



September 27, 2023

Summit Mountain Holding Group
6965 E. Powder Mountain Road (Hwy 158)
Eden, Utah 84310
Attn: Mr. Rick Everson (Director of Land Development)

IGES Project No. 01628-037

**RE: Review of Updated Grading Plan (Rev. 1)
Village Nests Retreat Development
Summit Powder Mountain Resort
Weber County, Utah**

Mr. Everson,

As requested, IGES has prepared the following grading plan review for the Village Nests Retreat development, located within the Summit Powder Mountain Resort in Weber County, Utah. The purpose of our services was to review the updated grading plans for the Village Nests with respect to geotechnical engineering and geologic hazards and to provide updated recommendations, as warranted. This submittal has been revised from our original submittal dated September 26, 2023; updates include providing supplemental recommendations for asphaltic pavement design.

Project Background

The Village Nests Retreat project area is a 1.4-acre parcel located east of Daybreak Ridge Road in the Summit Powder Mountain Resort. IGES first became involved with the Village Nests project in 2016; at that time, we understood the project to consist of 20 residential structures (presumed to be condominiums at the time), about half of which would also include parking garages, plus an additional two dedicated parking garages and carports. Development of the property was to include placing a relatively large quantity of engineered fill on a moderate natural grade (approximately 6H:1V), resulting in a new 2H:1V fill slope ranging in height up to approximately 30 feet.

In 2016, IGES completed a geologic hazards assessment (IGES, 2016) for the Village Nests project; this study included a background/literature review, site reconnaissance, and subsurface exploration consisting of the excavation of three test pits across the property. Subsurface earth materials were found to include topsoil forming on a colluvium deposit up to 6½ feet thick, underlain by weathered Wasatch Formation conglomerate. Based upon our assessment, IGES concluded that the geologic hazard risk associated with various potential geologic hazards was considered to be low and provided a number of supplemental geologic and geotechnical recommendations for development; however, for geotechnical engineering, the 2016 letter indicated that the Client could rely on the

original recommendations presented in the project-wide report for the Powder Mountain expansion (IGES, 2012), except where superseded by IGES (2016).

In 2017, IGES was engaged by the Client to provide support for grading of the Village Nests project. IGES (2017b) is a submittal that provided supplemental recommendations for grading of the fill slope, primarily dealing with the construction of keyways and an emphasis on benching and fill placement. During August of 2017, IGES conducted periodic construction observations to assess the earthwork contractor's compliance with our previous recommendations and the *standard of care* for placement of engineered fill. IGES' primary role was to assess completion of keyways and benching; during this time, Terracon was conducting nuclear density testing to assess compaction efforts by the contractor (Terracon was working as a subcontractor for IGES). Our 2017a submittal concluded the following:

“Based on our observations, the subject fill slope has been prepared in substantial compliance with the recommendations presented in the referenced geotechnical reports (IGES, 2012 and 2017a) and the fill section is considered suitable for development.”

Since the time of our involvement in 2017, and subsequent to mass-grading, we understand that the project was never taken to completion.

Current Plans

We understand that the Client has reassessed the project area and several significant changes have been made to the proposed plans. Based on the plan set titled “Village Nest at Powder Mountain – Site Construction Drawings” prepared by Talisman and dated September 7, 2023 (preliminary), the plans call for the construction of a new road ending in a cul-de-sac (Village Nest Road), accessed from Daybreak Ridge Road. The plans call for 20 single-family residential lots, accessed from either side of Village Nest Road, although Lot 8 appears to be accessed from Daybreak Ridge Road. The grading plans indicate that the new proposed grades for the Village Nests Retreat development will be accomplished with a series of cuts and fills, however most of the proposed grading will entail placing additional fill on the east side of the current project area. The plans also show a two-tier rockery to accommodate the grade change from the cul-de-sac and Daybreak Ridge Road, and another smaller single-tier rockery to accommodate the grade change between the cul-de-sac and an adjacent ski run. Some of the project area will be kept as ‘open space’.

Grading Plan Review

To assess the potential impact of the proposed grading to existing grade, IGES drew four geologic cross-sections through representative sections of the development; the sections (A-A' through D-D') are shown in plan-view on Figure A-1a (proposed development) and Figure A-1b (existing grade). The geologic cross-sections are presented as Figures 2a and 2b. The sections were drawn to graphically illustrate the following:

- a) Natural grade (prior to any development).

- b) Finish grade after grading for the greater Powder Mountain expansion project (primarily for Daybreak Ridge Road).
- c) Finish grade after grading for the Village Nests Retreat development in 2017.
- d) Proposed grade for the updated Village Nests Retreat development.

The grading plans indicate new engineered fill on the east side of the project area; the depth of fill will be on the order of 12 feet or less. New 2H:1V fill slopes will have a height of approximately 17 feet or less, depending on location.

Section D-D' also illustrates the proposed two-tier rockery to be utilized to accommodate the grade change from the cul-de-sac to Daybreak Ridge Road; this two-tier system, in conjunction with a 2H:1V slope, is designed to accommodate a 30-ft vertical grade change. The rockery between the cul-de-sac and the future ski run is not illustrated in section view, however this rockery is expected to be approximately 12 feet in height. The plans reference a submittal prepared by IGES in 2013 that provides generalized rockery construction guidelines for limited conditions.

Conclusions and Recommendations

Based upon our review, the new Village Nests Retreat plans are considered feasible from a geotechnical engineering and geologic hazard standpoint. However, based on the proposed grading, some additional recommendations are warranted; supplemental recommendations are provided below:

- 1) The currently proposed rockeries adjacent to the cul-de-sac are too tall and steep for the 2013 generalized rockery design guidelines to be applicable. Accordingly, these retaining systems require a site-specific design. Considering the proposed geometry, IGES considers a rockery to be a poor method for retaining earth materials at these locations. IGES recommends the retaining systems utilize an engineered product such as modular block walls (e.g., verti-block, redi-rock), or a gabion system or similar. For the two-tier wall, which requires accommodating a 30-foot vertical grade change, a soil nail wall may also be considered, since top-down construction may be more practical at this location. For the smaller single-tier retaining wall, a modular block system or gabions may also be used; however, since this location is a 'fill' area, a small-block MSE wall that utilizes geogrid may also be a viable option. Wall design should be performed by a qualified engineer, to be provided in a separate design submittal.
- 2) For construction of the new fill slopes, IGES recommends constructing the fill slopes as a buttress with a keyway and a subdrain; this is graphically illustrated on the geologic cross sections. Keyways should be 3 feet deep and 16 feet in length. Also, a subdrain should be installed along the heel of the keyway, as shown on the sections. The subdrains should outlet to a suitable location to allow the buttress to drain; ponding of water on the surface is not recommended.

- 3) The subdrain should consist of a 4-in. perforated PVC pipe, bedded and covered by at least 3 inches of $\frac{3}{4}$ " clean drain rock, and surrounded by a 4-oz. non-woven filter fabric such as Mirafi 140N or an engineer-approved equivalent.
- 4) For the keyway, buttress, and benching, the generalized guidelines presented in IGES (2017a) should be followed except where superseded herein.
- 5) Pavement Design: IGES understands that the current Weber County minimum pavement design is 3 in. asphalt over 6 in. roadbase over 8 in. subbase. For the Village Nests Retreat project, IGES considers this minimum pavement section acceptable from a geotechnical engineering standpoint. However, the Client may wish to consider utilizing 4 inches of asphalt instead of 3 inches; in our experience, 4 inches of asphalt will generally perform better over time in areas that receive significant snowfall (e.g. ski resorts), and 4 inches of asphalt is less susceptible to damage from snow plows.

Closure

All other recommendations presented in IGES (2012, 2017a, 2017b) remain valid and should be followed except where superseded herein.

We appreciate the opportunity to be of service on this project – if you have any questions, please contact the undersigned at 801-748-4044.

Respectfully submitted,
IGES, Inc.



David A. Glass, P.E.
Senior Geotechnical Engineer

Attachments:

References

Figure A-1 – Plan View

Figure A-2 – Section Views

References:

IGES, 2017a, Assessment of Fill Placement (Rev. 1), Village Nests Development, Summit Powder Mountain Resort, Weber County, Utah, IGES Project No. 01628-026, dated September 11, 2017.

IGES, 2017b, Recommendations for Fill Slope Placement, Village Nests Development, Summit Powder Mountain Resort, Utah: IGES Project No. 01628-026, dated July 21, 2017.

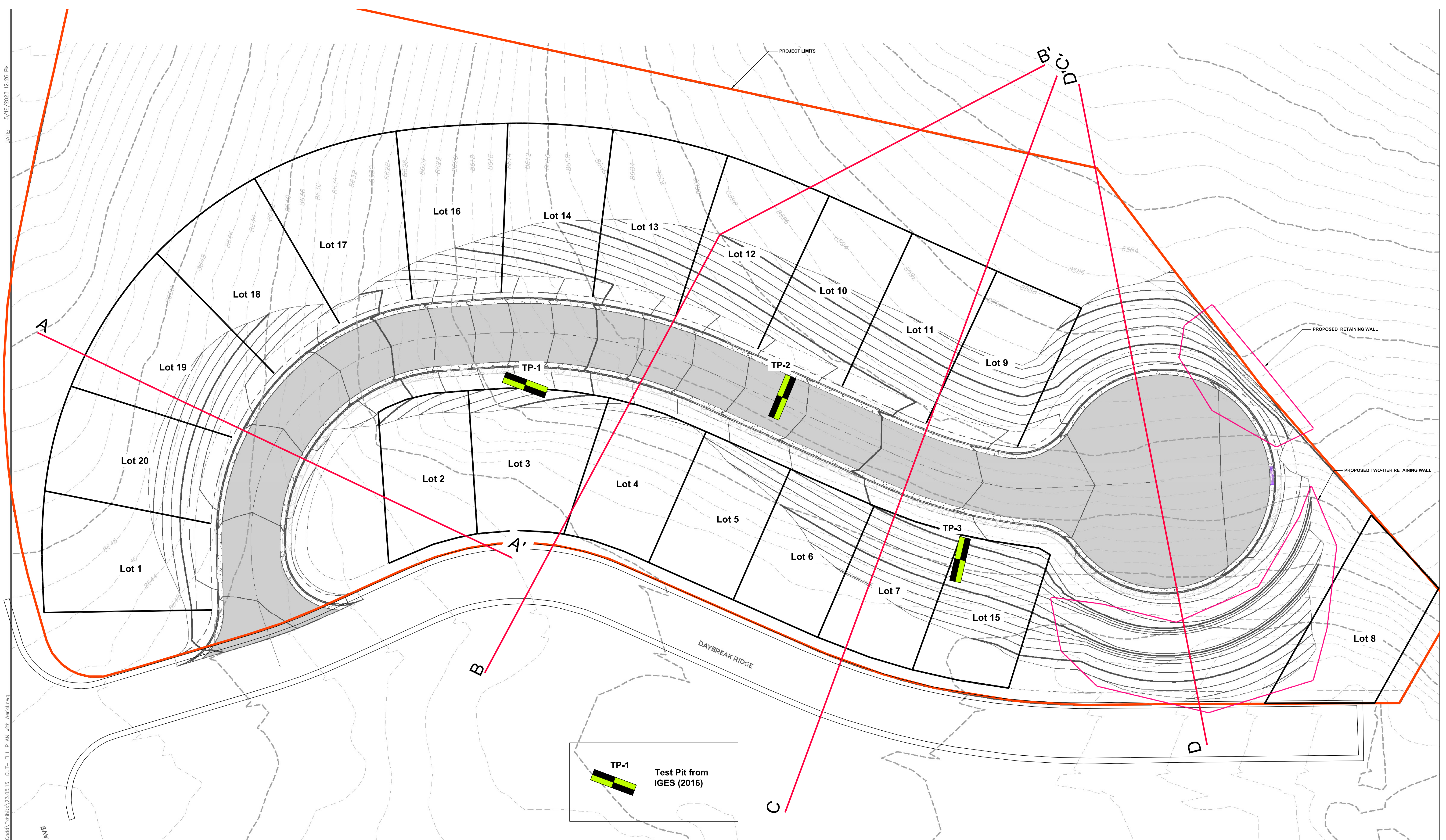
IGES, 2016, Geologic Hazard Assessment, Village Nests Condominiums, Summit Powder Mountain Resort, Utah: IGES Project No. 01628-015, dated December 1, 2016.

IGES, Inc., 2012, Design Geotechnical Investigation, Powder Mountain Resort, Weber County, Utah, IGES Project No. 01628-003, dated November 9, 2012.

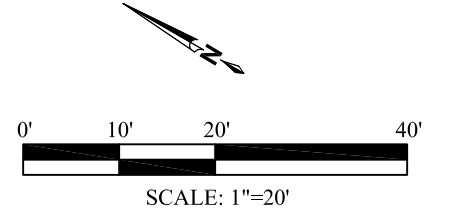
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Geod\jenh\13.05.16 - CUT - FILL PLAN with Aerial.dwg

Base Map: Sheet titled "Village Nest Cut-Fill Plan",
Sheet 201, prepared by Talisman, dated May 18, 2023.



TP-1
Test Pit from
IGES (2016)

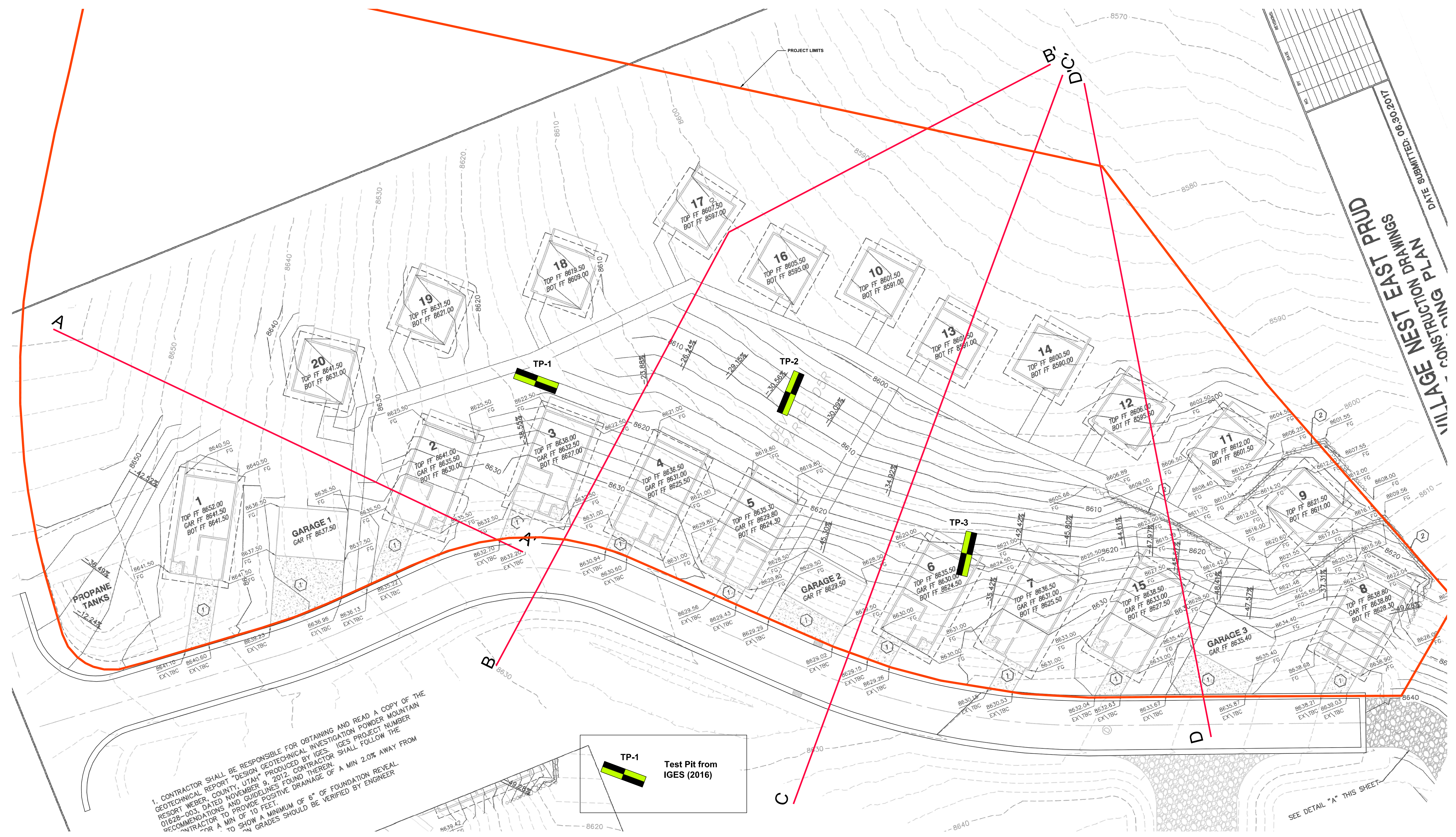


Village Nests Update
Summit Powder Mountain Resort
Weber County, Utah
Project No. 01628-037

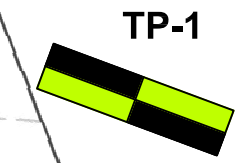
Figure
A-1a

PLAN VIEW - PROPOSED

DATE SUBMITTED: 08/30/2017
CONSTRUCTION DRAWINGS
VILLAGE NEST EAST PRUD

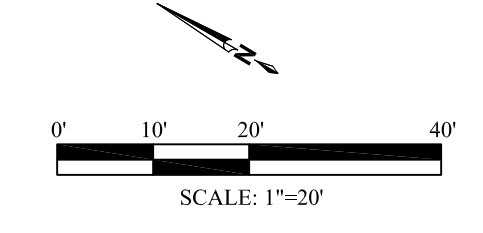


1. CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND READ A COPY OF THE GEOTECHNICAL REPORT "DESIGN GEOTECHNICAL INVESTIGATION POWDER MOUNTAIN RESORT WEBER, COUNTY, UTAH" PRODUCED BY IGES, IGES PROJECT NUMBER 01628-031, DATED NOVEMBER 9, 2012. CONTRACTOR SHALL FOLLOW THE RECOMMENDATIONS AND GUIDELINES FOUND THEREIN. CONTRACTOR SHALL PROVIDE POSITIVE DRAINAGE OF A MIN 2.0% AWAY FROM FOUNDATION REVEAL FOR A MINIMUM OF 6" OF FOUNDATION REVEAL. CONTRACTOR TO SHOW A MINIMUM OF 10 FEET. EXISTING GRADES SHOULD BE VERIFIED BY ENGINEER.

 **TP-1** Test Pit from IGES (2016)

Base Map: Sheet titled "Village Nest East PRUD, Site Construction Drawings Grading Plan", Sheet 1.09, prepared by Talisman, dated June 30, 2017.

SEE DETAIL "A" THIS SHEET



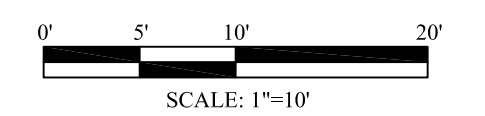
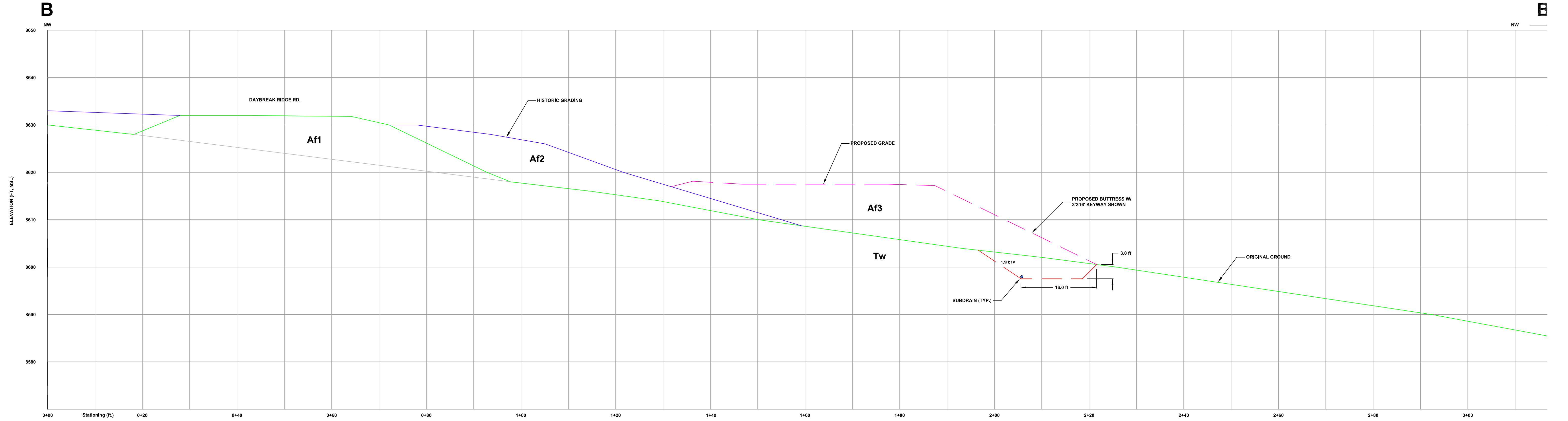
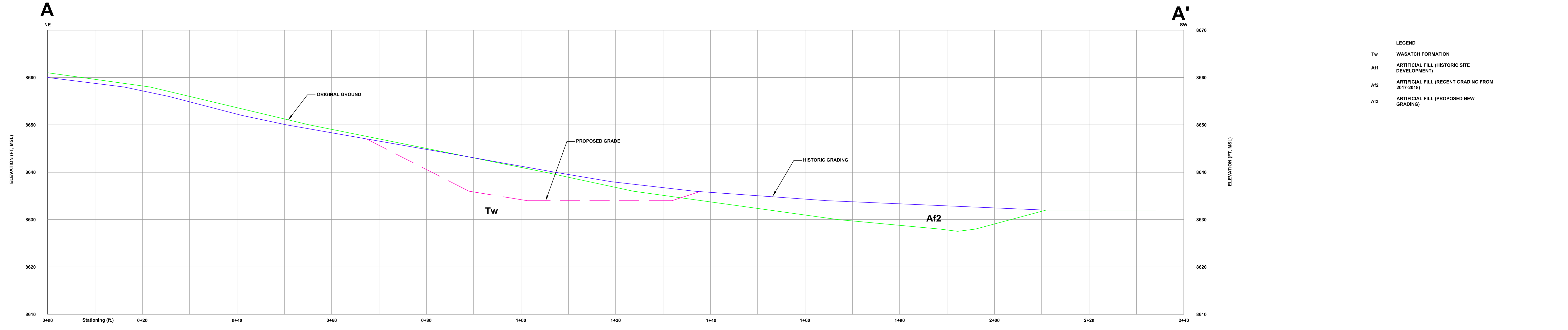
*Existing grade in 2023 following mass-grading in 2017



Village Nests Update
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Figure
A-1b

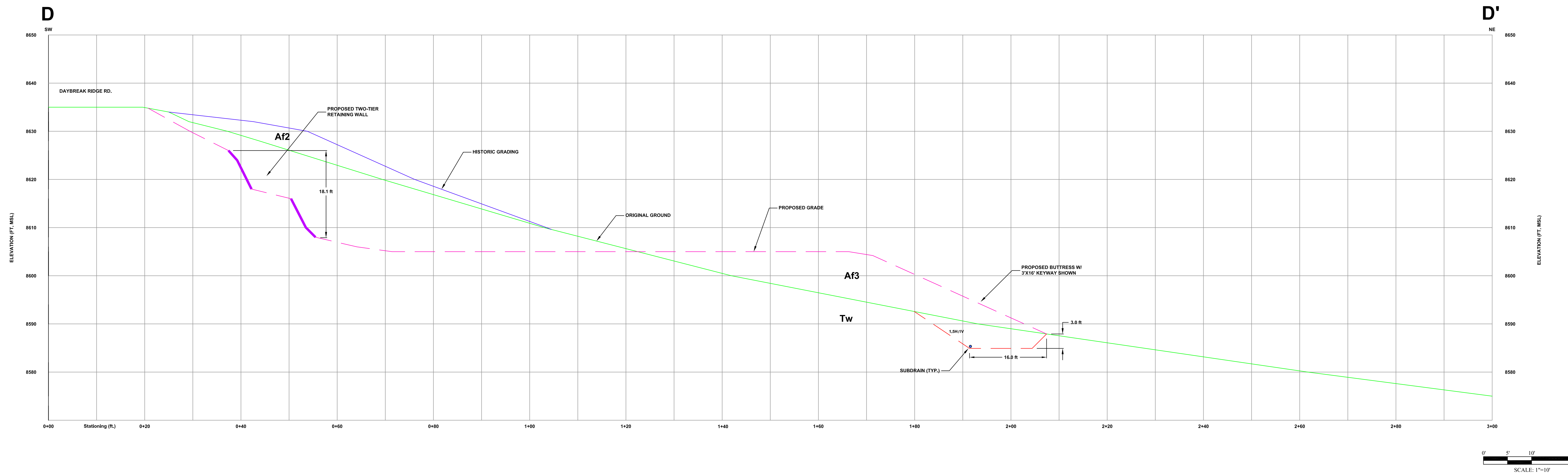
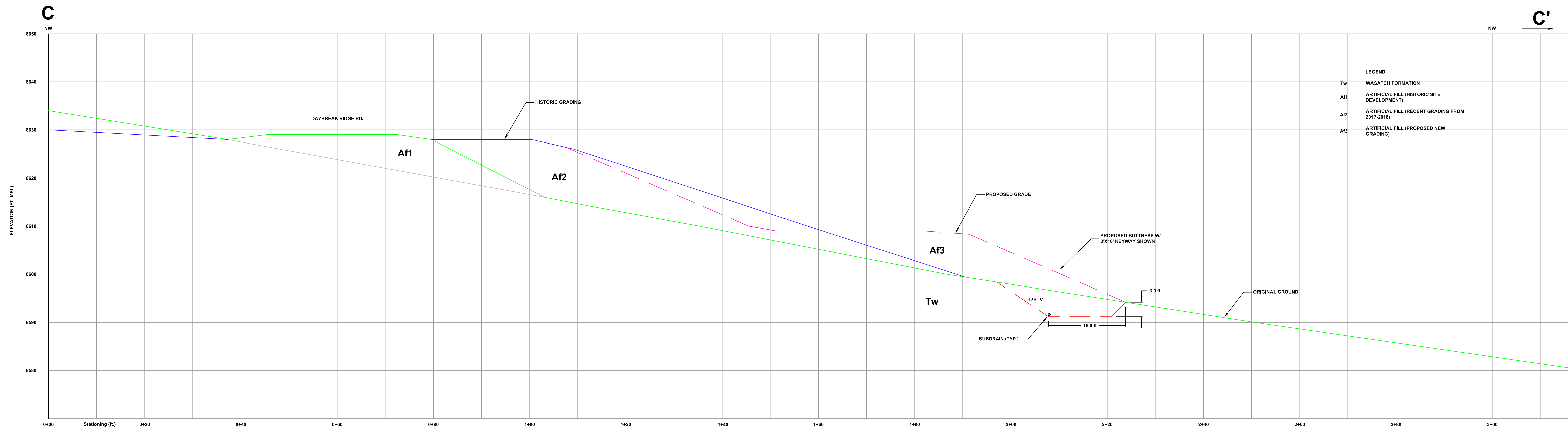
PLAN VIEW - EXISTING GRADE*



Village Nests Update
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Figure
A-2a

SECTION VIEWS



Village Nests Update
Summit Powder Mountain Resort
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Figure
A-2b

SECTION VIEWS