facility		**Job No.:** 25-13834	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Steamboat Ski Area, Steamboat Springs, Colorado		**Figure:** #2	



LEGEND:

TOPSOIL FILL

HIGHLY WEATHERED DECOMPOSED BEDROCK: Granitic Sands, clayey to silty, fine to coarse grained with gravels, very low to non plastic, medium dense to hard, moist to slightly moist and brown to light brown.

Indicates Depth of Rig Refusal in Bedrock.

Hand Drive California Liner Sample.

Small Disturbed Sample.

NOTES:

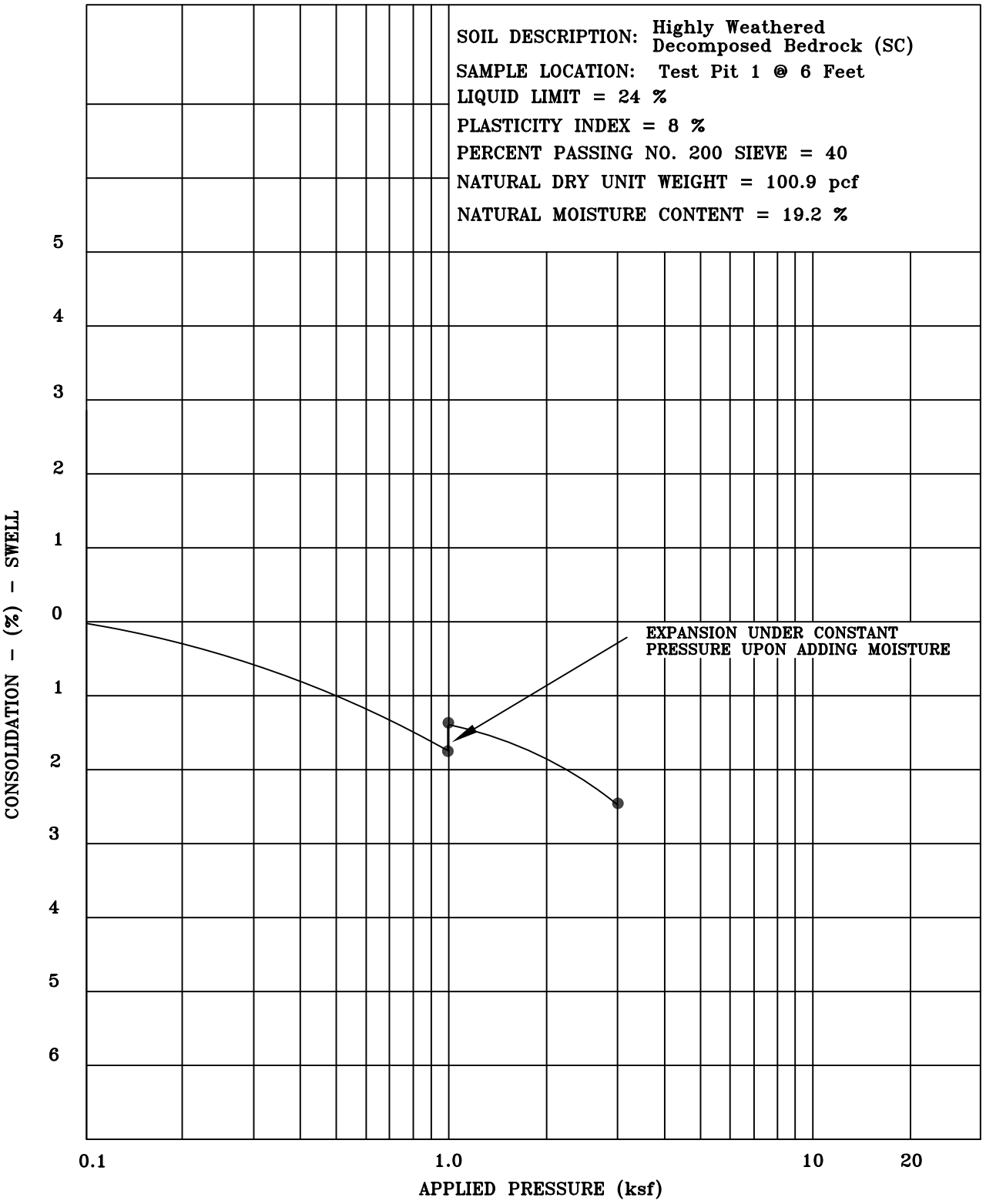
1) Test pits were excavated on October 30, 2025 with a Cat 305 trackhoe.

2) Test pit locations were determined by pacing from existing site features.

3) The elevations of the test pits were not measured and the logs are drawn to the depths investigated.

4) The lines between materials shown on the test pit logs represent the approximate boundaries between material types and transitions may be gradual.

Title: LOGS, LEGEND AND NOTES	Date: 1/6/2025	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
Job Name: SSRC Water Ramp Facility	Job No. 25-13834	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Steamboat Ski Area, Steamboat Springs, CO	Figure #3	



Title: SWELL–CONSOLIDATION TEST RESULTS		Date: 1/6/2025	NWCC North West Colorado Consultants, Inc. Geotechnical / Environmental Engineering · Materials Testing
Job Name: SSRC Water Ramp Facility		Job No. 25-13834	(970)879-7888 · Fax (970)879-7891 2580 Copper Ridge Drive Steamboat Springs, Colorado 80487
Location: Steamboat Ski Resort, Steamboat Springs, Colorado		Figure #4	

NWCC, Inc.

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

SAMPLE LOCATION		NATURAL MOISTURE CONTENT (%)	NATURAL DRY DENSITY (pcf)	ATTERBERG LIMITS		GRADATION		PERCENT PASSING No. 200 SIEVE	UNCONFINED COMPRESSIVE STRENGTH (PSF)	SOIL or BEDROCK DESCRIPTION	UNIFIED SOIL CLASS.
TEST PIT	DEPTH (feet)			LIQUID LIMIT (%)	PLASTICITY INDEX (%)	GRAVEL (%)	SAND (%)				
1	6	19.2	100.9	24	8	14	46	40		Highly Weathered Decomposed Bedrock	SC
2	5-6	8.5			NP	11	78	11		Highly Weathered Decomposed Bedrock	SM

Job No. 25-13834