Reconnaissance Report for the Reconstruction of Black Mountain Road

FINAL 11-18-19

Prepared For:
Hot Springs County, Wyoming

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CIVIL ENGINEER'S PROFESSIONAL CERTIFICATION

I hereby certify that this study was developed by me or under my direction and that I am a Professional Engineer licensed in the State of Wyoming as required by the provisions of W.S. 33-29-114 through W.S. 33-29-139.

IN WITNESS WHEREOF, I have hereunder set my hand and affixed my seal.

Dusty D. Spomer, PE 9483

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RECONNAISSANCE REPORT
BLACK MOUNTAIN ROAD (HOT SPRINGS COUNTY ROAD 6)

EXECUTIVE SUMMARY

Black Mountain Road is a major arterial providing critical access to a vast and otherwise inaccessible portion of Hot Springs County. Capital improvements are needed to upgrade Black Mountain Road to a level of service and safety that support the strategic needs of Hot Springs County. The road has deteriorated to a point that it is negatively impacting safe and efficient travel to the varied users along and beyond the study corridor. Users rely on the road for year-round access to several key economic assets of the County including oil/gas/mineral extraction, ranching, and recreation.

Drainage issues create roadside hazards and lead to deterioration of the roadway pavement. The deterioration of the road has led to a rutted, rough surface resulting in unsafe driving conditions. Open range and sharp corners create additional hazards. The road surface does not properly shed water leading to severe winter ice conditions. The road surfacing has passed its useful life and will sharply decline in coming years, rendering the road unusable if no action is taken.

This report provides a preliminary investigation and inventory of existing conditions and provides a preliminary level design based on the highest level of reuse of existing materials, reduces the demand on new materials, and provides the least cost option required to support the demand of the travelling public.

The selected approach to improving the road will allow continued access to ranch grazing lands as well as for exploration, development, and extraction of oil, gas, and minerals from the area, which have always been critical economic drivers in Hot Springs County. The selected approach will raise the level of safety for travelers of the corridor to modern standards, provide all weather access for all users, which also provides a secondary access into the Big Horn Basin, and deliver the most cost-effective solution for providing the transportation facility necessary to meet the strategic needs of Hot Springs County Study Area.

End of Executive Summary

RECONNAISSANCE REPORT

1.1. 2015 Engineering and Planning Study

This project was studied through a joint effort between Hot Springs County Wyoming and the Wyoming Department of Transportation in 2015. Project feasibility was studied from a socio-economic, cost benefit and transportation serviceability standpoint. The results of the study show that the road is necessary to support the transportation needs of industry, recreation and the general public. The study can be found in its entirety here: http://pluto.state.wy.us/awweb/pdfopener?md=1&did=11129067 . Data and analysis found in the 2015 Study will not be repeated in this report, except when necessary.

1.2. Project Description

Black Mountain Road (County Road 6) begins at the end of State Highway 172, approximately 11.2 miles east of Lucerne, WY which is approximately 7 miles north of the community of Thermopolis. The project is 8.65 miles in length. A Location Map is provided in Appendix A.

1.3. Project Type – Reconstruction on Existing Alignment

This project type covers projects reconstructed on existing alignments, including minor adjustments to existing centerline for improved horizontal or vertical alignment and widening for lane widths or shoulder widths. This project type analyzes a range of pavement design strategies (most of which use the existing pavement structure), structural improvements to existing drainage structures, and upgrade of geometric, operational, and safety elements.

1.4. Work Categories

Design criteria and design values cover the following basic project work categories:

1.4.1. Pavements

This project includes reconstruction of an existing pavement structure which includes providing appropriate and industry standard travel lane and shoulder widths. These criteria are based on a selected design life/design year, design year traffic volumes, and established design procedures and construction practices.

1.4.2. Safety

The project included evaluation of a five-year crash history. Roadside safety considerations include replacement or additional roadside safety hardware, including guardrail and sign mounting hardware that meets current safety standards. This work also included construction of a safety clear zone (clearance to obstructions) based on the AASHTO Roadside Design Guide. Crash data is included in the 2015 study.

1.4.3. Operational

The project considered improvements to all intersections to serve design year traffic movements.

1.5. Design Practices

The design criteria and design values, shown in Table 1.1, are based on use of the following design practices:

1.5.1. Design Life

Design life was selected to be 20 years from the year to be constructed or 2039 for the basis of this report.

1.5.2. Design Speed

Design speed is selected based on the functional classification of the roadway, the terrain features, and funding agency requirements or policy. The selected design speed will be set at or within 10 mph of the regulatory posted maximum speed limit, except where vertical or horizontal geometry require a lower speed due to terrain features.

1.5.3. Regulatory posted maximum speed limit

WS 31-5-301 establishes the maximum speed limit at 65 miles per hour for paved roadways and 55 miles per hour for unpaved roadways. Local authorities, in their respective jurisdictions, may determine a maximum speed limit which differs from this statute provided it is reasonable and safe.

1.5.4. Design Criteria and Design Values

Selected design criteria and design values are presented to guide geometric design elements. Based on proper selection of design speed, certain design criteria and design values, such as horizontal and vertical alignment, can be set to meet that design speed while other design criteria and design values, such as travel lane and shoulder widths, can be based on design year traffic volumes. The design values have been set to provide increased flexibility in the selection of values that both satisfy transportation safety and mobility needs while considering project cost, funding, and community or environmental concerns. Design exceptions should only be considered when it is cost prohibitive to achieve full compliance with a recommended design value. These actions must be fully documented through an administrative process. This project draws on several references (see citations) but primarily the County Road Fund Manual and AASHTO guidelines.

1.5.5. Design Exceptions

No design criteria exceptions are proposed in this report. Certain criteria were chosen applying engineering judgment where widely accepted guidance and design criteria were not specific.

1.5.6. Horizontal Alignment

The horizontal alignment will meet the selected design speed based on the combination of curve radius, superelevation and sight distance. Superelevation for this major collector is based on emax = 6%. Higher superelevation values are warranted for collectors with higher design year traffic volumes. Local/residential roads and streets with low speeds, adjacent development, frequent intersections with cross roads, and other urban-type features should make use of lesser superelevation rates. Advance curve warning signing for select curves should be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).

Since this reconstructed roadway is designed to closely follow the centerline of an existing road, it was prudent to make use of angle points or horizontal points of intersection to make slight deflections in the alignment without the use of horizontal curves. To do so, calculations were made based on design speed, superelevation and friction to determine what degree of deflection was allowable without requiring a horizontal curve. Calculations for this process is shown in Appendix B.

One particular curve (Curve C12) in the existing alignment presented an issue with design speed. It required a reduction in design speed for a very short section of road. This section happened to be in an area where the existing alignment was shifted to the right in the existing right-of-way. This presented an opportunity to make a slight realignment to allow the design speed to be continuous through this section with only minimal impact on the project. The curve radius was consequently increased creating only a slight shift towards the center of the right-of-way. This deviation is depicted in Appendix C. The design alignment is documented in Appendix D.

One critical element of this project is the existing cross-slope of the road which is not presently providing proper superelevation in the curves. A thorough analysis of existing cross-slope conditions is included in Appendix E. A design cross-slope of 1.5% was chosen to more closely reflect current conditions and to minimize construction quantities. Design cross-slope should be reexamined during final design.

Table 1.1 Reconstruction on Existing Alignment—Design Criteria and Design Values*

Design Criteria	Functional Classification Major Collector
Design Speed – Rolling Terrain	55 mph to 30 mph
Travel Lane Width, <2000 Vehicles/day	11 Feet
Shoulder Width	0
Horizontal Alignment –Isolated Curves	Meet Design Speed/Reduced Design Speed
Vertical Alignment –Isolated Curves	Meet Design Speed/Reduced Design Speed
Grades (Maximum)	Existing Grades for all Terrains
Bridge Roadway Width	Approach Roadway Width
Total Roadway Width	22 Feet
Design Curve Radius	Meet Design Speed/Reduced Design Speed
Maximum Superelevation	6%
Minimum K-factor	Meet Design Speed/Reduced Design Speed
Passing Sight Distance/Sight Distance	N/A
Cross Slope	1.5% min., 2.0% max.
Roadside Drainage	Foreslopes 4:1 max., Backslopes 3:1 max.

*Design Values are taken from County Road Fund Manual and AASHTO reference documents based on design speeds, traffic volumes, and terrain features.

1.5.7. Vertical Alignment

The vertical alignment meets the selected design speed based on the combination of curve length, grades, K-factor, sight distance and improving roadside drainage. Careful attention was given to providing a vertical profile that meets the necessary values for the design speed while minimizing earthwork and matching the existing vertical profile as closely as possible. One key factor in the vertical profile is how the design makes use of the variable thickness of existing pavement and based. This discussion is picked up later in the report in the pavement management section. All design vertical profile data can be reviewed in Appendix F.

1.6. Environmental Resource Inventory and Document Type

Design and construction of this project must comply with applicable state and federal environmental regulations, including public involvement actions. Projects using state or federal funds or requiring a permit from a federal agency require completion of an impact assessment and environmental document. The County must coordinate with WYDOT representatives to determine the impact and type of document required for compliance with environmental regulations. The environmental document must be completed in advance of right-of-way and easement acquisition and the bid and award of a construction contract.

Projects constructed with County Road Funds must comply with state and federal environmental and/or permitting requirements when construction is in or adjacent to streams or drainages. Water quality permits may be needed from the U.S. Army Corp of Engineers and the Wyoming Department of Environmental Quality.

Projects located adjacent to federally owned lands require coordination and compliance with environmental requirements if additional right-of-way or easements are needed through the federal agency managing those lands. For projects funded with state or federal funds, the County will need to coordinate with WYDOT and FHWA representatives to determine the type of document required for compliance with environmental regulations. Environmental documents and anticipated actions needed for this project are described below.

1.6.1. Wetlands

The plans depict potential wetlands at Station 850+00 – 855+00 RT and Station 889+00 LT/RT. Design should proceed to the point that it can be determined if reconstruction is likely to encroach on either of these two potential wetlands. If it appears likely that the work will encroach, a wetlands delineation should be completed so that the appropriate mitigation can occur in compliance with federal requirements. Reference Black Mountain Road Engineering and Planning Study, GDA Engineers, 2015.

1.6.2. Floodplains

Reference Black Mountain Road Engineering and Planning Study, GDA Engineers, 2015

1.6.3. Cultural – Historic and Archaeological

Reference Black Mountain Road Engineering and Planning Study, GDA Engineers, 2015

1.6.4. Threatened and Endangered Species and Wildlife

Reference Black Mountain Road Engineering and Planning Study, GDA Engineers, 2015

1.6.5. Hazardous Materials

Reference Black Mountain Road Engineering and Planning Study, GDA Engineers, 2015

1.6.6. Wildlife Movement and Habitat

Reference Black Mountain Road Engineering and Planning Study, GDA Engineers, 2015

1.6.7. Section 4(f) Evaluation

Reference Black Mountain Road Engineering and Planning Study, GDA Engineers, 2015

1.6.8. Environmental Assessment (EA) and Finding of No Significant Impact (FONSI):

This type of document is required when the project presents a substantial adverse impact to protected resources or requires right-of-way acquisition involving substantial relocations or adverse impacts to abutting properties. It is anticipated that this type of action is not required for this particular project.

1.6.9. Categorical Exclusion (Type 2):

This document is used for a project constructed within existing right-of-way, creating minimal ground disturbance, and not in proximity to a stream or drainage. Project impacts are anticipated to be substantial enough that this type of environmental action will not be sufficient.

1.6.10. Categorical Exclusion (Type 3):

This type of document is used for a project that requires new or additional right-of-way, requires ground disturbance for cuts or fills, and/or requires work in or adjacent to streams or drainages. This environmental action most likely fits the subject project best.

This action requires the County to complete an analysis of project impacts to environmental resources present in the project area and coordinate with federal and state regulatory agencies. It requires providing WYDOT a letter and technical reports presenting the project description and addressing: 1) impacts to water quality and wetlands where the project creates excavation or fill into or adjacent to streams or drainages 2) impacts to threatened or endangered species or habitat where the project causes excavation or fill into or adjacent to streams or drainages; and 3) impacts to cultural resources to include a cultural survey and compliance under Section 106 of the National Historic Preservation Act. Each analysis should identify all impacts and efforts made to avoid or minimize such impacts, including any proposed mitigation. Public involvement during the development of this project type must follow WYDOT Operating Policy 17-8, Public Involvement Policy. The categorical exclusion is completed in advance of easement and right-of-way acquisition and bidding and awarding a construction contract and must be signed by WYDOT and FHWA prior to construction.

Proposed work in or adjacent to streams or drainages must qualify for a Nationwide 404 Permit by the U.S. Army Corps of Engineers. Since there is no work proposed on bridges, the is no need to evaluate bridges for historical significance.

1.6.11. Public Engagement:

A public engagement effort was made as part of this project. A mailing list was generated to all potentially affected agencies, property owners along and beyond the project area, and key community stakeholders. A copy of the mailing list in include in Appendix G. A form letter was sent to each entity on the mailing list informing them of the project, asking for their initial comments or concerns and inviting them to a public informational meeting. A sample of the letter is also included in Appendix G. Ten response letters were received from a range of key stakeholders and agencies. Copies of the letters are found in Appendix G.

A public meeting was held on May 2, 2019 at the County Annex Building in Thermopolis. The design team gave a presentation covering the background of the project and identifying known impacts in all of the National Environmental Policy Act (NEPA) categories. Slides from the presentation and a sign-in sheet showing attendees are provided in Appendix G. The public involvement effort was modeled after a Level B effort as outlined in Operating Policy 17-8, Public Involvement Policy as published by the Wyoming Department of Transportation (WYDOT).

Table 1.2. Environmental Impact Evaluation

Resource	Impact: Minimal, No Impact, Not Present
Land Use Changes	No Impact
Relocation Potential	No Impact
Churches and Schools	Not Present
Emergency Routes	Minimal/Temporary
Recreational Sites (Parks)	Minimal/Temporary
Historic Sites	Minimal/Temporary
Archaeological Sites	Minimal/Temporary
Section 4 (f)	No Impact
Wetlands	Minimal
Water Quality	No Impact
Floodplains	No Impact
Wildlife and Habitat	Minimal/Temporary
Prime Farmland	No Impact
Threatened and Endangered Species	Minimal/Temporary
Contaminations – Hazardous Materials	Minimal/Temporary
Noise or Air	Minimal/Temporary

1.7. Roadside Safety

Design and construction should address roadside safety design elements as part of an overall direction, during project development and delivery, to reduce the frequency and severity of traffic crashes. Highway safety is improved when roadside hazards are removed, relocated farther from the traveled way, modified such as "breakaway" sign mounts, or shielded with guardrail. The recommendations for roadside safety should be considered concurrent with the requirements and recommendations addressed in the Road and Bridge Design Criteria and Design Values, Traffic Control Devices, and evaluation of drainage, pavements, structures and other facilities involved in this project.

The project should evaluate constructing a clear recovery area (horizontal clearance to obstructions) that is a minimum of 10 feet in width and a minimum of 1V:4H fore slope rates. Recommended widths, typically exceeding the minimum 10 feet, are presented in the AASHTO Roadside Design Guide and are based on traffic volumes, speeds, and fore slope and backslope rates.

Roadside safety hardware, including guardrail, bridge rail, and traffic sign supports, if located within the clear recovery area, should meet current safety design standards. For this project, it is recommended that all safety hardware reset or replaced both within and outside the clear recovery area meet current safety design standards.

Roadside safety should include implementing construction and maintenance practices that prevent pavement edge drop-off. Drop-offs are the vertical height differences between a paved traveled way and the adjacent shoulder blended material, or a paved roadway and the fore slope graded material. The design includes a tapered pavement edge shaping the edge of pavement to 30 degrees, eliminating a vertical drop-off.

1.8. Pavement Structure/Surface Treatment Selection and Design

Pavement design is an important consideration for this project. The pavement structure, including mix design and thicknesses, was selected and is documented in this report using established design procedures and construction practices, as this project will require a significant expenditure of funds and are expected to provide satisfactory service through the design life.

Wyoming Statute 31-5-102 and WS 31-5-301 establish a relationship between paved and unpaved roads and a maximum speed limit. WS 31-5-102 defines "paved" as a roadway that is covered by hot-rolled asphalt or concrete but is not constructed solely of recycled asphalt. "Unpaved" is defined as a roadway that is not paved. WS 31-5-301 establishes the maximum speed limit at 65 miles per hour for paved roadways and 55 miles per hour for unpaved roadways. Local authorities, in their respective jurisdictions, may determine that a maximum speed limit that differs from this statute is reasonable and safe. This project is designed as a Paved Roadway to maintain the level of service as a major collector.

A roadway pavement structure designed for long-term serviceability can include multiple components to create a safe and efficient traveled way.

A. Hot-Rolled Asphalt (Plant Mix Pavement (PMP)) is a pavement structure consisting of a layer/layers of a hot mixture of an asphalt binder and sized aggregates, each layer compacted to a specified thickness and placed over an aggregate or stabilized base. PMP may also be referred to as Hot Mix Asphalt (HMA).
B. Recycled Asphalt (RAP) is in-place, or existing, PMP that is excavated and pulverized and re-used in the project. It is used like an aggregate in the pavement structure, or with heating and addition of a binder it can be compacted to a pavement structure at a specified thickness and placed over a stabilized base. Cold in-place recycling of PMP is another available pavement strategy. Consistent with WS 31-5-102, a paved roadway cannot be constructed solely of recycled asphalt; an asphalt paved roadway can only incorporate a selected percentage of recycled asphalt.
C. Surface Treatments involve the application of blended aggregates with an asphalt or cement binder compacted to provide a ride surface for friction, smoothness, drainage, and resistance to rutting. Common surface treatments include chip seals and may be referred to as cover coats or invert penetration. Consistent with WS 31-5-102, a paved roadway cannot be constructed solely with surface treatments; a paved roadway must be constructed with hot-rolled asphalt or concrete.

This project proposes the use of cold in-place recycling of the existing bituminous pavement to be used as an aggregate base course for the pavement structure. This method is beneficial to this project as it takes advantage of the significant amount of existing pavement thickness as a material resource. This is especially important considering the nature of available gravel sources in the region and the considerable distance to those sources.

It is anticipated that the existing asphalt mat will be milled along with the underlying base course through an operation commonly referred to as “reclaiming”. A piece of equipment known as a “reclaimer” will likely be used to grind and pulverize the existing asphalt while at the same time incorporating the base course below into a mostly homogeneous material comprised of aggregate base course and recycled asphalt.

Due to the varying thickness of these two layers, the reclaimer will be closely monitored to only pick up these two materials and not penetrate into the underlying native soils which are not beneficial to the pavement structure. In general, these underlying soils are clays and do not provide structural benefit in the pavement section.

The reclaimed material will need to be windrowed to allow for pickup or transferred to trucks using conveyors or other means to capture the material with careful attention to preventing contamination by unsuitable underlying soils or other objectionable materials. Once the material is collected from the roadbed, the underlying soils will be moisture conditioned and recompacted per the recommendations of the geotechnical report (Rimrock Engineering report dated November 20, 2018 found in Appendix H). A geotextile fabric such as Mirafi RS580i will then be placed to prevent material contamination upwards into the recycled aggregate base course section and to provide structural strength. The evaluation of this pavement section, including an equivalent gravel section (no asphalt surfacing) and approach is found in Appendix I.

The design profile is set to balance the use of the recycled material longitudinally along the project corridor. A process of hauling and transfer of material will occur along the project corridor to move the recycled aggregate base course material from areas where it is currently thicker to areas that currently have less material in place. A table found in Appendix J illustrates the variable thickness of the existing materials which served as the basis of the design concept. This process will allow for the preparation of the subgrade (moisture conditioning and recompaction), placement of the geotextile fabric, and optimal re-use of the recycled asphalt and base course. It is anticipated that base course will need to be imported to achieve the necessary total base course thickness to achieve the needed strength in the pavement section. Preliminary estimates of the imported material are incorporated into the construction cost estimate found in Appendix N.

Finally, hot mix asphalt pavement will be placed on the compacted base course to provide the remaining strength component and roadway surface. It is unknown at this time whether a surfacing treatment such as chip seal or cover coat will be placed. The project budget is likely the determining factor for this element. It is advised that a surfacing course be incorporated if the budget allows. A chip seal should be placed in 3-5 years as a maintenance measure if budget constraints restrict placement of a surfacing treatment during initial construction.

The ultimate pavement section is 5" of hot mix asphalt over 11" of base course (recycled product or combination of recycled and imported). These two materials lie above the geotextile fabric which overlays the recompacted subgrade.

1.8.1. Geotechnical Investigations

Please refer to the geotechnical report for the project provided by Rimrock Engineering dated November 20, 2018 found in Appendix H.

1.8.2. Material Sources

Having an adequate source or sources for material for the project is key to keeping costs manageable given the remote location and large scope of the project. To ensure a feasible pit is within reasonable distance, preliminary investigation into available material sources was conducted. The County Road and Bridge Supervisor provided information on pits regularly utilized by Hot Springs County and would serve as potential material sources for this project. The information on these pits can be seen in the table below.

Table 1.3. Local Pit Information

Pit Name	Owner/Leasee	Material Type
Pierce Pit	Jim Lash	Crushed, Hot Mix, Aggregates
Wilson Pit	Howard Wilson	Crushed
Ready Pit	County	Crushed
Site #8	County	Crushed, Aggregates
Kirby #2	County (BLM)	Non-structural material

1.9. Drainage – Pavements, Structures, and Facilities

Drainage design elements are an important consideration for all projects and should be supported with area hydrology resulting in a hydraulics analysis and report in final design. A scour analysis should also be completed during final design for all structures. Drainage facilities should be designed to remove water from the roadway and carry water across the roadway right-of-way. Design of drainage structures must be supportive of and designed in conjunction with the pavement structure and roadside safety elements.

1.9.1. Roadway Cross Slope

The roadway surface cross slope was selected to ensure adequate drainage of the roadway surface. The paved surface for this project has a cross slope rate of 1.5 percent. The cross-slope break in areas of super elevation must be checked during final design to ensure a safe shoulder transition.

1.9.2. Roadside Drainage

Ditches are located alongside the roadway in both cut and fill sections and are designed to carry both roadway and adjacent area runoff. Assumptions have been made at this early stage of design as to the design depth of the roadside ditches. Final design must include further analysis to ensure the adequacy of the ditch sections assumed in this report. Fore slope rates, ditch shapes, and backslope rates should be selected to accommodate adequate drainage and roadside safety. Fore slope rates (minimum 1V:4H), rounded ditch shapes, and traversable (minimum 1V:3H) backslopes are recommended where right-of-way allows.

1.9.3. Project area hydrology/hydraulics analysis

Drainage basins were initially generated using readily available Digital Elevation Model (DEM) contour information. This model was input into ArcGIS to generate a preliminary stream network. Proposed culvert locations were input on the roadway alignment. This proposed culvert information, along with the stream network, generated initial drainage subbasins. A site visit was then conducted to alter and fine tune the drainage basins, primarily for small, localized areas that DEM information is not accurate enough to generate otherwise. A map of the drainage basins developed can be found in Appendix L.

Each basin was then input into WinTR-55, a software developed by the USDA to analyze watershed basins based on land use type, flow type, and rainfall type. At this stage of design, the following assumptions were made:

- Land use is sagebrush with grass understory, fair condition
- Soil is Hydrologic Group C (typically sandy clays with low infiltration rates)
- Flow is shallow concentrated
- 10-year storm

General slopes and flow lengths for each basin were calculated and input into WinTR-55. Using this information and the above assumptions, a time of concentration for each basin was calculated by WinTR-55. Rainfall intensities specific to Hot Springs County and standard rainfall distribution information were used.

The software then generated storm flow rates for each subbasin. A summary of the flow rates for each subbasin and the WinTR-55 output for each subbasin can be found in Appendix L. When completing final design, specific flow type and length of each type of flow for each subbasin should be developed (sheet flow, shallow concentrated, channel flow). On top of storm flow, other flow rates should be obtained for each subbasin (seasonal irrigation flow, wetland flow, etc.).

1.9.4. Bridges and Culverts

This project does not include replacement or rehabilitation of existing bridge structures and involves no new bridge structures. No hydraulics analysis or scour analysis was performed in this project for existing structures. All roadway improvements are designed to match the existing bridge approaches and bridge widths. No structure widening, channel modifications or bank protection modifications are planned.

Existing drainage facilities that have a history of frequent flooding were evaluated. Culvert end treatments, for both cross-drainage and parallel (under intersecting roads and driveways), will be beveled to match the fore slope or protected with a traversable end section, unless the culvert end is beyond an established clear recovery area.

For new culverts or replacement culverts, a hydraulics analysis is necessary during final design to support the hydraulic capacities based on a design flood consistent with the County's requirements for maintaining traffic on the roadway

and for minimizing upstream and downstream property damage. Existing drainage facilities will be replaced in-kind or upsized as required by the analysis. In many cases, as depicted in the plans found in Appendix O, culverts were added in locations that, by inspection, currently pond water on the high side of the roadway. These additional culverts are denoted as "new."

1.10. Right-of-Way

1.10.1. Existing Right-of-Way

This project requires that the County establish the existence and description of County-owned public right-of-way. That information is included in Appendix K. Establishing the public right-of-way required research of County records and legal descriptions. W.S. § 24-1-105 establishes a minimum right-of-way width at 60 feet for county roads. The findings of this report indicate that the right-of-way is in place and supports the construction of this project.

In final design it may become apparent that construction easements need to be secured in areas where the project requires surface grading or catch slopes beyond the existing right-of-way. Those areas are preliminarily identified on the plans (see Appendix O). Additionally, final design may prove that existing right-of-way is inadequate where drainages cross the project corridor. Preliminary design doesn't show this to be necessary, but it may become a factor during final design.

1.10.2. Acquisition and Relocation

If existing right-of-way is found to be required, acquisition of private property must provide for the uniform and equitable treatment of all landowners whose property is acquired for public use. Acquisition is defined as the process of acquiring real property or an interest (partial acquisition or easement) in that property. Once the County identifies the need and legal description of additional right-of-way, acquisition will follow general steps, which include property appraisal with initial contact with the property owner; determination of fair market value for the property or interest; negotiation leading to a written offer of compensation, including contact with the property owner to explain the acquisition process; an agreement to purchase or acquire by easement the property supported by legal description; and payment for the property or interest.

If federal funds and/or state funds are used, the County is to follow the procedures required by the Uniform Relocation Assistance and Real Property Act, required by 49 CFR Part 24. It is recommended that these procedures be followed in all acquisitions. When an agreement with the landowner cannot be reached through negotiations, the County will need to pursue the acquisition of the property through County Road Establishment procedures as outlined in Wyoming Statutes Title 24, Chapter 3 or through Eminent Domain as allowed under Title 1, Chapter 26.

Projects using state or federal funds will require a certification statement that all right-of-way needed to construct the proposed project is County-owned (public ownership). This certification is completed in advance of bidding and awarding a construction contract.

1.11. Utility Considerations

A project such as this can require adjustment or relocation of existing utilities occupying public right-of-way. Preliminary engineering examined this concern finding that relocation of public and privately-owned utilities within the public right-of-way is not likely needed. The review included overhead facilities and sub-surface utilities. Utility locates were performed throughout the entire project corridor and mapped in the topographic survey (see plans in Appendix O). Final design should include review of these findings to ensure that construction of the project does not require the adjustment or relocation of existing utilities or that these adjustments and relocations are either completed prior to construction or are incorporated in the contract plans as biddable contract work.

Projects using state or federal funds require a certification statement that all utility adjustments or relocations needed to construct the proposed project have been completed or are included in the project's contract plans as biddable work. This certification is completed in advance of bidding and awarding a construction contract.

1.12. Traffic Control Devices

Traffic control devices, including traffic signs, pavement markings, delineators, and intersection traffic control is necessary to provide for motorist guidance, improved traffic operations, and roadway safety. The project must provide for traffic signs, pavement markings, delineators, and intersection traffic control. These devices must meet Manual on Uniform Traffic Control Devices (MUTCD) standards. While all traffic control devices will be detailed in final design, the construction cost estimate found in Appendix N provides an allowance for these items.

1.12.1. Permanent Signing

Permanent signing is thought to very closely match the signage that currently exists along the project corridor. Only minor deviation is anticipated. All permanent signage will be replaced with new signs with new posts, designed and installed in accordance with MUTCD. An inventory of signage is included in Appendix M.

1.12.2. Delineation

The project includes new roadway delineators along the entire project corridor. All delineators will be replaced with new materials and designed and installed in accordance with MUTCD.

1.12.3. Striping

The current roadway is not striped. Roads of this type and traffic volume do not require striping. Centerline striping is considered an enhancement for this roadway and could be considered if budget allows. While centerline striping does provide an improved level of service, it also becomes a maintenance cost which deserves consideration.

1.13. Other Design Elements

1.13.1. Survey and Mapping

Surveys for terrain, land ownership, construction surveying/staking, and as constructed survey and recordation is needed for this project. These surveys should be completed under the direct supervision of and be stamped and signed by a Wyoming-registered professional land surveyor. Topographic survey of the project corridor was completed as part of this project and is reflected in the plans found in Appendix O. Land Ownership has been established and also appears on the plans. High resolution aerial photos were also obtained under this project and can be incorporated into final design documents. An allowance for Construction Surveying is included in the cost estimate.

1.13.2. Geotechnical Engineering

Geotechnical investigations and reporting are recommended for soils sampling/soil profile to support the design of a pavement structure and for foundation and design criteria for drainage structures. Geotechnical surveys and reports should be completed under the direct supervision of and be stamped and signed by a Wyoming-registered professional geologist or a Wyoming-registered professional engineer. A full geotechnical investigation and engineering report was conducted for this project. Please refer to the geotechnical report for the project provided by Rimrock Engineering dated November 20, 2018 found in Appendix H. Borings were taken at approximately 750' intervals along the roadway. A multitude of laboratory testing was conducted and documented in the report. Design and construction recommendations related to the roadway and structures are provided in the report and are incorporated into the design documents.

1.13.3. Earthwork and Reclamation

A major design element is the development of plans and specifications for the removal and placement of earthwork to construct the subgrade needed to support the pavement structure. Section 1.8 of this report details the earthwork involved under the pavement section. Additional earthwork and materials are needed to provide for recommended roadside safety. The shoulders and recoverable slopes in this project require a considerable amount of earthwork.

Topsoil will be stripped and stockpiled at the beginning of construction. Shoulders and roadside ditches will be graded according to the design plans. Topsoil will be replaced on all disturbed areas. Final design should include obtaining reclamation recommendations from an Agronomist experienced in this type of project in Wyoming. Reclamation recommendations should include application rates and methods seed and fertilizer mixture. The Wyoming Department of Transportation should be consulted on these recommendations as well.

1.13.4. Siltation and Erosions Control Plans

A Storm Water Permit must be obtained from the Wyoming Department of Environmental Quality (WYDEQ). Permit types are based on acreage of disturbance. The type of permit and permitting conditions require consultation with the WYDEQ during final design. This permit will require the development of a Storm Water Pollution Prevention Plan (SWPPP) for inclusion in contract plans. The SWPPP is a plan, specific to the construction site that describes "best management practices" that will be used to keep pollutants on site and out of adjacent surface waters and wetlands. The Contractor will be required to operate under the stipulations of the plan. Work elements required by the plan are accounted for in the Construction Cost Estimate.

1.13.5. Air and Water Quality Permits

The Contractor will be required to comply with Wyoming Department of Environmental Quality (WYDEQ) regulations as pertains to water and air quality. This commonly pertains to contractor operations involving crushing and screening of aggregates and the production of hot mix asphalt, among other things. The Contractor will be required to obtain the permits and operate under the regulations of the WYDEQ. Work elements required by such permits are accounted for in Mobilization bid item in the Construction Cost Estimate.

1.13.6. Intersections

This project proposes no improvements to intersections along the project corridor other than surfacing and drainage improvements. Intersections will be paved to the right-of-way. No geometric realignment of intersections is proposed.

1.13.7. Material Sources

This project requires that the contractor furnish all materials to be incorporated in the required contract work. Earthwork and aggregates used for the pavement structure or surface treatments will be obtained from "contractor furnished," "available sources," or "commercial sources." These sources, other than commercial, should be evaluated with material sampling to support use in construction of earthwork or the pavement structure or surface treatment. Additionally, these sources, other than commercial, may require clearance during environmental documentation and be seen as "site of work" requiring compliance with state or federal pre-determined wage rates. The County should consider obtaining an aggregate source capable of providing the required quality and quantity of aggregate needed by the project well in advance of bidding and making it available to the contractor as "owner provided." Distance to the project should be a top consideration in selecting a source.

1.13.8. Water Sources

The County should determine if it will take responsibility for obtaining the rights to a water source for the amount of water needed to construct the project, such as grading operations, including any pre-wetting, crushing and plant sites, dust control, topsoil, or landscaping. Water sources secured by the County should be by agreement to supply the needed quantities and should address any other right holders and priorities. Coordination with the State Engineers Office may be needed. It is advised that the County obtain water sources and make them available to the Contractor if possible. This should result in the most competitive bids.

1.13.9. Waters of the United States

The U.S. Army Corps of Engineers (COE) issues 404 permits, permitting the dredge or fill of materials into waters of the United States. Both individual and nationwide permits are used, depending on the project type and the level of

environmental documentation. Generally, a Nationwide Permit 14 can be used for roadway projects that impact ≤ ½ acre of water of the U.S.; Nationwide Permit 23 can be used for projects using categorical exclusion (CE) environmental documentation. This project most likely falls under these two categories.

An individual permit is typically used for projects using environmental assessment (EA) environmental documentation and for any project that does not meet the criteria of a nationwide permit. Each of these permits has a series of criteria for its use, and the COE should be consulted to ensure compliance with permitting requirements during final design.

1.13.10. Traffic Control Plans

Temporary traffic control during the construction of the project must be in conformance with the Manual on Uniform Traffic Control Devices (MUTCD). Temporary traffic control should provide for the safe and efficient movement of road users through and around construction areas while protecting workers; this can be accomplished with site specific traffic control plans or the use of applicable standard plans. Such plans require flaggers, temporary delineation, signage and other methods. The Contractor must update the plan continuously and abide by the requirements of the plan throughout construction.

1.14. Funding Plan

Ongoing efforts to fund the project include use of the Commission Road Improvement Program (CRIP) as established by the Wyoming Department of Transportation. CRIP was created to provide a means of financing roadway construction projects on selected county collector roads. The Commission has discretion in selecting candidate projects from proposals received by individual counties. The CRIP funding source is federal Surface Transportation Program (STP), and is subject to federal guidelines for federally-funded projects. County roads experiencing high demand induced by county growth, coupled with roadway exchange potential from the state highway system (SHS) to county jurisdiction are two features which strengthen a CRIP proposal.

The County is also able to use County Road Funds to finance a portion of the project.

1.15. References

1. County Road Fund Manual, Wyoming County Road Standards Committee, 2011.

2. Engineering and Planning Study for Black Mountain Road, GDA Engineers, 2015.

3. A Policy on Geometric Design of Highways and Streets, American Association of State Highway and Transportation Officials (AASHTO), 7th Ed., 2018.

4. Roadside Design Guide, American Association of State Highway and Transportation Officials (AASHTO), 4th Ed., 2015.

5. Guidelines for Geometric Design of Low-Volume Roads, American Association of State Highway and Transportation Officials (AASHTO), 2nd Ed., 2019.

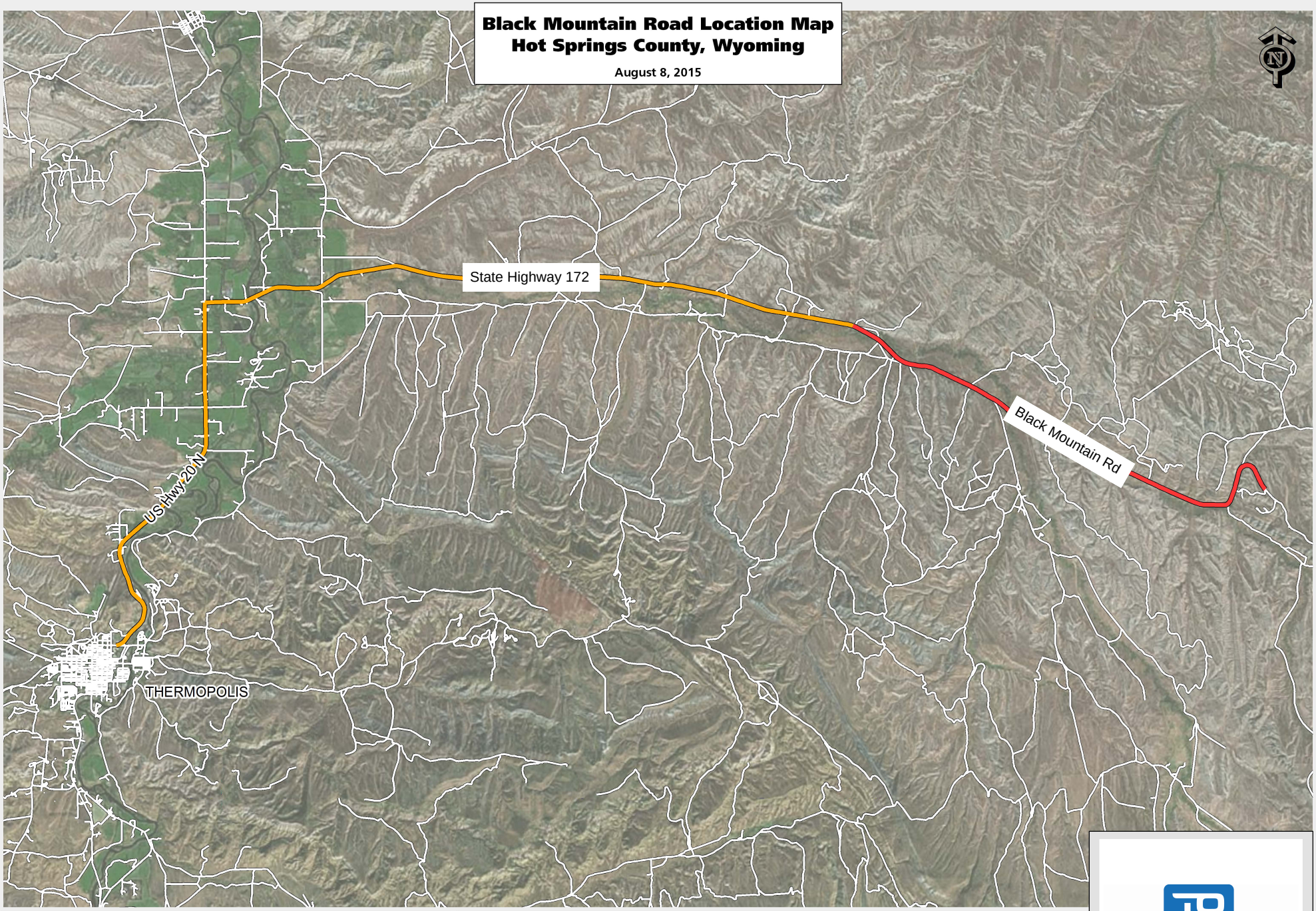
6. Manual on Uniform Traffic Control Devices (MUTCO), Federal Highway Administration, 2009.

7. WYDOT Operating Policy 17-8, Public Involvement Handbook and Resource Guide, Wyoming Department of Transportation, 2011.

Appendix A
Project Location

Black Mountain Road Location Map
Hot Springs County, Wyoming

August 8, 2015



1 inch = 11,500 feet

0 1 2 3 4 Miles

Coordinate System: NAD 1983 StatePlane Wyoming West Central FIPS 4903

ROADS

BLACK MOUNTAIN ROAD - PROJECT LOCATION

ROUTE FROM THERMOPOLIS TO PROJECT LOCATION - 18 MILES

T·O ENGINEERS

Appendix B
Horizontal Alignment Criteria

General Circular Curve Formulas:

*Tangent (T) = R*tan(Δ/2)*

*Curve Length (L) = 100*Δ*R/5729.58*

*Long Chord (LC) = 2R*sin(Δ/2)*

External Distance (E) = R/(Cos(Δ/2))-R

*Middle Ordinate (M) = E*cos(Δ/2)*

Side Friction Factor (f) = (V2/15R)-0.01e

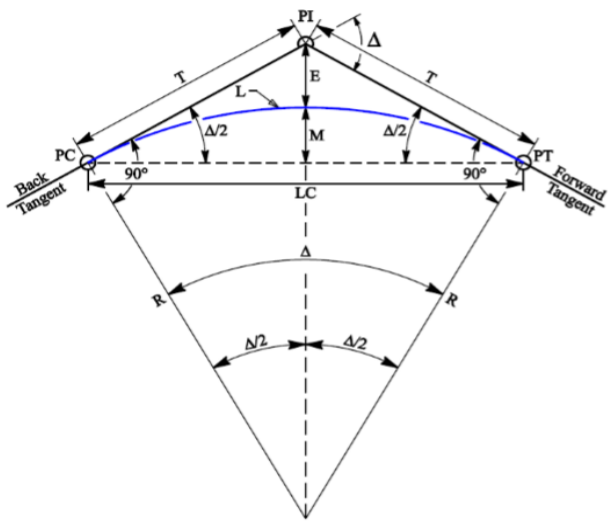


EXHIBIT 2
CIRCULAR CURVE COMPONENTS

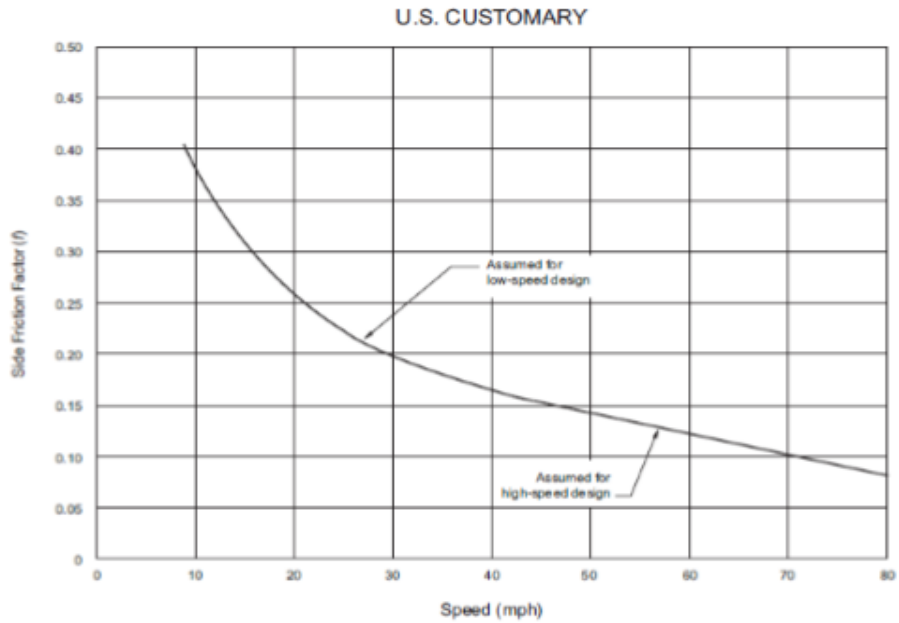


Figure 3-6. Side Friction Factors Assumed for Design

EXHIBIT 8
AASHTO SIDE FRICTION FACTORS

For design speed = 55mph and Δ_{max} = 1°, find Middle Ordinate (M) :

Δ (°)=	1	
Δ (RAD)=	0.01745	
Δ/2 (RAD)=	0.00873	
V (mph) =	55	
side friction factor (f) =	0.13	*per Horizontal Alignment and Superelevation, Chapter 3, Exhibit 8 for V shown below*
superelevation (e) =	0	*set to "0" given no superelevation thru PI*
formula: f =	$(V^2/15R)-.01e$	"e" term drops out if value = 0
revised formula: f =	$(V^2/15R)$	
Min. Radius (R_{min}) (ft) =	1551.28	
T_{min} =	13.54	
E_{max} (ft) =	0.059	
M_{max} (ft) =	0.059	
M_{max} (in) =	0.7	

For design speed = 65mph and Δ_{max} = 1°, find Middle Ordinate (M) :

Δ (°)=	1	
Δ (RAD)=	0.01745	
Δ/2 (RAD)=	0.00873	
V (mph) =	65	
side friction factor (f) =	0.12	*per Horizontal Alignment and Superelevation, Chapter 3, Exhibit 8 for V shown below*
superelevation (e) =	0	*set to "0" given no superelevation thru PI*
formula: f =	$(V^2/15R)-.01e$	"e" term drops out if value = 0
revised formula: f =	$(V^2/15R)$	
Min. Radius (R_{min}) (ft) =	2347.22	
T_{min} =	20.48	
E_{max} (ft) =	0.089	
M_{max} (ft) =	0.089	
M_{max} (in) =	1.1	

For design speed = 55mph and Δ_{max} = 2°, find Middle Ordinate (M) :

Δ (°)=	2	
Δ (RAD)=	0.03491	
Δ/2 (RAD)=	0.01745	
V (mph) =	55	
side friction factor (f) =	0.13	*per Horizontal Alignment and Superelevation, Chapter 3, Exhibit 8 for V shown below*
superelevation (e) =	0	*set to "0" given no superelevation thru PI*
formula: f =	$(V^2/15R)$-.01e	"e" term drops out if value = 0
revised formula: f =	$(V^2/15R)$	
Min. Radius (R_{min}) (ft) =	1551.28	
T_{min} =	27.08	
E_{max} (ft) =	0.236	
M_{max} (ft) =	0.236	
M_{max} (in) =	2.8	

For design speed = 65mph and Δ_{max} = 2°, find Middle Ordinate (M) :

Δ (°)=	2	
Δ (RAD)=	0.03491	
Δ/2 (RAD)=	0.01745	
V (mph) =	65	
side friction factor (f) =	0.12	*per Horizontal Alignment and Superelevation, Chapter 3, Exhibit 8 for V shown below*
superelevation (e) =	0	*set to "0" given no superelevation thru PI*
formula: f =	$(V^2/15R)$-.01e	"e" term drops out if value = 0
revised formula: f =	$(V^2/15R)$	
Min. Radius (R_{min}) (ft) =	2347.22	
T_{min} =	40.97	
E_{max} (ft) =	0.358	
M_{max} (ft) =	#REF!	
M_{max} (in) =	#REF!	

For design speed = 55mph and Δ_{max} = 3°, find Middle Ordinate (M) :

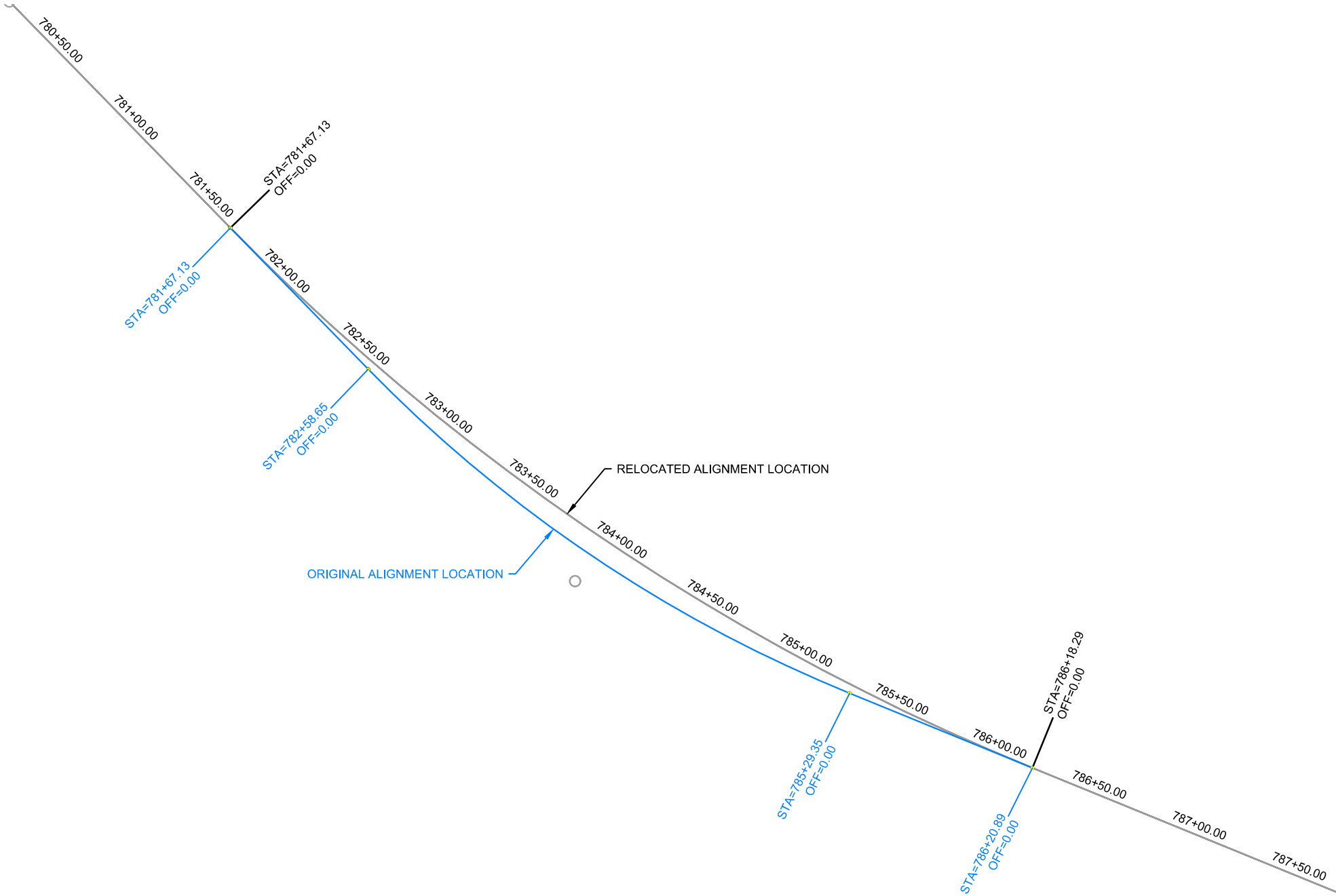
Δ (°)=	3	
Δ (RAD)=	0.05236	
Δ/2 (RAD)=	0.02618	
V (mph) =	55	
side friction factor (f) =	0.13	*per Horizontal Alignment and Superelevation, Chapter 3, Exhibit 8 for V shown below*
superelevation (e) =	0	*set to "0" given no superelevation thru PI*
formula: f =	$(V^2/15R)-.01e$	"e" term drops out if value = 0
revised formula: f =	$(V^2/15R)$	
Min. Radius (R_{min}) (ft) =	1551.28	
T_{min} =	40.62	
E_{max} (ft) =	0.532	
M_{max} (ft) =	0.532	
M_{max} (in) =	6.4	

For design speed = 65mph and Δ_{max} = 3°, find Middle Ordinate (M) :

Δ (°)=	3	
Δ (RAD)=	0.05236	
Δ/2 (RAD)=	0.02618	
V (mph) =	65	
side friction factor (f) =	0.12	*per Horizontal Alignment and Superelevation, Chapter 3, Exhibit 8 for V shown below*
superelevation (e) =	0	*set to "0" given no superelevation thru PI*
formula: f =	$(V^2/15R)-.01e$	"e" term drops out if value = 0
revised formula: f =	$(V^2/15R)$	
Min. Radius (R_{min}) (ft) =	2347.22	
T_{min} =	61.46	
E_{max} (ft) =	0.805	
M_{max} (ft) =	0.805	
M_{max} (in) =	9.7	

Appendix C

Deviation in Horizontal Alignment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781+50.00
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OFF=0.00
782+00.00
782+50.00
STA=782+58.65
OFF=0.00
783+00.00
783+50.00
RELOCATED ALIGNMENT LOCATION
ORIGINAL ALIGNMENT LOCATION
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784+50.00
785+00.00
STA=785+29.35
OFF=0.00
785+50.00
786+00.00
STA=786+18.29
OFF=0.00
STA=786+20.89
OFF=0.00
786+50.00
787+00.00
787+50.00

Appendix D
Design Horizontal Alignment

T-O Engineers

502 33rd Street

Cody, Wyoming 82414

Alignment Station and Curve Report **Client:** Client Company
Project Name: K:\180372\3_Acaddwg\Model\180372-C-BM-PR.dwg **Project Description:**
Report Date: 10/3/2019 10:34:48 AM **Prepared by:**

Alignment: Proposed BMR Alignment

Description:

Tangent Data

Description	PT Station	Northing	Easting
Start:	614+67.000	1177391.489	2177929.937
End:	615+51.468	1177377.057	2178013.162

Tangent Data

Parameter	Value	Parameter	Value
Length:	84.468	Course:	S 80° 09' 45.1884" E

Curve Point Data

Description	Station	Northing	Easting
PC:	615+51.468	1177377.057	2178013.162
RP:		1174618.227	2177534.773
PT:	624+77.985	1177071.967	2178883.536

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	18° 57' 32.8349"	Type:	RIGHT
Radius:	2800.000		
Length:	926.517	Tangent:	467.533
Mid-Ord:	38.236	External:	38.765
Chord:	922.296	Course:	S 70° 40' 58.7710" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	624+77.985	1177071.967	2178883.536
End:	641+84.146	1176250.107	2180378.705

Tangent Data

Parameter	Value	Parameter	Value
Length:	1706.161	Course:	S 61° 12' 12.3536" E

Curve Point Data

Description	Station	Northing	Easting
PC:	641+84.146	1176250.107	2180378.705
RP:		1173182.933	2178692.751
PT:	651+72.802	1175658.623	2181166.808

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	16° 11' 04.2704"	Type:	RIGHT
Radius:	3500.000		
Length:	988.656	Tangent:	497.641
Mid-Ord:	34.851	External:	35.201
Chord:	985.372	Course:	S 53° 06' 40.2183" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	651+72.802	1175658.623	2181166.808
End:	667+18.363	1174566.107	2182260.045

Tangent Data

Parameter	Value	Parameter	Value
Length:	1545.561	Course:	S 45° 01' 08.0831" E

Curve Point Data

Description	Station	Northing	Easting
PC:	667+18.363	1174566.107	2182260.045
RP:		1176582.027	2184274.634
PT:	684+54.274	1173776.042	2183775.686

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	34° 53' 54.1428"	Type:	LEFT
Radius:	2850.000		
Length:	1735.911	Tangent:	895.824
Mid-Ord:	131.148	External:	137.474
Chord:	1709.201	Course:	S 62° 28' 05.1545" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	684+54.274	1173776.042	2183775.686
End:	691+77.550	1173649.418	2184487.792

Tangent Data

Parameter	Value	Parameter	Value
Length:	723.276	Course:	S 79° 55' 02.2260" E

Curve Point Data

Description	Station	Northing	Easting
PC:	691+77.550	1173649.418	2184487.792
RP:		1174929.341	2184715.382
PT:	694+02.937	1173629.345	2184712.000

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	09° 56' 01.0776"	Type:	LEFT
Radius:	1300.000		
Length:	225.387	Tangent:	112.977
Mid-Ord:	4.881	External:	4.900
Chord:	225.105	Course:	S 84° 53' 02.7648" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	694+02.937	1173629.345	2184712.000
End:	694+94.946	1173629.106	2184804.008

Tangent Data

Parameter	Value	Parameter	Value
Length:	92.008	Course:	S 89° 51' 03.3036" E

Curve Point Data

Description	Station	Northing	Easting
PC:	694+94.946	1173629.106	2184804.008
RP:		1171629.113	2184798.802
PT:	699+03.393	1173586.488	2185209.512

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	11° 42' 04.1415"	Type:	RIGHT
Radius:	2000.000		
Length:	408.447	Tangent:	204.936
Mid-Ord:	10.418	External:	10.472
Chord:	407.738	Course:	S 84° 00' 01.0725" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	699+03.393	1173586.488	2185209.512
End:	701+46.526	1173536.559	2185447.463

Tangent Data

Parameter	Value	Parameter	Value

Length:	243.133	Course:	S 78° 08' 58.9459" E

Curve Point Data

Description	Station	Northing	Easting
PC:	701+46.526	1173536.559	2185447.463
RP:		1172508.938	2185231.840
PT:	704+12.452	1173449.751	2185698.070

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	14° 30' 39.1521"	Type:	RIGHT
Radius:	1050.000		
Length:	265.926	Tangent:	133.678
Mid-Ord:	8.407	External:	8.475
Chord:	265.216	Course:	S 70° 53' 39.3698" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	704+12.452	1173449.751	2185698.070
End:	710+75.347	1173155.407	2186292.032

Tangent Data

Parameter	Value	Parameter	Value
Length:	662.895	Course:	S 63° 38' 19.7938" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	710+75.347	1173155.407	2186292.032
End:	717+59.255	1172862.374	2186909.982

Tangent Data

Parameter	Value	Parameter	Value
Length:	683.908	Course:	S 64° 37' 46.5671" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	717+59.255	1172862.374	2186909.982
End:	721+57.953	1172687.876	2187268.466

Tangent Data

Parameter	Value	Parameter	Value
Length:	398.698	Course:	S 64° 02' 41.0969" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	721+57.953	1172687.876	2187268.466
End:	726+85.702	1172462.222	2187745.539

Tangent Data

Parameter	Value	Parameter	Value
Length:	527.749	Course:	S 64° 41' 09.3528" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	726+85.702	1172462.222	2187745.539
End:	729+92.558	1172327.694	2188021.335

Tangent Data

Parameter	Value	Parameter	Value
Length:	306.857	Course:	S 63° 59' 51.9611" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	729+92.558	1172327.694	2188021.335
End:	732+79.390	1172209.914	2188282.869

Tangent Data

Parameter	Value	Parameter	Value
Length:	286.832	Course:	S 65° 45' 21.7822" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	732+79.390	1172209.914	2188282.869
End:	735+06.903	1172113.129	2188488.770

Tangent Data

Parameter	Value	Parameter	Value
Length:	227.514	Course:	S 64° 49' 25.7922" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	735+06.903	1172113.129	2188488.770
End:	736+07.329	1172069.194	2188579.076

Tangent Data

Parameter	Value	Parameter	Value
Length:	100.426	Course:	S 64° 03' 23.3951" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	736+07.329	1172069.194	2188579.076
End:	742+24.431	1171794.146	2189131.491

Tangent Data

Parameter	Value	Parameter	Value
Length:	617.102	Course:	S 63° 31' 52.4415" E

Curve Point Data

Description	Station	Northing	Easting
PC:	742+24.431	1171794.146	2189131.491
RP:		1161768.159	2184139.540
PT:	749+17.343	1171466.324	2189741.824

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	03° 32' 41.0183"	Type:	RIGHT
Radius:	11200.000		
Length:	692.912	Tangent:	346.567
Mid-Ord:	5.358	External:	5.361
Chord:	692.802	Course:	S 61° 45' 31.9323" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	749+17.343	1171466.324	2189741.824
End:	761+35.964	1170856.765	2190797.038

Tangent Data

Parameter	Value	Parameter	Value
Length:	1218.621	Course:	S 59° 59' 11.4232" E

Curve Point Data

Description	Station	Northing	Easting
PC:	761+35.964	1170856.765	2190797.038
RP:		1173601.692	2192382.684
PT:	763+50.972	1170755.611	2190986.718

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	03° 53' 10.0871"	Type:	LEFT
Radius:	3170.000		
Length:	215.008	Tangent:	107.545
Mid-Ord:	1.823	External:	1.824
Chord:	214.967	Course:	S 61° 55' 46.4667" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	763+50.972	1170755.611	2190986.718
End:	764+84.717	1170696.714	2191106.796

Tangent Data

Parameter	Value	Parameter	Value
Length:	133.744	Course:	S 63° 52' 21.5102" E

Curve Point Data

Description	Station	Northing	Easting
PC:	764+84.717	1170696.714	2191106.796
RP:		1168452.171	2190005.876
PT:	768+06.086	1170537.063	2191385.450

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	07° 21' 54.8952"	Type:	RIGHT
Radius:	2500.000		
Length:	321.370	Tangent:	160.906
Mid-Ord:	5.162	External:	5.173
Chord:	321.148	Course:	S 60° 11' 24.0626" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	768+06.086	1170537.063	2191385.450
End:	769+42.757	1170461.644	2191499.427

Tangent Data

Parameter	Value	Parameter	Value
Length:	136.671	Course:	S 56° 30' 26.6150" E

Curve Point Data

Description	Station	Northing	Easting
PC:	769+42.757	1170461.644	2191499.427
RP:		1166708.838	2189016.195
PT:	773+76.144	1170205.467	2191848.787

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	05° 31' 04.9898"	Type:	RIGHT
Radius:	4500.000		
Length:	433.387	Tangent:	216.861
Mid-Ord:	5.216	External:	5.222
Chord:	433.219	Course:	S 53° 44' 54.1201" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	773+76.144	1170205.467	2191848.787
End:	778+59.178	1169901.415	2192224.119

Tangent Data

Parameter	Value	Parameter	Value
Length:	483.034	Course:	S 50° 59' 21.6252" E

Curve Point Data

Description	Station	Northing	Easting

PC:	778+59.178	1169901.415	2192224.119
RP:		1168813.574	2191342.868
PT:	780+22.763	1169791.260	2192344.931

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	06° 41' 41.2712"	Type:	RIGHT
Radius:	1400.000		
Length:	163.585	Tangent:	81.886
Mid-Ord:	2.389	External:	2.393
Chord:	163.492	Course:	S 47° 38' 30.9896" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	780+22.763	1169791.260	2192344.931
End:	781+67.132	1169687.926	2192445.750

Tangent Data

Parameter	Value	Parameter	Value
Length:	144.369	Course:	S 44° 17' 40.3540" E

Curve Point Data

Description	Station	Northing	Easting
PC:	781+67.132	1169687.926	2192445.750
RP:		1170456.108	2193233.086
PT:	786+18.291	1169437.694	2192817.356

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	23° 29' 58.3336"	Type:	LEFT
Radius:	1100.000		
Length:	451.159	Tangent:	228.796
Mid-Ord:	23.049	External:	23.542
Chord:	448.003	Course:	S 56° 02' 39.5208" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	786+18.291	1169437.694	2192817.356
End:	806+71.919	1168661.553	2194718.669

Tangent Data

Parameter	Value	Parameter	Value
Length:	2053.628	Course:	S 67° 47' 38.6876" E

Curve Point Data

Description	Station	Northing	Easting
PC:	806+71.919	1168661.553	2194718.669

RP:		1163986.103	2192810.090
PT:	816+30.164	1168217.647	2195566.272

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	10° 52' 19.0713"	Type:	RIGHT
Radius:	5050.000		
Length:	958.245	Tangent:	480.566
Mid-Ord:	22.712	External:	22.814
Chord:	956.809	Course:	S 62° 21' 29.1519" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	816+30.164	1168217.647	2195566.272
End:	818+90.908	1168075.339	2195784.757

Tangent Data

Parameter	Value	Parameter	Value
Length:	260.743	Course:	S 56° 55' 19.6163" E

Curve Point Data

Description	Station	Northing	Easting
PC:	818+90.908	1168075.339	2195784.757
RP:		1174317.913	2199850.807
PT:	830+99.491	1167500.573	2196846.414

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	09° 17' 41.4912"	Type:	LEFT
Radius:	7450.000		
Length:	1208.583	Tangent:	605.620
Mid-Ord:	24.494	External:	24.575
Chord:	1207.258	Course:	S 61° 34' 10.3619" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	830+99.491	1167500.573	2196846.414
End:	864+46.323	1166150.882	2199909.031

Tangent Data

Parameter	Value	Parameter	Value
Length:	3346.833	Course:	S 66° 13' 01.1074" E

Curve Point Data

Description	Station	Northing	Easting
PC:	864+46.323	1166150.882	2199909.031
RP:		1161712.748	2197953.151

PT:	874+23.436	1165669.733	2200757.571

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	11° 32' 35.4400"	Type:	RIGHT
Radius:	4850.000		
Length:	977.112	Tangent:	490.215
Mid-Ord:	24.586	External:	24.711
Chord:	975.461	Course:	S 60° 26' 43.3874" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	874+23.436	1165669.733	2200757.571
End:	889+95.954	1164760.455	2202040.546

Tangent Data

Parameter	Value	Parameter	Value
Length:	1572.518	Course:	S 54° 40' 25.6675" E

Curve Point Data

Description	Station	Northing	Easting
PC:	889+95.954	1164760.455	2202040.546
RP:		1168268.710	2204526.938
PT:	897+44.100	1164382.999	2202685.403

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	09° 58' 07.5250"	Type:	LEFT
Radius:	4300.000		
Length:	748.147	Tangent:	375.020
Mid-Ord:	16.261	External:	16.323
Chord:	747.204	Course:	S 59° 39' 29.4299" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	897+44.100	1164382.999	2202685.403
End:	939+31.714	1162589.594	2206469.555

Tangent Data

Parameter	Value	Parameter	Value
Length:	4187.614	Course:	S 64° 38' 33.1924" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	939+31.714	1162589.594	2206469.555
End:	945+62.696	1162330.968	2207045.098

Tangent Data

Parameter	Value	Parameter	Value
Length:	630.981	Course:	S 65° 48' 09.6534" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	945+62.696	1162330.968	2207045.098
End:	964+23.944	1161584.600	2208750.144

Tangent Data

Parameter	Value	Parameter	Value
Length:	1861.248	Course:	S 66° 21' 32.6666" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	964+23.944	1161584.600	2208750.144
End:	968+02.617	1161440.468	2209100.314

Tangent Data

Parameter	Value	Parameter	Value
Length:	378.673	Course:	S 67° 37' 39.6147" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	968+02.617	1161440.468	2209100.314
End:	971+07.484	1161334.232	2209386.072

Tangent Data

Parameter	Value	Parameter	Value
Length:	304.866	Course:	S 69° 36' 22.7424" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	971+07.484	1161334.232	2209386.072
End:	972+81.334	1161277.238	2209550.315

Tangent Data

Parameter	Value	Parameter	Value
Length:	173.851	Course:	S 70° 51' 45.7972" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	972+81.334	1161277.238	2209550.315
End:	974+42.357	1161229.901	2209704.223

Tangent Data

Parameter	Value	Parameter	Value
Length:	161.023	Course:	S 72° 54' 13.5183" E

Curve Point Data

Description	Station	Northing	Easting
PC:	974+42.357	1161229.901	2209704.223
RP:		1162854.782	2210203.985
PT:	979+30.295	1161154.892	2210184.667

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	16° 26' 42.5870"	Type:	LEFT
Radius:	1700.000		
Length:	487.938	Tangent:	245.658
Mid-Ord:	17.476	External:	17.658
Chord:	486.265	Course:	S 81° 07' 34.8118" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	979+30.295	1161154.892	2210184.667
End:	996+75.355	1161135.062	2211929.614

Tangent Data

Parameter	Value	Parameter	Value
Length:	1745.060	Course:	S 89° 20' 56.1053" E

Curve Point Data

Description	Station	Northing	Easting
PC:	996+75.355	1161135.062	2211929.614
RP:		1161585.033	2211934.728
PCC:	999+98.844	1161243.038	2212227.199

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	41° 11' 16.6231"	Type:	LEFT
Radius:	450.000		
Length:	323.489	Tangent:	169.090
Mid-Ord:	28.757	External:	30.720
Chord:	316.569	Course:	N 70° 03' 25.5831" E

Curve Point Data

Description	Station	Northing	Easting
PCC:	999+98.844	1161243.038	2212227.199
RP:		1161942.227	2211629.257
PT:	1004+59.082	1161615.522	2212489.294

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	28° 39' 45.7635"	Type:	LEFT
Radius:	920.000		

Length:	460.238	Tangent:	235.041
Mid-Ord:	28.630	External:	29.550
Chord:	455.454	Course:	N 35° 07' 54.3898" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1004+59.082	1161615.522	2212489.294
End:	1012+14.265	1162321.484	2212757.470

Tangent Data

Parameter	Value	Parameter	Value
Length:	755.182	Course:	N 20° 48' 01.5081" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1012+14.265	1162321.484	2212757.470
RP:		1162967.791	2211056.092
PT:	1014+11.837	1162509.622	2212817.478

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	06° 13' 11.3622"	Type:	LEFT
Radius:	1820.000		
Length:	197.573	Tangent:	98.883
Mid-Ord:	2.680	External:	2.684
Chord:	197.476	Course:	N 17° 41' 25.8270" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1014+11.837	1162509.622	2212817.478
End:	1028+84.643	1163934.995	2213188.244

Tangent Data

Parameter	Value	Parameter	Value
Length:	1472.805	Course:	N 14° 34' 50.1459" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1028+84.643	1163934.995	2213188.244
RP:		1163338.367	2215481.917
PT:	1031+09.643	1164149.735	2213255.130

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	05° 26' 22.1019"	Type:	RIGHT
Radius:	2370.000		
Length:	225.000	Tangent:	112.585

Mid-Ord:	2.670	External:	2.673
Chord:	224.916	Course:	N 17° 18' 01.1968" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1031+09.643	1164149.735	2213255.130
End:	1031+46.211	1164184.093	2213267.649

Tangent Data

Parameter	Value	Parameter	Value
Length:	36.568	Course:	N 20° 01' 12.2478" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1031+46.211	1164184.093	2213267.649
RP:		1163915.349	2214005.214
PT:	1037+04.675	1164600.469	2213622.022

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	40° 45' 40.8258"	Type:	RIGHT
Radius:	785.000		
Length:	558.464	Tangent:	291.637
Mid-Ord:	49.141	External:	52.423
Chord:	546.762	Course:	N 40° 24' 02.6607" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1037+04.675	1164600.469	2213622.022
End:	1037+92.103	1164643.146	2213698.325

Tangent Data

Parameter	Value	Parameter	Value
Length:	87.427	Course:	N 60° 46' 53.0735" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1037+92.103	1164643.146	2213698.325
RP:		1164145.670	2213976.566
PT:	1041+86.373	1164706.283	2214079.590

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	39° 37' 53.8288"	Type:	RIGHT
Radius:	570.000		
Length:	394.270	Tangent:	205.390
Mid-Ord:	33.751	External:	35.876

Chord:	386.457	Course:	N 80° 35' 49.9879" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1041+86.373	1164706.283	2214079.590
End:	1042+28.191	1164698.724	2214120.719

Tangent Data

Parameter	Value	Parameter	Value
Length:	41.818	Course:	S 79° 35' 13.0976" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1042+28.191	1164698.724	2214120.719
RP:		1164000.418	2213992.392
PT:	1048+88.556	1164314.961	2214628.915

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	53° 17' 25.2126"	Type:	RIGHT
Radius:	710.000		
Length:	660.365	Tangent:	356.242
Mid-Ord:	75.401	External:	84.360
Chord:	636.819	Course:	S 52° 56' 30.4913" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1048+88.556	1164314.961	2214628.915
End:	1063+63.498	1162992.657	2215282.342

Tangent Data

Parameter	Value	Parameter	Value
Length:	1474.942	Course:	S 26° 17' 47.8850" E

Curve Point Data

Description	Station	Northing	Easting
PC:	1063+63.498	1162992.657	2215282.342
RP:		1163812.242	2216940.890
PT:	1068+51.607	1162588.483	2215553.477

Circular Curve Data

Parameter	Value	Parameter	Value
Delta:	15° 07' 01.4923"	Type:	LEFT
Radius:	1850.000		
Length:	488.109	Tangent:	245.480
Mid-Ord:	16.075	External:	16.216
Chord:	486.695	Course:	S 33° 51' 18.6311" E

Tangent Data

Description	PT Station	Northing	Easting
Start:	1068+51.607	1162588.483	2215553.477
End:	1069+31.098	1162528.868	2215606.060

Tangent Data

Parameter	Value	Parameter	Value
Length:	79.491	Course:	S 41° 24' 49.3773" E

Appendix E
Superelevation

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
614+67.00	0.00'		0.00'		0.00'	
614+87.29	0.00'		0.00'		0.00'	
615+09.72	0.00'		0.00'		0.00'	
615+30.58	0.00'		0.00'		0.00'	
615+52.97			4497.86'		0.00'	
615+73.14	4497.96'	-1.30%	4497.83'	2.80%	4497.55'	
615+95.40	4497.96'	-2.40%	4497.72'	2.90%	4497.43'	
616+20.08	4497.96'	-1.90%	4497.77'	3.40%	4497.43'	
616+41.69	4498.04'	-2.10%	4497.83'	4.00%	4497.43'	
616+64.87	4498.03'	-0.90%	4497.94'	4.40%	4497.50'	
616+88.75	4498.03'	-0.40%	4497.99'	4.30%	4497.56'	
617+12.89	4498.03'	0.20%	4498.05'	4.40%	4497.61'	
617+37.35	4497.99'	0.10%	4498.00'	4.20%	4497.58'	
617+62.11	4497.88'	0.20%	4497.90'	4.60%	4497.44'	
617+87.17	4497.80'	1.00%	4497.90'	6.00%	4497.30'	
618+12.50	4497.85'	-0.80%	4497.77'	6.40%	4497.13'	
618+38.10	4497.86'	-1.60%	4497.70'	7.90%	4496.91'	
618+64.02	4497.83'	-2.10%	4497.62'	7.70%	4496.85'	
618+90.20	4497.73'	-2.00%	4497.53'	6.70%	4496.86'	
619+16.68	4497.71'	-1.80%	4497.53'	6.00%	4496.93'	
619+36.76	4497.67'	-2.30%	4497.44'	5.30%	4496.91'	
619+56.97	4497.63'	-2.00%	4497.43'	5.70%	4496.86'	
619+67.00	4497.60'	-2.30%	4497.37'	5.50%	4496.82'	
619+77.38	4497.54'	-2.30%	4497.31'	5.50%	4496.76'	
619+97.96	4497.47'	-2.40%	4497.23'	5.50%	4496.68'	
620+18.75	4497.43'	-3.50%	4497.08'	4.40%	4496.64'	
620+39.67	4497.44'	-3.40%	4497.10'	4.80%	4496.62'	
620+60.81	4497.46'	-2.30%	4497.23'	5.40%	4496.69'	
620+82.08	4497.32'	-3.00%	4497.02'	4.50%	4496.57'	
621+03.39	4497.15'	-2.00%	4496.95'	5.40%	4496.41'	
621+24.74	4497.14'	-2.10%	4496.93'	6.30%	4496.30'	
621+46.07	4497.14'	-3.10%	4496.83'	6.40%	4496.19'	
621+67.46	4497.02'	-3.10%	4496.71'	7.10%	4496.00'	
621+88.84	4496.82'	-2.80%	4496.54'	7.80%	4495.76'	
622+10.27	4496.51'	-2.30%	4496.28'	7.10%	4495.57'	
622+31.81	4496.25'	-2.90%	4495.96'	6.00%	4495.36'	
622+53.37	4496.14'	-4.20%	4495.72'	4.90%	4495.23'	
622+74.97	4496.01'	-2.70%	4495.74'	5.20%	4495.22'	
622+96.54	4495.90'	-3.20%	4495.58'	4.50%	4495.13'	
623+18.10	4495.87'	-2.70%	4495.60'	5.00%	4495.10'	
623+39.62	4495.81'	-3.50%	4495.46'	5.10%	4494.95'	
623+61.14	4495.75'	-2.90%	4495.46'	5.90%	4494.87'	
623+82.63	4495.55'	-2.90%	4495.26'	4.70%	4494.79'	
624+04.11	4495.44'	-1.80%	4495.26'	4.50%	4494.81'	
624+25.57	4495.42'	-2.70%	4495.15'	3.50%	4494.80'	
624+47.05	4495.28'	-2.70%	4495.01'	2.90%	4494.72'	
624+68.53	4495.06'	-2.30%	4494.83'	2.60%	4494.57'	
624+90.07	4495.01'	-1.70%	4494.84'	3.50%	4494.49'	
625+11.53	4494.89'	-2.50%	4494.64'	2.60%	4494.38'	
625+33.09	4494.78'	-1.60%	4494.62'	2.80%	4494.34'	
625+54.64	4494.58'	-0.50%	4494.53'	2.00%	4494.33'	
625+76.16	4494.42'	-1.20%	4494.30'	0.80%	4494.22'	
625+97.78	4494.27'	0.10%	4494.28'	1.40%	4494.14'	
626+19.40	4494.13'	0.30%	4494.16'	1.40%	4494.02'	
626+41.04	4493.98'	-0.60%	4493.92'	1.80%	4493.74'	
626+62.64	4493.84'	-1.80%	4493.66'	0.60%	4493.60'	
626+84.34	4493.69'	-1.90%	4493.50'	1.60%	4493.34'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
627+06.00	4493.51'	-1.80%	4493.33'	1.50%	4493.18'	
627+27.62	4493.47'	-0.20%	4493.45'	2.00%	4493.25'	
627+49.20	4493.38'	1.20%	4493.50'	2.00%	4493.30'	
627+70.69	4493.31'	1.80%	4493.49'	0.80%	4493.41'	
627+92.11	4493.36'	0.90%	4493.45'	0.40%	4493.41'	
628+13.54	4493.19'	1.20%	4493.31'	0.90%	4493.22'	
628+34.91	4493.09'	1.50%	4493.24'	1.30%	4493.11'	
628+56.25	4493.03'	1.10%	4493.14'	1.40%	4493.00'	
628+67.00	4492.99'	1.20%	4493.11'	1.80%	4492.93'	
628+77.53	4492.88'	1.90%	4493.07'	2.30%	4492.84'	
628+98.85	4492.73'	2.10%	4492.94'	1.30%	4492.81'	
629+20.12	4492.62'	1.60%	4492.78'	0.80%	4492.70'	
629+41.36	4492.64'	1.00%	4492.74'	1.20%	4492.62'	
629+62.55	4492.70'	0.70%	4492.77'	1.40%	4492.63'	
629+83.71	4492.60'	1.70%	4492.77'	1.60%	4492.61'	
630+04.86	4492.40'	2.60%	4492.66'	1.10%	4492.55'	
630+25.98	4492.43'	0.80%	4492.51'	0.20%	4492.49'	
630+47.15	4492.56'	0.00%	4492.56'	0.70%	4492.49'	
630+68.33	4492.56'	0.60%	4492.62'	1.00%	4492.52'	
630+89.49	4492.51'	0.60%	4492.57'	0.70%	4492.50'	
631+10.70	4492.42'	0.20%	4492.44'	0.10%	4492.43'	
631+31.89	4492.32'	0.30%	4492.35'	-0.10%	4492.36'	
631+53.07	4492.28'	0.00%	4492.28'	-0.20%	4492.30'	
631+74.22	4492.32'	0.40%	4492.36'	0.70%	4492.29'	
631+95.36	4492.38'	1.00%	4492.48'	2.50%	4492.23'	
632+16.54	4492.33'	1.60%	4492.49'	3.20%	4492.17'	
632+37.69	4492.10'	2.10%	4492.31'	2.10%	4492.10'	
632+58.88	4492.00'	3.00%	4492.30'	1.80%	4492.12'	
632+80.12	4492.04'	1.80%	4492.22'	0.20%	4492.20'	
633+01.39	4492.25'	1.90%	4492.44'	1.50%	4492.29'	
633+22.70	4492.45'	0.40%	4492.49'	1.60%	4492.33'	
633+43.93	4492.48'	1.50%	4492.63'	2.20%	4492.41'	
633+65.24	4492.51'	1.30%	4492.64'	1.50%	4492.49'	
633+86.50	4492.55'	2.30%	4492.78'	2.10%	4492.57'	
634+07.79	4492.67'	2.50%	4492.92'	2.40%	4492.68'	
634+29.14	4492.74'	2.70%	4493.01'	1.50%	4492.86'	
634+50.57	4492.78'	2.80%	4493.06'	1.20%	4492.94'	
634+72.17	4492.83'	2.10%	4493.04'	1.80%	4492.86'	
634+93.88	4492.95'	1.90%	4493.14'	1.30%	4493.01'	
635+15.68	4493.06'	2.60%	4493.32'	1.60%	4493.16'	
635+37.49	4493.15'	3.30%	4493.48'	1.70%	4493.31'	
635+59.36	4493.41'	3.10%	4493.72'	1.70%	4493.55'	
635+81.23	4493.67'	2.10%	4493.88'	2.00%	4493.68'	
636+03.13	4493.83'	2.30%	4494.06'	1.90%	4493.87'	
636+25.11	4493.90'	1.90%	4494.09'	1.20%	4493.97'	
636+47.08	4494.00'	2.00%	4494.20'	0.80%	4494.12'	
636+69.05	4494.23'	2.00%	4494.43'	1.10%	4494.32'	
636+91.09	4494.40'	1.50%	4494.55'	1.10%	4494.44'	
637+13.12	4494.50'	1.40%	4494.64'	0.50%	4494.59'	
637+35.11	4494.64'	2.00%	4494.84'	0.70%	4494.77'	
637+57.11	4494.90'	1.80%	4495.08'	1.20%	4494.96'	
637+79.06	4495.19'	1.30%	4495.32'	1.40%	4495.18'	
638+00.90	4495.38'	1.80%	4495.56'	1.50%	4495.41'	
638+22.75	4495.57'	1.30%	4495.70'	2.20%	4495.48'	
638+44.61	4495.38'	3.80%	4495.76'	1.50%	4495.61'	
638+66.67	4495.96'	1.20%	4496.08'	1.40%	4495.94'	
638+88.77	4496.02'	1.60%	4496.18'	1.30%	4496.05'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
639+10.92	4496.17'	1.50%	4496.32'	1.50%	4496.17'	
639+33.27	4496.36'	1.50%	4496.51'	1.90%	4496.32'	
639+55.95	4496.57'	1.20%	4496.69'	2.30%	4496.46'	
639+67.00	4496.68'	1.10%	4496.79'	2.20%	4496.57'	
639+78.93	4496.78'	1.10%	4496.89'	2.20%	4496.67'	
640+02.30	4496.98'	0.70%	4497.05'	1.90%	4496.86'	
640+25.85	4497.53'	-0.30%	4497.50'	2.20%	4497.28'	
640+49.52	4497.88'	-0.80%	4497.80'	3.00%	4497.50'	
640+73.24	4498.24'	-2.50%	4497.99'	4.20%	4497.57'	
640+97.03	4498.62'	-4.10%	4498.21'	5.10%	4497.70'	
641+20.83	4498.80'	-4.30%	4498.37'	5.30%	4497.84'	
641+44.64	4498.86'	-4.40%	4498.42'	5.90%	4497.83'	
641+68.46	4498.96'	-3.90%	4498.57'	5.60%	4498.01'	
641+92.36	4499.17'	-4.40%	4498.73'	4.70%	4498.26'	
642+16.26	4499.35'	-4.80%	4498.87'	3.40%	4498.53'	
642+40.18	4499.60'	-4.30%	4499.17'	5.50%	4498.62'	
642+63.95	4500.10'	-5.40%	4499.56'	6.70%	4498.89'	
642+87.64	4500.30'	-2.90%	4500.01'	7.40%	4499.27'	
643+11.26	4500.43'	-2.60%	4500.17'	6.00%	4499.57'	
643+34.95	4500.49'	-2.70%	4500.22'	5.90%	4499.63'	
643+58.54	4500.62'	-3.60%	4500.26'	6.50%	4499.61'	
643+82.26	4500.86'	-4.50%	4500.41'	6.30%	4499.78'	
644+06.00	4500.97'	-4.30%	4500.54'	7.50%	4499.79'	
644+29.65	4501.09'	-4.60%	4500.63'	7.40%	4499.89'	
644+53.38	4501.28'	-3.60%	4500.92'	7.00%	4500.22'	
644+76.99	4501.50'	-3.50%	4501.15'	6.70%	4500.48'	
645+00.75	4501.64'	-2.90%	4501.35'	5.00%	4500.85'	
645+24.30	4501.93'	-3.00%	4501.63'	4.70%	4501.16'	
645+48.02	4502.18'	-2.50%	4501.93'	5.60%	4501.37'	
645+71.68	4502.27'	-1.70%	4502.10'	5.20%	4501.58'	
645+95.30	4502.50'	-2.20%	4502.28'	5.20%	4501.76'	
646+19.03	4502.75'	-1.80%	4502.57'	6.20%	4501.95'	
646+42.64	4503.00'	-1.50%	4502.85'	5.80%	4502.27'	
646+66.25	4503.21'	-0.80%	4503.13'	3.90%	4502.74'	
646+89.86	4503.47'	-1.30%	4503.34'	3.60%	4502.98'	
647+13.54	4503.54'	-0.60%	4503.48'	3.90%	4503.09'	
647+37.21	4503.56'	-0.60%	4503.50'	4.20%	4503.08'	
647+61.01	4503.72'	-0.90%	4503.63'	5.10%	4503.12'	
647+84.77	4503.88'	-1.80%	4503.70'	5.70%	4503.13'	
648+08.58	4504.09'	-0.70%	4504.02'	6.80%	4503.34'	
648+32.45	4504.19'	-2.50%	4503.94'	5.50%	4503.39'	
648+56.42	4504.39'	-3.10%	4504.08'	5.40%	4503.54'	
648+67.00	4504.51'	-3.10%	4504.20'	5.50%	4503.65'	
648+80.31	4504.58'	-2.30%	4504.35'	5.40%	4503.81'	
649+04.23	4504.59'	-1.10%	4504.48'	5.00%	4503.98'	
649+28.16	4504.78'	-3.60%	4504.42'	5.10%	4503.91'	
649+52.18	4504.95'	-3.90%	4504.56'	5.30%	4504.03'	
649+76.17	4505.22'	-4.20%	4504.80'	5.70%	4504.23'	
650+00.12	4505.43'	-4.30%	4505.00'	7.40%	4504.26'	
650+24.11	4505.64'	-5.60%	4505.08'	7.30%	4504.35'	
650+48.02	4505.80'	-4.80%	4505.32'	6.90%	4504.63'	
650+71.92	4506.00'	-3.70%	4505.63'	6.70%	4504.96'	
650+95.75	4506.18'	-3.20%	4505.86'	6.10%	4505.25'	
651+19.55	4506.33'	-2.70%	4506.06'	5.80%	4505.48'	
651+43.30	4506.48'	-3.70%	4506.11'	5.50%	4505.56'	
651+66.97	4506.58'	-3.10%	4506.27'	6.10%	4505.66'	
651+90.61	4506.73'	-2.80%	4506.45'	5.40%	4505.91'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
652+14.14	4506.95'	-2.20%	4506.73'	5.00%	4506.23'	
652+37.64	4507.06'	-1.30%	4506.93'	4.70%	4506.46'	
652+61.03	4507.04'	-1.40%	4506.90'	4.70%	4506.43'	
652+84.42	4507.10'	-1.40%	4506.96'	5.40%	4506.42'	
653+07.71	4507.14'	-1.60%	4506.98'	3.90%	4506.59'	
653+31.06	4507.30'	-0.40%	4507.26'	4.00%	4506.86'	
653+54.29	4507.46'	-1.40%	4507.32'	4.00%	4506.92'	
653+67.00	4507.52'	-1.40%	4507.38'	4.00%	4506.98'	
653+77.55	4507.52'	-0.90%	4507.43'	4.00%	4507.03'	
654+00.70	4507.59'	-0.50%	4507.54'	4.30%	4507.11'	
654+23.82	4507.82'	-0.20%	4507.80'	5.40%	4507.26'	
654+46.85	4508.05'	0.30%	4508.08'	5.30%	4507.55'	
654+69.81	4508.19'	0.60%	4508.25'	4.20%	4507.83'	
654+92.76	4508.29'	0.90%	4508.38'	3.20%	4508.06'	
655+15.74	4508.36'	0.70%	4508.43'	2.90%	4508.14'	
655+38.74	4508.53'	-0.60%	4508.47'	2.90%	4508.18'	
655+61.81	4508.71'	-0.90%	4508.62'	4.50%	4508.17'	
655+84.76	4508.81'	-1.00%	4508.71'	3.10%	4508.40'	
656+07.78	4508.97'	-1.10%	4508.86'	3.60%	4508.50'	
656+30.73	4509.18'	-2.20%	4508.96'	2.80%	4508.68'	
656+53.67	4509.40'	-1.00%	4509.30'	3.50%	4508.95'	
656+76.57	4509.49'	-0.80%	4509.41'	2.90%	4509.12'	
656+99.45	4509.60'	-0.10%	4509.59'	2.70%	4509.32'	
657+22.26	4509.85'	-0.80%	4509.77'	2.70%	4509.50'	
657+45.06	4510.05'	-0.10%	4510.04'	3.60%	4509.68'	
657+67.69	4510.22'	0.30%	4510.25'	3.20%	4509.93'	
657+90.26	4510.36'	1.30%	4510.49'	3.10%	4510.18'	
658+12.63	4510.54'	1.70%	4510.71'	3.90%	4510.32'	
658+34.95	4510.69'	1.50%	4510.84'	3.60%	4510.48'	
658+57.15	4510.79'	1.10%	4510.90'	3.00%	4510.60'	
658+79.32	4510.88'	1.20%	4511.00'	3.60%	4510.64'	
659+01.40	4510.95'	1.30%	4511.08'	3.30%	4510.75'	
659+23.40	4511.09'	0.90%	4511.18'	3.10%	4510.87'	
659+45.29	4511.25'	0.20%	4511.27'	3.20%	4510.95'	
659+67.14	4511.36'	0.20%	4511.38'	2.70%	4511.11'	
659+88.88	4511.37'	0.70%	4511.44'	1.80%	4511.26'	
660+10.57	4511.41'	1.00%	4511.51'	1.80%	4511.33'	
660+32.20	4511.37'	2.20%	4511.59'	3.00%	4511.29'	
660+53.84	4511.29'	1.70%	4511.46'	2.80%	4511.18'	
660+75.44	4511.19'	1.10%	4511.30'	2.30%	4511.07'	
660+97.09	4511.12'	0.50%	4511.17'	2.40%	4510.93'	
661+18.68	4511.30'	0.50%	4511.35'	2.80%	4511.07'	
661+40.14	4511.52'	0.70%	4511.59'	2.50%	4511.34'	
661+61.52	4511.60'	1.30%	4511.73'	2.60%	4511.47'	
661+82.81	4511.59'	0.70%	4511.66'	2.30%	4511.43'	
662+04.05	4511.67'	-0.40%	4511.63'	2.10%	4511.42'	
662+25.25	4511.69'	-0.10%	4511.68'	2.10%	4511.47'	
662+46.34	4511.78'	-0.50%	4511.73'	1.70%	4511.56'	
662+67.46	4511.80'	0.10%	4511.81'	1.30%	4511.68'	
662+88.49	4511.89'	0.00%	4511.89'	1.60%	4511.73'	
663+09.46	4511.71'	1.30%	4511.84'	1.00%	4511.74'	
663+30.42	4511.57'	2.60%	4511.83'	0.30%	4511.80'	
663+51.51	4511.75'	1.70%	4511.92'	1.30%	4511.79'	
663+72.67	4511.82'	1.00%	4511.92'	2.00%	4511.72'	
663+93.95	4511.87'	0.60%	4511.93'	2.40%	4511.69'	
664+15.22	4512.02'	0.10%	4512.03'	2.70%	4511.76'	
664+36.60	4512.20'	1.00%	4512.30'	1.00%	4512.20'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
664+57.96	4512.38'	1.00%	4512.48'	0.00%	4512.48'	
664+79.28	4512.62'	0.20%	4512.64'	0.60%	4512.58'	
665+00.56	4512.80'	0.00%	4512.80'	1.20%	4512.68'	
665+21.71	4512.83'	1.50%	4512.98'	1.20%	4512.86'	
665+42.84	4512.90'	2.50%	4513.15'	1.00%	4513.05'	
665+63.88	4512.99'	2.70%	4513.26'	0.60%	4513.20'	
665+84.92	4512.96'	3.90%	4513.35'	-0.40%	4513.39'	
666+05.95	4513.33'	2.60%	4513.59'	-1.10%	4513.70'	
666+26.99	4513.51'	2.60%	4513.77'	-2.70%	4514.04'	
666+48.04	4513.64'	3.10%	4513.95'	-3.30%	4514.28'	
666+69.06	4513.83'	3.00%	4514.13'	-1.80%	4514.31'	
666+90.08	4514.08'	2.90%	4514.37'	-1.60%	4514.53'	
667+11.14	4514.21'	3.00%	4514.51'	-3.50%	4514.86'	
667+32.22	4514.21'	4.80%	4514.69'	-4.50%	4515.14'	
667+53.30	4514.30'	5.10%	4514.81'	-4.90%	4515.30'	
667+74.42	4514.45'	5.00%	4514.95'	-4.00%	4515.35'	
667+95.61	4514.44'	5.10%	4514.95'	-4.10%	4515.36'	
668+16.80	4514.43'	6.50%	4515.08'	-3.90%	4515.47'	
668+37.92	4514.74'	6.00%	4515.34'	-4.10%	4515.75'	
668+58.95	4515.03'	5.20%	4515.55'	-4.10%	4515.96'	
668+79.86	4515.20'	5.40%	4515.74'	-3.80%	4516.12'	
669+00.67	4515.30'	5.90%	4515.89'	-3.90%	4516.28'	
669+21.45	4515.25'	7.10%	4515.96'	-4.50%	4516.41'	
669+42.22	4515.28'	6.60%	4515.94'	-5.80%	4516.52'	
669+63.01	4515.41'	6.00%	4516.01'	-5.60%	4516.57'	
669+83.79	4515.61'	5.00%	4516.11'	-5.60%	4516.67'	
670+04.55	4515.72'	4.40%	4516.16'	-5.50%	4516.71'	
670+25.28	4515.70'	5.20%	4516.22'	-5.00%	4516.72'	
670+46.02	4515.82'	6.00%	4516.42'	-3.50%	4516.77'	
670+66.76	4515.96'	6.00%	4516.56'	-5.10%	4517.07'	
670+87.38	4516.06'	5.70%	4516.63'	-6.60%	4517.29'	
671+08.10	4516.21'	5.60%	4516.77'	-7.30%	4517.50'	
671+28.63	4516.43'	5.80%	4517.01'	-6.90%	4517.70'	
671+49.21	4516.65'	6.30%	4517.28'	-5.90%	4517.87'	
671+69.62	4516.83'	5.50%	4517.38'	-5.80%	4517.96'	
671+89.98	4517.00'	5.10%	4517.51'	-5.50%	4518.06'	
672+10.26	4517.11'	5.80%	4517.69'	-4.70%	4518.16'	
672+30.41	4517.19'	5.60%	4517.75'	-5.90%	4518.34'	
672+50.60	4517.32'	6.10%	4517.93'	-5.80%	4518.51'	
672+67.00	4517.47'	6.80%	4518.15'	-5.20%	4518.67'	
672+77.25	4517.65'	6.30%	4518.28'	-5.50%	4518.83'	
673+03.82	4518.15'	7.20%	4518.87'	-3.40%	4519.21'	
673+30.20	4518.69'	6.00%	4519.29'	-3.10%	4519.60'	
673+56.52	4518.89'	7.30%	4519.62'	-2.60%	4519.88'	
673+67.00	4519.01'	6.60%	4519.67'	-2.70%	4519.94'	
673+82.83	4519.11'	6.20%	4519.73'	-3.10%	4520.04'	
674+09.04	4519.22'	6.00%	4519.82'	-4.00%	4520.22'	
674+35.12	4519.32'	6.30%	4519.95'	-3.50%	4520.30'	
674+61.14	4519.39'	7.40%	4520.13'	-2.70%	4520.40'	
674+87.07	4519.50'	7.90%	4520.29'	-2.30%	4520.52'	
675+13.08	4519.68'	7.90%	4520.47'	-2.40%	4520.71'	
675+39.11	4519.83'	7.80%	4520.61'	-2.70%	4520.88'	
675+65.11	4520.00'	7.30%	4520.73'	-3.60%	4521.09'	
675+90.93	4520.19'	7.50%	4520.94'	-3.30%	4521.27'	
676+16.80	4520.28'	7.60%	4521.04'	-3.50%	4521.39'	
676+42.70	4520.40'	7.40%	4521.14'	-3.90%	4521.53'	
676+68.62	4520.49'	7.90%	4521.28'	-4.10%	4521.69'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
676+94.43	4520.60'	7.70%	4521.37'	-4.60%	4521.83'	
677+20.12	4520.80'	7.20%	4521.52'	-5.10%	4522.03'	
677+45.63	4520.89'	6.60%	4521.55'	-5.70%	4522.12'	
677+71.04	4520.74'	7.40%	4521.48'	-5.70%	4522.05'	
677+96.48	4520.77'	6.20%	4521.39'	-5.90%	4521.98'	
678+22.02	4520.83'	5.60%	4521.39'	-7.60%	4522.15'	
678+47.89	4520.88'	6.30%	4521.51'	-6.60%	4522.17'	
678+73.90	4520.98'	5.70%	4521.55'	-6.00%	4522.15'	
678+99.93	4520.87'	6.30%	4521.50'	-7.20%	4522.22'	
679+26.15	4520.92'	6.70%	4521.59'	-7.70%	4522.36'	
679+52.70	4521.15'	5.40%	4521.69'	-6.50%	4522.34'	
679+72.76	4521.15'	4.40%	4521.59'	-6.50%	4522.24'	
679+93.08	4521.16'	4.90%	4521.65'	-5.10%	4522.16'	
680+13.51	4521.25'	4.80%	4521.73'	-4.20%	4522.15'	
680+34.15	4521.40'	4.00%	4521.80'	-3.60%	4522.16'	
680+54.82	4521.52'	3.10%	4521.83'	-3.30%	4522.16'	
680+75.79	4521.43'	4.60%	4521.89'	-3.00%	4522.19'	
680+96.90	4521.36'	4.90%	4521.85'	-4.00%	4522.25'	
681+18.32	4521.58'	4.80%	4522.06'	-3.20%	4522.38'	
681+39.87	4521.78'	3.70%	4522.15'	-3.90%	4522.54'	
681+61.54	4521.84'	3.90%	4522.23'	-3.70%	4522.60'	
681+83.31	4521.88'	4.80%	4522.36'	-3.90%	4522.75'	
682+05.13	4521.96'	6.20%	4522.58'	-3.70%	4522.95'	
682+26.94	4522.00'	6.90%	4522.69'	-4.20%	4523.11'	
682+48.73	4521.95'	6.70%	4522.62'	-5.10%	4523.13'	
682+70.38	4522.14'	6.60%	4522.80'	-4.80%	4523.28'	
682+92.16	4522.43'	6.50%	4523.08'	-4.90%	4523.57'	
683+13.87	4522.52'	6.80%	4523.20'	-5.80%	4523.78'	
683+35.47	4522.60'	7.10%	4523.31'	-5.40%	4523.85'	
683+57.06	4522.93'	6.40%	4523.57'	-5.70%	4524.14'	
683+78.60	4523.32'	6.00%	4523.92'	-4.60%	4524.38'	
684+00.02	4523.56'	5.60%	4524.12'	-4.40%	4524.56'	
684+21.39	4523.81'	5.70%	4524.38'	-3.20%	4524.70'	
684+42.80	4524.01'	5.60%	4524.57'	-2.80%	4524.85'	
684+64.31	4524.04'	4.90%	4524.53'	-5.10%	4525.04'	
684+85.91	4524.21'	4.20%	4524.63'	-6.30%	4525.26'	
685+07.66	4524.55'	4.80%	4525.03'	-4.60%	4525.49'	
685+29.43	4524.83'	4.70%	4525.30'	-4.10%	4525.71'	
685+51.20	4525.13'	4.50%	4525.58'	-3.30%	4525.91'	
685+72.94	4525.43'	5.10%	4525.94'	-1.90%	4526.13'	
685+94.73	4525.71'	4.20%	4526.13'	-2.10%	4526.34'	
686+16.53	4526.15'	3.10%	4526.46'	0.30%	4526.43'	
686+38.29	4526.61'	1.80%	4526.79'	0.70%	4526.72'	
686+60.09	4527.08'	1.40%	4527.22'	0.30%	4527.19'	
686+81.95	4527.59'	1.50%	4527.74'	1.10%	4527.63'	
687+03.83	4528.13'	1.30%	4528.26'	-0.10%	4528.27'	
687+25.73	4528.57'	2.50%	4528.82'	0.00%	4528.82'	
687+47.69	4528.97'	2.70%	4529.24'	-0.90%	4529.33'	
687+69.72	4529.55'	2.70%	4529.82'	-0.50%	4529.87'	
687+91.76	4530.12'	1.90%	4530.31'	0.60%	4530.25'	
688+13.86	4530.69'	1.80%	4530.87'	1.70%	4530.70'	
688+35.95	4531.23'	1.10%	4531.34'	1.30%	4531.21'	
688+58.18	4531.69'	1.80%	4531.87'	1.50%	4531.72'	
688+80.40	4532.18'	1.60%	4532.34'	1.00%	4532.24'	
689+02.64	4532.73'	2.00%	4532.93'	0.50%	4532.88'	
689+24.78	4533.26'	3.00%	4533.56'	-0.10%	4533.57'	
689+46.84	4533.76'	3.60%	4534.12'	-0.50%	4534.17'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
689+68.74	4534.29'	4.10%	4534.70'	0.10%	4534.69'	
689+90.56	4534.80'	3.40%	4535.14'	0.60%	4535.08'	
690+12.31	4535.27'	1.80%	4535.45'	0.70%	4535.38'	
690+33.99	4535.62'	1.50%	4535.77'	0.40%	4535.73'	
690+55.59	4536.06'	1.00%	4536.16'	0.30%	4536.13'	
690+67.00	4536.22'	1.50%	4536.37'	-0.90%	4536.46'	
690+77.16	4536.36'	1.90%	4536.55'	-1.60%	4536.71'	
690+98.66	4536.74'	2.50%	4536.99'	-2.10%	4537.20'	
691+20.03	4537.12'	3.10%	4537.43'	-2.50%	4537.68'	
691+41.17	4537.45'	4.30%	4537.88'	-2.50%	4538.13'	
691+62.13	4537.89'	3.60%	4538.25'	-2.30%	4538.48'	
691+82.88	4538.12'	4.20%	4538.54'	-1.90%	4538.73'	
692+03.48	4538.26'	4.80%	4538.74'	-3.00%	4539.04'	
692+23.94	4538.23'	5.10%	4538.74'	-3.70%	4539.11'	
692+44.41	4538.15'	6.20%	4538.77'	-3.50%	4539.12'	
692+64.81	4538.07'	6.50%	4538.72'	-3.00%	4539.02'	
692+85.19	4537.96'	6.90%	4538.65'	-1.90%	4538.84'	
693+05.59	4537.86'	6.30%	4538.49'	-1.80%	4538.67'	
693+26.07	4537.69'	5.50%	4538.24'	-2.10%	4538.45'	
693+46.59	4537.44'	4.80%	4537.92'	-1.40%	4538.06'	
693+67.37	4537.08'	4.10%	4537.49'	-1.40%	4537.63'	
693+88.18	4536.63'	3.50%	4536.98'	-1.10%	4537.09'	
694+09.20	4536.29'	4.50%	4536.74'	0.20%	4536.72'	
694+30.36	4536.08'	3.80%	4536.46'	0.30%	4536.43'	
694+51.62	4536.13'	3.00%	4536.43'	1.40%	4536.29'	
694+72.97	4536.46'	0.20%	4536.48'	1.30%	4536.35'	
694+94.41	4536.82'	-0.80%	4536.74'	2.10%	4536.53'	
695+15.87	4537.11'	-2.00%	4536.91'	1.20%	4536.79'	
695+37.30	4537.43'	-1.50%	4537.28'	1.60%	4537.12'	
695+58.82	4537.75'	-1.30%	4537.62'	1.20%	4537.50'	
695+80.25	4538.05'	-1.40%	4537.91'	0.40%	4537.87'	
696+01.79	4538.34'	-0.30%	4538.31'	0.60%	4538.25'	
696+23.24	4538.71'	-0.90%	4538.62'	0.60%	4538.56'	
696+44.62	4539.08'	0.30%	4539.11'	1.40%	4538.97'	
696+65.99	4539.39'	0.60%	4539.45'	1.00%	4539.35'	
696+87.24	4539.72'	0.20%	4539.74'	1.60%	4539.58'	
697+08.45	4540.10'	-0.40%	4540.06'	2.10%	4539.85'	
697+29.72	4540.43'	0.00%	4540.43'	2.10%	4540.22'	
697+50.76	4540.66'	0.80%	4540.74'	2.50%	4540.49'	
697+71.75	4540.90'	1.70%	4541.07'	3.40%	4540.73'	
697+92.52	4541.13'	2.00%	4541.33'	3.80%	4540.95'	
698+13.29	4541.16'	2.30%	4541.39'	3.00%	4541.09'	
698+33.96	4541.21'	2.40%	4541.45'	3.40%	4541.11'	
698+54.69	4541.11'	2.20%	4541.33'	3.50%	4540.98'	
698+75.49	4540.95'	0.50%	4541.00'	2.00%	4540.80'	
698+96.50	4540.72'	0.70%	4540.79'	1.60%	4540.63'	
699+17.58	4540.52'	0.40%	4540.56'	1.20%	4540.44'	
699+38.88	4540.23'	2.00%	4540.43'	0.20%	4540.41'	
699+60.26	4540.23'	2.90%	4540.52'	0.00%	4540.52'	
699+81.74	4540.26'	4.20%	4540.68'	-0.10%	4540.69'	
700+03.32	4540.33'	4.30%	4540.76'	-1.20%	4540.88'	
700+24.92	4540.32'	5.00%	4540.82'	-3.00%	4541.12'	
700+46.61	4540.53'	4.80%	4541.01'	-1.30%	4541.14'	
700+68.42	4540.62'	3.80%	4541.00'	-0.60%	4541.06'	
700+90.34	4540.74'	3.90%	4541.13'	0.40%	4541.09'	
701+12.40	4540.91'	4.00%	4541.31'	0.50%	4541.26'	
701+34.54	4541.12'	3.20%	4541.44'	0.30%	4541.41'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
701+56.75	4541.37'	2.20%	4541.59'	0.70%	4541.52'	
701+67.00	4541.46'	2.70%	4541.73'	1.50%	4541.58'	
701+79.00	4541.60'	2.90%	4541.89'	2.40%	4541.65'	
702+01.19	4542.03'	1.40%	4542.17'	3.30%	4541.84'	
702+23.33	4542.46'	1.20%	4542.58'	3.50%	4542.23'	
702+45.36	4542.86'	1.10%	4542.97'	2.90%	4542.68'	
702+67.24	4543.27'	0.90%	4543.36'	2.90%	4543.07'	
702+89.05	4543.80'	0.60%	4543.86'	3.70%	4543.49'	
703+10.71	4544.27'	0.60%	4544.33'	4.40%	4543.89'	
703+32.29	4544.74'	0.80%	4544.82'	5.10%	4544.31'	
703+53.77	4545.15'	0.60%	4545.21'	4.90%	4544.72'	
703+75.08	4545.53'	0.60%	4545.59'	5.00%	4545.09'	
703+96.37	4545.97'	0.30%	4546.00'	4.60%	4545.54'	
704+17.68	4546.33'	-0.60%	4546.27'	3.50%	4545.92'	
704+38.96	4546.52'	0.70%	4546.59'	3.10%	4546.28'	
704+60.22	4546.59'	2.10%	4546.80'	2.70%	4546.53'	
704+81.40	4546.73'	2.70%	4547.00'	3.20%	4546.68'	
705+02.51	4546.88'	2.50%	4547.13'	1.90%	4546.94'	
705+23.58	4547.13'	3.40%	4547.47'	1.80%	4547.29'	
705+44.75	4547.55'	2.10%	4547.76'	1.90%	4547.57'	
705+66.04	4548.03'	1.80%	4548.21'	3.30%	4547.88'	
705+87.34	4548.54'	1.00%	4548.64'	4.40%	4548.20'	
706+08.66	4549.03'	0.90%	4549.12'	4.60%	4548.66'	
706+29.97	4549.52'	0.40%	4549.56'	4.40%	4549.12'	
706+51.49	4549.92'	1.70%	4550.09'	4.30%	4549.66'	
706+72.98	4550.24'	2.40%	4550.48'	5.20%	4549.96'	
706+94.43	4550.49'	1.50%	4550.64'	3.50%	4550.29'	
707+15.88	4550.71'	1.50%	4550.86'	3.10%	4550.55'	
707+37.31	4550.90'	3.40%	4551.24'	3.70%	4550.87'	
707+58.71	4551.17'	2.30%	4551.40'	2.40%	4551.16'	
707+80.01	4551.38'	2.80%	4551.66'	2.30%	4551.43'	
708+01.36	4551.56'	2.60%	4551.82'	3.00%	4551.52'	
708+22.65	4551.72'	2.20%	4551.94'	2.50%	4551.69'	
708+43.93	4551.86'	1.70%	4552.03'	1.70%	4551.86'	
708+65.24	4551.95'	2.30%	4552.18'	2.10%	4551.97'	
708+86.48	4552.01'	3.00%	4552.31'	2.10%	4552.10'	
709+07.66	4552.13'	3.10%	4552.44'	1.60%	4552.28'	
709+28.77	4552.24'	2.70%	4552.51'	0.40%	4552.47'	
709+49.90	4552.32'	3.60%	4552.68'	1.60%	4552.52'	
709+70.97	4552.35'	4.30%	4552.78'	0.90%	4552.69'	
709+92.06	4552.38'	4.80%	4552.86'	1.00%	4552.76'	
710+13.04	4552.48'	4.80%	4552.96'	1.60%	4552.80'	
710+34.09	4552.63'	3.70%	4553.00'	1.30%	4552.87'	
710+55.20	4552.73'	2.80%	4553.01'	0.90%	4552.92'	
710+76.23	4552.86'	1.70%	4553.03'	1.00%	4552.93'	
710+97.29	4552.86'	2.00%	4553.06'	0.90%	4552.97'	
711+18.42	4552.65'	1.70%	4552.82'	1.90%	4552.63'	
711+39.56	4552.28'	1.20%	4552.40'	1.80%	4552.22'	
711+60.83	4551.96'	1.20%	4552.08'	1.50%	4551.93'	
711+82.18	4551.69'	1.80%	4551.87'	1.20%	4551.75'	
712+03.59	4551.47'	2.80%	4551.75'	1.70%	4551.58'	
712+25.08	4551.20'	4.60%	4551.66'	1.90%	4551.47'	
712+46.68	4551.09'	4.00%	4551.49'	1.00%	4551.39'	
712+68.29	4551.04'	3.50%	4551.39'	0.80%	4551.31'	
712+89.93	4550.88'	3.90%	4551.27'	0.20%	4551.25'	
713+11.60	4550.89'	4.20%	4551.31'	-0.10%	4551.32'	
713+33.35	4550.96'	5.00%	4551.46'	1.00%	4551.36'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
713+55.13	4551.08'	4.90%	4551.57'	1.40%	4551.43'	
713+76.97	4551.18'	4.10%	4551.59'	1.40%	4551.45'	
713+98.81	4551.39'	3.40%	4551.73'	2.20%	4551.51'	
714+20.63	4551.52'	3.90%	4551.91'	2.80%	4551.63'	
714+42.38	4551.67'	3.60%	4552.03'	2.70%	4551.76'	
714+64.12	4551.95'	3.00%	4552.25'	3.10%	4551.94'	
714+85.86	4552.20'	3.70%	4552.57'	3.90%	4552.18'	
715+07.61	4552.63'	2.60%	4552.89'	4.00%	4552.49'	
715+29.29	4553.07'	2.10%	4553.28'	3.60%	4552.92'	
715+50.79	4553.52'	1.60%	4553.68'	3.00%	4553.38'	
715+72.03	4553.88'	2.00%	4554.08'	2.80%	4553.80'	
715+93.03	4554.21'	2.10%	4554.42'	2.60%	4554.16'	
716+13.78	4554.47'	2.00%	4554.67'	2.60%	4554.41'	
716+34.36	4554.56'	2.20%	4554.78'	1.50%	4554.63'	
716+54.83	4554.60'	3.70%	4554.97'	1.40%	4554.83'	
716+75.11	4554.57'	3.10%	4554.88'	0.90%	4554.79'	
716+95.23	4554.45'	3.30%	4554.78'	0.60%	4554.72'	
717+15.27	4554.14'	3.40%	4554.48'	-0.40%	4554.52'	
717+35.40	4553.93'	3.60%	4554.29'	0.50%	4554.24'	
717+55.45	4553.56'	4.50%	4554.01'	1.10%	4553.90'	
717+75.61	4553.24'	3.90%	4553.63'	1.40%	4553.49'	
717+95.77	4552.92'	3.00%	4553.22'	2.10%	4553.01'	
718+16.07	4552.53'	1.50%	4552.68'	2.20%	4552.46'	
718+36.52	4551.98'	1.60%	4552.14'	2.10%	4551.93'	
718+57.05	4551.46'	2.40%	4551.70'	2.50%	4551.45'	
718+77.76	4551.02'	4.00%	4551.42'	3.40%	4551.08'	
718+98.60	4550.59'	3.90%	4550.98'	3.50%	4550.63'	
719+19.51	4550.10'	4.40%	4550.54'	3.40%	4550.20'	
719+40.59	4549.56'	4.60%	4550.02'	2.60%	4549.76'	
719+61.86	4549.10'	5.00%	4549.60'	1.70%	4549.43'	
719+83.19	4548.75'	6.10%	4549.36'	1.90%	4549.17'	
720+04.61	4548.36'	6.10%	4548.97'	0.50%	4548.92'	
720+26.22	4548.09'	5.30%	4548.62'	-0.70%	4548.69'	
720+47.79	4547.83'	6.60%	4548.49'	-0.40%	4548.53'	
720+69.39	4547.90'	5.20%	4548.42'	-0.10%	4548.43'	
720+90.95	4547.98'	5.30%	4548.51'	1.10%	4548.40'	
721+12.53	4548.02'	5.00%	4548.52'	1.20%	4548.40'	
721+34.02	4548.09	4.80%	4548.57'	2.70%	4548.30'	
721+55.40	4548.16'	5.50%	4548.71'	3.60%	4548.35'	
721+76.77	4548.61'	2.50%	4548.86'	2.70%	4548.59'	
721+98.01	4548.46'	5.30%	4548.99'	3.30%	4548.66'	
722+19.28	4548.28'	6.60%	4548.94'	2.90%	4548.65'	
722+40.44	4548.57'	4.60%	4549.03'	2.70%	4548.76'	
722+61.51	4548.99'	4.50%	4549.44'	3.40%	4549.10'	
722+82.48	4549.44'	4.10%	4549.85'	3.50%	4549.50'	
723+03.36	4550.06'	2.40%	4550.30'	3.20%	4549.98'	
723+24.24	4550.58'	1.80%	4550.76'	3.80%	4550.38'	
723+45.19	4551.16'	0.90%	4551.25'	3.10%	4550.94'	
723+66.09	4551.80'	1.50%	4551.95'	4.30%	4551.52'	
723+86.93	4552.27'	1.00%	4552.37'	3.50%	4552.02'	
724+07.82	4552.72'	1.30%	4552.85'	3.50%	4552.50'	
724+28.74	4553.21'	1.40%	4553.35'	3.70%	4552.98'	
724+49.67	4553.76'	1.20%	4553.88'	3.40%	4553.54'	
724+70.63	4554.29'	1.90%	4554.48'	3.20%	4554.16'	
724+91.55	4554.78'	1.40%	4554.92'	3.20%	4554.60'	
725+12.37	4555.26'	0.90%	4555.35'	1.80%	4555.17'	
725+33.15	4555.68'	1.10%	4555.79'	2.10%	4555.58'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
725+53.79	4556.03'	1.00%	4556.13'	1.80%	4555.95'	
725+74.39	4556.37'	1.40%	4556.51'	1.30%	4556.38'	
725+94.90	4556.72'	2.20%	4556.94'	2.50%	4556.69'	
726+15.30	4557.07'	2.20%	4557.29'	2.00%	4557.09'	
726+35.58	4557.41'	1.90%	4557.60'	2.30%	4557.37'	
726+62.32	4557.76'	2.30%	4557.99'	2.30%	4557.76'	
726+88.72	4558.03'	2.50%	4558.28'	2.90%	4557.99'	
727+14.87	4558.11'	3.00%	4558.41'	3.70%	4558.04'	
727+40.88	4558.05'	2.80%	4558.33'	2.30%	4558.10'	
727+66.78	4558.00'	3.10%	4558.31'	2.20%	4558.09'	
727+92.54	4557.89'	3.70%	4558.26'	2.30%	4558.03'	
728+18.15	4557.83'	3.80%	4558.21'	2.60%	4557.95'	
728+43.74	4557.84'	1.90%	4558.03'	0.90%	4557.94'	
728+69.31	4557.77'	2.40%	4558.01'	0.60%	4557.95'	
728+94.89	4557.65'	3.70%	4558.02'	0.50%	4557.97'	
729+20.59	4557.74'	3.60%	4558.10'	-0.10%	4558.11'	
729+46.52	4557.83'	3.60%	4558.19'	-0.90%	4558.28'	
729+72.77	4557.77'	5.60%	4558.33'	-1.30%	4558.46'	
729+99.37	4557.84'	5.20%	4558.36'	-1.10%	4558.47'	
730+19.52	4557.89'	5.40%	4558.43'	-1.60%	4558.59'	
730+39.83	4557.93'	5.20%	4558.45'	-2.40%	4558.69'	
730+60.30	4558.00'	5.90%	4558.59'	-1.30%	4558.72'	
730+80.93	4558.15'	4.80%	4558.63'	-1.70%	4558.80'	
731+01.73	4558.38'	5.00%	4558.88'	-0.20%	4558.90'	
731+22.65	4558.66'	3.00%	4558.96'	-0.40%	4559.00'	
731+43.74	4558.88'	3.50%	4559.23'	1.20%	4559.11'	
731+64.87	4559.13'	3.00%	4559.43'	1.50%	4559.28'	
731+86.06	4559.32'	2.80%	4559.60'	1.80%	4559.42'	
732+07.18	4559.47'	3.20%	4559.79'	1.70%	4559.62'	
732+28.27	4559.75'	2.00%	4559.95'	1.50%	4559.80'	
732+49.41	4560.11'	1.30%	4560.24'	2.20%	4560.02'	
732+70.59	4560.39'	0.90%	4560.48'	1.80%	4560.30'	
732+91.81	4560.71'	1.20%	4560.83'	2.10%	4560.62'	
733+13.07	4561.05'	0.90%	4561.14'	1.90%	4560.95'	
733+34.42	4561.35'	1.60%	4561.51'	2.10%	4561.30'	
733+55.83	4561.73'	0.90%	4561.82'	2.20%	4561.60'	
733+67.00	4561.97'	0.70%	4562.04'	2.70%	4561.77'	
733+77.41	4562.23'	0.10%	4562.24'	3.00%	4561.94'	
733+99.08	4562.78'	-0.20%	4562.76'	4.00%	4562.36'	
734+20.75	4563.30'	-0.80%	4563.22'	4.00%	4562.82'	
734+42.48	4563.76'	0.20%	4563.78'	4.60%	4563.32'	
734+64.10	4564.25'	1.20%	4564.37'	4.50%	4563.92'	
734+85.63	4564.84'	1.60%	4565.00'	4.70%	4564.53'	
735+07.02	4565.40'	1.50%	4565.55'	4.40%	4565.11'	
735+28.33	4565.90'	1.40%	4566.04'	4.10%	4565.63'	
735+49.48	4566.38'	1.30%	4566.51'	4.60%	4566.05'	
735+70.55	4566.84'	0.90%	4566.93'	4.60%	4566.47'	
735+91.49	4567.18'	1.10%	4567.29'	3.10%	4566.98'	
736+12.43	4567.35'	1.50%	4567.50'	1.90%	4567.31'	
736+33.45	4567.41'	1.50%	4567.56'	1.40%	4567.42'	
736+54.61	4567.38'	2.50%	4567.63'	1.90%	4567.44'	
736+75.85	4567.31'	3.20%	4567.63'	1.40%	4567.49'	
736+97.29	4567.33'	2.50%	4567.58'	0.00%	4567.58'	
737+18.94	4567.49'	2.70%	4567.76'	0.40%	4567.72'	
737+40.68	4567.70'	2.50%	4567.95'	0.80%	4567.87'	
737+62.53	4567.89'	2.80%	4568.17'	0.90%	4568.08'	
737+84.41	4568.13'	2.70%	4568.40'	0.50%	4568.35'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
738+06.30	4568.38'	2.90%	4568.67'	1.30%	4568.54'	
738+28.26	4568.63'	3.00%	4568.93'	1.60%	4568.77'	
738+50.45	4568.88'	3.00%	4569.18'	2.00%	4568.98'	
738+72.96	4569.07'	3.10%	4569.38'	1.30%	4569.25'	
738+95.81	4569.32'	3.10%	4569.63'	1.40%	4569.49'	
739+18.90	4569.55'	3.50%	4569.90'	1.40%	4569.76'	
739+42.16	4569.81'	3.70%	4570.18'	1.40%	4570.04'	
739+65.48	4570.06'	2.90%	4570.35'	-0.20%	4570.37'	
739+88.72	4570.30'	2.60%	4570.56'	0.80%	4570.48'	
740+11.84	4570.47'	3.00%	4570.77'	1.40%	4570.63'	
740+34.89	4570.59'	2.90%	4570.88'	0.70%	4570.81'	
740+57.79	4570.73'	2.10%	4570.94'	1.30%	4570.81'	
740+80.67	4570.73'	1.20%	4570.85'	1.20%	4570.73'	
741+03.48	4570.71'	1.90%	4570.90'	1.20%	4570.78'	
741+26.24	4570.64'	3.80%	4571.02'	1.10%	4570.91'	
741+48.97	4570.53'	3.30%	4570.86'	0.70%	4570.79'	
741+71.57	4570.34'	3.60%	4570.70'	0.90%	4570.61'	
741+94.17	4570.08'	3.00%	4570.38'	1.00%	4570.28'	
742+16.74	4569.64'	3.00%	4569.94'	0.50%	4569.89'	
742+39.31	4569.18'	3.40%	4569.52'	-0.10%	4569.53'	
742+61.96	4568.75'	4.50%	4569.20'	-1.10%	4569.31'	
742+84.54	4568.40'	4.90%	4568.89'	-2.00%	4569.09'	
743+07.09	4568.25'	4.70%	4568.72'	-1.50%	4568.87'	
743+29.57	4568.20'	3.80%	4568.58'	-0.10%	4568.59'	
743+51.93	4568.11'	2.50%	4568.36'	0.30%	4568.33'	
743+74.23	4568.08'	2.60%	4568.34'	1.20%	4568.22'	
743+96.40	4567.98'	3.10%	4568.29'	1.90%	4568.10'	
744+18.46	4567.77'	2.40%	4568.01'	1.50%	4567.86'	
744+40.36	4567.48'	2.30%	4567.71'	1.80%	4567.53'	
744+62.09	4567.03'	3.30%	4567.36'	2.20%	4567.14'	
744+83.62	4566.58'	3.00%	4566.88'	2.60%	4566.62'	
745+05.00	4566.06'	3.00%	4566.36'	3.20%	4566.04'	
745+26.20	4565.49'	3.00%	4565.79'	3.30%	4565.46'	
745+47.27	4564.88'	2.50%	4565.13'	2.20%	4564.91'	
745+68.20	4564.22'	2.70%	4564.49'	2.10%	4564.28'	
745+89.03	4563.58'	3.60%	4563.94'	2.30%	4563.71'	
746+09.89	4563.02'	3.80%	4563.40'	2.50%	4563.15'	
746+30.84	4562.53'	3.60%	4562.89'	1.40%	4562.75'	
746+51.91	4562.03'	4.30%	4562.46'	1.10%	4562.35'	
746+73.08	4561.81'	3.80%	4562.19'	1.30%	4562.06'	
746+94.27	4561.52'	3.30%	4561.85'	1.50%	4561.70'	
747+15.48	4561.29'	3.30%	4561.62'	1.00%	4561.52'	
747+36.77	4561.10'	3.10%	4561.41'	1.00%	4561.31'	
747+58.02	4560.87'	2.40%	4561.11'	0.40%	4561.07'	
747+79.34	4560.70'	2.00%	4560.90'	0.80%	4560.82'	
748+00.68	4560.47'	2.10%	4560.68'	1.10%	4560.57'	
748+22.02	4560.27'	1.40%	4560.41'	0.60%	4560.35'	
748+43.33	4560.08'	2.20%	4560.30'	1.00%	4560.20'	
748+64.67	4559.84'	2.20%	4560.06'	-0.10%	4560.07'	
748+86.02	4559.59'	3.60%	4559.95'	-0.10%	4559.96'	
749+07.32	4559.39'	4.50%	4559.84'	-0.50%	4559.89'	
749+28.56	4559.30'	4.90%	4559.79'	-0.60%	4559.85'	
749+49.80	4559.25'	4.50%	4559.70'	-1.30%	4559.83'	
749+71.02	4559.34'	3.70%	4559.71'	-1.20%	4559.83'	
749+92.21	4559.40'	4.00%	4559.80'	-1.50%	4559.95'	
750+13.37	4559.39'	4.70%	4559.86'	-1.60%	4560.02'	
750+34.55	4559.37'	4.30%	4559.80'	-1.90%	4559.99'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
750+55.74	4559.42'	3.80%	4559.80'	-1.30%	4559.93'	
750+76.96	4559.55'	3.20%	4559.87'	0.10%	4559.86'	
750+98.16	4559.76'	2.70%	4560.03'	0.70%	4559.96'	
751+19.31	4560.07'	1.70%	4560.24'	1.80%	4560.06'	
751+40.37	4560.34'	2.60%	4560.60'	3.60%	4560.24'	
751+61.39	4560.73'	0.70%	4560.80'	3.80%	4560.42'	
751+82.19	4561.08'	0.10%	4561.09'	4.90%	4560.60'	
752+02.82	4561.42'	0.40%	4561.46'	6.20%	4560.84'	
752+23.27	4561.63'	0.30%	4561.66'	5.40%	4561.12'	
752+43.69	4561.77'	0.80%	4561.85'	5.10%	4561.34'	
752+64.09	4561.74'	1.00%	4561.84'	4.10%	4561.43'	
752+84.59	4561.66'	1.50%	4561.81'	4.20%	4561.39'	
753+05.19	4561.56'	3.00%	4561.86'	3.90%	4561.47'	
753+25.98	4561.65'	2.60%	4561.91'	3.40%	4561.57'	
753+46.82	4561.66'	3.30%	4561.99'	3.70%	4561.62'	
753+67.71	4561.72'	2.00%	4561.92'	2.90%	4561.63'	
753+88.75	4561.86'	1.20%	4561.98'	2.80%	4561.70'	
754+09.81	4562.02'	1.00%	4562.12'	2.50%	4561.87'	
754+31.09	4562.09'	1.10%	4562.20'	2.40%	4561.96'	
754+52.65	4562.09'	1.60%	4562.25'	2.10%	4562.04'	
754+74.50	4562.06'	2.80%	4562.34'	3.00%	4562.04'	
754+96.55	4562.19'	2.40%	4562.43'	3.60%	4562.07'	
755+18.84	4562.26'	3.00%	4562.56'	3.70%	4562.19'	
755+41.29	4562.45'	2.20%	4562.67'	2.80%	4562.39'	
755+63.79	4562.59'	2.70%	4562.86'	3.40%	4562.52'	
755+86.39	4562.74'	3.20%	4563.06'	3.40%	4562.72'	
756+08.99	4562.81'	4.00%	4563.21'	3.30%	4562.88'	
756+31.57	4563.11'	4.40%	4563.55'	3.50%	4563.20'	
756+54.02	4563.65'	3.40%	4563.99'	3.70%	4563.62'	
756+76.30	4564.17'	3.20%	4564.49'	4.10%	4564.08'	
756+98.42	4564.61'	3.70%	4564.98'	4.10%	4564.57'	
757+20.40	4565.06'	3.00%	4565.36'	3.80%	4564.98'	
757+42.30	4565.41'	2.40%	4565.65'	3.10%	4565.34'	
757+64.12	4565.71'	2.80%	4565.99'	3.40%	4565.65'	
757+85.91	4565.96'	3.00%	4566.26'	3.30%	4565.93'	
758+07.54	4566.12'	3.00%	4566.42'	2.20%	4566.20'	
758+29.10	4566.25'	3.40%	4566.59'	1.80%	4566.41'	
758+50.42	4566.39'	3.10%	4566.70'	2.40%	4566.46'	
758+71.68	4566.63'	3.60%	4566.99'	4.10%	4566.58'	
758+92.88	4567.00'	2.80%	4567.28'	4.50%	4566.83'	
759+13.96	4567.36'	2.10%	4567.57'	3.90%	4567.18'	
759+35.04	4567.57'	3.10%	4567.88'	3.90%	4567.49'	
759+56.01	4567.53'	5.20%	4568.05'	2.90%	4567.76'	
759+76.91	4567.70'	4.70%	4568.17'	2.60%	4567.91'	
759+97.86	4567.94'	5.70%	4568.51'	3.70%	4568.14'	
760+18.65	4568.27'	4.10%	4568.68'	2.70%	4568.41'	
760+39.33	4568.48'	4.30%	4568.91'	3.00%	4568.61'	
760+59.87	4568.67'	3.20%	4568.99'	2.90%	4568.70'	
760+80.50	4568.98'	3.30%	4569.31'	3.00%	4569.01'	
761+01.19	4569.24'	3.90%	4569.63'	3.00%	4569.33'	
761+21.92	4569.51'	3.00%	4569.81'	1.80%	4569.63'	
761+42.71	4569.95'	2.40%	4570.19'	2.60%	4569.93'	
761+63.61	4570.19'	3.10%	4570.50'	2.70%	4570.23'	
761+84.49	4570.47'	2.90%	4570.76'	2.60%	4570.50'	
762+05.50	4570.80'	3.30%	4571.13'	2.40%	4570.89'	
762+26.48	4571.19'	3.00%	4571.49'	1.60%	4571.33'	
762+47.50	4571.70'	1.40%	4571.84'	1.50%	4571.69'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
762+68.52	4572.14'	1.70%	4572.31'	2.20%	4572.09'	
762+89.56	4572.49'	1.70%	4572.66'	2.90%	4572.37'	
763+10.62	4572.88'	0.90%	4572.97'	1.70%	4572.80'	
763+31.73	4573.37'	-0.70%	4573.30'	1.20%	4573.18'	
763+52.80	4573.71'	0.50%	4573.76'	1.40%	4573.62'	
763+73.87	4574.01'	0.40%	4574.05'	1.60%	4573.89'	
763+94.95	4574.20'	0.80%	4574.28'	1.20%	4574.16'	
764+16.07	4574.42'	0.60%	4574.48'	1.90%	4574.29'	
764+37.16	4574.67'	0.30%	4574.70'	3.00%	4574.40'	
764+58.23	4574.93'	0.70%	4575.00'	3.00%	4574.70'	
764+79.29	4575.20'	-0.10%	4575.19'	2.70%	4574.92'	
765+00.37	4575.41'	0.10%	4575.42'	3.20%	4575.10'	
765+21.50	4575.70'	-0.80%	4575.62'	3.50%	4575.27'	
765+42.66	4575.90'	-1.20%	4575.78'	3.20%	4575.46'	
765+63.90	4576.09'	-1.60%	4575.93'	2.40%	4575.69'	
765+85.25	4576.22'	-1.50%	4576.07'	1.60%	4575.91'	
766+06.69	4576.36'	-1.40%	4576.22'	1.90%	4576.03'	
766+28.27	4576.44'	-1.20%	4576.32'	2.60%	4576.06'	
766+49.98	4576.47'	-1.50%	4576.32'	2.10%	4576.11'	
766+71.82	4576.55'	-2.80%	4576.27'	0.90%	4576.18'	
766+93.79	4576.72'	-0.60%	4576.66'	2.60%	4576.40'	
767+15.92	4576.81'	1.10%	4576.92'	2.70%	4576.65'	
767+38.23	4576.92'	-0.80%	4576.84'	1.60%	4576.68'	
767+60.59	4577.13'	-1.90%	4576.94'	1.90%	4576.75'	
767+83.20	4577.33'	-2.30%	4577.10'	2.40%	4576.86'	
768+05.82	4577.52'	-4.20%	4577.10'	2.30%	4576.87'	
768+28.57	4577.72'	-3.80%	4577.34'	3.10%	4577.03'	
768+51.30	4577.85'	-3.00%	4577.55'	3.40%	4577.21'	
768+74.15	4577.95'	-1.80%	4577.77'	4.00%	4577.37'	
768+97.37	4577.93'	-1.50%	4577.78'	2.10%	4577.57'	
769+20.89	4578.01'	-3.20%	4577.69'	2.30%	4577.46'	
769+44.78	4578.22'	-2.30%	4577.99'	1.70%	4577.82'	
769+68.69	4578.35'	-2.10%	4578.14'	1.80%	4577.96'	
769+92.66	4578.48'	-3.10%	4578.17'	0.90%	4578.08'	
770+16.66	4578.67'	-2.60%	4578.41'	1.70%	4578.24'	
770+40.45	4578.86'	-1.70%	4578.69'	3.00%	4578.39'	
770+64.27	4578.97'	-1.10%	4578.86'	2.50%	4578.61'	
770+87.98	4578.95'	-1.60%	4578.79'	2.20%	4578.57'	
771+11.71	4578.92'	-1.40%	4578.78'	3.00%	4578.48'	
771+35.31	4578.89'	-1.00%	4578.79'	3.70%	4578.42'	
771+58.97	4579.01'	-3.20%	4578.69'	1.60%	4578.53'	
771+82.62	4579.07'	-2.10%	4578.86'	2.50%	4578.61'	
772+06.14	4579.09'	-1.70%	4578.92'	2.10%	4578.71'	
772+29.54	4579.13'	-1.80%	4578.95'	2.70%	4578.68'	
772+52.86	4579.22'	-1.20%	4579.10'	3.40%	4578.76'	
772+76.06	4579.17'	-0.90%	4579.08'	2.70%	4578.81'	
772+99.14	4579.42'	-2.20%	4579.20'	1.30%	4579.07'	
773+22.09	4579.50'	-1.40%	4579.36'	1.20%	4579.24'	
773+44.92	4579.54'	-1.20%	4579.42'	1.70%	4579.25'	
773+67.61	4579.46'	-1.60%	4579.30'	1.20%	4579.18'	
773+90.17	4579.59'	-2.30%	4579.36'	1.80%	4579.18'	
774+12.59	4579.60'	-1.40%	4579.46'	3.10%	4579.15'	
774+34.88	4579.65'	-0.90%	4579.56'	3.30%	4579.23'	
774+56.99	4579.61'	0.30%	4579.64'	3.40%	4579.30'	
774+67.00	4579.62'	0.10%	4579.63'	2.10%	4579.42'	
774+78.95	4579.62'	0.00%	4579.62'	1.40%	4579.48'	
775+00.72	4579.61'	1.30%	4579.74'	2.00%	4579.54'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
775+22.31	4579.64'	1.00%	4579.74'	1.70%	4579.57'	
775+43.71	4579.64'	1.30%	4579.77'	1.40%	4579.63'	
775+64.88	4579.75'	1.60%	4579.91'	1.50%	4579.76'	
775+85.84	4579.97'	1.70%	4580.14'	2.30%	4579.91'	
776+06.59	4580.15'	1.10%	4580.26'	1.90%	4580.07'	
776+27.09	4580.30'	0.80%	4580.38'	1.80%	4580.20'	
776+47.39	4580.48'	0.70%	4580.55'	1.90%	4580.36'	
776+67.57	4580.59'	0.50%	4580.64'	1.70%	4580.47'	
776+94.28	4580.56'	0.60%	4580.62'	1.40%	4580.48'	
777+20.81	4580.52'	1.60%	4580.68'	1.00%	4580.58'	
777+47.09	4580.62'	1.50%	4580.77'	1.80%	4580.59'	
777+73.18	4580.68'	1.30%	4580.81'	1.90%	4580.62'	
777+98.95	4580.75'	1.00%	4580.85'	1.50%	4580.70'	
778+24.47	4581.01'	0.20%	4581.03'	2.50%	4580.78'	
778+49.73	4581.10'	-0.10%	4581.09'	2.50%	4580.84'	
778+74.80	4580.96'	0.30%	4580.99'	2.10%	4580.78'	
778+99.69	4580.88'	0.20%	4580.90'	2.30%	4580.67'	
779+24.45	4580.83'	1.20%	4580.95'	2.90%	4580.66'	
779+49.08	4580.81'	1.80%	4580.99'	2.90%	4580.70'	
779+73.65	4580.78'	1.60%	4580.94'	0.90%	4580.85'	
779+98.05	4580.72'	2.50%	4580.97'	1.00%	4580.87'	
780+22.19	4580.62'	1.90%	4580.81'	0.60%	4580.75'	
780+46.08	4580.62'	1.50%	4580.77'	0.70%	4580.70'	
780+69.65	4580.47'	2.50%	4580.72'	1.10%	4580.61'	
780+92.89	4580.33'	3.50%	4580.68'	1.50%	4580.53'	
781+15.73	4580.25'	5.40%	4580.79'	2.70%	4580.52'	
781+38.26	4580.19'	5.20%	4580.71'	2.40%	4580.47'	
781+60.31	4580.23'	3.50%	4580.58'	1.30%	4580.45'	
781+81.73	4580.42'	2.70%	4580.69'	2.70%	4580.42'	
782+02.52	4580.63'	1.10%	4580.74'	3.60%	4580.38'	
782+26.91	4580.65'	0.90%	4580.74'	3.40%	4580.40'	
782+49.36	4580.76'	0.60%	4580.82'	2.10%	4580.61'	
782+69.69	4580.82'	0.80%	4580.90'	1.50%	4580.75'	
782+93.02	4580.76'	2.30%	4580.99'	1.80%	4580.81'	
782+96.82	4580.74'	1.50%	4580.89'	0.70%	4580.82'	
783+15.22	4580.60'	2.70%	4580.87'	0.70%	4580.80'	
783+17.56	4580.58'	2.60%	4580.84'	0.30%	4580.81'	
783+40.76	4580.52'	2.70%	4580.79'	0.60%	4580.73'	
783+64.21	4580.45'	3.30%	4580.78'	2.30%	4580.55'	
783+84.83	4580.33'	3.70%	4580.70'	2.20%	4580.48'	
784+06.28	4580.43'	3.60%	4580.79'	1.90%	4580.60'	
784+27.95	4580.49'	2.40%	4580.73'	0.20%	4580.71'	
784+50.01	4580.47'	2.80%	4580.75'	1.00%	4580.65'	
784+72.42	4580.35'	2.10%	4580.56'	1.10%	4580.45'	
784+95.30	4580.19'	2.00%	4580.39'	1.40%	4580.25'	
785+18.58	4580.14'	1.90%	4580.33'	0.30%	4580.30'	
785+42.14	4580.11'	2.50%	4580.36'	1.10%	4580.25'	
785+66.09	4579.93'	1.70%	4580.10'	-1.20%	4580.22'	
785+90.27	4579.83'	2.60%	4580.09'	0.60%	4580.03'	
786+14.87	4579.85'	4.30%	4580.28'	2.60%	4580.02'	
786+39.61	4579.97'	4.30%	4580.40'	3.60%	4580.04'	
786+64.57	4580.06'	3.60%	4580.42'	3.10%	4580.11'	
786+89.68	4580.33'	3.60%	4580.69'	2.90%	4580.40'	
787+14.85	4580.73'	1.70%	4580.90'	1.80%	4580.72'	
787+40.11	4581.04'	1.40%	4581.18'	1.40%	4581.04'	
787+65.44	4581.33'	0.60%	4581.39'	0.10%	4581.38'	
787+90.86	4581.52'	1.60%	4581.68'	1.00%	4581.58'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
788+16.39	4581.74'	0.70%	4581.81'	1.00%	4581.71'	
788+41.90	4581.83'	1.00%	4581.93'	1.50%	4581.78'	
788+67.34	4581.81'	1.00%	4581.91'	0.80%	4581.83'	
788+92.87	4582.06'	0.90%	4582.15'	1.00%	4582.05'	
789+18.43	4582.29'	2.00%	4582.49'	1.80%	4582.31'	
789+43.95	4582.48'	2.40%	4582.72'	2.10%	4582.51'	
789+69.15	4582.67'	2.50%	4582.92'	2.10%	4582.71'	
789+94.11	4582.90'	1.70%	4583.07'	3.20%	4582.75'	
790+18.95	4583.01'	0.60%	4583.07'	2.70%	4582.80'	
790+43.58	4583.16'	-0.40%	4583.12'	2.00%	4582.92'	
790+68.16	4583.33'	0.30%	4583.36'	1.30%	4583.23'	
790+92.56	4583.52'	1.90%	4583.71'	1.60%	4583.55'	
791+16.84	4583.77'	2.20%	4583.99'	1.80%	4583.81'	
791+40.98	4583.90'	1.80%	4584.08'	1.50%	4583.93'	
791+65.00	4584.00'	2.00%	4584.20'	2.10%	4583.99'	
791+88.76	4584.20'	1.10%	4584.31'	2.20%	4584.09'	
792+12.24	4584.38'	1.50%	4584.53'	3.00%	4584.23'	
792+35.51	4584.42'	1.00%	4584.52'	2.50%	4584.27'	
792+58.59	4584.40'	0.60%	4584.46'	2.30%	4584.23'	
792+81.37	4584.40'	0.80%	4584.48'	2.30%	4584.25'	
793+03.91	4584.40'	1.40%	4584.54'	1.80%	4584.36'	
793+26.18	4584.38'	2.60%	4584.64'	2.70%	4584.37'	
793+48.15	4584.44'	2.70%	4584.71'	3.20%	4584.39'	
793+69.76	4584.63'	2.10%	4584.84'	-0.40%	4584.88'	
793+91.08	4584.86'	4.10%	4585.27'	1.30%	4585.14'	
794+12.48	4585.16'	0.00%	4585.16'	-0.50%	4585.21'	
794+34.24	4585.06'	1.80%	4585.24'	3.10%	4584.93'	
794+56.18	4585.00'	2.10%	4585.21'	0.60%	4585.15'	
794+67.00	4584.96'	2.80%	4585.24'	-0.50%	4585.29'	
794+78.33	4585.03'	2.40%	4585.27'	-1.30%	4585.40'	
795+00.66	4585.28'	0.90%	4585.37'	-0.80%	4585.45'	
795+23.13	4585.48'	1.60%	4585.64'	0.80%	4585.56'	
795+45.66	4585.55'	0.70%	4585.62'	-0.30%	4585.65'	
795+68.27	4585.68'	1.50%	4585.83'	0.70%	4585.76'	
795+91.05	4585.85'	2.50%	4586.10'	0.90%	4586.01'	
796+13.84	4586.08'	3.30%	4586.41'	1.50%	4586.26'	
796+36.50	4586.36'	2.60%	4586.62'	0.90%	4586.53'	
796+58.87	4586.75'	2.90%	4587.04'	1.20%	4586.92'	
796+81.27	4587.11'	4.10%	4587.52'	0.80%	4587.44'	
797+03.73	4587.80'	4.20%	4588.22'	1.50%	4588.07'	
797+26.14	4588.49'	3.90%	4588.88'	2.40%	4588.64'	
797+48.47	4589.15'	3.60%	4589.51'	2.80%	4589.23'	
797+70.79	4589.82'	4.50%	4590.27'	3.50%	4589.92'	
797+92.97	4590.51'	3.90%	4590.90'	3.00%	4590.60'	
798+15.22	4591.31'	1.90%	4591.50'	3.10%	4591.19'	
798+37.45	4591.90'	1.80%	4592.08'	3.10%	4591.77'	
798+59.62	4592.60'	2.50%	4592.85'	3.30%	4592.52'	
798+81.85	4593.61'	1.10%	4593.72'	3.00%	4593.42'	
799+04.13	4594.48'	2.40%	4594.72'	4.00%	4594.32'	
799+26.61	4595.50'	2.80%	4595.78'	4.20%	4595.36'	
799+49.20	4596.67'	2.30%	4596.90'	3.90%	4596.51'	
799+71.85	4597.83'	2.50%	4598.08'	3.90%	4597.69'	
799+94.32	4599.02'	2.00%	4599.22'	2.70%	4598.95'	
800+16.62	4600.04'	2.80%	4600.32'	1.80%	4600.14'	
800+38.75	4601.17'	3.10%	4601.48'	2.10%	4601.27'	
800+60.69	4602.31'	3.20%	4602.63'	2.20%	4602.41'	
800+82.61	4603.28'	3.20%	4603.60'	1.00%	4603.50'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
801+04.55	4604.18'	3.20%	4604.50'	0.70%	4604.43'	
801+26.66	4604.99'	3.90%	4605.38'	0.10%	4605.37'	
801+49.08	4605.86'	4.50%	4606.31'	-0.90%	4606.40'	
801+71.98	4606.72'	4.80%	4607.20'	-0.50%	4607.25'	
801+95.32	4607.64'	4.60%	4608.10'	0.70%	4608.03'	
802+19.18	4608.45'	4.40%	4608.89'	1.40%	4608.75'	
802+43.65	4609.10'	3.80%	4609.48'	1.20%	4609.36'	
802+68.76	4609.56'	3.30%	4609.89'	0.80%	4609.81'	
802+94.22	4609.96'	2.40%	4610.20'	0.60%	4610.14'	
803+19.99	4610.42'	2.30%	4610.65'	2.70%	4610.38'	
803+45.86	4610.90'	1.40%	4611.04'	3.30%	4610.71'	
803+71.70	4611.46'	1.80%	4611.64'	3.00%	4611.34'	
803+97.47	4611.86'	1.40%	4612.00'	2.50%	4611.75'	
804+23.23	4612.15'	1.10%	4612.26'	3.40%	4611.92'	
804+48.98	4612.58'	1.40%	4612.72'	3.90%	4612.33'	
804+74.71	4613.09'	2.10%	4613.30'	3.30%	4612.97'	
805+00.41	4613.40'	2.60%	4613.66'	2.30%	4613.43'	
805+26.04	4613.70'	3.00%	4614.00'	1.60%	4613.84'	
805+51.70	4614.09'	3.40%	4614.43'	1.80%	4614.25'	
805+67.00	4614.25'	3.20%	4614.57'	1.30%	4614.44'	
805+77.38	4614.32'	3.40%	4614.66'	1.70%	4614.49'	
806+03.08	4614.69'	1.50%	4614.84'	2.10%	4614.63'	
806+28.87	4614.97'	1.40%	4615.11'	2.30%	4614.88'	
806+54.75	4615.10'	3.20%	4615.42'	0.50%	4615.37'	
806+67.00	4615.28'	2.80%	4615.56'	1.00%	4615.46'	
806+80.70	4615.48'	2.40%	4615.72'	1.10%	4615.61'	
807+06.68	4615.85'	2.00%	4616.05'	1.50%	4615.90'	
807+32.71	4616.09'	2.20%	4616.31'	2.60%	4616.05'	
807+58.74	4616.21'	2.20%	4616.43'	2.70%	4616.16'	
807+84.73	4616.26'	1.90%	4616.45'	4.10%	4616.04'	
808+10.74	4616.27'	2.30%	4616.50'	4.70%	4616.03'	
808+36.81	4616.38'	1.60%	4616.54'	5.80%	4615.96'	
808+62.99	4616.43'	0.30%	4616.46'	5.60%	4615.90'	
808+89.25	4616.49'	-1.40%	4616.35'	5.60%	4615.79'	
809+15.82	4616.47'	-0.40%	4616.43'	5.50%	4615.88'	
809+36.17	4616.55'	-0.70%	4616.48'	5.10%	4615.97'	
809+56.85	4616.54'	-0.50%	4616.49'	5.20%	4615.97'	
809+67.00	4616.55'	-0.60%	4616.49'	4.90%	4616.00'	
809+77.84	4616.55'	-0.50%	4616.50'	4.50%	4616.05'	
809+99.01	4616.49'	0.40%	4616.53'	2.90%	4616.24'	
810+20.33	4616.40'	1.60%	4616.56'	2.50%	4616.31'	
810+41.73	4616.34'	0.90%	4616.43'	3.70%	4616.06'	
810+63.12	4616.27'	0.00%	4616.27'	5.90%	4615.68'	
810+84.51	4616.28'	-0.90%	4616.19'	6.40%	4615.55'	
811+05.95	4616.37'	-0.20%	4616.35'	5.80%	4615.77'	
811+27.39	4616.39'	0.50%	4616.44'	4.10%	4616.03'	
811+48.85	4616.28'	1.00%	4616.38'	3.10%	4616.07'	
811+70.28	4616.06'	1.60%	4616.22'	2.60%	4615.96'	
811+91.81	4616.20'	1.60%	4616.36'	2.70%	4616.09'	
812+13.33	4616.37'	1.00%	4616.47'	2.90%	4616.18'	
812+34.80	4616.48'	1.10%	4616.59'	2.50%	4616.34'	
812+56.27	4616.63'	0.50%	4616.68'	3.10%	4616.37'	
812+67.00	4616.65'	0.80%	4616.73'	3.80%	4616.35'	
812+77.79	4616.68'	1.00%	4616.78'	4.10%	4616.37'	
812+99.39	4616.75'	0.50%	4616.80'	3.60%	4616.44'	
813+21.04	4616.68'	1.90%	4616.87'	3.00%	4616.57'	
813+42.65	4616.47'	3.40%	4616.81'	2.10%	4616.60'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
813+64.27	4616.67'	1.20%	4616.79'	4.00%	4616.39'	
813+85.92	4616.93'	-0.20%	4616.91'	3.30%	4616.58'	
814+07.62	4617.16'	0.00%	4617.16'	3.20%	4616.84'	
814+29.23	4617.39'	1.50%	4617.54'	2.70%	4617.27'	
814+50.75	4617.68'	2.00%	4617.88'	1.60%	4617.72'	
814+72.41	4617.91'	2.90%	4618.20'	0.50%	4618.15'	
814+94.24	4618.17'	3.70%	4618.54'	0.60%	4618.48'	
815+16.19	4618.38'	5.00%	4618.88'	2.00%	4618.68'	
815+38.11	4618.65'	4.50%	4619.10'	1.70%	4618.93'	
815+60.07	4618.98'	3.90%	4619.37'	1.20%	4619.25'	
815+82.05	4619.28'	3.40%	4619.62'	1.90%	4619.43'	
816+04.07	4619.54'	4.00%	4619.94'	2.60%	4619.68'	
816+26.13	4619.86'	3.60%	4620.22'	1.70%	4620.05'	
816+48.26	4620.24'	3.70%	4620.61'	2.20%	4620.39'	
816+70.24	4620.62'	2.30%	4620.85'	1.40%	4620.71'	
816+92.08	4620.94'	2.20%	4621.16'	2.10%	4620.95'	
817+13.70	4621.20'	2.30%	4621.43'	2.20%	4621.21'	
817+35.13	4621.48'	2.20%	4621.70'	1.60%	4621.54'	
817+56.37	4621.78'	3.10%	4622.09'	2.80%	4621.81'	
817+67.00	4621.89'	3.10%	4622.20'	2.50%	4621.95'	
817+77.35	4621.97'	3.40%	4622.31'	2.00%	4622.11'	
817+98.15	4622.14'	4.30%	4622.57'	1.30%	4622.44'	
818+18.72	4622.46'	3.10%	4622.77'	0.40%	4622.73'	
818+39.14	4622.78'	3.00%	4623.08'	2.30%	4622.85'	
818+59.46	4622.85'	3.40%	4623.19'	2.90%	4622.90'	
818+79.61	4622.86'	4.90%	4623.35'	0.50%	4623.30'	
818+99.72	4623.51'	3.20%	4623.83'	-0.70%	4623.90'	
819+19.79	4624.01'	1.90%	4624.20'	-1.30%	4624.33'	
819+39.99	4624.35'	2.00%	4624.55'	-0.40%	4624.59'	
819+60.42	4624.66'	2.20%	4624.88'	-0.30%	4624.91'	
819+81.05	4624.95'	3.00%	4625.25'	0.50%	4625.20'	
820+01.85	4625.25'	3.30%	4625.58'	0.20%	4625.56'	
820+22.80	4625.57'	3.20%	4625.89'	0.10%	4625.88'	
820+43.80	4625.87'	3.70%	4626.24'	0.40%	4626.20'	
820+64.82	4626.14'	4.20%	4626.56'	0.50%	4626.51'	
820+85.79	4626.36'	4.80%	4626.84'	0.00%	4626.84'	
821+06.76	4626.65'	4.60%	4627.11'	-0.60%	4627.17'	
821+27.70	4626.95'	5.30%	4627.48'	-0.10%	4627.49'	
821+48.61	4627.25'	5.00%	4627.75'	-0.20%	4627.77'	
821+69.50	4627.41'	5.80%	4627.99'	-0.70%	4628.06'	
821+90.41	4627.48'	5.60%	4628.04'	-2.70%	4628.31'	
822+11.22	4627.70'	5.70%	4628.27'	-2.90%	4628.56'	
822+31.91	4628.02'	5.50%	4628.57'	-1.70%	4628.74'	
822+52.52	4628.18'	5.90%	4628.77'	-0.90%	4628.86'	
822+73.07	4628.14'	6.40%	4628.78'	-1.50%	4628.93'	
822+93.59	4628.14'	6.50%	4628.79'	-1.60%	4628.95'	
823+14.09	4628.28'	6.50%	4628.93'	-0.30%	4628.96'	
823+34.57	4628.55'	4.20%	4628.97'	0.00%	4628.97'	
823+55.06	4628.80'	3.60%	4629.16'	1.60%	4629.00'	
823+75.52	4629.04'	3.10%	4629.35'	1.40%	4629.21'	
823+96.00	4629.17'	2.60%	4629.43'	1.30%	4629.30'	
824+16.44	4629.29'	2.70%	4629.56'	1.80%	4629.38'	
824+36.95	4629.40'	1.60%	4629.56'	1.80%	4629.38'	
824+57.34	4629.43'	1.10%	4629.54'	1.70%	4629.37'	
824+77.66	4629.51'	1.60%	4629.67'	2.60%	4629.41'	
824+97.91	4629.57'	1.50%	4629.72'	2.90%	4629.43'	
825+18.02	4629.51'	1.50%	4629.66'	2.70%	4629.39'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
825+44.67	4629.46'	2.40%	4629.70'	2.10%	4629.49'	
825+71.16	4629.48'	1.90%	4629.67'	1.40%	4629.53'	
825+97.38	4629.60'	3.10%	4629.91'	0.60%	4629.85'	
826+23.40	4629.70'	3.20%	4630.02'	1.40%	4629.88'	
826+49.24	4629.62'	2.60%	4629.88'	1.50%	4629.73'	
826+74.82	4629.80'	2.10%	4630.01'	1.40%	4629.87'	
827+00.31	4629.68'	3.10%	4629.99'	-0.10%	4630.00'	
827+25.56	4629.58'	3.10%	4629.89'	-1.70%	4630.06'	
827+50.62	4629.89'	2.90%	4630.18'	1.50%	4630.03'	
827+75.53	4629.84'	-0.70%	4629.77'	1.60%	4629.61'	
828+00.25	4629.81'	-1.00%	4629.71'	2.50%	4629.46'	
828+24.88	4629.66'	0.20%	4629.68'	1.00%	4629.58'	
828+49.27	4629.39'	1.20%	4629.51'	0.40%	4629.47'	
828+73.43	4628.99'	3.10%	4629.30'	-0.30%	4629.33'	
828+97.35	4628.63'	3.60%	4628.99'	-1.70%	4629.16'	
829+21.25	4628.52'	3.30%	4628.85'	-0.70%	4628.92'	
829+45.07	4628.48'	2.00%	4628.68'	-0.40%	4628.72'	
829+68.80	4628.31'	1.70%	4628.48'	-0.40%	4628.52'	
829+92.57	4628.01'	3.00%	4628.31'	2.00%	4628.11'	
830+16.25	4627.66'	3.30%	4627.99'	3.30%	4627.66'	
830+40.13	4627.02'	4.40%	4627.46'	2.00%	4627.26'	
830+63.87	4626.41'	5.80%	4626.99'	-0.80%	4627.07'	
830+88.07	4626.89'	5.10%	4627.40'	0.60%	4627.34'	
831+12.52	4627.09'	2.70%	4627.36'	0.10%	4627.35'	
831+37.35	4627.21'	1.50%	4627.36'	1.70%	4627.19'	
831+62.34	4627.34'	0.60%	4627.40'	3.00%	4627.10'	
831+87.87	4627.35'	1.70%	4627.52'	4.10%	4627.11'	
832+14.07	4627.23'	1.70%	4627.40'	3.20%	4627.08'	
832+34.19	4627.19'	0.80%	4627.27'	2.80%	4626.99'	
832+54.74	4627.15'	0.70%	4627.22'	2.90%	4626.93'	
832+75.71	4627.11'	1.20%	4627.23'	3.10%	4626.92'	
832+97.04	4627.00'	1.80%	4627.18'	3.10%	4626.87'	
833+18.56	4626.91'	2.00%	4627.11'	3.10%	4626.80'	
833+40.27	4626.89'	2.30%	4627.12'	3.00%	4626.82'	
833+62.09	4626.92'	1.60%	4627.08'	2.40%	4626.84'	
833+83.85	4626.89'	1.60%	4627.05'	2.80%	4626.77'	
834+05.56	4626.86'	1.60%	4627.02'	3.20%	4626.70'	
834+27.22	4626.84'	1.60%	4627.00'	3.20%	4626.68'	
834+48.85	4626.80'	1.40%	4626.94'	3.00%	4626.64'	
834+70.48	4626.71'	2.00%	4626.91'	2.50%	4626.66'	
834+92.00	4626.65'	2.50%	4626.90'	2.30%	4626.67'	
835+13.48	4626.68'	1.80%	4626.86'	2.40%	4626.62'	
835+34.91	4626.71'	0.70%	4626.78'	2.00%	4626.58'	
835+56.28	4626.64'	1.00%	4626.74'	2.30%	4626.51'	
835+67.00	4626.60'	1.60%	4626.76'	2.60%	4626.50'	
835+77.54	4626.54'	2.40%	4626.78'	2.50%	4626.53'	
835+98.76	4626.45'	3.10%	4626.76'	1.80%	4626.58'	
836+19.93	4626.44'	2.90%	4626.73'	2.20%	4626.51'	
836+41.03	4626.45'	2.80%	4626.73'	3.80%	4626.35'	
836+62.14	4626.37'	3.80%	4626.75'	4.40%	4626.31'	
836+83.24	4626.28'	3.40%	4626.62'	4.20%	4626.20'	
837+04.30	4626.14'	2.90%	4626.43'	3.40%	4626.09'	
837+25.36	4626.02'	2.80%	4626.30'	3.10%	4625.99'	
837+46.39	4625.99'	2.90%	4626.28'	2.30%	4626.05'	
837+67.37	4625.91'	2.70%	4626.18'	2.80%	4625.90'	
837+88.34	4625.72'	2.60%	4625.98'	2.90%	4625.69'	
838+09.31	4625.54'	1.70%	4625.71'	2.20%	4625.49'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
838+30.27	4625.37'	1.90%	4625.56'	3.50%	4625.21'	
838+51.20	4625.23'	2.00%	4625.43'	3.40%	4625.09'	
838+72.11	4625.02'	2.90%	4625.31'	2.90%	4625.02'	
838+92.94	4624.90'	2.30%	4625.13'	2.70%	4624.86'	
839+13.77	4624.71'	2.10%	4624.92'	2.80%	4624.64'	
839+34.61	4624.36'	2.90%	4624.65'	2.50%	4624.40'	
839+55.34	4624.00'	2.20%	4624.22'	1.30%	4624.09'	
839+76.22	4623.60'	4.20%	4624.02'	2.40%	4623.78'	
839+97.02	4623.17'	4.50%	4623.62'	1.40%	4623.48'	
840+17.84	4622.93'	3.60%	4623.29'	1.10%	4623.18'	
840+38.66	4622.77'	2.90%	4623.06'	1.60%	4622.90'	
840+59.43	4622.54'	2.30%	4622.77'	1.30%	4622.64'	
840+80.19	4622.28'	2.40%	4622.52'	1.70%	4622.35'	
841+00.88	4622.08'	2.20%	4622.30'	2.10%	4622.09'	
841+21.59	4621.95'	1.50%	4622.10'	3.10%	4621.79'	
841+42.28	4621.65'	0.70%	4621.72'	3.10%	4621.41'	
841+62.92	4621.16'	1.60%	4621.32'	3.10%	4621.01'	
841+83.53	4620.91'	1.60%	4621.07'	3.40%	4620.73'	
842+04.13	4620.86'	1.20%	4620.98'	3.90%	4620.59'	
842+24.61	4620.67'	2.20%	4620.89'	4.00%	4620.49'	
842+44.87	4620.55'	2.20%	4620.77'	3.70%	4620.40'	
842+65.06	4620.38'	3.30%	4620.71'	4.00%	4620.31'	
842+85.13	4620.19'	3.30%	4620.52'	1.90%	4620.33'	
843+05.24	4620.03'	3.80%	4620.41'	1.50%	4620.26'	
843+25.38	4620.10'	3.00%	4620.40'	2.40%	4620.16'	
843+45.50	4620.13'	1.00%	4620.23'	1.40%	4620.09'	
843+65.70	4620.18'	-1.00%	4620.08'	0.80%	4620.00'	
843+85.99	4620.06'	0.60%	4620.12'	2.20%	4619.90'	
844+06.19	4619.90'	0.40%	4619.94'	1.80%	4619.76'	
844+26.44	4619.77'	1.40%	4619.91'	2.40%	4619.67'	
844+46.63	4619.65'	1.50%	4619.80'	2.00%	4619.60'	
844+66.82	4619.50'	1.80%	4619.68'	2.30%	4619.45'	
844+86.98	4619.30'	2.40%	4619.54'	2.10%	4619.33'	
845+07.13	4619.06'	2.90%	4619.35'	2.30%	4619.12'	
845+27.25	4618.78'	2.10%	4618.99'	1.20%	4618.87'	
845+47.37	4618.51'	2.30%	4618.74'	0.70%	4618.67'	
845+67.45	4618.23'	2.90%	4618.52'	0.80%	4618.44'	
845+87.51	4618.01'	3.30%	4618.34'	0.60%	4618.28'	
846+14.17	4617.81'	3.50%	4618.16'	1.40%	4618.02'	
846+40.73	4617.73'	2.30%	4617.96'	3.30%	4617.63'	
846+67.17	4617.60'	1.60%	4617.76'	4.40%	4617.32'	
846+93.50	4617.20'	1.50%	4617.35'	4.00%	4616.95'	
847+19.75	4616.54'	3.00%	4616.84'	3.40%	4616.50'	
847+45.99	4616.05'	2.10%	4616.26'	2.90%	4615.97'	
847+72.23	4615.88'	0.40%	4615.92'	4.80%	4615.44'	
847+98.59	4615.80'	0.80%	4615.88'	5.30%	4615.35'	
848+24.89	4615.57'	0.00%	4615.57'	3.80%	4615.19'	
848+51.23	4615.40'	0.40%	4615.44'	3.50%	4615.09'	
848+67.00	4615.39'	0.30%	4615.42'	4.20%	4615.00'	
848+77.48	4615.39'	0.10%	4615.40'	4.20%	4614.98'	
849+03.57	4615.41'	1.00%	4615.51'	5.30%	4614.98'	
849+29.49	4615.51'	0.30%	4615.54'	4.50%	4615.09'	
849+55.32	4615.47'	2.10%	4615.68'	3.20%	4615.36'	
849+67.00	4615.44'	2.50%	4615.69'	3.50%	4615.34'	
849+80.95	4615.55'	1.50%	4615.70'	2.00%	4615.50'	
850+06.48	4615.55'	1.70%	4615.72'	1.50%	4615.57'	
850+32.07	4615.58'	0.80%	4615.66'	0.90%	4615.57'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
850+57.48	4615.54'	0.80%	4615.62'	2.10%	4615.41'	
850+82.80	4615.33'	0.30%	4615.36'	3.30%	4615.03'	
851+08.20	4615.02'	-0.10%	4615.01'	4.20%	4614.59'	
851+33.72	4614.93'	1.10%	4615.04'	3.60%	4614.68'	
851+59.36	4614.99'	0.50%	4615.04'	3.50%	4614.69'	
851+85.16	4615.00'	0.70%	4615.07'	2.40%	4614.83'	
852+11.09	4615.07'	0.60%	4615.13'	1.70%	4614.96'	
852+37.19	4615.03'	0.90%	4615.12'	1.30%	4614.99'	
852+63.40	4615.08'	1.30%	4615.21'	1.90%	4615.02'	
852+89.75	4615.20'	0.90%	4615.29'	2.40%	4615.05'	
853+16.12	4615.30'	2.30%	4615.53'	2.80%	4615.25'	
853+42.68	4615.40'	2.30%	4615.63'	1.50%	4615.48'	
853+62.70	4615.52'	1.70%	4615.69'	1.30%	4615.56'	
853+82.80	4615.66'	1.60%	4615.82'	1.60%	4615.66'	
854+02.99	4615.78'	1.40%	4615.92'	0.80%	4615.84'	
854+23.23	4615.90'	1.80%	4616.08'	0.90%	4615.99'	
854+43.55	4615.99'	1.20%	4616.11'	0.80%	4616.03'	
854+63.98	4616.12'	0.80%	4616.20'	0.10%	4616.19'	
854+84.45	4616.28'	1.00%	4616.38'	-0.40%	4616.42'	
855+04.95	4616.51'	1.10%	4616.62'	-0.90%	4616.71'	
855+25.41	4616.76'	1.40%	4616.90'	-0.30%	4616.93'	
855+45.79	4617.03'	1.80%	4617.21'	0.20%	4617.19'	
855+66.11	4617.30'	1.60%	4617.46'	1.20%	4617.34'	
855+86.38	4617.58'	1.40%	4617.72'	1.40%	4617.58'	
856+06.56	4617.88'	1.10%	4617.99'	1.70%	4617.82'	
856+26.66	4618.18'	1.20%	4618.30'	1.90%	4618.11'	
856+46.72	4618.43'	1.30%	4618.56'	1.60%	4618.40'	
856+66.72	4618.64'	1.40%	4618.78'	0.80%	4618.70'	
856+93.36	4618.89'	1.50%	4619.04'	1.60%	4618.88'	
857+20.03	4619.07'	2.00%	4619.27'	1.80%	4619.09'	
857+40.05	4619.25'	1.80%	4619.43'	2.00%	4619.23'	
857+60.09	4619.41'	1.90%	4619.60'	2.60%	4619.34'	
857+80.16	4619.61'	1.80%	4619.79'	2.50%	4619.54'	
858+00.28	4619.88'	2.30%	4620.11'	2.20%	4619.89'	
858+20.39	4620.18'	2.20%	4620.40'	1.30%	4620.27'	
858+40.43	4620.48'	1.60%	4620.64'	0.60%	4620.58'	
858+67.02	4620.89'	1.70%	4621.06'	1.20%	4620.94'	
858+93.57	4621.28'	1.70%	4621.45'	1.20%	4621.33'	
859+13.67	4621.67'	1.30%	4621.80'	1.70%	4621.63'	
859+34.02	4621.96'	1.50%	4622.11'	1.30%	4621.98'	
859+54.60	4622.29'	2.30%	4622.52'	1.80%	4622.34'	
859+75.44	4622.54'	2.50%	4622.79'	1.30%	4622.66'	
859+96.55	4622.78'	2.70%	4623.05'	0.50%	4623.00'	
860+17.92	4623.13'	1.90%	4623.32'	0.20%	4623.30'	
860+39.52	4623.56'	0.30%	4623.59'	-1.00%	4623.69'	
860+61.32	4624.00'	1.20%	4624.12'	0.20%	4624.10'	
860+83.14	4624.39'	1.20%	4624.51'	-0.10%	4624.52'	
861+04.93	4624.76'	1.70%	4624.93'	0.40%	4624.89'	
861+26.75	4625.10'	1.50%	4625.25'	0.60%	4625.19'	
861+48.59	4625.35'	1.70%	4625.52'	0.60%	4625.46'	
861+70.36	4625.73'	1.70%	4625.90'	0.70%	4625.83'	
861+92.14	4626.09'	1.70%	4626.26'	0.70%	4626.19'	
862+13.95	4626.41'	1.60%	4626.57'	0.10%	4626.56'	
862+36.06	4626.70'	4.20%	4627.12'	1.80%	4626.94'	
862+58.35	4627.06'	5.50%	4627.61'	3.30%	4627.28'	
862+80.75	4627.47'	5.10%	4627.98'	3.80%	4627.60'	
863+03.21	4627.89'	4.80%	4628.37'	4.20%	4627.95'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
863+25.68	4628.35'	3.90%	4628.74'	4.40%	4628.30'	
863+48.14	4628.65'	4.20%	4629.07'	5.40%	4628.53'	
863+70.57	4628.92'	5.00%	4629.42'	6.00%	4628.82'	
863+92.94	4629.19'	4.10%	4629.60'	5.30%	4629.07'	
864+15.15	4629.63'	2.80%	4629.91'	4.90%	4629.42'	
864+37.27	4630.17'	2.70%	4630.44'	3.50%	4630.09'	
864+59.26	4630.68'	3.20%	4631.00'	4.10%	4630.59'	
864+81.15	4631.20'	2.70%	4631.47'	3.90%	4631.08'	
865+02.86	4631.69'	1.80%	4631.87'	3.60%	4631.51'	
865+24.35	4632.13'	1.30%	4632.26'	4.00%	4631.86'	
865+45.63	4632.55'	1.10%	4632.66'	3.40%	4632.32'	
865+66.78	4632.98'	1.80%	4633.16'	3.60%	4632.80'	
865+87.78	4633.44'	0.40%	4633.48'	2.10%	4633.27'	
866+08.74	4633.82'	1.70%	4633.99'	2.00%	4633.79'	
866+29.56	4634.22'	3.00%	4634.52'	2.50%	4634.27'	
866+50.28	4634.77'	2.70%	4635.04'	3.30%	4634.71'	
866+70.87	4635.11'	3.90%	4635.50'	3.50%	4635.15'	
866+91.23	4635.60'	3.00%	4635.90'	3.20%	4635.58'	
867+11.57	4636.06'	2.90%	4636.35'	4.20%	4635.93'	
867+31.68	4636.45'	0.80%	4636.53'	2.80%	4636.25'	
867+58.33	4637.08'	0.50%	4637.13'	3.40%	4636.79'	
867+84.74	4637.54'	0.80%	4637.62'	3.60%	4637.26'	
868+10.95	4637.89'	2.50%	4638.14'	4.60%	4637.68'	
868+37.09	4638.31'	0.50%	4638.36'	4.50%	4637.91'	
868+63.45	4638.74'	1.70%	4638.91'	3.70%	4638.54'	
868+83.60	4639.24'	0.10%	4639.25'	2.80%	4638.97'	
869+03.89	4639.59'	-0.80%	4639.51'	3.70%	4639.14'	
869+24.26	4639.83'	0.00%	4639.83'	4.30%	4639.40'	
869+44.68	4640.00'	0.30%	4640.03'	3.20%	4639.71'	
869+65.11	4640.21'	1.30%	4640.34'	3.10%	4640.03'	
869+85.57	4640.46'	2.40%	4640.70'	3.70%	4640.33'	
870+06.01	4640.68'	2.80%	4640.96'	3.80%	4640.58'	
870+26.40	4640.99'	2.30%	4641.22'	4.50%	4640.77'	
870+46.84	4641.34'	1.20%	4641.46'	3.20%	4641.14'	
870+67.19	4641.61'	1.50%	4641.76'	3.00%	4641.46'	
870+87.52	4641.87'	2.30%	4642.10'	4.00%	4641.70'	
871+07.90	4642.07'	2.50%	4642.32'	3.30%	4641.99'	
871+28.20	4642.35'	3.20%	4642.67'	3.00%	4642.37'	
871+48.63	4642.77'	2.80%	4643.05'	2.50%	4642.80'	
871+69.25	4643.16'	2.50%	4643.41'	2.20%	4643.19'	
871+90.07	4643.51'	2.10%	4643.72'	2.10%	4643.51'	
872+11.14	4643.89'	1.50%	4644.04'	1.80%	4643.86'	
872+32.37	4644.23'	1.60%	4644.39'	2.60%	4644.13'	
872+53.70	4644.47'	2.70%	4644.74'	3.00%	4644.44'	
872+75.10	4644.71'	3.10%	4645.02'	2.70%	4644.75'	
872+96.50	4645.00'	3.60%	4645.36'	2.10%	4645.15'	
873+17.85	4645.31'	4.00%	4645.71'	1.60%	4645.55'	
873+39.16	4645.60'	4.50%	4646.05'	2.40%	4645.81'	
873+60.40	4645.93'	3.90%	4646.32'	2.00%	4646.12'	
873+81.61	4646.15'	4.50%	4646.60'	1.70%	4646.43'	
874+02.77	4646.44'	4.70%	4646.91'	1.90%	4646.72'	
874+23.90	4646.67'	5.70%	4647.24'	2.40%	4647.00'	
874+44.95	4647.05'	4.90%	4647.54'	2.50%	4647.29'	
874+65.98	4647.36'	4.60%	4647.82'	2.30%	4647.59'	
874+86.92	4647.70'	3.70%	4648.07'	2.60%	4647.81'	
875+07.83	4648.06'	2.60%	4648.32'	2.60%	4648.06'	
875+28.70	4648.38'	3.20%	4648.70'	3.40%	4648.36'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
875+49.57	4648.66'	2.40%	4648.90'	3.10%	4648.59'	
875+70.44	4648.82'	2.60%	4649.08'	3.60%	4648.72'	
875+91.30	4649.04'	3.00%	4649.34'	4.60%	4648.88'	
876+12.16	4649.30'	2.40%	4649.54'	3.60%	4649.18'	
876+33.05	4649.48'	2.70%	4649.75'	4.70%	4649.28'	
876+54.03	4649.68'	3.20%	4650.00'	5.20%	4649.48'	
876+75.05	4649.79'	3.10%	4650.10'	3.40%	4649.76'	
876+96.12	4649.97'	3.80%	4650.35'	3.10%	4650.04'	
877+17.14	4650.17'	3.50%	4650.52'	2.90%	4650.23'	
877+38.12	4650.35'	2.90%	4650.64'	2.90%	4650.35'	
877+58.99	4650.49'	3.50%	4650.84'	3.40%	4650.50'	
877+79.74	4650.66'	3.70%	4651.03'	3.00%	4650.73'	
878+00.43	4650.75'	5.30%	4651.28'	3.30%	4650.95'	
878+21.12	4650.83'	4.50%	4651.28'	2.40%	4651.04'	
878+41.83	4651.18'	3.20%	4651.50'	2.00%	4651.30'	
878+62.53	4651.40'	3.60%	4651.76'	2.40%	4651.52'	
878+83.15	4651.61'	3.60%	4651.97'	2.00%	4651.77'	
879+03.63	4651.79'	3.10%	4652.10'	1.90%	4651.91'	
879+24.07	4651.95'	4.40%	4652.39'	1.80%	4652.21'	
879+44.46	4652.15'	4.30%	4652.58'	1.30%	4652.45'	
879+64.82	4652.40'	3.70%	4652.77'	1.20%	4652.65'	
879+85.13	4652.65'	3.70%	4653.02'	1.10%	4652.91'	
880+05.28	4652.88'	3.60%	4653.24'	1.60%	4653.08'	
880+31.94	4653.20'	3.90%	4653.59'	2.30%	4653.36'	
880+58.30	4653.57'	3.70%	4653.94'	2.40%	4653.70'	
880+84.38	4653.97'	3.10%	4654.28'	2.20%	4654.06'	
881+10.32	4654.31'	2.90%	4654.60'	2.80%	4654.32'	
881+36.21	4654.59'	2.30%	4654.82'	2.40%	4654.58'	
881+62.19	4654.72'	3.70%	4655.09'	2.80%	4654.81'	
881+88.29	4655.01'	3.20%	4655.33'	2.30%	4655.10'	
882+14.37	4655.25'	3.80%	4655.63'	2.20%	4655.41'	
882+40.72	4655.58'	3.50%	4655.93'	2.40%	4655.69'	
882+60.88	4655.78'	3.80%	4656.16'	2.40%	4655.92'	
882+81.30	4656.02'	3.80%	4656.40'	2.50%	4656.15'	
883+01.99	4656.29'	3.80%	4656.67'	2.20%	4656.45'	
883+22.94	4656.56'	3.20%	4656.88'	1.70%	4656.71'	
883+44.18	4656.81'	3.20%	4657.13'	2.20%	4656.91'	
883+65.68	4657.07'	3.40%	4657.41'	2.60%	4657.15'	
883+87.35	4657.34'	3.30%	4657.67'	3.20%	4657.35'	
884+09.12	4657.55'	3.50%	4657.90'	3.20%	4657.58'	
884+31.02	4657.78'	3.60%	4658.14'	3.80%	4657.76'	
884+52.85	4657.98'	3.20%	4658.30'	3.40%	4657.96'	
884+74.64	4658.23'	2.90%	4658.52'	3.50%	4658.17'	
884+96.35	4658.51'	3.50%	4658.86'	3.60%	4658.50'	
885+17.88	4658.75'	3.40%	4659.09'	3.30%	4658.76'	
885+39.20	4659.08'	3.00%	4659.38'	3.80%	4659.00'	
885+60.21	4659.37'	2.80%	4659.65'	3.90%	4659.26'	
885+80.82	4659.63'	3.00%	4659.93'	4.30%	4659.50'	
886+00.96	4659.97'	2.40%	4660.21'	3.40%	4659.87'	
886+27.05	4660.41'	2.50%	4660.66'	3.50%	4660.31'	
886+52.22	4660.84'	2.30%	4661.07'	4.30%	4660.64'	
886+76.31	4661.05'	3.80%	4661.43'	3.90%	4661.04'	
886+99.36	4661.39'	3.50%	4661.74'	3.80%	4661.36'	
887+21.39	4661.56'	3.70%	4661.93'	3.70%	4661.56'	
887+42.38	4661.76'	3.10%	4662.07'	3.50%	4661.72'	
887+62.38	4661.86'	3.40%	4662.20'	3.20%	4661.88'	
887+85.67	4662.07'	3.20%	4662.39'	3.50%	4662.04'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
888+05.97	4662.18'	2.60%	4662.44'	2.40%	4662.20'	
888+28.64	4662.39'	2.00%	4662.59'	2.60%	4662.33'	
888+48.77	4662.58'	2.30%	4662.81'	3.60%	4662.45'	
888+49.08	4662.58'	2.20%	4662.80'	3.60%	4662.44'	
888+70.26	4662.53'	3.80%	4662.91'	4.10%	4662.50'	
888+92.25	4662.47'	5.10%	4662.98'	4.20%	4662.56'	
889+12.76	4662.64'	5.10%	4663.15'	4.50%	4662.70'	
889+35.10	4662.91'	4.70%	4663.38'	3.90%	4662.99'	
889+58.75	4663.27'	4.50%	4663.72'	3.10%	4663.41'	
889+83.04	4663.72'	3.50%	4664.07'	3.20%	4663.75'	
890+08.00	4663.99'	3.90%	4664.38'	2.80%	4664.10'	
890+28.43	4664.26'	3.20%	4664.58'	2.50%	4664.33'	
890+49.18	4664.39'	3.00%	4664.69'	1.80%	4664.51'	
890+70.18	4664.61'	3.00%	4664.91'	1.80%	4664.73'	
890+91.32	4664.77'	3.80%	4665.15'	2.20%	4664.93'	
891+12.59	4664.92'	4.00%	4665.32'	2.00%	4665.12'	
891+33.98	4665.00'	4.80%	4665.48'	3.00%	4665.18'	
891+55.57	4665.12'	4.10%	4665.53'	2.20%	4665.31'	
891+67.00	4665.16'	4.10%	4665.57'	1.90%	4665.38'	
891+77.31	4665.20'	4.00%	4665.60'	1.40%	4665.46'	
891+99.26	4665.28'	4.50%	4665.73'	1.10%	4665.62'	
892+21.42	4665.40'	2.80%	4665.68'	1.00%	4665.58'	
892+43.73	4665.54'	3.10%	4665.85'	1.50%	4665.70'	
892+66.14	4665.63'	2.90%	4665.92'	1.50%	4665.77'	
892+88.60	4665.64'	3.70%	4666.01'	1.20%	4665.89'	
893+11.21	4665.62'	3.60%	4665.98'	2.50%	4665.73'	
893+34.00	4665.59'	3.20%	4665.91'	2.10%	4665.70'	
893+56.98	4665.57'	3.20%	4665.89'	3.00%	4665.59'	
893+67.00	4665.56'	3.20%	4665.88'	3.50%	4665.53'	
893+80.16	4665.55'	3.20%	4665.87'	4.00%	4665.47'	
894+03.53	4665.51'	2.80%	4665.79'	3.70%	4665.42'	
894+27.08	4665.46'	2.50%	4665.71'	3.80%	4665.33'	
894+50.72	4665.29'	3.00%	4665.59'	4.10%	4665.18'	
894+74.23	4665.17'	3.00%	4665.47'	3.60%	4665.11'	
894+97.66	4665.25'	2.50%	4665.50'	4.00%	4665.10'	
895+20.86	4665.36'	1.70%	4665.53'	3.80%	4665.15'	
895+43.76	4665.34'	1.90%	4665.53'	3.50%	4665.18'	
895+66.63	4665.30'	2.60%	4665.56'	3.80%	4665.18'	
895+89.25	4665.31'	2.50%	4665.56'	2.60%	4665.30'	
896+11.67	4665.41'	1.00%	4665.51'	2.30%	4665.28'	
896+34.00	4665.55'	1.50%	4665.70'	5.90%	4665.11'	
896+56.33	4665.56'	1.80%	4665.74'	5.30%	4665.21'	
896+67.00	4665.57'	2.20%	4665.79'	4.70%	4665.32'	
896+78.69	4665.58'	2.70%	4665.85'	4.40%	4665.41'	
897+01.19	4665.57'	2.20%	4665.79'	2.30%	4665.56'	
897+23.79	4665.59'	2.30%	4665.82'	1.80%	4665.64'	
897+46.59	4665.60'	2.80%	4665.88'	2.40%	4665.64'	
897+69.51	4665.65'	2.70%	4665.92'	2.70%	4665.65'	
897+92.59	4665.58'	3.40%	4665.92'	2.10%	4665.71'	
898+15.84	4665.66'	3.20%	4665.98'	1.90%	4665.79'	
898+39.23	4665.83'	2.80%	4666.11'	1.70%	4665.94'	
898+62.77	4666.03'	2.50%	4666.28'	2.60%	4666.02'	
898+86.31	4666.25'	2.00%	4666.45'	1.90%	4666.26'	
899+09.94	4666.47'	2.10%	4666.68'	2.00%	4666.48'	
899+33.61	4666.70'	2.30%	4666.93'	3.40%	4666.59'	
899+57.31	4666.86'	2.20%	4667.08'	3.10%	4666.77'	
899+81.02	4667.01'	2.40%	4667.25'	2.50%	4667.00'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
900+04.81	4667.29'	2.90%	4667.58'	2.30%	4667.35'	
900+28.54	4667.62'	2.40%	4667.86'	2.10%	4667.65'	
900+52.22	4667.80'	2.10%	4668.01'	1.90%	4667.82'	
900+75.96	4668.03'	1.70%	4668.20'	2.00%	4668.00'	
900+99.57	4668.22'	1.90%	4668.41'	2.00%	4668.21'	
901+22.86	4668.48'	1.00%	4668.58'	1.40%	4668.44'	
901+45.85	4668.74'	-0.20%	4668.72'	1.40%	4668.58'	
901+68.50	4668.89'	0.60%	4668.95'	2.10%	4668.74'	
901+90.91	4669.01'	1.00%	4669.11'	2.30%	4668.88'	
902+13.15	4669.17'	1.30%	4669.30'	2.60%	4669.04'	
902+35.18	4669.39'	1.90%	4669.58'	2.90%	4669.29'	
902+57.10	4669.61'	2.30%	4669.84'	3.40%	4669.50'	
902+79.05	4669.85'	1.80%	4670.03'	3.00%	4669.73'	
903+00.90	4670.17'	0.80%	4670.25'	2.30%	4670.02'	
903+22.78	4670.45'	0.10%	4670.46'	1.70%	4670.29'	
903+44.65	4670.71'	0.80%	4670.79'	2.00%	4670.59'	
903+66.46	4671.02'	0.60%	4671.08'	1.90%	4670.89'	
903+88.25	4671.31'	1.00%	4671.41'	2.30%	4671.18'	
904+09.99	4671.64'	0.80%	4671.72'	3.00%	4671.42'	
904+31.66	4671.96'	1.40%	4672.10'	3.30%	4671.77'	
904+53.27	4672.28'	2.20%	4672.50'	3.70%	4672.13'	
904+74.84	4672.60'	2.60%	4672.86'	3.50%	4672.51'	
904+96.41	4672.87'	2.10%	4673.08'	2.50%	4672.83'	
905+18.00	4673.15'	2.50%	4673.40'	2.30%	4673.17'	
905+39.59	4673.48'	1.80%	4673.66'	1.90%	4673.47'	
905+61.18	4673.76'	1.20%	4673.88'	1.60%	4673.72'	
905+82.80	4673.97'	2.00%	4674.17'	1.40%	4674.03'	
906+04.43	4674.20'	2.10%	4674.41'	1.10%	4674.30'	
906+26.10	4674.35'	2.70%	4674.62'	1.20%	4674.50'	
906+47.85	4674.59'	1.60%	4674.75'	0.90%	4674.66'	
906+69.63	4674.78'	1.80%	4674.96'	1.60%	4674.80'	
906+91.57	4674.96'	1.40%	4675.10'	1.70%	4674.93'	
907+13.58	4675.07'	1.60%	4675.23'	1.80%	4675.05'	
907+35.62	4675.30'	0.90%	4675.39'	2.00%	4675.19'	
907+57.59	4675.41'	1.60%	4675.57'	2.60%	4675.31'	
907+79.62	4675.57'	1.40%	4675.71'	2.30%	4675.48'	
908+01.55	4675.73'	1.90%	4675.92'	2.50%	4675.67'	
908+23.53	4675.89'	1.90%	4676.08'	3.60%	4675.72'	
908+45.39	4676.05'	1.40%	4676.19'	2.40%	4675.95'	
908+67.18	4676.16'	1.70%	4676.33'	3.30%	4676.00'	
908+88.85	4676.30'	1.50%	4676.45'	3.40%	4676.11'	
909+10.59	4676.40'	1.70%	4676.57'	4.80%	4676.09'	
909+32.39	4676.50'	0.60%	4676.56'	4.30%	4676.13'	
909+54.05	4676.51'	0.80%	4676.59'	3.80%	4676.21'	
909+75.49	4676.56'	2.00%	4676.76'	4.90%	4676.27'	
909+96.72	4676.61'	0.90%	4676.70'	3.90%	4676.31'	
910+17.73	4676.63'	0.50%	4676.68'	3.30%	4676.35'	
910+38.59	4676.62'	1.10%	4676.73'	3.10%	4676.42'	
910+59.29	4676.76'	0.30%	4676.79'	3.00%	4676.49'	
910+79.96	4676.78'	0.10%	4676.79'	3.20%	4676.47'	
911+00.55	4676.70'	0.90%	4676.79'	3.50%	4676.44'	
911+21.30	4676.62'	1.50%	4676.77'	3.20%	4676.45'	
911+42.23	4676.67'	0.90%	4676.76'	2.70%	4676.49'	
911+63.34	4676.80'	1.10%	4676.91'	3.30%	4676.58'	
911+84.66	4676.85'	1.20%	4676.97'	3.70%	4676.60'	
912+06.14	4676.87'	1.20%	4676.99'	4.00%	4676.59'	
912+27.78	4676.86'	1.20%	4676.98'	4.00%	4676.58'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
912+49.61	4676.82'	0.90%	4676.91'	3.40%	4676.57'	
912+71.47	4676.79'	1.70%	4676.96'	3.20%	4676.64'	
912+93.37	4676.79'	1.50%	4676.94'	3.00%	4676.64'	
913+15.26	4676.73'	0.90%	4676.82'	2.60%	4676.56'	
913+37.09	4676.71'	0.90%	4676.80'	3.70%	4676.43'	
913+58.90	4676.70'	0.70%	4676.77'	3.40%	4676.43'	
913+80.63	4676.69'	-0.20%	4676.67'	2.50%	4676.42'	
914+02.30	4676.69'	0.70%	4676.76'	3.20%	4676.44'	
914+24.12	4676.75'	0.20%	4676.77'	3.10%	4676.46'	
914+46.08	4676.75'	0.20%	4676.77'	3.00%	4676.47'	
914+68.23	4676.73'	1.00%	4676.83'	2.90%	4676.54'	
914+90.50	4676.69'	1.40%	4676.83'	2.80%	4676.55'	
915+12.94	4676.60'	1.50%	4676.75'	2.50%	4676.50'	
915+35.56	4676.49'	2.10%	4676.70'	2.80%	4676.42'	
915+58.36	4676.46'	0.90%	4676.55'	2.60%	4676.29'	
915+81.32	4676.39'	1.10%	4676.50'	3.40%	4676.16'	
916+04.53	4676.16'	2.40%	4676.40'	3.90%	4676.01'	
916+27.87	4675.94'	2.40%	4676.18'	2.70%	4675.91'	
916+51.38	4676.07'	2.20%	4676.29'	3.10%	4675.98'	
916+74.95	4676.04'	2.20%	4676.26'	3.10%	4675.95'	
916+98.64	4675.94'	1.80%	4676.12'	3.50%	4675.77'	
917+22.36	4675.93'	1.20%	4676.05'	4.10%	4675.64'	
917+46.04	4675.73'	2.00%	4675.93'	3.60%	4675.57'	
917+69.62	4675.71'	1.20%	4675.83'	4.40%	4675.39'	
917+93.19	4675.46'	1.10%	4675.57'	4.00%	4675.17'	
918+16.64	4675.27'	1.90%	4675.46'	2.70%	4675.19'	
918+39.91	4675.32'	2.40%	4675.56'	1.80%	4675.38'	
918+62.92	4675.52'	1.60%	4675.68'	2.60%	4675.42'	
918+85.75	4675.60'	1.40%	4675.74'	3.20%	4675.42'	
919+08.45	4675.58'	1.30%	4675.71'	3.10%	4675.40'	
919+31.10	4675.52'	1.50%	4675.67'	4.10%	4675.26'	
919+53.73	4675.48'	1.90%	4675.67'	4.40%	4675.23'	
919+76.34	4675.50'	1.00%	4675.60'	2.40%	4675.36'	
919+98.88	4675.47'	2.70%	4675.74'	2.90%	4675.45'	
920+21.29	4675.53'	3.20%	4675.85'	3.10%	4675.54'	
920+43.77	4675.58'	2.60%	4675.84'	3.40%	4675.50'	
920+66.20	4675.58'	3.20%	4675.90'	2.70%	4675.63'	
920+88.64	4675.73'	2.50%	4675.98'	2.40%	4675.74'	
921+11.02	4675.67'	3.90%	4676.06'	3.20%	4675.74'	
921+33.26	4675.66'	4.10%	4676.07'	2.90%	4675.78'	
921+55.46	4675.77'	3.40%	4676.11'	2.30%	4675.88'	
921+67.00	4675.84'	2.60%	4676.10'	1.90%	4675.91'	
921+77.58	4675.84'	2.50%	4676.09'	2.20%	4675.87'	
921+99.48	4675.84'	3.50%	4676.19'	2.80%	4675.91'	
922+21.26	4675.85'	3.00%	4676.15'	1.80%	4675.97'	
922+42.85	4675.85'	2.50%	4676.10'	2.00%	4675.90'	
922+64.40	4675.77'	1.80%	4675.95'	1.70%	4675.78'	
922+85.78	4675.87'	1.20%	4675.99'	2.60%	4675.73'	
923+07.16	4675.94'	0.40%	4675.98'	3.30%	4675.65'	
923+28.32	4675.73'	1.10%	4675.84'	3.50%	4675.49'	
923+49.49	4675.27'	3.50%	4675.62'	3.10%	4675.31'	
923+70.51	4675.20'	4.00%	4675.60'	4.50%	4675.15'	
923+91.42	4675.23'	3.20%	4675.55'	2.50%	4675.30'	
924+12.07	4675.19'	2.70%	4675.46'	3.20%	4675.14'	
924+36.61	4675.10'	4.10%	4675.51'	4.30%	4675.08'	
924+57.05	4675.02'	3.70%	4675.39'	3.60%	4675.03'	
924+80.28	4674.91'	4.20%	4675.33'	2.10%	4675.12'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
925+00.56	4674.81'	4.30%	4675.24'	2.40%	4675.00'	
925+22.23	4674.72'	3.00%	4675.02'	3.00%	4674.72'	
925+45.30	4674.57'	2.50%	4674.82'	1.60%	4674.66'	
925+65.91	4674.51'	3.10%	4674.82'	1.60%	4674.66'	
925+87.67	4674.40'	2.40%	4674.64'	0.30%	4674.61'	
926+10.37	4674.36'	2.00%	4674.56'	-0.20%	4674.58'	
926+33.78	4674.29'	2.50%	4674.54'	0.90%	4674.45'	
926+58.00	4674.00'	3.80%	4674.38'	1.20%	4674.26'	
926+82.95	4673.94'	3.70%	4674.31'	2.20%	4674.09'	
927+03.43	4673.88'	4.20%	4674.30'	1.70%	4674.13'	
927+24.28	4673.82'	3.70%	4674.19'	0.60%	4674.13'	
927+45.55	4673.68'	4.30%	4674.11'	3.10%	4673.80'	
927+67.15	4673.72'	2.70%	4673.99'	3.80%	4673.61'	
927+88.92	4673.77'	2.20%	4673.99'	2.90%	4673.70'	
928+10.77	4673.73'	2.40%	4673.97'	3.30%	4673.64'	
928+32.55	4673.49'	3.40%	4673.83'	2.30%	4673.60'	
928+54.09	4673.35'	3.30%	4673.68'	1.40%	4673.54'	
928+75.39	4673.19'	3.90%	4673.58'	1.60%	4673.42'	
928+96.43	4673.16'	4.20%	4673.58'	3.10%	4673.27'	
929+17.08	4673.36'	4.50%	4673.81'	6.00%	4673.21'	
929+37.44	4673.54'	3.10%	4673.85'	5.60%	4673.29'	
929+57.76	4673.53'	3.00%	4673.83'	3.80%	4673.45'	
929+78.12	4673.53'	3.80%	4673.91'	4.50%	4673.46'	
929+98.57	4673.63'	3.70%	4674.00'	6.40%	4673.36'	
930+19.15	4673.79'	2.60%	4674.05'	6.30%	4673.42'	
930+39.76	4673.89'	3.00%	4674.19'	4.90%	4673.70'	
930+60.41	4673.94'	3.60%	4674.30'	5.00%	4673.80'	
930+81.06	4674.09'	3.50%	4674.44'	3.70%	4674.07'	
931+01.65	4674.22'	3.20%	4674.54'	3.80%	4674.16'	
931+22.14	4674.27'	2.50%	4674.52'	3.20%	4674.20'	
931+42.50	4674.29'	2.60%	4674.55'	3.60%	4674.19'	
931+62.80	4674.29'	2.90%	4674.58'	3.70%	4674.21'	
931+83.03	4674.30'	2.30%	4674.53'	2.20%	4674.31'	
932+03.19	4674.34'	3.20%	4674.66'	2.10%	4674.45'	
932+23.30	4674.38'	3.40%	4674.72'	2.30%	4674.49'	
932+43.38	4674.45'	2.70%	4674.72'	2.50%	4674.47'	
932+63.43	4674.54'	2.70%	4674.81'	2.70%	4674.54'	
932+83.47	4674.64'	3.10%	4674.95'	2.80%	4674.67'	
933+08.34	4674.82'	2.00%	4675.02'	2.50%	4674.77'	
933+28.34	4674.94'	1.20%	4675.06'	2.70%	4674.79'	
933+48.38	4675.01'	2.50%	4675.26'	3.60%	4674.90'	
933+68.42	4675.17'	2.40%	4675.41'	3.40%	4675.07'	
933+88.43	4675.43'	2.00%	4675.63'	3.90%	4675.24'	
934+13.23	4675.83'	1.10%	4675.94'	1.30%	4675.81'	
934+37.58	4676.46'	-0.10%	4676.45'	0.20%	4676.43'	
934+61.62	4677.06'	1.30%	4677.19'	1.20%	4677.07'	
934+85.40	4677.82'	2.30%	4678.05'	2.60%	4677.79'	
935+09.07	4678.55'	2.60%	4678.81'	3.10%	4678.50'	
935+32.67	4679.31'	3.00%	4679.61'	3.00%	4679.31'	
935+56.32	4680.03'	1.70%	4680.20'	1.20%	4680.08'	
935+67.00	4680.35'	1.80%	4680.53'	1.20%	4680.41'	
935+80.08	4680.80'	1.20%	4680.92'	0.90%	4680.83'	
936+03.90	4681.57'	1.70%	4681.74'	1.20%	4681.62'	
936+27.77	4682.25'	3.80%	4682.63'	2.00%	4682.43'	
936+51.55	4683.16'	4.50%	4683.61'	1.50%	4683.46'	
936+75.26	4684.14'	3.70%	4684.51'	1.00%	4684.41'	
936+98.90	4685.10'	2.90%	4685.39'	1.90%	4685.20'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
937+22.43	4685.94'	3.20%	4686.26'	1.90%	4686.07'	
937+45.88	4686.86'	3.30%	4687.19'	3.00%	4686.89'	
937+69.16	4687.80'	2.80%	4688.08'	2.90%	4687.79'	
937+92.41	4688.66'	2.70%	4688.93'	2.00%	4688.73'	
938+15.45	4689.64'	1.80%	4689.82'	1.60%	4689.66'	
938+38.25	4690.68'	2.00%	4690.88'	1.60%	4690.72'	
938+60.66	4691.82'	1.40%	4691.96'	2.80%	4691.68'	
938+82.75	4692.77'	1.60%	4692.93'	3.70%	4692.56'	
939+04.43	4693.55'	1.90%	4693.74'	4.10%	4693.33'	
939+25.73	4694.38'	1.60%	4694.54'	2.50%	4694.29'	
939+46.61	4695.07'	2.40%	4695.31'	1.50%	4695.16'	
939+67.25	4695.76'	3.40%	4696.10'	2.90%	4695.81'	
939+87.65	4696.43'	4.30%	4696.86'	3.70%	4696.49'	
940+08.04	4697.14'	3.70%	4697.51'	3.50%	4697.16'	
940+28.59	4697.97'	2.50%	4698.22'	3.30%	4697.89'	
940+49.30	4698.85'	1.80%	4699.03'	2.50%	4698.78'	
940+70.36	4699.65'	1.40%	4699.79'	0.80%	4699.71'	
940+91.86	4700.32'	2.10%	4700.53'	0.70%	4700.46'	
941+13.88	4700.93'	2.40%	4701.17'	0.30%	4701.14'	
941+36.52	4701.57'	1.50%	4701.72'	0.90%	4701.63'	
941+59.68	4702.23'	1.20%	4702.35'	0.30%	4702.32'	
941+83.19	4702.75'	1.50%	4702.90'	1.80%	4702.72'	
942+06.48	4703.20'	1.50%	4703.35'	0.50%	4703.30'	
942+29.54	4703.67'	2.60%	4703.93'	1.50%	4703.78'	
942+52.40	4704.06'	3.10%	4704.37'	1.80%	4704.19'	
942+75.16	4704.52'	2.60%	4704.78'	1.80%	4704.60'	
942+97.73	4704.92'	1.90%	4705.11'	1.80%	4704.93'	
943+20.20	4705.18'	2.10%	4705.39'	1.60%	4705.23'	
943+42.67	4705.37'	2.90%	4705.66'	0.70%	4705.59'	
943+65.02	4705.72'	3.20%	4706.04'	1.10%	4705.93'	
943+87.19	4706.04'	4.20%	4706.46'	3.20%	4706.14'	
944+09.28	4706.30'	3.00%	4706.60'	2.50%	4706.35'	
944+31.56	4706.54'	3.30%	4706.87'	2.20%	4706.65'	
944+54.17	4706.80'	3.80%	4707.18'	2.50%	4706.93'	
944+67.00	4706.81'	5.00%	4707.31'	2.50%	4707.06'	
944+77.46	4706.76'	6.50%	4707.41'	2.50%	4707.16'	
945+01.32	4707.31'	6.50%	4707.96'	1.70%	4707.79'	
945+25.74	4708.07'	4.00%	4708.47'	2.10%	4708.26'	
945+50.50	4708.59'	3.50%	4708.94'	2.10%	4708.73'	
945+70.59	4708.94'	3.30%	4709.27'	1.60%	4709.11'	
945+90.85	4709.26'	4.40%	4709.70'	2.00%	4709.50'	
946+11.22	4709.66'	4.50%	4710.11'	1.70%	4709.94'	
946+31.75	4710.07'	4.50%	4710.52'	0.90%	4710.43'	
946+52.42	4710.57'	4.10%	4710.98'	2.00%	4710.78'	
946+73.23	4710.96'	4.50%	4711.41'	3.00%	4711.11'	
946+94.17	4711.43'	3.50%	4711.78'	3.10%	4711.47'	
947+15.24	4711.80'	2.20%	4712.02'	3.10%	4711.71'	
947+36.39	4712.10'	1.70%	4712.27'	3.10%	4711.96'	
947+57.63	4712.18'	4.10%	4712.59'	3.50%	4712.24'	
947+78.92	4712.46'	2.80%	4712.74'	1.90%	4712.55'	
948+00.22	4712.70'	2.90%	4712.99'	2.00%	4712.79'	
948+21.57	4712.90'	3.60%	4713.26'	2.60%	4713.00'	
948+42.96	4713.09'	3.30%	4713.42'	1.90%	4713.23'	
948+64.44	4713.28'	2.80%	4713.56'	1.90%	4713.37'	
948+86.05	4713.35'	3.20%	4713.67'	2.20%	4713.45'	
949+07.80	4713.35'	3.90%	4713.74'	2.40%	4713.50'	
949+29.71	4713.46'	2.80%	4713.74'	2.20%	4713.52'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
949+51.85	4713.50'	2.50%	4713.75'	2.90%	4713.46'	
949+74.13	4713.55'	1.70%	4713.72'	2.80%	4713.44'	
949+96.51	4713.48'	2.40%	4713.72'	2.80%	4713.44'	
950+18.85	4713.40'	3.60%	4713.76'	3.40%	4713.42'	
950+41.21	4713.42'	3.40%	4713.76'	3.30%	4713.43'	
950+63.58	4713.46'	3.20%	4713.78'	2.50%	4713.53'	
950+85.92	4713.50'	4.00%	4713.90'	3.00%	4713.60'	
951+08.03	4713.59'	4.50%	4714.04'	3.40%	4713.70'	
951+29.80	4713.70'	3.70%	4714.07'	2.20%	4713.85'	
951+51.18	4713.85'	2.40%	4714.09'	2.10%	4713.88'	
951+72.17	4713.89'	2.70%	4714.16'	1.90%	4713.97'	
951+95.93	4713.96'	3.30%	4714.29'	2.30%	4714.06'	
952+17.65	4714.04'	2.60%	4714.30'	1.90%	4714.11'	
952+38.09	4714.11'	2.50%	4714.36'	2.00%	4714.16'	
952+59.32	4714.21'	2.90%	4714.50'	3.40%	4714.16'	
952+82.10	4714.32'	1.90%	4714.51'	2.90%	4714.22'	
953+05.37	4714.43'	2.90%	4714.72'	3.80%	4714.34'	
953+27.61	4714.57'	2.60%	4714.83'	2.10%	4714.62'	
953+47.76	4714.72'	2.60%	4714.98'	1.80%	4714.80'	
953+69.23	4714.85'	3.50%	4715.20'	2.70%	4714.93'	
953+91.95	4714.96'	2.60%	4715.22'	4.10%	4714.81'	
954+15.51	4715.16'	3.00%	4715.46'	3.50%	4715.11'	
954+39.89	4715.53'	1.50%	4715.68'	2.30%	4715.45'	
954+64.91	4715.66'	3.00%	4715.96'	2.40%	4715.72'	
954+85.33	4715.86'	3.50%	4716.21'	2.60%	4715.95'	
955+06.12	4716.07'	3.00%	4716.37'	2.30%	4716.14'	
955+27.29	4716.26'	2.40%	4716.50'	1.90%	4716.31'	
955+48.84	4716.43'	2.40%	4716.67'	2.00%	4716.47'	
955+70.75	4716.67'	1.70%	4716.84'	2.60%	4716.58'	
955+92.99	4716.68'	2.80%	4716.96'	2.60%	4716.70'	
956+15.52	4716.90'	1.70%	4717.07'	1.70%	4716.90'	
956+38.28	4717.20'	1.90%	4717.39'	2.10%	4717.18'	
956+61.19	4717.55'	1.10%	4717.66'	2.20%	4717.44'	
956+84.28	4717.79'	1.00%	4717.89'	3.60%	4717.53'	
957+07.53	4718.06'	1.60%	4718.22'	4.10%	4717.81'	
957+30.94	4718.43'	1.00%	4718.53'	3.50%	4718.18'	
957+54.46	4718.75'	0.70%	4718.82'	3.20%	4718.50'	
957+67.00	4718.92'	0.50%	4718.97'	3.00%	4718.67'	
957+78.08	4719.07'	0.30%	4719.10'	2.90%	4718.81'	
958+01.76	4719.38'	0.50%	4719.43'	3.20%	4719.11'	
958+25.41	4719.67'	1.10%	4719.78'	3.60%	4719.42'	
958+49.09	4720.00'	1.20%	4720.12'	4.40%	4719.68'	
958+72.80	4720.27'	1.70%	4720.44'	4.20%	4720.02'	
958+96.49	4720.59'	1.00%	4720.69'	1.80%	4720.51'	
959+20.26	4720.89'	0.80%	4720.97'	2.00%	4720.77'	
959+44.07	4721.22'	-0.20%	4721.20'	2.00%	4721.00'	
959+67.95	4721.47'	0.40%	4721.51'	2.50%	4721.26'	
959+91.86	4721.78'	0.00%	4721.78'	4.40%	4721.34'	
960+15.71	4722.01'	0.70%	4722.08'	2.90%	4721.79'	
960+39.41	4722.25'	1.40%	4722.39'	1.20%	4722.27'	
960+62.88	4722.58'	1.40%	4722.72'	0.80%	4722.64'	
960+85.82	4723.00'	0.40%	4723.04'	1.70%	4722.87'	
961+08.38	4723.24'	0.70%	4723.31'	2.50%	4723.06'	
961+30.72	4723.34'	2.20%	4723.56'	2.60%	4723.30'	
961+53.12	4723.57'	2.10%	4723.78'	2.10%	4723.57'	
961+75.50	4723.72'	2.00%	4723.92'	1.70%	4723.75'	
961+97.90	4723.75'	3.10%	4724.06'	1.90%	4723.87'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
962+20.04	4723.88'	2.60%	4724.14'	2.20%	4723.92'	
962+41.80	4723.89'	3.10%	4724.20'	2.90%	4723.91'	
962+63.33	4723.95'	3.10%	4724.26'	2.70%	4723.99'	
962+84.61	4724.04'	2.00%	4724.24'	2.70%	4723.97'	
963+05.52	4724.00'	2.90%	4724.29'	3.70%	4723.92'	
963+26.14	4723.99'	2.20%	4724.21'	2.80%	4723.93'	
963+46.50	4723.99'	2.60%	4724.25'	3.20%	4723.93'	
963+66.52	4723.92'	3.20%	4724.24'	2.20%	4724.02'	
963+91.32	4724.03'	2.20%	4724.25'	1.40%	4724.11'	
964+15.86	4724.21'	1.30%	4724.34'	0.60%	4724.28'	
964+40.19	4724.31'	1.30%	4724.44'	0.50%	4724.39'	
964+64.41	4724.41'	1.30%	4724.54'	2.30%	4724.31'	
964+88.71	4724.50'	1.40%	4724.64'	3.30%	4724.31'	
965+13.08	4724.57'	0.90%	4724.66'	2.50%	4724.41'	
965+37.60	4724.53'	2.50%	4724.78'	2.30%	4724.55'	
965+62.32	4724.48'	3.30%	4724.81'	1.70%	4724.64'	
965+86.82	4724.54'	2.80%	4724.82'	0.60%	4724.76'	
966+11.00	4724.49'	3.30%	4724.82'	0.10%	4724.81'	
966+35.17	4724.39'	2.90%	4724.68'	-1.30%	4724.81'	
966+59.23	4724.39'	3.10%	4724.70'	-0.70%	4724.77'	
966+82.72	4724.45'	4.20%	4724.87'	0.30%	4724.84'	
967+05.98	4724.45'	4.70%	4724.92'	-0.50%	4724.97'	
967+29.30	4724.69'	4.60%	4725.15'	0.00%	4725.15'	
967+52.75	4724.92'	4.40%	4725.36'	0.10%	4725.35'	
967+76.34	4725.13'	3.60%	4725.49'	0.30%	4725.46'	
968+00.14	4725.20'	3.80%	4725.58'	1.00%	4725.48'	
968+24.15	4725.32'	3.00%	4725.62'	0.90%	4725.53'	
968+48.35	4725.53'	2.50%	4725.78'	1.00%	4725.68'	
968+72.75	4725.66'	2.40%	4725.90'	1.80%	4725.72'	
968+97.28	4725.69'	2.20%	4725.91'	0.70%	4725.84'	
969+22.02	4725.74'	2.30%	4725.97'	1.70%	4725.80'	
969+42.02	4725.70'	2.00%	4725.90'	1.80%	4725.72'	
969+62.23	4725.65'	2.30%	4725.88'	2.10%	4725.67'	
969+82.67	4725.62'	2.50%	4725.87'	2.50%	4725.62'	
970+03.36	4725.70'	1.20%	4725.82'	2.50%	4725.57'	
970+24.19	4725.71'	2.10%	4725.92'	2.90%	4725.63'	
970+45.08	4725.63'	2.20%	4725.85'	2.00%	4725.65'	
970+65.84	4725.51'	3.60%	4725.87'	3.10%	4725.56'	
970+86.66	4725.52'	2.90%	4725.81'	2.20%	4725.59'	
971+07.46	4725.64'	2.70%	4725.91'	2.90%	4725.62'	
971+28.29	4725.77'	3.30%	4726.10'	3.90%	4725.71'	
971+49.21	4725.76'	2.80%	4726.04'	1.40%	4725.90'	
971+70.12	4725.71'	4.30%	4726.14'	2.50%	4725.89'	
971+91.17	4725.67'	4.60%	4726.13'	2.40%	4725.89'	
972+12.29	4725.66'	5.10%	4726.17'	2.30%	4725.94'	
972+33.49	4725.66'	4.60%	4726.12'	1.30%	4725.99'	
972+54.66	4725.66'	4.60%	4726.12'	0.60%	4726.06'	
972+75.71	4725.60'	4.80%	4726.08'	0.70%	4726.01'	
972+96.76	4725.52'	4.70%	4725.99'	-0.20%	4726.01'	
973+17.66	4725.50'	4.20%	4725.92'	-0.80%	4726.00'	
973+38.53	4725.57'	5.20%	4726.09'	1.00%	4725.99'	
973+59.47	4725.61'	4.30%	4726.04'	0.30%	4726.01'	
973+80.48	4725.65'	4.40%	4726.09'	0.40%	4726.05'	
974+01.67	4725.65'	4.10%	4726.06'	0.40%	4726.02'	
974+22.86	4725.66'	4.20%	4726.08'	0.50%	4726.03'	
974+44.04	4725.75'	3.60%	4726.11'	0.40%	4726.07'	
974+65.12	4725.86'	3.70%	4726.23'	1.20%	4726.11'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
974+86.22	4725.91'	3.60%	4726.27'	1.00%	4726.17'	
975+07.43	4725.97'	4.40%	4726.41'	2.10%	4726.20'	
975+28.85	4725.97'	4.40%	4726.41'	2.20%	4726.19'	
975+50.46	4725.93'	4.80%	4726.41'	1.60%	4726.25'	
975+72.18	4725.94'	5.70%	4726.51'	1.10%	4726.40'	
975+94.01	4725.95'	5.70%	4726.52'	1.20%	4726.40'	
976+15.89	4725.96'	6.10%	4726.57'	2.70%	4726.30'	
976+37.99	4725.90'	6.10%	4726.51'	1.90%	4726.32'	
976+60.36	4725.78'	5.90%	4726.37'	2.10%	4726.16'	
976+82.95	4725.61'	4.50%	4726.06'	0.20%	4726.04'	
977+05.40	4725.41'	4.50%	4725.86'	-0.20%	4725.88'	
977+27.87	4725.12'	4.40%	4725.56'	-0.30%	4725.59'	
977+50.45	4724.79'	3.90%	4725.18'	0.40%	4725.14'	
977+73.23	4724.50'	3.20%	4724.82'	1.60%	4724.66'	
977+96.29	4724.32'	2.40%	4724.56'	1.30%	4724.43'	
978+19.59	4724.06'	1.00%	4724.16'	1.50%	4724.01'	
978+43.12	4723.58'	1.10%	4723.69'	2.40%	4723.45'	
978+66.97	4723.08'	2.00%	4723.28'	2.50%	4723.03'	
978+91.04	4722.68'	2.00%	4722.88'	2.80%	4722.60'	
979+15.29	4722.36'	1.60%	4722.52'	2.10%	4722.31'	
979+39.55	4722.15'	1.30%	4722.28'	3.30%	4721.95'	
979+63.81	4721.97'	0.90%	4722.06'	4.20%	4721.64'	
979+88.12	4721.75'	0.50%	4721.80'	3.50%	4721.45'	
980+12.46	4721.59'	-0.30%	4721.56'	2.90%	4721.27'	
980+36.70	4721.38'	0.70%	4721.45'	3.20%	4721.13'	
980+60.82	4721.05'	1.50%	4721.20'	2.10%	4720.99'	
980+84.79	4720.86'	2.00%	4721.06'	2.80%	4720.78'	
981+08.59	4720.79'	1.40%	4720.93'	3.60%	4720.57'	
981+32.11	4720.81'	0.70%	4720.88'	3.90%	4720.49'	
981+55.30	4720.90'	1.10%	4721.01'	4.00%	4720.61'	
981+67.00	4720.91'	1.30%	4721.04'	3.60%	4720.68'	
981+78.11	4720.90'	1.60%	4721.06'	3.20%	4720.74'	
982+00.83	4720.81'	1.90%	4721.00'	2.00%	4720.80'	
982+23.57	4720.74'	2.10%	4720.95'	1.80%	4720.77'	
982+46.36	4720.68'	2.30%	4720.91'	1.20%	4720.79'	
982+69.10	4720.83'	1.20%	4720.95'	2.30%	4720.72'	
982+91.75	4721.11'	0.80%	4721.19'	4.00%	4720.79'	
983+14.36	4721.27'	-0.20%	4721.25'	5.20%	4720.73'	
983+36.96	4721.29'	-0.50%	4721.24'	5.20%	4720.72'	
983+59.63	4721.15'	1.20%	4721.27'	4.10%	4720.86'	
983+82.18	4721.17'	4.10%	4721.58'	4.40%	4721.14'	
984+04.58	4721.41'	4.00%	4721.81'	2.00%	4721.61'	
984+26.81	4721.89'	2.10%	4722.10'	2.10%	4721.89'	
984+48.83	4722.27'	1.80%	4722.45'	3.00%	4722.15'	
984+70.82	4722.45'	2.30%	4722.68'	2.80%	4722.40'	
984+92.74	4722.57'	3.60%	4722.93'	2.70%	4722.66'	
985+14.57	4722.76'	3.80%	4723.14'	3.20%	4722.82'	
985+36.40	4722.95'	3.30%	4723.28'	2.80%	4723.00'	
985+58.30	4723.08'	2.40%	4723.32'	2.20%	4723.10'	
985+80.28	4723.18'	2.90%	4723.47'	2.20%	4723.25'	
986+02.33	4723.29'	2.80%	4723.57'	2.20%	4723.35'	
986+24.44	4723.35'	3.60%	4723.71'	2.80%	4723.43'	
986+46.62	4723.49'	3.10%	4723.80'	2.50%	4723.55'	
986+68.91	4723.51'	4.30%	4723.94'	2.80%	4723.66'	
986+91.25	4723.64'	4.00%	4724.04'	2.60%	4723.78'	
987+13.64	4723.83'	4.60%	4724.29'	3.40%	4723.95'	
987+36.02	4724.01'	4.50%	4724.46'	3.30%	4724.13'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
987+58.39	4724.30'	4.00%	4724.70'	3.70%	4724.33'	
987+80.72	4724.60'	3.60%	4724.96'	3.00%	4724.66'	
988+03.05	4724.78'	2.90%	4725.07'	1.90%	4724.88'	
988+25.40	4724.92'	2.60%	4725.18'	2.00%	4724.98'	
988+47.76	4724.98'	3.10%	4725.29'	2.90%	4725.00'	
988+70.23	4724.93'	4.50%	4725.38'	3.70%	4725.01'	
988+92.74	4725.10'	4.90%	4725.59'	4.60%	4725.13'	
989+15.21	4725.40'	4.40%	4725.84'	6.50%	4725.19'	
989+37.73	4725.73'	2.80%	4726.01'	3.80%	4725.63'	
989+60.23	4726.03'	2.30%	4726.26'	5.20%	4725.74'	
989+82.83	4726.30'	1.20%	4726.42'	6.20%	4725.80'	
990+05.38	4726.61'	1.30%	4726.74'	6.00%	4726.14'	
990+27.94	4726.87'	2.10%	4727.08'	5.80%	4726.50'	
990+50.44	4727.10'	1.90%	4727.29'	4.10%	4726.88'	
990+72.86	4727.37'	2.30%	4727.60'	4.30%	4727.17'	
990+95.21	4727.73'	2.00%	4727.93'	4.00%	4727.53'	
991+17.45	4728.08'	1.90%	4728.27'	4.50%	4727.82'	
991+39.68	4728.40'	1.40%	4728.54'	3.80%	4728.16'	
991+61.90	4728.69'	2.00%	4728.89'	3.80%	4728.51'	
991+84.09	4729.01'	2.10%	4729.22'	4.40%	4728.78'	
992+06.31	4729.35'	1.40%	4729.49'	4.80%	4729.01'	
992+28.55	4729.56'	1.70%	4729.73'	3.40%	4729.39'	
992+50.76	4729.81'	2.10%	4730.02'	3.50%	4729.67'	
992+72.96	4730.13'	2.50%	4730.38'	2.50%	4730.13'	
992+95.16	4730.35'	2.20%	4730.57'	2.00%	4730.37'	
993+17.39	4730.53'	2.70%	4730.80'	2.20%	4730.58'	
993+39.63	4730.80'	2.30%	4731.03'	3.10%	4730.72'	
993+61.81	4731.09'	2.60%	4731.35'	2.80%	4731.07'	
993+84.00	4731.52'	2.30%	4731.75'	3.50%	4731.40'	
994+06.05	4731.83'	2.80%	4732.11'	4.50%	4731.66'	
994+28.00	4732.17'	3.50%	4732.52'	4.90%	4732.03'	
994+49.79	4732.49'	3.20%	4732.81'	3.90%	4732.42'	
994+71.44	4732.81'	1.80%	4732.99'	3.30%	4732.66'	
994+92.75	4733.11'	2.30%	4733.34'	4.20%	4732.92'	
995+13.76	4733.31'	2.80%	4733.59'	2.90%	4733.30'	
995+34.33	4733.65'	2.40%	4733.89'	2.10%	4733.68'	
995+54.48	4733.81'	3.60%	4734.17'	2.10%	4733.96'	
995+67.00	4733.98'	3.60%	4734.34'	2.40%	4734.10'	
995+79.10	4734.16'	3.40%	4734.50'	2.60%	4734.24'	
996+03.07	4734.48'	3.70%	4734.85'	1.90%	4734.66'	
996+26.42	4734.76'	3.80%	4735.14'	1.00%	4735.04'	
996+49.22	4735.09'	3.80%	4735.47'	1.40%	4735.33'	
996+71.65	4735.41'	4.10%	4735.82'	1.60%	4735.66'	
996+94.02	4735.68'	4.80%	4736.16'	1.80%	4735.98'	
997+16.27	4736.02'	4.60%	4736.48'	1.50%	4736.33'	
997+38.33	4736.34'	4.30%	4736.77'	4.20%	4736.35'	
997+60.24	4736.68'	4.80%	4737.16'	-0.20%	4737.18'	
997+82.05	4737.01'	5.10%	4737.52'	-2.70%	4737.79'	
998+03.80	4737.28'	7.30%	4738.01'	-3.00%	4738.31'	
998+25.56	4737.56'	8.30%	4738.39'	-3.40%	4738.73'	
998+47.24	4738.05'	7.20%	4738.77'	-3.00%	4739.07'	
998+68.97	4738.61'	5.60%	4739.17'	-0.90%	4739.26'	
998+90.69	4738.88'	7.10%	4739.59'	-0.90%	4739.68'	
999+12.43	4739.36'	6.20%	4739.98'	-0.30%	4740.01'	
999+34.18	4739.75'	5.60%	4740.31'	-0.10%	4740.32'	
999+56.13	4740.02'	5.00%	4740.52'	-0.10%	4740.53'	
999+67.00	4740.01'	5.80%	4740.59'	0.10%	4740.58'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
999+78.33	4740.03'	6.40%	4740.67'	0.50%	4740.62'	
1000+00.92	4740.22'	4.70%	4740.69'	0.00%	4740.69'	
1000+23.83	4740.25'	5.20%	4740.77'	-0.20%	4740.79'	
1000+47.09	4740.42'	4.60%	4740.88'	-1.50%	4741.03'	
1000+70.56	4740.75'	4.00%	4741.15'	-1.70%	4741.32'	
1000+94.22	4741.07'	3.50%	4741.42'	-0.60%	4741.48'	
1001+18.08	4741.36'	2.50%	4741.61'	0.00%	4741.61'	
1001+42.06	4741.51'	2.40%	4741.75'	-0.50%	4741.80'	
1001+66.26	4741.68'	2.50%	4741.93'	-0.40%	4741.97'	
1001+90.70	4742.06'	0.00%	4742.06'	-2.20%	4742.28'	
1002+15.06	4742.50'	1.40%	4742.64'	-1.10%	4742.75'	
1002+39.43	4742.76'	2.00%	4742.96'	-0.70%	4743.03'	
1002+63.80	4743.17'	0.30%	4743.20'	-0.40%	4743.24'	
1002+88.09	4743.48'	1.20%	4743.60'	0.80%	4743.52'	
1003+12.37	4743.83'	1.10%	4743.94'	0.80%	4743.86'	
1003+36.70	4744.06'	2.30%	4744.29'	1.20%	4744.17'	
1003+60.95	4744.28'	4.60%	4744.74'	-0.30%	4744.77'	
1003+85.03	4745.01'	3.50%	4745.36'	-0.80%	4745.44'	
1004+08.78	4745.84'	2.20%	4746.06'	-0.30%	4746.09'	
1004+32.20	4746.64'	1.60%	4746.80'	1.40%	4746.66'	
1004+55.18	4747.37'	1.70%	4747.54'	1.10%	4747.43'	
1004+67.00	4747.74'	2.10%	4747.95'	0.70%	4747.88'	
1004+77.79	4748.09'	2.30%	4748.32'	0.20%	4748.30'	
1004+99.89	4748.99'	2.20%	4749.21'	0.90%	4749.12'	
1005+21.43	4749.91'	2.10%	4750.12'	2.40%	4749.88'	
1005+42.51	4750.68'	2.10%	4750.89'	1.00%	4750.79'	
1005+63.32	4751.48'	1.20%	4751.60'	1.10%	4751.49'	
1005+84.05	4752.24'	0.80%	4752.32'	1.60%	4752.16'	
1006+04.79	4752.90'	1.00%	4753.00'	1.30%	4752.87'	
1006+25.25	4753.75'	0.90%	4753.84'	-0.30%	4753.87'	
1006+45.66	4754.77'	0.20%	4754.79'	0.80%	4754.71'	
1006+66.54	4755.63'	-0.10%	4755.62'	1.10%	4755.51'	
1006+87.95	4756.52'	3.00%	4756.82'	4.20%	4756.40'	
1007+09.77	4757.23'	5.00%	4757.73'	3.60%	4757.37'	
1007+31.94	4758.20'	4.50%	4758.65'	4.00%	4758.25'	
1007+54.46	4759.19'	3.10%	4759.50'	1.60%	4759.34'	
1007+76.91	4760.00'	1.70%	4760.17'	-0.40%	4760.21'	
1007+99.21	4760.95'	0.40%	4760.99'	0.60%	4760.93'	
1008+21.60	4761.70'	-0.10%	4761.69'	-0.70%	4761.76'	
1008+43.97	4762.45'	1.90%	4762.64'	2.50%	4762.39'	
1008+66.46	4763.28'	0.90%	4763.37'	3.00%	4763.07'	
1008+88.93	4764.17'	1.20%	4764.29'	3.60%	4763.93'	
1009+11.36	4765.05'	0.80%	4765.13'	3.80%	4764.75'	
1009+33.72	4765.86'	0.50%	4765.91'	2.50%	4765.66'	
1009+56.07	4766.61'	0.40%	4766.65'	2.70%	4766.38'	
1009+67.00	4766.95'	1.10%	4767.06'	2.80%	4766.78'	
1009+78.30	4767.29'	2.00%	4767.49'	3.10%	4767.18'	
1010+00.38	4767.85'	2.20%	4768.07'	2.30%	4767.845	
1010+22.17	4768.59'	1.90%	4768.78'	2.70%	4768.51'	
1010+43.80	4769.16'	2.90%	4769.45'	2.70%	4769.18'	
1010+65.39	4769.62'	3.80%	4770.00'	2.20%	4769.78'	
1010+86.40	4769.85'	4.00%	4770.25'	1.70%	4770.08'	
1011+06.53	4770.00'	5.20%	4770.52'	1.50%	4770.37'	
1011+30.28	4770.61'	5.10%	4771.12'	5.10%	4770.61'	
1011+53.45	4771.81'	1.80%	4771.99'	8.10%	4771.18'	
1011+75.53	4772.93'	1.50%	4773.08'	6.10%	4772.47'	
1011+96.41	4773.69'	2.90%	4773.98'	3.60%	4773.62'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
1012+19.29	4774.43'	4.60%	4774.89'	3.60%	4774.53'	
1012+37.44	4775.13'	5.90%	4775.72'	1.60%	4775.56'	
1012+40.80	4775.24'	4.30%	4775.67'	-1.00%	4775.77'	
1012+57.71	4775.97'	5.30%	4776.50'	2.70%	4776.23'	
1012+79.49	4776.84'	2.20%	4777.06'	3.60%	4776.70'	
1013+01.57	4777.34'	1.30%	4777.47'	1.80%	4777.29'	
1013+21.80	4777.63'	2.40%	4777.87'	1.10%	4777.76'	
1013+42.67	4778.13'	2.90%	4778.42'	1.00%	4778.32'	
1013+63.93	4778.81'	2.60%	4779.07'	0.80%	4778.99'	
1013+85.54	4779.48'	3.00%	4779.78'	-0.20%	4779.80'	
1014+07.55	4780.08'	4.00%	4780.48'	0.00%	4780.48'	
1014+30.32	4780.54'	2.80%	4780.82'	0.40%	4780.78'	
1014+50.42	4780.88'	3.40%	4781.22'	0.90%	4781.13'	
1014+71.02	4781.20'	3.50%	4781.55'	1.80%	4781.37'	
1014+92.16	4781.67'	2.40%	4781.91'	2.90%	4781.62'	
1015+13.87	4782.15'	1.50%	4782.30'	2.70%	4782.03'	
1015+36.24	4782.47'	1.30%	4782.60'	2.40%	4782.36'	
1015+59.32	4782.70'	1.20%	4782.82'	3.20%	4782.50'	
1015+83.20	4782.87'	1.10%	4782.98'	3.20%	4782.66'	
1016+03.54	4783.06'	1.10%	4783.17'	3.30%	4782.84'	
1016+24.21	4783.26'	1.30%	4783.39'	3.00%	4783.09'	
1016+45.07	4783.56'	1.60%	4783.72'	3.40%	4783.38'	
1016+66.02	4783.82'	2.00%	4784.02'	3.40%	4783.68'	
1016+87.02	4784.08'	3.70%	4784.45'	4.50%	4784.00'	
1017+08.04	4784.43'	3.70%	4784.80'	4.20%	4784.38'	
1017+28.99	4784.86'	3.20%	4785.18'	3.80%	4784.80'	
1017+49.92	4785.18'	3.70%	4785.55'	4.10%	4785.14'	
1017+70.99	4785.49'	3.20%	4785.81'	4.20%	4785.39'	
1017+92.28	4785.83'	2.00%	4786.03'	4.30%	4785.60'	
1018+13.94	4786.08'	0.30%	4786.11'	5.20%	4785.59'	
1018+35.89	4786.28'	-0.20%	4786.26'	6.00%	4785.66'	
1018+58.08	4786.48'	-0.20%	4786.46'	5.70%	4785.89'	
1018+80.31	4786.81'	0.20%	4786.83'	6.90%	4786.14'	
1019+02.58	4787.07'	-0.20%	4787.05'	4.90%	4786.56'	
1019+24.86	4787.26'	0.60%	4787.32'	3.90%	4786.93'	
1019+47.27	4787.37'	0.30%	4787.40'	1.60%	4787.24'	
1019+69.76	4787.47'	1.00%	4787.57'	2.10%	4787.36'	
1019+92.40	4787.42'	2.50%	4787.67'	4.20%	4787.25'	
1020+15.18	4787.36'	2.90%	4787.65'	5.10%	4787.14'	
1020+38.12	4787.67'	1.00%	4787.77'	3.60%	4787.41'	
1020+61.18	4788.02'	0.20%	4788.04'	2.50%	4787.79'	
1020+84.36	4788.41'	1.20%	4788.53'	3.10%	4788.22'	
1021+07.11	4788.75'	1.80%	4788.93'	3.00%	4788.63'	
1021+29.15	4788.93'	2.40%	4789.17'	2.50%	4788.92'	
1021+51.14	4789.07'	2.80%	4789.35'	4.00%	4788.95'	
1021+73.10	4789.27'	3.30%	4789.60'	5.50%	4789.05'	
1021+94.97	4789.50'	3.50%	4789.85'	2.60%	4789.59'	
1022+16.71	4789.70'	1.80%	4789.88'	1.30%	4789.75'	
1022+38.53	4789.78'	0.60%	4789.84'	1.00%	4789.74'	
1022+60.45	4789.74'	1.30%	4789.87'	1.20%	4789.75'	
1022+82.29	4789.76'	1.10%	4789.87'	1.50%	4789.72'	
1023+03.92	4789.88'	2.00%	4790.08'	3.90%	4789.69'	
1023+25.40	4789.97'	1.90%	4790.16'	4.00%	4789.76'	
1023+46.92	4790.06'	1.70%	4790.23'	2.50%	4789.98'	
1023+68.56	4790.24'	1.10%	4790.35'	2.70%	4790.08'	
1023+90.15	4790.37'	1.80%	4790.55'	2.20%	4790.33'	
1024+11.57	4790.39'	2.20%	4790.61'	1.60%	4790.45'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
1024+32.79	4790.41'	2.50%	4790.66'	2.60%	4790.40'	
1024+53.66	4790.44'	2.40%	4790.68'	3.10%	4790.37'	
1024+74.10	4790.46'	2.30%	4790.69'	3.50%	4790.34'	
1024+94.23	4790.48'	2.80%	4790.76'	4.00%	4790.36'	
1025+18.18	4790.50'	2.30%	4790.73'	2.90%	4790.44'	
1025+41.97	4790.53'	3.20%	4790.85'	2.70%	4790.58'	
1025+65.73	4790.52'	3.40%	4790.86'	3.60%	4790.50'	
1025+89.52	4790.69'	1.50%	4790.84'	3.60%	4790.48'	
1026+13.41	4790.77'	0.20%	4790.79'	3.10%	4790.48'	
1026+37.10	4790.89'	-0.20%	4790.87'	5.30%	4790.34'	
1026+60.80	4790.89'	-0.10%	4790.88'	7.20%	4790.16'	
1026+80.84	4790.79'	-1.00%	4790.69'	8.20%	4789.87'	
1027+01.34	4790.69'	-0.40%	4790.65'	6.30%	4790.02'	
1027+21.82	4790.81'	1.80%	4790.99'	4.80%	4790.51'	
1027+42.11	4791.15'	2.90%	4791.44'	3.70%	4791.07'	
1027+62.34	4791.57'	2.60%	4791.83'	2.80%	4791.55'	
1027+82.66	4792.00'	2.20%	4792.22'	3.80%	4791.84'	
1028+03.15	4792.30'	2.10%	4792.51'	3.30%	4792.18'	
1028+23.63	4792.67'	1.50%	4792.82'	3.80%	4792.44'	
1028+44.26	4792.88'	1.90%	4793.07'	3.00%	4792.77'	
1028+64.93	4793.25'	1.20%	4793.37'	3.90%	4792.98'	
1028+85.61	4793.40'	2.10%	4793.61'	4.40%	4793.17'	
1029+06.40	4793.29'	2.40%	4793.53'	1.30%	4793.40'	
1029+27.30	4793.30'	3.70%	4793.67'	2.10%	4793.46'	
1029+48.24	4793.65'	2.90%	4793.94'	2.10%	4793.73'	
1029+69.08	4794.24'	1.80%	4794.42'	1.60%	4794.26'	
1029+89.87	4794.90'	1.10%	4795.01'	2.20%	4794.79'	
1030+10.80	4795.35'	0.20%	4795.37'	2.90%	4795.08'	
1030+32.12	4795.54'	-1.20%	4795.42'	3.70%	4795.05'	
1030+53.79	4795.73'	-1.60%	4795.57'	5.50%	4795.02'	
1030+75.33	4796.07'	-2.20%	4795.85'	6.20%	4795.23'	
1030+96.82	4796.37'	-2.00%	4796.17'	7.30%	4795.44'	
1031+18.45	4796.58'	-4.20%	4796.16'	8.40%	4795.32'	
1031+40.21	4796.85'	-5.70%	4796.28'	8.80%	4795.40'	
1031+62.00	4797.08'	-5.60%	4796.52'	4.50%	4796.07'	
1031+83.76	4797.36'	-2.70%	4797.09'	4.90%	4796.60'	
1032+05.32	4797.79'	-3.80%	4797.41'	4.40%	4796.97'	
1032+26.49	4798.48'	-2.90%	4798.19'	5.80%	4797.61'	
1032+47.37	4799.11'	-1.80%	4798.93'	6.30%	4798.30'	
1032+67.98	4799.59'	-3.20%	4799.27'	5.10%	4798.76'	
1032+88.42	4799.76'	-2.00%	4799.56'	3.90%	4799.17'	
1033+08.61	4800.22'	-3.00%	4799.92'	3.50%	4799.57'	
1033+32.53	4800.93'	-2.50%	4800.68'	6.20%	4800.06'	
1033+56.09	4801.49'	-2.60%	4801.23'	5.50%	4800.68'	
1033+67.00	4801.76'	-1.70%	4801.59'	6.00%	4800.99'	
1033+79.18	4802.07'	-0.90%	4801.98'	6.30%	4801.35'	
1034+02.14	4802.70'	-1.10%	4802.59'	6.30%	4801.96'	
1034+25.34	4803.33'	-1.80%	4803.15'	6.50%	4802.50'	
1034+48.81	4803.86'	-0.60%	4803.80'	6.40%	4803.16'	
1034+72.46	4804.42'	1.40%	4804.56'	5.10%	4804.05'	
1034+96.28	4805.06'	3.00%	4805.36'	4.20%	4804.94'	
1035+16.41	4805.85'	1.60%	4806.01'	4.50%	4805.56'	
1035+36.74	4806.90'	-0.30%	4806.87'	5.10%	4806.36'	
1035+57.13	4807.94'	-1.00%	4807.84'	4.70%	4807.37'	
1035+78.10	4808.96'	-0.30%	4808.93'	3.40%	4808.59'	
1035+99.41	4809.97'	0.90%	4810.06'	4.20%	4809.64'	
1036+20.98	4811.13'	1.80%	4811.31'	5.90%	4810.72'	

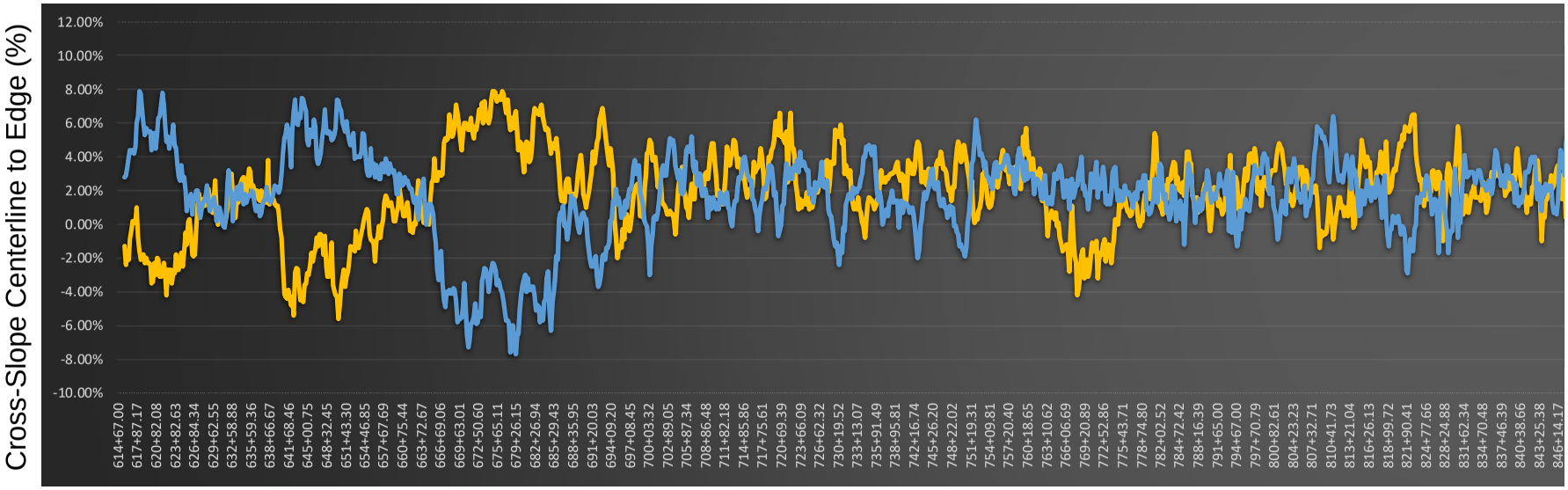
Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
1036+42.77	4812.48'	-0.50%	4812.43'	5.70%	4811.86'	
1036+64.83	4813.67'	0.40%	4813.71'	7.50%	4812.96'	
1036+86.94	4814.92'	0.40%	4814.96'	7.80%	4814.18'	
1037+08.44	4816.21'	-0.10%	4816.20'	9.10%	4815.29'	
1037+29.53	4817.42'	0.20%	4817.44'	9.10%	4816.53'	
1037+50.41	4818.68'	0.30%	4818.71'	8.50%	4817.86'	
1037+70.86	4819.96'	-0.20%	4819.94'	6.20%	4819.32'	
1037+91.28	4821.24'	0.00%	4821.24'	4.80%	4820.76'	
1038+11.55	4822.52'	-1.00%	4822.42'	3.30%	4822.09'	
1038+31.55	4823.76'	-0.40%	4823.72'	4.70%	4823.25'	
1038+55.30	4825.34'	-1.10%	4825.23'	6.50%	4824.58'	
1038+67.00	4826.06'	-1.30%	4825.93'	7.20%	4825.21'	
1038+78.92	4826.80'	-1.50%	4826.65'	7.00%	4825.95'	
1039+02.24	4828.28'	0.10%	4828.29'	9.00%	4827.39'	
1039+25.36	4829.65'	-0.20%	4829.63'	7.50%	4828.88'	
1039+48.55	4830.94'	-0.30%	4830.91'	7.80%	4830.13'	
1039+71.94	4832.19'	0.40%	4832.23'	9.10%	4831.32'	
1039+95.66	4833.37'	0.50%	4833.42'	10.10%	4832.41'	
1040+15.91	4834.39'	-0.20%	4834.37'	8.50%	4833.52'	
1040+36.54	4835.38'	-1.30%	4835.25'	9.50%	4834.30'	
1040+57.40	4836.27'	-1.70%	4836.10'	10.10%	4835.09'	
1040+78.04	4837.08'	-1.10%	4836.97'	9.20%	4836.05'	
1040+98.49	4837.72'	0.30%	4837.75'	9.20%	4836.83'	
1041+19.11	4838.25'	0.50%	4838.30'	7.20%	4837.58'	
1041+39.86	4838.88'	0.10%	4838.89'	6.10%	4838.28'	
1041+60.72	4839.61'	0.50%	4839.66'	7.50%	4838.91'	
1041+81.56	4840.35'	0.60%	4840.41'	6.90%	4839.72'	
1042+02.40	4841.00'	0.80%	4841.08'	6.50%	4840.43'	
1042+23.43	4841.60'	0.80%	4841.68'	5.70%	4841.11'	
1042+44.76	4842.14'	-0.20%	4842.12'	4.20%	4841.70'	
1042+66.47	4842.70'	-0.50%	4842.65'	4.50%	4842.20'	
1042+88.65	4843.19'	-1.20%	4843.07'	3.60%	4842.71'	
1043+11.18	4843.73'	-2.20%	4843.51'	3.00%	4843.21'	
1043+33.98	4844.29'	-1.70%	4844.12'	3.60%	4843.76'	
1043+56.83	4844.87'	-1.50%	4844.72'	3.70%	4844.35'	
1043+67.00	4845.08'	-1.40%	4844.94'	3.50%	4844.59'	
1043+79.67	4845.20'	0.10%	4845.21'	3.20%	4844.89'	
1044+02.59	4845.80'	-0.90%	4845.71'	4.40%	4845.27'	
1044+25.37	4846.40'	-1.80%	4846.22'	5.20%	4845.70'	
1044+48.32	4846.90'	-2.30%	4846.67'	6.10%	4846.06'	
1044+71.21	4847.76'	-4.20%	4847.34'	7.90%	4846.55'	
1044+93.98	4848.77'	-5.70%	4848.20'	8.50%	4847.35'	
1045+16.41	4849.83'	-5.10%	4849.32'	9.90%	4848.33'	
1045+38.79	4851.03'	-6.50%	4850.38'	9.10%	4849.47'	
1045+60.95	4852.16'	-5.40%	4851.62'	9.70%	4850.65'	
1045+82.93	4853.33'	-4.20%	4852.91'	8.00%	4852.11'	
1046+04.93	4854.59'	-3.90%	4854.20'	5.20%	4853.68'	
1046+27.12	4855.82'	-2.80%	4855.54'	3.60%	4855.18'	
1046+49.59	4857.17'	-2.40%	4856.93'	4.00%	4856.53'	
1046+72.31	4858.56'	-1.90%	4858.37'	4.40%	4857.93'	
1046+95.11	4860.05'	-2.40%	4859.81'	4.70%	4859.34'	
1047+17.92	4861.55'	-1.30%	4861.42'	5.50%	4860.87'	
1047+40.66	4863.10'	-1.50%	4862.95'	4.80%	4862.47'	
1047+63.27	4864.68'	-0.90%	4864.59'	5.30%	4864.06'	
1047+85.83	4866.28'	-0.60%	4866.22'	3.90%	4865.83'	
1048+08.42	4867.91'	-0.70%	4867.84'	3.90%	4867.45'	
1048+31.12	4869.44'	-0.90%	4869.35'	3.90%	4868.96'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
1048+53.91	4870.86'	-0.50%	4870.81'	3.60%	4870.45'	
1048+76.83	4872.44'	-0.70%	4872.37'	3.20%	4872.05'	
1048+99.60	4874.14'	-1.30%	4874.01'	2.00%	4873.81'	
1049+22.21	4875.90'	-0.70%	4875.83'	2.50%	4875.58'	
1049+44.62	4877.62'	0.00%	4877.62'	2.30%	4877.39'	
1049+66.91	4879.36'	0.20%	4879.38'	2.50%	4879.13'	
1049+89.08	4881.05'	-0.10%	4881.04'	2.40%	4880.80'	
1050+11.30	4882.74'	0.70%	4882.81'	2.80%	4882.53'	
1050+33.50	4884.52'	1.10%	4884.63'	4.50%	4884.18'	
1050+55.66	4886.29'	0.20%	4886.31'	3.90%	4885.92'	
1050+67.00	4887.18'	-0.20%	4887.16'	3.70%	4886.79'	
1050+77.71	4888.00'	-0.30%	4887.97'	3.60%	4887.61'	
1050+99.71	4889.72'	0.00%	4889.72'	3.10%	4889.41'	
1051+21.47	4891.53'	0.40%	4891.57'	2.80%	4891.29'	
1051+43.12	4893.33'	0.00%	4893.33'	2.90%	4893.04'	
1051+64.63	4895.07'	-0.80%	4894.99'	3.60%	4894.63'	
1051+86.04	4896.83'	-1.10%	4896.72'	3.80%	4896.34'	
1052+07.42	4898.52'	-1.10%	4898.41'	4.20%	4897.99'	
1052+28.67	4900.14'	-0.80%	4900.06'	3.90%	4899.67'	
1052+49.83	4901.74'	-0.60%	4901.68'	2.90%	4901.39'	
1052+70.93	4903.39'	0.00%	4903.39'	4.30%	4902.96'	
1052+92.05	4905.02'	0.20%	4905.04'	4.10%	4904.63'	
1053+13.19	4906.61'	0.20%	4906.63'	2.80%	4906.35'	
1053+34.29	4908.15'	2.30%	4908.38'	4.00%	4907.98'	
1053+55.38	4909.72'	1.60%	4909.88'	3.70%	4909.51'	
1053+76.56	4911.32'	1.20%	4911.44'	4.10%	4911.03'	
1053+97.95	4912.75'	0.30%	4912.78'	3.00%	4912.48'	
1054+19.71	4914.15'	0.60%	4914.21'	2.60%	4913.95'	
1054+41.66	4915.61'	1.40%	4915.75'	3.20%	4915.43'	
1054+63.24	4917.13'	1.30%	4917.26'	4.10%	4916.85'	
1054+84.63	4918.60'	0.10%	4918.61'	3.00%	4918.31'	
1055+05.88	4920.00'	0.70%	4920.07'	2.60%	4919.81'	
1055+27.05	4921.47'	0.70%	4921.54'	3.40%	4921.20'	
1055+48.11	4922.89'	0.70%	4922.96'	3.90%	4922.57'	
1055+69.30	4924.37'	0.50%	4924.42'	3.80%	4924.04'	
1055+90.46	4925.90'	1.30%	4926.03'	3.90%	4925.64'	
1056+11.65	4927.47'	1.10%	4927.58'	4.20%	4927.16'	
1056+32.86	4929.03'	0.20%	4929.05'	2.80%	4928.77'	
1056+54.17	4930.43'	0.90%	4930.52'	3.20%	4930.20'	
1056+75.38	4931.91'	1.30%	4932.04'	4.20%	4931.62'	
1056+96.50	4933.37'	0.50%	4933.42'	4.00%	4933.02'	
1057+17.70	4934.78'	0.10%	4934.79'	4.50%	4934.34'	
1057+39.05	4936.07'	0.40%	4936.11'	4.80%	4935.63'	
1057+60.63	4937.37'	0.50%	4937.42'	4.60%	4936.96'	
1057+82.47	4938.78'	0.30%	4938.81'	4.20%	4938.39'	
1058+04.46	4940.20'	0.30%	4940.23'	3.30%	4939.90'	
1058+26.52	4941.65'	1.00%	4941.75'	4.60%	4941.29'	
1058+48.77	4943.09'	0.80%	4943.17'	4.80%	4942.69'	
1058+71.20	4944.42'	1.00%	4944.52'	3.70%	4944.15'	
1058+93.67	4945.76'	1.00%	4945.86'	3.40%	4945.52'	
1059+16.23	4947.09'	1.20%	4947.21'	4.70%	4946.74'	
1059+38.85	4948.42'	1.10%	4948.53'	4.90%	4948.04'	
1059+61.51	4949.73'	1.90%	4949.92'	5.30%	4949.39'	
1059+84.10	4951.08'	1.10%	4951.19'	3.70%	4950.82'	
1060+06.41	4952.36'	1.70%	4952.53'	3.50%	4952.18'	
1060+28.42	4953.72'	1.60%	4953.88'	4.50%	4953.43'	
1060+50.23	4955.02'	1.60%	4955.18'	4.10%	4954.77'	

Station	Existing EP Left		Existing CL	Existing EP Right		Profile
	Elevation(Actual)	Lane Slope	Elevation(Actual)	Lane Slope	Elevation(Actual)	
1060+71.92	4956.42'	0.60%	4956.48'	5.10%	4955.97'	
1060+93.44	4957.65'	-0.50%	4957.60'	3.90%	4957.21'	
1061+14.66	4958.79'	0.80%	4958.87'	4.50%	4958.42'	
1061+35.74	4959.95'	-0.20%	4959.93'	2.90%	4959.64'	
1061+56.79	4961.19'	1.00%	4961.29'	3.30%	4960.96'	
1061+67.00	4961.82'	0.70%	4961.89'	3.70%	4961.52'	
1061+77.82	4962.42'	1.00%	4962.52'	3.80%	4962.14'	
1061+98.57	4963.56'	2.00%	4963.76'	2.60%	4963.50'	
1062+19.13	4964.70'	1.90%	4964.89'	1.80%	4964.71'	
1062+40.13	4965.88'	2.60%	4966.14'	2.30%	4965.91'	
1062+61.38	4967.17'	1.70%	4967.34'	2.10%	4967.13'	
1062+82.66	4968.43'	1.60%	4968.59'	2.20%	4968.37'	
1063+03.87	4969.67'	1.80%	4969.85'	2.60%	4969.59'	
1063+25.11	4971.09'	0.30%	4971.12'	2.60%	4970.86'	
1063+46.33	4972.48'	0.50%	4972.53'	3.90%	4972.14'	
1063+67.48	4973.78'	0.30%	4973.81'	3.30%	4973.48'	
1063+88.54	4975.06'	0.20%	4975.08'	2.50%	4974.83'	
1064+09.60	4976.36'	0.10%	4976.37'	2.20%	4976.15'	
1064+30.81	4977.63'	0.60%	4977.69'	2.00%	4977.49'	
1064+52.24	4978.89'	1.30%	4979.02'	1.80%	4978.84'	
1064+73.91	4980.23'	1.60%	4980.39'	2.00%	4980.19'	
1064+95.77	4981.59'	1.80%	4981.77'	2.20%	4981.55'	
1065+17.53	4982.98'	2.60%	4983.24'	2.30%	4983.01'	
1065+39.11	4984.44'	2.20%	4984.66'	1.30%	4984.53'	
1065+60.65	4985.82'	3.30%	4986.15'	1.80%	4985.97'	
1065+82.21	4987.38'	2.40%	4987.62'	2.10%	4987.41'	
1066+03.85	4988.79'	2.40%	4989.03'	1.10%	4988.92'	
1066+25.57	4990.11'	2.20%	4990.33'	0.50%	4990.28'	
1066+47.20	4991.29'	2.10%	4991.50'	1.60%	4991.34'	
1066+68.77	4992.41'	2.40%	4992.65'	2.40%	4992.41'	
1066+90.28	4993.58'	2.60%	4993.84'	2.30%	4993.61'	
1067+11.87	4994.76'	2.80%	4995.04'	2.60%	4994.78'	
1067+33.50	4995.93'	2.20%	4996.15'	2.70%	4995.88'	
1067+55.31	4997.06'	1.00%	4997.16'	3.00%	4996.86'	
1067+67.00	4997.62'	0.40%	4997.66'	2.70%	4997.39'	
1067+77.13	4998.06'	0.20%	4998.08'	2.30%	4997.85'	
1067+98.62	4999.06'	0.30%	4999.09'	1.80%	4998.91'	
1068+19.80	5000.12'	0.60%	5000.18'	2.40%	4999.94'	
1068+40.67	5001.17'	0.70%	5001.24'	1.70%	5001.07'	
1068+61.33	5002.14'	0.10%	5002.15'	0.30%	5002.12'	
1068+81.87	5002.98'	-0.10%	5002.97'	-1.20%	5003.09'	
1069+02.24	5003.76'	1.90%	5003.95'	1.50%	5003.80'	
1069+22.59	5004.52'	0.50%	5004.57'	2.10%	5004.36'	
1069+33.67	5004.81'	0.30%	5004.84'	-0.20%	5004.86'	

Max Lane Slope:	8.30%	10.10%
Min Lane Slope:	-6.50%	-7.70%

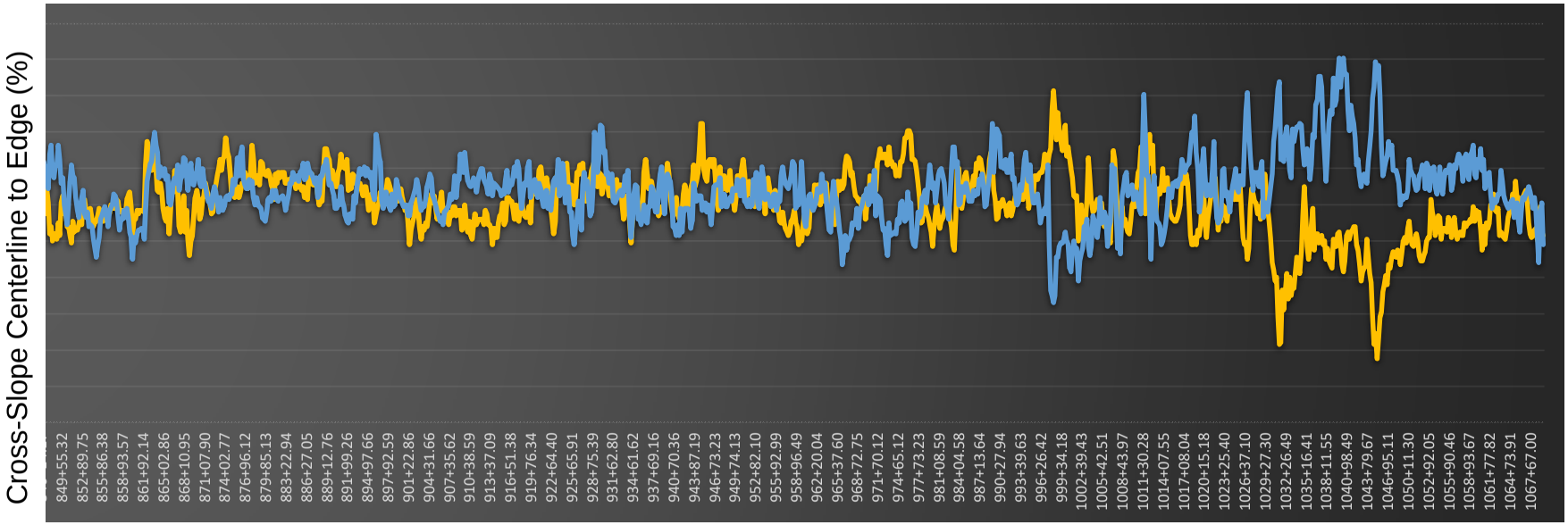
Left and Right Cross-Slopes from Centerline by Station



Blue = Left
Yellow = Right

Station (ft)

Left and Right Cross-Slopes from Centerline by Station



Blue = Left
Yellow = Right

Appendix F
Vertical Profile

Profile PVI Station & Curve Report

Client:
Hot Springs County
Client Company
Address 1
Date: 10/3/2019 10:30:46 AM

Prepared by:
T-O Engineers
502 33rd Street

Vertical Alignment: Proposed BMR Profile
Description:
Station Range: Start: 614+67.01, End: 1069+31.10

PVI	Station	Grade Out	Curve Length
0.00	614+67.01	0.01%	
1.00	617+00.00	-0.28%	
2.00	620+00.00	-0.39%	
3.00	633+00.00	0.83%	500.00'

Vertical Curve Information:(sag curve)

PVC Station:	630+50.00	Elevation:	4,492.75'
PVI Station:	633+00.00	Elevation:	4,491.77'
PVT Station:	635+50.00	Elevation:	4,493.84'
Low Point:	632+10.86	Elevation:	4,492.43'
Grade in:	-0.39%	Grade out:	0.83%
Change:	1.22%	K:	408.189109720696
Curve Length:	500.00'		
Headlight Distance:			

4.00	641+00.00	0.73%	
5.00	655+00.00	0.64%	
6.00	660+00.00	0.03%	300.00'

Vertical Curve Information:(crest curve)

PVC Station:	658+50.00	Elevation:	4,510.80'
PVI Station:	660+00.00	Elevation:	4,511.75'
PVT Station:	661+50.00	Elevation:	4,511.80'
High Point:	661+50.00	Elevation:	4,511.80'
Grade in:	0.64%	Grade out:	0.03%
Change:	0.60%	K:	498.549488884541

	Curve Length: 300.00'		
	Passing Distance: 2,719.79'	Stopping Distance: 1,254.41'	
7.00	664+00.00	0.81%	200.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 663+00.00	Elevation: 4,511.85'	
	PVI Station: 664+00.00	Elevation: 4,511.89'	
	PVT Station: 665+00.00	Elevation: 4,512.70'	
	Low Point: 663+00.00	Elevation: 4,511.85'	
	Grade in: 0.03%	Grade out: 0.81%	
	Change: 0.78%	K: 257.253429799889	
	Curve Length: 200.00'		
	Headlight Distance:		
8.00	676+00.00	0.21%	400.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 674+00.00	Elevation: 4,520.00'	
	PVI Station: 676+00.00	Elevation: 4,521.63'	
	PVT Station: 678+00.00	Elevation: 4,522.05'	
	High Point: 678+00.00	Elevation: 4,522.05'	
	Grade in: 0.81%	Grade out: 0.21%	
	Change: 0.60%	K: 668.820660998223	
	Curve Length: 400.00'		
	Passing Distance: 2,785.60'	Stopping Distance: 1,311.20'	
9.00	685+00.00	2.27%	500.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 682+50.00	Elevation: 4,523.01'	
	PVI Station: 685+00.00	Elevation: 4,523.55'	
	PVT Station: 687+50.00	Elevation: 4,529.23'	
	Low Point: 682+50.00	Elevation: 4,523.01'	
	Grade in: 0.21%	Grade out: 2.27%	
	Change: 2.06%	K: 242.650311105055	
	Curve Length: 500.00'		
	Headlight Distance: 2,269.78'		
10.00	692+32.50	0.13%	300.00'

Vertical Curve Information:(crest curve)

PVC Station:	690+82.50	Elevation:	4,536.79'
PVI Station:	692+32.50	Elevation:	4,540.20'
PVT Station:	693+82.50	Elevation:	4,540.40'
High Point:	693+82.50	Elevation:	4,540.40'
Grade in:	2.27%	Grade out:	0.13%
Change:	2.15%	K:	139.831738242474
Curve Length:	300.00'		
Passing Distance:	870.77'	Stopping Distance:	459.76'

11.00	702+00.00	1.77%	300.00'

Vertical Curve Information:(sag curve)

PVC Station:	700+50.00	Elevation:	4,541.25'
PVI Station:	702+00.00	Elevation:	4,541.45'
PVT Station:	703+50.00	Elevation:	4,544.10'
Low Point:	700+50.00	Elevation:	4,541.25'
Grade in:	0.13%	Grade out:	1.77%
Change:	1.64%	K:	182.989390039057
Curve Length:	300.00'		
Headlight Distance:			

12.00	709+00.00	-0.55%	300.00'

Vertical Curve Information:(crest curve)

PVC Station:	707+50.00	Elevation:	4,551.17'
PVI Station:	709+00.00	Elevation:	4,553.82'
PVT Station:	710+50.00	Elevation:	4,553.00'
High Point:	709+78.96	Elevation:	4,553.19'
Grade in:	1.77%	Grade out:	-0.55%
Change:	2.32%	K:	129.507360089765
Curve Length:	300.00'		
Passing Distance:	817.55'	Stopping Distance:	436.89'

13.00	713+00.00	0.90%	250.00'

Vertical Curve Information:(sag curve)

PVC Station:	711+75.00	Elevation:	4,552.31'
PVI Station:	713+00.00	Elevation:	4,551.63'

	PVT Station: 714+25.00	Elevation: 4,552.75'	
	Low Point: 712+69.99	Elevation: 4,552.05'	
	Grade in: -0.55%	Grade out: 0.90%	
	Change: 1.44%	K: 173.17115414214	
	Curve Length: 250.00'		
	Headlight Distance:		
14.00	717+00.00	-1.24%	350.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 715+25.00	Elevation: 4,553.64'	
	PVI Station: 717+00.00	Elevation: 4,555.21'	
	PVT Station: 718+75.00	Elevation: 4,553.04'	
	High Point: 716+71.94	Elevation: 4,554.30'	
	Grade in: 0.90%	Grade out: -1.24%	
	Change: 2.13%	K: 164.150145710293	
	Curve Length: 350.00'		
	Passing Distance: 900.24'	Stopping Distance: 486.69'	
15.00	722+00.00	2.13%	400.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 720+00.00	Elevation: 4,551.50'	
	PVI Station: 722+00.00	Elevation: 4,549.02'	
	PVT Station: 724+00.00	Elevation: 4,553.29'	
	Low Point: 721+46.91	Elevation: 4,550.59'	
	Grade in: -1.24%	Grade out: 2.13%	
	Change: 3.37%	K: 118.757127853754	
	Curve Length: 400.00'		
	Headlight Distance: 538.38'		
16.00	727+00.00	-0.00%	300.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 725+50.00	Elevation: 4,556.48'	
	PVI Station: 727+00.00	Elevation: 4,559.68'	
	PVT Station: 728+50.00	Elevation: 4,559.67'	
	High Point: 728+49.54	Elevation: 4,559.67'	
	Grade in: 2.13%	Grade out: -0.00%	
	Change: 2.13%	K: 140.550750010887	

	Curve Length: 300.00'		
	Passing Distance: 874.47'	Stopping Distance: 461.36'	
17.00	732+00.00	2.18%	250.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 730+75.00	Elevation: 4,559.67'	
	PVI Station: 732+00.00	Elevation: 4,559.66'	
	PVT Station: 733+25.00	Elevation: 4,562.38'	
	Low Point: 730+75.38	Elevation: 4,559.67'	
	Grade in: -0.00%	Grade out: 2.18%	
	Change: 2.18%	K: 114.751825178926	
	Curve Length: 250.00'		
	Headlight Distance: 1,090.55'		
18.00	736+00.00	0.98%	200.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 735+00.00	Elevation: 4,566.19'	
	PVI Station: 736+00.00	Elevation: 4,568.36'	
	PVT Station: 737+00.00	Elevation: 4,569.34'	
	High Point: 737+00.00	Elevation: 4,569.34'	
	Grade in: 2.18%	Grade out: 0.98%	
	Change: 1.20%	K: 166.776496511538	
	Curve Length: 200.00'		
	Passing Distance: 1,389.48'	Stopping Distance: 654.18'	
19.00	741+00.00	-1.75%	500.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 738+50.00	Elevation: 4,570.80'	
	PVI Station: 741+00.00	Elevation: 4,573.24'	
	PVT Station: 743+50.00	Elevation: 4,568.87'	
	High Point: 740+29.02	Elevation: 4,571.68'	
	Grade in: 0.98%	Grade out: -1.75%	
	Change: 2.73%	K: 183.399156954416	
	Curve Length: 500.00'		
	Passing Distance: 817.20'	Stopping Distance: 493.73'	
20.00	749+00.00	0.53%	300.00'

Vertical Curve Information:(sag curve)

PVC Station:	747+50.00	Elevation:	4,561.87'
PVI Station:	749+00.00	Elevation:	4,559.24'
PVT Station:	750+50.00	Elevation:	4,560.03'
Low Point:	749+80.68	Elevation:	4,559.85'
Grade in:	-1.75%	Grade out:	0.53%
Change:	2.28%	K:	131.802830370207
Curve Length:	300.00'		
Headlight Distance:	1,020.35'		

21.00	756+00.00	1.47%	300.00'

Vertical Curve Information:(sag curve)

PVC Station:	754+50.00	Elevation:	4,562.14'
PVI Station:	756+00.00	Elevation:	4,562.92'
PVT Station:	757+50.00	Elevation:	4,565.13'
Low Point:	754+50.00	Elevation:	4,562.14'
Grade in:	0.53%	Grade out:	1.47%
Change:	0.94%	K:	318.583477076198
Curve Length:	300.00'		
Headlight Distance:			

22.00	765+00.00	0.34%	400.00'

Vertical Curve Information:(crest curve)

PVC Station:	763+00.00	Elevation:	4,573.20'
PVI Station:	765+00.00	Elevation:	4,576.13'
PVT Station:	767+00.00	Elevation:	4,576.82'
High Point:	767+00.00	Elevation:	4,576.82'
Grade in:	1.47%	Grade out:	0.34%
Change:	1.12%	K:	356.012434968391
Curve Length:	400.00'		
Passing Distance:	1,576.31'	Stopping Distance:	791.49'

23.00	781+00.00	-0.04%	400.00'

Vertical Curve Information:(crest curve)

PVC Station:	779+00.00	Elevation:	4,580.95'
PVI Station:	781+00.00	Elevation:	4,581.64'

	PVT Station: 783+00.00	Elevation:	4,581.56'
	High Point: 782+60.88	Elevation:	4,581.57'
	Grade in: 0.34%	Grade out:	-0.04%
	Change: 0.38%	K:	1048.88908252814
	Curve Length: 400.00'		
	Passing Distance: 4,254.91'	Stopping Distance:	1,942.66'
24.00	788+90.00	0.65%	300.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 787+40.00	Elevation:	4,581.40'
	PVI Station: 788+90.00	Elevation:	4,581.34'
	PVT Station: 790+40.00	Elevation:	4,582.32'
	Low Point: 787+56.30	Elevation:	4,581.40'
	Grade in: -0.04%	Grade out:	0.65%
	Change: 0.69%	K:	437.068806550055
	Curve Length: 300.00'		
	Headlight Distance:		
25.00	797+00.00	4.47%	450.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 794+75.00	Elevation:	4,585.14'
	PVI Station: 797+00.00	Elevation:	4,586.60'
	PVT Station: 799+25.00	Elevation:	4,596.65'
	Low Point: 794+75.00	Elevation:	4,585.14'
	Grade in: 0.65%	Grade out:	4.47%
	Change: 3.82%	K:	117.897826619792
	Curve Length: 450.00'		
	Headlight Distance: 511.16'		
26.00	803+00.00	0.31%	500.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 800+50.00	Elevation:	4,602.23'
	PVI Station: 803+00.00	Elevation:	4,613.40'
	PVT Station: 805+50.00	Elevation:	4,614.17'
	High Point: 805+50.00	Elevation:	4,614.17'
	Grade in: 4.47%	Grade out:	0.31%
	Change: 4.16%	K:	120.311825281653

	Curve Length: 500.00'		
	Passing Distance: 622.09'	Stopping Distance: 399.89'	
27.00	814+00.00	1.43%	300.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 812+50.00	Elevation: 4,616.34'	
	PVI Station: 814+00.00	Elevation: 4,616.81'	
	PVT Station: 815+50.00	Elevation: 4,618.95'	
	Low Point: 812+50.00	Elevation: 4,616.34'	
	Grade in: 0.31%	Grade out: 1.43%	
	Change: 1.12%	K: 269.034811676385	
	Curve Length: 300.00'		
	Headlight Distance:		
28.00	824+00.00	-0.34%	600.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 821+00.00	Elevation: 4,626.78'	
	PVI Station: 824+00.00	Elevation: 4,631.06'	
	PVT Station: 827+00.00	Elevation: 4,630.05'	
	High Point: 825+85.44	Elevation: 4,630.24'	
	Grade in: 1.43%	Grade out: -0.34%	
	Change: 1.76%	K: 340.612620568873	
	Curve Length: 600.00'		
	Passing Distance: 1,177.85'	Stopping Distance: 677.27'	
29.00	838+00.00	-0.92%	300.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 836+50.00	Elevation: 4,626.86'	
	PVI Station: 838+00.00	Elevation: 4,626.35'	
	PVT Station: 839+50.00	Elevation: 4,624.97'	
	High Point: 836+50.00	Elevation: 4,626.86'	
	Grade in: -0.34%	Grade out: -0.92%	
	Change: 0.58%	K: 515.137209248793	
	Curve Length: 300.00'		
	Passing Distance: 2,805.30'	Stopping Distance: 1,291.16'	
30.00	844+00.00	-0.48%	300.00'

Vertical Curve Information:(sag curve)

PVC Station:	842+50.00	Elevation:	4,622.22'
PVI Station:	844+00.00	Elevation:	4,620.84'
PVT Station:	845+50.00	Elevation:	4,620.13'
Low Point:	845+50.00	Elevation:	4,620.13'
Grade in:	-0.92%	Grade out:	-0.48%
Change:	0.44%	K:	677.291003512928
Curve Length:	300.00'		
Headlight Distance:			

31.00	852+00.00	0.79%	500.00'

Vertical Curve Information:(sag curve)

PVC Station:	849+50.00	Elevation:	4,618.22'
PVI Station:	852+00.00	Elevation:	4,617.03'
PVT Station:	854+50.00	Elevation:	4,619.01'
Low Point:	851+37.56	Elevation:	4,617.78'
Grade in:	-0.48%	Grade out:	0.79%
Change:	1.27%	K:	394.231492031831
Curve Length:	500.00'		
Headlight Distance:			

32.00	860+00.00	1.76%	400.00'

Vertical Curve Information:(sag curve)

PVC Station:	858+00.00	Elevation:	4,621.79'
PVI Station:	860+00.00	Elevation:	4,623.37'
PVT Station:	862+00.00	Elevation:	4,626.89'
Low Point:	858+00.00	Elevation:	4,621.79'
Grade in:	0.79%	Grade out:	1.76%
Change:	0.96%	K:	414.763460367816
Curve Length:	400.00'		
Headlight Distance:			

33.00	874+00.00	1.03%	400.00'

Vertical Curve Information:(crest curve)

PVC Station:	872+00.00	Elevation:	4,644.46'
PVI Station:	874+00.00	Elevation:	4,647.97'

	PVT Station: 876+00.00	Elevation:	4,650.03'
	High Point: 876+00.00	Elevation:	4,650.03'
	Grade in: 1.76%	Grade out:	1.03%
	Change: 0.73%	K:	550.363629892943
	Curve Length: 400.00'		
	Passing Distance: 2,327.65'	Stopping Distance:	1,114.39'
34.00	892+00.00	-0.28%	400.00'
	Vertical Curve Information:(crest curve)		
	PVC Station: 890+00.00	Elevation:	4,664.45'
	PVI Station: 892+00.00	Elevation:	4,666.51'
	PVT Station: 894+00.00	Elevation:	4,665.96'
	High Point: 893+15.19	Elevation:	4,666.08'
	Grade in: 1.03%	Grade out:	-0.28%
	Change: 1.31%	K:	305.965754825808
	Curve Length: 400.00'		
	Passing Distance: 1,382.83'	Stopping Distance:	708.34'
35.00	896+00.00	0.57%	200.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 895+00.00	Elevation:	4,665.68'
	PVI Station: 896+00.00	Elevation:	4,665.40'
	PVT Station: 897+00.00	Elevation:	4,665.97'
	Low Point: 895+65.65	Elevation:	4,665.59'
	Grade in: -0.28%	Grade out:	0.57%
	Change: 0.84%	K:	236.834182373085
	Curve Length: 200.00'		
	Headlight Distance:		
36.00	901+00.00	1.18%	400.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 899+00.00	Elevation:	4,667.11'
	PVI Station: 901+00.00	Elevation:	4,668.24'
	PVT Station: 903+00.00	Elevation:	4,670.60'
	Low Point: 899+00.00	Elevation:	4,667.11'
	Grade in: 0.57%	Grade out:	1.18%

	Change: 0.61% K: 652.924388400443 Curve Length: 400.00' Headlight Distance:		
37.00	910+00.00	-0.32%	800.00'
	Vertical Curve Information:(crest curve) PVC Station: 906+00.00 Elevation: 4,674.14' PVI Station: 910+00.00 Elevation: 4,678.86' PVT Station: 914+00.00 Elevation: 4,677.58' High Point: 912+29.81 Elevation: 4,677.86' Grade in: 1.18% Grade out: -0.32% Change: 1.50% K: 533.778163796887 Curve Length: 800.00' Passing Distance: 1,431.77' Stopping Distance: 843.42'		
38.00	919+00.00	0.18%	200.00'
	Vertical Curve Information:(sag curve) PVC Station: 918+00.00 Elevation: 4,676.31' PVI Station: 919+00.00 Elevation: 4,675.99' PVT Station: 920+00.00 Elevation: 4,676.17' Low Point: 919+26.62 Elevation: 4,676.11' Grade in: -0.32% Grade out: 0.18% Change: 0.50% K: 397.11884918277 Curve Length: 200.00' Headlight Distance:		
39.00	922+00.00	-0.40%	150.00'
	Vertical Curve Information:(crest curve) PVC Station: 921+25.00 Elevation: 4,676.41' PVI Station: 922+00.00 Elevation: 4,676.54' PVT Station: 922+75.00 Elevation: 4,676.24' High Point: 921+72.21 Elevation: 4,676.45' Grade in: 0.18% Grade out: -0.40% Change: 0.59% K: 255.503454918502 Curve Length: 150.00' Passing Distance: 2,709.01' Stopping Distance: 1,207.01'		

40.00	928+50.00	0.15%	300.00'

Vertical Curve Information:(sag curve)

PVC Station:	927+00.00	Elevation:	4,674.53'
PVI Station:	928+50.00	Elevation:	4,673.93'
PVT Station:	930+00.00	Elevation:	4,674.15'
Low Point:	929+20.12	Elevation:	4,674.09'
Grade in:	-0.40%	Grade out:	0.15%
Change:	0.55%	K:	547.145869805227
Curve Length:	300.00'		
Headlight Distance:			

41.00	934+00.00	3.83%	400.00'

Vertical Curve Information:(sag curve)

PVC Station:	932+00.00	Elevation:	4,674.44'
PVI Station:	934+00.00	Elevation:	4,674.73'
PVT Station:	936+00.00	Elevation:	4,682.38'
Low Point:	932+00.00	Elevation:	4,674.44'
Grade in:	0.15%	Grade out:	3.83%
Change:	3.68%	K:	108.715341631639
Curve Length:	400.00'		
Headlight Distance:	483.95'		

42.00	942+00.00	1.39%	600.00'

Vertical Curve Information:(crest curve)

PVC Station:	939+00.00	Elevation:	4,693.86'
PVI Station:	942+00.00	Elevation:	4,705.33'
PVT Station:	945+00.00	Elevation:	4,709.50'
High Point:	945+00.00	Elevation:	4,709.50'
Grade in:	3.83%	Grade out:	1.39%
Change:	2.44%	K:	246.157184387361
Curve Length:	600.00'		
Passing Distance:	934.41'	Stopping Distance:	572.00'

43.00	948+00.00	0.39%	200.00'

Vertical Curve Information:(crest curve)

PVC Station:	947+00.00	Elevation:	4,712.27'

PVI Station:	948+00.00	Elevation:	4,713.66'
PVT Station:	949+00.00	Elevation:	4,714.06'
High Point:	949+00.00	Elevation:	4,714.06'
Grade in:	1.39%	Grade out:	0.39%
Change:	0.99%	K:	201.201598729159
Curve Length:	200.00'		
Passing Distance:	1,655.65'	Stopping Distance:	768.57'

44.00	955+00.00	1.22%	600.00'

Vertical Curve Information:(sag curve)

PVC Station:	952+00.00	Elevation:	4,715.24'
PVI Station:	955+00.00	Elevation:	4,716.42'
PVT Station:	958+00.00	Elevation:	4,720.08'
Low Point:	952+00.00	Elevation:	4,715.24'
Grade in:	0.39%	Grade out:	1.22%
Change:	0.83%	K:	725.169556023648
Curve Length:	600.00'		
Headlight Distance:			

45.00	962+00.00	0.14%	300.00'

Vertical Curve Information:(crest curve)

PVC Station:	960+50.00	Elevation:	4,723.14'
PVI Station:	962+00.00	Elevation:	4,724.97'
PVT Station:	963+50.00	Elevation:	4,725.17'
High Point:	963+50.00	Elevation:	4,725.17'
Grade in:	1.22%	Grade out:	0.14%
Change:	1.09%	K:	276.264015966466
Curve Length:	300.00'		
Passing Distance:	1,574.01'	Stopping Distance:	761.99'

46.00	976+50.00	-1.52%	200.00'

Vertical Curve Information:(crest curve)

PVC Station:	975+50.00	Elevation:	4,726.79'
PVI Station:	976+50.00	Elevation:	4,726.93'
PVT Station:	977+50.00	Elevation:	4,725.41'
High Point:	975+66.36	Elevation:	4,726.81'

	Grade in: 0.14%	Grade out: -1.52%	
	Change: 1.65%	K: 120.912314239283	
	Curve Length: 200.00'		
	Passing Distance: 1,034.87'	Stopping Distance: 501.78'	
47.00	981+00.00	0.71%	400.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 979+00.00	Elevation: 4,723.13'	
	PVI Station: 981+00.00	Elevation: 4,720.10'	
	PVT Station: 983+00.00	Elevation: 4,721.51'	
	Low Point: 981+72.84	Elevation: 4,721.06'	
	Grade in: -1.52%	Grade out: 0.71%	
	Change: 2.23%	K: 179.644683766509	
	Curve Length: 400.00'		
	Headlight Distance: 1,341.32'		
48.00	989+00.00	1.27%	400.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 987+00.00	Elevation: 4,724.34'	
	PVI Station: 989+00.00	Elevation: 4,725.76'	
	PVT Station: 991+00.00	Elevation: 4,728.31'	
	Low Point: 987+00.00	Elevation: 4,724.34'	
	Grade in: 0.71%	Grade out: 1.27%	
	Change: 0.57%	K: 706.076858679832	
	Curve Length: 400.00'		
	Headlight Distance:		
49.00	1003+50.00	3.84%	300.00'
	Vertical Curve Information:(sag curve)		
	PVC Station: 1002+00.00	Elevation: 4,742.32'	
	PVI Station: 1003+50.00	Elevation: 4,744.24'	
	PVT Station: 1005+00.00	Elevation: 4,749.99'	
	Low Point: 1002+00.00	Elevation: 4,742.32'	
	Grade in: 1.27%	Grade out: 3.84%	
	Change: 2.56%	K: 117.035571738196	
	Curve Length: 300.00'		
	Headlight Distance: 714.71'		

50.00	1013+00.00	1.22%	800.00'

Vertical Curve Information:(crest curve)

PVC Station:	1009+00.00	Elevation:	4,765.34'
PVI Station:	1013+00.00	Elevation:	4,780.69'
PVT Station:	1017+00.00	Elevation:	4,785.59'
High Point:	1017+00.00	Elevation:	4,785.59'
Grade in:	3.84%	Grade out:	1.22%
Change:	2.61%	K:	306.150981002533
Curve Length:	800.00'		
Passing Distance:	991.78'	Stopping Distance:	637.90'

51.00	1020+00.00	0.28%	200.00'

Vertical Curve Information:(crest curve)

PVC Station:	1019+00.00	Elevation:	4,788.04'
PVI Station:	1020+00.00	Elevation:	4,789.27'
PVT Station:	1021+00.00	Elevation:	4,789.54'
High Point:	1021+00.00	Elevation:	4,789.54'
Grade in:	1.22%	Grade out:	0.28%
Change:	0.95%	K:	211.12053983567
Curve Length:	200.00'		
Passing Distance:	1,732.34'	Stopping Distance:	801.53'

52.00	1027+00.00	1.59%	400.00'

Vertical Curve Information:(sag curve)

PVC Station:	1025+00.00	Elevation:	4,790.65'
PVI Station:	1027+00.00	Elevation:	4,791.21'
PVT Station:	1029+00.00	Elevation:	4,794.40'
Low Point:	1025+00.00	Elevation:	4,790.65'
Grade in:	0.28%	Grade out:	1.59%
Change:	1.32%	K:	303.570415408288
Curve Length:	400.00'		
Headlight Distance:			

53.00	1035+00.00	5.99%	400.00'

Vertical Curve Information:(sag curve)

	PVC Station: 1033+00.00	Elevation: 4,800.78'		
	PVI Station: 1035+00.00	Elevation: 4,803.97'		
	PVT Station: 1037+00.00	Elevation: 4,815.94'		
	Low Point: 1033+00.00	Elevation: 4,800.78'		
	Grade in: 1.59%	Grade out: 5.99%		
	Change: 4.39%	K: 91.0373068294285		
	Curve Length: 400.00'			
	Headlight Distance: 407.34'			
54.00	1041+00.00	1.91%	400.00'	
	Vertical Curve Information:(crest curve)			
	PVC Station: 1039+00.00	Elevation: 4,827.92'		
	PVI Station: 1041+00.00	Elevation: 4,839.90'		
	PVT Station: 1043+00.00	Elevation: 4,843.73'		
	High Point: 1043+00.00	Elevation: 4,843.73'		
	Grade in: 5.99%	Grade out: 1.91%		
	Change: 4.08%	K: 98.1558232193775		
	Curve Length: 400.00'			
	Passing Distance: 579.46'	Stopping Distance: 361.20'		
55.00	1045+00.00	6.67%	250.00'	
	Vertical Curve Information:(sag curve)			
	PVC Station: 1043+75.00	Elevation: 4,845.16'		
	PVI Station: 1045+00.00	Elevation: 4,847.55'		
	PVT Station: 1046+25.00	Elevation: 4,855.89'		
	Low Point: 1043+75.00	Elevation: 4,845.16'		
	Grade in: 1.91%	Grade out: 6.67%		
	Change: 4.76%	K: 52.5634756770038		
	Curve Length: 250.00'			
	Headlight Distance: 263.90'			
56.00	1049+00.00	8.08%		
57.00	1052+00.00	6.99%		
58.00	1058+00.00	5.96%		
59.00	1064+00.00	6.34%		
60.00	1067+00.00	4.17%	300.00'	
	Vertical Curve Information:(crest curve)			

	PVC Station:	1065+50.00	Elevation:	4,985.69'
	PVI Station:	1067+00.00	Elevation:	4,995.20'
	PVT Station:	1068+50.00	Elevation:	5,001.46'
	High Point:	1068+50.00	Elevation:	5,001.46'
	Grade in:	6.34%	Grade out:	4.17%
	Change:	2.17%	K:	138.393021507627
	Curve Length:	300.00'		
	Passing Distance:	863.35'	Stopping Distance:	456.58'
61.00	1069+31.10			

Appendix G
Environmental Documentation

T·O ENGINEERS

April 11, 2019

Mark Sattelberg
Field Supervisor
US Fish & Wildlife Service
5353 Yellowstone Road, Suite 308A
Cheyenne, WY 82009

SAMPLE LETTER

RE: Black Mountain Road Reconnaissance Report - please note highlighted changes from 4/9/19 letter

To Whom It May Concern:

Hot Springs County completed an Engineering and Planning Study in 2015 to evaluate the current roadway and provide planning-level analysis of roadway improvement recommendations for 8.65 miles of County Road 6, commonly known as Black Mountain Road. T-O Engineers is currently completing a more in-depth Reconnaissance Report Project, which examines key evidence effecting the design for maintaining the roadway and will provide preliminary design of the most critical components of the ultimate design.

The enclosed drawing depicts the 8.65 mile section of Black Mountain Road (County Road 6) proposed for reconstruction, beginning at mile marker 0.00 at the end of State Highway 172. The roadway will be reconstructed within the roadway's current alignment.

A public forum will be held on Thursday, May 2, 2019, at 7:00 PM at the Hot Springs County Annex Building, 117 North 4th Street, Thermopolis, Wyoming. The intent of this meeting is to present the goals and known impacts of the reconstruction of Black Mountain Road so interested parties gain a thorough understanding of the project, and to provide an opportunity for comment and discussion.

The forum will include an overview of any environmentally sensitive topics in the project area. This is intended to help the County and funding agencies evaluate whether the proposed project might impact the environment in a positive, neutral, or negative way.

The following impact categories will be reviewed:

- Air Quality
- Biological Resources
- Climate
- Coastal Resources
- Department of Transportation Act: Section 4(f)
- Farmlands
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Historical, Architectural, Archaeological, and Cultural Resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Noise-Compatible Land Use
- Socioeconomic Impacts, Environmental Justice, and Children's Health and Safety
- Visual Effects
- Water Resources
- Cumulative Impacts

On behalf of Hot Springs County, please accept this letter as our request for your agency review of known environmental concerns and potential impacts of the planned development. Please provide any comments, concerns, or requirements your agency may have regarding the listed impacts **no later than May 17, 2019**.

Please review the enclosed agency mailing list. If you note any omitted agencies or incorrect contacts, please forward the letter to the correct person and let us know. Please contact me at (307) 587-3411 or at wwerbelow@to-engineers.com if you need additional information or have questions.

Thank you for your assistance,
T-O Engineers

Wes Werbelow, PE

Enclosures: Agency Mailing List – 4/10/2019 updated list
Project Vicinity Map

First	Last	Title	Department	Address	City, State	Zip Code	Phone Number
Daniel	Webber	Hot Springs County Assessor	Hot Springs County Assessor's Office	415 Arapahoe	Thermoplis, WY	82443	307-864-3414
Tom	Ryan	Chairman, County Commissioners	Hot Springs County Board of Commissioners	415 Arapahoe	Thermoplis, WY	82443	307-864-8040
Phillip	Scheel	Vice Chairman, County Commissioners	Hot Springs County Board of Commissioners	415 Arapahoe	Thermoplis, WY	82443	307-864-8040
Jack	Baird	County Commissioner	Hot Springs County Board of Commissioners	415 Arapahoe	Thermoplis, WY	82443	307-864-8040
Bo	Bowman	County Planner	Hot Springs County	415 Arapahoe	Thermoplis, WY	82443	307-864-2961
Dustin	Hunt	Superintendent	Hot Springs County School District #1	415 Springview Street	Thermoplis, WY	82443	307-864-6580
		Board Members	Hot Springs County Weed and Pest	P.O. Box 543	Thermoplis, WY	82443	307-864-2278
Jill	Logan	County Attorney	Hot Springs County	415 Arapahoe	Thermoplis, WY	82443	307-864-2004
Rosemary	DeSeyn	County Clerk	Hot Springs County	415 Arapahoe	Thermoplis, WY	82443	307-864-3515
Terri	Cornella	County Clerk of District Court	Hot Springs County	415 Arapahoe	Thermoplis, WY	82443	307-864-3323
Dave	Schlager	County Road and Bridge Supervisor	Hot Springs County	415 Arapahoe	Thermoplis, WY	82443	307-864-3497
Jerimie	Kraushaar	County Sheriff	Hot Springs County	415 Arapahoe	Thermoplis, WY	82443	307-864-2622
Julie	Mortimore	County Treasurer	Hot Springs County	415 Arapahoe	Thermoplis, WY	82443	307-864-3616
Mike	Valle	District Manager	Bureau of Land Management	101 South 23rd Street	Worland, WY	82401	307-347-5100
Mary Jo	Rugwell	Acting Director	Bureau of Land Management	PO Box 1828	Cheyenne, WY	82003	307-775-6256
Carlie	Ronca	Area Manager	Bureau of Reclamation	PO Box 1630	Mills, WY	82644	307-261-5671
Mary	Neumayr	Chairman	Council on Environmental Quality (CEQ)	730 Jackson Place NW	Washington, DC	20503	202-395-5750
William	Gordon	Emergency Management Coordinator	Hot Springs County Homeland Security & Emergency Management	415 Arapahoe, Court House, 1st Floor	Thermoplis, WY	82443	307-864-4649
		Chief, NEPA Branch	U.S. EPA, Region 8 (ORA-N)	1595 Wynkoop Street	Denver, CO	80202	303-312-6704
Lois	VanMark	State Executive Director	Farm Service Agency	951 Werner Court, Ste. 130	Casper, WY	82601	307-261-5231
Lisa	Bower	County Executive Director	Farm Service Agency - Hot Springs County	208 Shiloh Road	Worland, WY	82401	307-347-2456
Robert	Farmer	Acting Administrator for FEMA Region VIII	Federal Emergency Management Agency	Denver Federal Center Building 710, Box 25267	Denver, CO	80225	303-235-4800
		Natural Resources Policy Director	Governor's Office State of Wyoming	State Capitol, 200 West 24th Street	Cheyenne, WY	82002	307-777-5629
Harry	LaBonde, Jr.	Director	Wyoming Water Development Office	6920 Yellowtail Road	Cheyenne, WY	82002	307-777-6819
			Hot Springs Conservation District	601 Broadway, Suite A	Thermoplis, WY	82443	307-864-3488
Astrid	Martinez	State Conservationist	Natural Resources Conservation Service	PO Box 33124	Casper, WY	82602	307-233-6750
Sara	Needles	Cultural Resources Division Administrator	Office of the Wyoming State Archaeologist	2301 Central Ave., Barrett Building 4th Floor	Cheyenne, WY	82002	307-777-2416
Mark	Miller	State Archaeologist	Office of the Wyoming State Archaeologist	Department 3431, 1000 East University Avenue	Laramie, WY	82071	307-721-0882
Ernie	Slagle	Director of Public Works	Town of Thermopolis Public Works Department	PO Box 603	Thermoplis, WY	82443	307-864-9285
Tracey	VanHeule	City Clerk/Treasurer	Town of Thermopolis	PO Box 603	Thermoplis, WY	82443	307-864-3838
Julie	Matthews	Police Chief	Town of Thermopolis Police Department	417 Arapahoe	Thermoplis, WY	82443	307-864-3114
Mike	Chementi	Mayor	Town of Thermopolis	PO Box 603	Thermoplis, WY	82443	307-864-9285
		Council Members	Town of Thermopolis	PO Box 603	Thermoplis, WY	82443	307-864-9285
Eric	Laux	CENWO-PMA-C	US Army Corps of Engineers, Omaha District, Planning Branch	1616 Capitol Avenue	Omaha, NE	68102-4901	402-995-2417
Mike	Happold, CENWO-ORD-WY	Wyoming Regulatory Office	US Army Corps of Engineers	2232 Dell Range Blvd., Suite 210	Cheyenne, WY	82009-4942	307-772-2300
Mark	Hogan	Mountain-Prairie State Coordinator	US Fish & Wildlife Service	170 N. 1st Street	Lander, WY	82520	307-332-2159
Mark	Sattelberg	Field Supervisor	US Fish & Wildlife Service	5353 Yellowstone Road, Suite 308A	Cheyenne, WY	82009	307-772-2374
Noreen	Walsh	Mountain-Prairie Region Office	US Fish & Wildlife Service	134 Union Blvd.	Lakewood, CO	80228	303-236-7905
Brian	Ferebee	Regional Forester	US Forest Service Rocky Mountain Region	1617 Cole Blvd., Bldg. 17	Lakewood, CO	80401	303-275-5350
Dan	Haas	U.S. Fish and Wildlife Service	Wild and Scenic Rivers	64 Maple Street	Burbank, WA	99323	509-546-8333
Shawn	Reese	Chief Executive Officer	Wyoming Business Council	214 W. 15th Street	Cheyenne, WY	82002	307-777-2800
Chris	Wichmann	Division Manager, Natural Resource & Policy Division	Wyoming Department of Agriculture	2219 Carey Avenue	Cheyenne, WY	82002	307-777-7321
		Central Region Headquarters	National Oceanic and Atmospheric Administration	7220 NW 101st Terrace	Kansas City, MO	64153	
		National Oceanic and Atmospheric Administration	Wyoming Department of Commerce	12744 West U.S. Hwy. 26	Riverton, WY	82501	307-857-3898
		Lander District Office	Wyoming Department of Environmental Quality	510 Meadowview Dr.	Lander, WY	82520	307-332-3144
Mike	Ceballos	Director	Wyoming Department of Family Services	2300 Capitol Avenue, 3rd Floor Hathaway Building	Cheyenne, WY	82002	307-777-7564
J.M.	Reed	Director	Wyoming Department of Fire Prevention & Electical Safety	320 West 25th St., 3rd Floor	Cheyenne, WY	82002	307-777-7288
Robin	Jones	LQD District 1 Supervisor, Vegetation Ecologist	Wyoming Land Quality Division	200 West 17th Street, Suite 10	Cheyenne, WY	82002	307-777-7756
Marcia	Murdoch	AML Environmental Program Principal	Wyoming DEQ, Abandoned Mine Land Division	200 West 17th Street, 3rd Floor	Cheyenne, WY	82002	307-777-7937
Nancy	Vehr	Administrator	Wyoming DEQ, Air Quality Division	200 West 17th Street, 3rd Floor	Cheyenne, WY	82002	307-777-7937
Luke	Esoh	Administrator	Wyoming DEQ, Solid & Hazardous Waste Division	200 West 17th Street, 3rd Floor	Cheyenne, WY	82002	307-777-7937

First	Last	Title	Department	Address	City, State	Zip Code	Phone Number
Bret	Callaway	Natural Resources Analyst	Wyoming Department of Water Quality	200 West 17th Street, Basement	Cheyenne, WY	82002	307-777-7937
Kim E.	Lovett	Administrator	Wyoming Department of Revenue Excise Tax Division	122 West 25th Street, 2nd Floor West	Cheyenne, WY	82002	307-777-5200
Sean	Allen	Boards and Commissions Administrator	Wyoming Department of Education	122 West 25th Street, Suite E200	Cheyenne, WY	82002	307-777-7675
Mike	Ceballos	Director	Wyoming Department of Health	6101 Yellowstone Road, Suite 420	Cheyenne, WY	82002	307-777-6340
			Hot Springs County Public Health	117 North 4th Street	Thermoplis, WY	82443	307-864-3311
		District 5 Headquarters	Wyoming Department of Transportation	Box 461, 218 W. C St.	Basin, WY	82410	307-568-3400
Scott	Gamo	Environmental Services Manager	Wyoming Department of Transportation	5300 Bishop Blvd.	Cheyenne, WY	82009	307-777-3997
John	Ysebaert	Deputy Director	Wyoming Department of Workforce Services	122 W. 25th St., Herschler Bldg. 2E	Cheyenne, WY	82002	307-777-8650
Angi	Bruce	Deputy Director	Wyoming Game and Fish Department	5400 Bishop Blvd.	Cheyenne, WY	82006	307-777-4600
Guy	Cameron	Director of Homeland Security	Wyoming Office of Homeland Security	5500 Bishop, East Door	Cheyenne, WY	82002	307-777-4663
Jennifer	Scoggin	Director	Wyoming Office of State Lands & Investments	122 W. 25th Street Herschler Building 3rd Floor West	Cheyenne, WY	82001	307-777-7331
Mark	Watson	Agency Supervisor	Wyoming Oil and Gas Conservation Commission	PO Box 2640	Casper, WY	82602	307-234-7147
Christopher	Petrie	Secretary and Chief Counsel	Wyoming Public Service Commission	2515 Warren Avenue, Suite 300	Cheyenne, WY	82002	307-777-7427
Lisa	Lindemann	Administrator	Wyoming State Engineers Office	122 West 25th St., 4th Floor East	Cheyenne, WY	82002	307-777-6150
Loren	Smith	Superintendent, Division 3	Wyoming State Engineers Office	715 East Roosevelt	Riverton, WY	82501	307-856-0747
Josh	Shroyer	District 3 Forester	Wyoming State Forestry Division	2500 Academy Court	Riverton, WY	82501	307-856-8655
Tom	Drean	Director and State Geologist	Wyoming State Geological Survey	PO Box 1347	Laramie, WY	82073	307-766-2286
Richard	Currit	Senior Archaeologist	Wyoming State Historic Preservation Office	2301 Central Avenue, Barrett Building, Third Floor	Cheyenne, WY	82002	307-777-7697
Bob	Budd	Executive Director	Wyoming Wildlife and Natural Resource Trust	Hathaway Building, 1st Floor, 2300 Capitol Avenue, Suite 117	Cheyenne, WY	82002	307-777-8024

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
1616 CAPITOL AVENUE
OMAHA NE 68102-4901

APR 2 5 2019

Planning, Programs, and Project Management Division

Mr. Wes Werbelow
T-O Engineers
502 33rd Street
Cody, Wyoming 82414

Dear Mr. Werbelow:

The U.S. Army Corps of Engineers, Omaha District (Corps) has reviewed your letter dated April 11, 2019 (received April 15, 2019) regarding the environmental review of the proposed Black Mountain Road Reconnaissance Report project, in Hot Springs County, Wyoming. It is understood that the proposed project would provide a more in-depth report on the reconstruction of 8.65 miles of Black Mountain Road (County Road 6). We offer the following comments for your consideration:

Your plans should be coordinated with the state water quality office that has jurisdiction within the area where the project is located to ensure compliance with federal and state water quality standards and regulations mandated by the Clean Water Act and administered by the U.S. Environmental Protection Agency. Please coordinate with the Wyoming Department of Environmental Quality concerning state water quality programs.

If you have not already done so, it is recommended you consult with the U.S. Fish and Wildlife Service and the Wyoming Game and Fish Department regarding fish and wildlife resources. In addition, the Wyoming State Historic Preservation Office should be contacted for information and recommendations on potential cultural resources in the project area.

Since the proposed project does not appear to be located within Corps owned or operated lands, your plans should be submitted to the local floodplain administrator for review and approval prior to construction. It should be ensured that the proposed project is in compliance with the floodplain management criteria of Hot Springs County and the State of Wyoming. In addition, please coordinate with the following floodplain management office:

Wyoming Office of Homeland Security
Attention: Ms. Kim Johnson
Herschler Building, 1st Floor East
122 West 25th Street
Cheyenne, Wyoming 82002
Telephone: 307.777.4910
Fax: 307.635.6017
Email: kjohnson@state.wy.us

Any proposed placement of dredged or fill material into waters of the United States (including jurisdictional wetlands) requires Department of the Army authorization under Section 404 of the Clean Water Act. You can visit the Omaha District's Regulatory website for permit applications and related information. Please review the information on the provided website (http://www.nwo.usace.army.mil/Missions/RegulatoryProgram.aspx) to determine if this project requires a 404 permit. For a detailed review of the permit requirements, preliminary and final project plans should be sent to:

U.S. Army Corps of Engineers
Wyoming Regulatory Office
Attention: Mr. Mike Happold, CENWO-ODR-WY
2232 Dell Range Boulevard, Suite 210
Cheyenne, Wyoming 82009-4942

In addition, please update your records with our current mailing address:

U.S. Army Corps of Engineers, Omaha District
Planning Branch
Attention: Mr. Eric Laux, CENWO-PMA-C
1616 Capitol Ave.
Omaha, Nebraska 68102-4901

If you have any questions, please contact Ms. Shelly McPherron of my staff at (402) 995-2507 or michelle.m.mcpherron@usace.army.mil and reference PD# 8180 in the subject line.

Sincerely,

Eric A. Laux, PMP
Chief, Environmental & Cultural Resources

WYOMING OFFICE OF STATE LANDS AND INVESTMENTS

122 West 25th Street
Cheyenne, WY 82002
Phone: 307-777-7331
Fax: 307-777-3524
slfmail@wyo.gov

MARK GORDON
Governor

JENIFER E. SCOGGIN
Director

April 22, 2019

Wes Werbelow, PE.
T-O Engineers
502 33rd Street
Cody, WY 82414

RE: Black Mountain Road Reconnaissance Report
Hot Springs County, Wyoming

Dear Mr. Wes Werbelow,

The Office of State Lands and Investments (Office) is in receipt of your letter dated April 9, 2019 regarding Black Mountain Road maintenance and reconstruction in Hot Springs County, Wyoming. While the Office has no specific environmental concerns regarding the proposed project at this time, the project proponents are advised they must comply with the Rules and Regulations adopted by the Board of Land Commissioners in accordance with W.S. §36-2-107 and W.S. §36-9-118, in the event that development or travel occurs on state lands.

The State of Wyoming holdings within the project vicinity (Tract 37, 38, 39 of T43N, R92W) are split estate holdings wherein the state owns the minerals but not the surface. Although the Office does not have any concerns regarding surface impacts on this section, the Office provides the following comment regarding subsurface impacts. In the event exploration and development of the mineral estate is pursued, the project proponent should be aware the mineral acreage is the dominant estate within these trust parcels. As such, the proposed project and other surface uses, would become servient to the mineral estate and would be required to accommodate mineral exploration and development in the area.

There also exists a right-of-way easement within Section 39 of T43N R91W along the reconstruction route. Should any additional area be needed outside of the current easement during maintenance or reconstruction, you will need to obtain a temporary use permit through the Office. Any additional access across or work performed on state lands will require prior authorization from the state.

We appreciate this opportunity to comment on this project. If we may be of further assistance, please do not hesitate to contact this office.

Regards,

Jenifer E. Scoggin
Director

jc/hd

STATE WYOMING Historic Preservation OFFICE

April 25, 2019

Wes Werbelow, P.E.
T.O. Engineers
502 33rd Street
Cody, WY 82414

re: T.O. Engineers, Black Mountain Road Reconnaissance Report (SHPO File # 0419RLC008)

Dear Mr. Werbelow:

Thank you for consulting with the Wyoming State Historic Preservation Office (SHPO) regarding the above referenced undertaking.

If the road reconstruction will be entirely within the current road prism no further identification efforts are necessary and the project will have no effect on historic properties.

However, if new disturbance outside of the current road prism is needed, additional consultation with our office will be required.

Please refer to the SHPO project control number 0419RLC008 on any future correspondence dealing with this project. If you have any questions, contact me at 307-777-5497.

Sincerely,

Richard L. Currit
Senior Archaeologist

USDA
United States Department of Agriculture

May 9, 2019

T-O Engineers
Wes Werbelow, PE
502 33rd Street
Cody, WY 82414

Dear Wes:

The Natural Resources Conservation Service (NRCS) has reviewed the **Black Mountain Road Reconnaissance Report** proposal dated April 11, 2019.

The Agriculture and Food Act of 1981, (Public Law 97-98) containing the Farmland Protection Policy Act (FPPA)—Subtitle I of Title XV, Section 1539-1549, is intended to minimize the impact federal programs have on the unnecessary and irreversible conversion of farmland to nonagricultural uses. Projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by a federal agency or with assistance from a federal agency.

The proposed project area is located within the Hot Springs County Area, WY soil survey area and does not have soil survey information available at this time.

Due to the lack of soil survey information we can not determine farmland designation in the project area. As such, we do not believe the work will adversely impact Farmland and no further action with regard to FPPA is required on your part. See the website link below for more information on the Farmland Protection Act

NRCS - Farmland Protection Policy Act Website:
https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/landuse/fppa/

Sincerely,

DAN MATTKE
Area Resource Soil Scientist
508 N. Broadway Ave.
Riverton, WY 82501
307-240-3210

Cc: Astrid Martinez – State Conservationist

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
5353 Yellowstone Road, Suite 308A
Cheyenne, Wyoming 82009

APR 24 2019

In Reply Refer To:
06E13000-2019-CPA-0062

Wes Werbelow, PE
TO Engineers
502 33rd Street
Cody, Wyoming 82414

Dear Mr. Werbelow:

Thank you for your letter of April 9, 2019, received in our office on April 15, regarding the proposed Black Mountain Road Roadway Improvement Project (Project). This Project will evaluate and provide a planning-level analysis of roadway recommendations for 8.65 miles of County Road 6 or Black Mountain Road. The Project will occur on Black Mountain Road (county Road 6) beginning at mile marker 0.00 at the end of State Highway 172, Hot Springs County, Wyoming.

We are writing in response to your inquiry related to species listed under the Endangered Species Act (ESA; 16 U.S.C. 1531 *et seq.*), species of special concern, or migratory birds and are providing recommendations regarding Ute Ladies'-tresses (*Spiranthes diluvialis*) and migratory birds.

Ute Ladies'-tresses

If the Project will impact wetlands, you should determine wither the wetlands are suitable habitat for Ute Ladies'- tresses. If the wetlands are found to contain suitable habitat for Ute Ladies'-tresses a survey for the orchid should be conducted prior to the implementation of Project activities. Many orchid species take 5 to 10 years to reach reproductive maturity; this appears to be true for Ute ladies'-tresses (FR 57 2048). Furthermore, reproductively mature plants do not flower every year. For these reasons, 2 to 3 years of surveys are necessary to determine presence or absence of Ute ladies'-tresses. Surveys should be conducted by knowledgeable botanists trained in conducting rare plant surveys.

Ute ladies'-tresses is a perennial orchid, 8 to 20 inches tall, with white or ivory flowers clustered into a spike arrangement at the top of the stem. Ute ladies'-tresses typically blooms from late July through August. However, it may bloom in early July or still be in flower as late as early October, depending on location and climatic conditions. Ute ladies'-tresses is endemic to moist

soils near wetland meadows, springs, lakes, and perennial streams where it colonizes early successional point bars or sandy edges. The elevation range of known occurrences is 4,200 to 7,000 feet (although no known populations in Wyoming occur above 5,500 feet). Soils where Ute ladies'-tresses have been found typically range from fine silt/sand, to gravels and cobbles, as well as to highly organic and peaty soil types. Ute ladies'-tresses is not found in heavy or tight clay soils or in extremely saline or alkaline soils. Ute ladies'-tresses typically occurs in small, scattered groups found primarily in areas where vegetation is relatively open.

Migratory Birds

We also recommend you review recommendations for the protection of migratory birds (see https://www.fws.gov/wyominges/species_Migratory.php) and review your Project relative to responsibilities for wetland protection (see http://www.fws.gov/wyominges/landscapeConservation.php).

We appreciate your efforts to conserve endangered, threatened, and candidate species and migratory birds. If you have any questions regarding this letter or your responsibilities under the ESA or other authorities, please contact Lisa Solberg Schwab of my office at the letterhead address or phone (307) 367-5340.

Sincerely,

FOR Tyler A. Abbott
Field Supervisor
Wyoming Field Office

cc: WGFD, Statewide Nongame Bird and Mammal Program Supervisor, Lander, WY (Z. Walker) (zack.walker@wyo.gov)
WGFD, Statewide Habitat Protection Program, Cheyenne, WY (wgfd.hpp@wyo.gov)

Mark Gordon, Governor

Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.

DEQ

Todd Parfitt, Director

April 24, 2019

Wes Werbelow, PE
T-O Engineers
502 33rd Street
Cody, Wyoming 82414

Via: wwerbelow@to-engineers.com

Re: Black Mountain Road Reconstruction

Dear Mr. Werbelow,

Thank you for the opportunity to provide feedback on the Black Mountain Road Reconstruction Project (Project) proposed by Hot Springs County. The Wyoming Department of Environmental Quality (WDEQ) – Water Quality Division (WQD) is responsible for protecting surface water and groundwater quality in the State of Wyoming and therefore takes an interest in the potential impacts of the Project to water resources. The WQD understands that T-O Engineering is soliciting feedback from agencies regarding sensitive resources that have the potential to be impacted by the Project as part of a Reconnaissance Report Project. Please accept the following comments on behalf of the WQD.

The Project involves the reconstruction of an 8.65 mile section of State Highway 172 along Kirby Creek. A 2003 watershed and assessment inventory report conducted by the Hot Springs Conservation District indicated that Kirby Creek is known to experience high rates of erosion. As a result, the WQD recommends that the project implement all reasonable and applicable best management practices (BMPs) to address bank erosion along Kirby Creek during construction. The Wyoming Department of Transportation's (WYDOT) *Pollution Controls and Best Management Practices for Storm Water during Construction Field Guide* is a good resource for road construction BMPs. The field guide is available through WYDOT's website.

In addition, your Project may require the following permits and/or authorizations:

Storm Water Permit. A storm water permit is required any time project construction results in clearing, grading, or otherwise disturbing one or more acres. The disturbed area does not need to be contiguous. The permit is required for surface disturbances associated with construction of the project, access roads, construction of wetland mitigation sites, borrow and stockpiling areas, equipment staging and maintenance areas and any other disturbed areas associated with construction. A general permit has been established for this purpose and either the project sponsor or general contractor is responsible for filing a Notice of Intent (NOI) and complying with the provisions of the general permit. The NOI should be filed

no later than 30 days prior to the start of construction activity. Please contact Barb Sahl (307-777-7570) for additional information.

Temporary Turbidity Waiver. Wyoming's Water Quality Rules and Regulations, Chapter 1, Wyoming Surface Water Quality Standards, include turbidity criteria for waters designated as fisheries and/or drinking water supplies. Any type of construction activity within these streams is likely to result in exceedances of these criteria. In accordance with Section 23(c)(ii) of Chapter 1, the administrator of the WQD may authorize temporary increases in turbidity above the numeric criteria in Section 23(a) in response to an individual application for a specific activity. In circumstances where a project has the potential to exceed the turbidity criteria, a waiver is recommended. An application must be submitted and a waiver approved by the administrator before work begins. This process generally takes about 45 days. Please contact Bret Callaway (307-777-5802) for more information.

Spill Reporting. Chapter 4 of the Wyoming Water Quality Rules and Regulations requires that the WQD be notified of spills or releases of chemicals and petroleum products. Spills can be reported to WDEQ by calling 307-777-7501 or through the following website: http://wyospills.org/

If you have any questions or concerns, please contact me at bret.callaway@wyo.gov or 307-777-5802.

Regards,

Bret Callaway
Natural Resource Analyst
Wyoming DEQ

Romero, Shaunna

From: Werbelow, Wes
Sent: Tuesday, May 7, 2019 4:02 PM
To: Romero, Shaunna
Subject: FW: re; Black Mountain Road Reconnaissance Report

WES WERBELOW, PE | *Project Manager*

T-O ENGINEERS
502 33rd Street | Cody, Wyoming 82414
D 307.587.3411 M 307.250.0654
www.to-engineers.com

From: Sean Allen <sean.allen@wyo.gov>
Sent: Monday, May 6, 2019 9:50 PM
To: Werbelow, Wes <wwerbelow@to-engineers.com>
Subject: re; Black Mountain Road Reconnaissance Report

Wes Werbelow, PE
T-O Engineers
502 33rd Street
Cody, WY 82414

Dear Mr. Werbelow:

Thank you for requesting comment regarding the proposed project for County Road 6 in Hot Springs County.

At this time, The Department of Education is not aware of significant environmental concerns or potential impacts surrounding the project that the Department has jurisdiction over.

Please update the Department with any relevant discovery as it relates to socioeconomic impacts, and children's health & safety.

Thank you,

Sean Allen
Boards & Commissions Administrator
Wyoming Department of Education

WYOMING
DEPARTMENT OF EDUCATION
307.421.1693

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Act and may be disclosed to third parties.

Department of Environmental Quality

To protect, conserve, and enhance the Quality of Wyoming's Environment for the benefit of current and future generations

Mark Gordon, Governor

Todd Parfitt, Director

April 10, 2019

Wes Werbelow, P.E.
T-O Engineers
502 33rd Street
Cody, WY 82414

RE: Black Mountain Road Reconnaissance Report

Dear Mr. Werbelow,

Regarding your 4/9/2019 letter requesting a compliance determination for the Black Mountain Road project, the Air Quality Division has no concerns at this time and will not require any permitting. In order to maintain compliance with our general opacity and public nuisance standards, however, the contractor should be advised to minimize fugitive dust emissions during construction. This normally includes watering access roads and staging areas, particularly during dry, windy conditions. The burning of waste materials is prohibited without specific authorization from the Air Quality Division. This project is not located in the vicinity of an area where known violations of ambient air quality standards have occurred.

Please be aware that Chapter 3, Section 8 regarding renovation or demolition involving materials suspect for asbestos may apply to this project. Changes to building finishes, demolition of buildings, or tie-ins to water and sewer lines may disturb asbestos-containing material. Prior to commencement of the project, an asbestos inspection is strongly recommended. Please contact Linda DeWitt, Asbestos Program Coordinator at (307) 777-7394 for further information.

Please call me at (307) 332-6755 or email at greg.meeker@wyo.gov if you have any questions concerning this matter.

Sincerely,

Greg Meeker
District 4 Engineer
Air Quality Division

IMPACT: PRJ000325

WYOMING GAME AND FISH DEPARTMENT

5400 Bishop Blvd. Cheyenne, WY 82006

Phone: (307) 777-4600 Fax: (307) 777-4699

wgfd.wyo.gov

GOVERNOR
MARK GORDON

DIRECTOR
BRIAN R. NESVIK

COMMISSIONERS
DAVID RAEL – President
PETER J. DUBE – Vice President
RALPH BROKAW
GAY LYNN BYRD
PATRICK CRANK
RICHARD LADWIG
MIKE SCHMID

May 8, 2019

WER 4515.05
T-O Engineers
Black Mountain Road Reconnaissance Report
Hot Springs County

Wes Werbelow, P.E.
T-O Engineers
502 33rd Street
Cody, WY 82414

Dear Mr. Werbelow,

The staff of the Wyoming Game and Fish Department (Department) has reviewed the proposed Black Mountain Road Reconnaissance Report located in Hot Springs County. We offer the following comments for your consideration.

Terrestrial Considerations:

The proposed project will occur partially within crucial mule deer winter range. Due to substantial use of this area by mule deer in the winter, we recommend a seasonal stipulation be applied within crucial winter range from November 15 – April 30.

Aquatic Considerations:

To minimize impacts to the aquatic resources of nearby waterways, we recommend the following:

- Accepted best management practices be implemented to ensure that all sediments and other pollutants are contained within the boundaries of the work area. Disturbed areas that are contributing sediment to surface waters as a result of project activities should be promptly re-vegetated to maintain water quality.

- Equipment should be serviced and fueled away from streams and riparian areas. Equipment staging areas should be at least 500 feet from riparian areas.

- The spread of aquatic invasive species (AIS) from one body of water to another is a violation of state statute and Wyoming Game and Fish Commission Regulation.

1. To prevent the spread of AIS, the following is required: Equipment that was in contact with a water positive for zebra/quagga mussels (currently none in Wyoming) within the last 30 days, is required to undergo inspection by an authorized inspector prior to contacting a Wyoming water.
2. From March through November, all equipment that may harbor water must be inspected before coming in contact with a Wyoming waterbody.
3. Follow these guidelines whenever working in water.
    - Clean all plants, mud, and debris from vehicle, tanks, and equipment.
    - Drain all water from tanks and equipment, leave wet compartments open to dry.
    - Do not move plants, animals, or water from one waterbody to another.
    - Conduct work from upstream to downstream whenever possible.
    - Avoid sucking organic or bottom materials into water intakes.
    - Avoid obtaining water from multiple sources. Use potable water when possible.
4. Wyoming waters with AIS can be found at:

http://wgfd.maps.arcgis.com/apps/webappviewer/index.html?id=935acbec194f4d42823af3db59272409

Thank you for the opportunity to comment. If you have any questions or concerns please contact Sam Hochhalter, Cody Region Fisheries Supervisor, at 307-527-7125 Ext. *816, or Matt Fry, Habitat Protection Biologist, at 307-777-4510.

Sincerely,

For Angi Bruce
Deputy Director

AB/mf/ml

cc: U.S. Fish and Wildlife Service
Sam Hochhalter, Wyoming Game and Fish Department
Chris Wichmann, Wyoming Department of Agriculture, Cheyenne

Romero, Shaunna

Subject: FW: Black Mtn Rd Reconnaissance Report

From: David Lucke <david.lucke@wyo.gov>
Date: April 17, 2019 at 1:58:14 PM MDT
To: wwerbelow@to-engineers.com, Erin Campbell-Stone <erin.campbell@wyo.gov>
Subject: Black Mtn Rd Reconnaissance Report

Dear Wes Werbelow,

Thank you for the invitation to review known environmental concerns and potential impacts of the Black Mountain Road improvement project. The Wyoming State Geological Survey has no comments, concerns, or requirements at this time.

Sincerely,
David Lucke

--
David Lucke
Manager GIS and Information Management
Wyoming State Geological Survey
david.lucke@wyo.gov
(307) 766-2286 x232

E-Mail to and from me, in connection with the transaction of public business, is subject to the Wyoming Public Records Act and may be disclosed to third parties.

Environmental Impacts Public Meeting
Black Mountain Road Reconnaissance Report
May 2nd, 2019
7:00 PM

T·O ENGINEERS

Name	Company/Representing	Address	Contact Number(s)	Email Address
Wes Werbelow	T-O Engineers	502 33rd Street Cody, WY 82414	p: 307-587-3411 m: f:	wwerbelow@to-engineers.com
Dave Schlager	Hot Springs Co. Road & Bridge		p: 864-3497 m: f:	roadandbridge@hscounty.com
Jim Wilson	V Ranch	2406 Kirby Creek Road	p: 307-864-2009 m: f:	
Terry Wilson	V Ranch	"	p: " m: f:	copperwth4@gmail.com
Sonja Becker	Hot Springs Conservation Dist		p: 307-867-2233 m: f:	hotspringsCD@gmail.com sonja.becker.hscd@gmail.com
Bo Bowman	County Planner	415 Arapahoe St. Thermop	p: 864-2961 m: f:	hscplanner@hscounty.com
Everett Jones	Kirby Creek Ranch	1660 Black MT RD	p: 921-8787 m: f:	
JACK BAIRD	Commissioner		p: m: f:	Jack.Baird@hscounty.com

BLACK MOUNTAIN ROAD RECONNAISSANCE REPORT

ENVIRONMENTAL IMPACTS PUBLIC MEETING

T·O ENGINEERS

WELCOME!

- Introductions and Attendance
- We're Here to Update Stakeholders & Get Input
- Interrupt and Ask Questions!

T·O ENGINEERS

T·O ENGINEERS

ROADWAY ISSUES

Pavement Condition

Drainage Issues

T·O ENGINEERS

ROADWAY ISSUES

Pavement Condition

Drainage Issues

T·O ENGINEERS

LAND USES

- Range Land
- Recreation
- Mineral
- Residential

T·O ENGINEERS

WHAT'S BEEN DONE SO FAR

- **2014 Engineering and Planning Study**
  - Desktop Environmental Review
  - Roadway Inventory
    - Bridges, culverts, utilities, etc
  - Network Analysis
    - Traffic counts/projections, crash data, etc
  - Alternative Analysis
    - 4 Alternatives: "Do nothing" up to Traditional Reconstruct
    - Life Cycle Cost Analysis

T·O ENGINEERS

WHAT'S BEEN DONE SO FAR

- **Road Condition Findings**
- Pavement Condition Index (PCI)

PCI Analysis (ASTM 6433)	
Condition	Length (ft)
Good	4,600
Satisfactory	0
Fair	0
Poor	3,100
Very Poor	6,800
Serious	6,800
Failed	24,400

53% Failed, 37% Poor to Serious

T·O ENGINEERS

WHAT'S BEEN DONE SO FAR

- **Local Technology Assistance Program (LTAP)**
- Ground Penetrating Radar Analysis

Condition	Rutting Roadway Length (ft)	Rutting Depth (in)	IRI Condition Roadway	IRI Rating
Good	5,200	(0-0.25")	700	0-110
Fair	26,100	(0.25"-0.5")	10,600	110-220
Poor	14,000	(+0.5")	34,000	220

Rutting ≈ 60% Fair; 30% Poor
Ride/Smoothness ≈ 75% Poor; 24% Fair

T·O ENGINEERS

WHAT'S BEEN DONE SO FAR

- **PCI and PSR Data**
- PSR = Present Serviceability Rating
  - PSR calculated by WYDOT equation, combines PCI, IRI (roughness), and rutting.

Rating	PCI	Length (ft)	Percent
Good	100 - 70	4600	10%
Fair	70 - 55	0	0%
Poor	55 - 0	41100	90%

Rating	PSR	Length (ft)	Percent
Excellent	5.0 - 3.5	0	0%
Good	3.5 - 2.5	0	0%
Fair	2.5 - 2.0	0	0%
Poor	2.0 - 0	45700	100%

T·O ENGINEERS

WHAT'S BEEN DONE SO FAR

- **Funding Options**
  - Applied for Federal Land Access Program (FLAP) grant
  - Wyoming Business Council
  - Explored WYDOT funding options

T·O ENGINEERS

WHAT THIS STUDY IS DOING

- Geotechnical Investigation
- Right of Way and Ground Surveys
- Environmental Review
- Preliminary Design
  - Geometry
  - Pavement Section
  - Drainage Design
  - Phasing

T·O ENGINEERS

GEOTECHNICAL INVESTIGATION

Failures and Distresses Caused By:

- Poor subgrade soils
- Inadequate/inconsistent pavement section
- Lack of drainage

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GEOTECHNICAL INVESTIGATION

Recommended full pavement reconstruction

At minimum, subgrade remediation required
(Scarification, moisture conditioning, and recompaction)

Strongly recommended separation/stabilization geotextile

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GEOTECHNICAL INVESTIGATION

UNREINFORCED PAVEMENT SECTIONS (Inches)			
Traffic Area	Asphalt Concrete	Base Course	Total
Black Mountain Road	5	16	21
Black Mountain Road	6	13	19

REINFORCED PAVEMENT SECTIONS (RS580i)			
Traffic Area	Asphalt Concrete	Base Course	Total
Black Mountain Road	5	9	14
Black Mountain Road	6	7	13

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ROW SURVEY

- Records indicate 150' ROW was purchased/deeded
- 1982 – 60' ROW Survey on second half of road
- No evidence that 60' ROW was dedicated/recorded, or that 150' was abandoned/vacated
- Plans based on existence of 150' ROW entire length

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ROW SURVEY

- Roadway existed in current location for many decades
- Survey found that roadway strays from record ROW in one location

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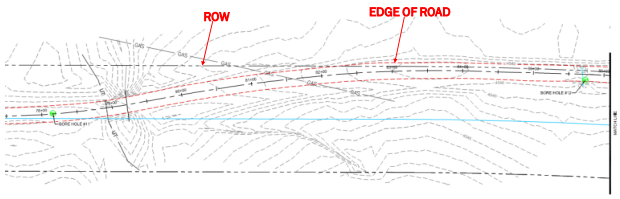

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GROUND SURVEY

- Record alignment does not overlay true road centerline in many instances

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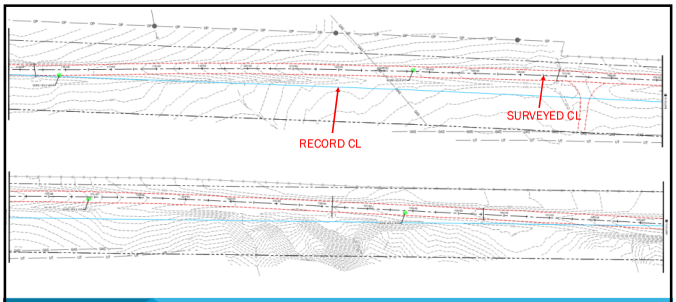

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DESIGN

- Establish Design Criteria
  - Dependent on funding type
- County Road Fund Manual
  - WYDOT developed for different types of County Road projects

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DESIGN

T·O ENGINEERS

DESIGN – ESTABLISH ALIGNMENT

- Evaluated existing geometry
- Horizontal Alignment
  - Keep roadway in existing alignment
  - Surveyed road centerline serves as basis for new alignment
- Avoid compound curves

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DESIGN – DESIGN SPEED

- CRFM specifies 65 mph max for paved, 55 mph max for unpaved
- Due to possible unpaved conditions, 55 mph was analyzed
- Existing geometry allows for 55 mph
- Some curves require reduced speeds for safety

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DESIGN – PAVEMENT DESIGN

- Used geotechnical recommendation as baseline
- Utilize existing suitable material to max extents possible
- Option for gravel equivalent section (no asphalt)
- 20 year analysis period

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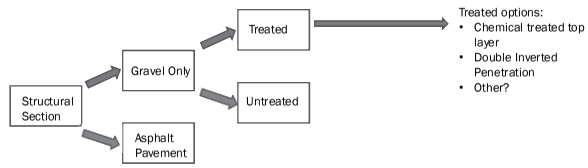
DESIGN – PAVEMENT DESIGN



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DESIGN – PAVEMENT DESIGN

Unreinforced

Asphalt Pavement			Gravel Section		
Asphalt (in)	Base (in)	Total (in)	Asphalt (in)	Base (in)	Total (in)
5	16	21	N/A	36	36

Reinforced

Asphalt Pavement			Gravel Section		
Asphalt (in)	Base (in)	Total (in)	Asphalt (in)	Base (in)	Total (in)
5	9	14	N/A	24	24

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DESIGN – SUBGRADE MEDIATION

- Scarify, moisture condition, recompact
- Proof rolling
- Repair soft spots
- Install separation fabric
  - Added strength
  - Separate poor subgrade from good material

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DESIGN – FINAL PROFILE

- Using borings, average asphalt thickness and base thickness combined is approx. 11”
- Establishes haul volume
- Construction
  - Reclaim/blend asphalt and base course
  - Minimize haul of this material to ~2000-3000 ft
  - Condition subgrade, install fabric

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ENVIRONMENTAL REVIEW

NEPA Categories	
Air Quality	Historical, Architectural, Archaeological, and Cultural Resources
Biological Resources	Natural Resources and Energy Supply
Climate	Socioeconomic Impacts
Coastal Resources	Visual Effects
Department of Transportation Act	Water Resources
Farmlands	Cumulative Impacts
Hazardous Materials, Pollution Prevention, and Solid Waste	

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BIOLOGICAL RESOURCES

- Impacts of proposed action on endangered or threatened species

Species	Scientific Name	Listing Status
Greater Sage-Grouse	Centrocercus Urophasianus	Candidate
Ute Ladies'-Tresses	Spiranthes Diluvialis	Threatened

- Improvements made within existing ROW should not have an impact on these species

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FARMLANDS

- Regulates conversion of farmlands to nonagricultural use
- Existing ROW does not include farmlands

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HAZARDOUS MATERIALS, SOLID WASTE, AND POLLUTION PREVENTION

- No hazardous materials anticipated
- Solid waste and pollution during construction managed using industry standards and best practices

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HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

- Coordination with National Register of Historic Places (NRHP)
- Wyoming State Historic Preservation Office (SHPO)
- Tribal Historic Preservation Office (THPO)

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WATER RESOURCES

- Wetlands
  - National Wetlands Inventory contains wetlands near the corridor, but none spanning corridor
- Floodplains
  - Currently unmapped by FEMA (Zone D Designation)
- Surface Waters
  - Study impacts of existing waters of the US
- Groundwater
- Wild and Scenic Rivers

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CUMULATIVE IMPACTS

- Examine past, present, and reasonably foreseeable future projects
- No significant cumulative impacts anticipated

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CRFM – ENVIRONMENTAL DOCUMENTATION

- Environmental Assessment and FONSI
  - Needed with impacts to environmental resources
  - Substantial adverse impact to protected resources/ROW acquisition with substantial relocations
- Categorical Exclusion (Type 3)
  - New or additional ROW, disturbance for cuts/fills
  - Work in adjacent streams/drainages

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CRFM – ENVIRONMENTAL DOCUMENTATION

- Categorical Exclusion (Type 3)
  - Must document:
    - Impacts to water quality and wetlands
    - Impacts to threatened or endangered species
    - Impacts to cultural resources

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CRFM – ENVIRONMENTAL DOCUMENTATION

- Categorical Exclusion (Type 2)
  - Within existing ROW, minimal ground disturbance, and not in proximity to a stream or drainage

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OUTREACH

- Letters sent to 70 agencies thought to have an interest in project corridor
- Invited to this informational meeting
- Requested preliminary comments

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ENVIRONMENTAL COMMENT

- Requesting comments, concerns, or requirements from agencies no later than May 17, 2019.
- Letters to:

  Wes Werbelow
  502 33rd Street
  Cody, WY 82414

- Copies of this presentation can be requested at wwerbelow@to-engineers.com

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THANK YOU!

- Questions:
  - Wes Werbelow, PE wwerbelow@to-engineers.com
  - Dusty Spomer, PE dspomer@to-engineers.com
  - 307-587-3411

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Appendix H
Geotechnical Investigation and Report

RIMROCK
ENGINEERING, INC.

5440 Holiday Avenue • Billings, MT 59101 • Phone 406.294.8400 • www.rimrock.biz

GEOTECHNICAL ENGINEERING REPORT
BLACK MOUNTAIN ROAD STUDY
BLACK MOUNTAIN ROAD
HOT SPRINGS COUNTY, WYOMING

November 20, 2018
Project No. G18106

Prepared for:

Hot Springs County Commissioners
415 Arapahoe Street
Thermopolis, Wyoming 82443

Prepared by:

Rimrock Engineering, Inc.
5440 Holiday Avenue
Billings, Montana 59102

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5440 Holiday Avenue • Billings, MT 59101 • Phone 406.294.8400 • www.rimrock.biz

November 20, 2018

Mr. Tom Ryan
Hot Springs County Commissioners
415 Arapahoe Street
Thermopolis, Wyoming 82443

Re: Geotechnical Engineering Report
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

Dear Mr. Ryan:

Rimrock Engineering, Inc. has completed the geotechnical engineering services for the referenced project. The attached report presents the results of our findings. Our work consisted of subsurface exploration, laboratory testing, engineering analyses, and preparation of this report.

We appreciate this opportunity to be of service to you and are prepared to provide construction materials testing services during the construction phase of the project. If you have any questions regarding this report or need additional information or services, please contact us.

Sincerely,
RIMROCK ENGINEERING, INC.

Professional Engineer (Civil)
MATTHEW GEERING
12761
Date 11/20/18
WYOMING

Matt Geering, P.E.
Principal/Vice President

Wade Reynolds
President/Office Manager

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APPENDICES

Appendix A Plan Sheets (Boring Locations), Logs, USCS Description, and Log Key
Appendix B Laboratory and Field Test Results

EXECUTIVE SUMMARY

Rimrock Engineering has completed the geotechnical engineering services for the Black Mountain Road project located on Black Mountain Road in Hot Springs County, Wyoming. A total of sixty-two (62) borings were drilled to approximate depths ranging from 5 to 6 feet below existing grades at the project site.

The following geotechnical conditions and considerations were identified:

- Based on materials encountered in our borings, underlying variable asphalt pavement sections, the subsurface profile generally consists of lean clay soils. Sandstone was encountered in Boring B-25 and sandy shale was encountered within Borings B-49 and B-53. Groundwater was not encountered.

- Medium to high plasticity lean clay subgrade soils were encountered throughout the road alignment. Clay soils are typically poor materials for supporting pavements. The clay soils, in their existing condition, are variably soft to stiff in consistency and expected to be relatively stable upon initial exposure. However, clay soils may become unstable with repetitive traffic and increased moisture. In our opinion, a combination of poor subgrade soils, inadequate and inconsistent pavement section, lack of drainage, and lack of continued maintenance are the primary causes for the current pavement failures and distress.

- We recommend remediation/improvement consist of complete pavement reconstruction. At a minimum, subgrade remediation in the form of scarification, moisture conditioning, and recompaction should create a stable base for pavement construction. The use of separation/stabilization geotextile is strongly recommended due to soft and weak subgrade soils. Geotextiles will help stabilize the select fill materials while prohibiting fines from migrating into the granular materials. Increasing the pavement sections along with positive drainage may significantly increase the life of pavement sections.

It should be noted that specific project details were not fully developed or included in this summary. The information provided in this executive summary should be used in conjunction with the entire report for design purposes.

GEOTECHNICAL ENGINEERING REPORT
BLACK MOUNTAIN ROAD STUDY
BLACK MOUNTAIN ROAD
HOT SPRINGS COUNTY, WYOMING

1.0 INTRODUCTION AND SCOPE

1.1 Project Description

The project consists of possible improvements to 8.65 miles of County Road 6, commonly known as Black Mountain Road within Hot Springs County, Wyoming. Black Mountain Road begins at reference mile marker 0.00 at the end of State Highway 172. Possible methods of improvement include rehabilitation, reconstruction, and/or reclamation. We understand the existing asphalt paved roadway is deteriorating, likely due to poor drainage and subgrade conditions along with heavy truck traffic use from oil distraction/distribution and bentonite mining operations. Based on PCS (Pavement Condition Survey) and PSR (Present Serviceability Rating) data, the roadway is condition is classified as poor. These conditions may be leading to an unsafe roadway.

Project average annual daily trips (AADT) were provided for yearn 2035 which consist of 49 cars and 44 trucks. We understand the total ESALs for a 20 year analysis period of 530,000 was calculated. Due to the amount of traffic observed, WYDOT classifies this roadway as a major rural collector.

1.2 Purpose and Scope of Work

The purpose of this study is to evaluate the feasibility of the proposed development with respect to the observed subsurface conditions and to provide information, opinions, and geotechnical engineering recommendations relative to:

- General soil and groundwater conditions
- Existing pavement section conditions
- Potential causes for pavement failure and distress
- Remediation alternative(s)
- Site and subgrade preparation
- Asphalt pavement thickness design
- Corrosivity of soils
- General construction considerations
- General earthwork and site drainage

Our scope of services consisted of site reconnaissance, field exploration, laboratory testing, engineering analyses, and preparation of this report.

2.0 METHODS OF INVESTIGATION

2.1 Field Exploration

The subsurface exploration consisted of drilling a total of sixty-two (62) borings from October 18 and 19, 2018 to approximate depths ranging from 5 to 6 feet below existing grades. The borings were drilled using our truck mounted drill rig equipped with solid flight augers. Half of the borings included coring of the asphalt using a diamond bit core barrel prior to conducting the soil boring. As requested, the core samples were provided to TO Engineers. Groundwater levels were measured during drilling operations. Upon completion of drilling and/or groundwater measurements, the borings were backfilled with drill cuttings, compacted with the equipment at hand, and patched with asphalt cold patch.

Logs of the borings along with Plan Sheets are included in Appendix A. The borings were located and marked in the field by TO Engineers. Plan Sheets and ground surface elevations were provided by TO Engineers. The locations and elevations of the borings should be considered accurate only to the degree implied by the means and methods used to define them.

Rimrock Engineering personnel logged the soil conditions encountered in the borings. At selected intervals, samples of the subsurface materials were taken by driving split-spoon samplers and collecting auger cuttings. Penetration resistance measurements were obtained by driving the samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the relative density or consistency of the materials encountered. The samples were tagged for identification, sealed to reduce moisture loss, and taken to our laboratory for further examination, testing, and classification.

2.2 Laboratory Testing

The purpose of the laboratory testing is to assess the physical and engineering properties of the soil samples collected in the field to be used in our geotechnical evaluations and analyses. Laboratory testing was performed on selected soil samples to assess the following:

- Visual classification (USCS)
- Moisture content
- Sieve analysis
- Moisture/density relationship
- Atterberg limits
- Consolidation/swell
- Sulfate, chloride, pH and resistivity
- California Bearing Ratio (CBR)

The soil descriptions presented on the boring logs are in accordance with our enclosed Unified Soil Classification System (USCS) and Log Key. Individual laboratory test results can be found in Appendix B at the end of this report.

3.0 SITE & SUBSURFACE CONDITIONS

3.1 Site Conditions

The project site consists of the existing Black Mountain Road in Hot Springs County and starts about 14 miles northeast of Thermopolis, Wyoming. Black Mountain Road is paved with asphalt for the entire 8.65-mile project alignment. The existing pavement section is variable in condition and total section thickness throughout the entire alignment. Both the asphalt and base course thicknesses vary throughout. Several of the asphalt cores show significant deterioration and evidence of various overlays and other pavement constructions. The base course consists mainly of silty sand soils.

Distress was observed along the most of the road alignment. Distresses observed includes fatigue cracking, edge cracking, longitudinal and traverse cracking, rutting, patches, and pot holes. Distress generally ranges from moderate to high throughout the alignment.

3.2 Subsurface Soil Conditions

Based on materials encountered in our borings, underlying a variable asphalt pavement section, the subsurface profile generally consists of soft to stiff lean clay soils. Sandstone was encountered in Boring B-25 and sandy shale was encountered within Borings B-49 and B-53.

The near surface clay soils had Standard Penetration Test (SPT) N-values in the range of 3 to 21 blows per foot (bpf) with values usually less than 10 which indicates the soils to be variably soft to stiff in consistency, moderately to highly compressible, and have low shear strength characteristics. The sedimentary bedrock is generally medium hard to hard. For a more detailed description of the subsurface conditions, please refer to the logs provided in Appendix A.

3.3 Groundwater Conditions

The borings were observed while drilling and after completion for the presence and level of groundwater. Groundwater was not encountered within the depths explored while drilling or for the short duration the borings were allowed to remain open. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations. Groundwater can be expected to fluctuate with varying seasonal and weather conditions. Evaluation of the factors that affect groundwater fluctuations is beyond the scope of this report.

3.4 Laboratory Test Results

The near surface lean clay soils encountered in the borings were generally of medium to high plasticity and had the following Liquid Limit, Plastic Limit, and Plasticity Index values:

Location	Depth (ft)	Material	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
B-3	4.5	CL	32	15	17
B-9	4.5	CL	34	17	17
B-16	3..5	CL	38	19	19
B-24	1.0	CL	29	17	12
B-33	4.5	CL	36	16	20
B-42	4.5	CL	31	15	16
B-49	3.0	CL	27	15	12
B-55	3.5	CL	49	27	22
B-62	4.5	CL	38	17	21

The subsurface soils were tested for grain size distribution (sieve analysis). The results for the coarse grained soils are summarized below:

Location	Depth (ft)	Material	%Gravel (%)	% Sand (%)	% Clay/Silt (%)
B-1	0.5	SM	20.6	51.9	27.5

Sample of the lean clay soils was remolded and tested for consolidation/swell potential. The samples were allowed to consolidate under a confining pressure of 1,000 pounds per square foot (psf). Once consolidation under the surcharge load was complete, the samples were inundated with water and allowed to swell/collapse. After movement from the addition of water ceased, incremental loads were then applied to further consolidate the samples.

Consolidation/swell test results indicate that the lean clay soils exhibit moderate to high compressibility and slight collapse potential with increase moisture (See Consolidation Tests in Appendix B). Results are summarized below:

Location	Depth (ft)	Material	Dry Unit Weight (pcf)	Collapse Potential (%)	Strain at 2,000 psf (%)
B-14	4.5	CL	107.2	0.8	4.0
B-32	4.5	CL	101.6	-	4.6

Representative samples of the lean clay soils were collected for Moisture-Density Relationship (Standard M/D) and California Bearing Ratio (CBR) testing. The results are summarized in the following table:

Location	Depth (ft)	Material	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR (%)
B-4/6/10/14	2-5	CL	110.1	16.8	4.4
B-16/17/19/20	2-5	CL	111.0	14.0	2.1

Location	Depth (ft)	Material	Maximum Dry Density (pcf)	Optimum Moisture Content (%)	CBR (%)
B-22/26/30	2-5	CL	107.3	15.6	1.3
B-32/34/36/38	2-5	CL	108.5	16.0	4.9
B-44 to B-49	2-5	CL	113.7	13.7	6.3
B-57 to B-62	2-5	CL	104.8	17.3	3.1

3.5 Dynamic Cone Penetrometer (DCP) Results

DCP testing was performed at locations selected by Rimrock Engineering using our KSE DCP. Results are summarized below:

Test	Location	Depth (ft)	Correlated Average CBR	Minimum CBR
DCP Test 1	B-2	1.5-4	2.1	0.8
DCP Test 2	B-14	1.5-4	1.4	0.9
DCP Test 3	B-30	1.5-4	3.2	2.0
DCP Test 4	B-38	1.5-4	9.4	2.1
DCP Test 5	B-50	1.5-4	3.7	2.0
Average			**4.0**	**1.6**

4.0 RECOMMENDATIONS

4.1 Geotechnical Concerns/Considerations

Medium to high plasticity lean clay subgrade soils were encountered throughout the road alignment. Clay soils are typically poor materials for supporting pavements. The clay soils, in their existing condition, are variably soft to stiff in consistency and expected to be relatively stable upon initial exposure. However, clay soils may become unstable with repetitive traffic and increased moisture. In our opinion, a combination of poor subgrade soils, inadequate and inconsistent pavement section, lack of drainage, and lack of continued maintenance are the primary causes for the current pavement failures and distress.

Due to these concerns and conditions, we recommend remediation/improvement consist of complete pavement reconstruction. At a minimum, subgrade remediation in the form of scarification, moisture conditioning, and recompaction should create a stable base for pavement construction. The use of separation/stabilization geotextile is strongly recommended due to soft and weak subgrade soils, especially with CBR values less than 3. Geotextiles will help stabilize the select fill materials while prohibiting fines from migrating into the granular materials. Increasing the pavement sections along with positive drainage and continual maintenance should significantly increase the life of pavement sections.

4.2 Earthwork

The following sections present recommendations for site and subgrade preparation and placement of fill materials on the project. Earthwork on the project should be observed and tested by Rimrock Engineering.

4.2.1 Site and Subgrade Preparation

Existing pavement sections, existing utilities (if encountered), man-made debris, and other unsuitable materials should be removed from proposed pavement sections and areas to receive fill materials. It is anticipated that excavations for the proposed construction can be accomplished with conventional earthmoving equipment.

Based on the subsurface conditions encountered by the geotechnical exploration, subgrade soils along the alignment are anticipated to be relatively to marginally stable. The stability of the subgrade soils will likely be affected by precipitation, repetitive construction traffic or other factors. If unstable conditions develop, workability may be improved by scarifying and drying, or by over-excavation of wet zones and stabilization with a geotextile (such as Mirafi RS580i or approved alternative) and select granular material as recommended, and under the observation of the geotechnical engineer. Geotechnical observation during replacement operations should be conducted to determine the final depth of replacement along with the need for additional reinforcing.

Subgrade soils beneath pavements and areas to receive fill should be scarified to a depth of at least 8 inches, moisture conditioned and compacted in accordance with Section 4.2.3. The moisture content and compaction of subgrade soils should be maintained until pavement construction. The prepared subgrade for pavement support should be proof-rolled by a standard, tandem axle dump truck loaded to its capacity. The proof-rolling should be observed by our geotechnical engineer to identify areas of soft subgrade. Any areas that become unstable or “pump” under the loaded dump truck should be excavated to a depth to be determined by the geotechnical engineer and replaced with a dense graded gravel/sand mixture to stabilize the subgrade. Additionally, a geogrid or geotextile separation fabric may be required to stabilize soft subgrade soils. Once the subgrade has been proof-rolled and approved by the geotechnical engineer, pavement sections may be placed.

4.2.2 Material Requirements

It is anticipated that excavated materials will be used to the extent practical as pavement subgrade fill. The material suitability should be evaluated by the geotechnical engineer prior to use. Moisture conditioning and processing of on-site soils will likely be required.

Aggregate base course should consist of a blend of sand and gravel which meets Wyoming DOT specifications for quality and gradation.

4.2.3 Compaction Requirements

Fill materials should be placed and compacted in loose lift thicknesses of 8 inches or less when heavy, self-propelled compaction equipment is used. When hand-guided equipment such as jumping jack or plate compactor is used, loose lift thicknesses should be on the order of 4 to 6 inches.

The following table lists the compaction requirements for the different types of fill recommended in this report.

Item	Description
Compaction Requirement (ASTM D698)	**Aggregate Base (beneath pavements):** 95% **Scarified Subgrade Soils:** 95%
Moisture Content (ASTM D698)	±3 % of optimum

The Contractor shall provide and use sufficient equipment of a type and weight suitable for the conditions encountered in the field. The equipment shall be capable of obtaining the required compaction in all areas, including those that are inaccessible to ordinary rolling equipment.

4.2.4 Surface Grading and Drainage

Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Water permitted to pond can result in unexpected soil movements. Infiltration of water into excavations must be prevented during construction.

4.2.5 Construction Considerations

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light, rubber-tracked construction equipment would aid in reducing subgrade disturbance. Should unstable subgrade conditions develop, our geotechnical engineer should review conditions and provide recommendations for stabilization.

The site should be graded to prevent ponding of surface water on, or direction of runoff toward, the prepared subgrades or excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed.

As a minimum, all temporary excavations should be sloped or braced as required by Occupational Health and Safety Administration (OSHA) regulations to provide stability and safe working conditions. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the

excavations, as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

Rimrock Engineering should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during compaction of backfill and final preparation for construction of pavements.

4.3 Corrosion Protection

A soil sample was submitted for water soluble sulfate, pH and electrical resistivity testing. The results are summarized in the following table:

Location	Depth (ft)	Material	Chloride Content (mg/kg)	Soluble Sulfate Content (%)	Resistivity (ohm-cm)	pH
B-6	4.5	CL	63	0.94	80	8.7
B-23	3.5	CL	120	0.93	69	8.3
B-39	4.5	CL	132	0.38	156	8.0
B-57	3.0	CL	2	0.39	307	7.8

Water soluble sulfate values in the range of 0.20 to 2.00 are considered to have a severe soluble sulfate reaction with normal strength concrete. As a result, Type V Portland cement with a maximum water-cementitious materials ratio of 0.45 with a minimum compressive strength of 4,500 psi should be specified for all project concrete placed on and below grade.

Resistivity values less than 1,000 are considered to be very strongly aggressive with regard to corrosion of buried metals. If corrosion of buried metal is critical, it should be protected using a non-corrosive backfill, wrapping, coating, sacrificial anodes, or a combination of these methods, as designed by a qualified corrosion engineer.

4.4 Pavements

Pavement section alternatives for this project were designed based on the procedures outlined in the 1993 Guideline for Design of Pavement Structures by the American Association of State Highway and Transportation Officials (AASHTO). Input variables used in the calculations are presented in the following table:

Parameter	Value	Parameter	Value
CBR Value	1.3	Reliability (%)	85
Subgrade Drainage Coefficient	0.9	Standard Deviation	0.45
Initial Serviceability Index	4.2	Terminal Serviceability Index	2.0

It is anticipated that pavement subgrade soils will consist of clay materials which are typically considered poor materials for pavement support. Please note that this CBR value and the pavement section alternatives provided assume that the site soils will be re-compacted and left in-place within the pavement areas. If this is not the case, Rimrock Engineering should be notified to provide additional pavement design recommendations based on the subgrade soils which will be present below the pavement sections.

The following equivalent 18-kip single axle load (ESAL) values, over a 20-year design period, were used in the pavement thickness design. Please notify us if any of the parameters used in the pavement design do not adequately define the anticipated conditions.

Traffic Area	Assumed 20 yr. ESAL
Black Mountain Road	530,000

The following tables present the pavement section alternatives based on the above parameters.

UNREINFORCED PAVEMENT SECTIONS (Inches)			
Traffic Area	**Asphalt Concrete**	**Base Course**	**Total**
Black Mountain Road	5	16	21
Black Mountain Road	6	13	19

Due to the low CBR value of the near surface clay soils, a separation/stabilization geotextile should be considered and is recommended for pavement section construction across the site. We recommend the use of Mirafi RS580i beneath pavement sections. In our experience, this geotextile has proved to be reliable and performs exceptionally. The use of geotextiles helps to reduce the amount of base course as well. The calculated reinforced sections are provided below.

REINFORCED PAVEMENT SECTIONS (RS580i)			
Traffic Area	**Asphalt Concrete**	**Base Course**	**Total**
Black Mountain Road	5	9	14
Black Mountain Road	6	7	13

As described above, subgrade strength is somewhat variable across the project, which is also evident in the field. Based on this data and our analysis using TenCate MiraSpec Road Design Software, with a CBR value of 1.3 and when unstable conditions are encountered, a minimum of 10 inches of geotextile-reinforced (RS580i) structural fill may be required in order to stabilize the subgrade prior to road section construction.

Asphalt concrete should be composed of a mixture of aggregate, filler and additives (if required), and approved bituminous material. The asphalt concrete should conform to approved mix

designs which include volumetrics, Marshall properties, optimum asphalt cement content, job mix formula, and recommended mixing and placing temperatures. The asphalt concrete should be consistent with an approved mix design conforming to local standards. Mix designs should be submitted prior to construction to verify their adequacy. Aggregate used in the asphalt should meet Wyoming DOT specifications for quality and gradation.

Asphalt material should be placed in maximum 3-inch lifts (compacted thickness) and should be compacted to the minimum standards as outlined in Wyoming DOT specifications. Aggregate base course should consist of a blend of sand and gravel which meets Wyoming DOT specifications for quality and gradation.

Each pavement alternative should be evaluated with respect to current material availability and economic conditions. The pavement sections presented herein are based on design parameters selected by Rimrock Engineering based on experience with similar projects and soil conditions. Design parameters may vary with the specific project and material source. Variation of these parameters may change the thickness of the pavement sections presented. Rimrock Engineering is prepared to discuss the details of these parameters and their effects on pavement design and reevaluate pavement design as appropriate.

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section.

The pavement sections provided in this report represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g. crack and joint sealing and patching) and global maintenance (e.g. surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance program, additional engineering input is recommended to determine the type and extent of preventive maintenance appropriate. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

5.0 ADDITIONAL SERVICES

5.1 Project Bid Documents

It has been our experience during the bidding process, that contractors often contact us to discuss the geotechnical aspects of the project. Informal contacts between Rimrock Engineering and an individual contractor could result in incorrect or incomplete information being provided to the

contractor. Therefore, we recommend a pre-bid meeting be held to answer any questions about the report prior to submittal of bids. If this is not possible, questions or clarifications regarding this report should be directed to the project Owner or his designated representative. After consultation with Rimrock Engineering, the project Owner (or his representative) should provide clarifications or additional information to all contractors bidding the job.

5.2 Construction Observation/Testing and Plan Review

The recommendations made in this report are based on the assumption that an adequate program of tests and observations will be made during construction to verify compliance with these recommendations. These tests and observations should include, but not necessarily be limited to, the following:

- Observations and testing during site preparation and earthwork
- Observation and testing of construction materials

We also recommend that project plans and specifications be reviewed by Rimrock Engineering to verify compatibility with our findings and recommendations. Additional information concerning the scope and cost of these services can be obtained from our office.

The review of plans and specifications and the field observation and testing by Rimrock Engineering are an integral part of the conclusions and recommendations made in this report. If we are not retained for these services, the Client agrees to assume Rimrock Engineering's responsibility for any potential claims that may arise during construction.

6.0 LIMITATIONS

Recommendations contained in this report are based on our field explorations, laboratory tests, and our understanding of the proposed construction. The study was performed using a mutually agreed upon scope of work. It is our opinion that this study was a cost-effective method to evaluate the subject site and evaluate some of the potential geotechnical concerns. More detailed, focused, and/or thorough investigations can be conducted. Further studies will tend to increase the level of assurance; however, such efforts will result in increased costs. If the Client wishes to reduce the uncertainties beyond the level associated with this study, Rimrock Engineering should be contacted for additional consultation.

The soils data used in the preparation of this report were obtained from borings made for this investigation. It is possible that variations in soils exist between the points explored. The nature and extent of soil variations may not be evident until construction occurs. If any soil conditions are encountered at this site which is different from those described in this report, our firm should be immediately notified so that we may make any necessary revisions to our recommendations. In addition, if the scope of the proposed project changes, our firm should be notified. This report has been prepared for design purposes for specific application to this project in accordance with the

generally accepted standards of practice at the time the report was written. No warranty, express or implied, is made.

Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the authors of this report, are only mentioned in the given standard; they are not incorporated into it or “included by reference,” as that latter term is used relative to contracts or other matters of law.

This report may be used only by the Client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on- and off-site), or other factors including advances in man’s understanding of applied science may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 36 months from its issue. Rimrock Engineering should be notified if the project is delayed by more than 24 months from the date of this report so that a review of site conditions can be made, and recommendations revised if appropriate.

It is the Client’s responsibility to see that all parties to the project including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the Contractor’s option and risk. Any party other than the Client who wishes to use this report shall notify Rimrock Engineering of such intended use. Based on the intended use of the report, Rimrock Engineering may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the Client or anyone else will release Rimrock Engineering from any liability resulting from the use of this report by any unauthorized party.

APPENDIX A

Field Exploration

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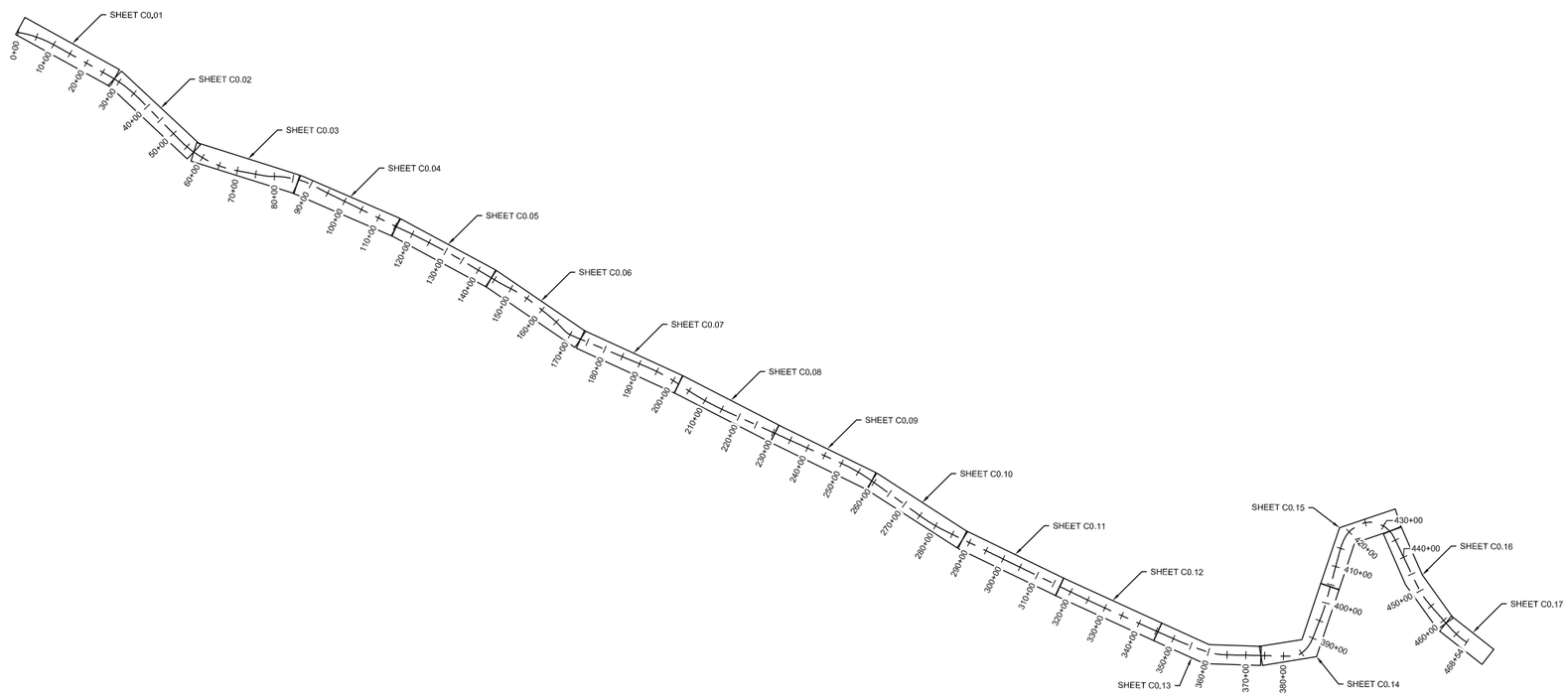

LEGEND

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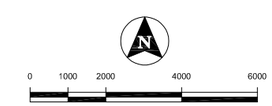
	BMR CL FROM SURVEY
	BMR RIGHT OF WAY
	EXISTING EDGE OF PAVEMENT
BH	BORE HOLE



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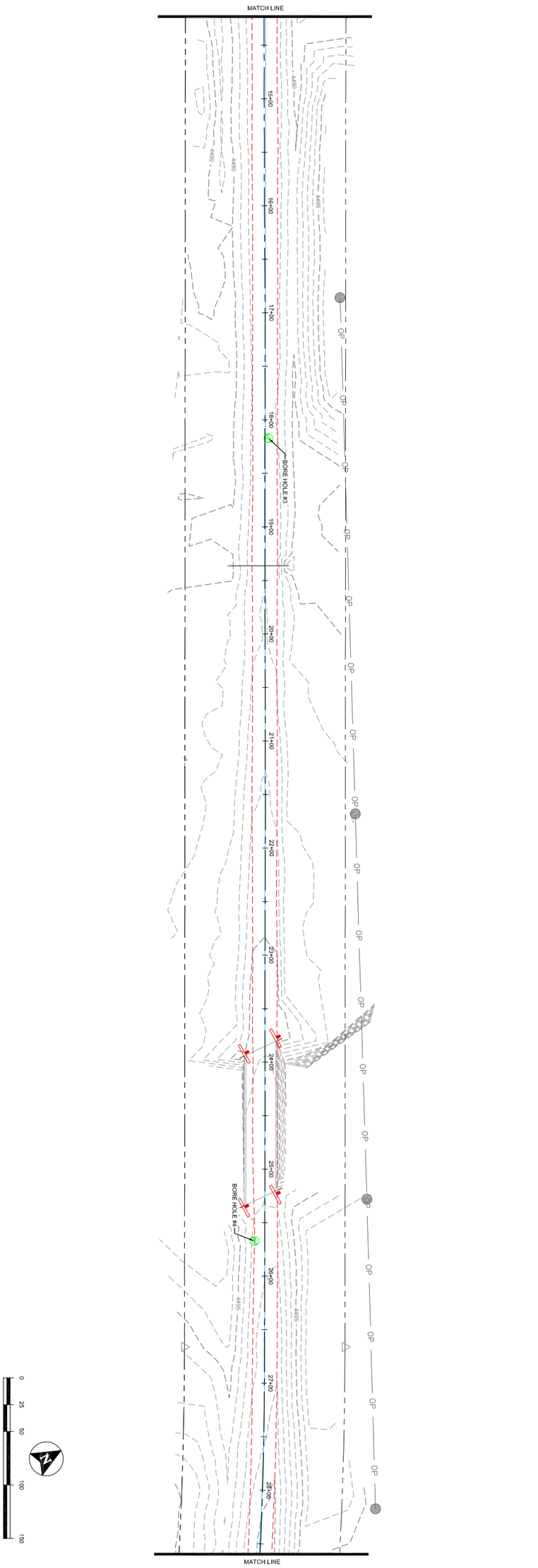

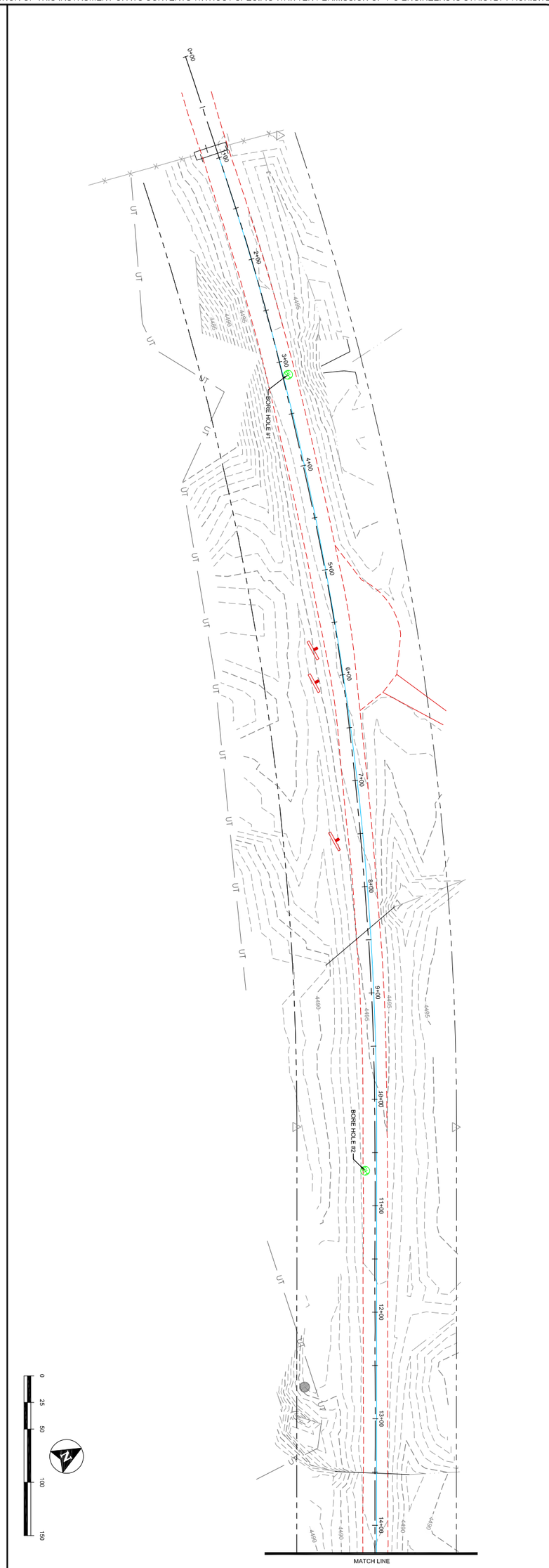

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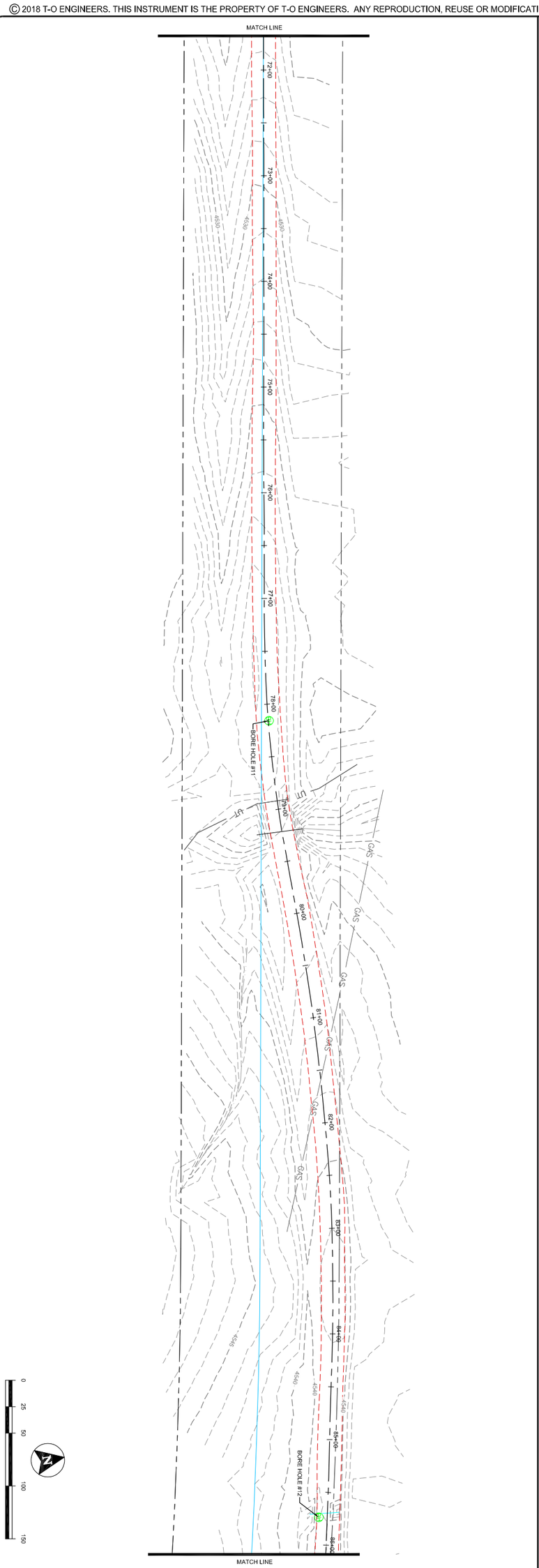

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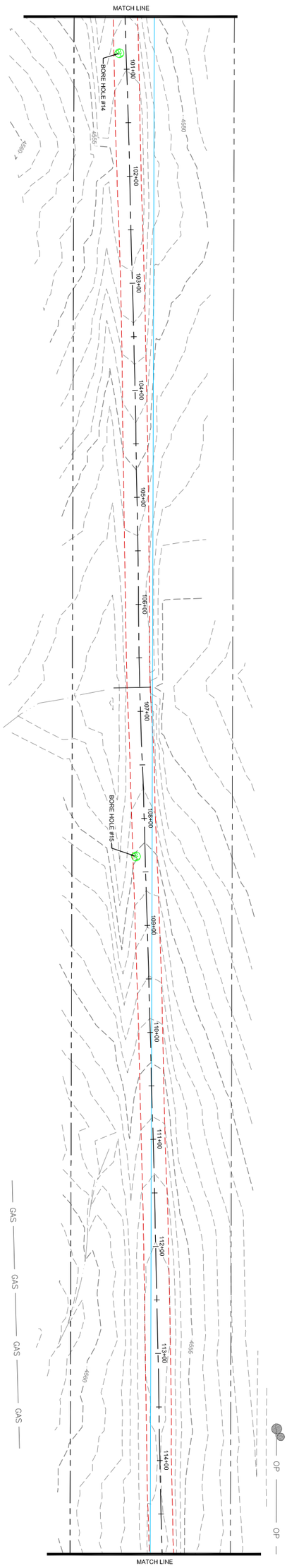

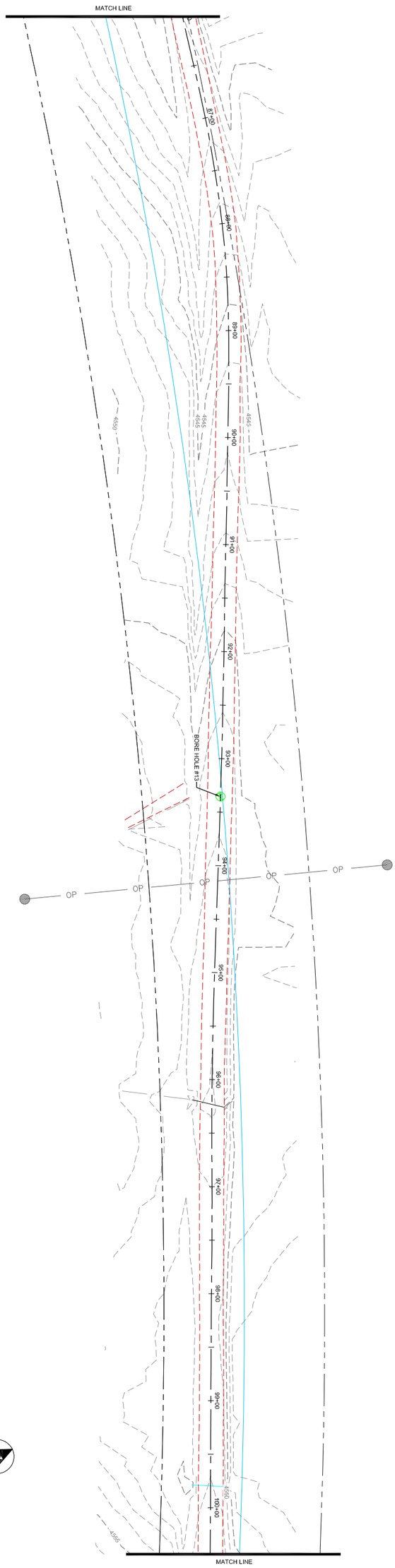

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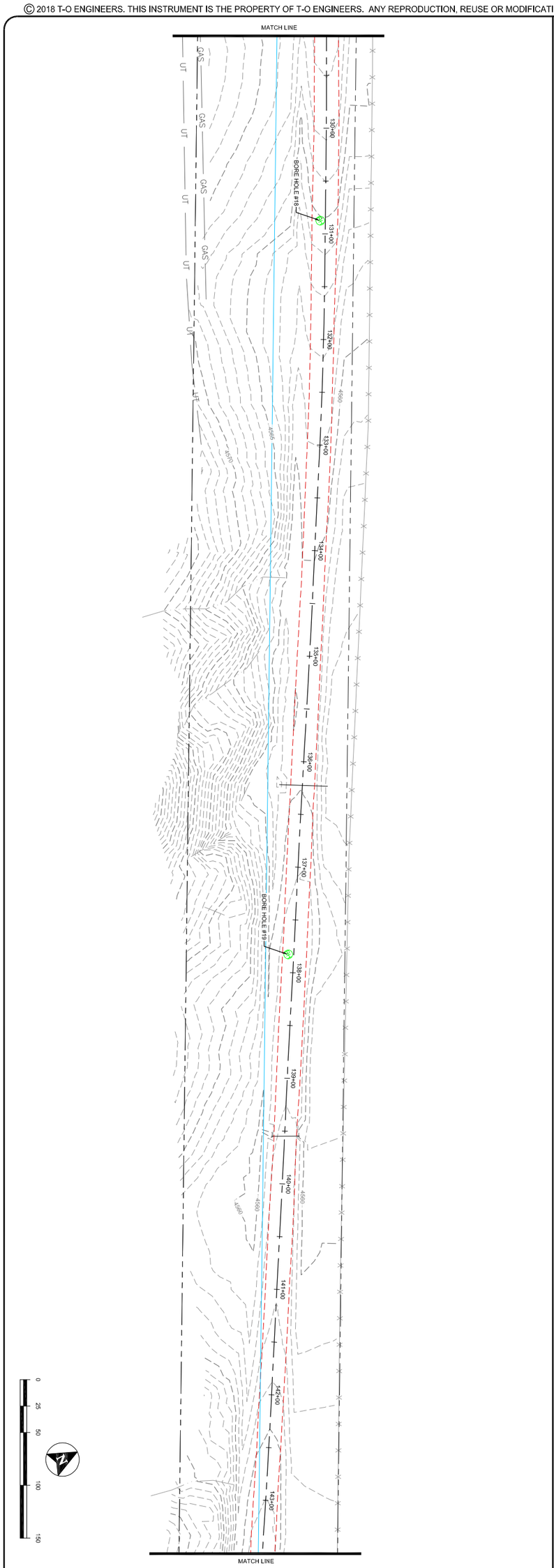

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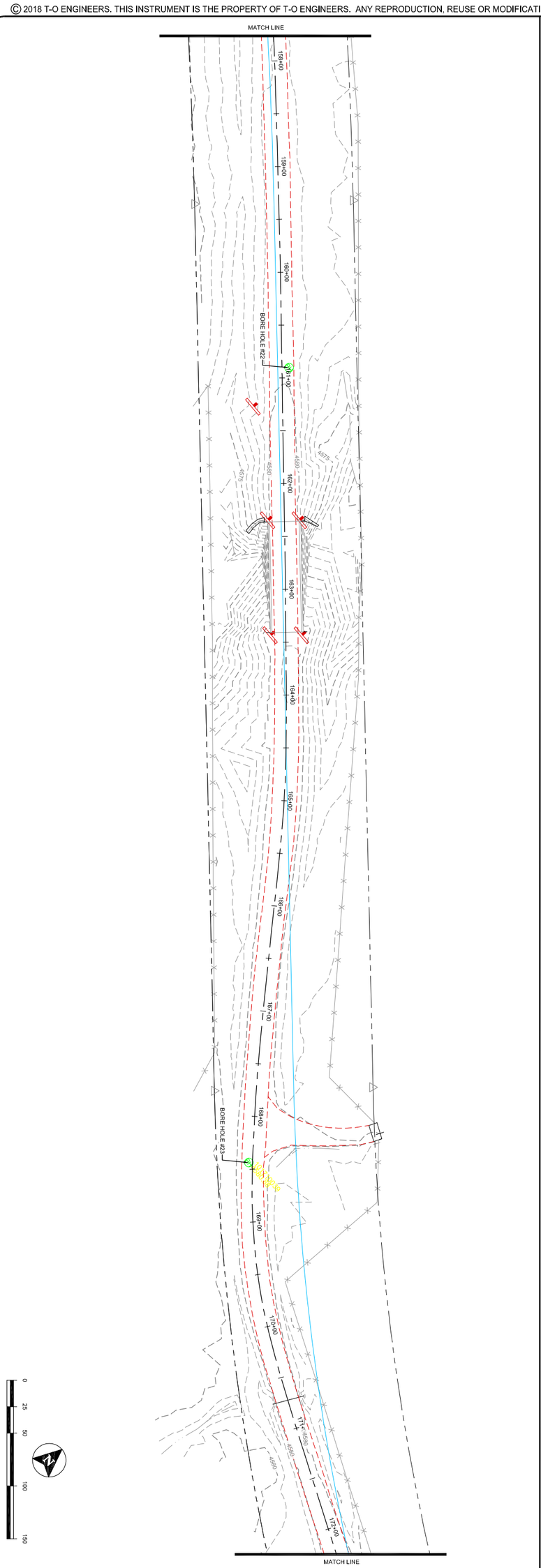

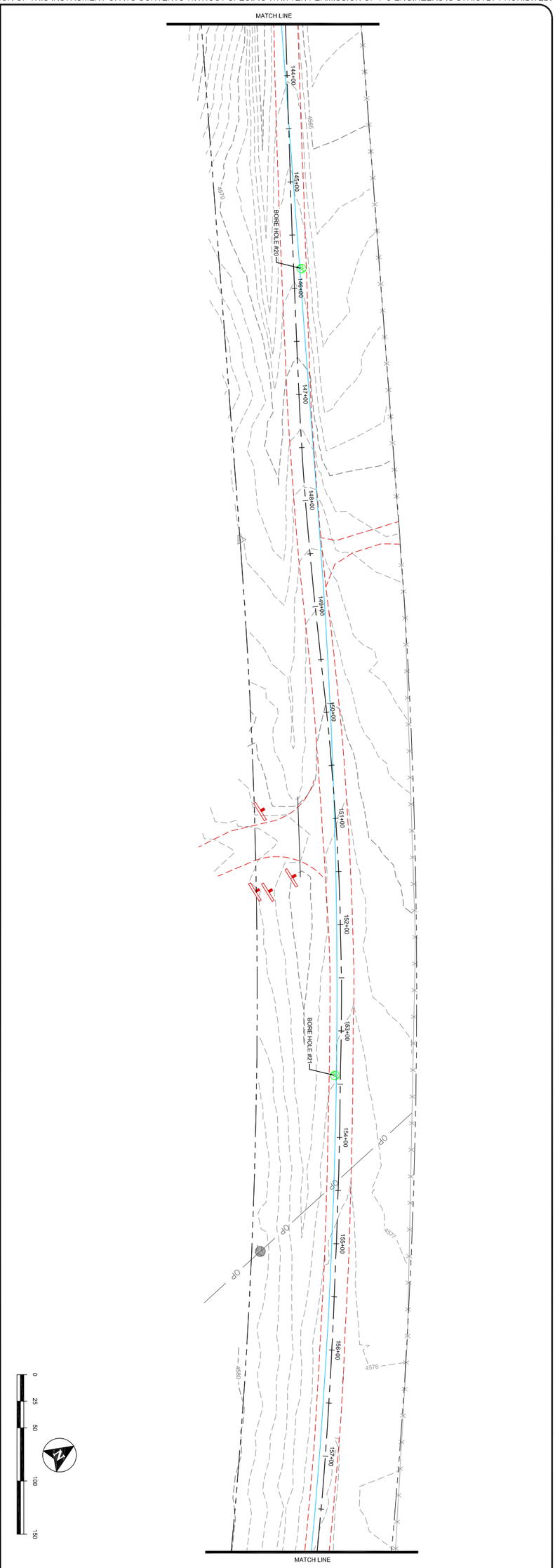

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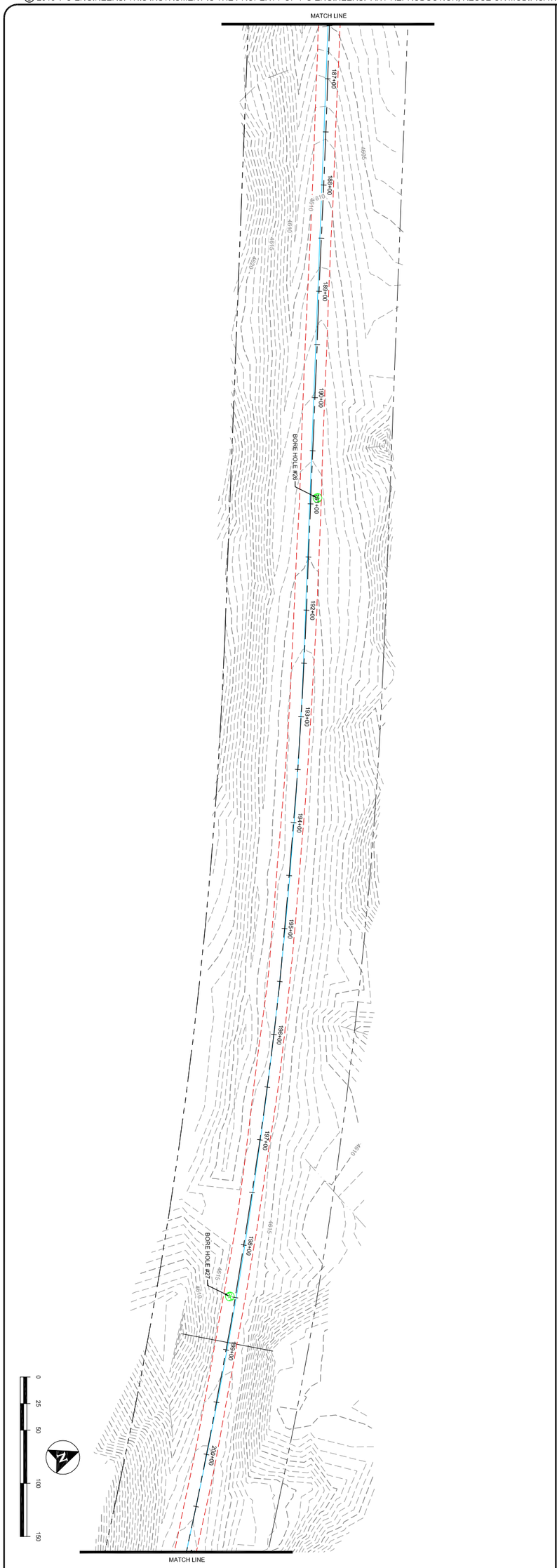

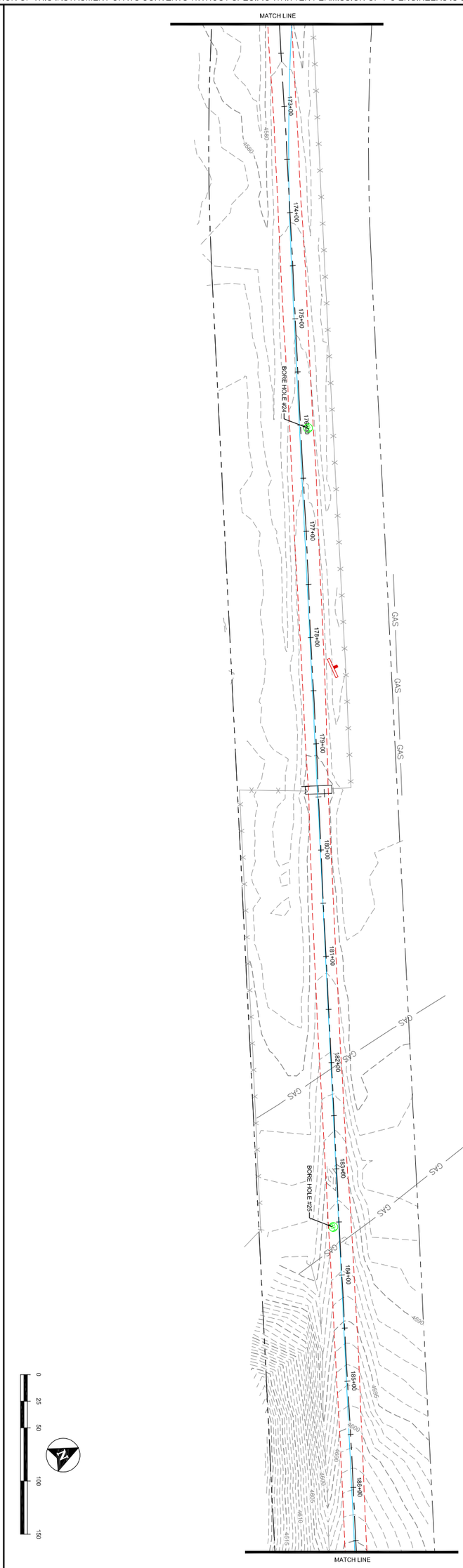

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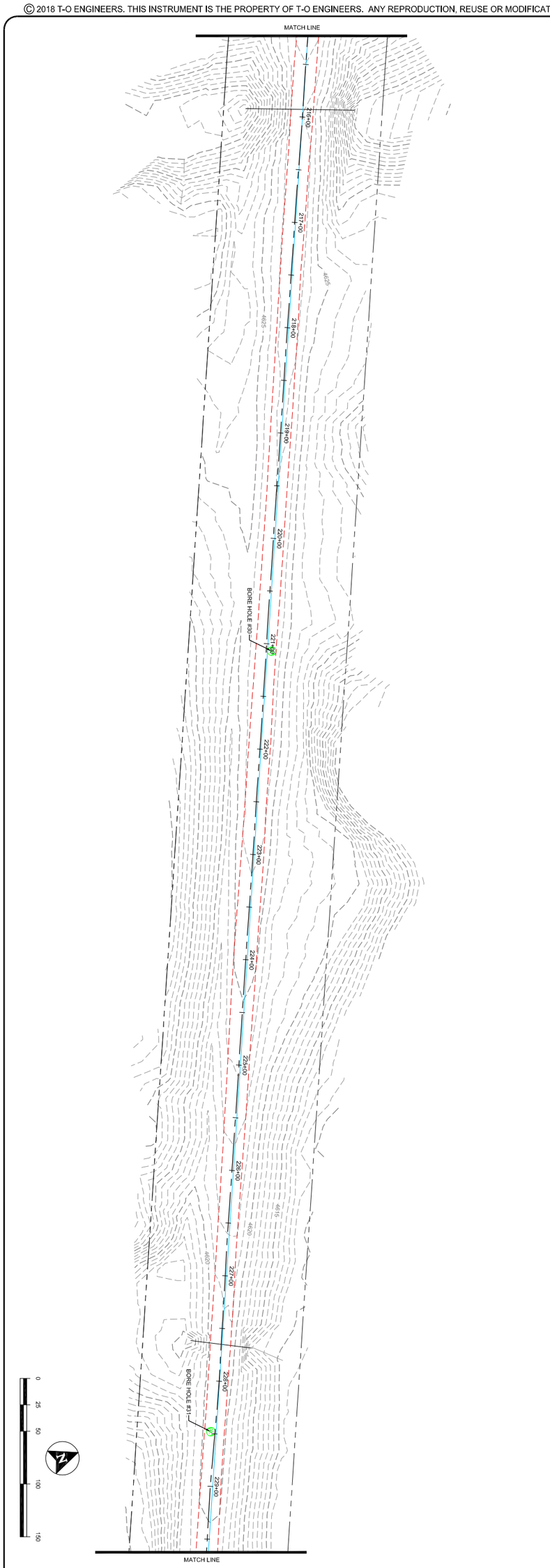

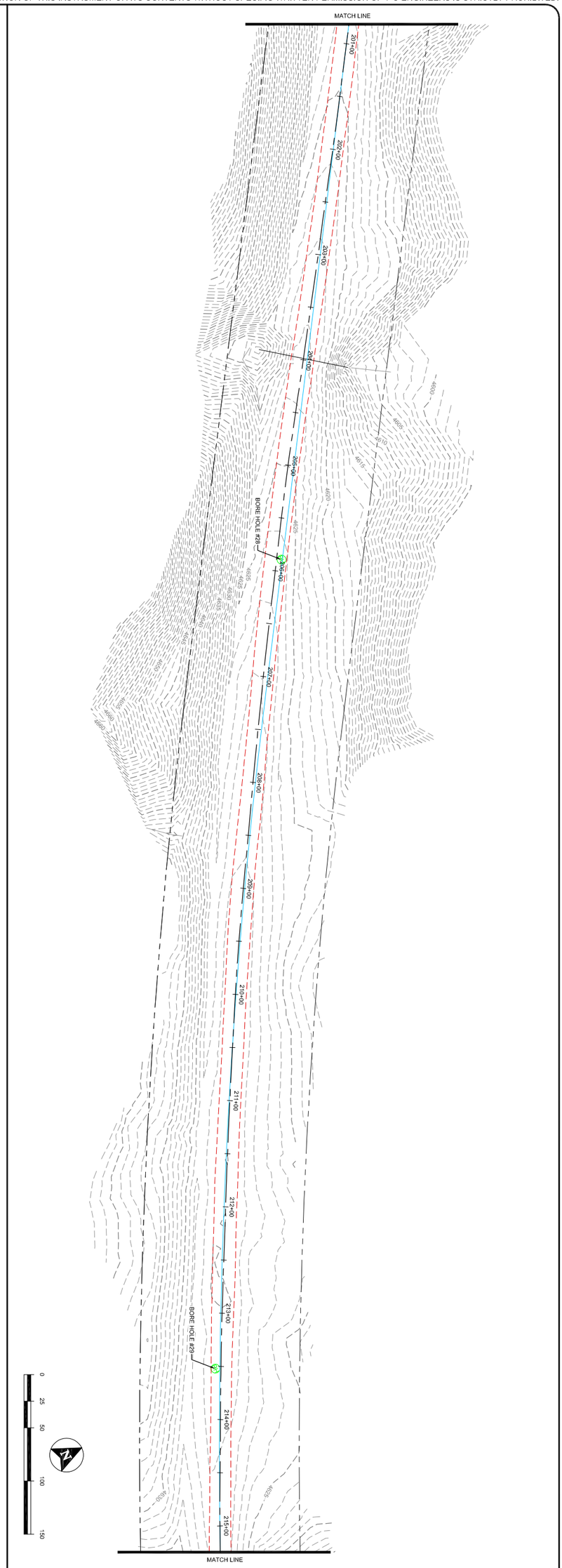

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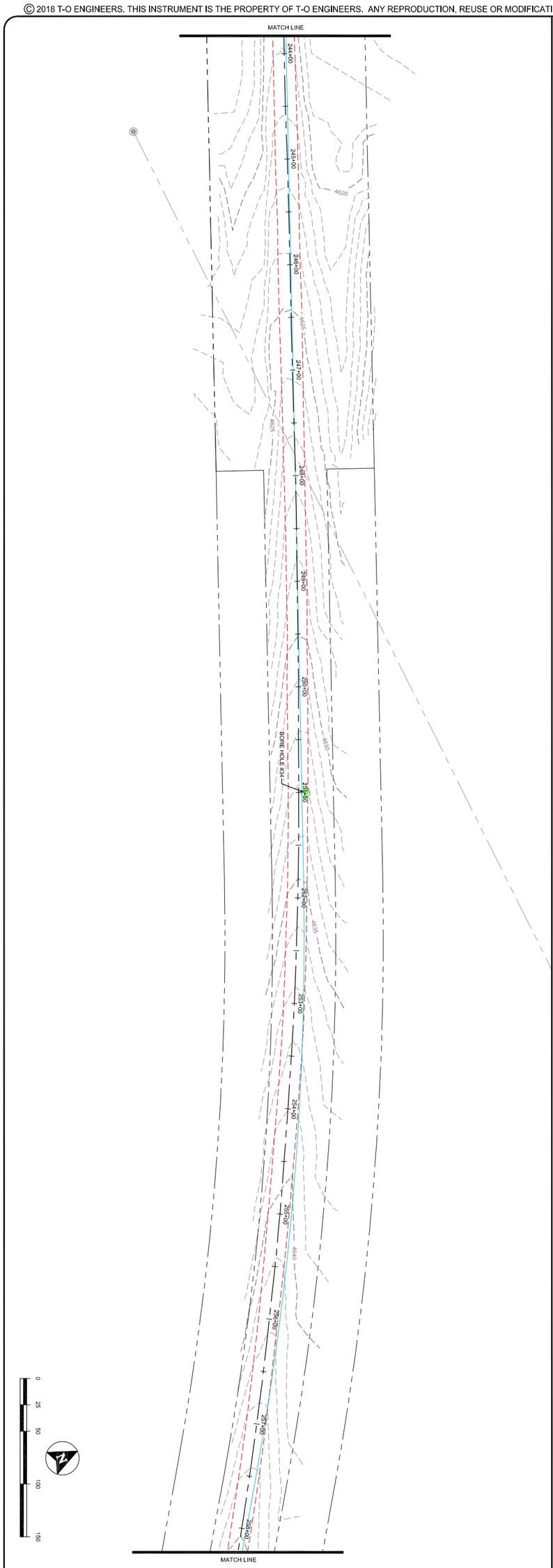

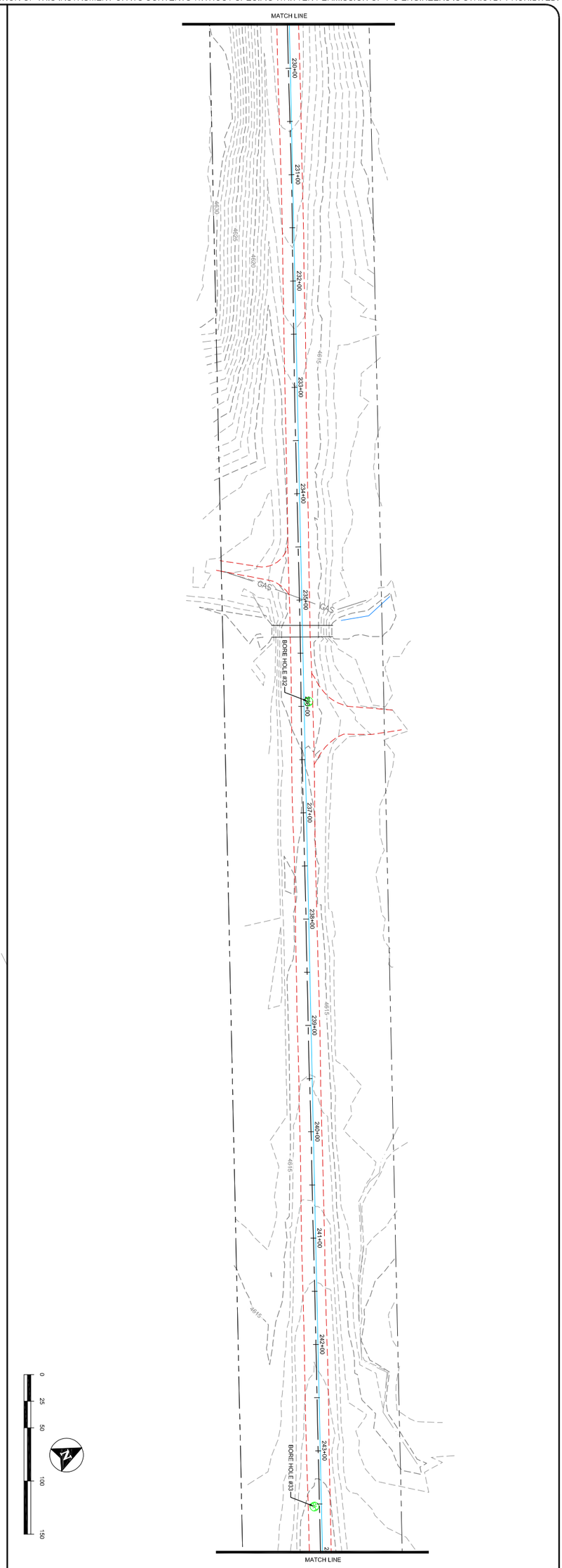

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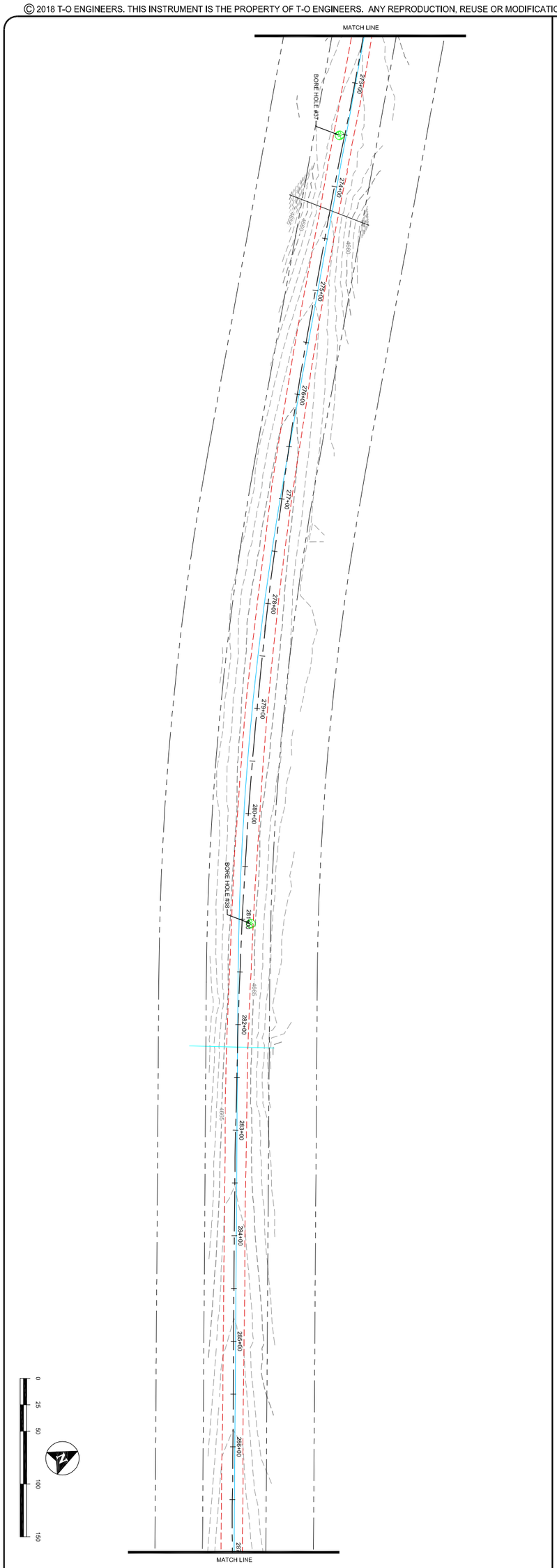

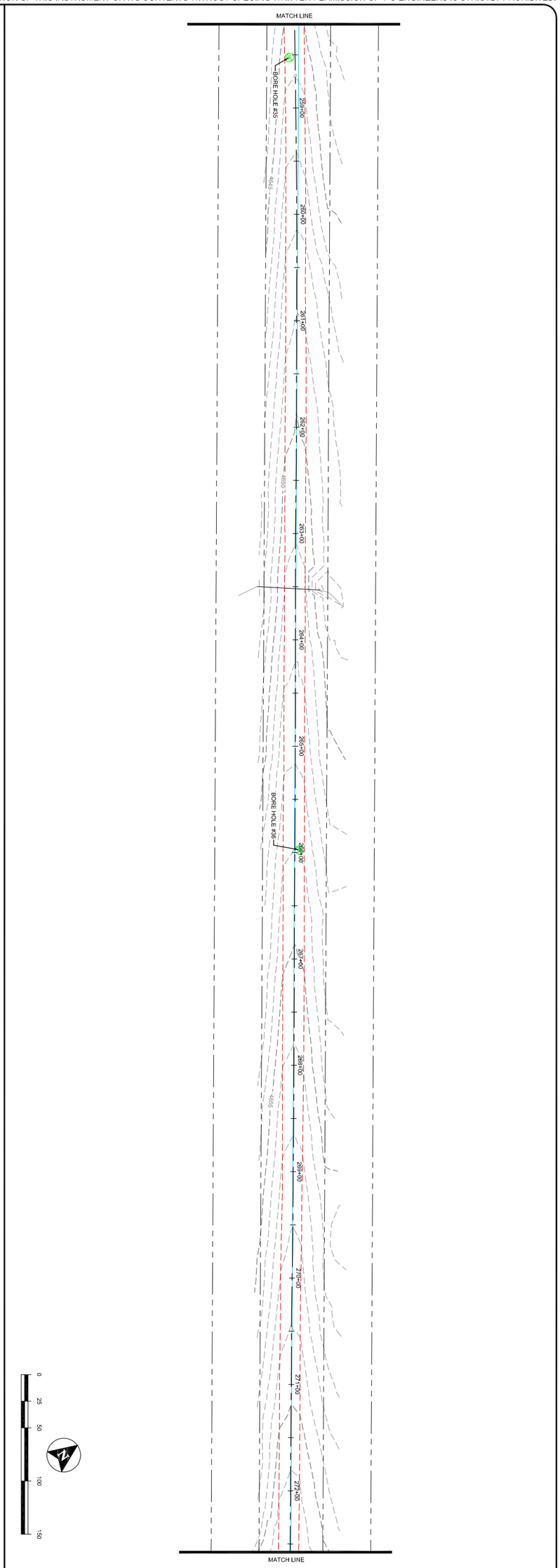

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SHEET: C0.10

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REVISIONS		
NO.	DESCRIPTION	DATE

BORDER SIZE	22"x34"
DESIGNED	DDS
DRAWN	TJI
CHECKED	DDS
APPROVED	DDS

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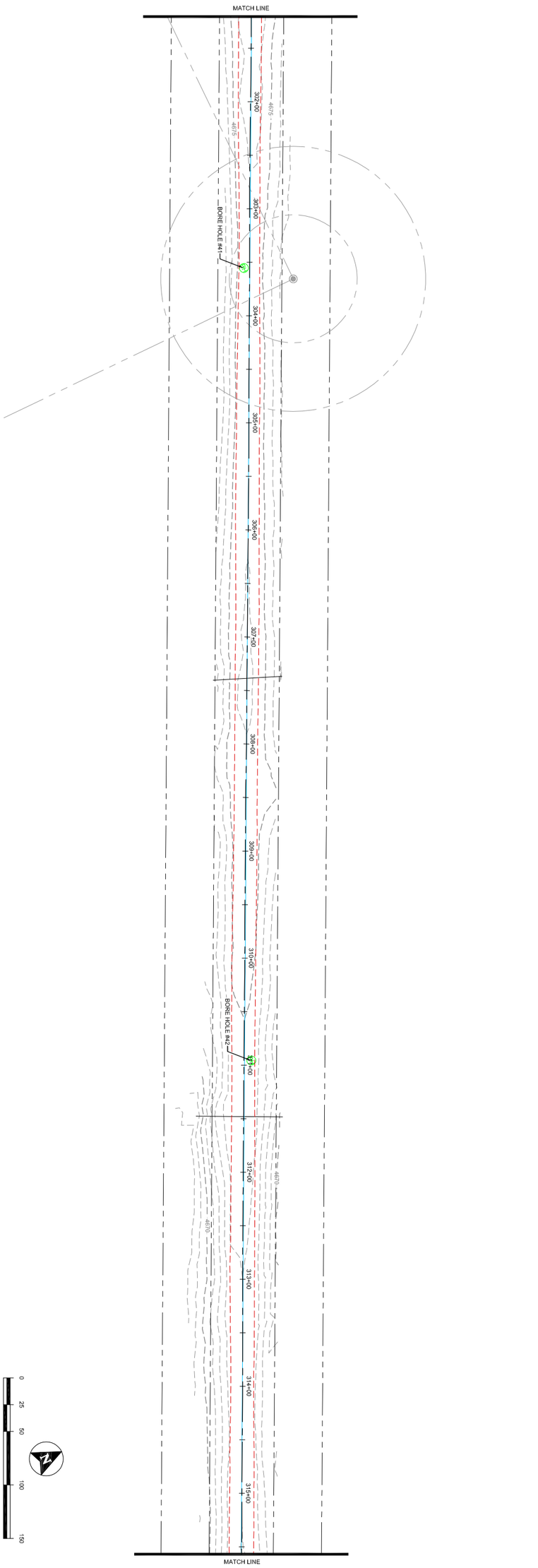

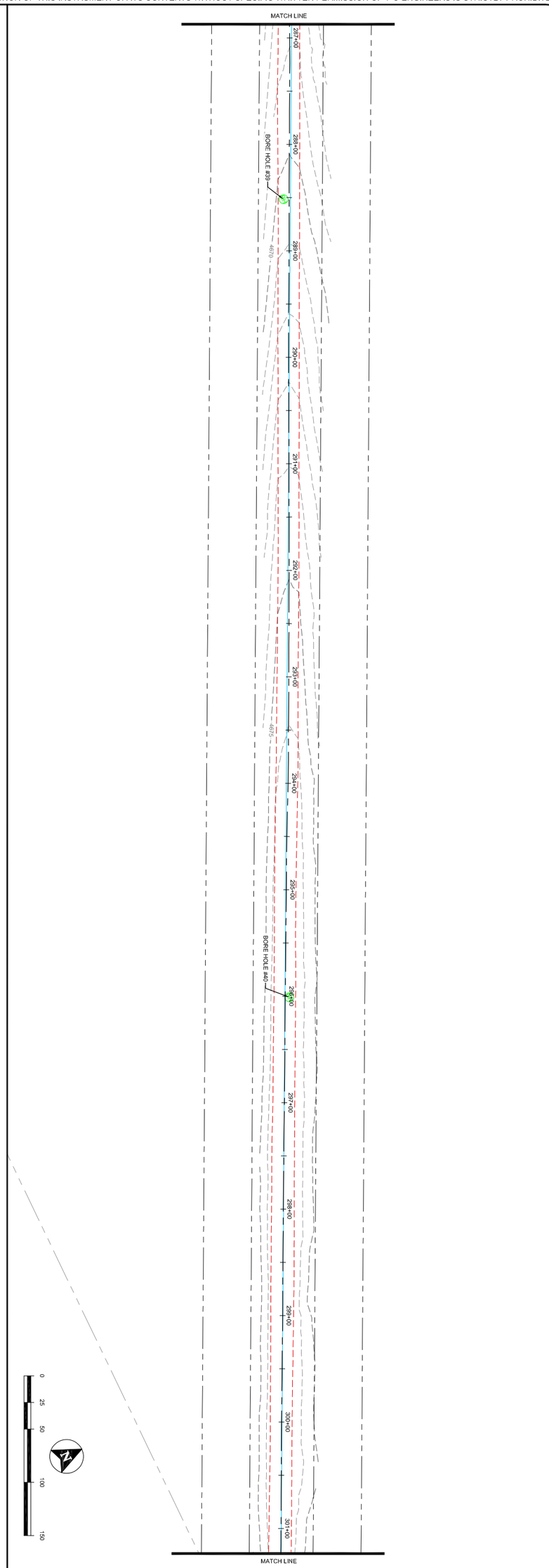

ATTENTION:
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SHEET: C0.11

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REVISIONS			BORDER SIZE
NO.	DESCRIPTION	DATE	22"x34"
			DESIGNED
			DDS
			DRAWN
			TJI
			CHECKED
			DDS
			APPROVED
			DDS

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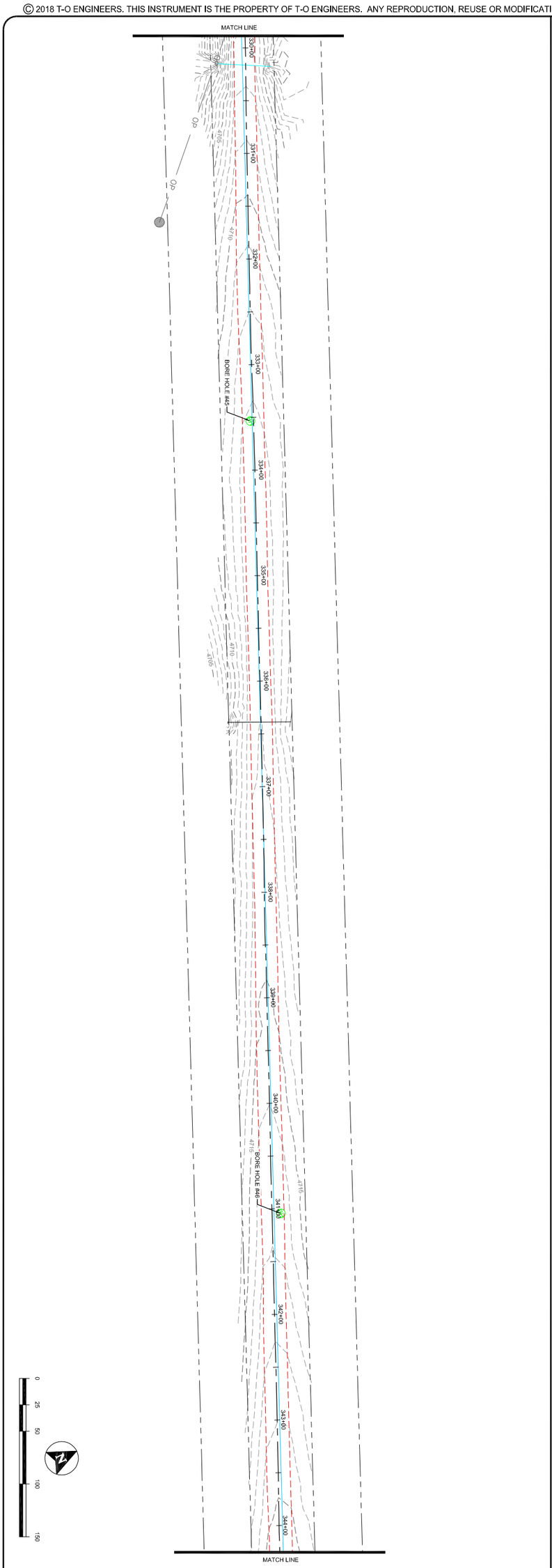

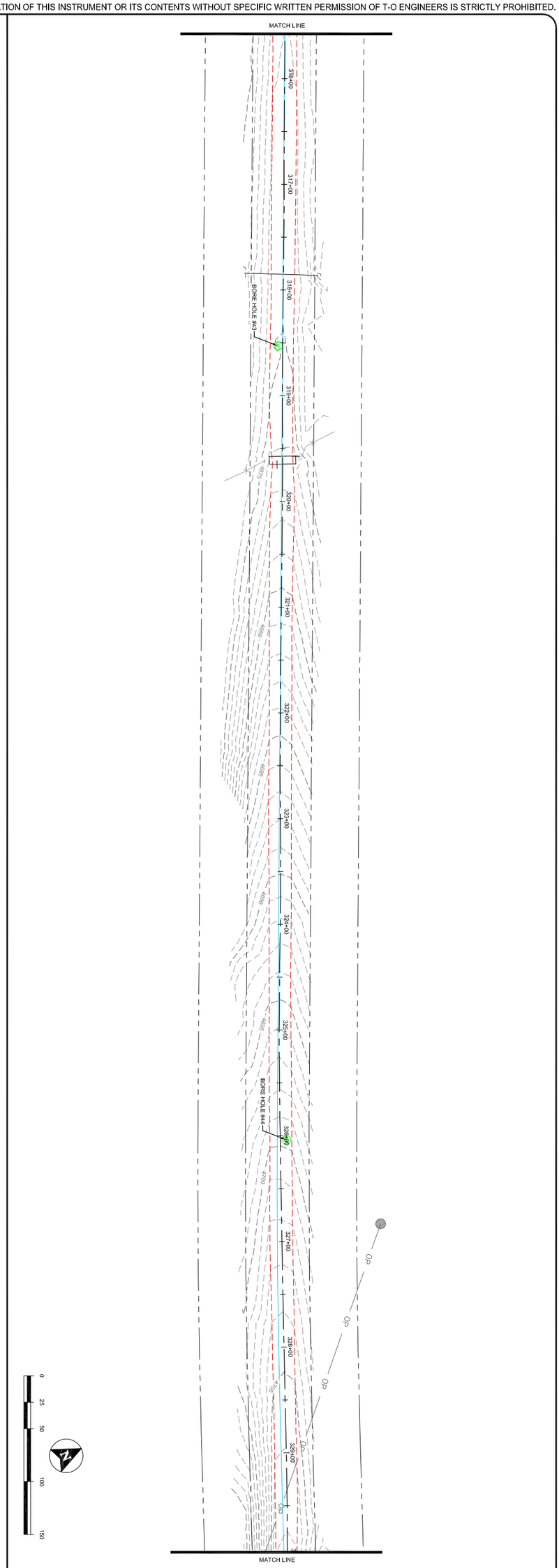

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DATE: November 19, 2018
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REVISIONS			
NO.	DESCRIPTION	DATE	BORDER SIZE 22"x34"
			DESIGNED DDS
			DRAWN TJI
			CHECKED DDS
			APPROVED DDS

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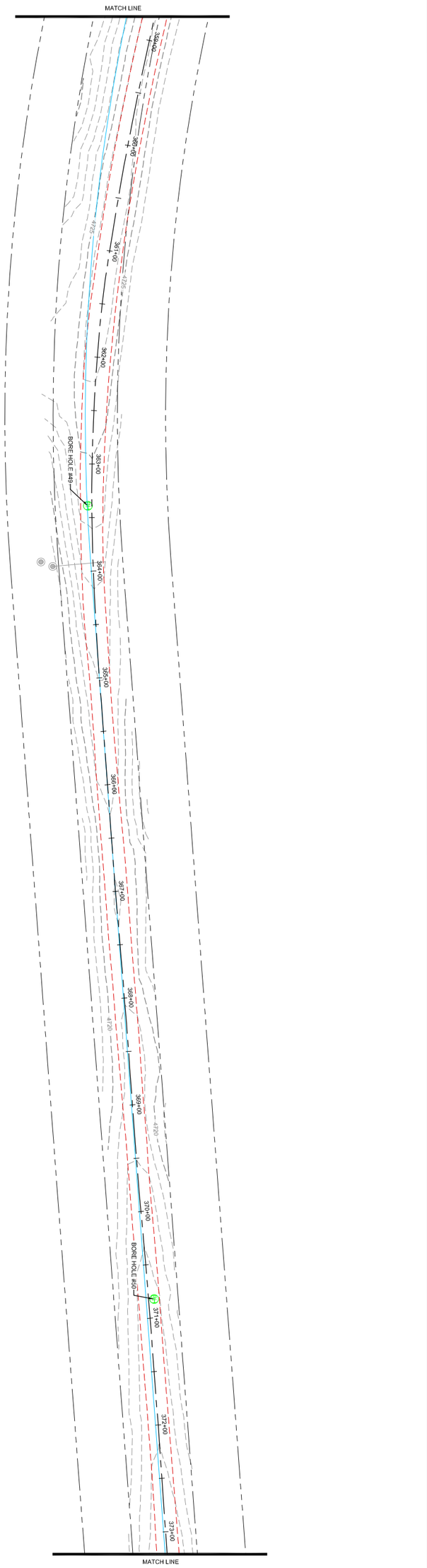

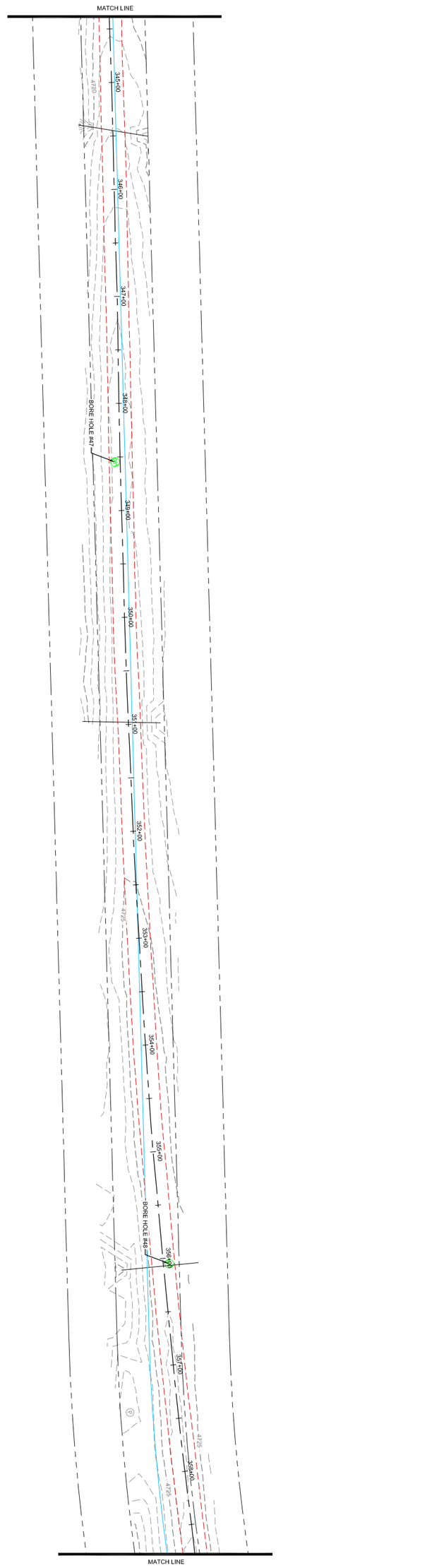

0 25 50 100 150

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DATE: November 19, 2018

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REVISIONS			BORDER SIZE
NO.	DESCRIPTION	DATE	22"x34"
			DESIGNED
			DDS
			DRAWN
			TJI
			CHECKED
			DDS
			APPROVED
			DDS

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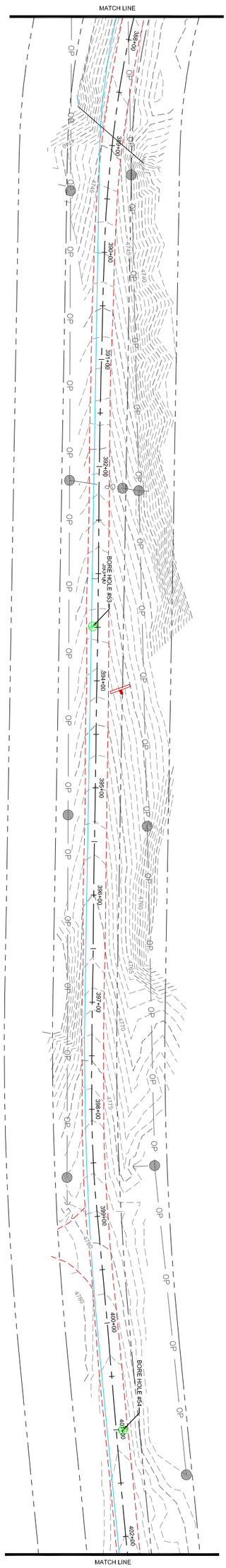

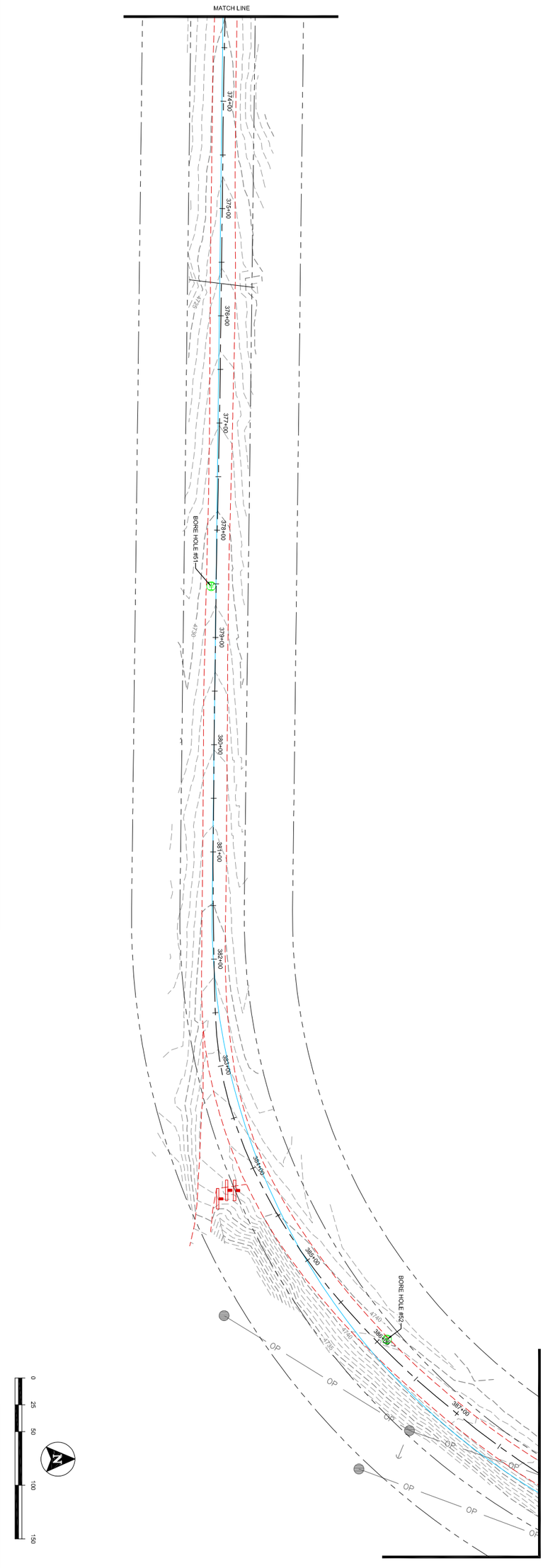

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REVISIONS			BORDER SIZE
NO.	DESCRIPTION	DATE	22"x34"
			DESIGNED
			DDS
			DRAWN
			TJI
			CHECKED
			DDS
			APPROVED
			DDS

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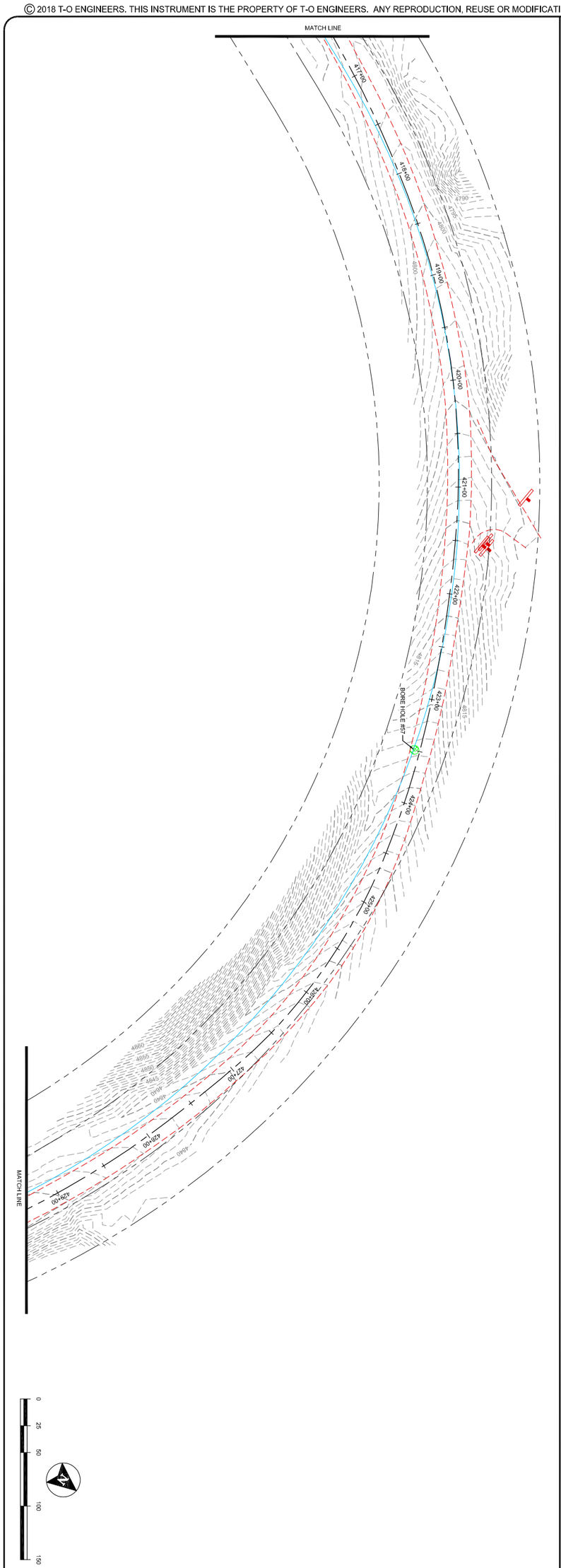

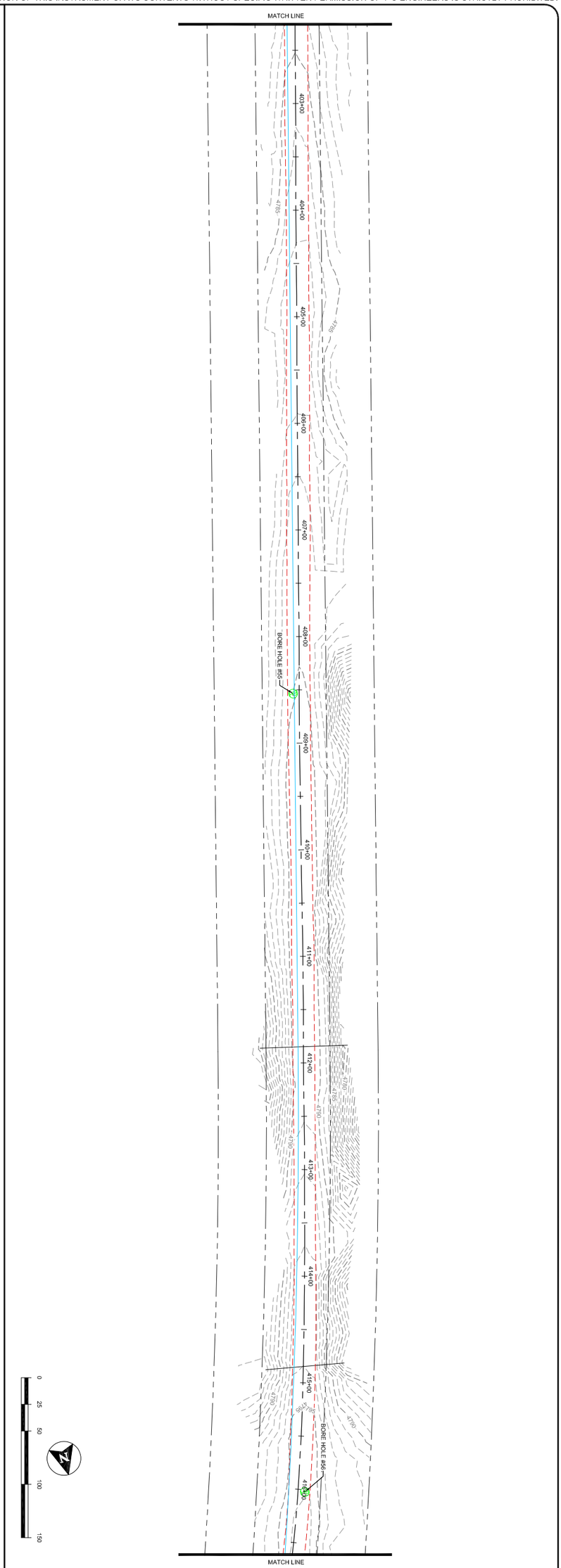

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IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 19, 2018
PROJECT: 180372
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REVISIONS		
NO.	DESCRIPTION	DATE

BORDER SIZE	22"x34"
DESIGNED	DDS
DRAWN	TJI
CHECKED	DDS
APPROVED	DDS

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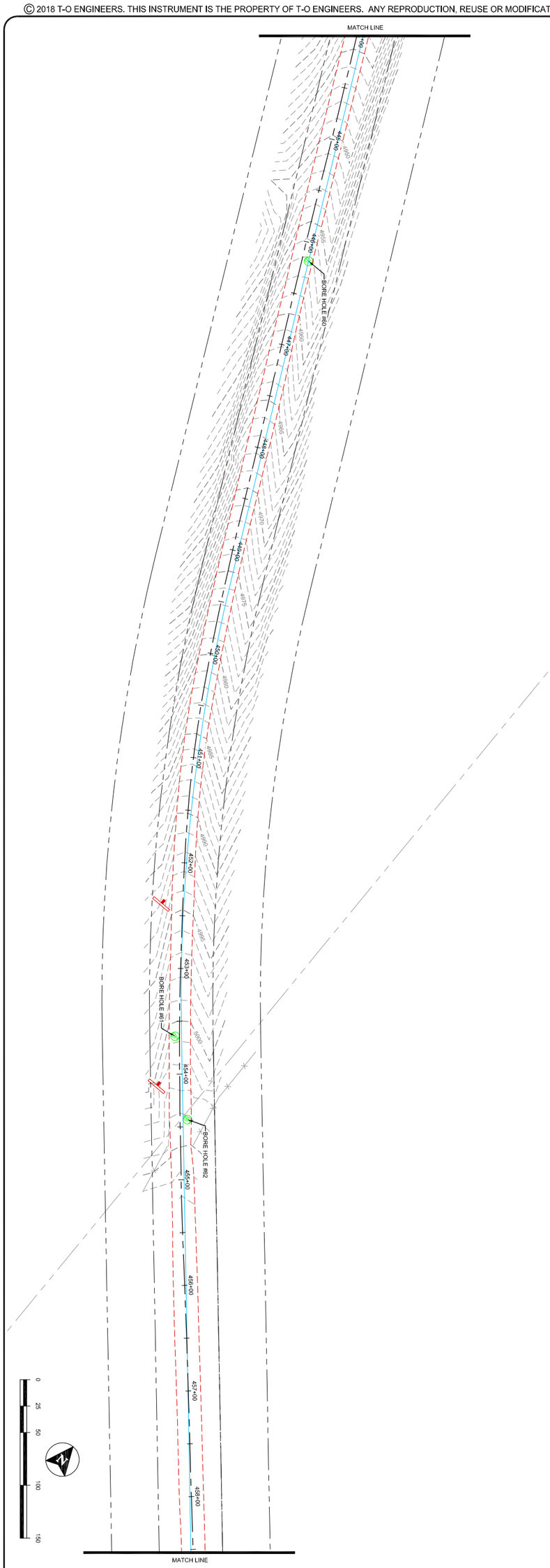

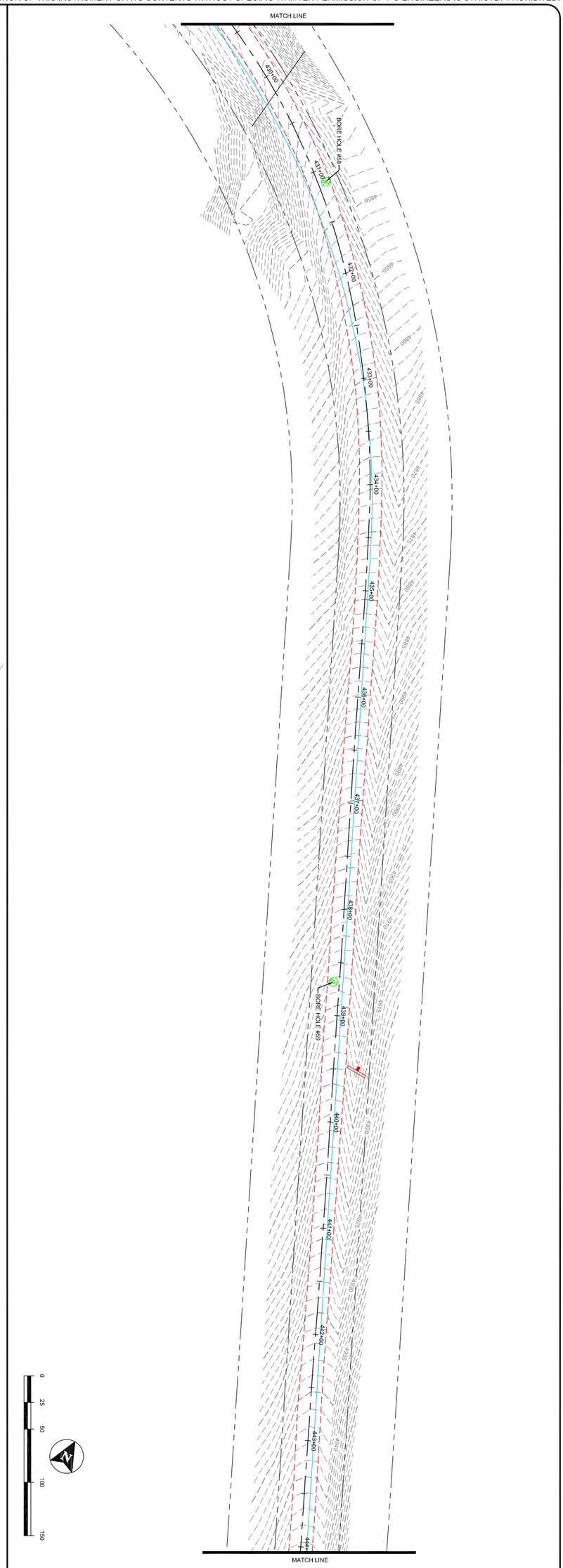

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DATE: November 19, 2018
PROJECT: 180372
SHEET: C0.16

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REVISIONS			BORDER SIZE
NO.	DESCRIPTION	DATE	22"x34"
			DESIGNED
			DDS
			DRAWN
			TJI
			CHECKED
			DDS
			APPROVED
			DDS

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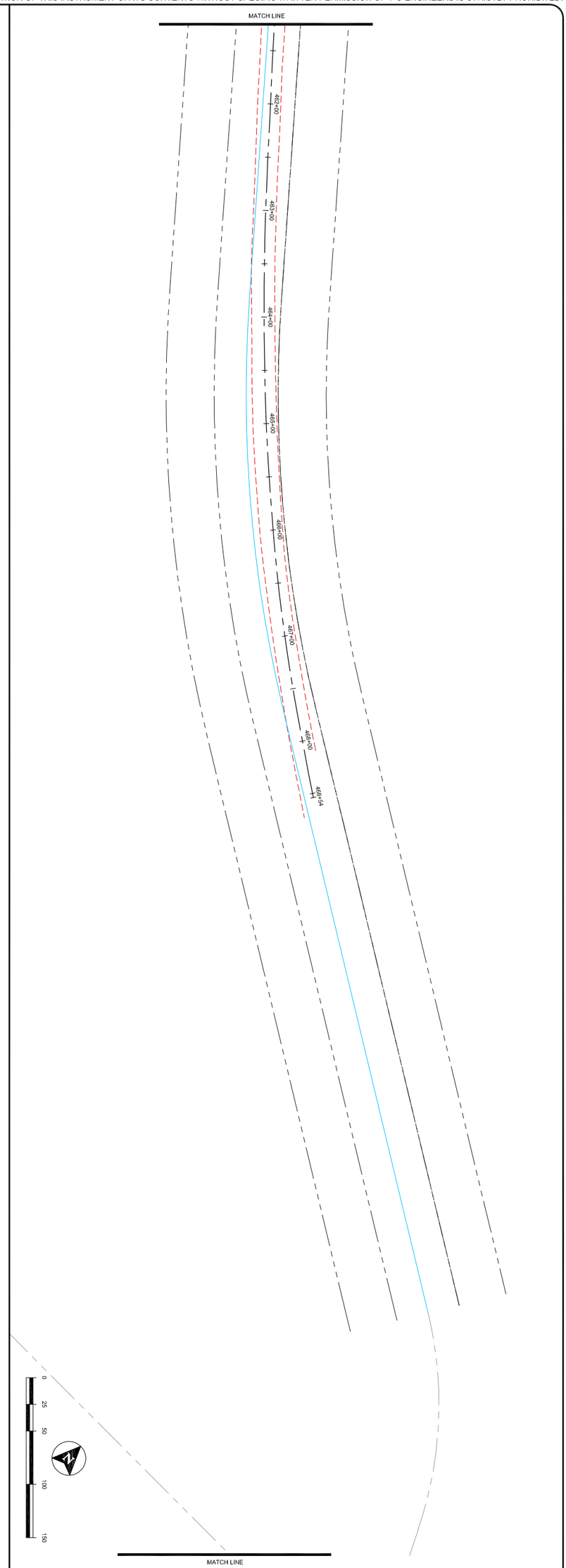

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DATE: November 19, 2018
PROJECT: 180372
SHEET: C0.17

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REVISIONS			BORDER SIZE
NO.	DESCRIPTION	DATE	22"x34"
			DESIGNED
			DDS
			DRAWN
			TJI
			CHECKED
			DDS
			APPROVED
			DDS

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 313.65

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4497.911 Total Depth (ft): 6 Groundwater Depth (ft): I None F None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6.5"	
								BASE ~18"	MC=8%
								LEAN CLAY(CL) Gray/brown, stiff, medium plasticity, fill.	
4495									
									MC=17%
	5			10	1.5				
								End of Boring	
4490									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B- 1

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

EXHIBIT

1 of 1

1

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 1067.06

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4494.441 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~19"	
								LEAN CLAY(CL) Gray/brown, stiff, medium to high plasticity, black peat layers interbedded.	MC=19%
4490				8	1.5				
	5							End of Boring	
4485									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B- 2

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

EXHIBIT

1 of 1

2

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 1817.10

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4492.189 Total Depth (ft): 6 Groundwater Depth (ft): I. None F. None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6"	
								BASE ~18"	
4490								**LEAN CLAY(CL)** Gray/brown, stiff, medium plasticity.	
	5			12	1.5				MC=15%
								End of Boring	
4485									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B- 3

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

EXHIBIT

1 of 1

3

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 2567.17

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4497.432 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~8"	
								BASE ~2"	
								LEAN CLAY(CL) Gray with white mottling, very stiff, medium plasticity, fill.	
4495									
									MC=9%
				20	1.5				
	5							**End of Boring**	
4490									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-4
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
1 of 1

4

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 3320.48

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4503.863 Total Depth (ft): 5 Groundwater Depth (ft): I. ▽ None F. ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~4"	
								BASE ~18"	
								LEAN CLAY(CL) Gray/brown, stiff, medium plasticity.	MC=8%
4500									
	5							End of Boring	
4495									

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Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B- 5

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

EXHIBIT

1 of 1

5

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 4072.72

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4508.491 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~4"	
								BASE ~16"	
								LEAN CLAY(CL) Gray/brown, stiff, medium plasticity.	
4505									
									MC=11%
	5			12	1.5				
								End of Boring	
4500									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B- 6

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

EXHIBIT

1 of 1

6

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 4882.71

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4511.841 Total Depth (ft): 6 Groundwater Depth (ft): I: None F: None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~4"	
								BASE ~14"	
4510								LEAN CLAY(CL) Gray/brown, stiff, medium plasticity.	
	5			10	1.5				MC=8%
								End of Boring	
4505									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-7

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

EXHIBIT

1 of 1

7

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 5571.35

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4516.621 Total Depth (ft): 6 Groundwater Depth (ft): I: None F: None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~3"	
								BASE ~18"	
4515								LEAN CLAY(CL) Gray/brown, stiff, medium plasticity.	
	5			9	1.5				
								End of Boring	
4510									

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Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B- 8

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

EXHIBIT

1 of 1

8

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 6317.40

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4521.122 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~4"	
								BASE ~8"	
4520								**LEAN CLAY with SAND(CL)** Brown, medium stiff, medium plasticity, fine sand.	
	5			6	1.5				MC=18%
4515								**End of Boring**	

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B- 9
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
1 of 1

9

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 7065.41

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4525.766 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
4525								**BASE** ~13"	MC=7%
								LEAN CLAY(CL) Gray/brown, stiff, medium plasticity.	MC=11%
				7	1.5				
	5							**End of Boring**	
4520									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-10
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
1 of 1

10

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 7815.80

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4538.425 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~3"	
								BASE ~14"	
								LEAN CLAY(CL) Brown, stiff, medium plasticity, trace of gravel.	MC=15%
4535									
	5							**End of Boring**	
4530									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-11

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

EXHIBIT

1 of 1

11

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 8573.81

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4541.065 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6"	
								BASE ~12"	
4540								**LEAN CLAY(CL)** Brown, medium stiff, medium plasticity.	MC=12%
				4	1.5				
	5							End of Boring	
4535									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 9335.51

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4551.743 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~4"	
								BASE ~6"	
4550								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	
	5			5	1.5				
								End of Boring	
4545									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

LOG OF BORING B-13

Black Mountain Road Study

Black Mountain Road

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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 10084.85

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4553.616 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~4"	
								BASE ~8"	
								LEAN CLAY(CL) Gray/brown, medium stiff, medium plasticity.	
4550									
	5			6	1.2				
								End of Boring	
4545									

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Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-14
Black Mountain Road Study
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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 10835.46

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4550.107 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
4550								ASPHALT ~4"	
								BASE ~10"	
								LEAN CLAY(CL) Brown, stiff, medium plasticity.	
				8	1.5				MC=10%
4545	5							End of Boring	

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Date: 11/19/2018 File Number: 2018

LOG OF BORING B-15
Black Mountain Road Study
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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 11585.89

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4558.727 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~12"	
								BASE ~4"	
								LEAN CLAY(CL) Brown, stiff, medium plasticity.	
4555				10	1.5				MC=18%
	5							**End of Boring**	
4550									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

LOG OF BORING B-16

Black Mountain Road Study

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 12363.66

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4566.344 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~4"	
								LEAN CLAY(CL) Light brown, medium stiff, medium plasticity.	
4565				5	1.5				
	5							**End of Boring**	
4560									

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 13087.55

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4564.940 Total Depth (ft): 5 Groundwater Depth (ft): I None F None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~12"	
								LEAN CLAY(CL) Gray/brown, stiff, medium plasticity.	
				8	1.5				MC=16%
4560	5							**End of Boring**	
4555									

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 13782.91

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4561.665 Total Depth (ft): 5 Groundwater Depth (ft): I: None F: None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~8"	
								LEAN CLAY with SAND(CL) Brown, stiff, medium plasticity, trace of gravel.	
4560									MC=9%
				9	0.7				
	5							End of Boring	
4555									

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Date: 11/19/2018 File Number: 2018

LOG OF BORING B-19
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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 14581.69

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4568.724 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~8"	
								BASE ~10"	
								LEAN CLAY(CL) Brown, stiff, medium plasticity.	
4565				9	1.5				MC=8%
	5							**End of Boring**	
4560									

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Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-20
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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 15341.92

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4576.896 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~7"	
								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	
4575				5	1.5				
	5							**End of Boring**	
4570									

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Date: 11/19/2018 File Number: 2018

LOG OF BORING B-21

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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 16090.44

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4579.809 Total Depth (ft): 5.5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~7"	
								BASE ~14"	MC=5%
									MC=15%
								LEAN CLAY(CL) Gray/brown, stiff, medium plasticity.	
									MC=15%
4575	5			9	1.5				
								End of Boring	
4570									

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Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-22
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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 16843.89

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4580.880 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6"	
								BASE ~6"	
4580								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	
									MC=19%
				4	1.5				
	5							End of Boring	
4575									

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Date: 11/19/2018 File Number: 2018

LOG OF BORING B-23
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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 17603.19

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4583.446 Total Depth (ft): 5 Groundwater Depth (ft): I. ▽ None F. ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5.5"	
								BASE ~3"	
								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	MC=17%
				4	1.5				
4580									
	5							**End of Boring**	
4575									

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 18354.52

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4591.537 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~3"	
								BASE ~3"	
								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	
4590									
									MC=7%
				50/0.7	1.3				
								SANDSTONE Light brown, medium hard to hard.	
	5							**End of Boring**	
4585									

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18
Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 19084.17

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4614.395 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~3.5"	
								BASE ~8"	
								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	MC=11%
4610				6	1.2				
	5							End of Boring	
4605									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 19849.86

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4616.791 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6"	
								LEAN CLAY with SAND(CL) Brown, stiff, medium plasticity, fine sand.	
4615									
									MC=117%
				7	1.5				
	5							**End of Boring**	
4610									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 20588.85

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4626.317 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~3"	
								BASE ~9"	
4625								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	
				4	1.5				MC=14%
	5							End of Boring	
4620									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 21352.26

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4629.758 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~2.5"	
								BASE ~4"	
								LEAN CLAY(CL) Brown, soft, medium plasticity.	
									MC=12%
				3	1.5				
4625	5							**End of Boring**	
4620									

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

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Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 22106.69

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4626.797 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~2.5"	
								BASE ~3"	
								LEAN CLAY(CL) Brown, stiff, medium plasticity.	
4625									
									MC=10%
	5			8	1.5				
								End of Boring	
4620									

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Date: 11/19/2018 File Number: 2018

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Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 22848.28

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4620.386 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
4620								ASPHALT ~5"	
								BASE ~5"	
								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	
									MC=10%
	5			4	1.5				
4615								End of Boring	

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 23585.46

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4615.622 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6"	
4615								**BASE** ~6"	
								LEAN CLAY(CL) Gray/brown, medium stiff, medium plasticity.	
	5			4	1.5				
4610								**End of Boring**	

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Date: 11/19/2018 File Number: 2018

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Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 24352.23

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4620.444 Total Depth (ft): 6 Groundwater Depth (ft): I: None F: None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
4620								**ASPHALT** ~8"	
								BASE ~7"	
								LEAN CLAY(CL) Brown, soft, medium to high plasticity.	MC=24%
	5			3	1.5				
4615								**End of Boring**	

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Date: 11/19/2018 File Number: 2018

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Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 25100.53

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4633.174 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~8"	
								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	
4630									
									MC=14%
	5			4	1.5				
								End of Boring	
4625									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 25852.34

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4645.727 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~4"	
4645								LEAN CLAY(CL) Brown, stiff, medium plasticity.	
	5			9	1.5				
4640								End of Boring	

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 26597.40

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4653.934 Total Depth (ft): 5 Groundwater Depth (ft): I None F None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~7"	
								LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	MC=13%
4650									
	5							**End of Boring**	
4645									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18
Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 27351.48

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4662.449 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~6"	
								LEAN CLAY(CL) Brown, stiff, medium plasticity.	
4660									
	5			9	1.5				MC=7%
								End of Boring	
4655									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18
Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 28103.89

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4665.390 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
4665								**ASPHALT** ~5"	
								BASE ~7"	
								SANDY LEAN CLAY(CL) Brown, very stiff, medium plasticity.	MC=9%
	5			21	1.5				
4660								**End of Boring**	

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-38

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

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Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 28851.48

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4670.367 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
4670								**BASE** ~7"	
								LEAN CLAY(CL) Gray with white mottling, very stiff, medium plasticity, sandy shale fragments.	
									MC=13%
	5			20	1.5				
4665									
								End of Boring	

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-39

Black Mountain Road Study

Black Mountain Road

Hot Springs County, Wyoming

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 29600.99

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4676.868 Total Depth (ft): 5 Groundwater Depth (ft): I. ▽ None F. ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~3"	
								BASE ~7"	
								SANDY LEAN CLAY(CL) Brown, stiff, medium plasticity, fine sand.	
4675									
				14	1.5				MC=8%
	5							**End of Boring**	
4670									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study
Black Mountain Road
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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18
Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 30355.40

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4675.421 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
4675								BASE ~5"	
								LEAN CLAY(CL) with SAND Gray, medium stiff, medium plasticity, fine sand.	
				5	1.5				MC=10%
	5							End of Boring	
4670									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study

Black Mountain Road

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 31095.65

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4674.638 Total Depth (ft): 6 Groundwater Depth (ft): I None F None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~9"	
								BASE ~7"	
								LEAN CLAY with SAND(CL) Gray, medium stiff, medium plasticity, fine sand.	
4670	5			5	1.5				MC=20%
								End of Boring	
4665									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study

Black Mountain Road

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 31852.79

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4675.183 Total Depth (ft): 5 Groundwater Depth (ft): I None F None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
4675								**ASPHALT** ~6"	
								BASE ~7"	
								SANDY LEAN CLAY(CL) Brown, medium stiff, medium plasticity.	MC=14%
				5	1.5				
	5							**End of Boring**	
4670									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-43

Black Mountain Road Study

Black Mountain Road

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43

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 32603.85

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4699.785 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~6"	
								SANDY LEAN CLAY(CL) Brown, medium stiff, medium plasticity, fine sand.	
				12	1.5				MC=6%
4695	5							**End of Boring**	
4690									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study
Black Mountain Road
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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 33353.43

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4713.154 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~3"	
								BASE ~9"	
								SANDY LEAN CLAY(CL) Brown, stiff, medium plasticity.	
4710									MC=6%
				11	1.5				
	5							**End of Boring**	
4705									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 34104.50

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4716.778 Total Depth (ft): 6 Groundwater Depth (ft): I. None F. None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6"	
								BASE ~6"	
								SANDY LEAN CLAY(CL) Gray/brown, medium stiff, medium plasticity.	
4715									
	5			5	1.5				MC=13%
								End of Boring	
4710									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study
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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 34854.72

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4724.122 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6"	
								BASE ~6"	
								SANDY LEAN CLAY(CL) brown, stiff, medium plasticity, fine sand, sandstone fragments.	MC=7%
4720				7	1.5				
	5							End of Boring	
4715									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18
Rimrock Engineering

Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 35605.47

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4725.723 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~8"	
4725								**BASE** ~3"	
								LEAN CLAY(CL) Gray/brown, medium stiff, medium plasticity.	
									MC=16%
				5	1.5				
	5							End of Boring	
4720									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study

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Date Completed: 10/19/2018 Logged By: M. Geering

Location: STA 36338.96

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4724.396 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~3"	
								SANDY LEAN CLAY(CL) Gray, medium stiff, medium plasticity, fine sand, some sandy shale fragments.	
								SANDY SHALE Dark gray, hard.	MC=18%
4720									
	5							**End of Boring**	
4715									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study
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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 37082.45

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4723.267 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~3.5"	
								BASE ~3"	
								LEAN CLAY(CL) Brown, stiff, medium plasticity.	
4720									
	5			12	1.5				MC=10%
								End of Boring	
4715									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 37852.31

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4730.787 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~7"	
4730								**LEAN CLAY(CL)** Gray, medium stiff, medium plasticity, fill.	
				4	1.5				MC=20%
	5							**End of Boring**	
4725									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 38605.04

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4738.269 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~6"	
								SANDY LEAN CLAY(CL) Gray/brown, medium stiff, medium plasticity.	
4735									MC=18%
	5							**End of Boring**	
4730									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-52

Black Mountain Road Study

Black Mountain Road

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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 39349.12

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4761.645 Total Depth (ft): 6 Groundwater Depth (ft): I None F None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~7"	
								BASE ~3"	
								LEAN CLAY(CL) Gray/brown, stiff, medium to high plasticity.	
4760									
								SANDY SHALE Darky gray/gray, medium hard.	MC=20%
	5			29	1.5				
								End of Boring	
4755									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 40100.94

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4782.775 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~7"	
4780								**LEAN CLAY(CL)** Gray/brown, stiff, medium to high plasticity, some apparent bentonitic seams.	MC=22%
	5			7	1.5				
4775								**End of Boring**	

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 40853.45

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4790.02 Total Depth (ft): 5 Groundwater Depth (ft): I. ▽ None F. ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~11"	
								LEAN CLAY(CL) Gray/brown, stiff, medium to high plasticity.	
									MC=19%
				10	1.5				
4785	5							**End of Boring**	

2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 41602.07

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4795.925 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~7"	
								BASE ~3"	
4795								**LEAN CLAY(CL)** Gray/brown, stiff, medium to high plasticity.	
									MC=15%
				10	1.5				
	5							**End of Boring**	
4790									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 42349.63

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4822.582 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~4"	
								BASE ~6"	
								LEAN CLAY with SAND(CL) Gray/brown, medium stiff, medium to high plasticity, fine sand.	
4820									MC=20%
	5							**End of Boring**	
4815									

Rimrock Engineering

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Date: 11/19/2018 File Number: 2018

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Black Mountain Road Study

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 43112.69

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4853.021 Total Depth (ft): 6 Groundwater Depth (ft): I. ▽ None F. ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~4"	
								BASE ~6"	
								LEAN CLAY with SAND(CL) Gray/brown, soft, medium to high plasticity, fine sand.	
4850									
	5			3	1.5				MC=16%
								End of Boring	
4845									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 43868.64

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4908.194 Total Depth (ft): 6 Groundwater Depth (ft): I. None F. None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~7"	
								BASE ~3"	
								LEAN CLAY(CL) Gray/brown, stiff, medium to high plasticity.	
4905									
									MC=19%
	5			9	1.5				
								End of Boring	
4900									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 44617.32

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 4957.217 Total Depth (ft): 5 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~4"	
								LEAN CLAY with SAND(CL) Gray/brown, stiff, medium to high plasticity, fine sand.	
4955									MC=18%
	5							End of Boring	
4950									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

LOG OF BORING B-60
Black Mountain Road Study
Black Mountain Road
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Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 45364.25

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 5000.677 Total Depth (ft): 6 Groundwater Depth (ft): I. None F. None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~4"	
5000								**LEAN CLAY with SAND(CL)** Gray/brown, stiff, medium to high plasticity, fine sand.	
									MC=16%
									MC=15%
	5			7	1.5				
4995								**End of Boring**	

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

Date Completed: 10/18/2018 Logged By: M. Geering

Location: STA 45443.08

Drill Operator: W.R. Method: Solid Flight Auger

Elev. Top of Hole: 5004.128 Total Depth (ft): 6 Groundwater Depth (ft): I ▽ None F ▼ None

ELEVATION (ft)	DEPTH (ft)	SAMPLE TYPE	SAMPLE NO.	BLOWS/FOOT (N-VALUE)	RECOVERY (ft)	POCKET PEN. (tsf)	Graphic Log	DESCRIPTION	NOTES
								ASPHALT ~5"	
								BASE ~3"	
								LEAN CLAY with SAND(CL) Brown, stiff, medium to high plasticity, fine sand.	
5000									
									MC=16%
	5			7	1.5				
								End of Boring	
4995									

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106

Date: 11/19/2018 File Number: 2018

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2015 RIMROCK SOIL LOG G18106.GPJ 11/19/18

Rimrock Engineering

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			USCS SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	GRAVELS (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	INORGANIC SILTS & VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY
LOAMS				UNDER USDA SOIL CLASSIFICATION SYSTEM, SOIL OF APPROXIMATELY EQUAL SAND/SILT/CLAY

RIMROCKUSCS G18106.GPJ 11/19/18

Rimrock Engineering

Drafted By: M. Geering
Date: 11/19/2018
Project No.: G18106
File Number: 2018

UNIFIED SOIL CLASSIFICATION SYSTEM
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
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LOG SYMBOLS

	BULK / BAG SAMPLE	-4	PERCENT FINER THAN THE NO. 4 SIEVE (ASTM Test Method C 136)
	SHELBY TUBE (3 inch outside diameter)	-200	PERCENT FINER THAN THE NO. 200 SIEVE (ASTM Test Method C 117)
	CALIFORNIA SAMPLER (3 inch outside diameter)	LL	LIQUID LIMIT (ASTM Test Method D 4318)
	STANDARD PENETRATION SPLIT SPOON SAMPLER (2 inch outside diameter)	PI	PLASTICITY INDEX (ASTM Test Method D 4318)
	AUGER SAMPLE	EI	EXPANSION INDEX (UBC STANDARD 29-2)
	ROCK CORE	COL	COLLAPSE POTENTIAL
	WATER LEVEL (level where first encountered)	UC	UNCONFINED COMPRESSION (ASTM Test Method D 2166)
	WATER LEVEL (level after completion)		
	SEEPAGE	MC	MOISTURE CONTENT (ASTM Test Method D 2216)

GENERAL NOTES

1. *Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual.*
2. *No warranty is provided as to the continuity of soil conditions between individual sample locations.*
3. *Logs represent general soil conditions observed at the point of exploration on the date indicated.*
4. *In general, Unified Soil Classification System designations presented on the logs were evaluated by visual methods only. Therefore, actual designations (based on laboratory tests) may vary.*

2015RIMROCKLOGKEY G18106.GPJ 11/19/18

Rimrock Engineering

Drafted By: M. Geering
Date: 11/19/2018
Project No.: G18106
File Number: 2018

LOG KEY
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
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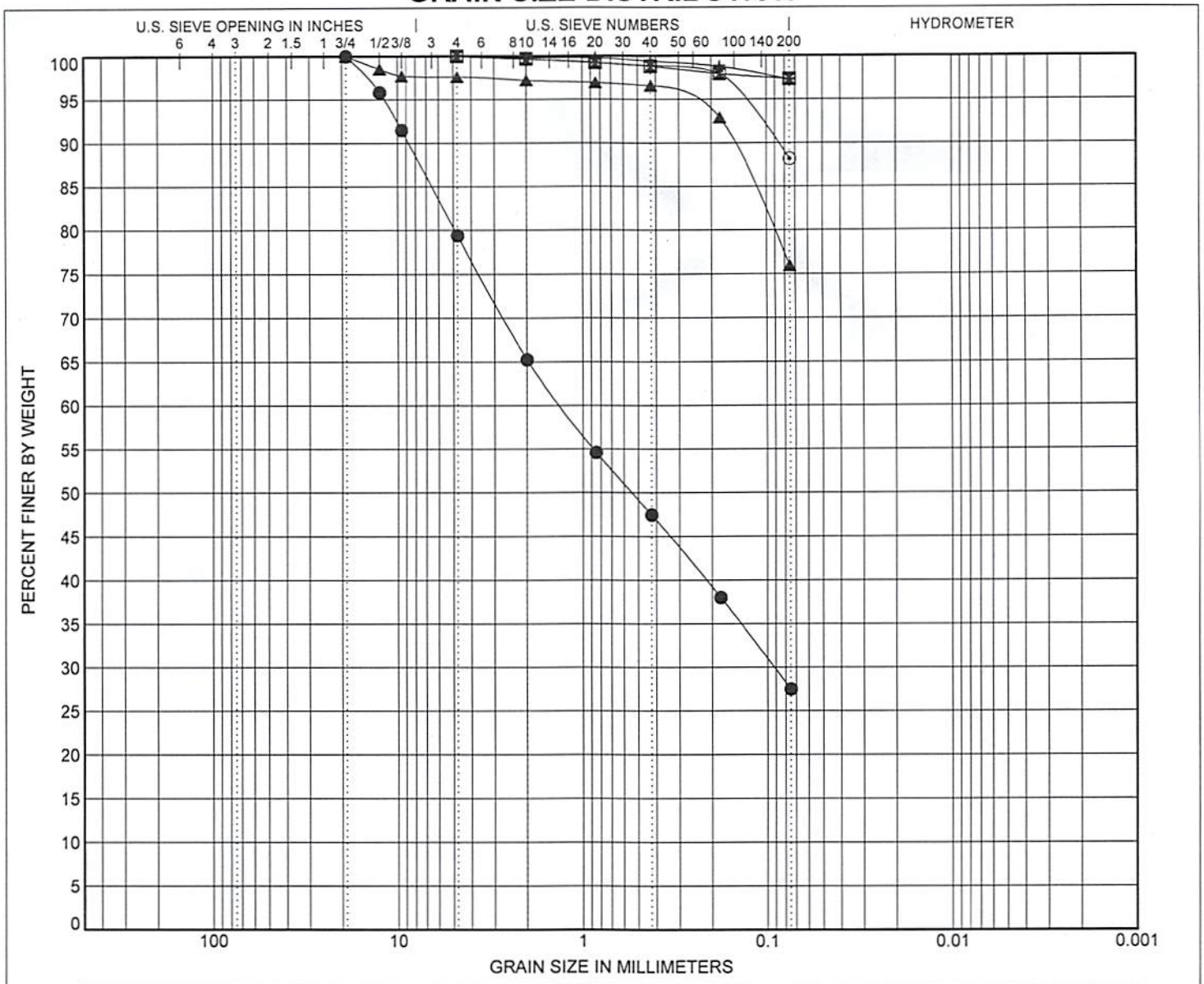
APPENDIX B

Laboratory & Field Test Results

GRAIN SIZE DISTRIBUTION



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	CLASSIFICATION	LL	PL	PI	Cc	Cu
●	B- 1	0.5	SILTY SAND with GRAVEL(SM)	NP	NP	NP		
⊠	B- 3	4.5	LEAN CLAY(CL)	32	15	17		
▲	B- 9	4.5	LEAN CLAY with SAND(CL)	34	17	17		
★	B-16	3.5	LEAN CLAY(CL)	38	19	19		
⊙	B-24	1.0	LEAN CLAY(CL)	29	17	12		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B- 1	0.5	19	1.311	0.092		20.6	51.9	27.5	
⊠	B- 3	4.5	4.75				0.0	2.7	97.3	
▲	B- 9	4.5	19				2.4	21.7	75.9	
★	B-16	3.5	4.75				0.0	2.7	97.3	
⊙	B-24	1.0	4.75				0.0	11.8	88.2	

Rimrock Engineering

Drafted By: M. Geering
Date: 11/15/2018

Project No. G18106
File No. 2018

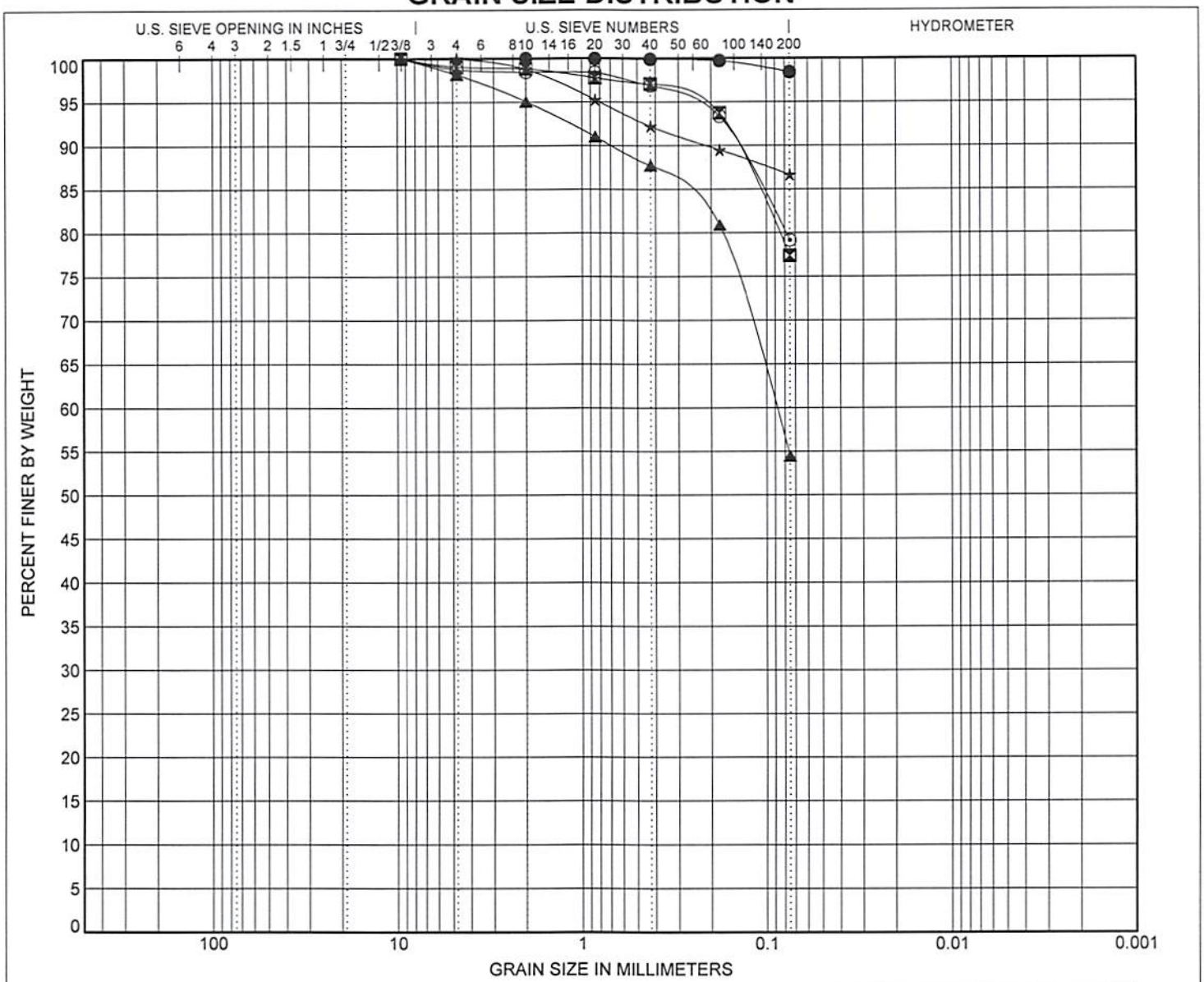
SIEVE ANALYSIS
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
1 of 2

RIMROCK SIEVE2 G18106.GPJ 11/15/18

Copyright Rimrock Engineering, Inc. 2013

GRAIN SIZE DISTRIBUTION



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	CLASSIFICATION	LL	PL	PI	Cc	Cu
●	B-33	4.5	LEAN CLAY(CL)	36	16	20		
⊠	B-42	4.5	LEAN CLAY with SAND(CL)	31	15	16		
▲	B-49	3.0	SANDY LEAN CLAY(CL)	27	15	12		
★	B-55	3.5	LEAN CLAY(CL)	49	27	22		
⊙	B-62	4.5	LEAN CLAY with SAND(CL)	38	17	21		

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-33	4.5	2				0.0	1.6	98.4	
⊠	B-42	4.5	9.5				1.0	21.6	77.4	
▲	B-49	3.0	9.5	0.09			1.8	43.7	54.5	
★	B-55	3.5	4.75				0.0	13.3	86.7	
⊙	B-62	4.5	9.5				1.3	19.6	79.2	

Rimrock Engineering

Drafted By: M. Geering
Date: 11/15/2018

Project No. G18106
File No. 2018

SIEVE ANALYSIS
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
2 of 2

RIMROCK SIEVE2 G18106.GPJ 11/15/18

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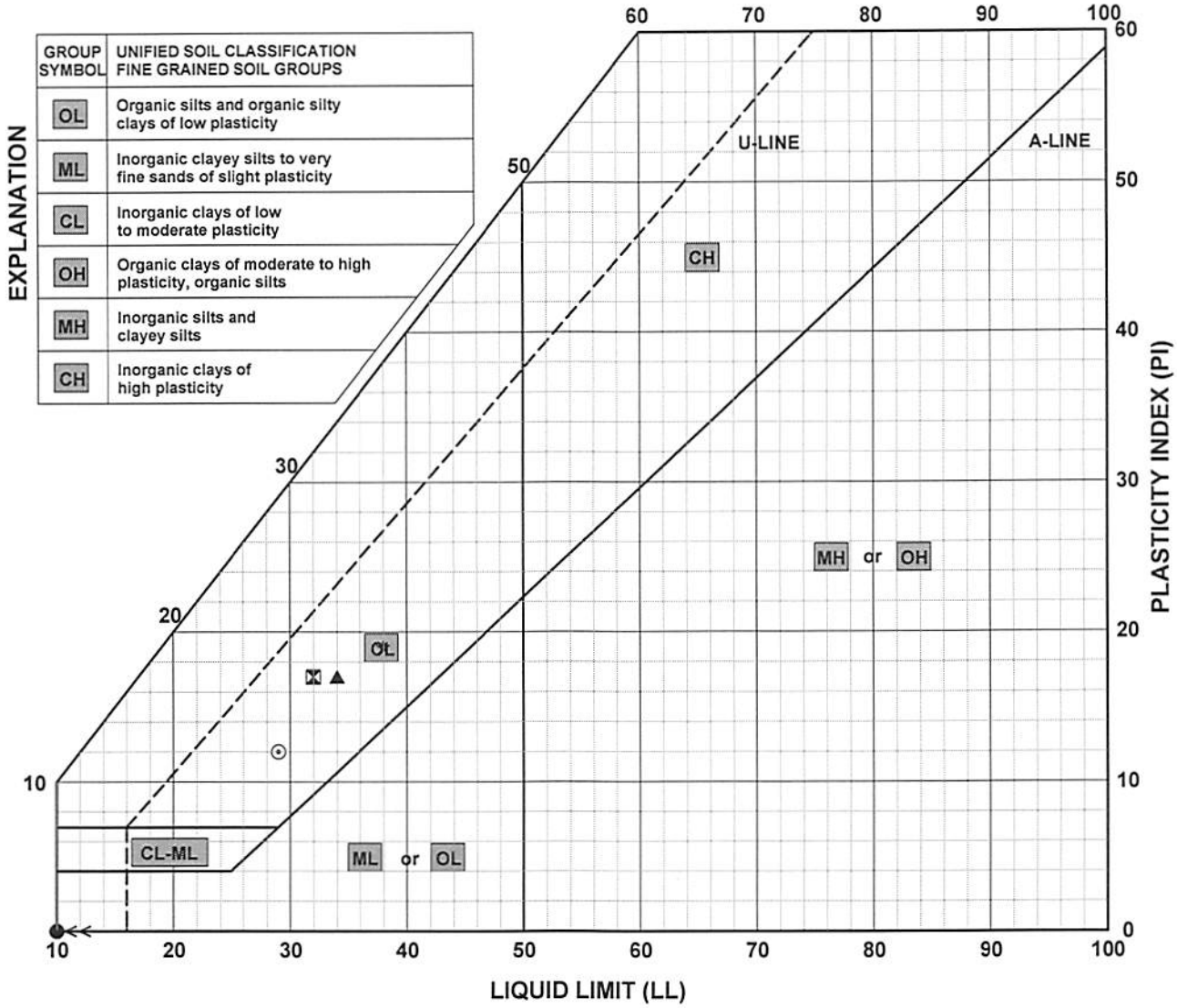

LEGEND:	SOURCE	DEPTH	LL	PL	PI	CLASSIFICATION
●	B- 1	0.5	NP	NP	NP	SILTY SAND with GRAVEL(SM)
⊠	B- 3	4.5	32	15	17	LEAN CLAY(CL)
▲	B- 9	4.5	34	17	17	LEAN CLAY with SAND(CL)
★	B-16	3.5	38	19	19	LEAN CLAY(CL)
⊙	B-24	1.0	29	17	12	LEAN CLAY(CL)

RIMROCK ATTERBURG G18106.GPJ 11/19/18

Rimrock Engineering

Drafted By: M. Geering Project No.: G18106
Date: 11/19/2018 File No: 2018

ATTERBERG LIMITS
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
1 of 2
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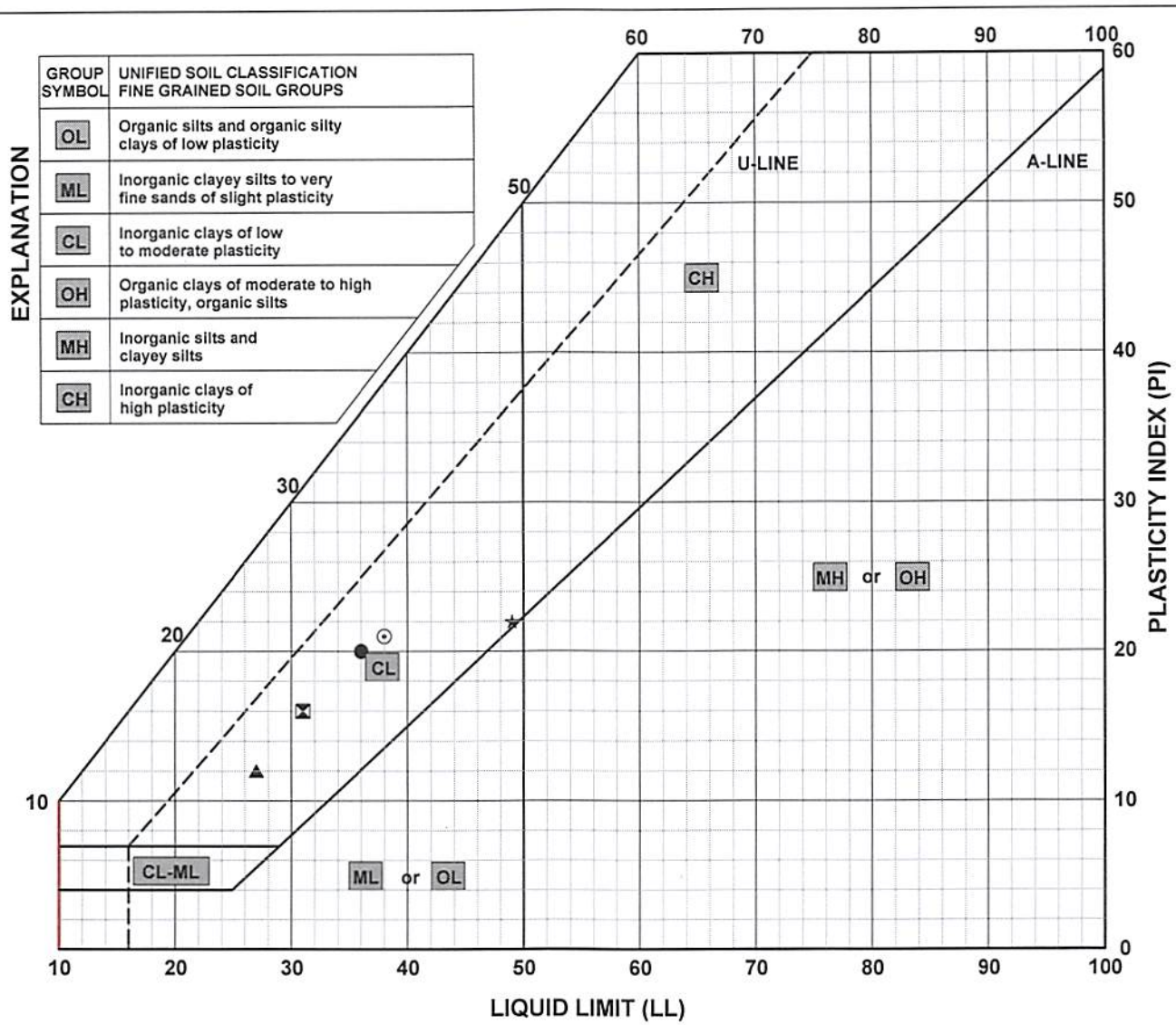

LEGEND:	SOURCE	DEPTH	LL	PL	PI	CLASSIFICATION
●	B-33	4.5	36	16	20	LEAN CLAY(CL)
⧗	B-42	4.5	31	15	16	LEAN CLAY with SAND(CL)
▲	B-49	3.0	27	15	12	SANDY LEAN CLAY(CL)
★	B-55	3.5	49	27	22	LEAN CLAY(CL)
⊙	B-62	4.5	38	17	21	LEAN CLAY with SAND(CL)

RIMROCK ATTERBURG G18106.GPJ 11/19/18

Rimrock Engineering

Drafted By: M. Geering
Date: 11/19/2018
Project No.: G18106
File No: 2018

ATTERBERG LIMITS
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
2 of 2

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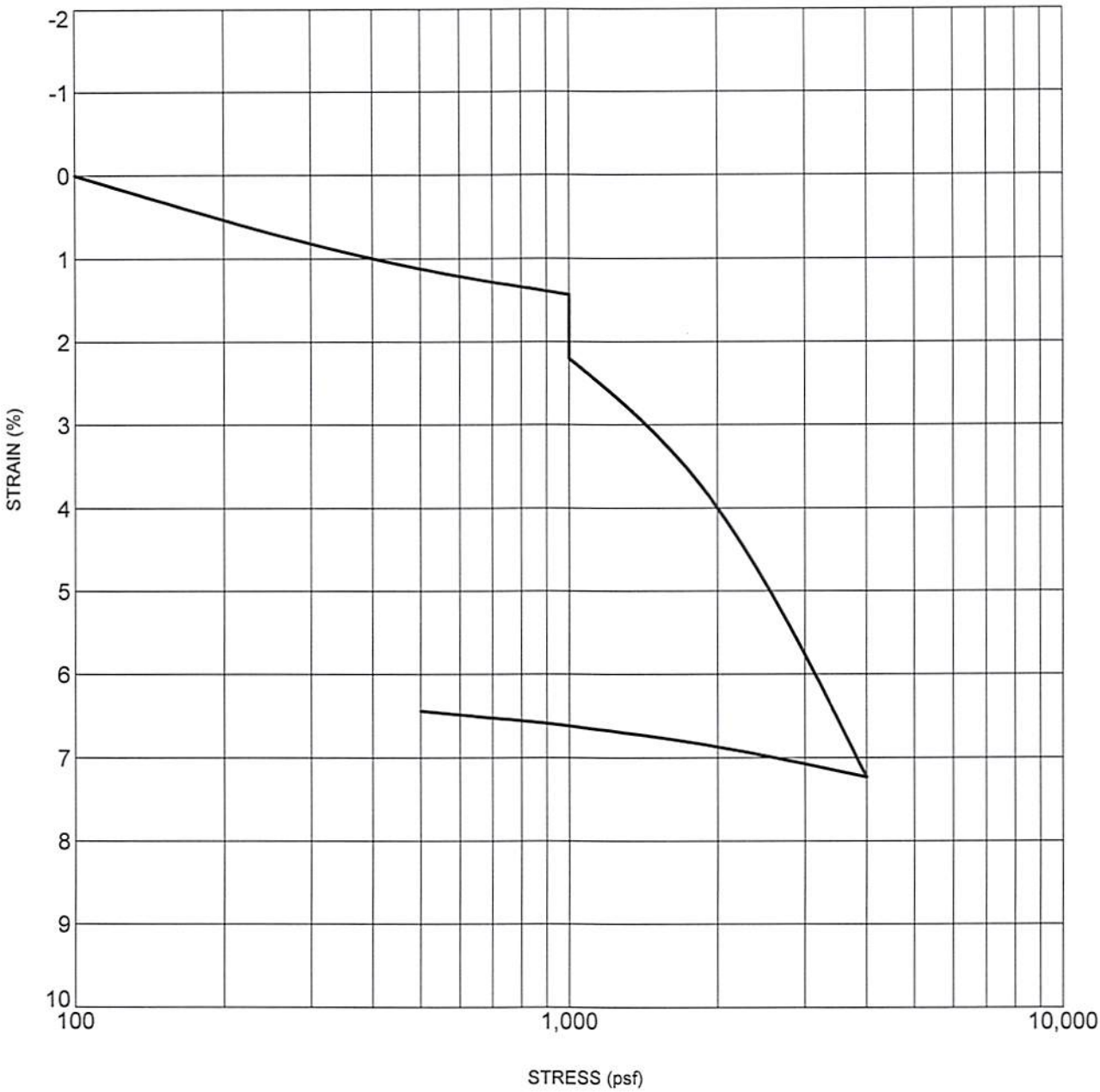


		Before	After
BORING: B-14	Wet Unit Weight (pcf) =	122.3	132.5
Depth: 4.5 feet	Moisture Content (%) =	14.0	20.9
Classification: LEAN CLAY(CL)	Dry Unit Weight (pcf) =	107.2	109.6

Inundated @ 1000 psf.

Rimrock Engineering

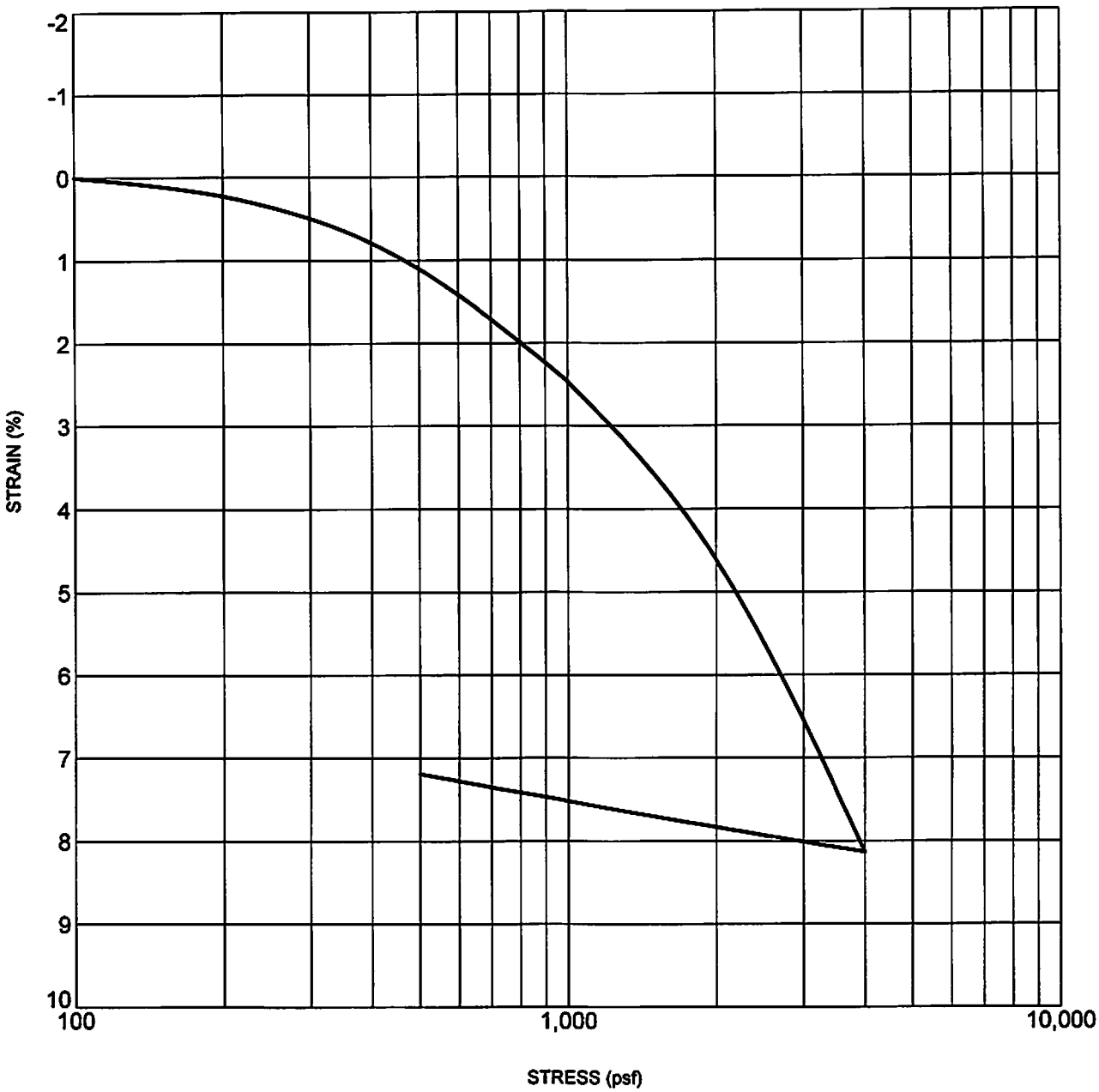
Drafted By: M. Geering
Date: 11/19/2018
Project No.: G18106
File Number: 2018

CONSOLIDATION/SWELL TEST
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
1 of 2

RIMROCK CONSOLIDATION G18106.GPJ 11/19/18

Rimrock Engineering, Inc.



		Before	After
BORING: B-32	Wet Unit Weight (pcf) =	120.8	130.4
Depth: 4.5 feet	Moisture Content (%) =	18.8	20.9
Classification: LEAN CLAY(CL)	Dry Unit Weight (pcf) =	101.6	107.9

Inundated @ 1000 psf.

Rimrock Engineering

Drafted By: M. Geering
Date: 11/19/2018
Project No.: G18106
File Number: 2018

CONSOLIDATION/SWELL TEST
Black Mountain Road Study
Black Mountain Road
Hot Springs County, Wyoming

EXHIBIT
2 of 2

RIMROCK CONSOLIDATION G18106.GPJ 11/19/18

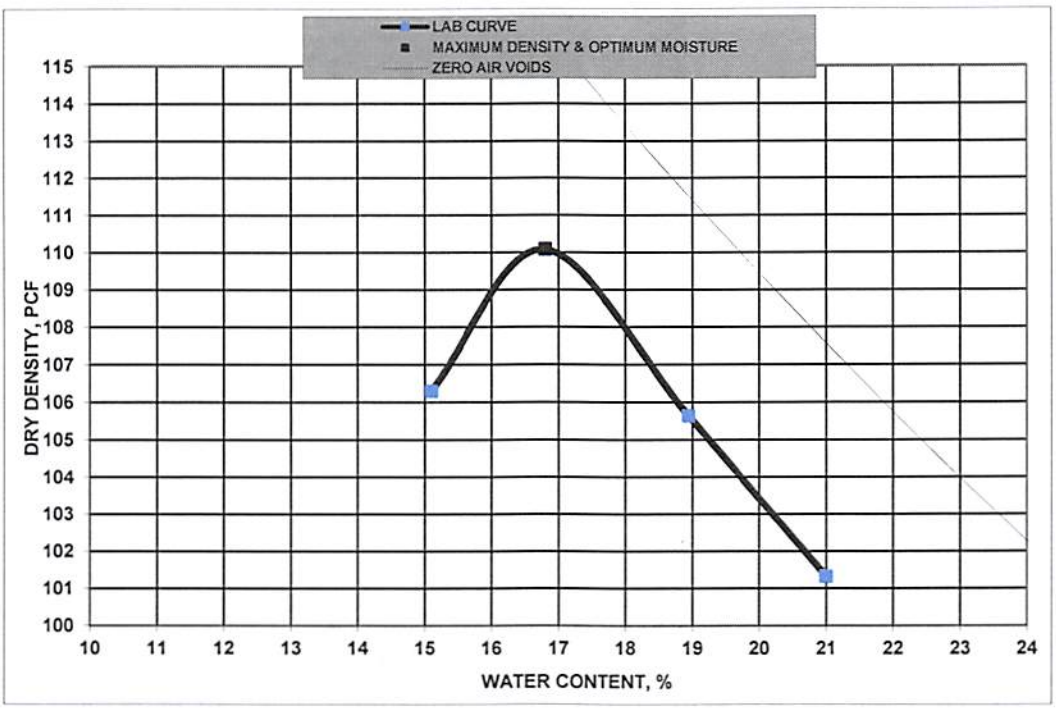
Rimrock Engineering, Inc.

RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-4/6/10/14
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/18/2018

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	110.1
Optimum Moisture, %:	16.8
Test Method:	ASTM D698
Visual Classification:	LEAN CLAY(CL)

EXHIBIT

1 of 6

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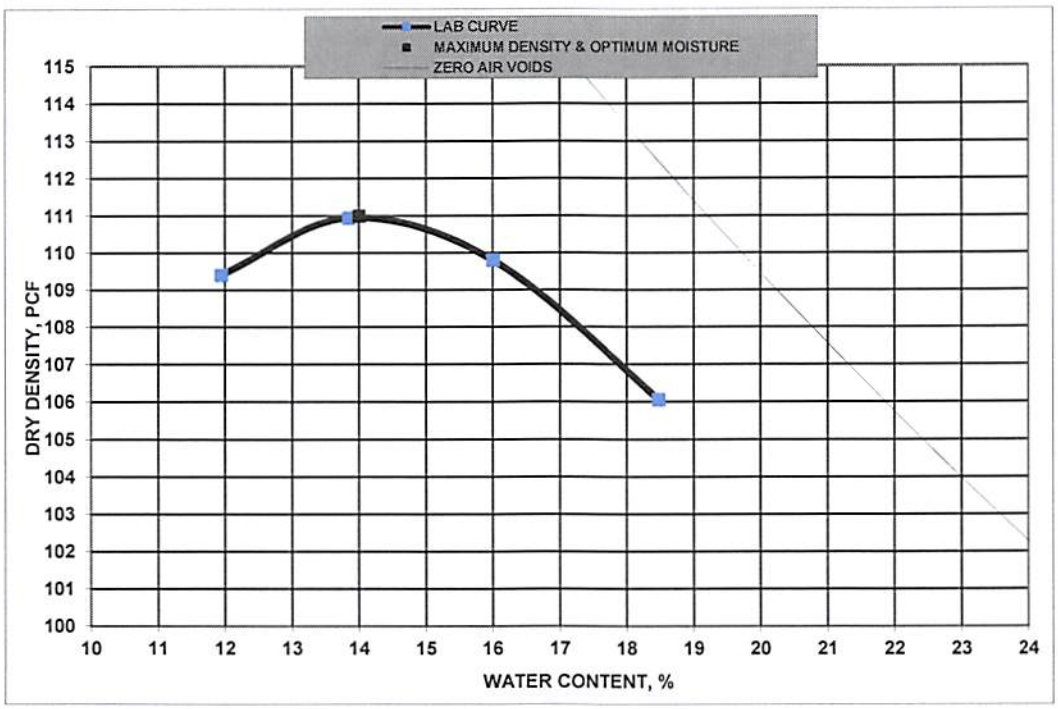
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-16/17/19/20
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/18/2018

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	111.0
Optimum Moisture, %:	14.0
Test Method:	ASTM D698
Visual Classification:	LEAN CLAY(CL)

EXHIBIT

2 of 6

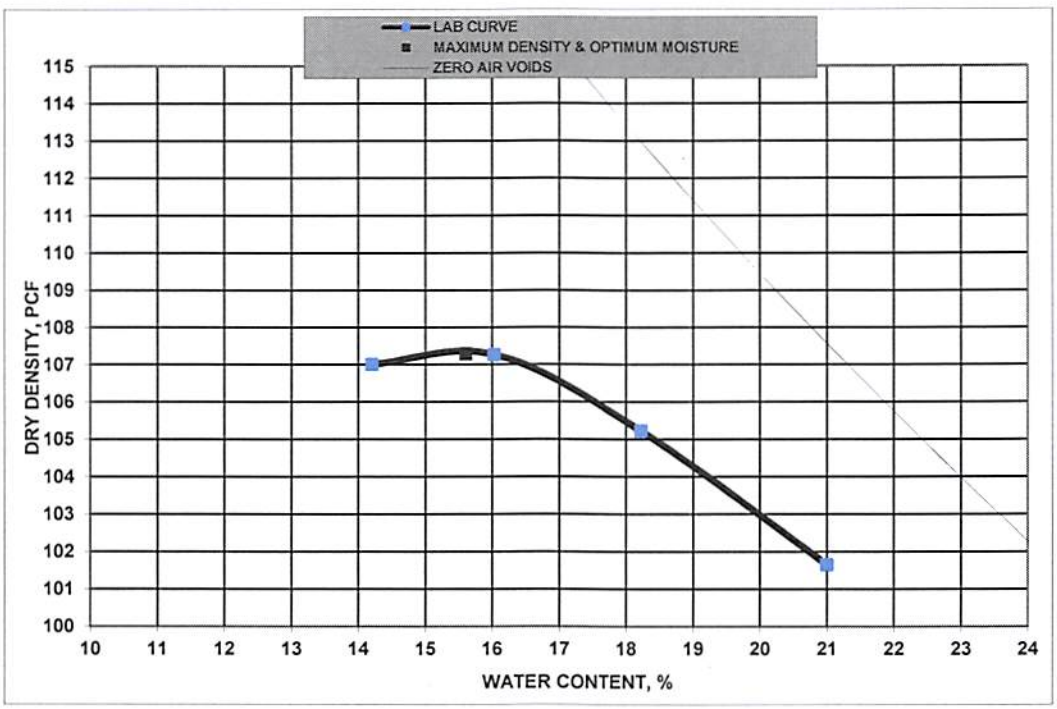
68

RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-22/26/30
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/18/2018

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	107.3
Optimum Moisture, %:	15.6
Test Method:	ASTM D698
Visual Classification:	LEAN CLAY(CL)

EXHIBIT

3 of 6

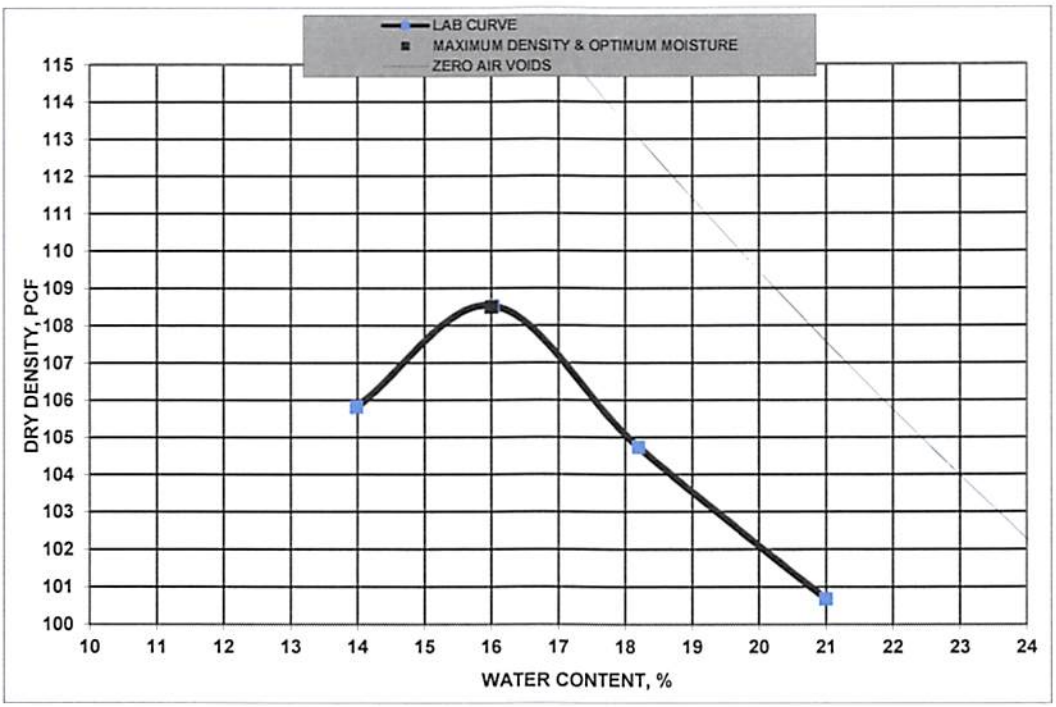
68

RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-32/34/36/38
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/19/2018

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	108.5
Optimum Moisture, %:	16.0
Test Method:	ASTM D698
Visual Classification:	LEAN CLAY(CL)

EXHIBIT

4 of 6

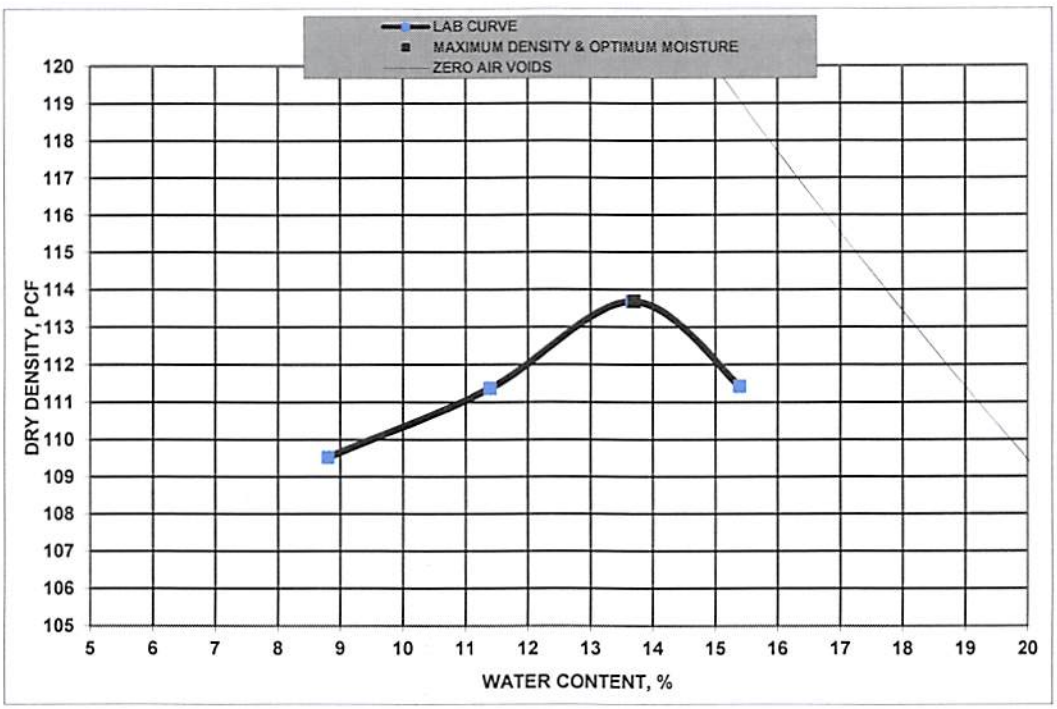
68

RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-44-49
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	SANDY LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/19/2018

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	113.7
Optimum Moisture, %:	13.7
Test Method:	ASTM D698
Visual Classification:	SANDY LEAN CLAY(CL)

EXHIBIT

5 of 6

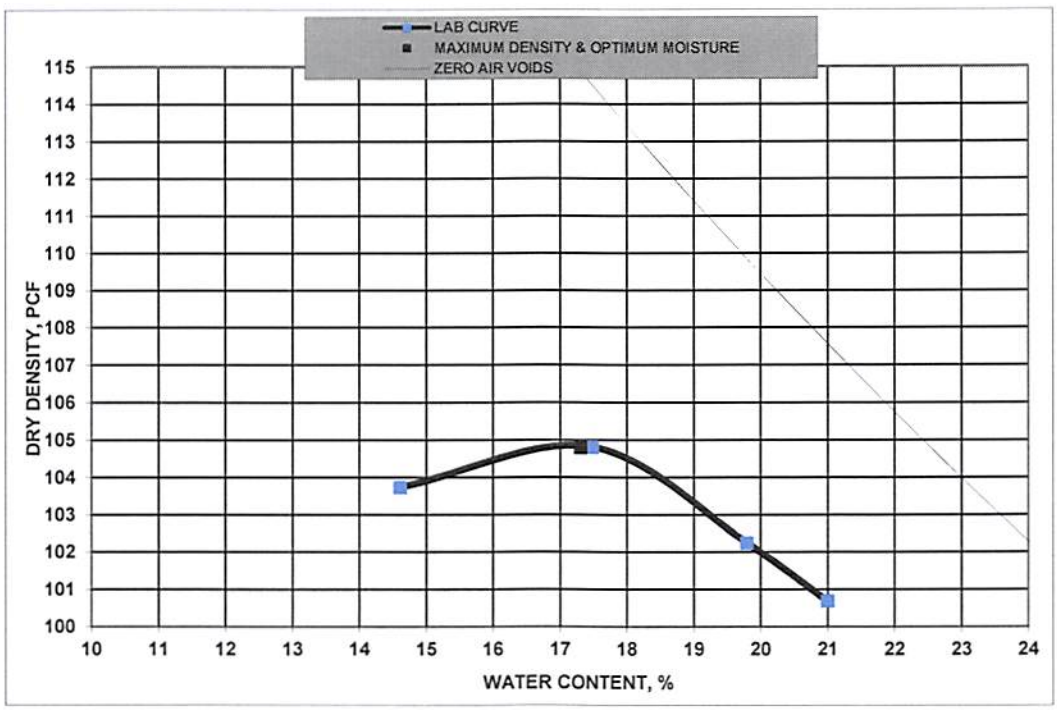
68

RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-57-62
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/18/2018

MOISTURE-DENSITY RELATIONSHIP



Maximum Density, PCF:	104.8
Optimum Moisture, %:	17.3
Test Method:	ASTM D698
Visual Classification:	LEAN CLAY(CL)

EXHIBIT

6 of 6

68

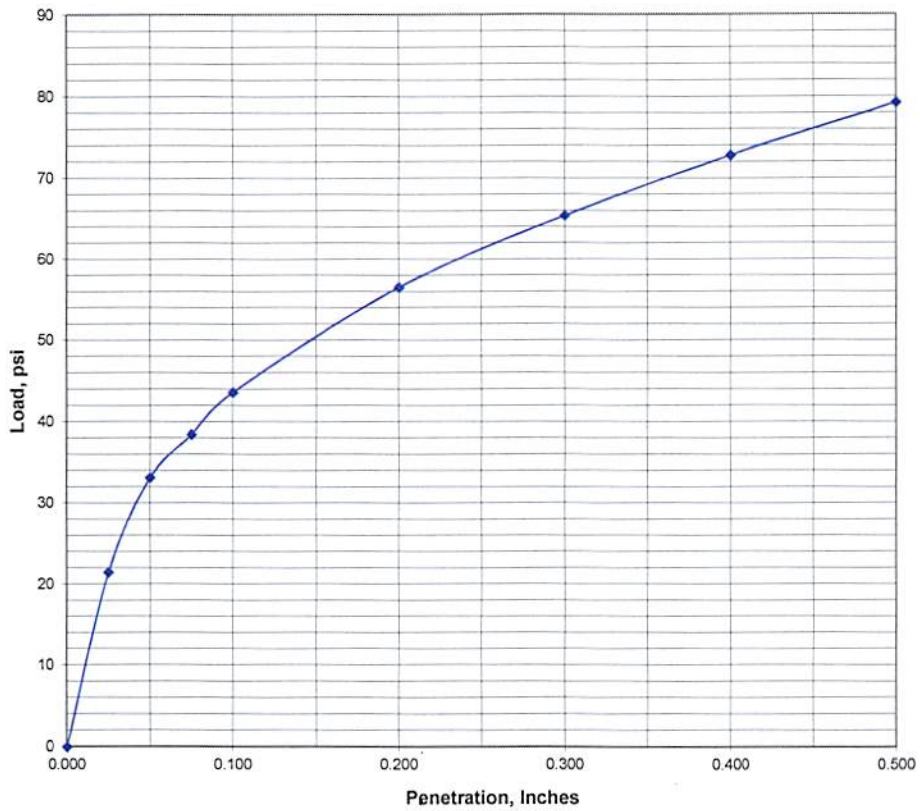
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-4/6/10/14
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/18/2018

CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)



% CBR @ 0.1" **4.4**

EXHIBIT
1 of 6

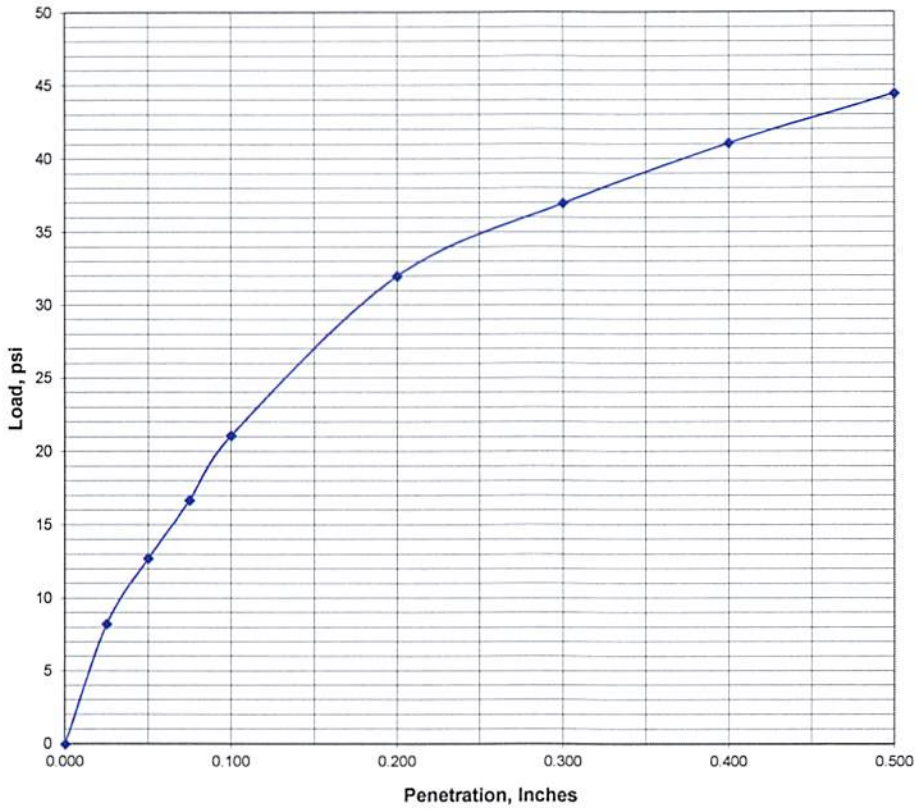
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-16/17/19/20
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/18/2018

CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)



% CBR @ 0.1" **2.1**

EXHIBIT
2 of 6

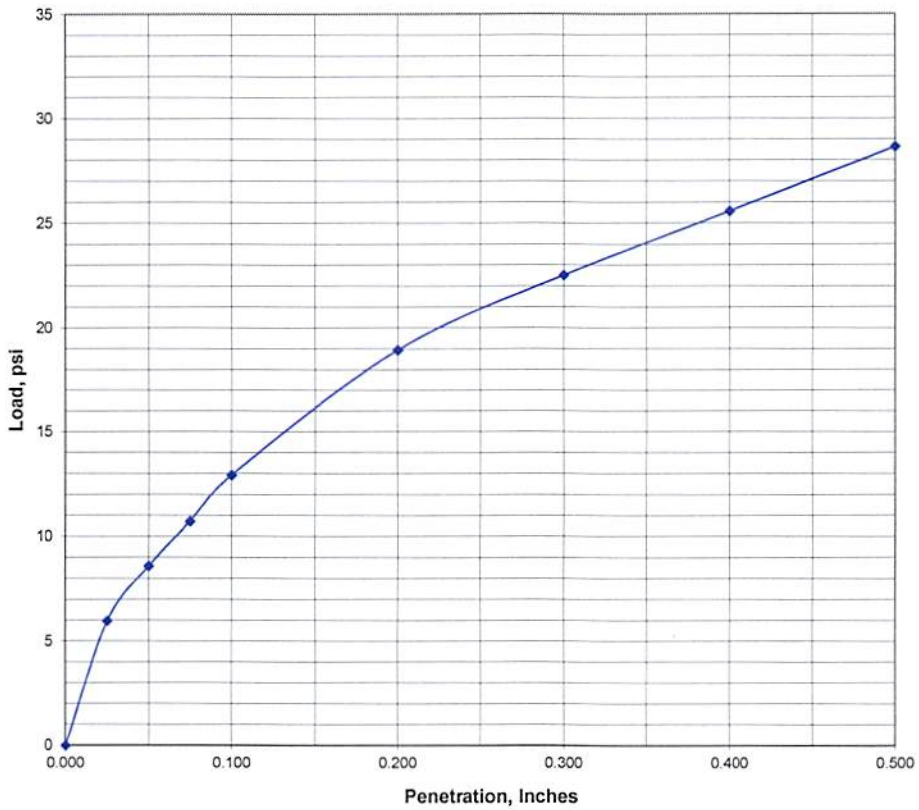
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-22/26/30
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/18/2018

CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)



% CBR @ 0.1" **1.3**

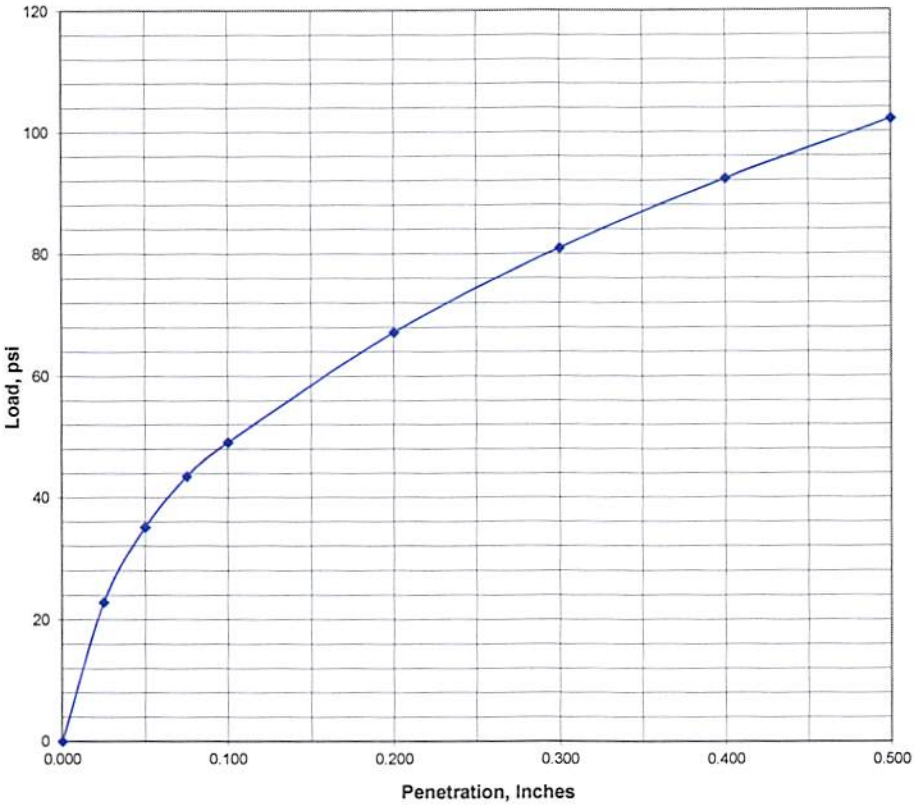
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-32/34/36/38
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/19/2018

CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)



% CBR @ 0.1" **4.9**

EXHIBIT
4 of 6

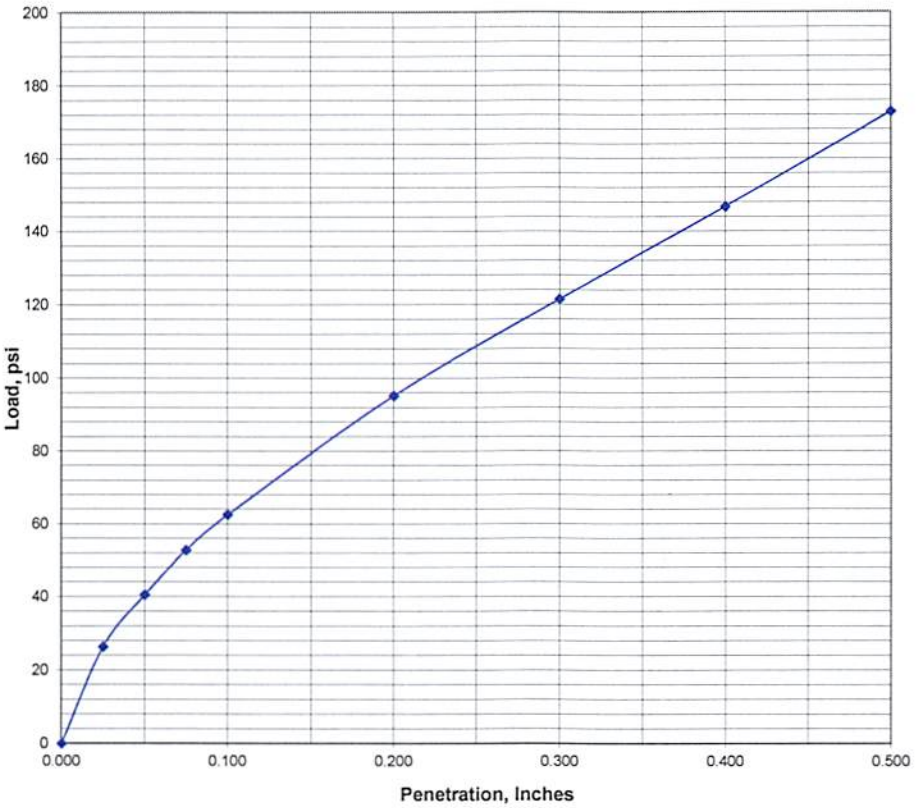
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-44-49
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	SANDY LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/19/2018

CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)



% CBR @ 0.1" **6.3**

EXHIBIT
5 of 6

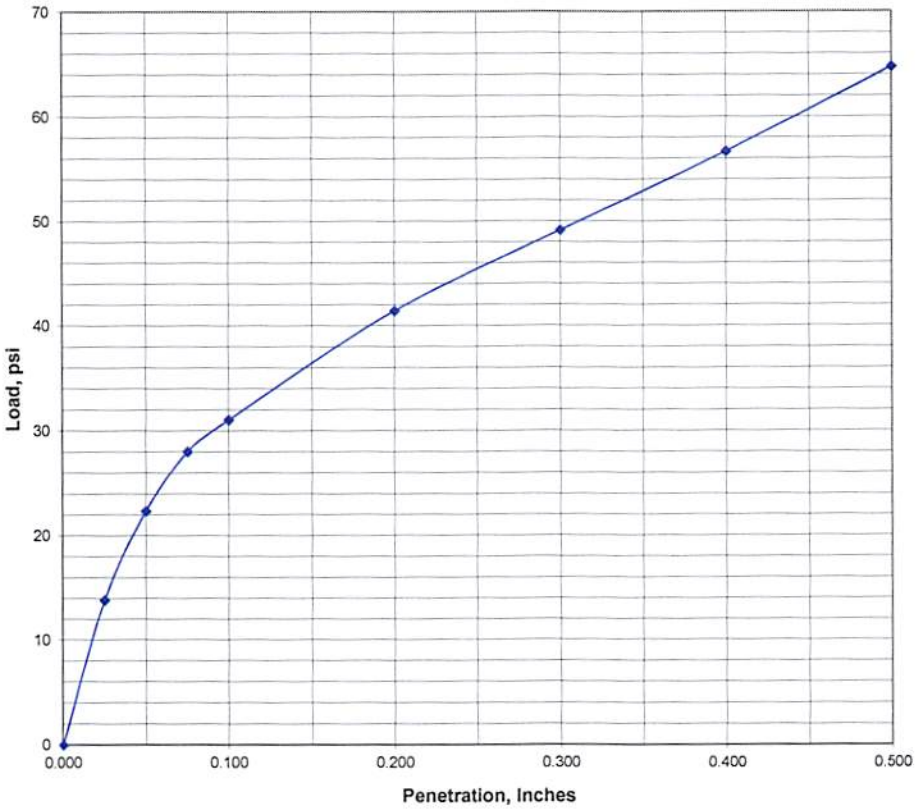
RIMROCK ENGINEERING, INC.

PHYSICAL PROPERTIES OF SOIL/AGGREGATE

Client Name:	Hot Springs County Commisioners	**Project No:**	G18106
Address:	415 Arapahoe Street Thermopolis, Wyoming 82443	**Date of Report:**	11/16/18
Project Name:	Black Mountain Road Study	**Sample Location:**	B-57-62
Project Location:	Hot Springs County, Wyoming	**Sample Depth:**	2'-5'
Sampled By:	Rimrock Engineering, Inc.	**Classification:**	LEAN CLAY(CL)
Submitted By:	Rimrock Engineering, Inc.	**Date Sampled:**	10/18/2018

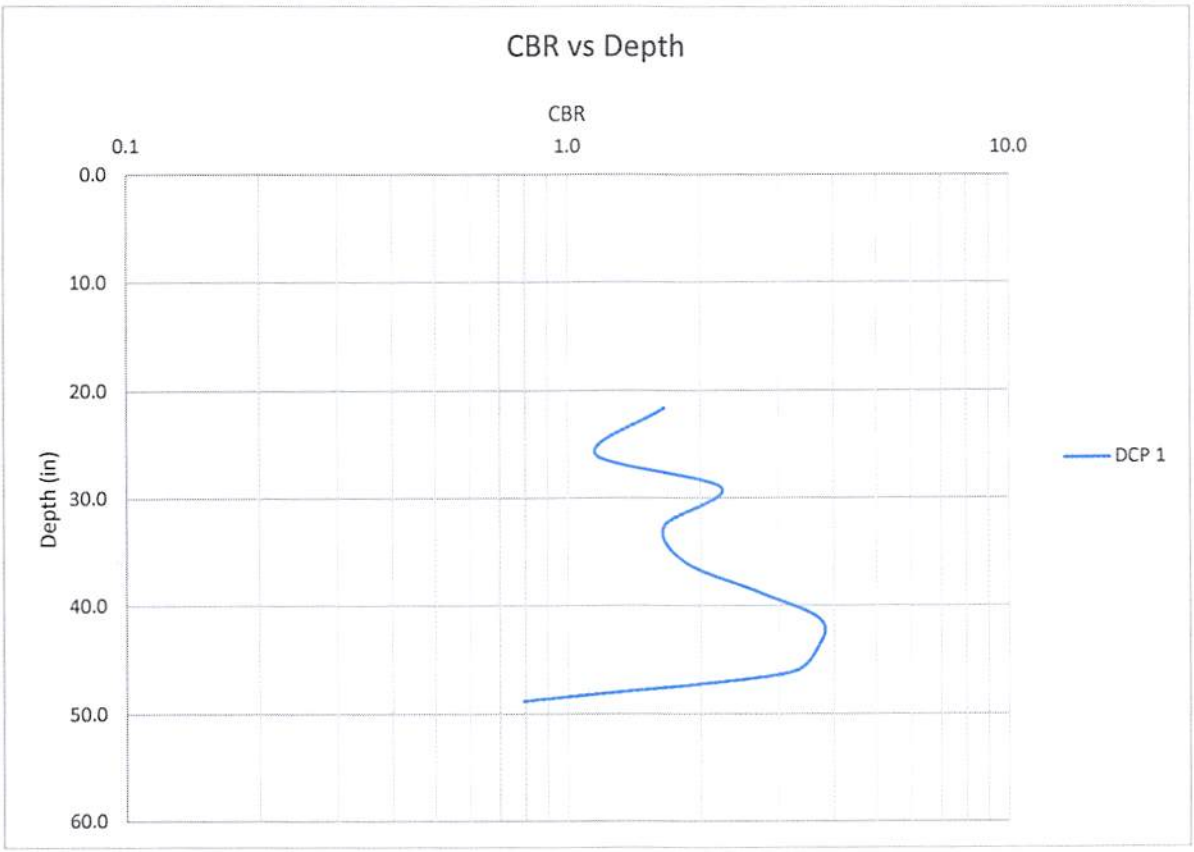
CALIFORNIA BEARING RATIO

LABORATORY BEARING RATIO (CBR)

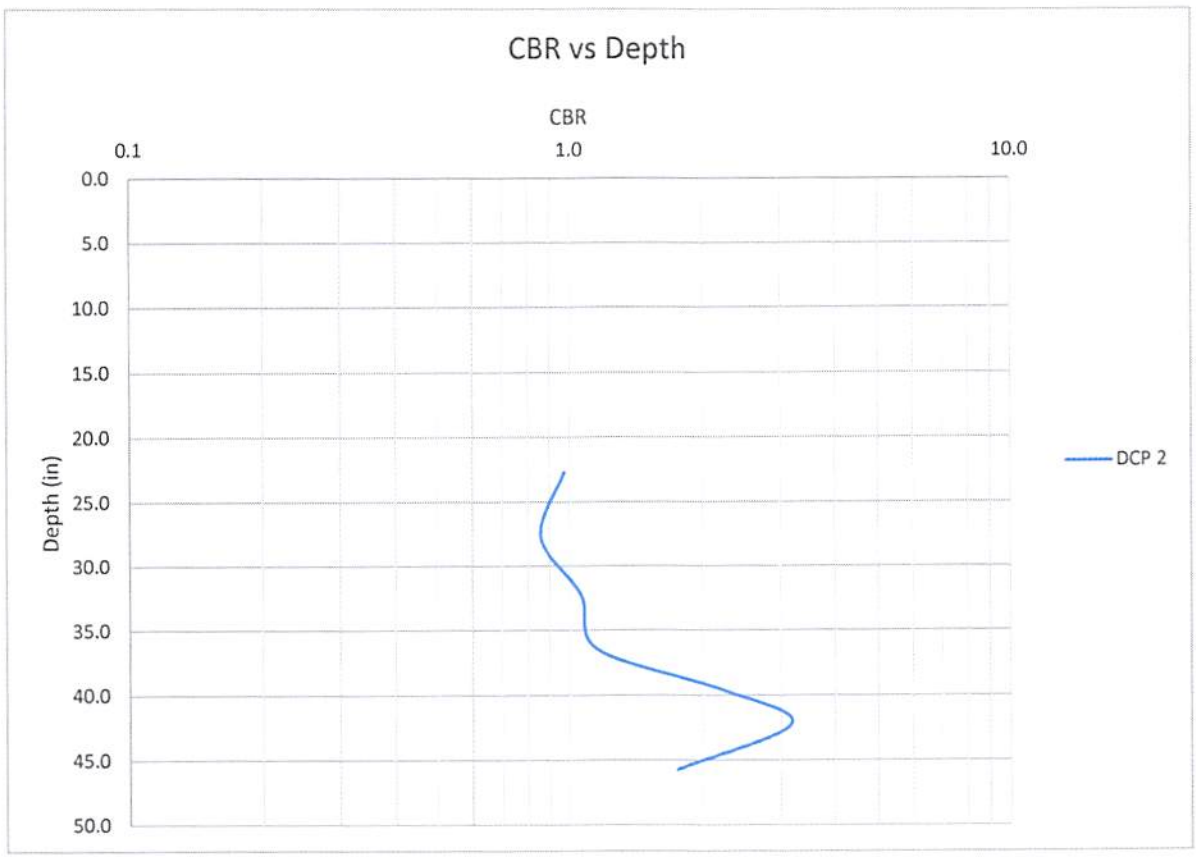


% CBR @ 0.1" **3.1**

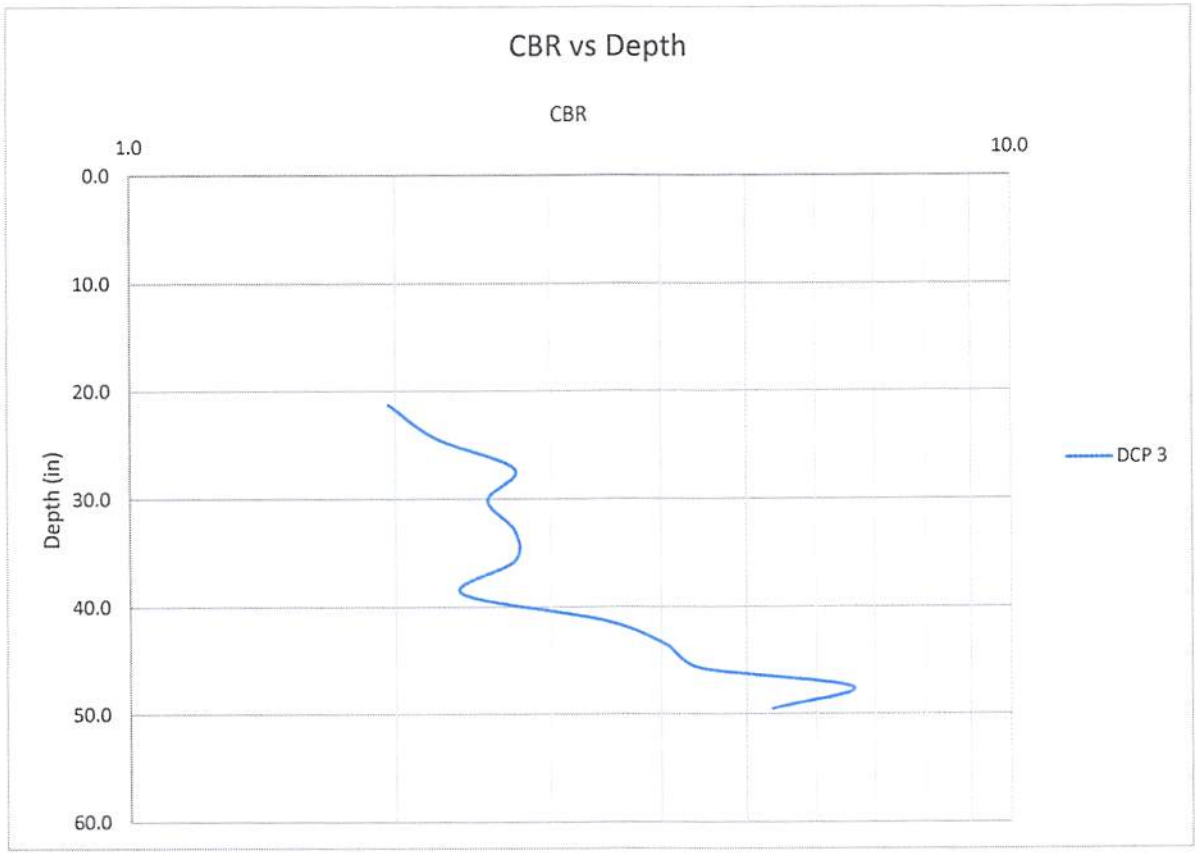
EXHIBIT
6 of 6



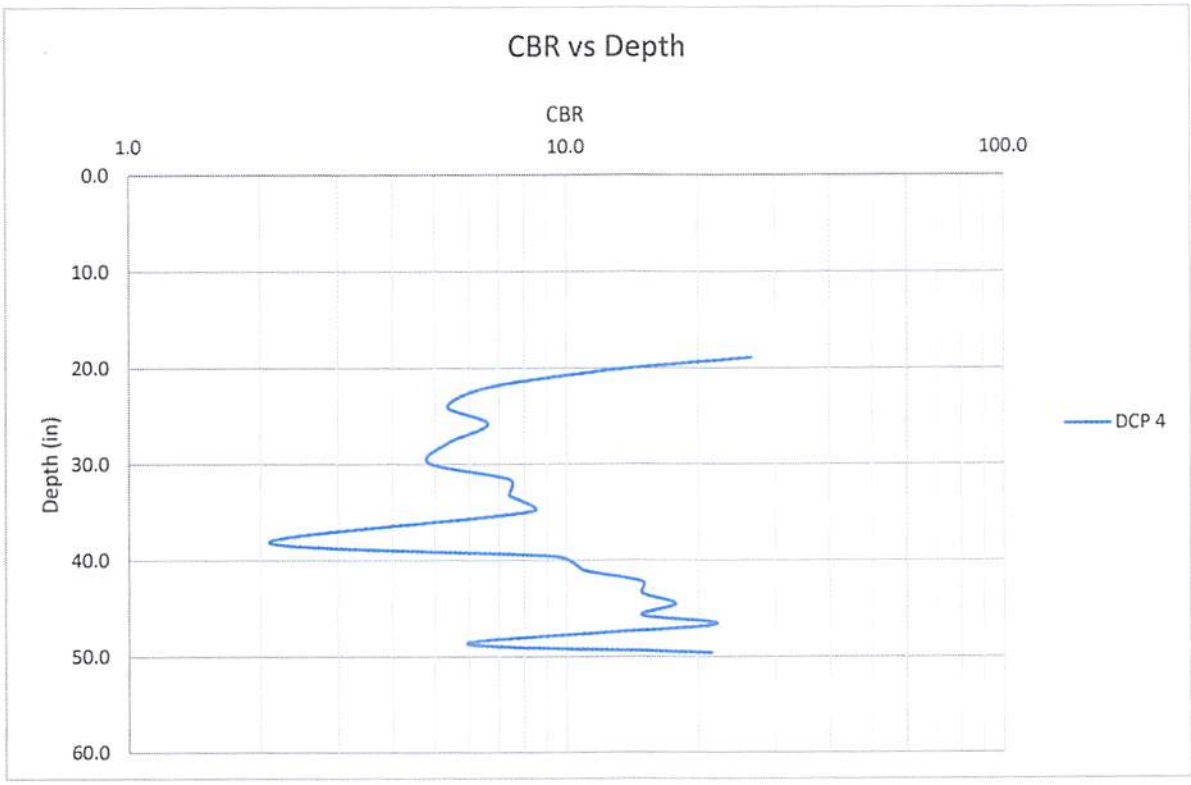
Min =	**0.8**	
Max =	**3.7**	
W. Avg =	**2.1**	**Clay (CL)**



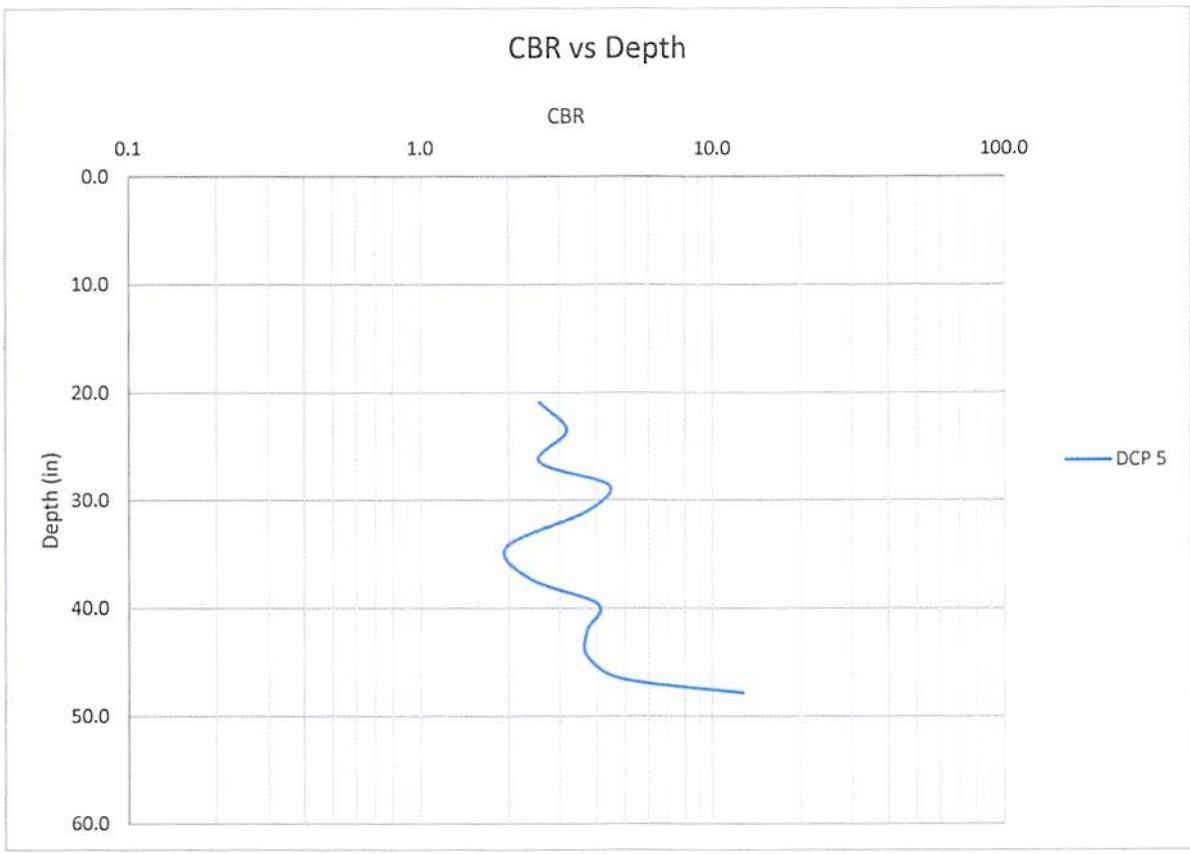
Min =	**0.9**	
Max =	**3.2**	
W. Avg =	**1.4**	**Clay (CL)**



Min =	**2.0**	
Max =	**6.6**	
W. Avg =	**3.2**	**Clay (CL)**



Min =	**2.1**	
Max =	**26.4**	
W. Avg =	**9.4**	**Clay (CL)**



Min =	**2.0**	
Max =	**12.7**	
W. Avg =	**3.7**	**Clay (CL)**

Appendix I
Pavement Design

FLEXIBLE ASPHALT CONCRETE PAVEMENT DESIGN

Project: **Black Mountain Road**
File: Recon Report
Date: 4/23/19

Design
Section: Roadway
Flexible section - Design by R-Value
See *ITD Materials Manual,* Section 510, for ITD specifics.

Design Elements		
Design Subgrade Support R-value*:	20	(Enter)
Estimated Traffic Index (T.I.):	8.35	(Enter)
Regional (ITD) Climate Factor:	1.00	(Enter from ITD map)
Substitution Ratios (ITD or ACHD)		(Enter from chart below.)
Asphalt Concrete:	1.95	
Aggregate Base:	1.10	
Subbase:	1.00	

Minimum Required Total Design Gravel Equivalence (GE)= 2.14 feet

Determine Required Gravel Equivalent of Asphalt Concrete:

Aggregate Base Course Minimum Support R-value*:	75		(Enter)
Asphalt Concrete (AC) Gravel Equivalent Required:	0.67	feet	
Calculated Asphalt Concrete Thickness from GE:	0.35	feet	
Enter Minimum AC Thickness (in feet)**:	0.4167	feet **	(Enter)
Minimum AC Thickness**:	0.42	feet **	
Asphalt Concrete GE=	0.81	feet	

Determine Required Gravel Equivalent of Aggregate Base:

Subbase Course Mininum Support R-value*:	60		(Enter)
Gravel Equivalent Required:	1.07	feet	
Aggregate Base (AB) Gravel Equivalent Required:	0.26	feet	
Calculated Aggregate Base Course Thickness:	0.24	feet	
Enter minimum section thickness if other than 0.35 feet:	0.35	feet ***	
Minimum AB Thickness***:	0.35	feet ***	
Aggregate Base GE=	0.39	feet	
Aggregate Base GE + Asphalt Concrete GE=	1.20	feet	

Determine Required Gravel Equivalent of Subbase:

Subgrade Minimum Support R-value:	20.00	
Gravel Equivalent Required:	2.14	feet
Subbase (SB) Gravel Equivalent Required:	0.94	feet
Calculated Subbase (SB) Course Thickness:	0.95	feet
Enter new subgrade section thickness to test for ballast requirements:	0.00	feet ****
Minimum SB Thickness**** :	0.95	feet ****
Subbase GE=	0.95	feet
Subbase GE + Aggregate Base GE + Asphalt Concrete GE=	2.15	feet

Check Design by Expansion Pressure:

Total thickness must satisfy ballast requirements of subgrade soil.

Subgrade Expansion Pressure:	0.00	psi	(Enter)
Average Unit Weight of Section Aggregate:	130.0	pcf	(Enter)
Minimum Section Thickness to Satisfy Ballast Requirement:	0.00	feet	
Calculated Total Design Section Thickness:	1.72	feet	

RECOMMENDED DESIGN PAVEMENT SECTION:

For: Roadway

Asphalt Concrete:	5.0	inches
Aggregate Base Course:	4.0	inches
Subbase Course:	12.0	inches
GE Provided :	2.18	feet
Mininum GE Required:	2.14	feet

ITD Climatic Factor

Zone	Regional Factor
1	1.00
2	1.05
3	1.10
4	1.15

IDAHO TRANSPORTATION DEPARTMENT (ITD) SUBSTITUION RATIOS FOR COMMON PAVEMENT AND BASE MATERIALS

Traffic Index	Plantmix Pavement	Road Mix Pavement and ATB	Asphalt Treated Permeable Base (ATPB)	Untreated Aggregate Base(UTB)*	Granular Subbase**
14.5-16.5	1.4	1.10	1.2	1.0	0.85
12.7-14.4	1.5	1.20	1.2	1.0	0.85
10.0-12.6	1.6	1.30	1.2	1.0	0.85
8.1-9.9	1.8	1.45	1.2	1.0	0.85
6.7-8.0	2.0	1.60	1.2	1.0	0.85
5.6-6.6	2.2	1.75	1.2	1.0	0.85
0.0-5.5	2.4	1.90	1.2	1.0	0.85

Source: *ITD Materials Manual* , December 1997
* 70<R-Value<75, use 0.9 **If R-value < 60 use 0.75

ADA COUNTY HIGHWAY DISTRICT (ACHD) SUBSTITUTION RATIOS FOR FLEXIBLE PAVEMENT DESIGN

Asphalt Concrete:	1.95
Aggregate Base:	1.1
Subbase:	1.0

Source: *ACHD Development Policy Manual* , 7/13/1994

Notes:

*Use actual R-values where possible.

** Minimum Asphalt Concrete Thickness:
0.15 ft. (1.8") : per ITD
0.21 ft. (2.5") : Local streets per A.C.H.D.
0.25 ft. (3.0") : Arterial and Collector Streets per ACHD & on Asphalt Treated Permeable Base (ATPB) per ITD

*** Minimum Aggregate Base (AB) thickness is 0.35 ft. per ITD (4.0 inches rounded to nearest inch.) for ATB, ATPB, UTB.

**** ITD minimum Subbase (SB) thickness is 0.35 ft. (4.2"), but for practical purposes, 0.5 ft. (6") is used here.

PAVEMENT DESIGN - STRUCTURAL NUMBER METHOD

Unreinforced

Known Variables			Source
	SN req.	3.8	AASHTO nomograph
	a1	0.44	Table 76.13, CERM, plant mix
	m2	0.9	Geotech report
	a2	0.14	Table 76.13, crushed base

Asphalt Thickness	SN1	Aggregate Thickness	Total Thickness
3	1.32	19.68	22.68
4	1.76	16.19	20.19
5	2.2	12.70	17.70
6	2.64	9.21	15.21
7	3.08	5.71	12.71
8	3.52	2.22	10.22

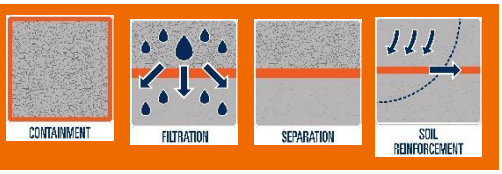
Reinforced

Known Variables			Source
	SN req.	2.8	AASHTO nomograph
	a1	0.44	Table 76.13, CERM, plant mix
	m2	0.9	Geotech report
	a2	0.14	Table 76.13, crushed base

Asphalt Thickness	SN1	Aggregate Thickness	Total Thickness
3	1.32	11.75	14.75
4	1.76	8.25	12.25
4.5	1.98	6.51	11.01
5	2.2	4.76	9.76
6	2.64	1.27	7.27
7	3.08	-2.22	4.78
8	3.52	-5.71	2.29

TENCATE GEOSYNTHETICS
Americas

Mirafi® RS580*i*



Mirafi® RS580*i* is a specially designed geosynthetic that integrates the key performance characteristics to maximize performance. Extensive performance testing has been performed per AASHTO and FHWA guidelines to validate performance for both paved and unpaved roads.

Roadway Design and Performance Properties	Guidance Document / Test Method	Unit	Design / Calibration Value	
Base Course M_R Improvement Factor[1]	AASHTO R50-09	---	1.40	
Subgrade M_R Improvement / Increase[2]	AASHTO R50-09	lb/in^2 (MPa)	9,000 (62.0)	
Cyclic Tensile Modulus: J_{cyclic}[3]	ASTM D7556	kip/ft (kN/m)	MD	CD
			60 (876)	160 (2,336)
Resilient Interface Shear Stiffness: G_I[3]	ASTM D7499	kip/in^2 (MPa)	329 (2,268)	
Traffic Benefit Ratio: TBR[4,5,6]	AASHTO R50-09	---	9.0 / 13.1 / 39.0	
Interaction Coefficient: C_i[7]	ASTM D6706	---	0.90	
Pore Pressure Dissipation Ratio[4]	Measured	---	2.0	
Typical Dynamic Filtration Pore Size 0_{95} / 0_{50} [8]	ASTM D6767	microns	337 / 192	
Maximum Percent Open Area: MPOA[9]	ASTM D6767	Percent	7.3	
Tensile Strength @ 2% Strain (MARV)	ASTM D4595	lb/ft (kN/m)	480 (7.0)	1,800 (26.3)
Tensile Strength @ 5% Strain (MARV)	ASTM D4595	lb/ft (kN/m)	1,440 (21.0)	4,380 (63.9)

Index Properties	Test Method	Unit	Roll Value
Apparent Opening Size, AOS (Maximum Roll Value)	ASTM D4751	U.S Sieve (mm)	40 (0.425)
Hydraulic Flow Rate (MARV)	ASTM D4491	gal/min/ft^2 (l/min/m^2)	75 (3,056)
Permittivity (MARV)	ASTM D4491	sec^{-1}	1.0
UV Resistance (at 500 hours exposure)	ASTM D4355	% strength retained	90

FGS000703
ETQR17

GAI-LAP-25-97

Notes:

[1] Value Determined from Results of Independent Testing Performed at Kansas State University in accordance with NCHRP Report 512 "Accelerated Pavement Testing: Data Guidelines" and AASHTO R50-09 Geosynthetic Reinforcement of the Aggregate Base Course of Flexible Pavement Structures." Multiplier for Unbound Granular Material; for SG M_R between 4.5 and 6.9 ksi (30.9 and 47.4 MPa).

[2] Value Determined from Results of Independent Testing and Geosynthetic Calibrations to AASHTOWare ME Reported by NCHRP 01-50 "Quantifying the Influence of Geosynthetics on Pavement Performance." Subgrade M_R Increase for SG M_R between 5 and 25 ksi (69 and 172 MPa).

[3] Value Determined from Results of Independent Testing and Geosynthetic Calibrations Reported by WTI / MTSU "Relative Operational Performance of Geosynthetics Used as Subgrade Stabilization." Cyclic Tensile Modulus Measured at 2% Permanent Strain; Resilient Interface Shear Stiffness Normal Stress = 5.08 psi (35 kPa); Interface Shear Stress = 0.73 psi (5 kPa).

[4] Value Determined from Results of Independent Testing Performed at GeoTesting Express (GeoComp) "A Laboratory Evaluation of the Performance of TenCate Mirafi® Geosynthetics in Roadway Stabilization Applications – Georgia Silt Subgrade," September 1, 2011. 9-kip {40 kN} Wheel Load, SG CBR = 1%, 12-inch (300-mm) Crushed Aggregate BC (CBR > 25%), 3-inch (75-mm) Rut Depth.

[5] Value Determined from Results of Independent Testing Performed at LTRC "Performance of Reinforced–Stabilized Unpaved Test Sections Built Over Native Soft Soil Under Full-Scale Moving Wheel Loads," TRR Volume 2511, 2015. Measured at 0.34-inch (8.64 mm) Rut Depth; Peak Pore Pressure 6-inches (150 mm) Below Geosynthetic.

[6] Value Determined from Results of Independent Testing Performed at GeoTesting Express (GeoComp) "A Laboratory Evaluation of the Performance of TenCate Mirafi® Geosynthetics in Roadway Stabilization Applications – Montana Clay Subgrade," September 1, 2011. 9-kip (40 kN) Wheel Load, SG CBR = 1.8%, 8-inch (200-mm) Rounded Aggregate BC (CBR > 25%), 3-inch (75-mm) Rut Depth.

[7] Interaction Coefficient value is for sand (SP) or gravel (GW) based on testing conducted by SGI Testing Services.

[8] Typical Value Determined from Specimen Results of Independent Testing Performed at TRI Environmental, Various Dates.

[9] Maximum Value Determined from Specimen Results of Independent Testing Performed at TRI Environmental, Various Dates.

U.S. Patent 8,333,220 and 8,598,054

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Appendix J
Asphalt and Base Summary

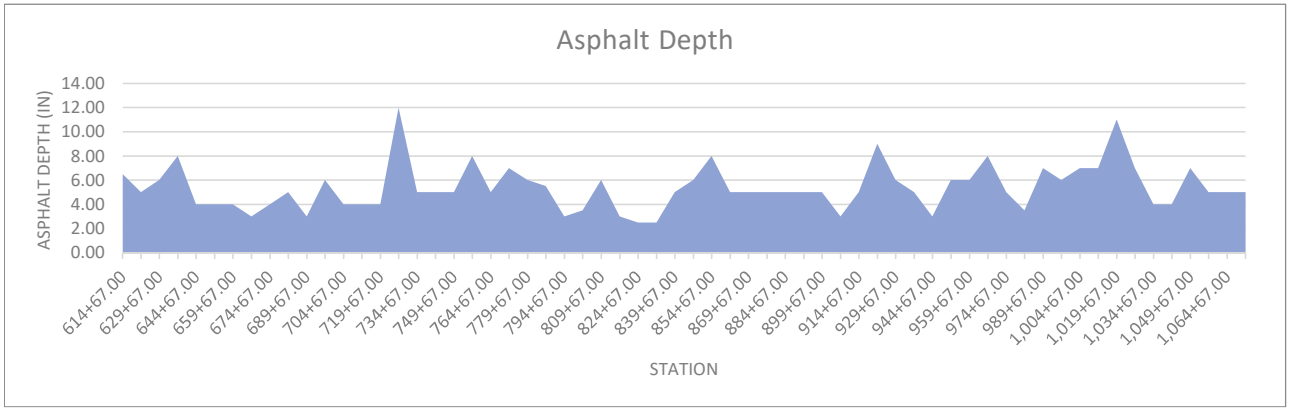
Asphalt and Base Depth Summary

Boring #	Distance (ft)	Station	Asphalt Depth (in)	Base Depth (in)	Total Depth (in)	Average Paved Width (ft)	Asphalt Average End Area (sqft)	Base Average End Area (sqft)	Asphalt Volume (BCY)	Base Volume (BCY)
1	0.00	614+67.00	6.50	18	24.50	26	14.08	39.00	0.00	0.00
2	750.00	622+17.00	5	19	24.00	26	10.83	41.17	346.06	1113.43
3	1500.00	629+67.00	6	18	24.00	22	11.00	33.00	303.24	1030.09
4	2250.00	637+17.00	8	2	10.00	22	14.67	3.67	356.48	509.26
5	3000.00	644+67.00	4	18	22.00	22	7.33	33.00	305.56	509.26
6	3750.00	652+17.00	4	16	20.00	22	7.33	29.33	203.70	865.74
7	4500.00	659+67.00	4	14	18.00	22	7.33	25.67	203.70	763.89
8	5250.00	667+17.00	3	18	21.00	22	5.50	33.00	178.24	814.81
9	6000.00	674+67.00	4	8	12.00	22	7.33	14.67	178.24	662.04
10	6750.00	682+17.00	5	13	18.00	22	9.17	23.83	229.17	534.72
11	7500.00	689+67.00	3	14	17.00	22	5.50	25.67	203.70	687.50
12	8250.00	697+17.00	6	12	18.00	22	11.00	22.00	229.17	662.04
13	9000.00	704+67.00	4	6	10.00	22	7.33	11.00	254.63	458.33
14	9750.00	712+17.00	4	8	12.00	22	7.33	14.67	203.70	356.48
15	10500.00	719+67.00	4	10	14.00	22	7.33	18.33	203.70	458.33
16	11250.00	727+17.00	12	4	16.00	22	22.00	7.33	407.41	356.48
17	12000.00	734+67.00	5	4	9.00	22	9.17	7.33	432.87	203.70
18	12750.00	742+17.00	5	12	17.00	22	9.17	22.00	254.63	407.41
19	13500.00	749+67.00	5	8	13.00	22	9.17	14.67	254.63	509.26
20	14250.00	757+17.00	8	10	18.00	22	14.67	18.33	331.02	458.33
21	15000.00	764+67.00	5	7	12.00	22	9.17	12.83	331.02	432.87
22	15750.00	772+17.00	7	14	21.00	22	12.83	25.67	305.56	534.72
23	16500.00	779+67.00	6	6	12.00	22	11.00	11.00	331.02	509.26
24	17250.00	787+17.00	5.5	3	8.50	22	10.08	5.50	292.82	229.17
25	18000.00	794+67.00	3	3	6.00	22	5.50	5.50	216.44	152.78
26	18750.00	802+17.00	3.5	8	11.50	22	6.42	14.67	165.51	280.09
27	19500.00	809+67.00	6	0	6.00	22	11.00	0.00	241.90	203.70
28	20250.00	817+17.00	3	9	12.00	22	5.50	16.50	229.17	229.17
29	21000.00	824+67.00	2.5	4	6.50	22	4.58	7.33	140.05	331.02
30	21750.00	832+17.00	2.5	3	5.50	22	4.58	5.50	127.31	178.24
31	22500.00	839+67.00	5	5	10.00	22	9.17	9.17	190.97	203.70
32	23250.00	847+17.00	6	6	12.00	22	11.00	11.00	280.09	280.09
33	24000.00	854+67.00	8	7	15.00	22	14.67	12.83	356.48	331.02
34	24750.00	862+17.00	5	8	13.00	22	9.17	14.67	331.02	381.94
35	25500.00	869+67.00	5	4	9.00	22	9.17	7.33	254.63	305.56
36	26250.00	877+17.00	5	7	12.00	22	9.17	12.83	254.63	280.09
37	27000.00	884+67.00	5	6	11.00	22	9.17	11.00	254.63	331.02
38	27750.00	892+17.00	5	7	12.00	22	9.17	12.83	254.63	331.02
39	28500.00	899+67.00	5	7	12.00	22	9.17	12.83	254.63	356.48
40	29250.00	907+17.00	3	7	10.00	22	5.50	12.83	203.70	356.48
41	30000.00	914+67.00	5	5	10.00	22	9.17	9.17	203.70	305.56
42	30750.00	922+17.00	9	7	16.00	22	16.50	12.83	356.48	305.56
43	31500.00	929+67.00	6	7	13.00	22	11.00	12.83	381.94	356.48
44	32250.00	937+17.00	5	6	11.00	22	9.17	11.00	280.09	331.02
45	33000.00	944+67.00	3	9	12.00	22	5.50	16.50	203.70	381.94
46	33750.00	952+17.00	6	6	12.00	22	11.00	11.00	229.17	381.94
47	34500.00	959+67.00	6	6	12.00	22	11.00	11.00	305.56	305.56
48	35250.00	967+17.00	8	3	11.00	22	14.67	5.50	356.48	229.17
49	36000.00	974+67.00	5	3	8.00	22	9.17	5.50	331.02	152.78
50	36750.00	982+17.00	3.5	3	6.50	22	6.42	5.50	216.44	152.78
51	37500.00	989+67.00	7	0	7.00	22	12.83	0.00	267.36	76.39
52	38250.00	997+17.00	6	0	6.00	22	11.00	0.00	331.02	0.00
53	39000.00	1,004+67.00	7	3	10.00	22	12.83	5.50	331.02	76.39

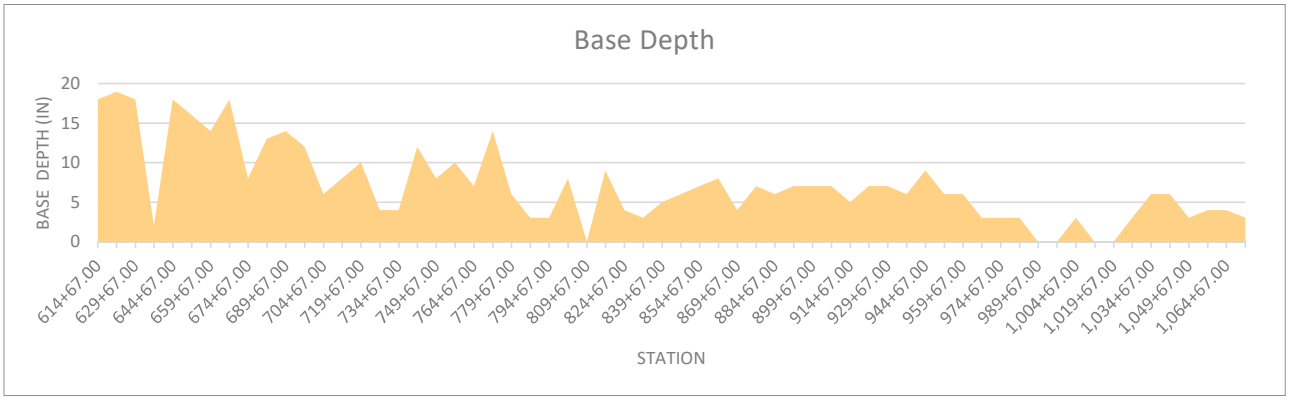
Boring #	Distance (ft)	Station	Asphalt Depth (in)	Base Depth (in)	Total Depth (in)	Average Paved Width (ft)	Asphalt Average End Area (sqft)	Base Average End Area (sqft)	Asphalt Volume (BCY)	Base Volume (BCY)
54	39750.00	1,012+17.00	7	0	7.00	22	12.83	0.00	356.48	76.39
55	40500.00	1,019+67.00	11	0	11.00	22	20.17	0.00	458.33	0.00
56	41250.00	1,027+17.00	7	3	10.00	22	12.83	5.50	458.33	76.39
57	42000.00	1,034+67.00	4	6	10.00	22	7.33	11.00	280.09	229.17
58	42750.00	1,042+17.00	4	6	10.00	22	7.33	11.00	203.70	305.56
59	43500.00	1,049+67.00	7	3	10.00	22	12.83	5.50	280.09	229.17
60	44250.00	1,057+17.00	5	4	9.00	22	9.17	7.33	305.56	178.24
61	45000.00	1,064+67.00	5	4	9.00	22	9.17	7.33	254.63	203.70
62	45075.37	1,065+42.37	5	3	8.00	22	9.17	5.50	25.59	17.91
								Totals (BCY):	16645.71	22064.61

Totals include estimated quantities to current project finish at STA 1,069+33.67

Depth Statistics:				
	Min =	2.50	0.00	2.50
	Max =	12.00	19.00	31.00
	Range =	9.50	19.00	28.50
	Ave =	5.37	7.10	12.47
	Median =	5.00	6.00	11.00



Asphalt Depth Distribution		
Range	# Samples	% of Total
<=3"	8	13%
>3",<=6"	40	65%
>6"	14	23%



Base Depth Distibution		
Range	# Samples	% of Total
<=6"	33	53%
>6",<=12"	19	31%
>12"	10	16%

Appendix K
Right-of-Way

Right of way for Black Mountain Road through Sections 5, 6, 7, 8, 9, 10, 13, 14, 15, 23, and 24 of Township 43 North, Range 92 West, 6 P.M. and Sections 18, 19 and 20 of Township 43 North, Range 91 West, 6 P.M., Hot Springs County, Wyoming.

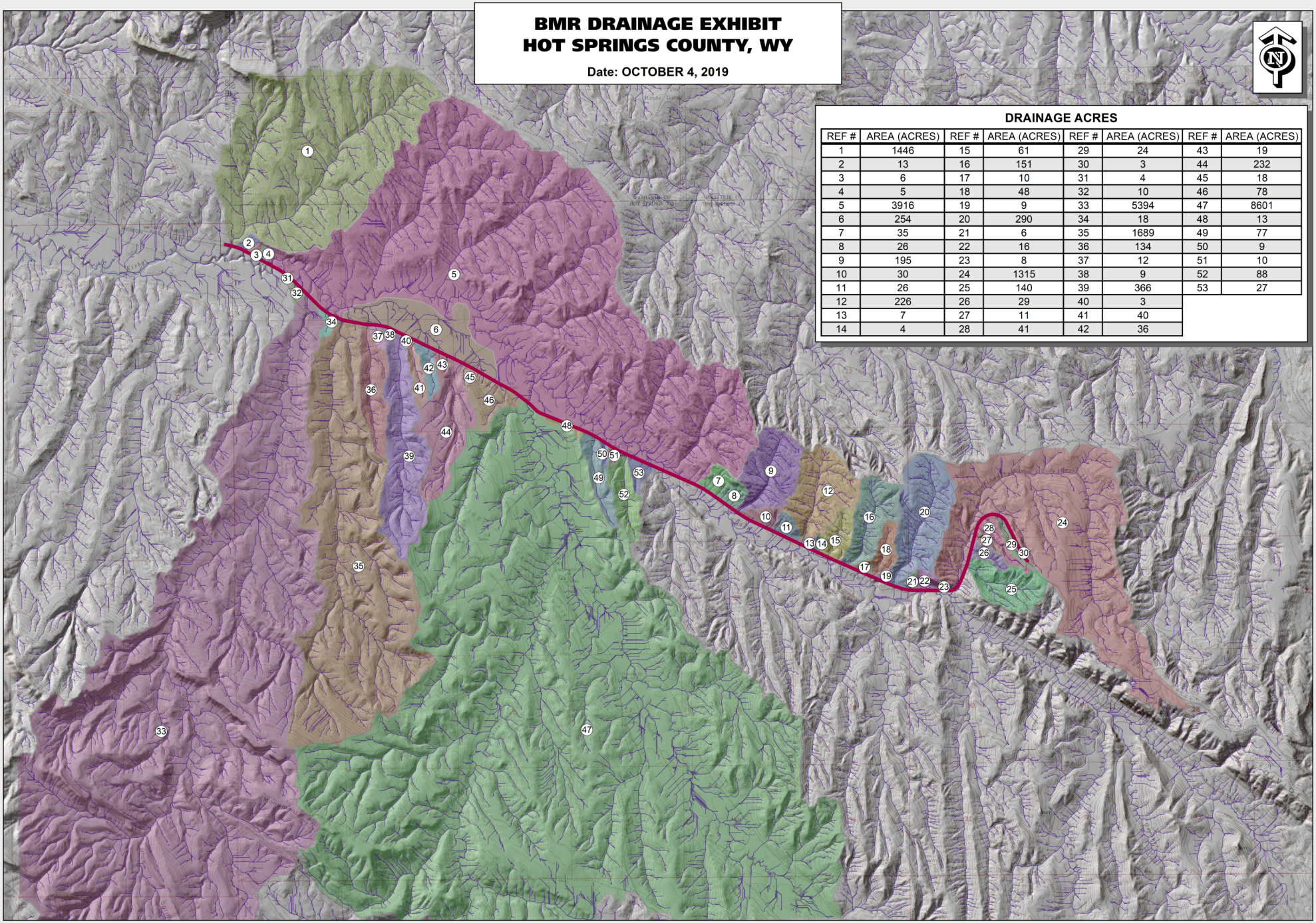
There has been evidence presented to this office that the portions of Black Mountain Road within:

1. Sections 5, 6, 7, 8 and 9 of T43N, R92W crossing BLM land are WYDOT right of way for Highway 172 and is 150 feet wide.
2. Sections 10, 13, 14, 15, 23, and 24 of T43N, R92W and Sections 18, 19 and 20 of T43N, R91W crossing BLM land is a RS2477 road right of way and is 100 feet wide.
3. Section 19 of T43N, R91W crossing STATE OF WYOMING land is an easement granted under permit number 4311 and is 60 feet wide.

Appendix L
Drainage Analysis

BMR DRAINAGE EXHIBIT
HOT SPRINGS COUNTY, WY

Date: OCTOBER 4, 2019



DRAINAGE ACRES

REF #	AREA (ACRES)	REF #	AREA (ACRES)	REF #	AREA (ACRES)	REF #	AREA (ACRES)
1	1446	15	61	29	24	43	19
2	13	16	151	30	3	44	232
3	6	17	10	31	4	45	18
4	5	18	48	32	10	46	78
5	3916	19	9	33	5394	47	8601
6	254	20	290	34	18	48	13
7	35	21	6	35	1689	49	77
8	26	22	16	36	134	50	9
9	195	23	8	37	12	51	10
10	30	24	1315	38	9	52	88
11	26	25	140	39	366	53	27
12	226	26	29	40	3		
13	7	27	11	41	40		
14	4	28	41	42	36		

1 inch = 6,000 feet

0 3,000 6,000 9,000 12,000 Feet

Coordinate System: NAD 1983 2011 StatePlane Wyoming W Central FIPS 4903 Ft US

Legend

DRAINAGE NETWORK (DARK LINE)

ROADWAY ALIGNMENT

COLOR RANGE FOR DRAINAGES

T·O ENGINEERS

Black Mountain Road
Hot Springs County
Stormwater Flow Information

*Q generated using WIN TR-55 from USDA, 10 yr storm

Assumptions:
-Flow is shallow concentrated
-Land use is Sagebrush w/ grass understory, Hydrologic Group C

Ref #	Area (Acres)	High Elev	Low Elev	Length (ft.)	Slope (ft/ft)	Q (cfs)*
1	1447	4699	4471	12210	0.0187	13.3
2	13	4546	4487	850	0.0694	0.17
3	6	4581	4484	710	0.1366	0.08
4	6	4574	4484	765	0.1176	0.08
5	3916	Flow goes to river, utilizes bridge crossing				
6	254	Flow goes to river, utilizes bridge crossing				
7	35	4851	4631	1670	0.1317	0.46
8	26	4879	4646	1250	0.1864	0.34
9	195	4806	4647	4420	0.0360	2.27
10	30	4825	4655	1900	0.0895	0.39
11	26	4827	4670	1690	0.0929	0.34
12	226	4803	4666	4560	0.0300	2.58
13	7	4829	4668	780	0.2064	0.09
14	4	4840	4668	830	0.2072	0.05
15	62	4861	4670	2760	0.0692	0.79
16	151	4897	4688	4720	0.0443	1.77
17	11	4851	4702	890	0.1674	0.14
18	48	4920	4709	2690	0.0784	0.61
19	10	4810	4712	710	0.1380	0.13
20	291	4910	4707	6620	0.0307	3.12
21	6	4880	4706	930	0.1871	0.08
22	17	4887	4703	980	0.1878	0.22
23	9	4750	4709	1010	0.0406	0.12
24	1316	5121	4728	20500	0.0192	10.67
25	141	5045	4771	4030	0.0680	1.74
26	29	4962	4783	1890	0.0947	0.38
27	12	4937	4783	1490	0.1034	0.16
28	42	5010	4790	3290	0.0669	0.53
29	24	5008	4842	2720	0.0610	0.3
30	3	4999	4955	940	0.0468	0.1
31	4	4503	4489	1020	0.0137	0.05
32	10	4511	4499	930	0.0129	0.13
33	5395	Flow goes to river, utilizes bridge crossing				
34	18	4569	4508	2140	0.0285	0.23
35	1690	5189	4504	20300	0.0337	14.77

36	135	4726	4528	6080	0.0326	1.47
37	13	4634	4529	1290	0.0814	0.17
38	10	4619	4541	850	0.0918	0.13
39	367	4947	4543	10700	0.0378	3.7
40	3	4605	4546	550	0.1073	0.1
41	41	4725	4548	3340	0.0530	0.51
42	36	4711	4540	2720	0.0629	0.46
43	19	4688	4551	1640	0.0835	0.25
44	232	4850	4562	7180	0.0401	2.51
45	19	4690	4557	1910	0.0696	0.24
46	78	4717	4561	3600	0.0433	0.95
47	8602	Flow goes to river, utilizes bridge crossing				
48	14	4681	4573	2390	0.0452	0.18
49	76	4746	4587	4440	0.0358	0.89
50	10	4725	4602	1100	0.1118	0.13
51	11	4727	4618	1000	0.1090	0.14
52	88	4776	4607	4130	0.0409	1.05
53	27	4772	4601	2020	0.0847	0.35

WinTR-55 Current Data Description

--- Identification Data ---

User: WW
Project: BMR
SubTitle:
State: Wyoming
County: Hot Springs
Filename: <new file>

Date: 10/4/2019
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
#1		Outlet	1447	63	1.537
#2		Outlet	13	63	0.1
#3		Outlet	6	63	0.1
#4		Outlet	6	63	0.1
#7		Outlet	35	63	0.1
#8		Outlet	26	63	0.1
#9		Outlet	195	63	.401
#10		Outlet	30	63	.109
#11		Outlet	26	63	0.1
#12		Outlet	226	63	.453

Total area: 2010 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW BMR

Hot Springs County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW BMR

Hot Springs County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)
SUBAREAS	
#1	13.30
#2	0.17
#3	0.08
#4	0.08
#7	0.46
#8	0.34
#9	2.27
#10	0.39
#11	0.34
#12	2.58
REACHES	
OUTLET	18.20

WW BMR

Hot Springs County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)
SUBAREAS		
#1	13.30	14.00
#2	0.17	12.34
#3	0.08	12.34
#4	0.08	12.34
#7	0.46	12.34
#8	0.34	12.34
#9	2.27	12.62
#10	0.39	12.34
#11	0.34	12.34
#12	2.58	12.68
REACHES		
OUTLET	18.20	

WW BMR

Hot Springs County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
#1	1447.00	1.537	63	Outlet	
#2	13.00	0.100	63	Outlet	
#3	6.00	0.100	63	Outlet	
#4	6.00	0.100	63	Outlet	
#7	35.00	0.100	63	Outlet	
#8	26.00	0.100	63	Outlet	
#9	195.00	0.401	63	Outlet	
#10	30.00	0.109	63	Outlet	
#11	26.00	0.100	63	Outlet	
#12	226.00	0.453	63	Outlet	

Total Area: 2010 (ac)

Hot Springs County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
#1							
SHALLOW	12210	0.0187	1.1				1.537
					Time of Concentration		1.537
#2							
SHALLOW	850	0.0694	1.1				0.056
					Time of Concentration		0.1
#3							
SHALLOW	710	0.1366	1.1				0.033
					Time of Concentration		0.1
#4							
SHALLOW	765	0.1176	1.1				0.038
					Time of Concentration		0.1
#7							
SHALLOW	1670	0.1317	1.1				0.079
					Time of Concentration		0.1
#8							
SHALLOW	1250	0.1864	1.1				0.050
					Time of Concentration		0.1
#9							
SHALLOW	4420	0.0360	1.1				0.401
					Time of Concentration		.401
#10							
SHALLOW	1900	0.0895	1.1				0.109
					Time of Concentration		.109
#11							
SHALLOW	1690	0.0929	1.1				0.095
					Time of Concentration		0.1
#12							
SHALLOW	4560	0.0300	1.1				0.453
					Time of Concentration		.453

Hot Springs County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
#1	Sagebrush (w/ grass understory)	(fair)	C	1447	63
	Total Area / Weighted Curve Number			1447	63
				====	==
#2	Sagebrush (w/ grass understory)	(fair)	C	13	63
	Total Area / Weighted Curve Number			13	63
				==	==
#3	Sagebrush (w/ grass understory)	(fair)	C	6	63
	Total Area / Weighted Curve Number			6	63
				=	==
#4	Sagebrush (w/ grass understory)	(fair)	C	6	63
	Total Area / Weighted Curve Number			6	63
				=	==
#7	Sagebrush (w/ grass understory)	(fair)	C	35	63
	Total Area / Weighted Curve Number			35	63
				==	==
#8	Sagebrush (w/ grass understory)	(fair)	C	26	63
	Total Area / Weighted Curve Number			26	63
				==	==
#9	Sagebrush (w/ grass understory)	(fair)	C	195	63
	Total Area / Weighted Curve Number			195	63
				===	==
#10	Sagebrush (w/ grass understory)	(fair)	C	30	63
	Total Area / Weighted Curve Number			30	63
				==	==
#11	Sagebrush (w/ grass understory)	(fair)	C	26	63
	Total Area / Weighted Curve Number			26	63
				==	==
#12	Sagebrush (w/ grass understory)	(fair)	C	226	63
	Total Area / Weighted Curve Number			226	63
				===	==

WinTR-55 Current Data Description

--- Identification Data ---

User: WW
Project: BMR
SubTitle: Areas 13-22
State: Wyoming
County: Hot Springs
Filename: <new file>

Date: 10/4/2019
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
#13		Outlet	7	63	0.1
#14		Outlet	4	63	0.1
#15		Outlet	62	63	.181
#16		Outlet	151	63	.386
#17		Outlet	11	63	0.1
#18		Outlet	48	63	.165
#19		Outlet	10	63	0.1
#20		Outlet	291	63	.65
#21		Outlet	6	63	0.1
#22		Outlet	17	63	0.1

Total area: 607 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW BMR
Areas 13-22
Hot Springs County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW BMR
Areas 13-22
Hot Springs County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)
SUBAREAS	
#13	0.09
#14	0.05
#15	0.79
#16	1.77
#17	0.14
#18	0.61
#19	0.13
#20	3.12
#21	0.08
#22	0.22
REACHES	
OUTLET	6.49

WW BMR
Areas 13-22
Hot Springs County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs) (hr)
SUBAREAS	
#13	0.09 12.34
#14	0.05 12.34
#15	0.79 12.42
#16	1.77 12.60
#17	0.14 12.34
#18	0.61 12.41
#19	0.13 12.34
#20	3.12 12.95
#21	0.08 12.34
#22	0.22 12.34
REACHES	
OUTLET	6.49

WW BMR

Areas 13-22

Hot Springs County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
#13	7.00	0.100	63	Outlet	
#14	4.00	0.100	63	Outlet	
#15	62.00	0.181	63	Outlet	
#16	151.00	0.386	63	Outlet	
#17	11.00	0.100	63	Outlet	
#18	48.00	0.165	63	Outlet	
#19	10.00	0.100	63	Outlet	
#20	291.00	0.650	63	Outlet	
#21	6.00	0.100	63	Outlet	
#22	17.00	0.100	63	Outlet	

Total Area: 607 (ac)

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
#13							
SHALLOW	780	0.2064	0.050				0.030
					Time of Concentration		0.1
#14							
SHALLOW	830	0.2072	0.050				0.031
					Time of Concentration		0.1
#15							
SHALLOW	2760	0.0692	0.050				0.181
					Time of Concentration		.181
#16							
SHALLOW	4720	0.0443	0.050				0.386
					Time of Concentration		.386
#17							
SHALLOW	890	0.1674	0.050				0.037
					Time of Concentration		0.1
#18							
SHALLOW	2690	0.0784	0.050				0.165
					Time of Concentration		.165
#19							
SHALLOW	710	0.1380	0.050				0.033
					Time of Concentration		0.1
#20							
SHALLOW	6620	0.0307	0.050				0.650
					Time of Concentration		.65
#21							
SHALLOW	930	0.1871	0.050				0.037
					Time of Concentration		0.1
#22							
SHALLOW	980	0.1878	0.050				0.039
					Time of Concentration		0.1

BMR
Areas 13-22
Hot Springs County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
#13	Sagebrush (w/ grass understory)	(fair)	C	7	63
	Total Area / Weighted Curve Number			7	63
				=	==
#14	Sagebrush (w/ grass understory)	(fair)	C	4	63
	Total Area / Weighted Curve Number			4	63
				=	==
#15	Sagebrush (w/ grass understory)	(fair)	C	62	63
	Total Area / Weighted Curve Number			62	63
				==	==
#16	Sagebrush (w/ grass understory)	(fair)	C	151	63
	Total Area / Weighted Curve Number			151	63
				===	==
#17	Sagebrush (w/ grass understory)	(fair)	C	11	63
	Total Area / Weighted Curve Number			11	63
				==	==
#18	Sagebrush (w/ grass understory)	(fair)	C	48	63
	Total Area / Weighted Curve Number			48	63
				==	==
#19	Sagebrush (w/ grass understory)	(fair)	C	10	63
	Total Area / Weighted Curve Number			10	63
				==	==
#20	Sagebrush (w/ grass understory)	(fair)	C	291	63
	Total Area / Weighted Curve Number			291	63
				===	==
#21	Sagebrush (w/ grass understory)	(fair)	C	6	63
	Total Area / Weighted Curve Number			6	63
				=	==
#22	Sagebrush (w/ grass understory)	(fair)	C	17	63
	Total Area / Weighted Curve Number			17	63
				==	==

WinTR-55 Current Data Description

--- Identification Data ---

User: WW
Project: BMR
SubTitle: Areas 23-32
State: Wyoming
County: Hot Springs
Filename: <new file>

Date: 10/4/2019
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
#23		Outlet	9	63	0.1
#24		Outlet	1316	63	2.547
#25		Outlet	141	63	.266
#26		Outlet	29	63	.106
#27		Outlet	12	63	0.1
#28		Outlet	42	63	.219
#29		Outlet	24	63	.19
#30		Outlet	3	63	0.1
#31		Outlet	4	63	.15
#32		Outlet	10	63	.141

Total area: 1590 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW BMR

Areas 23-32

Hot Springs County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW

BMR
Areas 23-32
Hot Springs County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)
SUBAREAS	
#23	0.12
#24	10.67
#25	1.74
#26	0.38
#27	0.16
#28	0.53
#29	0.30
#30	.00
#31	0.05
#32	0.13
REACHES	
OUTLET	12.66

WW BMR
Areas 23-32
Hot Springs County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs) (hr)
SUBAREAS	
#23	0.12 12.34
#24	10.67 15.02
#25	1.74 12.48
#26	0.38 12.34
#27	0.16 12.34
#28	0.53 12.45
#29	0.30 12.43
#30	.00 n/a
#31	0.05 12.38
#32	0.13 12.36
REACHES	
OUTLET	12.66

WW

BMR
Areas 23-32
Hot Springs County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
#23	9.00	0.100	63	Outlet	
#24	1316.00	2.547	63	Outlet	
#25	141.00	0.266	63	Outlet	
#26	29.00	0.106	63	Outlet	
#27	12.00	0.100	63	Outlet	
#28	42.00	0.219	63	Outlet	
#29	24.00	0.190	63	Outlet	
#30	3.00	0.100	63	Outlet	
#31	4.00	0.150	63	Outlet	
#32	10.00	0.141	63	Outlet	

Total Area: 1590 (ac)

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
#23							
SHALLOW	1010	0.0406	0.050				0.086
					Time of Concentration		0.1
#24							
SHALLOW	20500	0.0192	0.050				2.547
					Time of Concentration		2.547
#25							
SHALLOW	4030	0.0680	0.050				0.266
					Time of Concentration		.266
#26							
SHALLOW	1890	0.0947	0.050				0.106
					Time of Concentration		.106
#27							
SHALLOW	1490	0.1034	0.050				0.080
					Time of Concentration		0.1
#28							
SHALLOW	3290	0.0669	0.050				0.219
					Time of Concentration		.219
#29							
SHALLOW	2720	0.0610	0.050				0.190
					Time of Concentration		.19
#30							
SHALLOW	940	0.0468	0.050				0.075
					Time of Concentration		0.1
#31							
SHALLOW	1020	0.0137	0.050				0.150
					Time of Concentration		.15
#32							
SHALLOW	930	0.0129	0.050				0.141
					Time of Concentration		.141

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
#23	Sagebrush (w/ grass understory) (fair)	C	9	63
	Total Area / Weighted Curve Number		9	63
			=	==
#24	Sagebrush (w/ grass understory) (fair)	C	1316	63
	Total Area / Weighted Curve Number		1316	63
			====	==
#25	Sagebrush (w/ grass understory) (fair)	C	141	63
	Total Area / Weighted Curve Number		141	63
			===	==
#26	Sagebrush (w/ grass understory) (fair)	C	29	63
	Total Area / Weighted Curve Number		29	63
			==	==
#27	Sagebrush (w/ grass understory) (fair)	C	12	63
	Total Area / Weighted Curve Number		12	63
			==	==
#28	Sagebrush (w/ grass understory) (fair)	C	42	63
	Total Area / Weighted Curve Number		42	63
			==	==
#29	Sagebrush (w/ grass understory) (fair)	C	24	63
	Total Area / Weighted Curve Number		24	63
			==	==
#30	Sagebrush (w/ grass understory) (fair)	C	3	63
	Total Area / Weighted Curve Number		3	63
			=	==
#31	Sagebrush (w/ grass understory) (fair)	C	4	63
	Total Area / Weighted Curve Number		4	63
			=	==
#32	Sagebrush (w/ grass understory) (fair)	C	10	63
	Total Area / Weighted Curve Number		10	63
			==	==

WinTR-55 Current Data Description

--- Identification Data ---

User: WW
Project: BMR
SubTitle: Areas 34-43
State: Wyoming
County: Hot Springs
Filename: <new file>

Date: 10/4/2019
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
#34		Outlet	18	63	.218
#35		Outlet	1690	63	1.904
#36		Outlet	135	63	.58
#37		Outlet	13	63	0.1
#38		Outlet	10	63	0.1
#39		Outlet	367	63	.948
#40		Outlet	3	63	0.1
#41		Outlet	41	63	.25
#42		Outlet	36	63	.187
#43		Outlet	19	63	0.1

Total area: 2332 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW BMR
Areas 34-43
Hot Springs County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW

BMR
Areas 34-43
Hot Springs County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)
SUBAREAS	
#34	0.23
#35	14.77
#36	1.47
#37	0.17
#38	0.13
#39	3.70
#40	.00
#41	0.51
#42	0.46
#43	0.25
REACHES	
OUTLET	20.21

WW BMR
Areas 34-43
Hot Springs County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)
SUBAREAS		
#34	0.23	12.45
#35	14.77	14.37
#36	1.47	12.84
#37	0.17	12.34
#38	0.13	12.34
#39	3.70	13.34
#40	.00	n/a
#41	0.51	12.47
#42	0.46	12.42
#43	0.25	12.34
REACHES		
OUTLET	20.21	

WW BMR

Areas 34-43

Hot Springs County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
#34	18.00	0.218	63	Outlet	
#35	1690.00	1.904	63	Outlet	
#36	135.00	0.580	63	Outlet	
#37	13.00	0.100	63	Outlet	
#38	10.00	0.100	63	Outlet	
#39	367.00	0.948	63	Outlet	
#40	3.00	0.100	63	Outlet	
#41	41.00	0.250	63	Outlet	
#42	36.00	0.187	63	Outlet	
#43	19.00	0.100	63	Outlet	

Total Area: 2332 (ac)

Areas 34-43
Hot Springs County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
#34							
SHALLOW	2140	0.0285	0.050				0.218
					Time of Concentration		.218
#35							
SHALLOW	20300	0.0337	0.050				1.904
					Time of Concentration		1.904
#36							
SHALLOW	6080	0.0326	0.050				0.580
					Time of Concentration		.58
#37							
SHALLOW	1290	0.0814	0.050				0.078
					Time of Concentration		0.1
#38							
SHALLOW	850	0.0918	0.050				0.048
					Time of Concentration		0.1
#39							
SHALLOW	10700	0.0378	0.050				0.948
					Time of Concentration		.948
#40							
SHALLOW	550	0.1073	0.050				0.029
					Time of Concentration		0.1
#41							
SHALLOW	3340	0.0530	0.050				0.250
					Time of Concentration		.25
#42							
SHALLOW	2720	0.0629	0.050				0.187
					Time of Concentration		.187
#43							
SHALLOW	1640	0.0835	0.050				0.098
					Time of Concentration		0.1

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
#34	Sagebrush (w/ grass understory)	(fair)	C	18	63
	Total Area / Weighted Curve Number			18	63
				==	==
#35	Sagebrush (w/ grass understory)	(fair)	C	1690	63
	Total Area / Weighted Curve Number			1690	63
				====	==
#36	Sagebrush (w/ grass understory)	(fair)	C	135	63
	Total Area / Weighted Curve Number			135	63
				===	==
#37	Sagebrush (w/ grass understory)	(fair)	C	13	63
	Total Area / Weighted Curve Number			13	63
				==	==
#38	Sagebrush (w/ grass understory)	(fair)	C	10	63
	Total Area / Weighted Curve Number			10	63
				==	==
#39	Sagebrush (w/ grass understory)	(fair)	C	367	63
	Total Area / Weighted Curve Number			367	63
				===	==
#40	Sagebrush (w/ grass understory)	(fair)	C	3	63
	Total Area / Weighted Curve Number			3	63
				=	==
#41	Sagebrush (w/ grass understory)	(fair)	C	41	63
	Total Area / Weighted Curve Number			41	63
				==	==
#42	Sagebrush (w/ grass understory)	(fair)	C	36	63
	Total Area / Weighted Curve Number			36	63
				==	==
#43	Sagebrush (w/ grass understory)	(fair)	C	19	63
	Total Area / Weighted Curve Number			19	63
				==	==

WinTR-55 Current Data Description

--- Identification Data ---

User: WW
Project: BMR
SubTitle: Areas 44-53
State: Wyoming
County: Hot Springs
Filename: <new file>

Date: 10/4/2019
Units: English
Areal Units: Acres

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
#44		Outlet	232	63	.617
#45		Outlet	19	63	.125
#46		Outlet	78	63	.298
#48		Outlet	14	63	.194
#49		Outlet	76	63	.404
#50		Outlet	10	63	0.1
#51		Outlet	11	63	0.1
#52		Outlet	88	63	.352
#53		Outlet	27	63	.119

Total area: 555 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW BMR

Areas 44-53

Hot Springs County, Wyoming

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	-Yr (in)
1.1	1.55	1.87	2.35	2.65	2.95	.0

Storm Data Source: User-provided custom storm data
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

WW BMR

Areas 44-53

Hot Springs County, Wyoming

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period 10-Yr (cfs)
SUBAREAS	
#44	2.51
#45	0.24
#46	0.95
#48	0.18
#49	0.89
#50	0.13
#51	0.14
#52	1.05
#53	0.35
REACHES	
OUTLET	6.06

WW BMR
Areas 44-53
Hot Springs County, Wyoming

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period 10-Yr (cfs)	(hr)
SUBAREAS		
#44	2.51	12.90
#45	0.24	12.35
#46	0.95	12.51
#48	0.18	12.43
#49	0.89	12.63
#50	0.13	12.34
#51	0.14	12.34
#52	1.05	12.56
#53	0.35	12.35
REACHES		
OUTLET	6.06	

WW

BMR
Areas 44-53
Hot Springs County, Wyoming

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
#44	232.00	0.617	63	Outlet	
#45	19.00	0.125	63	Outlet	
#46	78.00	0.298	63	Outlet	
#48	14.00	0.194	63	Outlet	
#49	76.00	0.404	63	Outlet	
#50	10.00	0.100	63	Outlet	
#51	11.00	0.100	63	Outlet	
#52	88.00	0.352	63	Outlet	
#53	27.00	0.119	63	Outlet	

Total Area: 555 (ac)

WW BMR
Areas 44-53
Hot Springs County, Wyoming

Sub-Area Time of Concentration Details

Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
#44							
SHALLOW	7180	0.0401	0.050				0.617
					Time of Concentration		.617
#45							
SHALLOW	1910	0.0696	0.050				0.125
					Time of Concentration		.125
#46							
SHALLOW	3600	0.0433	0.050				0.298
					Time of Concentration		.298
#48							
SHALLOW	2390	0.0452	0.050				0.194
					Time of Concentration		.194
#49							
SHALLOW	4440	0.0358	0.050				0.404
					Time of Concentration		.404
#50							
SHALLOW	1100	0.1118	0.050				0.057
					Time of Concentration		0.1
#51							
SHALLOW	1000	0.1090	0.050				0.052
					Time of Concentration		0.1
#52							
SHALLOW	4130	0.0409	0.050				0.352
					Time of Concentration		.352
#53							
SHALLOW	2020	0.0847	0.050				0.119
					Time of Concentration		.119

BMR
Areas 44-53
Hot Springs County, Wyoming

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use		Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
#44	Sagebrush (w/ grass understory)	(fair)	C	232	63
	Total Area / Weighted Curve Number			232	63
				===	==
#45	Sagebrush (w/ grass understory)	(fair)	C	19	63
	Total Area / Weighted Curve Number			19	63
				==	==
#46	Sagebrush (w/ grass understory)	(fair)	C	78	63
	Total Area / Weighted Curve Number			78	63
				==	==
#48	Sagebrush (w/ grass understory)	(fair)	C	14	63
	Total Area / Weighted Curve Number			14	63
				==	==
#49	Sagebrush (w/ grass understory)	(fair)	C	76	63
	Total Area / Weighted Curve Number			76	63
				==	==
#50	Sagebrush (w/ grass understory)	(fair)	C	10	63
	Total Area / Weighted Curve Number			10	63
				==	==
#51	Sagebrush (w/ grass understory)	(fair)	C	11	63
	Total Area / Weighted Curve Number			11	63
				==	==
#52	Sagebrush (w/ grass understory)	(fair)	C	88	63
	Total Area / Weighted Curve Number			88	63
				==	==
#53	Sagebrush (w/ grass understory)	(fair)	C	27	63
	Total Area / Weighted Curve Number			27	63
				==	==

Appendix M
Inventory of Existing Conditions

APPROACH SUMMARY

APPROACH	STATION/SIDE	SURFACE
1	646+21.00 (L)	GRAVEL
2	647+20.00 (R)	ASPHALT
3	665+32.00 (L)	FIELD
4	674+10.00 (R)	ASPHALT
5	707+92.00 (R)	GRAVEL
6	736+50.00 (L)	FIELD
7	741+25.00 (L)	GRAVEL
8	742+15.00 (R)	GRAVEL
9	763+15.00 (L)	ASPHALT
10	765+80.00 (R)	ASPHALT
11	782+82.00 (L)	ASPHALT
12	793+77.00 (R)	FIELD
13	796+12.00 (L)	GRAVEL
14	849+40.00 (R)	FIELD
15	850+80.00 (L)	ASPHALT
16	882+56.00 (R)	FIELD
17	922+91.00 (L)	FIELD
18	965+22.00 (L)	FIELD
19	973+76.00 (R)	FIELD
20	998+32.00 (R)	ASPHALT
21	1013+88.00 (R)	ASPHALT
22	1035+75.00 (L)	GRAVEL
23	1069+10.00 (R)	GRAVEL

NOTE: ALL APPROACHS WILL BE IMPROVED TO THE ROW

CULVERT SUMMARY

Station	Existing Size	New Size	Remarks
617+83.73	Box	Box	
623+06.63	24"	24"	
628+18.18	24"	24"	
634+03.55	24"	24"	
643+42.4	24"	24"	
647+23.50	18"	18"	Remove and replace approach culvert
653+00.97	18"	18"	
661+07.25	72"	84"	Upsize to next WYDOT pay item
668+99.21	24"	24"	
674+13.30		18"	New approach culvert
680+88.65	64"	60"	Downsize to next WYDOT pay item
693+88.77	36"	36"	
700+36.76	24"	24"	
710+90.62	24"	24"	
714+46.83	6"	18"	Upsize
721+44.84	24"	24"	
729+99.58	30"	30"	
741+49.45	24"	24"	
750+89.71	18"	18"	
754+22.12	24"	24"	
763+15.05		18"	New approach culvert
765+82.59	18"	18"	Remove and replace approach culvert
782+85.95		18"	New approach culvert
785+39.69	18"	18"	
813+57.65	24"	Box	Upsize to box?
818+63.33	18"	18"	
830+57.50	30"	30"	
842+29.61	18"	18"	
849+87.95	80"	84"	Upsize to next WYDOT pay item
849+98.98	80"	84"	Upsize to next WYDOT pay item
850+80.72		18"	New approach culvert
865+97.40		18"	New roadway culvert
878+16.31	24"	24"	Probably needs upsizing
888+87.36	36"	36"	
896+85.90	24"	24"	
918+87.40		18"	New roadway culvert
922+03.10	36"	36"	
926+12.58	24"	24"	
932+49.70	18"	18"	
944+80.78	54"	60"	Upsize to next WYDOT pay item
951+03.20	15"	18"	Upsize
960+09.28	18"	18"	
965+62.50	18"	18"	
970+71.55	24"	24"	
981+22.40		18"	New roadway culvert
984+12.40		18"	New roadway culvert
990+34.43	18"	18"	
1003+55.34	60"	60"	
1011+07.40		18"	New roadway culvert
1019+72.40		18"	New roadway culvert
1026+49.96	24"	24"	
1029+49.89	24"	24"	
1044+83.48	24"	24"	
1060+97.40		18"	New roadway culvert

Size	Total
18"	24
24"	17
30"	2
36"	3
60"	3
84"	3
Box	2
	54

SIGN SUMMARY

East Bound

Sign Type	Mile Post	Station	Color(s)	Description
11.26 Mile Marker	0	620+39.54	Green	State Mile Marker 11.26 w/ 1 delineator Pole
HSC Rd. 6	0	620+70.45	Green & Blue	County Road 6
Open Range	0.05	622+21.63	Yellow/black	Open Range
Directional	0.3	638+50.00	Yellow/black	2 width signs for bridge, 2 on each side
L.O.R	0.4	645+15.24	Yellow/black	Livestock on Road
Jctn K.C.	7.1	765+50.00	Various	Kirby Creek Junction - CR7, BME, KCR , stop sign
Directional	2.9	777+50.00	Yellow/black	2 width signs for bridge, 2 on each side
Jctn L.C Rd.	7.1	998+72.40	Various	Lake Creek Rd. junction, BMR, Yield
180 curve	7.6	1025+67.40	Yellow/black	180 curve
2-signs	8.4	1067+06.17	Yellow/black	Danger - loose gravel/open range
Reduce	8.4	1068+77.21	Yellow/black	Reduce speed on gravel

West Bound

180 curve	8.2	1054+17.25	Yellow/black	180 curve
Jctn M.D.	7.8	1036+47.40	Various	Murphy Dome Road junction, BMR, Yield, WGFD
90 Turn	7.3	1008+73.60	Yellow/black	90 right hand turn
L.O.R	3.2	792+94.07	Yellow/black	Livestock on road 5.2
Bridge	3	777+50.00	2-width	2 width signs for bridge, 2 on each side
Bridge	0.3	638+50.00	Yellow/black	2 width signs for bridge, 2 on each side

FENCE SUMMARY

Left

Fence Type	Start STA	End STA
Wire	741+54.67	782+63.40
Wire	782+81.71	794+07.68
Wire	1068+47.64	1021+40.47

Right

Fence Type	Start STA	End STA
Wire	775+73.37	782+10.87
Wire	794+07.68	798+18.79

POTENTIAL WETLANDS SUMMARY

Left

Approx. STA	Acres
889+00.00	±0.7

Right

Approx. STA	Acres
852+00.00	±3.9
889+00.00	±0.3

Appendix N
Quantities and Cost Estimate

Cut/Fill Report

Generated: 2019-10-03 09:26:08

By user: TIreland

Drawing: K:\180372\3_Acaddwg\Model\K:\180372\3_Acaddwg\Model\180372-C-BM-PR.dwg

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Volume Surface - Complete Roadway Datum Section	full	1.000	1.000	2181301.86	56373.18	15036.34	41336.84<Cut>

Totals

	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	2181301.86	56373.18	15036.34	41336.84<Cut>

* Value adjusted by cut or fill factor other than 1.0

BLACK MOUNTAIN ROAD
Reconnaissance Report Cost Estimate
8/30/2019

T-O ENGINEERS

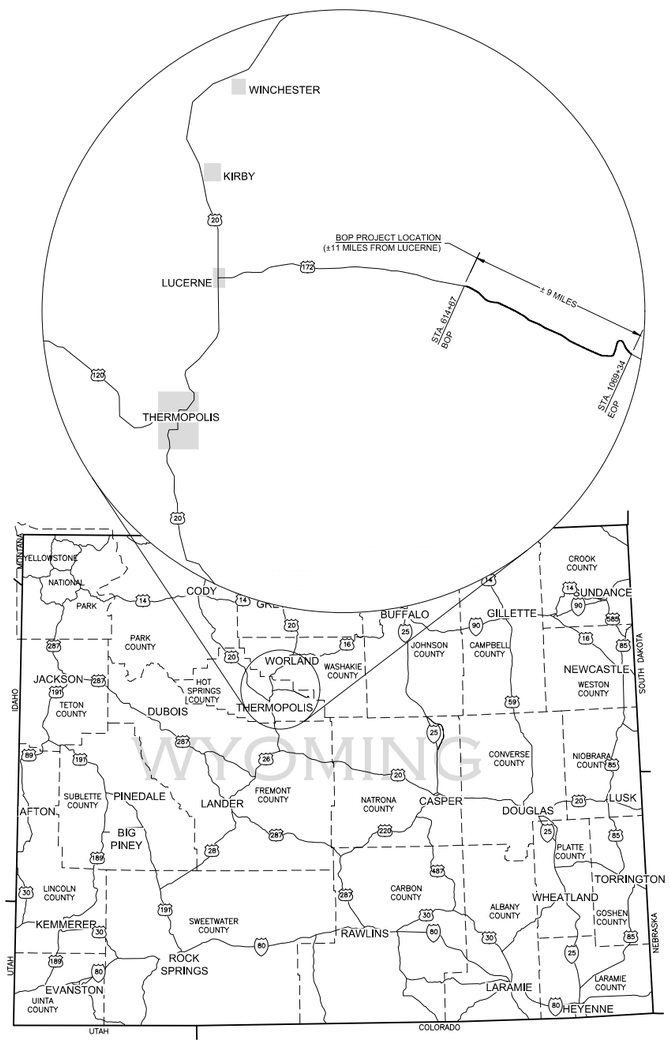
ITEM	ITEM DESCRIPTION	PROJECT QUANTITY	UNITS	UNIT PRICE	TOTAL PRICE
105.09010	CONTRACTOR SURVEYING	1	LS	$ 110,000.00	$ 110,000.00
106.05100	FIELD LABORATORY	1	EA	$ 15,000.00	$ 15,000.00
109.08000	MOBILIZATION	1	LS	$ 660,000.00	$ 660,000.00
201.03201	CLEARING AND GRUBBING	50	ACRE	$ 1,000.00	$ 50,000.00
202.03100	UTILITY CROSSINGS	8	EA	$ 1,000.00	$ 8,000.00
202.03120	REMOVAL OF SIGNS	21	EA	$ 150.00	$ 3,150.00
202.03140	REMOVAL OF CATTLE GUARDS	3	EA	$ 1,600.00	$ 4,800.00
202.03205	REMOVAL OF FENCE	6,700	FT	$ 0.50	$ 3,350.00
202.03260	REMOVAL OF PIPE	2,782	FT	$ 20.00	$ 55,640.00
202.03500	RESET MAILBOX (SINGLE)	10	EA	$ 400.00	$ 4,000.00
203.02000	BORROW SPECIAL EXCAVATION	33,900	CY	$ 10.00	$ 339,000.00
203.02500	UNCLASSIFIED EXCAVATION	10,000	CY	$ 8.00	$ 80,000.00
206.03300	CULVERT SUBEXCAVATION	200	CY	$ 20.00	$ 4,000.00
207.03100	TOPSOIL STORING	26,400	CY	$ 2.40	$ 63,360.00
207.03200	TOPSOIL PLACING	26,400	CY	$ 2.60	$ 68,640.00
209.01000	WATER	6,000	MG	$ 6.50	$ 39,000.00
215.03402	EXCELSIOR SEDIMENT LOG	728	FT	$ 10.00	$ 7,280.00
216.03105	SEEDING	237,000	SY	$ 0.40	$ 94,810.00
216.03120	FERTILIZER TYPE I	3,000	LB	$ 3.00	$ 9,000.00
216.03600	HYDRAULIC MULCHING	75	TON	$ 2,500.00	$ 187,500.00
217.01000	GEOTEXTILE, DRAINAGE AND FILTRATION	1,653	SY	$ 4.50	$ 7,440.00
217.01043	GEOTEXTILE, SUBGRADE REINFORCEMENT	110,940	SY	$ 2.25	$ 249,615.00
221.01000	DUST CONTROL AGENT	67	TON	$ 225.00	$ 14,980.00
301.01085	CRUSHED BASE	10,200	CY	$ 36.00	$ 367,200.00
399.00021	FULL DEPTH RECLAMATION	110,936	SY	$ 1.75	$ 194,140.00
401.02000	HOT PLANT MIX	30,785	TON	$ 50.00	$ 1,539,250.00
401.02040	TEST STRIP	1	EA	$ 15,000.00	$ 15,000.00
401.02055	HOT PLANT MIX APPROACHES	244	TON	$ 50.00	$ 12,210.00
401.03322	ASPHALT BINDER (PG 64-28)	1,862	TON	$ 580.00	$ 1,079,810.00
407.01000	TACK COAT	133	TON	$ 590.00	$ 78,550.00
502.11008	PRECAST BOX CULVERTS 10 X 8 FT	200	FT	$ 865.00	$ 173,000.00
511.06000	MACHINE-PLACED RIPRAP	462	CY	$ 100.00	$ 46,230.00
513.00020	CLASS B CONCRETE	25	CY	$ 950.00	$ 23,750.00
603.20018	RCP 18 in	1,518	FT	$ 45.00	$ 68,310.00
603.20024	RCP 24 in	1,014	FT	$ 80.00	$ 81,120.00
603.20030	RCP 30 in	133	FT	$ 110.00	$ 14,630.00
603.20036	RCP 36 in	189	FT	$ 240.00	$ 45,360.00
603.20060	RCP 60 in	215	FT	$ 340.00	$ 73,100.00
603.22018	RCP FE SECT 18 in	48	EA	$ 820.00	$ 39,360.00
603.22024	RCP FE SECT 24 in	34	EA	$ 1,000.00	$ 34,000.00
603.22030	RCP FE SECT 30 in	4	EA	$ 1,200.00	$ 4,800.00
603.22036	RCP FE SECT 36 in	6	EA	$ 1,800.00	$ 10,800.00
603.22060	RCP FE SECT 60 in	3	EA	$ 2,200.00	$ 6,600.00
603.22084	RCP FE SECT 84 in	3	EA	$ 1,800.00	$ 5,400.00
606.01020	MGS GUARD RAIL	600	FT	$ 33.00	$ 19,800.00
607.20500	FENCE TYPE E (WOOD POSTS)	6,700	FT	$ 1.80	$ 12,060.00
607.70709	GATES RAIL 4 -FT	2	EA	$ 200.00	$ 400.00
607.71300	GATES RAIL 16 -FT	4	EA	$ 500.00	$ 2,000.00
607.71500	GATES RAIL 20 -FT	4	EA	$ 500.00	$ 2,000.00
607.80100	BRACE PANELS	13	EA	$ 150.00	$ 2,010.00
607.90100	END PANELS	12	EA	$ 180.00	$ 2,160.00
611.10100	HIGHWAY MONUMENTS	20	EA	$ 250.00	$ 5,000.00
614.01000	EROSION CONTROL CONCRETE	20	CY	$ 700.00	$ 14,000.00
615.01024	CATTLE GUARD (HEAVY DUTY) 24 FT	3	EA	$ 19,000.00	$ 57,000.00
615.02018	CATTLE GUARD (MEDIUM DUTY) 18 FT	3	EA	$ 12,000.00	$ 36,000.00
615.08000	CATTLE GUARD SWING-WING	12	EA	$ 350.00	$ 4,200.00
617.01010	HEADWALL (CONC)	10	CY	$ 1,900.00	$ 19,000.00
702.30110	SIGN POSTS, WOOD 6 X 6 in	300	FT	$ 21.00	$ 6,300.00
702.30500	SIGN PANELS, ALUMINUM	250	SF	$ 30.00	$ 7,500.00
702.50200	DELINEATORS, TYPE II	300	EA	$ 40.00	$ 12,000.00
703.03100	FLAGGING	1,500	HR	$ 33.00	$ 49,500.00
				Total	**$ 6,132,115.00**
				Contingency (10%)	$ 613,220.00
				Engineering Design, Bidding, and CA Services	$ 978,100.00
				Grand Total	**$ 7,724,000.00**

Appendix O
Plans

BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT

HOT SPRINGS COUNTY,WYOMING

OCTOBER 2019



SHEET INDEX	
SHEET NUMBER	SHEET TITLE
1	COVER SHEET
2	KEY MAP AND SUMMARY SHEET
3	PLAN AND PROFILE SHEET 614+00 TO 641+00
4	PLAN AND PROFILE SHEET 641+00 TO 668+00
5	PLAN AND PROFILE SHEET 668+00 TO 695+00
6	PLAN AND PROFILE SHEET 695+00 TO 722+00
7	PLAN AND PROFILE SHEET 722+00 TO 749+00
8	PLAN AND PROFILE SHEET 749+00 TO 776+00
9	PLAN AND PROFILE SHEET 776+00 TO 803+00
10	PLAN AND PROFILE SHEET 803+00 TO 830+00
11	PLAN AND PROFILE SHEET 830+00 TO 857+00
12	PLAN AND PROFILE SHEET 857+00 TO 884+00
13	PLAN AND PROFILE SHEET 884+00 TO 911+00
14	PLAN AND PROFILE SHEET 911+00 TO 938+00
15	PLAN AND PROFILE SHEET 938+00 TO 965+00
16	PLAN AND PROFILE SHEET 965+00 TO 992+00
17	PLAN AND PROFILE SHEET 992+00 TO 1019+00
18	PLAN AND PROFILE SHEET 1019+00 TO 1046+00
19	PLAN AND PROFILE SHEET 1046+00 TO 1061+00
20	PLAN AND PROFILE SHEET 1016+00 TO 1088+00
21	DETAIL SHEET

NOT FOR CONSTRUCTION

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Professional Engineer (Civil) DUSTIN D. SPOMER 9488 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

T-O ENGINEERS
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PHONE: (307) 527-5182 WWW.TO-ENGINEERS.COM
BOISE • CODY • COEUR D'ALENE • HEBER CITY
MERIDIAN • NAMPA • SPOKANE

BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
COVER SHEET

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 1 OF 21

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SIGN SUMMARY

EAST BOUND			
SIGN TYPE	NEW STATION	COLOR(S)	DESCRIPTION
11.26 MILE MARKER	620+39.54	GREEN	STATE MILE MARKER 11.26 W/ 1 DELINEATOR POLE
HSC RD. 6	620+70.45	GREEN & BLUE	COUNTY ROAD 6
OPEN RANGE	622+21.63	YELLOW/BLACK	OPEN RANGE
DIRECTIONAL	638+50.00	YELLOW/BLACK	2 WIDTH SIGNS FOR BRIDGE, 2 ON EACH SIDE
L.O.R	645+15.24	YELLOW/BLACK	LIVESTOCK ON ROAD
JCTN K.C.	765+50.00	VARIOUS	KIRBY CREEK JUNCTION - CR7, BME, KCR , STOP SIGN
DIRECTIONAL	777+50.00	YELLOW/BLACK	2 WIDTH SIGNS FOR BRIDGE, 2 ON EACH SIDE
JCTN L.C RD.	998+72.40	VARIOUS	LAKE CREEK RD. JUNCTION, BMR, YIELD
180 CURVE	1025+67.40	YELLOW/BLACK	180 CURVE
2-SIGNS	1067+06.17	YELLOW/BLACK	DANGER - LOOSE GRAVEL/OPEN RANGE
REDUCE	1068+77.21	YELLOW/BLACK	REDUCE SPEED ON GRAVEL
WEST BOUND			
180 CURVE	1054+17.25	YELLOW/BLACK	180 CURVE
JCTN M.D.	1036+47.40	VARIOUS	MURPHY DOME ROAD JUNCTION, BMR, YIELD, WGFD
90 TURN	1008+73.60	YELLOW/BLACK	90 RIGHT HAND TURN
L.O.R	792+94.07	YELLOW/BLACK	LIVESTOCK ON ROAD 5.2
BRIDGE	777+50.00	2-WIDTH	2 WIDTH SIGNS FOR BRIDGE, 2 ON EACH SIDE
BRIDGE	638+50.00	YELLOW/BLACK	2 WIDTH SIGNS FOR BRIDGE, 2 ON EACH SIDE

FENCE SUMMARY

LEFT		
FENCE TYPE	START STA	END STA
WIRE	741+54.67	782+63.40
WIRE	782+81.71	794+07.68
WIRE	1068+47.64	1021+40.47
RIGHT		
FENCE TYPE	START STA	END STA
WIRE	775+73.37	782+10.87
WIRE	794+07.68	798+18.79

NOTES:

1. ALL FENCE TO BE REMOVED AND REPLACED WITH LIKE KIND BUT POSITIONED ON R.O.W.
2. BRACE PANELS AND END PANELS NECESSARY FOR TIE-INS TO EXISTING PRIVATE FENCES.

DESIGN CRITERIA

DESIGN SPEED	STA START	STA END
55	614+67.00	996+75.33
40	996+75.33	1004+59.06
55	1004+59.06	1031+09.62
40	1031+09.62	1048+88.53
55	1048+88.53	1069+31.07

WETLANDS SUMMARY

LEFT	
APPROX. STA	ACRES
889+00.00	±0.7
RIGHT	
APPROX. STA	ACRES
852+00.00	±3.9
889+00.00	±0.3

APPROACH SUMMARY

APPROACH	LOCATION (SIDE)	SURFACE
1	646+21.00 (L)	GRAVEL
2	647+20.00 (R)	ASPHALT
3	665+32.00 (L)	FIELD
4	674+10.00 (R)	ASPHALT
5	707+92.00 (R)	GRAVEL
6	736+50.00 (L)	FIELD
7	741+25.00 (L)	GRAVEL
8	742+15.00 (R)	GRAVEL
9	763+15.00 (L)	ASPHALT
10	765+80.00 (R)	ASPHALT
11	782+82.00 (L)	ASPHALT
12	793+77.00 (R)	FIELD
13	796+12.00 (L)	GRAVEL
14	849+40.00 (R)	FIELD
15	850+80.00 (L)	ASPHALT
16	882+56.00 (R)	FIELD
17	922+91.00 (L)	FIELD
18	965+22.00 (L)	FIELD
19	973+76.00 (R)	FIELD
20	998+32.00 (R)	ASPHALT
21	1013+88.00 (R)	ASPHALT
22	1035+75.00 (L)	GRAVEL
23	1069+10.00 (R)	GRAVEL

NOTES:

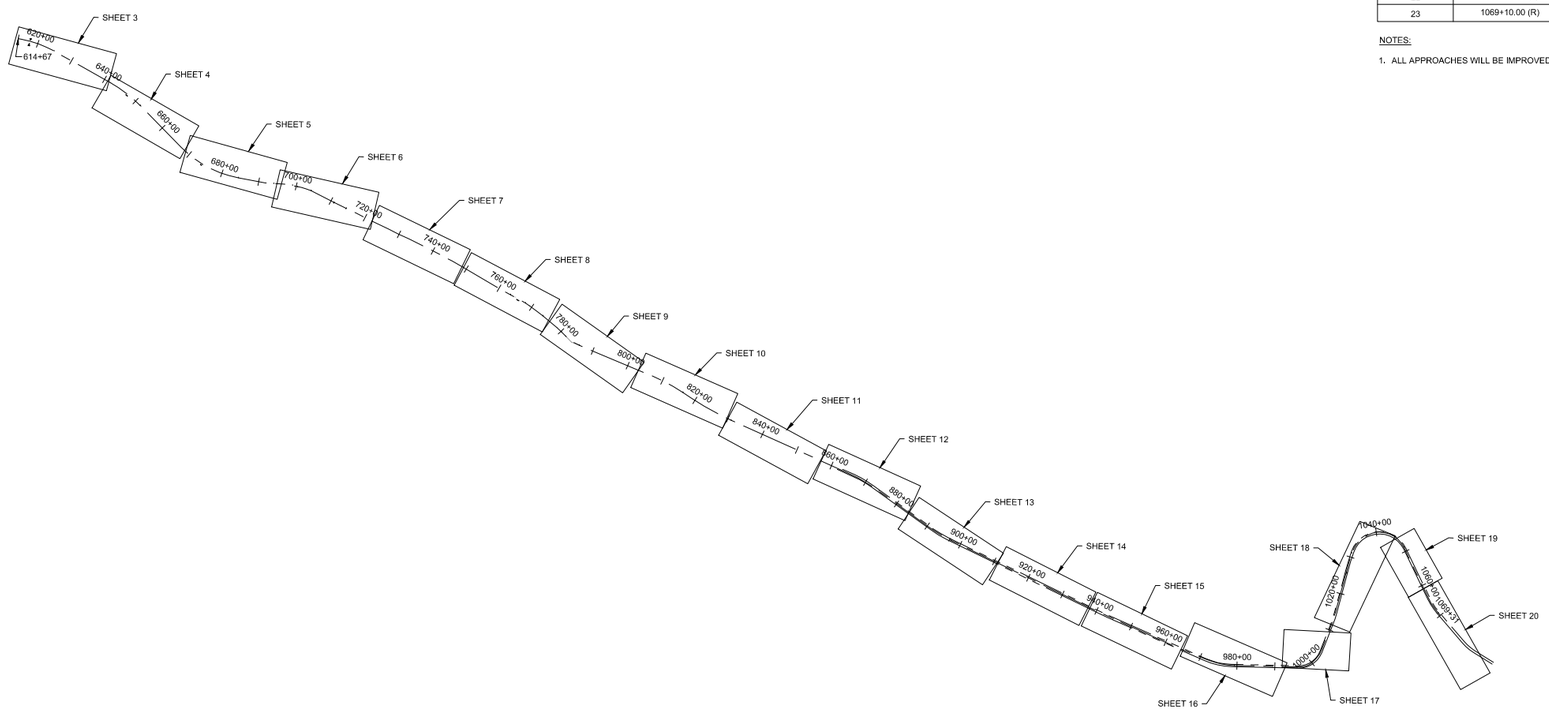
1. ALL APPROACHES WILL BE IMPROVED TO THE ROW.

PIPE CULVERT SUMMARY

STATION	EXISTING SIZE	NEW SIZE	REMARKS
617+83.73	BOX	BOX	
623+06.63	24"	24"	
628+18.18	24"	24"	
634+03.55	24"	24"	
643+42.4	24"	24"	
647+23.50	18"	18"	REMOVE AND REPLACE APPROACH CULVERT
653+00.97	18"	18"	
661+07.25	72"	84"	UPSIZE TO NEXT WYDOT PAY ITEM
668+99.21	24"	24"	
674+13.30		18"	NEW APPROACH CULVERT
680+88.65	64"	60"	DOWNSIZE TO NEXT WYDOT PAY ITEM
693+88.77	36"	36"	
700+36.76	24"	24"	
710+90.62	24"	24"	
714+46.83	6"	18"	UPSIZE
721+44.84	24"	24"	
729+99.58	30"	30"	
741+49.45	24"	24"	
750+89.71	18"	18"	
754+22.12	24"	24"	
763+15.05		18"	NEW APPROACH CULVERT
765+82.59	18"	18"	REMOVE AND REPLACE APPROACH CULVERT
782+85.95		18"	NEW APPROACH CULVERT
785+39.69	18"	18"	
813+57.65	24"	BOX	UPSIZE TO BOX?
818+63.33	18"	18"	
830+57.50	30"	30"	
842+29.61	18"	18"	
849+87.95	80"	84"	UPSIZE TO NEXT WYDOT PAY ITEM
849+98.98	80"	84"	UPSIZE TO NEXT WYDOT PAY ITEM
850+80.72		18"	NEW APPROACH CULVERT
865+97.40		18"	NEW ROADWAY CULVERT
878+16.31	24"	24"	PROBABLY NEEDS UPSIZING
888+87.36	36"	36"	
896+85.90	24"	24"	
918+87.40		18"	NEW ROADWAY CULVERT
922+03.10	36"	36"	
926+12.58	24"	24"	
932+49.70	18"	18"	
944+80.78	54"	60"	UPSIZE TO NEXT WYDOT PAY ITEM
951+03.20	15"	18"	UPSIZE
960+09.28	18"	18"	
965+62.50	18"	18"	
970+71.55	24"	24"	
981+22.40		18"	NEW ROADWAY CULVERT
984+12.40		18"	NEW ROADWAY CULVERT
990+34.43	18"	18"	
1003+55.34	60"	60"	
1011+07.40		18"	NEW ROADWAY CULVERT
1019+72.40		18"	NEW ROADWAY CULVERT
1026+49.96	24"	24"	
1029+49.89	24"	24"	
1044+83.48	24"	24"	
1060+97.40		18"	NEW ROADWAY CULVERT

NOTES:

1. ALL EXISTING PIPES TO BE REMOVED AND REPLACED UNLESS OTHERWISE NOTED.



LEGEND

2500	EXISTING CONTOUR
	BMR CL FROM RECORD
	BMR CL FROM SURVEY
	SECTION LINE
	BMR RIGHT OF WAY
	EXISTING EDGE OF PAVEMENT
X X X X	EXISTING FENCE
UT	EXISTING UNDERGROUND TELECOMMUNICATIONS
OP	EXISTING OVERHEAD POWER
GAS	EXISTING GAS MAIN
	FLOW LINE
	EXISTING SIGN
	EXISTING POWER POLE
	EXISTING GUY ANCHOR
	FOUND BRASS CAP
BH	BORE HOLE
	CONSTRUCTION PERMIT OUTSIDE COUNTY ROW

PROJECT CONTROL

DESCRIPTION	NORTHING	EASTING	ELEVATION
1G - PLASTIC CAP	1174059.744	2182795.530	4521.276
2 - PLASTIC CAP	1171748.227	2189128.861	4567.685
3 - PLASTIC CAP	1166747.913	2198648.852	4610.115
4 - PLASTIC CAP	1161260.427	2209463.167	4721.985
5 - PLASTIC CAP	1162497.316	2215578.541	5000.724

COORDINATE SYSTEM

COORDINATE SYSTEM IS NAD83 WYOMING STATE PLANE COORDINATES WEST CENTRAL ZONE U.S. SURVEY FEET. GROUND SCALE FACTOR 1.0002237500

NOTES:

1. THE CONTRACTOR WILL PROTECT ALL SURVEY MONUMENTS/CONTROL POINTS DURING CONSTRUCTION. IF THE CONTRACTOR DISTURBS SURVEY MONUMENTS/CONTROL POINTS, THE ENGINEER'S SURVEYOR WILL RE-ESTABLISH THESE MONUMENTS AT THE CONTRACTORS EXPENSE.

0 1000 2000 4000 6000

Professional Engineer (Civil) JUSTIN D. SPOMER 14864 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS		
NO.	DESCRIPTION	DATE

T-O ENGINEERS
CONSULTING ENGINEERS, SURVEYORS & PLANNERS
502 33RD STREET
CODY, WY 82414
PHONE: (307) 527-5182 WWW.TO-ENGINEERS.COM
BOISE • CODY • COEUR D'ALENE • KIEBER CITY
MERIDIAN • NAMPA • SPOKANE

BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
KEY MAP AND SUMMARY SHEET

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 2 OF 21

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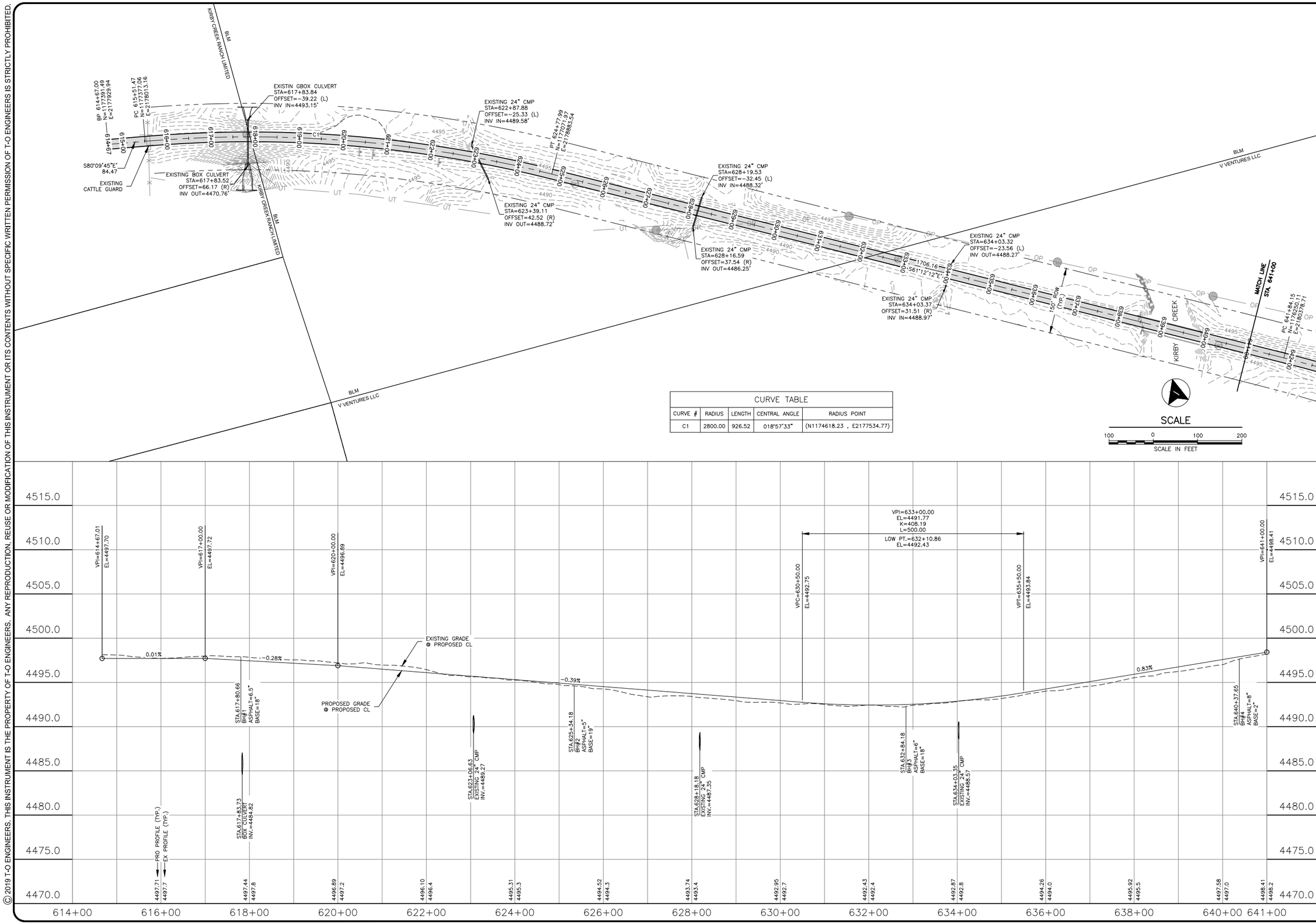

CURVE TABLE

CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C1	2800.00	926.52	018°57'33"	(N1174618.23 , E2177534.77)

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Professional Engineer (Civil) JUSTIN D. SPOMER 9488 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 614+00 TO 641+00

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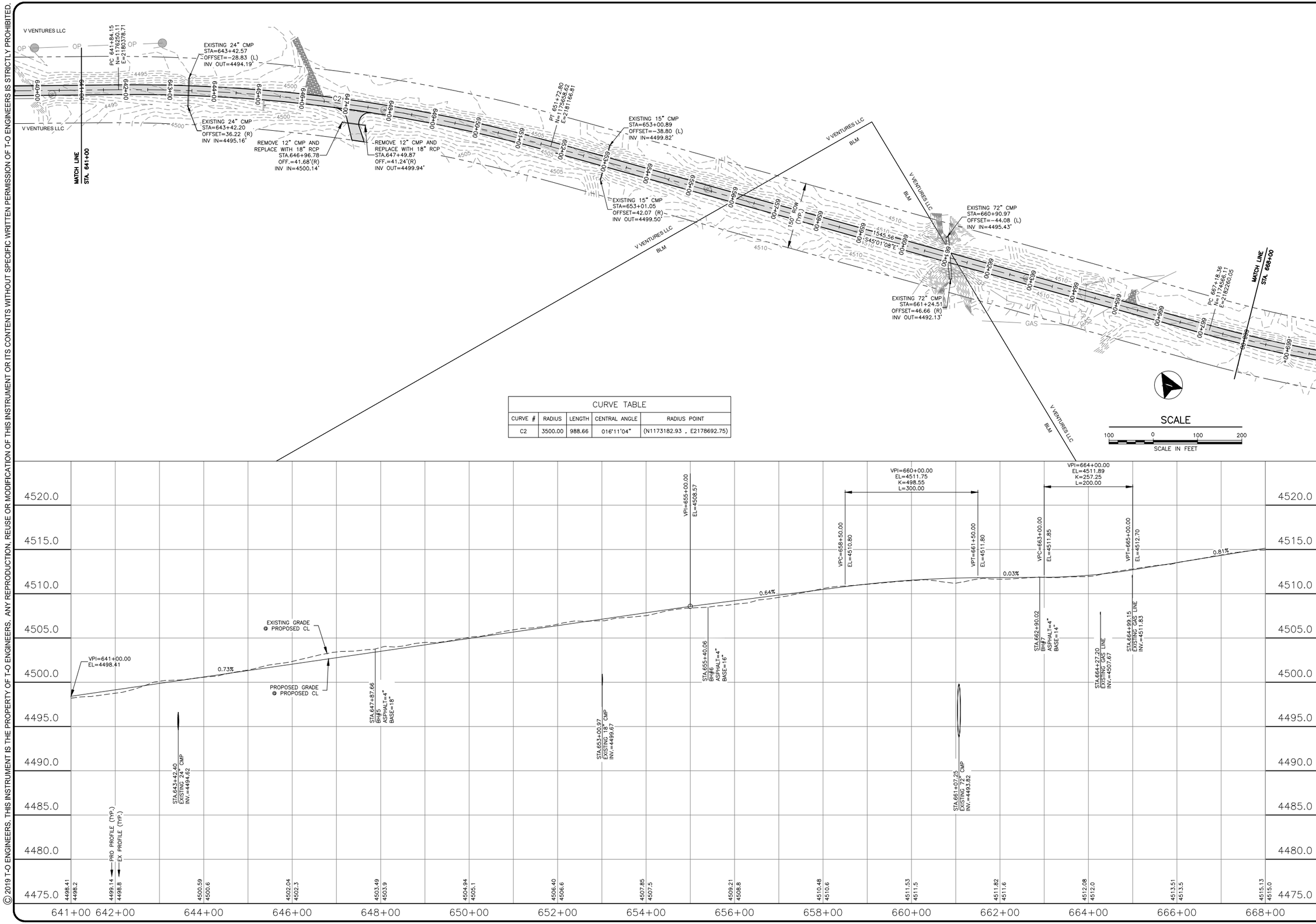
DATE: November 20, 2019
PROJECT: 180372
SHEET: 3 OF 21



CURVE TABLE

CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C2	3500.00	988.66	016°11'04"	(N1173182.93 , E2178692.75)

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Professional Engineer (Civil) JUSTIN D. SPOMER 9488 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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CODY, WY 82414
PHONE: (307) 587-3411 WWW.TO-ENGINEERS.COM
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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 641+00 TO 668+00

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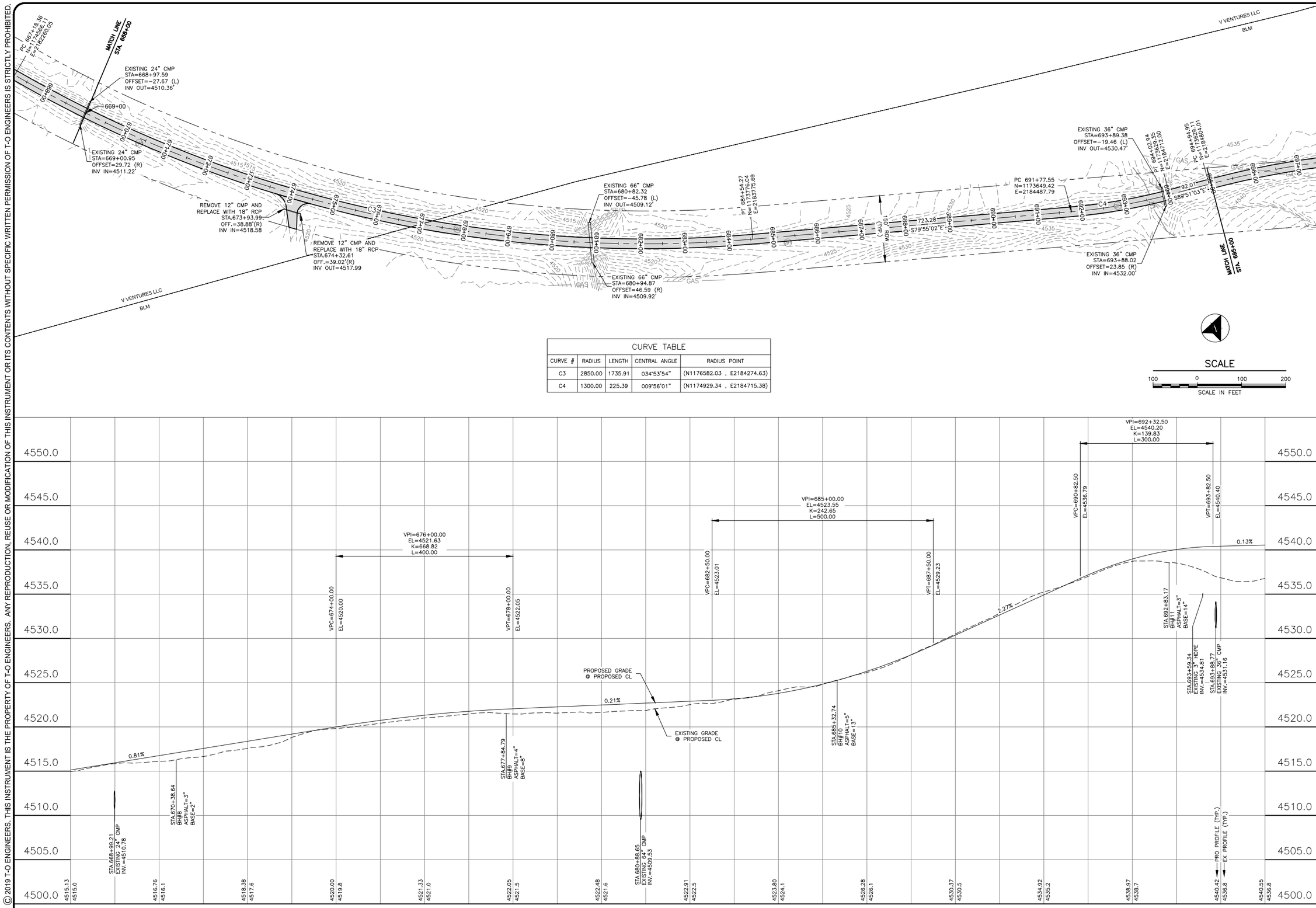
DATE: November 20, 2019
PROJECT: 180372
SHEET: 4 OF 21



CURVE TABLE				
CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C3	2850.00	1735.91	034°53'54"	(N1176582.03 , E2184274.63)
C4	1300.00	225.39	009°56'01"	(N1174929.34 , E2184715.38)

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Professional Engineer (Civil)
JUSTIN D. SPOMER
WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS		
NO.	DESCRIPTION	DATE

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502 33RD STREET
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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 668+00 TO 695+00

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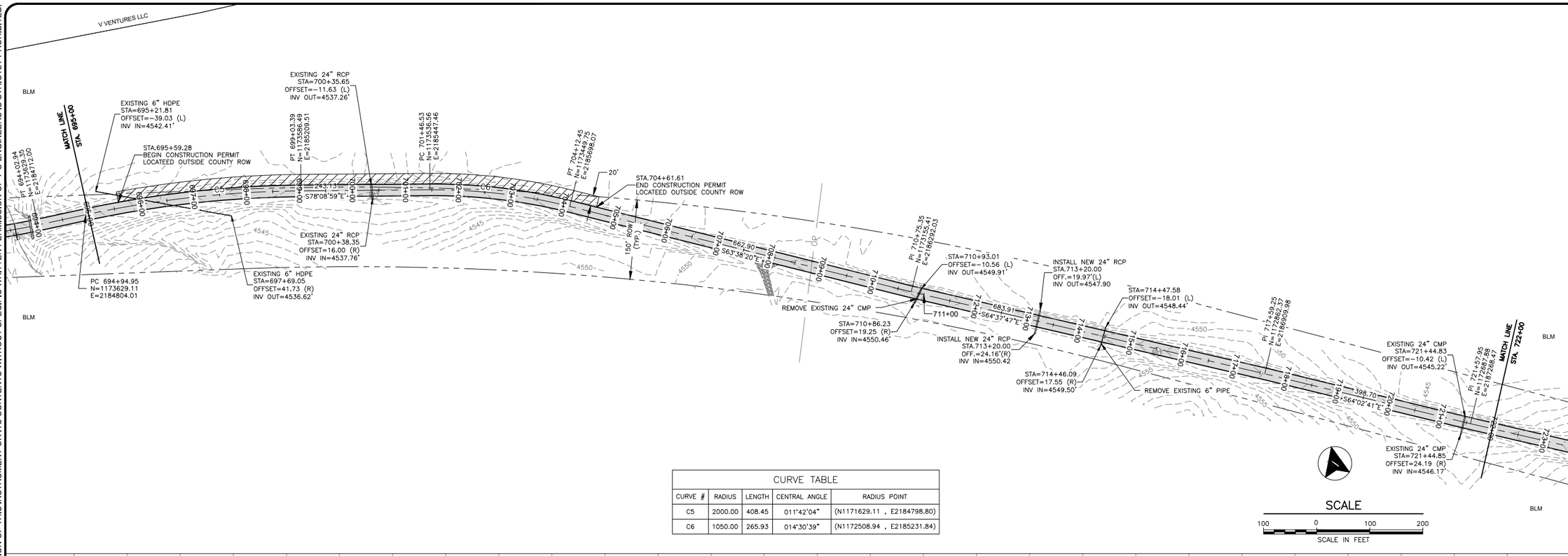
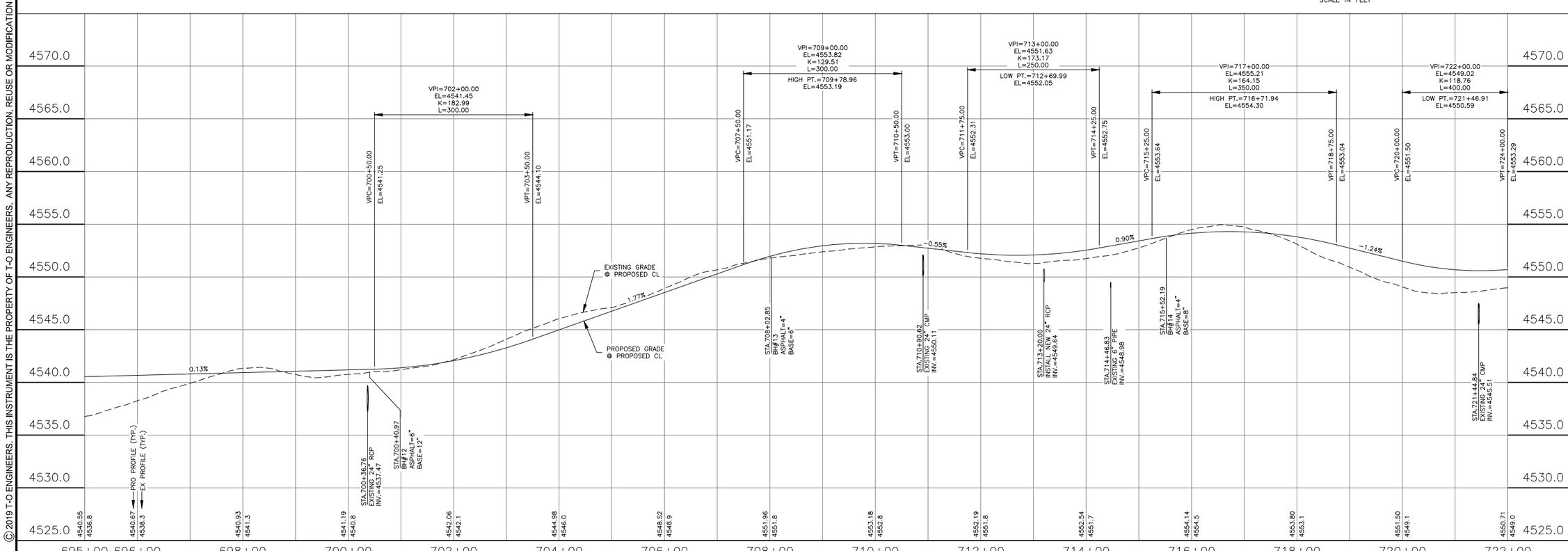
DATE: November 20, 2019
PROJECT: 180372
SHEET: 5 OF 21



CURVE TABLE

CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C5	2000.00	408.45	011°42'04"	(N1171629.11 , E2184798.80)
C6	1050.00	265.93	014°30'39"	(N1172508.94 , E2185231.84)



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Professional Engineer (Civil) JUSTIN D. SPOMER 14834 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

T-O ENGINEERS
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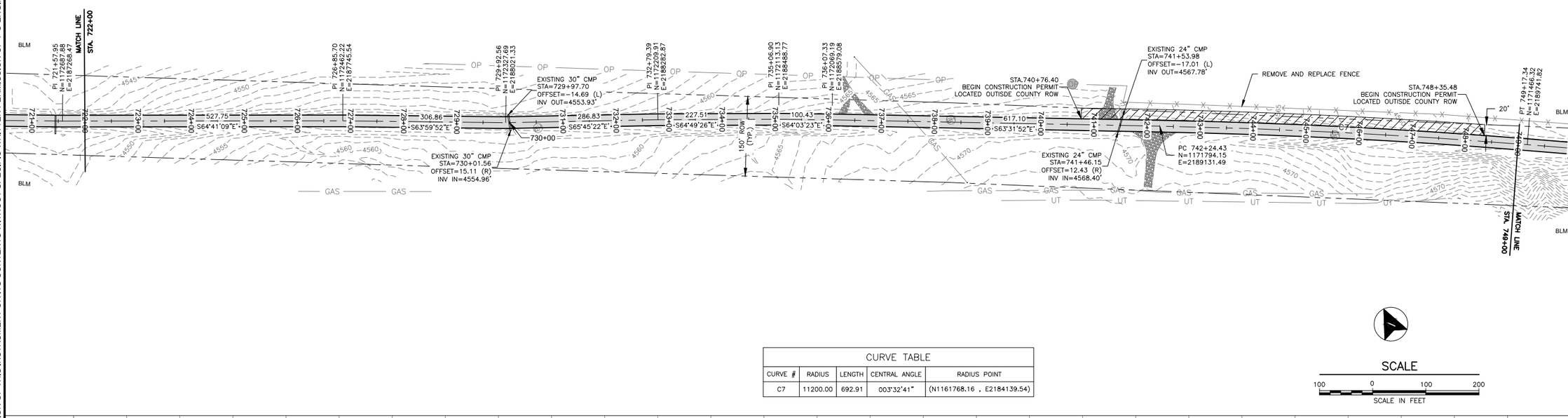
BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 695+00 TO 722+00

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 6 OF 21

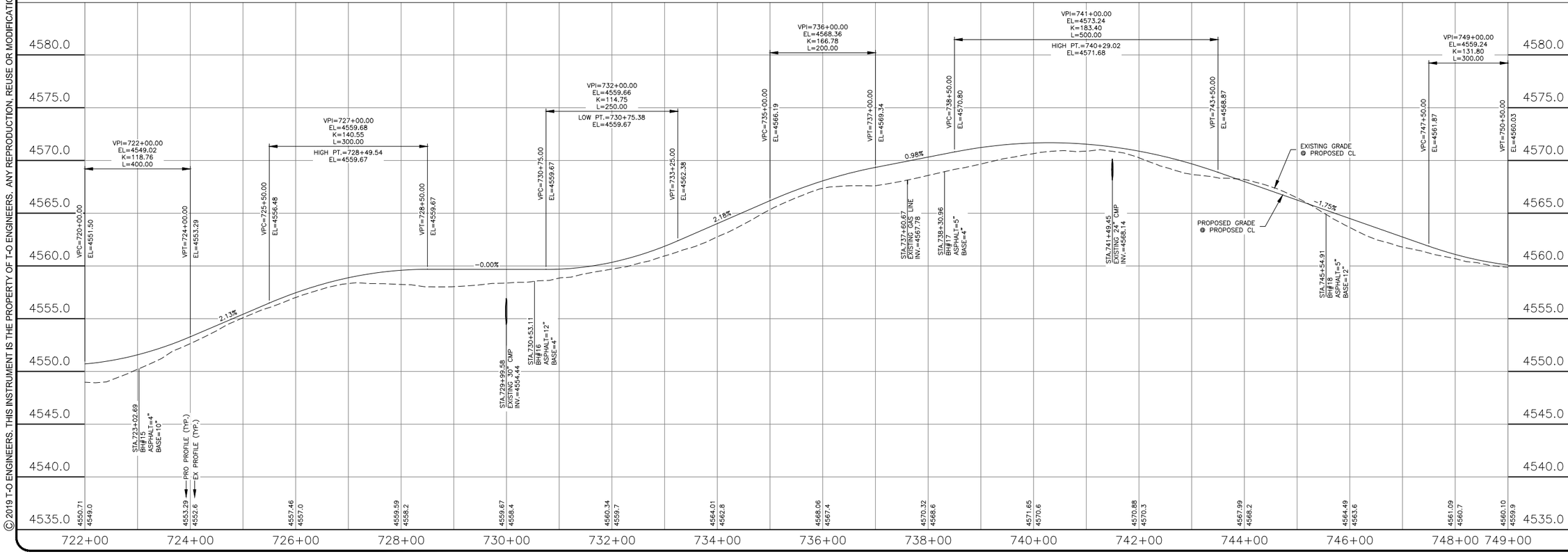


CURVE TABLE				
CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C7	11200.00	692.91	003°32'41"	(N1161768.16 , E2184139.54)

SCALE

100 0 100 200

SCALE IN FEET



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K:\180372\3_Acad\dwg\Sheets\Plan and Profile Sheets\7 PLAN AND PROFILE SHEET 722+00 TO 749+00.dwg, 11/20/2019 6:06:32 PM, Tireland

K:\180372\3_ACAD\DWG\SHEETS\PLAN AND PROFILE SHEETS\7 PLAN AND PROFILE SHEET 722+00 TO 749+00.DWG, 11/20/2019

Professional Engineer (Civil) JUSTIN D. SPOMER 14864 WYOMING

BORDER SIZE:	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

NO.	DESCRIPTION	DATE

REVISIONS

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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 722+00 TO 749+00

ATTENTION:
0 1/2 1
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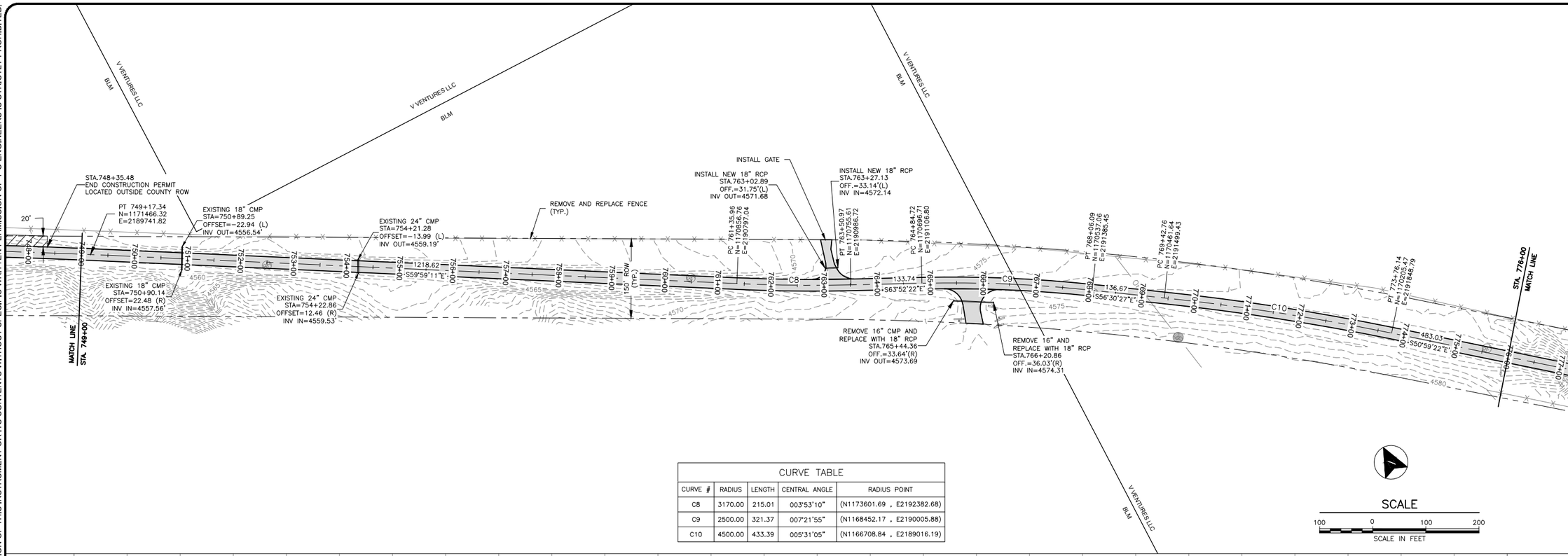
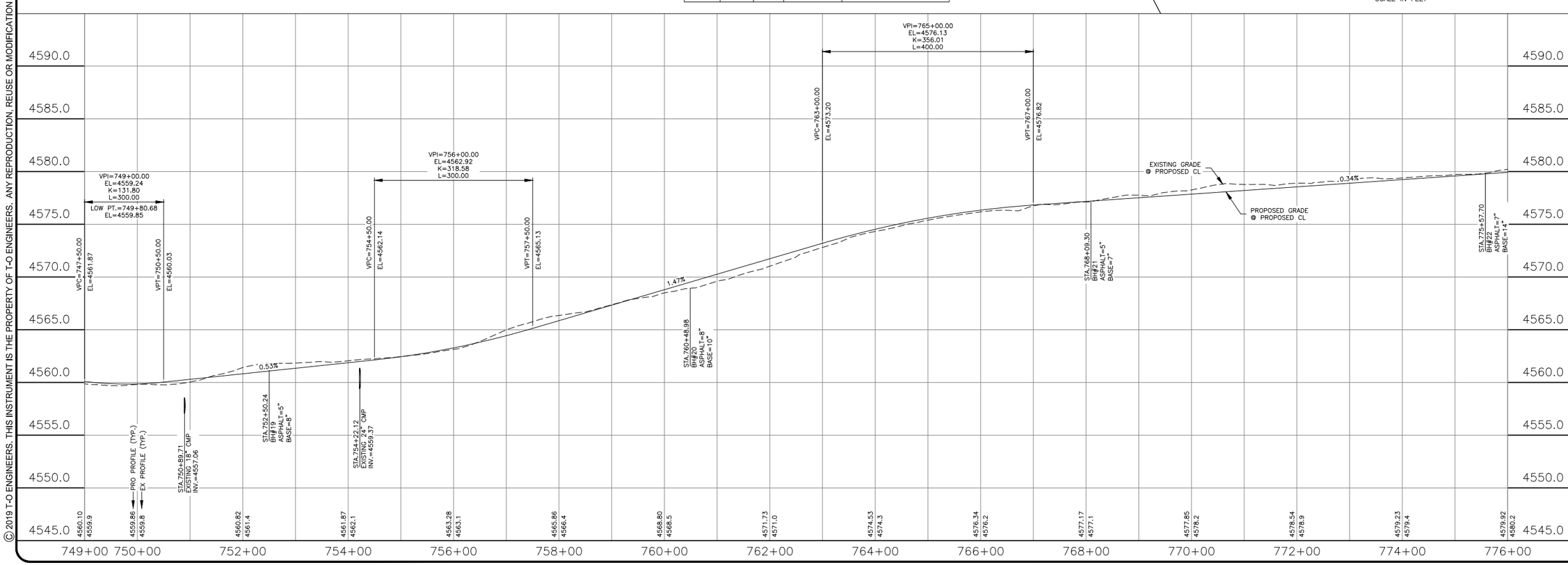
DATE: November 20, 2019
PROJECT: 180372
SHEET: 7 OF 21



CURVE TABLE				
CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C8	3170.00	215.01	003°53'10"	(N1173601.69 , E2192382.68)
C9	2500.00	321.37	007°21'55"	(N1168452.17 , E2190005.88)
C10	4500.00	433.39	005°31'05"	(N1166708.84 , E2189016.19)



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K:\180372\3_Acad\dwg\Sheets\Plan and Profile Sheets\8 PLAN AND PROFILE SHEET 749+00 TO 776+00.dwg, 11/20/2019 6:09:13 PM, Tireland

K:\180372\3_ACAD\DWG\SHEETS\PLAN AND PROFILE SHEETS\8 PLAN AND PROFILE SHEET 749+00 TO 776+00.DWG, 11/20/2019

Professional Engineer (Civil)
JUSTIN D. SPOMER
WYOMING

BORDER SIZE:	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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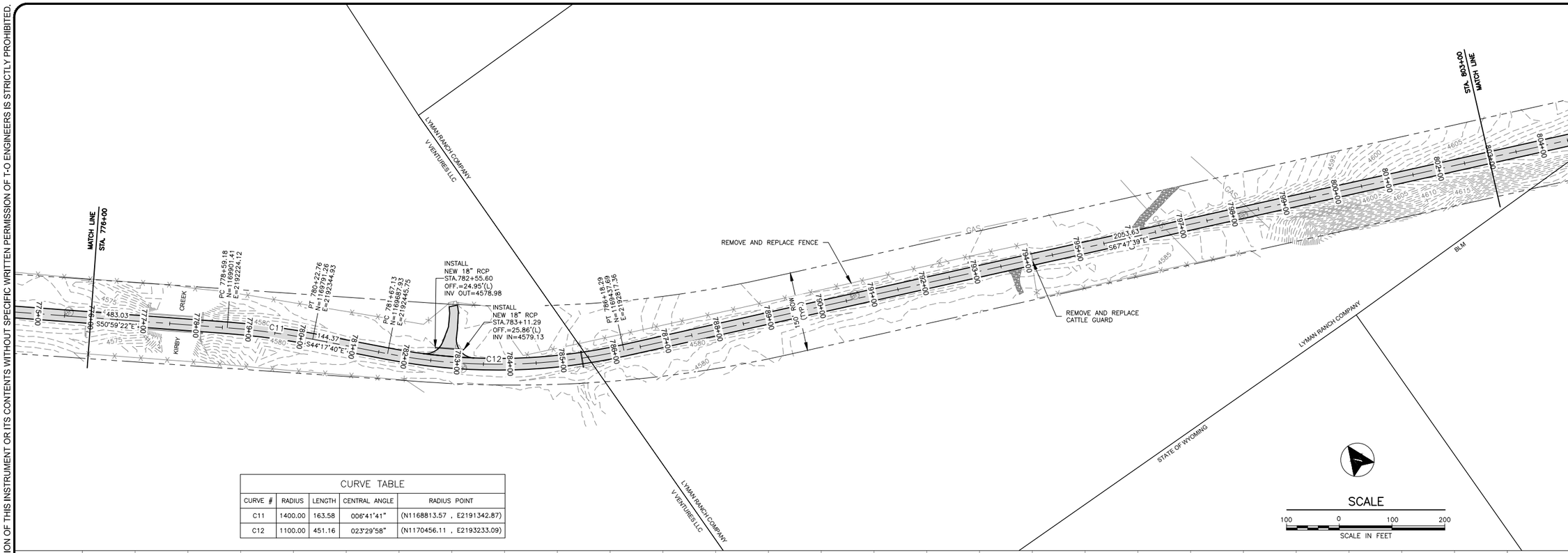
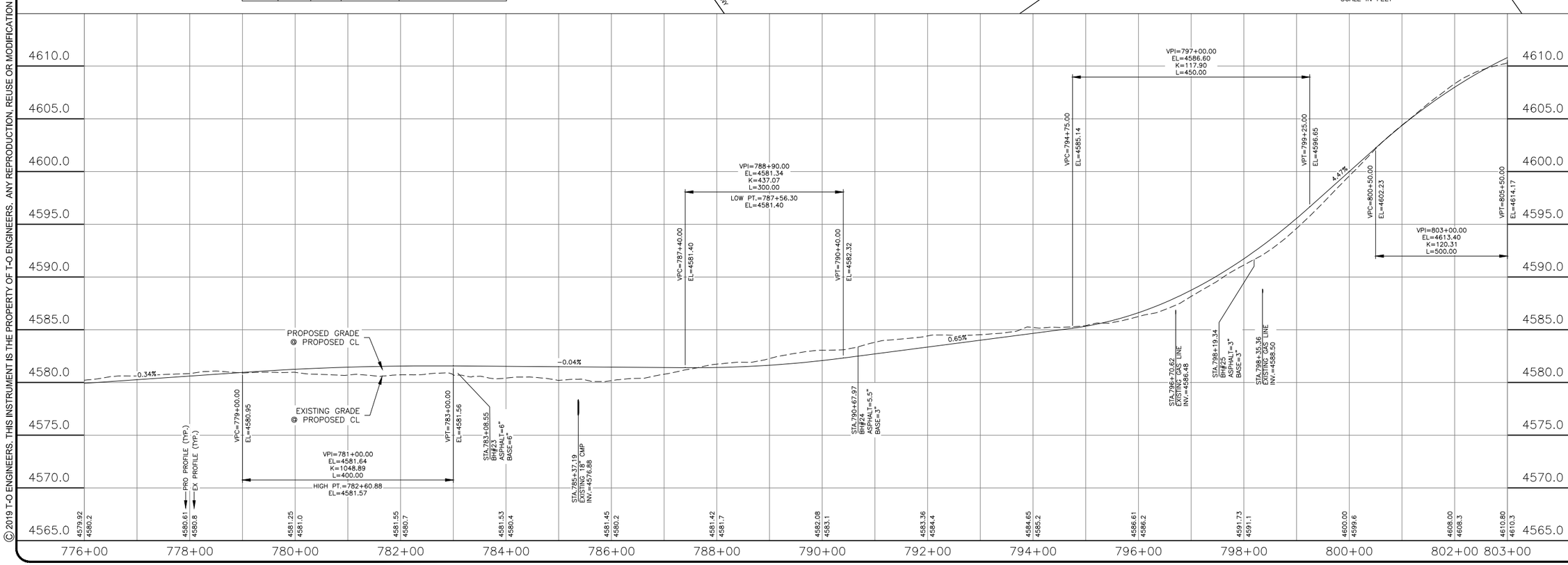
BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 749+00 TO 776+00

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 8 OF 21



CURVE TABLE				
CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C11	1400.00	163.58	006°41'41"	(N1168813.57 , E2191342.87)
C12	1100.00	451.16	023°29'58"	(N1170456.11 , E2193233.09)



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K:\180372\3_Acaddwg\Sheets\Plan and Profile Sheets\9 PLAN AND PROFILE SHEET 776+00 TO 803+00.dwg, 11/20/2019 6:12:23 PM, Tireland

Professional Engineer (Civil) JUSTIN D. SPOMER 9488 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 776+00 TO 803+00

ATTENTION:
0 1/2 1
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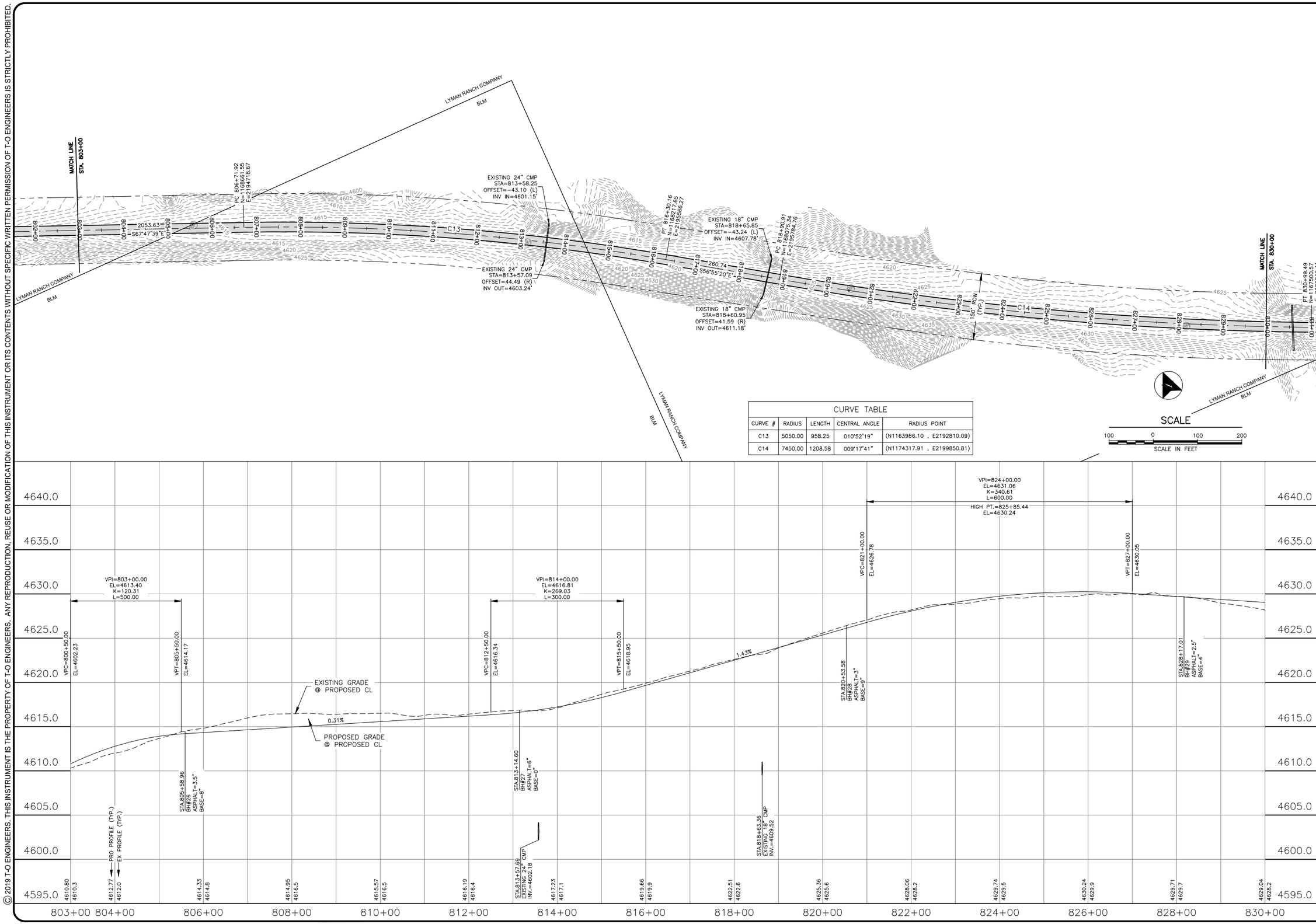
DATE: November 20, 2019
PROJECT: 180372
SHEET: 9 OF 21



CURVE TABLE

CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C13	5050.00	958.25	010°52'19"	(N1163986.10 , E2192810.09)
C14	7450.00	1208.58	009°17'41"	(N1174317.91 , E2199850.81)

Professional Engineer (Civil) JUSTIN D. SPOMER 9488 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 803+00 TO 830+00

ATTENTION:
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PROJECT: 180372
SHEET: 10 OF 21

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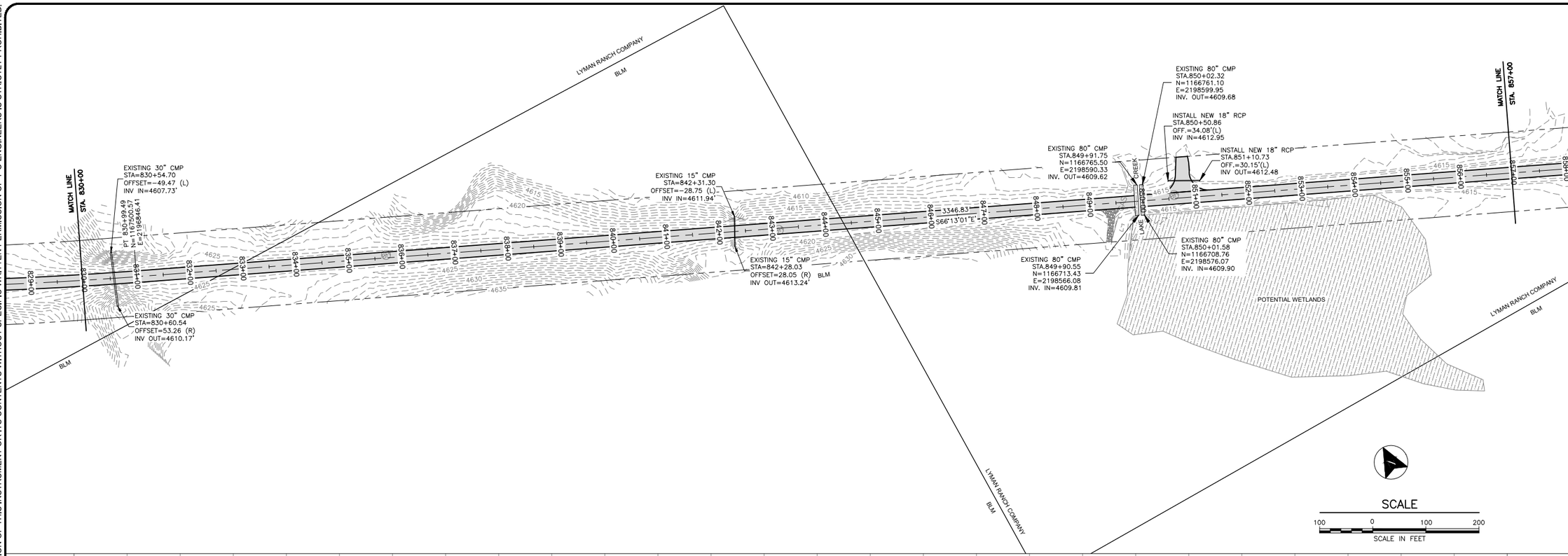

Professional Engineer (Civil)
JUSTIN D. SPOMER
WYOMING

BORDER SIZE	22"X34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS		
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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 830+00 TO 857+00

ATTENTION:
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PROJECT: 180372
SHEET: 11 OF 21

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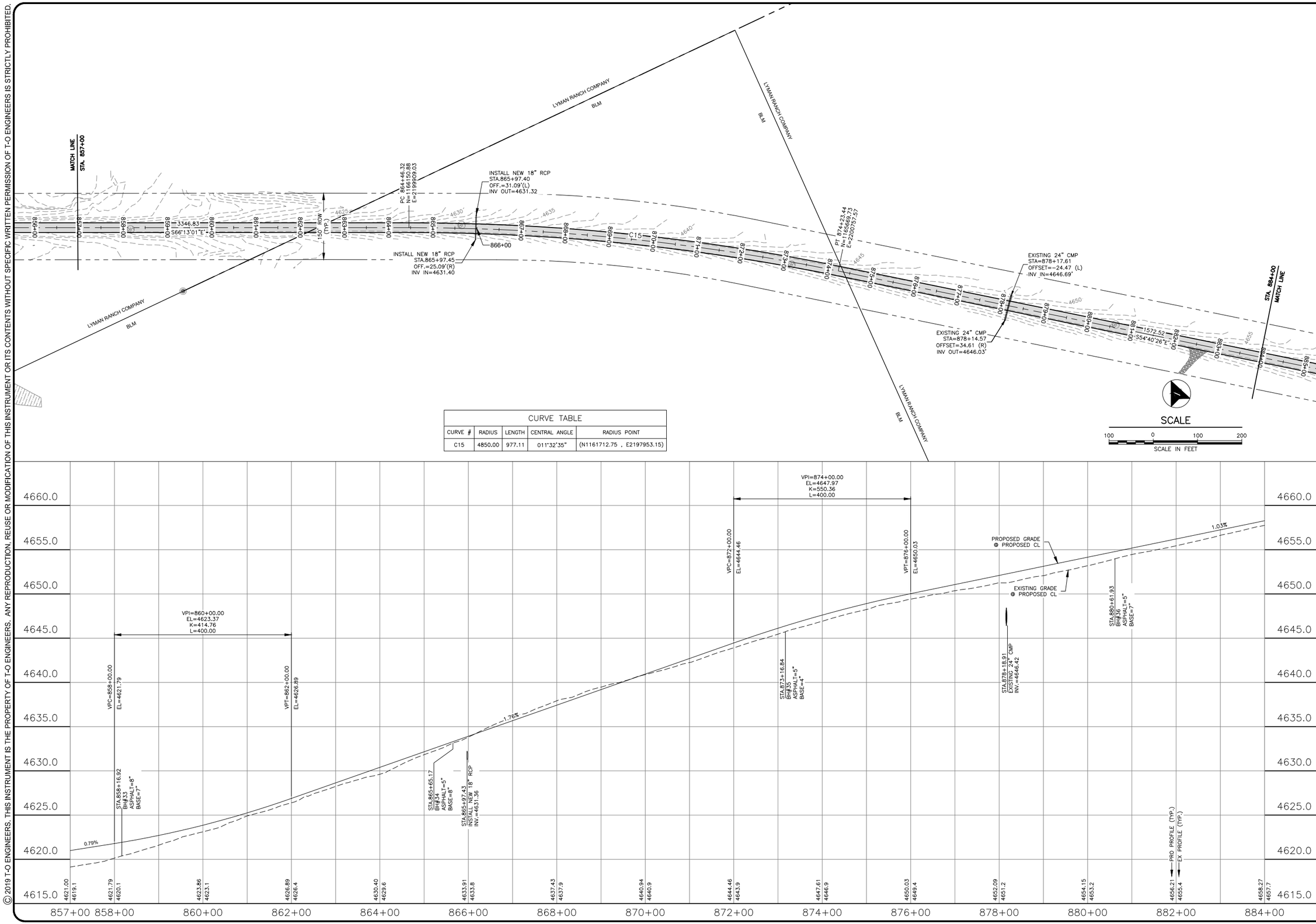

CURVE TABLE

CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C15	4850.00	977.11	011°32'35"	(N1161712.75 , E2197953.15)

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K:\180372\3_Acad\dwg\Sheets\Plan and Profile Sheets\12 PLAN AND PROFILE SHEET 857+00 TO 884+00.dwg, 11/20/2019 6:20:39 PM, Tireland

Professional Engineer (Civil)
JUSTIN D. SPOMER
9488
Date
WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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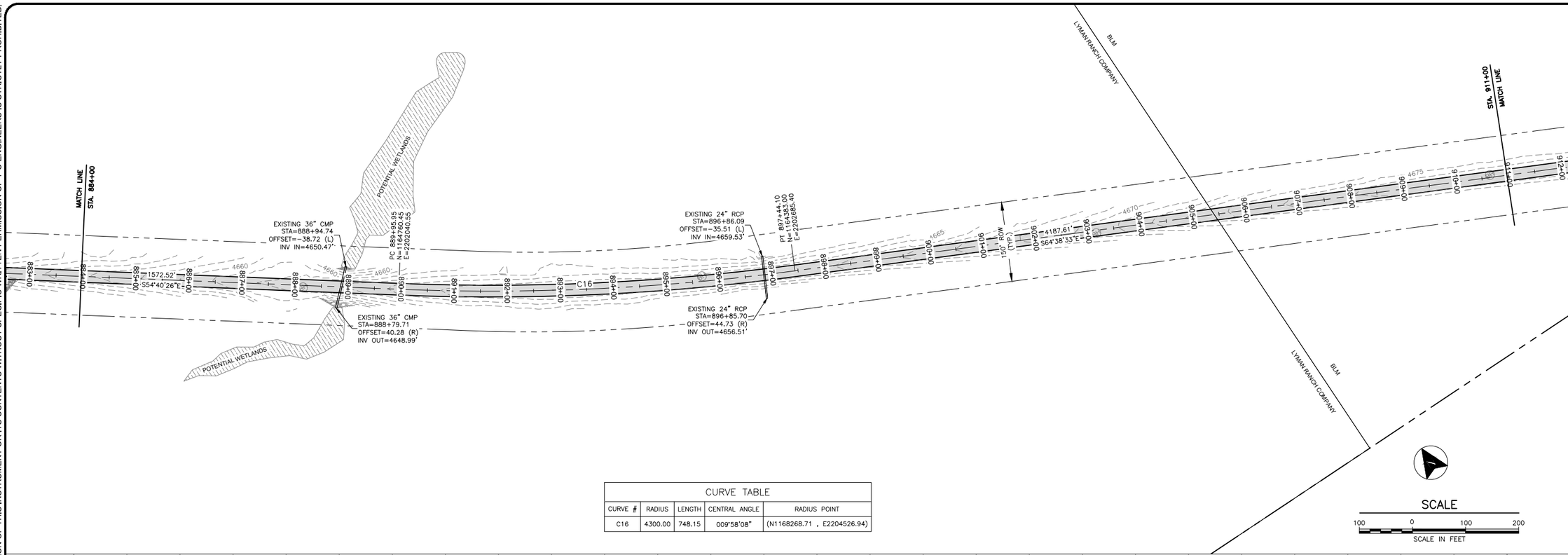
BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 857+00 TO 884+00

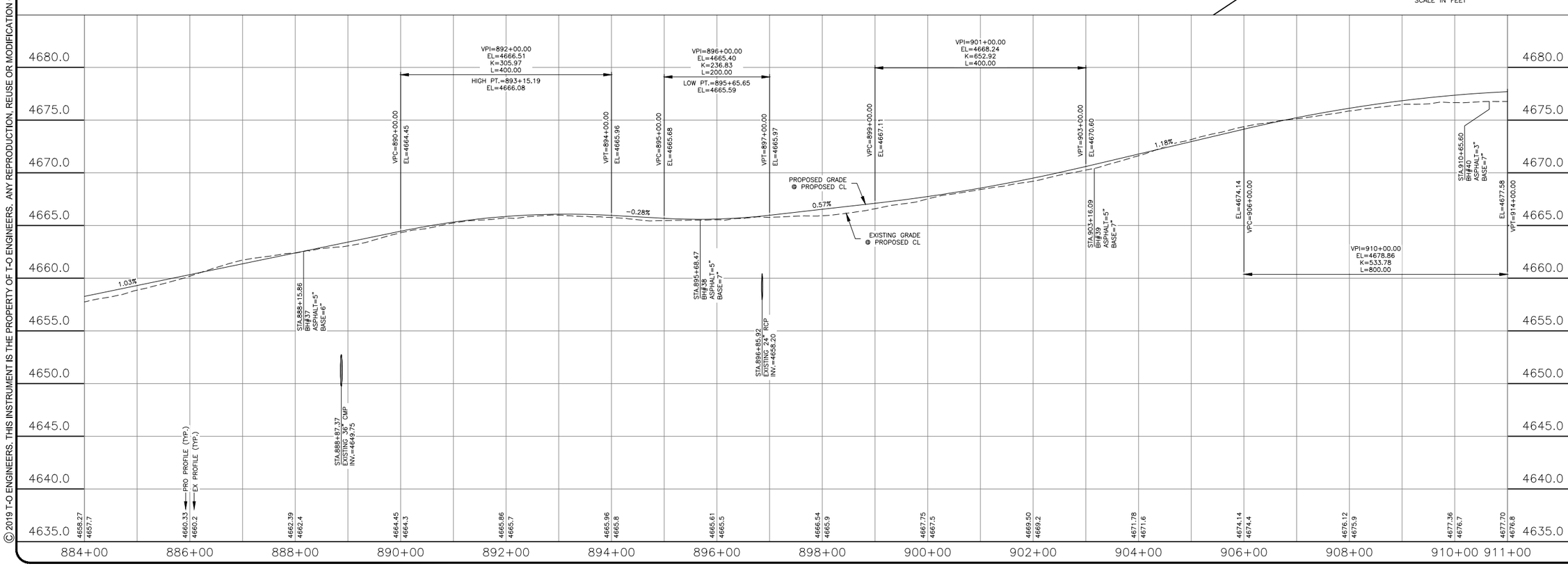
ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 12 OF 21



CURVE TABLE

CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C16	4300.00	748.15	009°58'08"	(N1168268.71 , E2204526.94)



Professional Engineer (Civil)
JUSTIN D. SPOMER
9488
Date
WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 884+00 TO 911+00

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 13 OF 21

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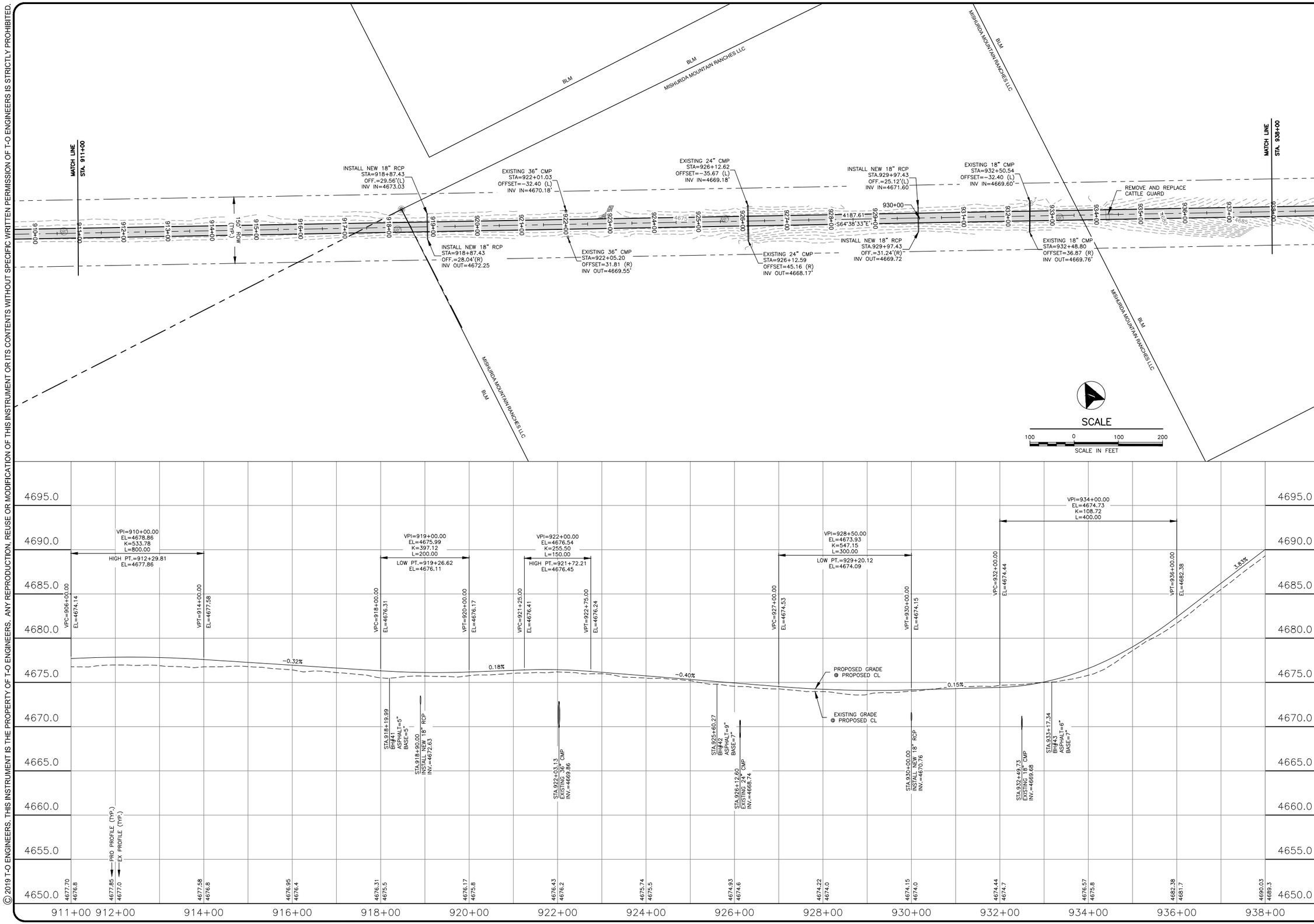

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K:\180372\3_Acad\dwg\Sheets\Plan and Profile Sheets\14 PLAN AND PROFILE SHEET 911+00 TO 938+00.dwg, 11/20/2019 6:26:01 PM, Tireland

Professional Engineer (Civil) DUSTIN D. SPOMER 9483 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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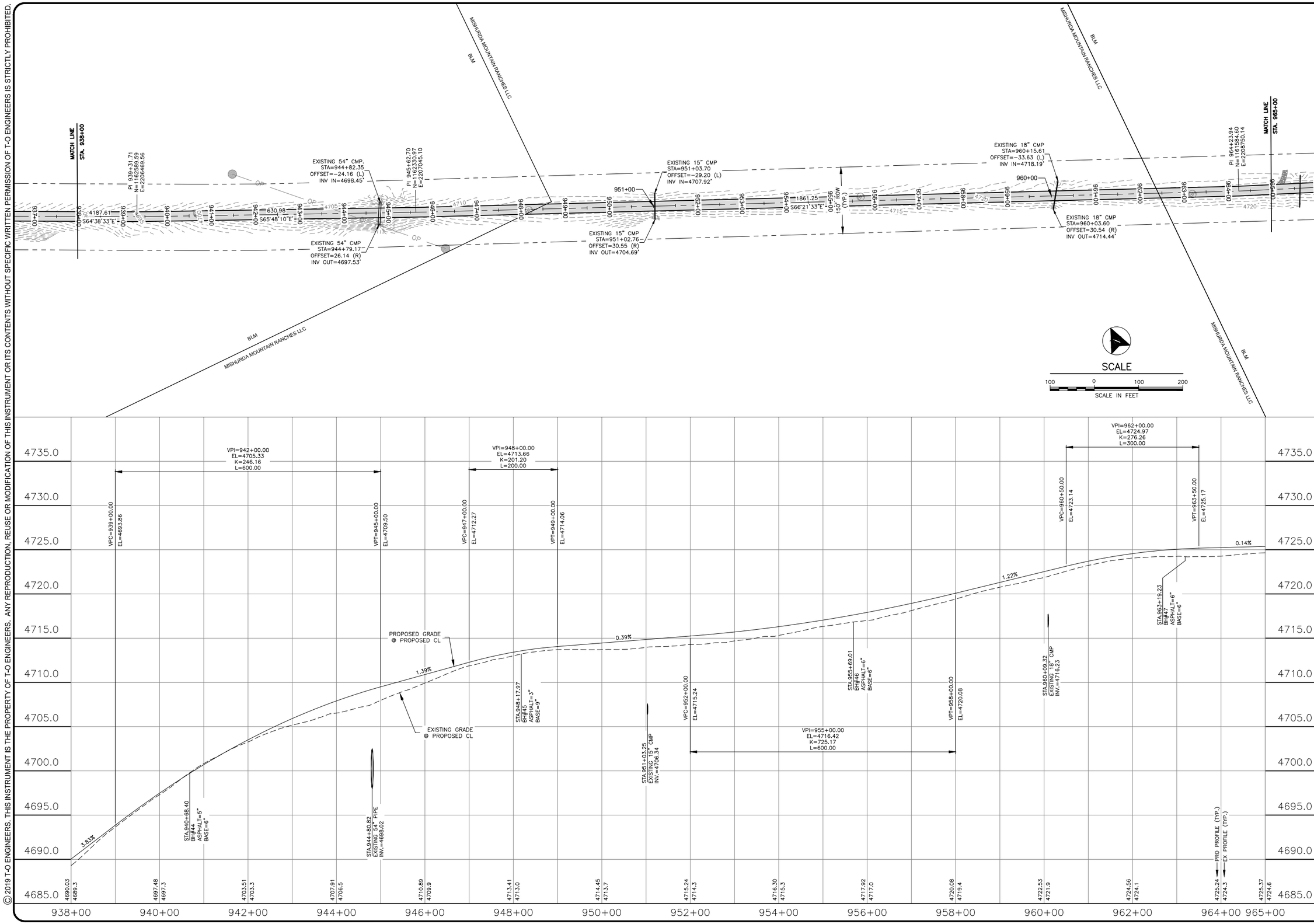
BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 911+00 TO 938+00

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 14 OF 21



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Professional Engineer (Civil) JUSTIN D. SPOMER 9488 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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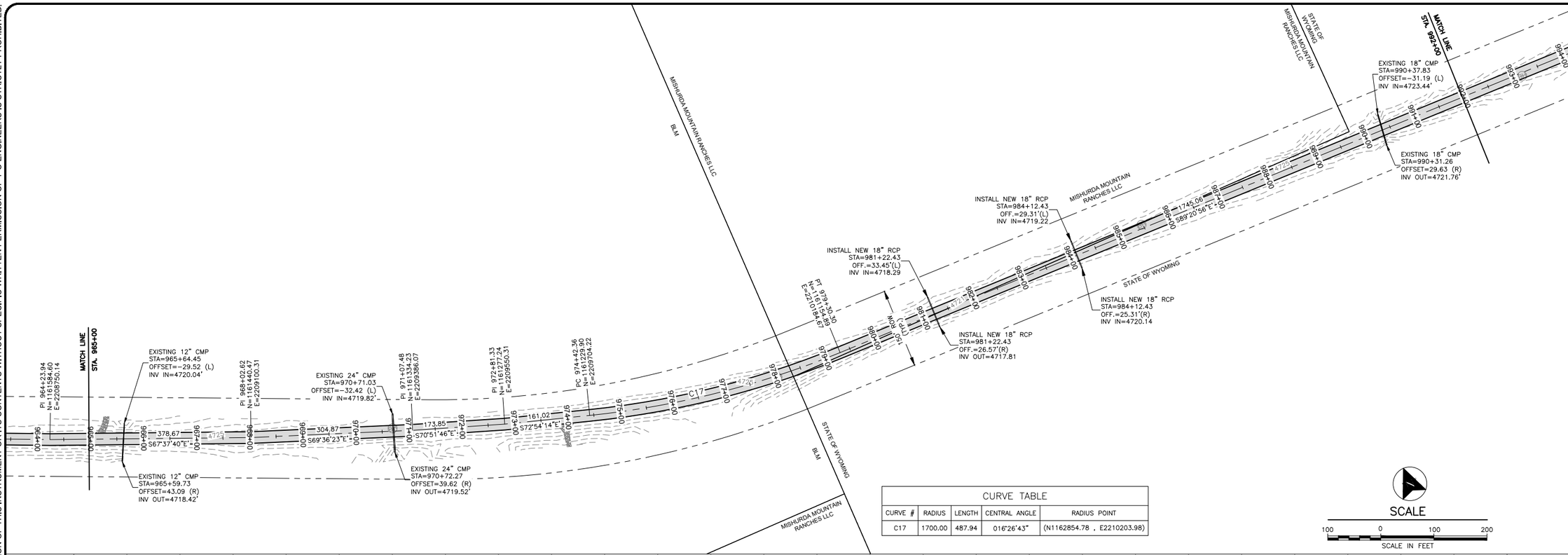
BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 938+00 TO 965+00

ATTENTION: 0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 15 OF 21



CURVE TABLE				
CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C17	1700.00	487.94	016°26'43"	(N1162854.78 , E2210203.98)

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K:\180372\3_ACAD\DWG\SHEETS\PLAN AND PROFILE SHEETS\16 PLAN AND PROFILE SHEET 965+00 TO 992+00.DWG, 11/20/2019

Professional Engineer (Civil) JUSTIN D. SPOMER 14834 WYOMING

BORDER SIZE:	22"X34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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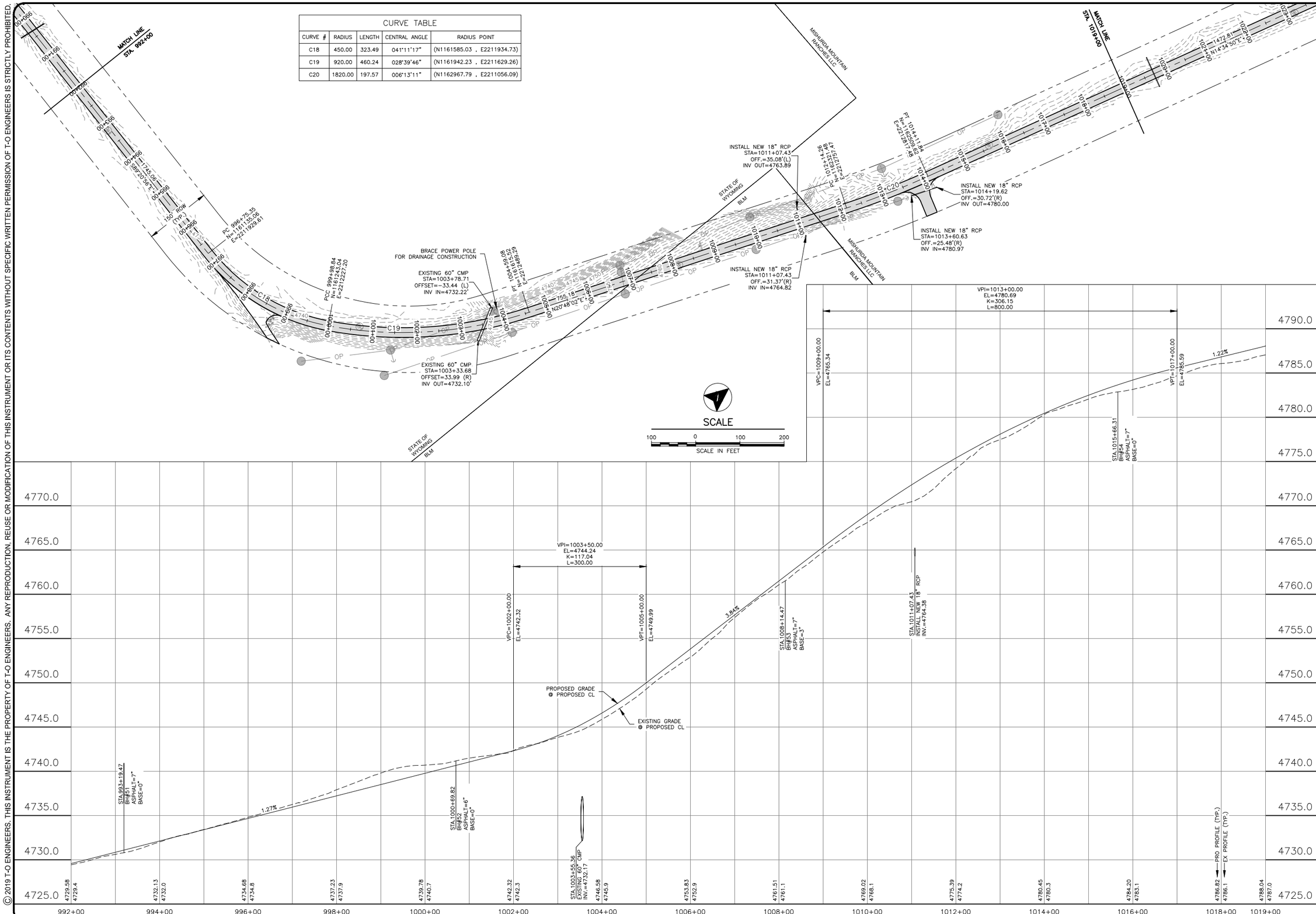
BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 965+00 TO 992+00

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 16 OF 21

CURVE TABLE				
CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C18	450.00	323.49	041°11'17"	(N1161585.03 , E2211934.73)
C19	920.00	460.24	028°39'46"	(N1161942.23 , E2211629.26)
C20	1820.00	197.57	006°13'11"	(N1162967.79 , E2211056.09)



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Professional Engineer (Civil) DUSTIN D. SPOMER 9483 WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

T-O ENGINEERS
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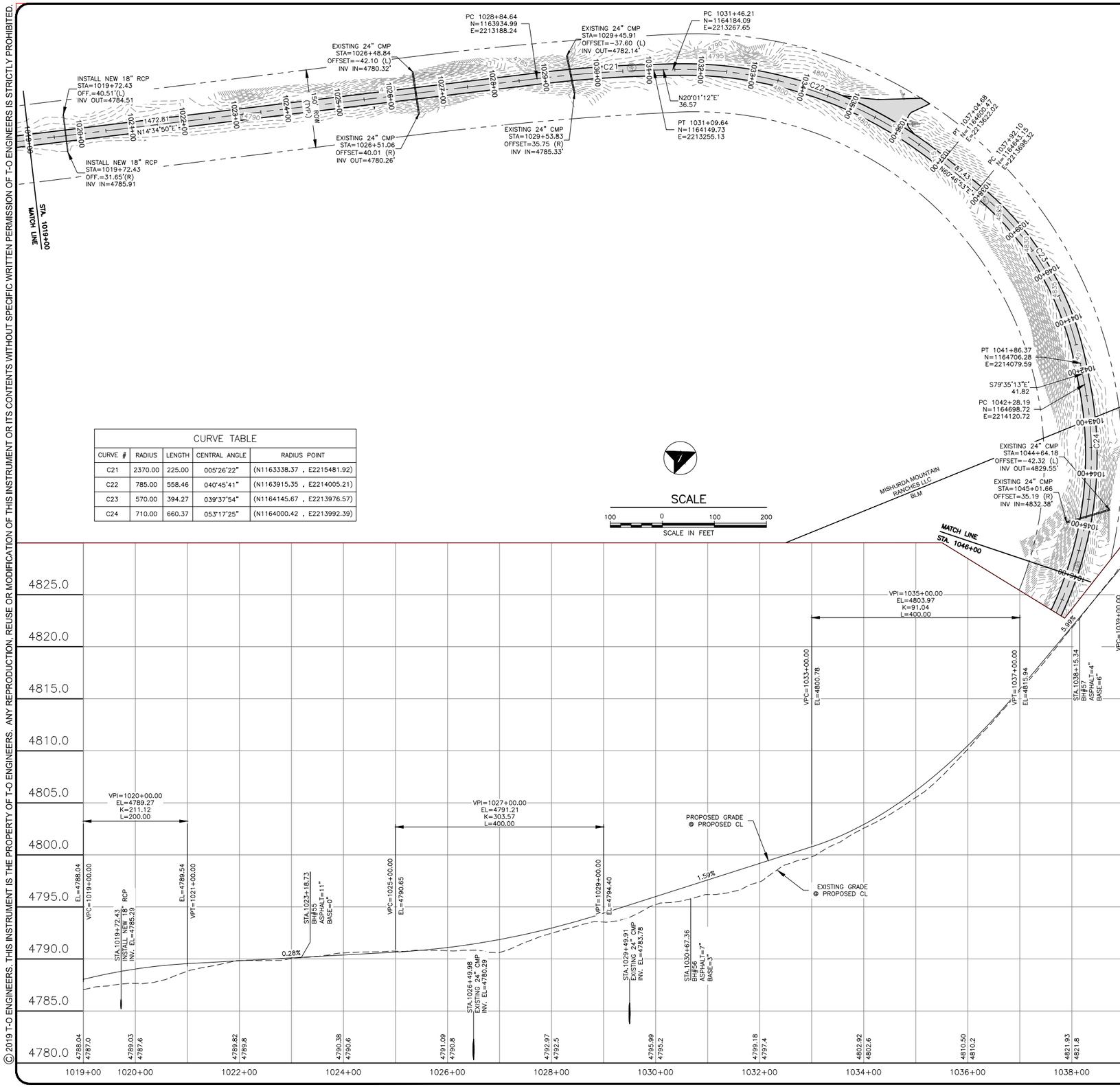
BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 992+00 TO 1019+00

ATTENTION: 0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: November 20, 2019
PROJECT: 180372
SHEET: 17 OF 21



CURVE TABLE

CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C21	2370.00	225.00	005°26'22"	(N1163338.37 , E2215481.92)
C22	785.00	558.46	040°45'41"	(N1163915.35 , E2214005.21)
C23	570.00	394.27	039°37'54"	(N1164145.67 , E2213976.57)
C24	710.00	660.37	053°17'25"	(N1164000.42 , E2213992.39)

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Professional Engineer (Civil) JUSTIN D. SPOMER 14864 WYOMING

BORDER SIZE:	22"X34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

REVISIONS

NO.	DESCRIPTION	DATE

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BLACK MOUNTAIN ROAD RECONSTRUCTION PROJECT
RECONNAISSANCE REPORT
PLAN AND PROFILE SHEET 1019+00 TO 1046+00

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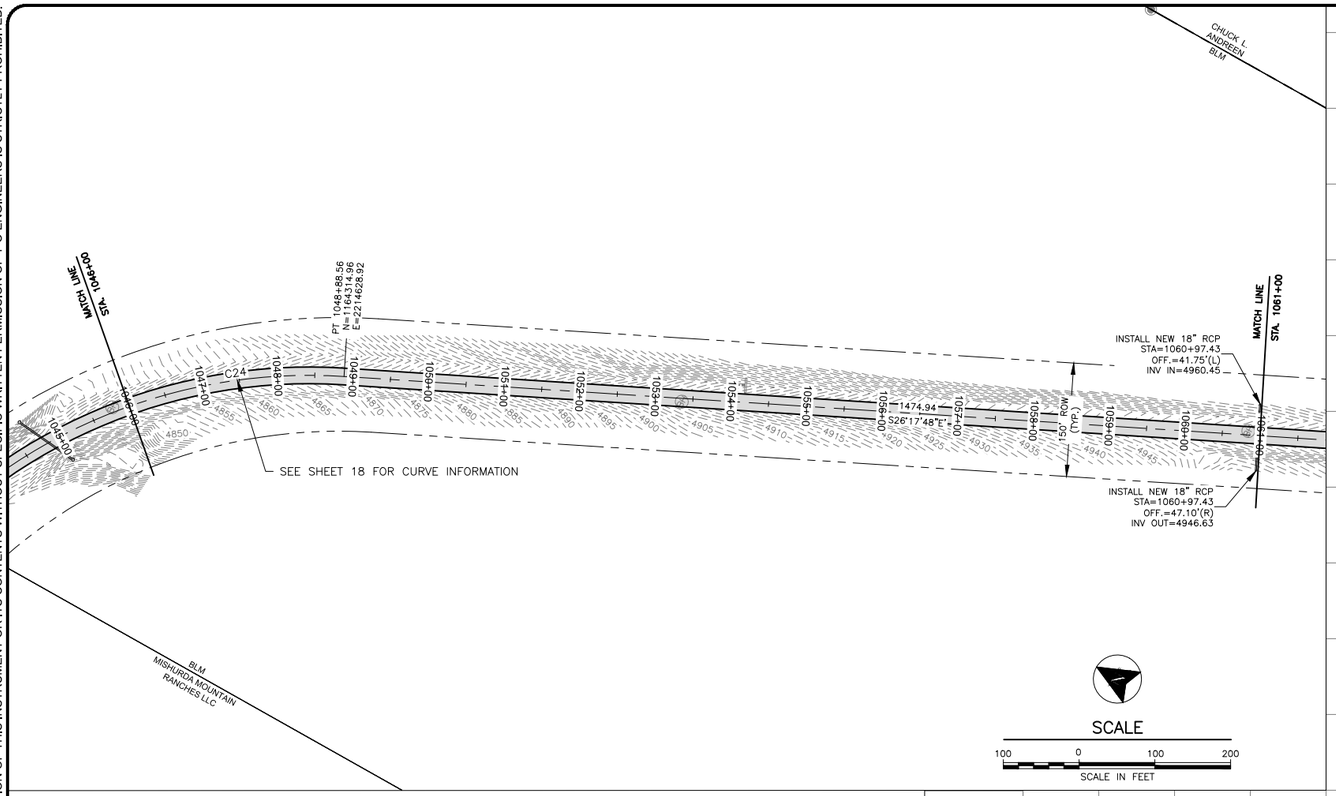

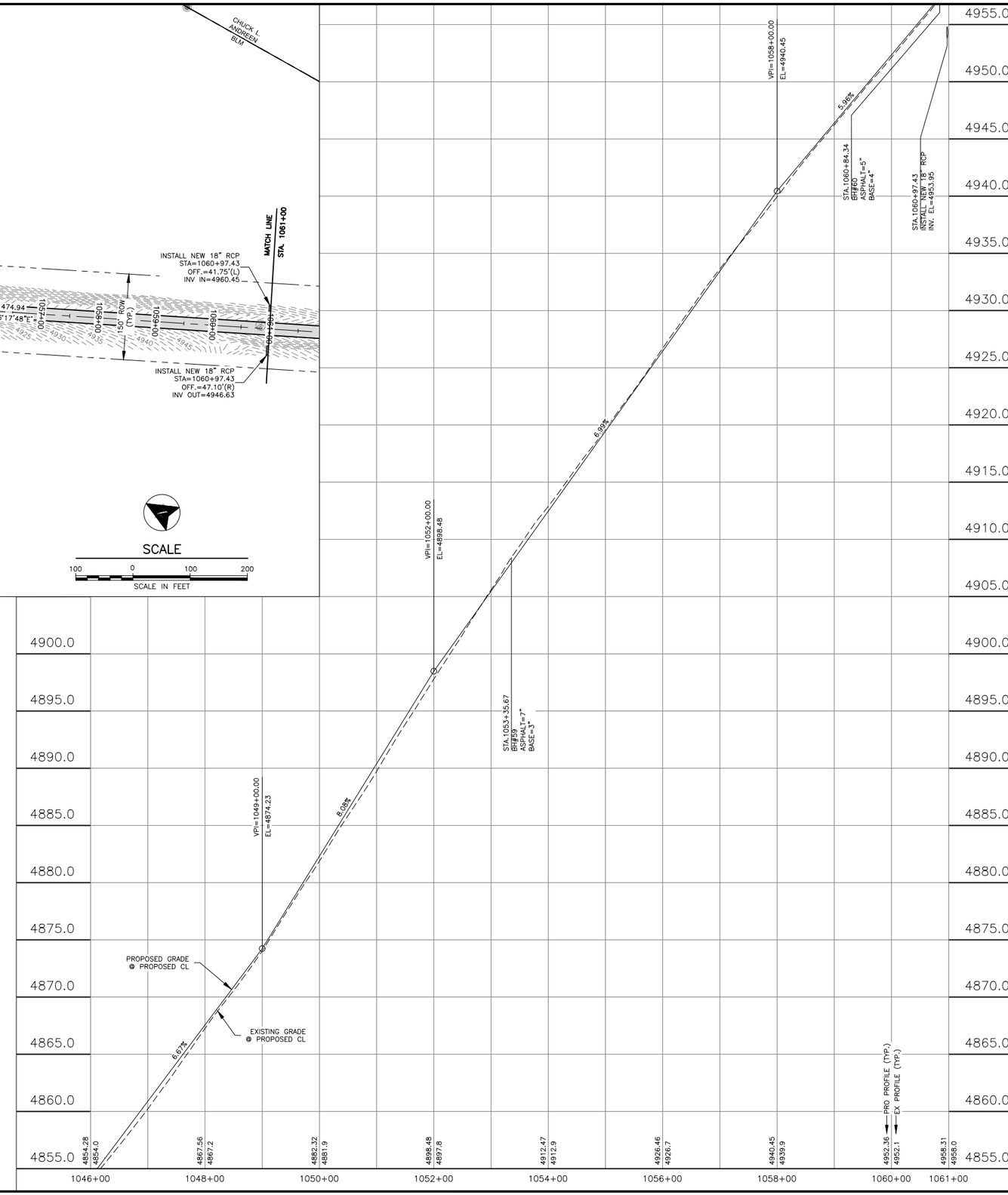

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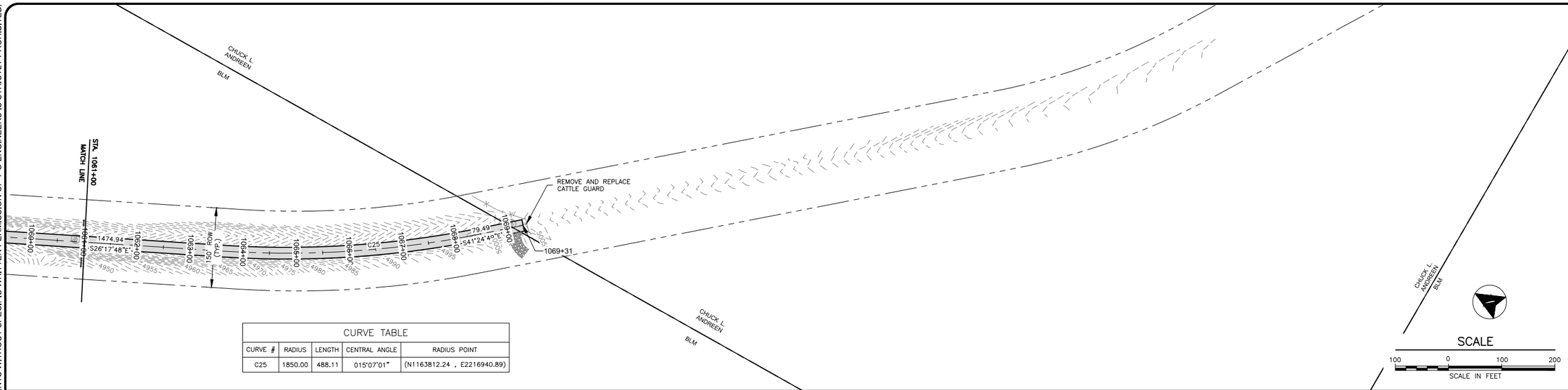
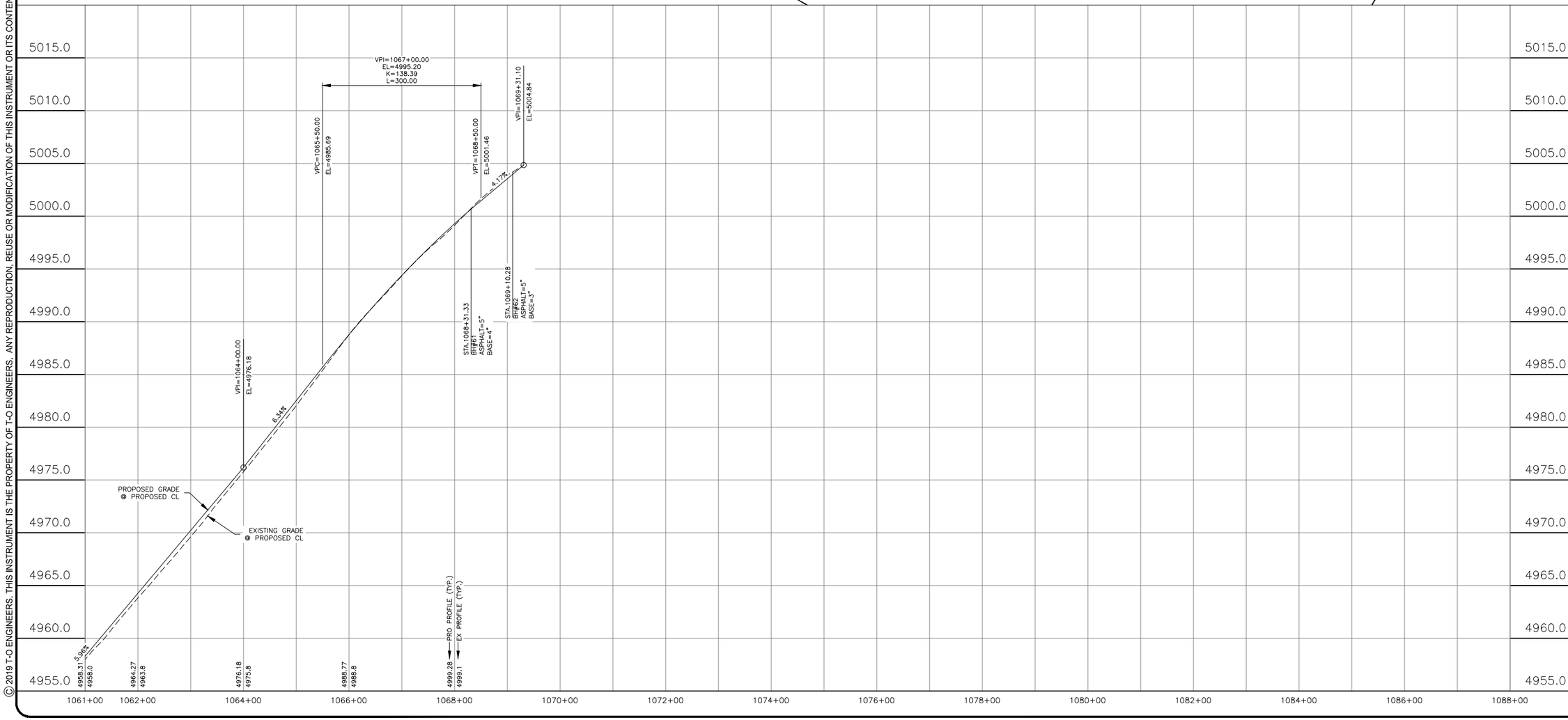


CURVE TABLE				
CURVE #	RADIUS	LENGTH	CENTRAL ANGLE	RADIUS POINT
C25	1850.00	488.11	015°07'01"	(N1163812.24 , E2216940.89)



Professional Engineer (Civil)
DUSTIN D. SPOMER
9483
Date
WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
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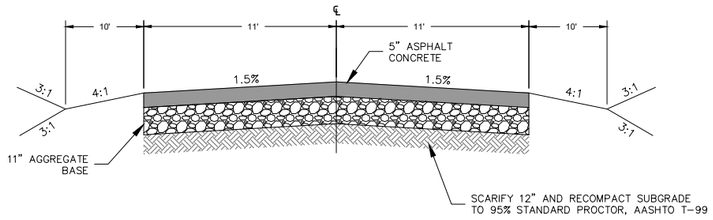

TYPICAL ROAD SECTION

N.T.S.

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Professional Engineer (Civil)
DUSTIN D. SPOMER
9483
Date
WYOMING

BORDER SIZE	22"x34"
DESIGNED	WSW
DRAWN	TJI
CHECKED	WSW
APPROVED	DDS

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