MEMORANDUM

State of Alaska
Department of Transportation & Public Facilities
Northern Region Design and Engineering Services

TO: SEE DISTRIBUTION

DATE: January 4, 2016

FILE NO: H:\Projects\Communities\Kotzebue\76884_Kotz_to_Cape_Blossom_Rd\04 PS&E\DSR\final
PHONE NO: (907) 451-2276
FAX NO: (907) 451-5126

FROM: Albert Beck, P.E.
Design Group Chief
Northern Region

SUBJECT: Kotzebue to Cape Blossom Road
Z768840000/NCPD-0002(204)
Final Design Study Report

The Final Design Study Report for the subject project is now available on-line at the following addresses: http://web.dot.state.ak.us/nreg/design/des_com/index.cfm or http://web.dot.state.ak.us/stest/eDocsNorthernSearch.cfm

DISTRIBUTION:

By E-mail: Ryan F. Anderson, P.E., Preconstruction Engineer
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Evan Booth, M&O Western District Superintendent

Paper Copy: Barbara L. Tanner, P.E., Chief of Contracts & LPA Design *(Original)*
Albert M.L. Beck, P.E., Design Group Chief

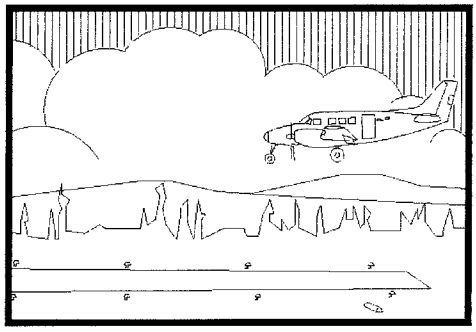
slm/mlh

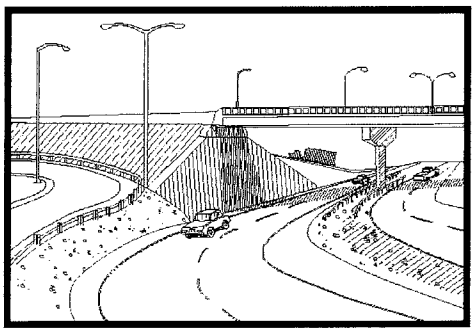
Attachment: Final Design Study Report (Paper Copy Distribution only)

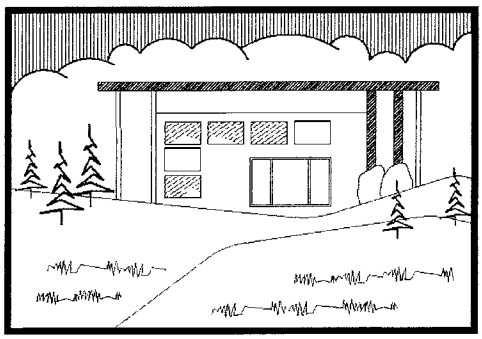
DESIGN STUDY REPORT

Kotzebue to Cape Blossom Road

Z768840000/NCPD-0002(204)

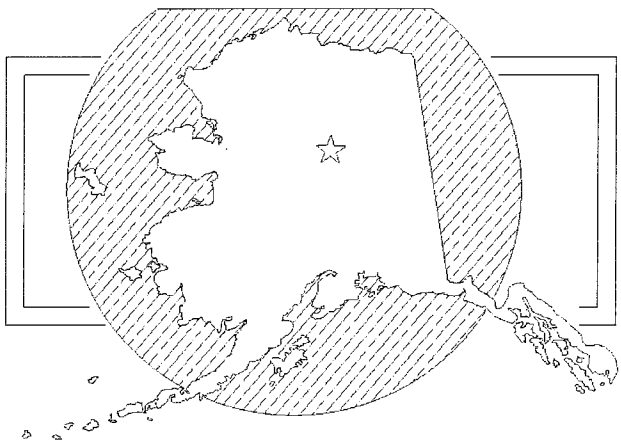






STATE OF ALASKA

Department of Transportation and Public Facilities



NORTHERN REGION

January 2016

DESIGN APPROVAL

KOTZEBUE TO CAPE BLOSSOM ROAD

PROJECT NO. Z768840000/NCPD-0002(204)

Requested by:

Albert Beck, P.E. — Date 1/5/16
Aviation Group Chief
Northern Region

Design Approval Granted:

Ryan F. Anderson, P.E. — Date 1/6/2016
Preconstruction Engineer
Northern Region

Distribution: DSR Distribution Memo Recipients
Michael Cain, Field Operations Engineer, FHWA
The Honorable Donald Olson, Senator
The Honorable Benjamin Nageak, Representative
Clement Richards Sr, Borough Mayor, Northwest Arctic Borough
Fred Smith, Planning Department Director, Northwest Arctic Borough
Maija Lukin, Mayor, City of Kotzebue
Derek Martin, City Manager, City of Kotzebue
Mike Tabor, Acting Executive Director, Native Village of Kotzebue
Wayne Westlake, President, NANA Regional Native Corporation, Inc.
Cheryl Edenshaw, Chairperson, Board of Directors, Kikiktagruk Inupiat Corporation
Glenna Parrish., Mayor, City of Buckland
Ronald Moto, Sr., Mayor, City of Deering

DESIGN STUDY REPORT
FOR

KOTZEBUE TO CAPE BLOSSOM ROAD

PROJECT NO. Z768840000/NCPD-0002(204)

PREPARED BY: Scott Maybrier

UNDER THE SUPERVISION OF: Albert Beck, P.E.

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NORTHERN REGION DESIGN AND ENGINEERING SERVICES
JANUARY, 2016
KOTZEBUE TO CAPE BLOSSOM ROAD
PROJECT NO. Z768840000/NCPD-0002(204)

Table of Contents

INTRODUCTION/HISTORY

The Alaska Department of Transportation and Public Facilities (DOT&PF) proposes to construct a new all-season road from Kotzebue, Alaska, south across the Baldwin Peninsula to a beach access area near Cape Blossom. Kotzebue is the transportation hub and the largest of the 11 communities in the Northwest Arctic Borough (NWAB). Approximately 5,000 tons of freight is barged in Kotzebue each year, of which about 2,000 tons is transferred to NWAB villages. This freight includes semi-perishable goods, basic construction supplies, and vehicles such as cars and all-terrain vehicles, but does not include fuel or material and supplies for capital projects.

The proposed Cape Blossom Road is being designed for commercial and recreational uses with an estimated volume of 100 vehicles per day or less.

A reconnaissance study for this project was completed in 2011.

Figure 1

PROJECT DESCRIPTION

This project will construct a two-lane gravel road approximately 11 miles long, with a road surface width of 24 feet and side slopes 3:1 or steeper. Turnouts with ramps down to the tundra will be constructed along the road near traditional trail crossings.

A bridge will be constructed to span Sadie Creek. This bridge will be approximately 240 feet long and will include three-span steel girders with precast deck planks.

The Baldwin Peninsula is underlain by continuous permafrost. Thermal degradation of locally been engineered to minimize potential road surface snow drifting and to provide thermal protection for the permafrost. Cross culverts will be installed as necessary to maintain drainage.

Figure 2

DESIGN STANDARDS

The design standards for this project are based on:

AASHTO's Guidelines for Geometric Design of Very Low-Volume Local Roads, 2001 (GDVLVLR)

ASSHTO's A Policy on Geometric Design of Highways and Streets 2001

State of Alaska, DOT&PF, Highway Preconstruction Manual (PCM)

A design speed of 45 miles per hour was selected for this road. The terrain allowed curvatures to meet this design speed and there are no limiting factors requiring a reduced speed.

The Project Design Criteria worksheet is located in Appendix A. No Design Designation was prepared for this project because it is a new road. The approved Design Designation waiver is located in Appendix A.

DESIGN EXCEPTIONS AND DESIGN WAIVERS

There are no design exceptions or waivers for this project.

DESIGN ALTERNATIVES

Alternatives considered for the design included 2:1 versus 3:1 sides slopes. While 3:1 side slopes would provide more protection to the road from differential settlement of permafrost, 2:1 side slopes were also considered, given the large amount of borrow required to construct the road embankment and the high cost of barging to the Kotzebue area.

Different road embankment heights were considered. A two foot height was considered to limit borrow costs, but it was determined that a 6 foot high embankment should be constructed to limit the effects of snow drifting.

Two bridge alternatives were presented by bridge design: Option 1 was a three-span steel girders with precast deck planks and Option 2 was a two span decked bulb-tee girders. Option 1 was selected as the preferred alternative because the precast concrete girders could not be transported to the site without first constructing the deep water port at Cape Blossom.

Another consideration included deciding where to connect the new alignment to the existing road system. One alternative considered was to utilize the existing road out to the wind turbine farm as the first leg of the alignment. Many of the curves of the existing road would have to be realigned to meet current design standards, which would require additional fill. The worst of these curves is a safety and design life concern as it is at the edge of a drop-off along the coast. Also, a Right of Way easement would need to be acquired for this alternative as it crosses through an Air Force land parcel.

An alternate beginning of the project was considered, which is on Hillside Drive, 1.1 miles east of the intersection with Air Force Road. This new alignment would connect to the end of the

existing road, on the east end of the wind turbine farm. While this new alignment would add a crossing at June Creek requiring a fish pass culvert, it would have far fewer curves than along the existing road. It would require a large amount of fill for the new alignment, and it would increase the wetlands impact of the project.

PREFERRED DESIGN ALTERNATIVE

The preferred design alternative will begin at the intersection with Hillside Drive, and continue on the existing road to the wind turbine farm. The project beginning was chosen to minimize wetlands impacts and the amount of fill needed. The road will have two 10 foot lanes with 2 foot shoulders, 3 percent cross slopes, and 3:1 sideslopes. The side-slopes were chosen to help minimize the effects of thermal degradation at the shoulders of the road. The embankment will be on average 6 feet high to mitigate the effects of snow drifting.

3R ANALYSIS

Not applicable. This is a new road.

TRAFFIC ANALYSIS

Not applicable. This is a new road.

HORIZONTAL/VERTICAL ALIGNMENT

The grades and all the horizontal and vertical curves for the entire project will meet current design standards for the design speed of 45 MPH. The maximum grade on this project will be 7 percent, and the minimum degree of curvature will be 4.5 degrees.

TYPICAL SECTIONS

The roadway will have a 24 foot total width as recommended by GDVLVLR. This will consist of two 10 foot lanes with typical 2 foot shoulders on each side. The surface will be 6 inches of gravel. Normal crown will be set at 3 percent. Compaction of all lifts will be governed by DOT&PF Standard Specifications for Highway Construction.

Three typical sections are used in this project:

Fill Typical

The fill typical will be the main typical used for this project. Borrow meeting the requirements for Selected Material, Type C, Modified, may be used to bring the embankment up to subgrade. Selected Material, Type C, Modified will contain a maximum of 20 percent material passing the No. 200 sieve to ensure that the embankment is not constructed of silt. If silt construction is determined to be the most cost effective construction method, then settlement time will be required for the embankment to consolidate. It may be necessary to place fill during frozen conditions, given the terrain is mostly permafrost and thaw lakes. Frozen embankment shall consist of fragments smaller than 6 inches. No ice shall be place in the embankment. The road will be surfaced with 6 inches of crushed aggregate surface course. The fill slopes will be at 3:1.

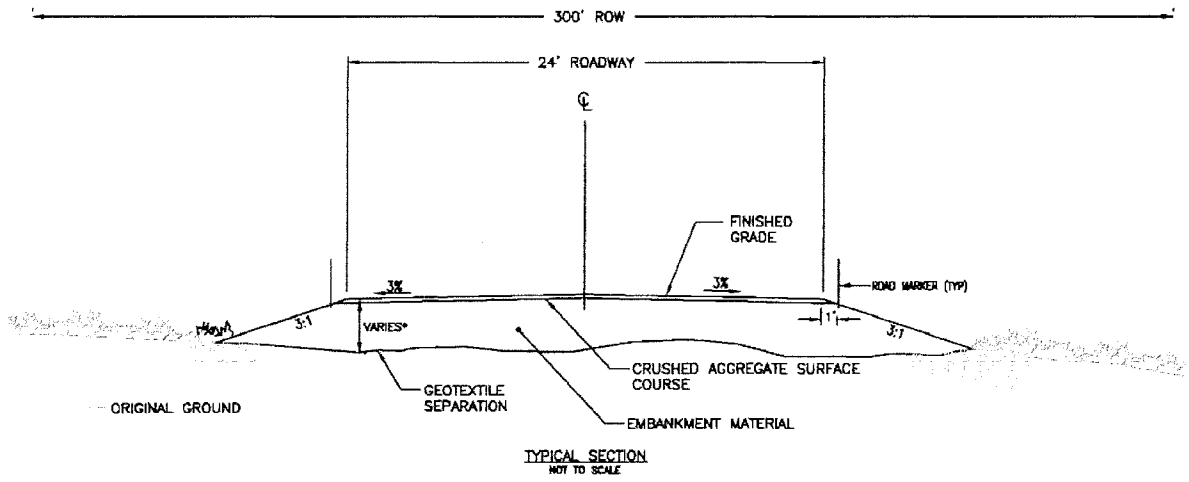


Figure 3

Pullout Typical

This typical shall be built the same as the fill typical, except it will include a 25 foot turnout on one side. Turnouts will be built at locations where traditional use trails intersect with the road alignment. The purpose of this typical is to construct access points to the traditional use trails in the area. The Kotzebue IRA has requested road signage to support tourism and identify traditional trail crossings at the pullouts. They would like the signs to be written in both Inupiaq and English.

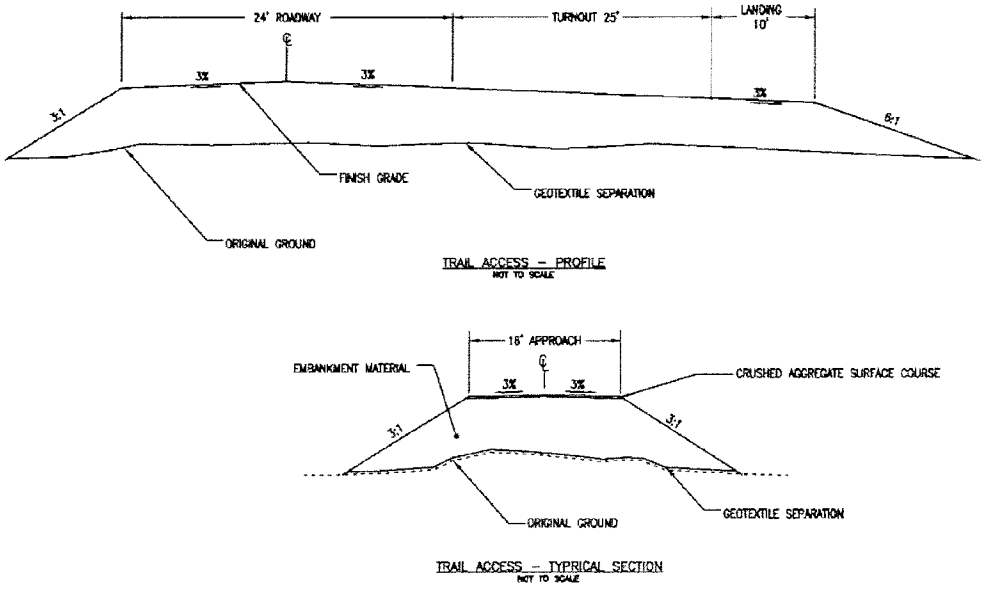


Figure 4

Cut Typical

This typical shall also be built as the fill typical, but will use 3:1 backslopes. The purpose of this typical is to provide access to the beach at the end of the project.

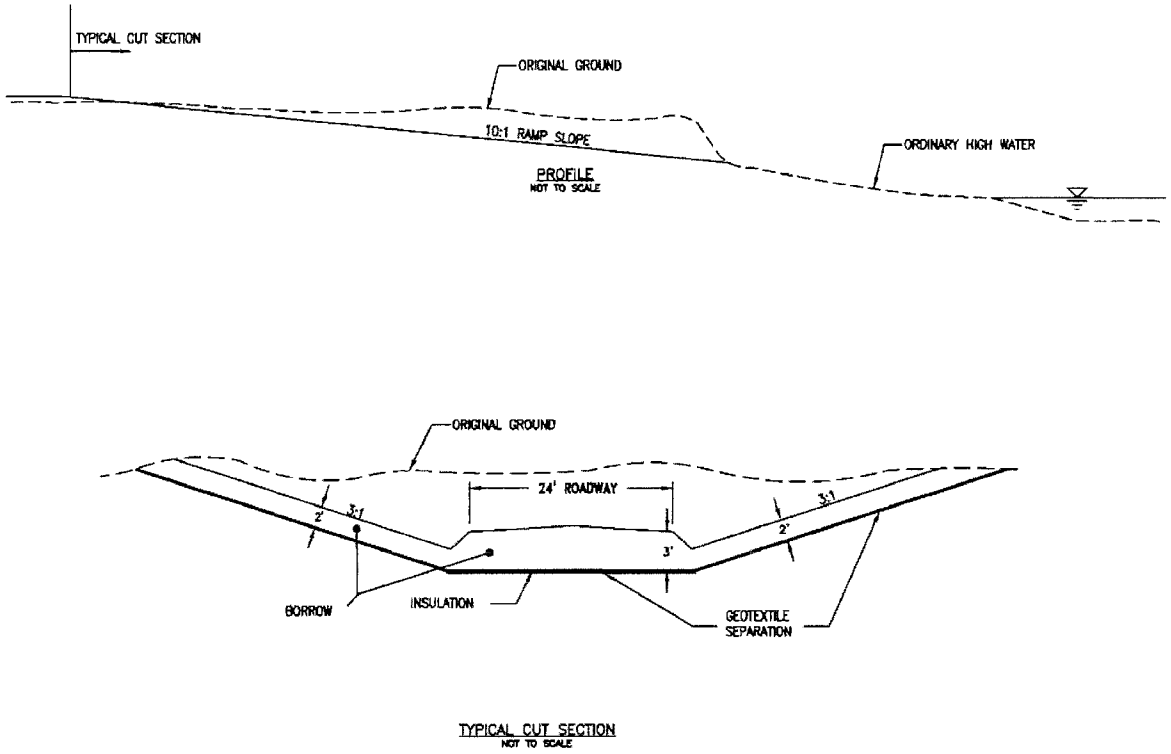


Figure 5

See the appendices for additional details on the proposed bridge typical.

PAVEMENT DESIGN

Not applicable. This is a gravel road.

PRELIMINARY BRIDGE LAYOUT

A new bridge will be located at Sadie Creek. It will be approximately 240-feet long by 27-feet wide, three span, with precast deck bridge, with a deck height of 20-feet, and a precast concrete driving surface. See appendix G for preliminary bridge plans.

RIGHT-OF-WAY REQUIREMENTS

The right-of-way (ROW) will be 150 feet on either side of the r
for three segments where the ROW will be wider due to more relief in the terrain and to

accommodate large fill and pullout areas. Where the Cape Blossom Road connects to Hillside Drive will require a Temporary Construction Permit (TCP).

A 300 foot ROW was selected to accommodate the roadway embankment and possible future utilities with as uniform a ROW width as possible.
The majority of the land needed is owned by Nana Regional Corporation, Inc. and Kikiktagruk Inupiat Corporation, Inc., and the United States of America (Bureau of Land Management). All are large parcels with partial acquisitions through them. The BLM land has been selected by KIC under ANILCA.

The ROW for this project is undeveloped. There are no native allotments impacted by this project.

The type of interest to be acquired will be determined during ROW negotiations but will be sufficient for certification in this federally funded project

MAINTENANCE CONSIDERATIONS

The City of Kotzebue has agreed to maintain the Cape Blossom Road. DOT&PF will retain maintenance of the Sadie Creek Bridge. This project will add an additional 22 lane miles of road. Potential maintenance concerns will include:

- Snow removal. The road will be constructed with a 6 foot height in areas of snow drift concern to help alleviate snow drifting.
- Settlement of road caused by seasonal thaw of foundation soils. The road will be constructed of sufficient height to minimize thawing of the underlying permafrost.
- A cost analysis will be done to determine if insulation board is an economic alternative to building up the embankment to prevent permafrost degradation.
- Dust control. An initial dust palliative will be applied as part of construction and additional dust suppression may be needed at future intervals

MATERIAL SOURCES

All material will be Contractor furnished. Several commercial sources for embankment fill are located in the region. The closest material site with a sufficient quantity of material to construct the road is likely the Kikiktagruk Inupiat Corporation (KIC) Iggy Hill material site. This site is currently undeveloped however KIC has obtained permits for the site.

Other nearby material sites include the existing Drake Construction material site on the Noatak River, an existing material site at Nimiuk Point owned by KIC, and undeveloped material sites near the community of Buckland. The Noatak River site and Nimiuk point site are potential sources of gravel while the Buckland site may be a source for rock and gravel. Crushed aggregate for the road surface would likely be purchased from one of these existing sources.

Figure 6 shows regional material sites. All material sites require either ice roads or barging to transport material to the project.

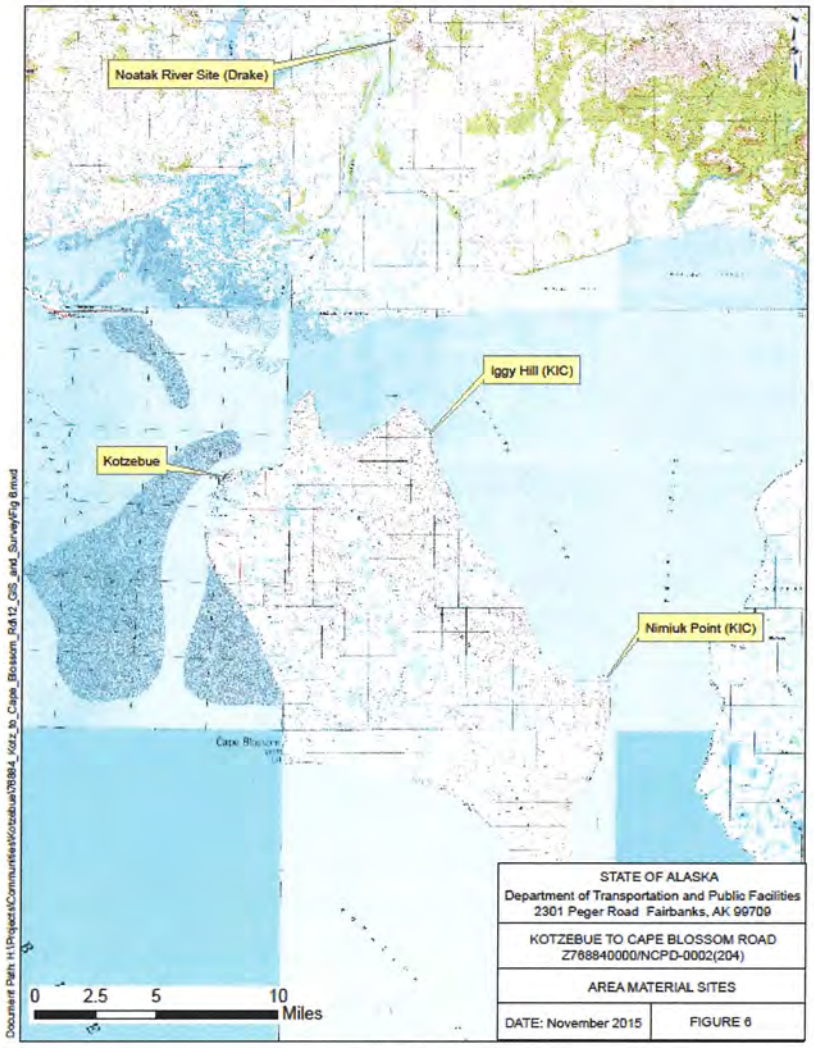


Figure 6

UTILITY RELOCATION & COORDINATION

This project will impact utilities along the existing road out to the wind turbine farm. Overhead power poles will need to be moved to allow for the fill of the new road embankment. The local am radio station's antenna array will also have to be moved. One wind turbine that is immediately adjacent to the alignment will need to be moved a safe distance away from the proposed road.

There are no known utilities beyond the eastern edge of the wind turbine farm.

ACCESS CONTROL FEATURES

The Air Force may require access control along the alignment that passes through the Air Force land, and KEA may require access controls through the wind turbine lease area. Driveways connecting to Cape Blossom Road include the dump, the Air Force's satellite facility, and KEA's

driveways at the wind turbine farm. Trail ramps will be constructed as part of the project to provide access to traditional trails in the area.

PEDESTRIAN/BICYCLE (ADA) PROVISIONS

No separate facilities will be included for bicycle and pedestrian traffic. Pedestrians and bicycles will share the road with vehicular traffic.

SAFETY IMPROVEMENTS

This project will meet standards for new construction. The addition of dust palliative to the crushed surface course will reduce blowing dust and increase visibility. The road geometry will be constructed to reduce the effects of blowing snow to increase safety of vehicles that use the road during periods of non-maintenance. Placement of culverts along the project, will maintain drainage throughout the project area.

INTELLIGENT TRANSPORTATION SYSTEM FEATURES

Not applicable. There are no intelligent transportation system features within the project limits.

DRAINAGE

The Baldwin Peninsula is characterized by thaw lakes from permafrost melting. These lakes are typically shallow and freeze to the bottom in winter. Surface drainage drains to numerous thaw lakes and to June Creek and Sadie Creek. June Creek drains to Kotzebue Lagoon which connects to the Kotzebue Sound. Sadie Creek drains to Kotzebue Sound. The project area is undeveloped, and there are no known contaminant sources that would cause water quality degradation. There are no impaired water bodies in the project area. There is no municipal stormwater system in the project area, and there would be no mix of discharges from a permitted industrial facility.

Approximately fifteen 36 inch or smaller diameter culverts will be required throughout the alignment to provide cross drainage.

A bridge will be constructed at Sadie Creek.

SOIL CONDITIONS

Kotzebue is located in coastal northwestern Alaska, north of the Arctic Circle and south of the Brooks Range. Situated on the northwest tip of the Baldwin Peninsula (protruding into Kotzebue Sound), Kotzebue's climate is transitional between maritime to continental. Recent freeze/thaw indices will be obtained to aid in the thermal design and height of the road embankment for this project. The following data are from the Western Regional Climate Center web site (*www.wroc.dri.edu*).

Climate data summary for the Kotzebue Airport, period from 9/12/1897 to 1/20/2015

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Avg. Max. Temp. (^{0}F)	3.8	4.2	8.4	21	38	51	59	56.5	47	28	14	5.5	28.1
Avg. Min. Temp. (^{0}F)	-9.5	-10	-7.9	4.3	25.1	39	49	47.1	37	19	3.4	-7.3	15.7
Avg. Total Precip. (in.)	0.5	0.51	0.37	0.4	0.35	0.6	1.5	2.14	1.5	0.8	0.63	0.6	9.87
Avg. Total SnowFall (in.)	7.8	7.5	5.8	5.3	1.4	0.1	0	0	1	6.6	9.4	9.3	54.3

The Baldwin Peninsula, lies within the Kobuk-Selawik Lowland physiographic province. The peninsula is a "rolling, lake-dotted lowland containing hills as high as 350 feet, bordered by bluffs" (Wahrhaftig, 1965). It formed as the end moraine of an early Pleistocene glacier that moved west out of the Brooks Range. Marine and glacial sediments were likely mixed as the moraine pushed across the (intermittent) ocean floor. Subsequent to its formation, the peninsula has undergone erosion of its coastline as well as accumulation of thick silt deposits on its uplands. The silt mantle exceeds 70 feet in places where drilled (R&M, 2007), and contains organics and ice, as wedges, lenses and crystals. Bedrock does not outcrop on the peninsula.

The uplands are underlain by permafrost except beneath thaw lakes and larger creeks (i.e. Sadie Creek) where thaw bulbs are present. The active layer is probably 1 to 3 feet thick in undisturbed areas. Historically, the project area has low seismicity.

Landforms include thaw ponds and lakes, drained lake beds turned to muskeg, and rolling hills composed of vegetated silt with organics and ice. Patterned ground is evident throughout the area. Aerial photographs show that some areas have more prominent polygons than other areas, either due to a deeper active layer or larger diameter polygons.

The following is a generalized soil profile of the area:

- Organic mat, 6-12 inches thick with visible ice
- Brown silt with high organics and visible ice (Vs)
- Gray silt (not always present) with slight organics, excess nonvisible ice (Nbe)
- Massive ice thicker than 3 feet is present in some areas.

EROSION AND SEDIMENT CONTROL

The footprint of this project will be large enough to require a storm water pollution prevention plan (SWPPP). Because this project will be a new construction, particular attention will be required to prevent runoff of silty material onto the existing ground and waterbodies. Also, Sadie Creek is known to provide fish habitat, so appropriate temporary erosion and sediment controls will be in place while constructing the fish passage culvert at the bridge at Sadie Creek. Controls will also be required for the large stockpiles of borrow and surfacing materials. Dust control will need to be discussed as the Kotzebue area is known to be windy.

ENVIRONMENTAL COMMITMENTS

The following environmental commitments were detailed in the approved Environmental Assessment (EA) (Appendix B).

- A Section 404 permit is necessary for the placement of fill into wetlands and other waters of the U.S.

- A Title 41 Fish Habitat Permit will be required for Sadie Creek.

Other important considerations include:

1. Equipment, other than vessels, must not enter open water areas of a watercourse during winter. Ice or snow bridges and approach ramps constructed at stream crossings must be substantially free of extraneous material (i.e., soil, rock, wood, or vegetation) and, if requested by the Alaska Department of Fish and Game (ADF&G), Division of Habitat, must be removed or breached before breakup. Alterations of the banks of a watercourse are prohibited.

2. Ice roads shall be kept clean from debris.

3. Fueling the equipment while it is on the ice is prohibited.

4. End-dumping riprap along the stream bank is prohibited. Riprap shall be strategically placed to prevent excess rock in the streambed.

5. Temporary degradation of water quality and to the EFH, through increased turbidity during the revetment construction, will be reduced by phasing the amount of disturbance along the river's bank until the section under construction is stabilized.

6. The contractor will utilize best management practices (BMPs) during construction as outlined in an approved contractor-produced SWPPP and HMCP to avoid and minimize sediments and pollutants from entering the Innoko River.

7. If contaminated soil or water is encountered during construction, the DOT&PF project manager and ADEC will be notified and a response plan will be developed for the site

8. Temporary degradation of air quality from fugitive dust will be mitigated by applying water, as necessary, to the dust prone areas during construction.

9. In order to protect nesting migratory birds, the contractor will avoid vegetative clearing during the nesting season of May 1 through July 15 or from May 5 through July 25, depending on which timing window helps facilitate the project, per U.S. Fish and Wildlife Service (USFWS) informal Section 7 consultation, letter dated October 1, 2012.

10. All disturbed surfaces resulting from this project will be permanently stabilized.

11. The DOT&PF contract will recommend that erosion control products composed of forage material (straw bales, straw wattles, straw blankets, coir logs, ect.) be weed free certified.

12. The DOT&PF contract specification will require the awarded contractor to remove all soil, vegetation, and rock medium from equipment by washing all equipment, prior to moblization to the site.

13. The DOT&PF contract will specify of the awarded contractor that if any eagle nest is located within a half mile of project related activities, then they shall contact the USFWS Permit Office at: permitR7MB@fws.gov or 907-786-3685, and refer to http://alaska.fws.gov/eaglepermit/permit.htm for additional guidance.

WORK ZONE TRAFFIC CONTROL

The majority of this project will be a new road with no existing traffic. The contractor shall be required to submit for approval a traffic maintenance plan detailing traffic control features during construction. Special traffic control requirements will be included in the plans an special provisions. Any traffic at intersections with the existing trails will be accommodated during construction.

VALUE ENGINEERING

A Value Engineering Study was considered for this project. Project costs will exceed $40 million, but a value engineering study was determined to not be necessary for the following reasons:

- The project is not on the National Highway System.

- The project location is remote, thus mobilization costs of personnel, equipment, and materials account for a large portion of project costs

- A significant percentage of project costs are due to the large amount of borrow required to construct the embankment. The embankment will be constructed on average 6 feet high to minimize the effects of differential settlement of melting permafrost and to limit the effects of snow drifting.

Value engineering principles have been incorporated into the project development in order to produce a cost effective design.

COST ESTIMATE

The estimated costs for this project are as follows:

Design	$3,462,000.00
Utilities	$250,000.00
Right of Way	$1,676,000.00
Construction (Includes 4.65% ICAP & 10% Engineering)	$39,835,000.00
Total Cost of Project	$45,223,000.00

APPENDIX A

DESIGN CRITERIA
AND
DESIGN DESIGNATION

ALASKA DOT&PF PRECONSTRUCTION MANUAL
Chapter 11 - Design
PROJECT DESIGN CRITERIA

Project Name: KOTZEBUE TO CAPE BLOSSOM ROAD			
☑ New Construction/Reconstruction ☐ 3R ☐ PM ☐ Other:			
Project Number: 76884/NCPD-0002(204) ☐ NHS ☑ Non NHS			
Functional Classification:	Rural Collector		
Design Year:	2045	**Present ADT: 0**	
Design Year ADT:	less than 400	**Mid Design Period ADT: n/a**	
DHV:	n/a	**Directional Split: 50/50**	
Percent Trucks:	n/a	**Equivalent Axle Loading: n/a**	
Pavement Design Year:	n/a	**Design Vehicle: WB-40**	
Terrain:	Level	**Number of Roadways: 1**	
Design Speed:	45 mph		
Width of Traveled Way:	**10 feet**		
Width of Shoulders:	**Outside: 2 feet**	**Inside: n/a**	
Cross Slope:	3%		
Superelevation Rate:	6%		
Minimum Radius of Curvature:	660 feet		
Min. K-Value for Vert. Curves:	**Sag: 79**	**Crest: 61**	
Maximum Allowable Grade:	7%		
Minimum Allowable Grade:	0%		
Stopping Sight Distance:	360 feet		
Lateral Offset to Obstruction:	0 to 6 feet		
Vertical Clearance:	**16 feet 6 inches no anticpated overhead utilities during this project**		
Bridge Width:	**27 feet wide with 10 foot lanes, 2 foot shoulders**		
Bridge Structural Capacity:	**HL93 per the AASHTO LRFD Bridge Design a Specifications**		
Passing Sight Distance:	**1,625 feet**		
Surface Treatment:	**T/W: gravel**	**Shoulders: gravel**	
Side Slope Ratios:	**Foreslopes: 2:1**	**Backslopes: 3:1**	
Degree of Access Control:	**n/a**		
Median Treatment:	n/a		
Illumination:	n/a		
Curb Usage and Type:	n/a		
Bicycle Provisions:	shared roadway		
Pedestrian Provisions:	shared roadway		
Misc. Criteria:	n/a		

Proposed - Designer/Consultant: _____ **Date:** 7-28-14

Endorsed - Engineering Manager: _____ **Date:** 7/28/14

AG **Approved - Preconstruction Engineer:** _____ **Date:** 7/28/14

Shaded criteria are commonly referred to as the *FWHA 13 controlling criteria*. For NHS routes only, these criteria must meet the minimums established in the Green Book (*AASHTO A Policy on Geometric Design of Highways and Streets*). For all other routes, these criteria must meet the minimums established in the *Alaska Highway Preconstruction Manual*. Otherwise a Design Exception must be approved.

Design Criteria marked with a " # " do not meet minimums and must have a Design Exception(s) and/or Design Waiver(s) approved. See the Design Study Report for Design Exception/Design Waiver approval(s) and approved design criteria values.

MEMORANDUM

State of Alaska
Department of Transportation & Public Facilities
Northern Region Design and Engineering Services

TO: Ryan F. Anderson, P.E.
Preconstruction Engineer
Northern Region

DATE: July 28, 2014

FILE NO: T:\00 Aviation & Community Rds & Buildings\Kotzebue\02 Highways\76884 Kotz to Cape Blossom Rd\04 PS&E\DSR\#Design Designation Waiver memo 07-14.docx

THRU: Albert M.L. Beck, P.E.
Design Group Chief
Northern Region

PHONE NO: (907) 451-2322

FAX NO: (907) 451-5126

FROM: Christopher F. Johnston, P.E.
Engineering Manager
Northern Region

SUBJECT: Kotzebue to Cape Blossom Road
76884/NCPD-0002(204)
Design Designation Waiver

A waiver of the Highway Preconstruction Manual requirement for a Design Designation (HPM 1100.4.1) is requested.

The purpose of this project is to construct a new road from Kotzebue to Cape Blossom.

The project design will not require the information from the Design Designation process and will be designed to the approved design criteria.

Approved: _____ 7/28/2014
Ryan F. Anderson, P.E., Preconstruction Engineer — Date

slm/knt

cc by e-mail: Judy Chapman, Planning Chief

APPENDIX B

ENVIRONMENTAL DOCUMENT

KOTZEBUE TO CAPE BLOSSOM ROAD
Federal Project Number: NCPD-0002(204)
State Project Number: 76884

REVISED ENVIRONMENTAL ASSESSMENT
Submitted pursuant to 42 U.S.C. 4332(2)(c)

By the
U.S. Department of Transportation
Federal Highway Administration
And
State of Alaska
Department of Transportation and Public Facilities

This action complies with
Executive Order 12898, Environmental Justice;
Executive Order 11988, Floodplain Management;
Executive Order 11990, Protection of Wetlands;
Executive Order 11593, Protection and Enhancement of the Cultural Environment; and
Executive Order 13112, Invasive Species.

Recommended for Public Availability by:

12/6/2013
Date

Ryan F. Anderson, P.E.
Regional Preconstruction Engineer
State of Alaska Department of Transportation and Public Facilities

Approved for Public Availability by:

12-10-2013
Date

John W. Huestis, P.E.
Northern Region Area Engineer
Federal Highway Administration

The following individuals may be contacted for additional information concerning this document:

Brett Nelson, Environmental Manager, Alaska Department of Transportation and Public Facilities, Northern Region, 2301 Peger Road, Fairbanks, Alaska 99709

John W. Huestis, P.E., Northern Region Area Engineer, Federal Highway Administration, Alaska Division, P.O. Box 21648, Juneau, Alaska 99802-1648

The proposed action includes: upgrading Air Force Road from Hillside Road to the Kotzebue Electric Association (KEA) Wind Farm, and constructing a two-lane gravel road from the wind farm to a beach access ramp above the high tide line near Cape Blossom. The proposed road would provide all-season access between Kotzebue and Cape Blossom.

APPENDIX C

PRELIMINARY PLAN AND PROFILE SHEETS

CURVE INFORMATION:
Δ = DEFLECTION ANGLE
D = DEGREE OF CURVE
T = TANGENT LENGTH
L = LENGTH OF CURVE
R = RADIUS

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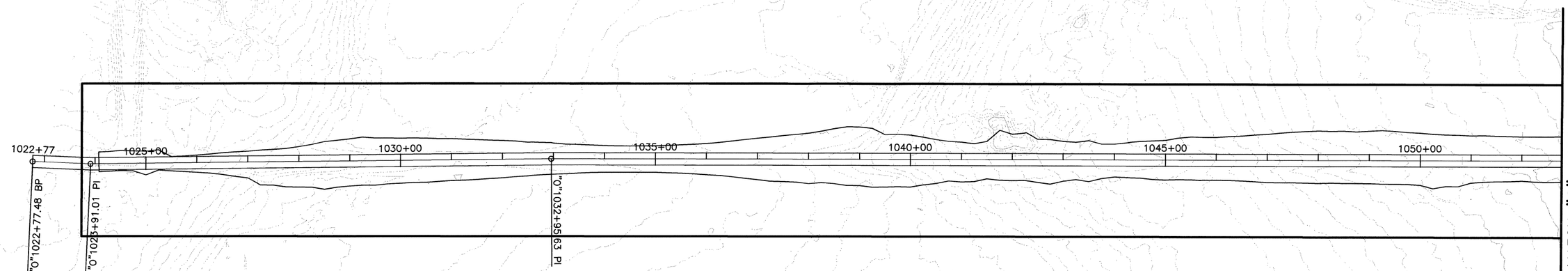
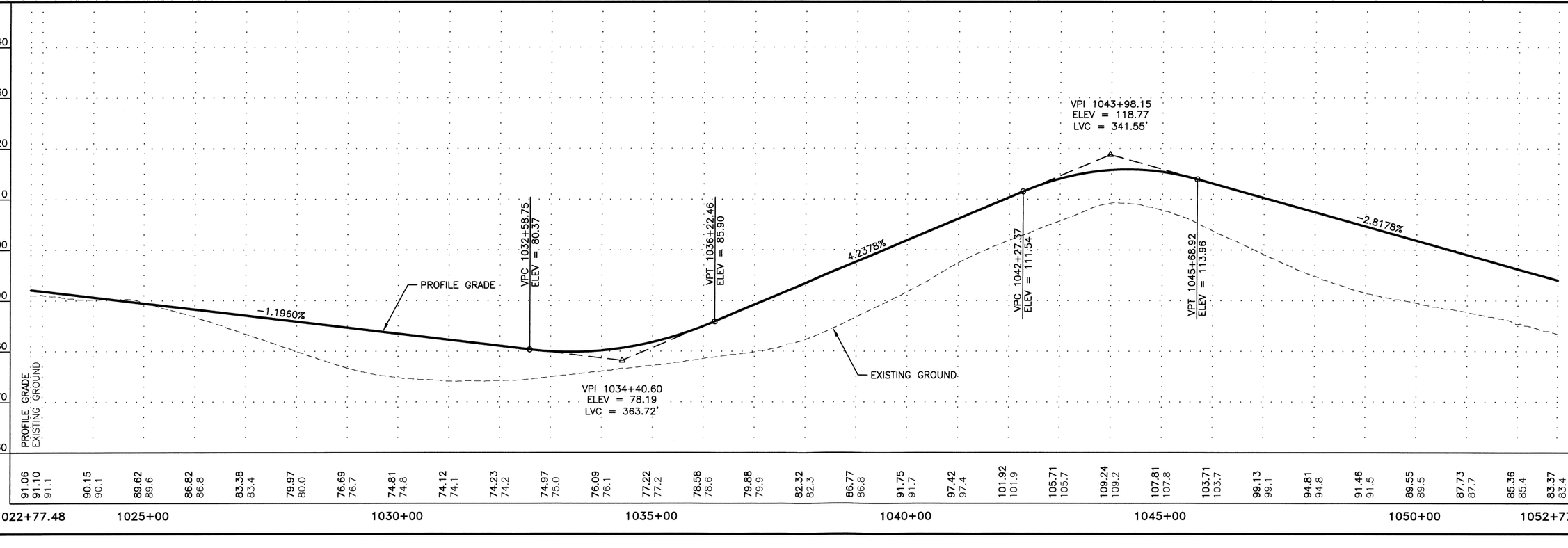
ALASKA	NCPD-0002(204)	2015	1	21





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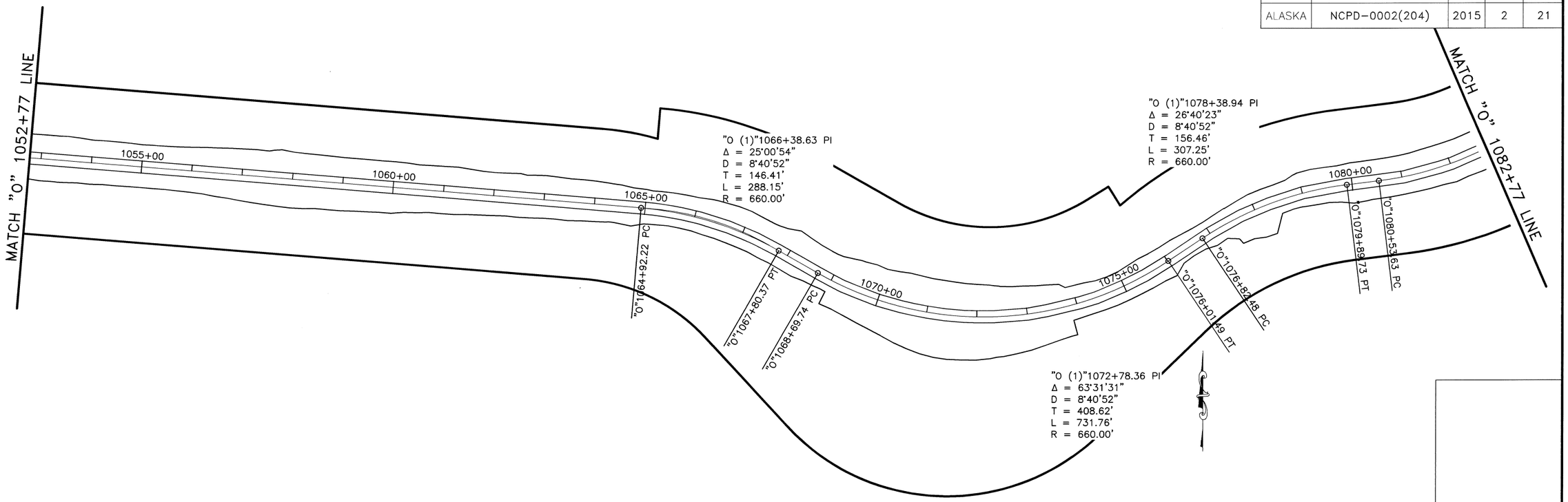

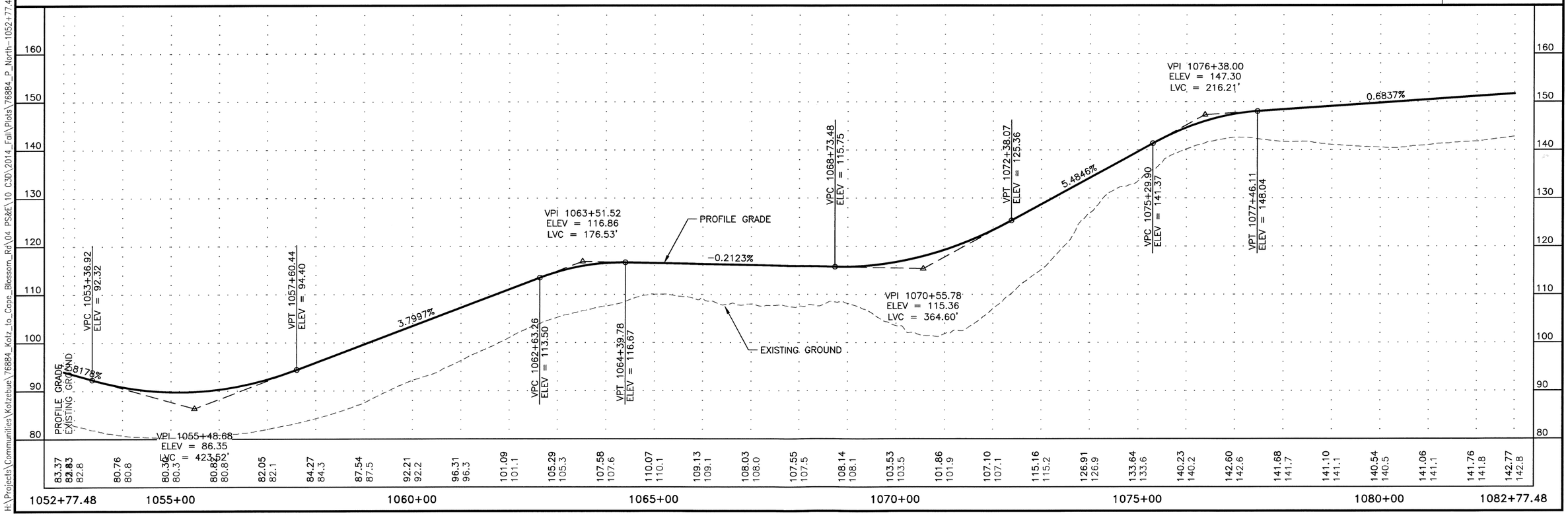

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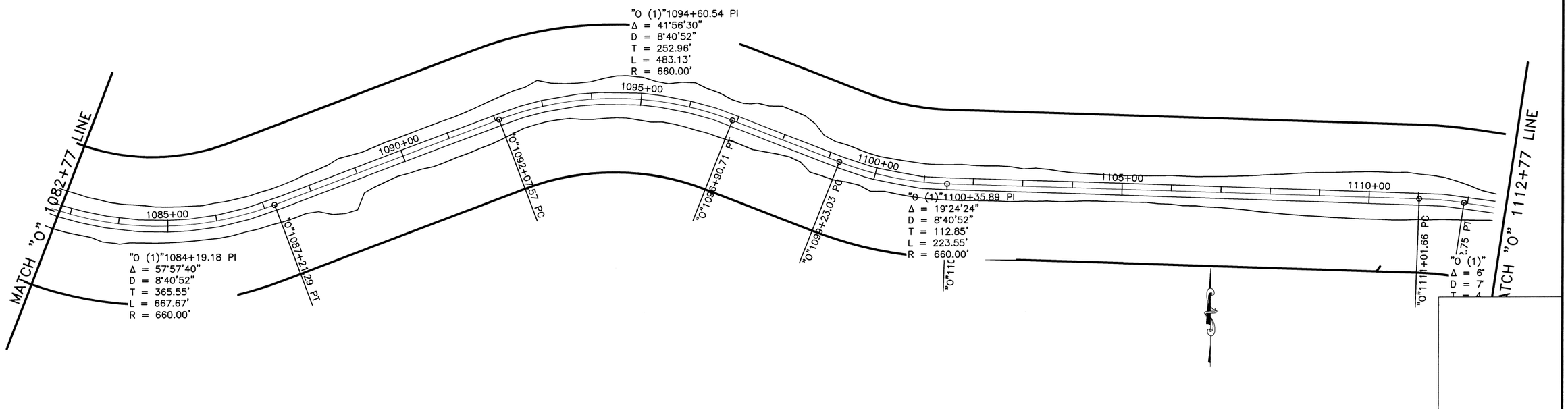

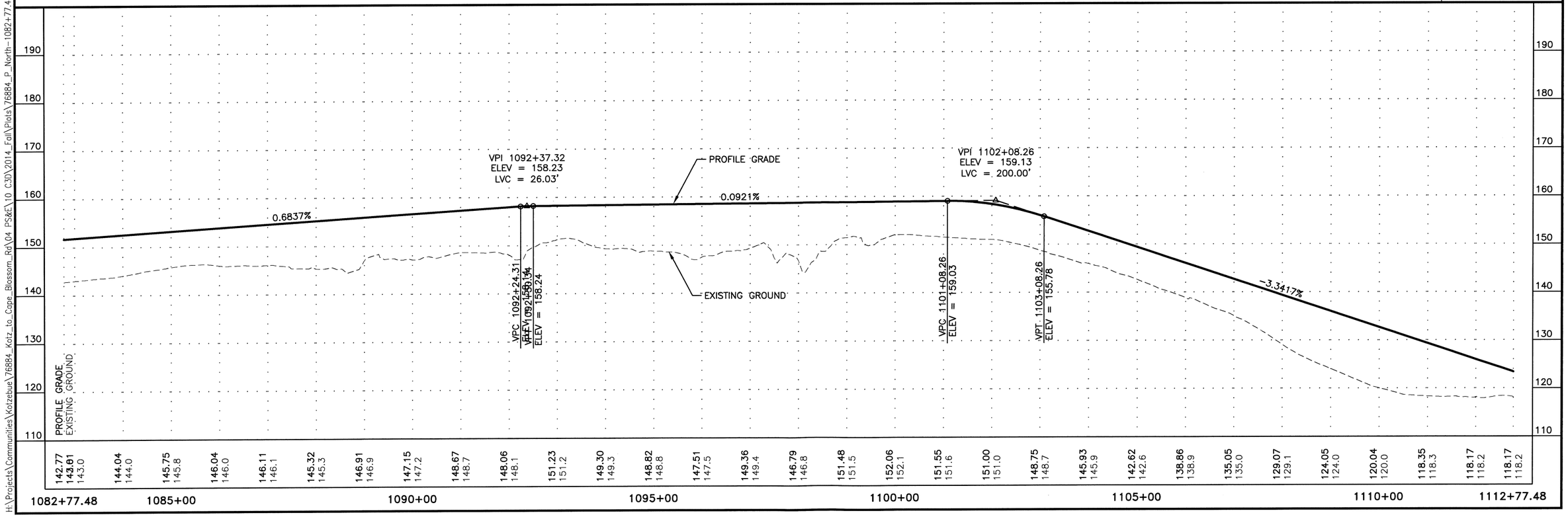

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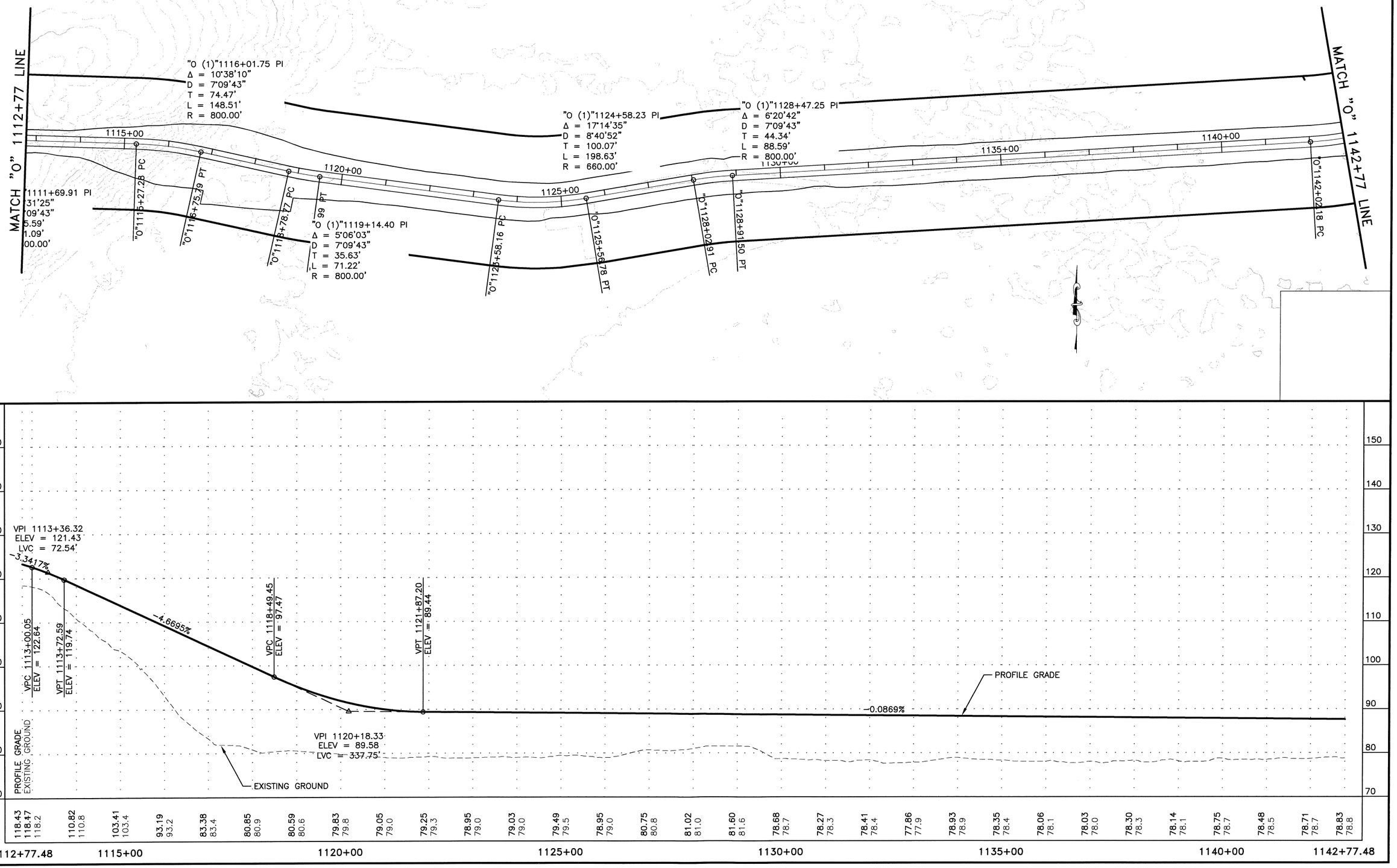

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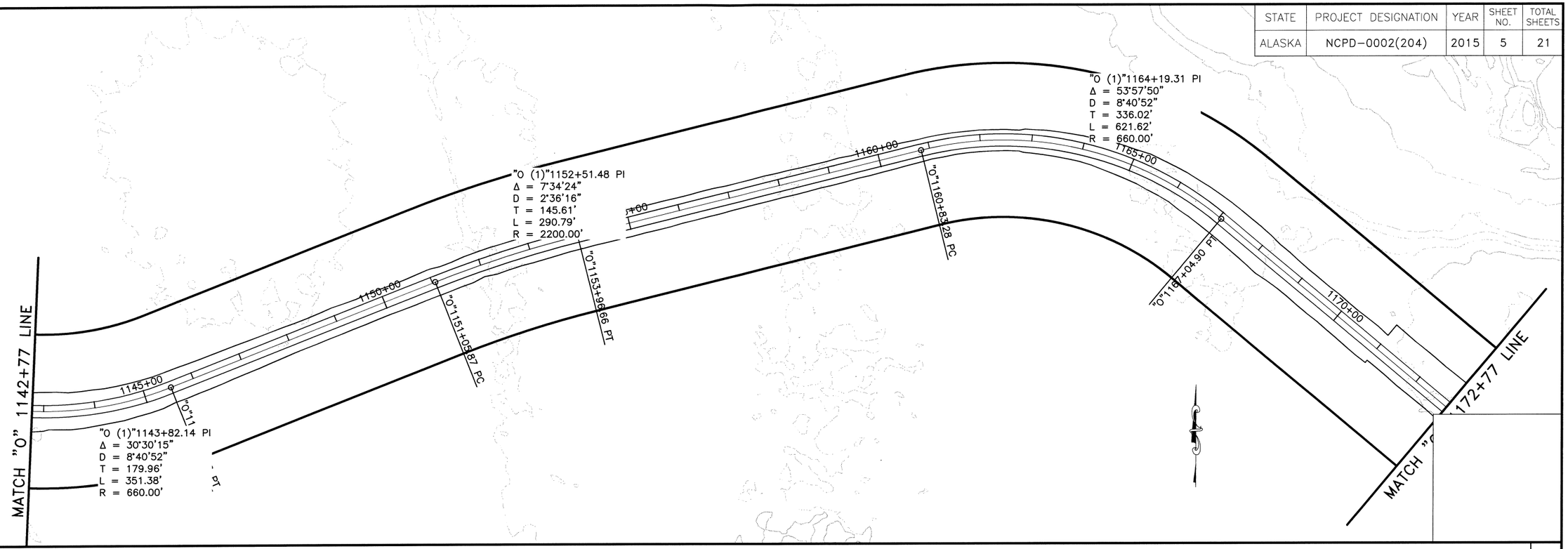

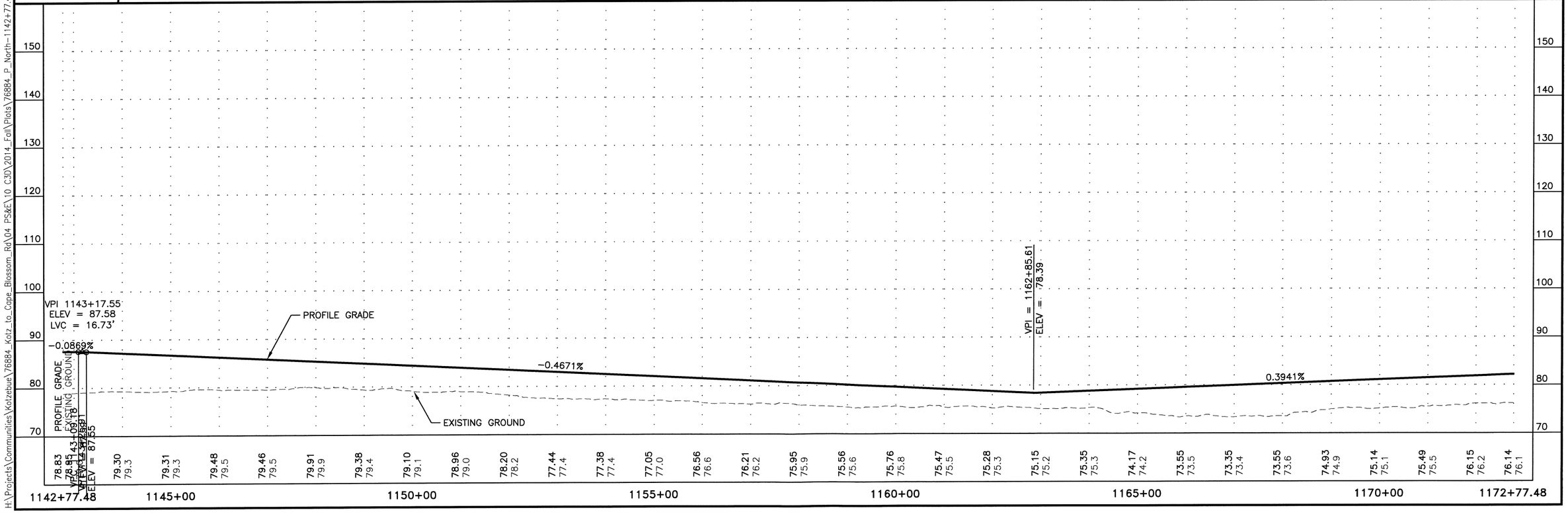

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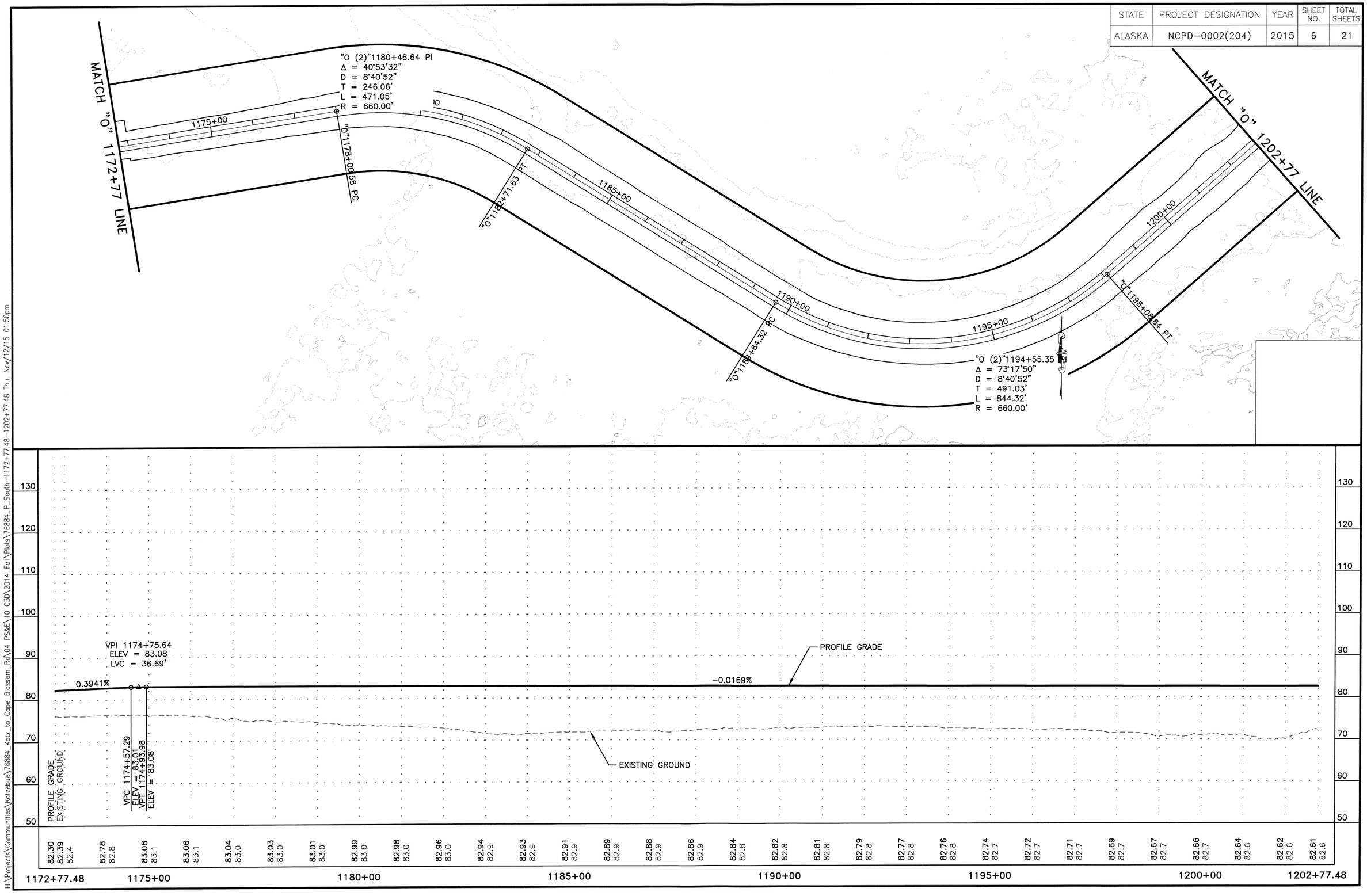

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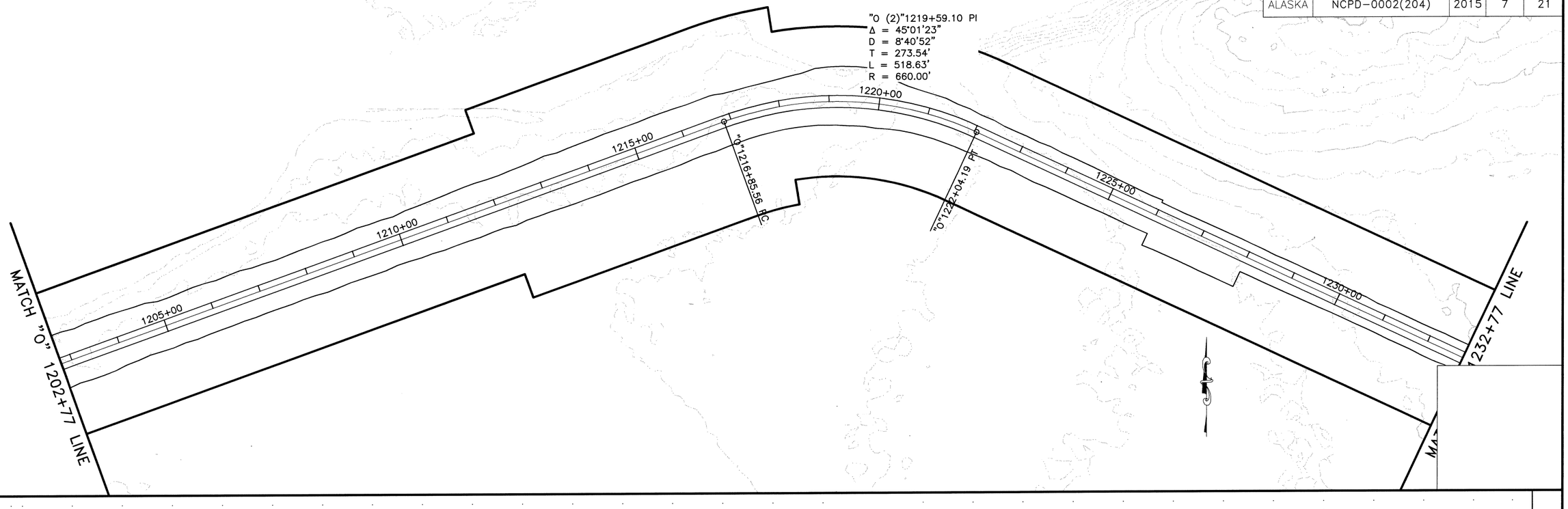

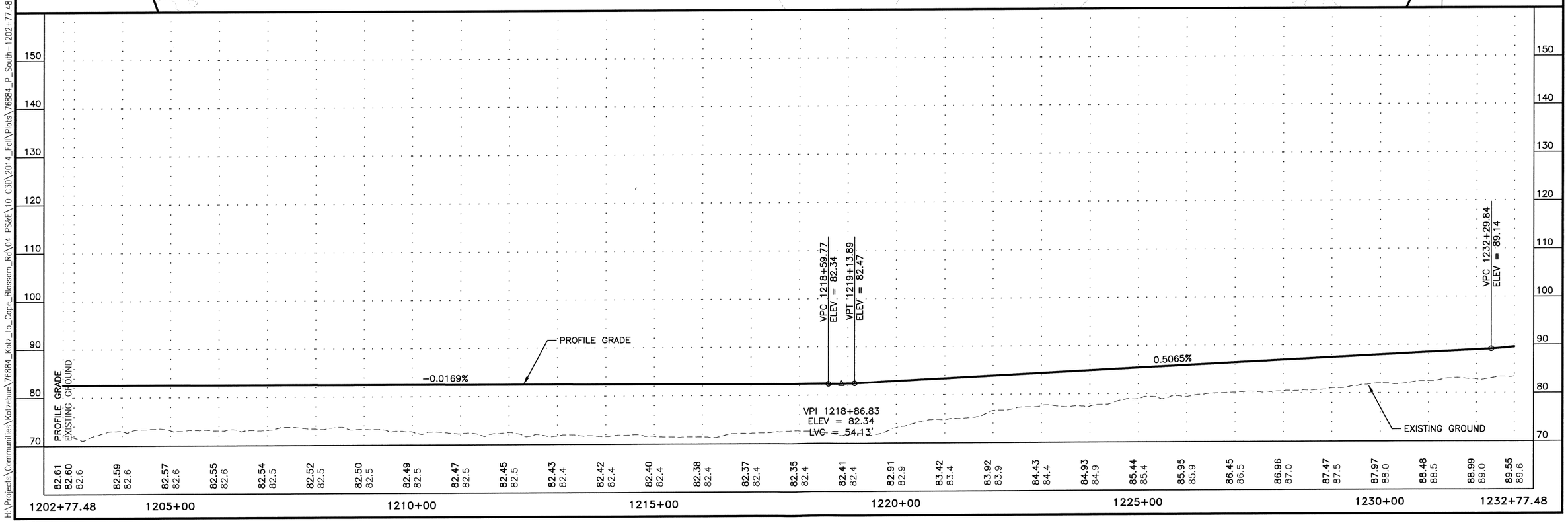

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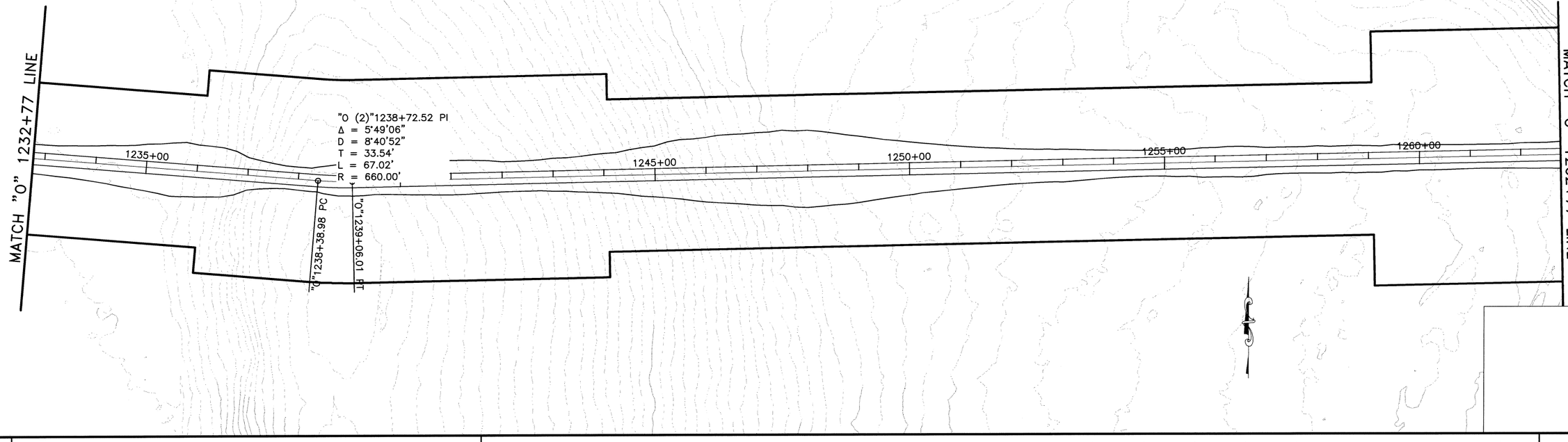

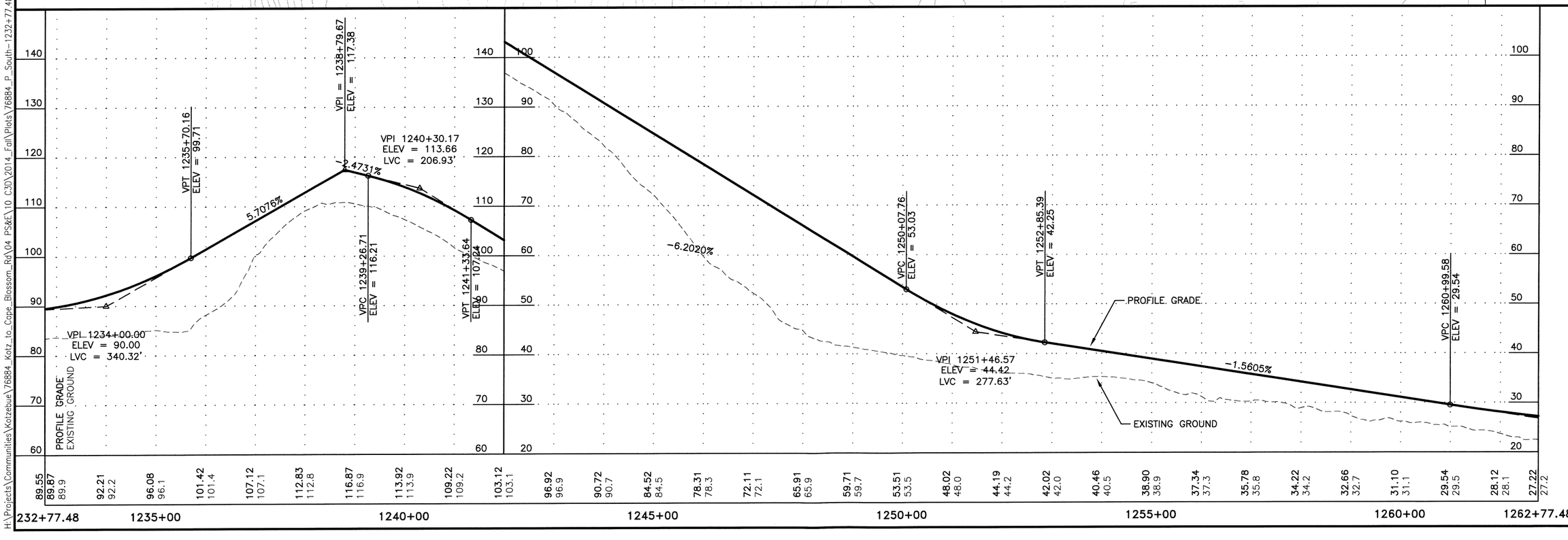

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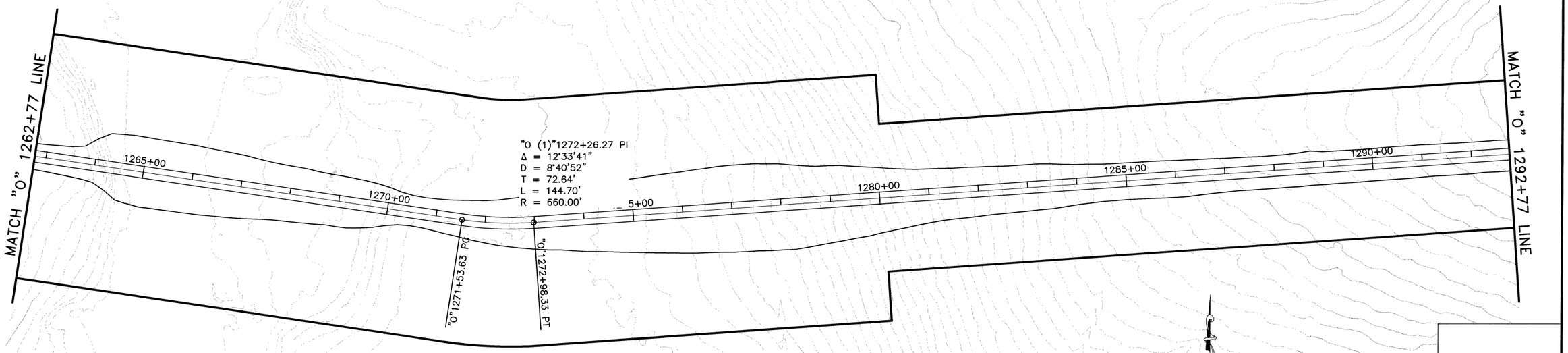

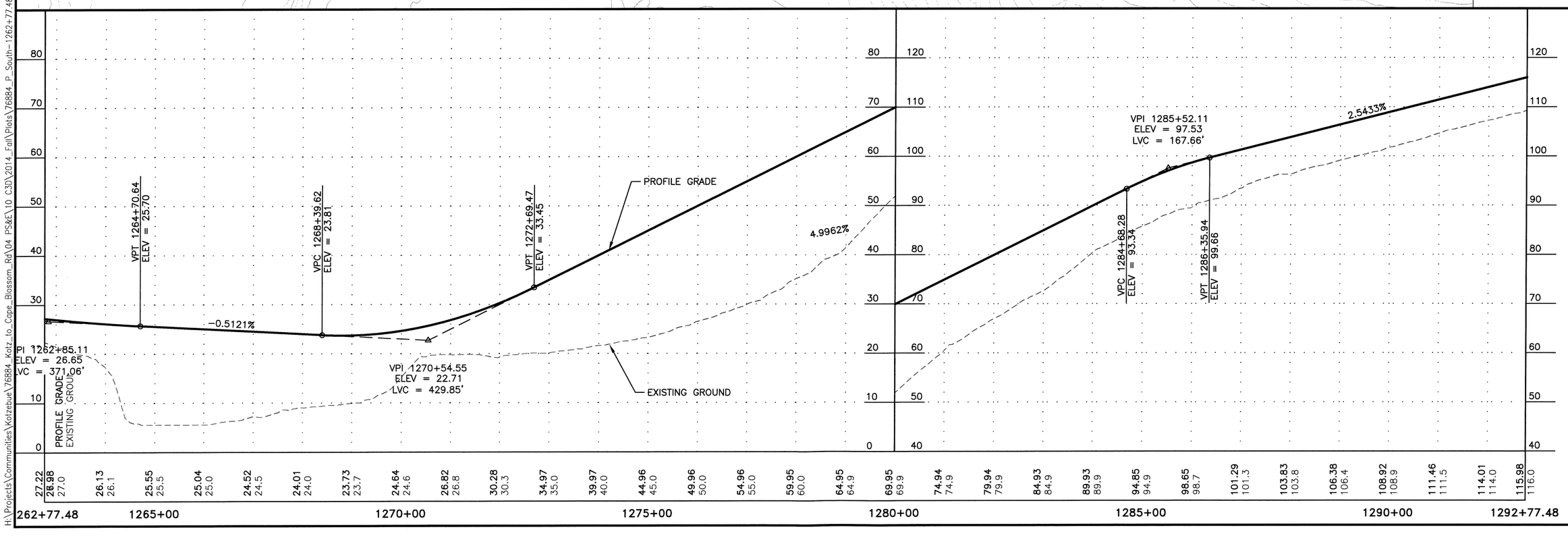

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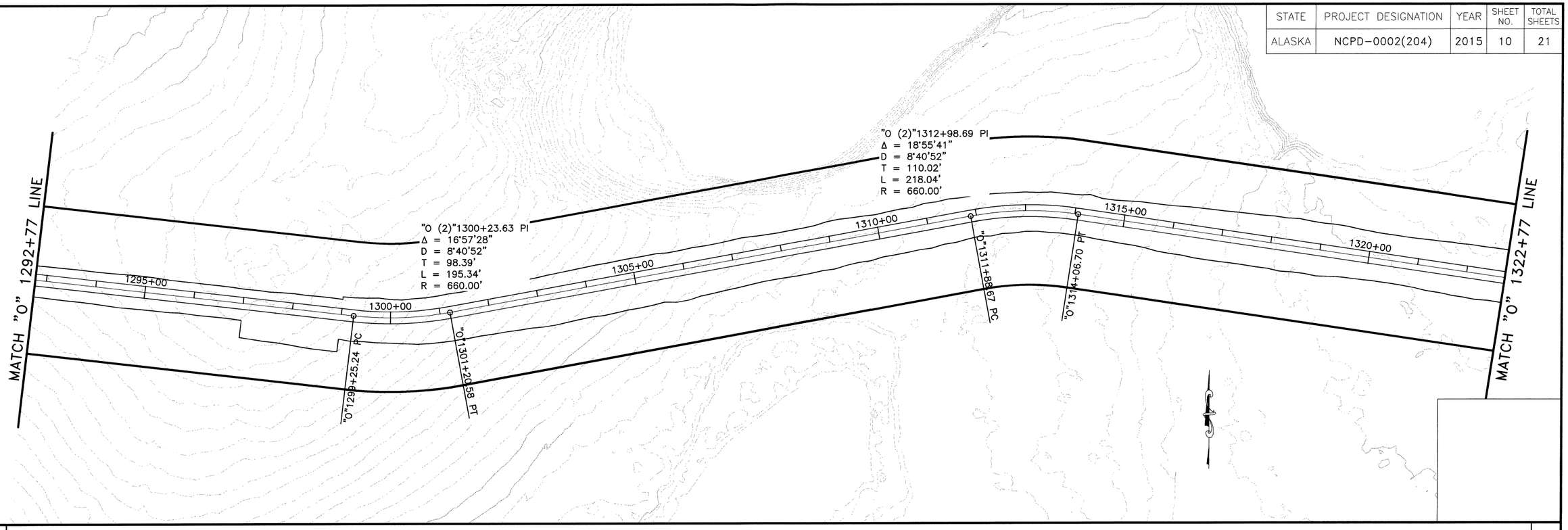

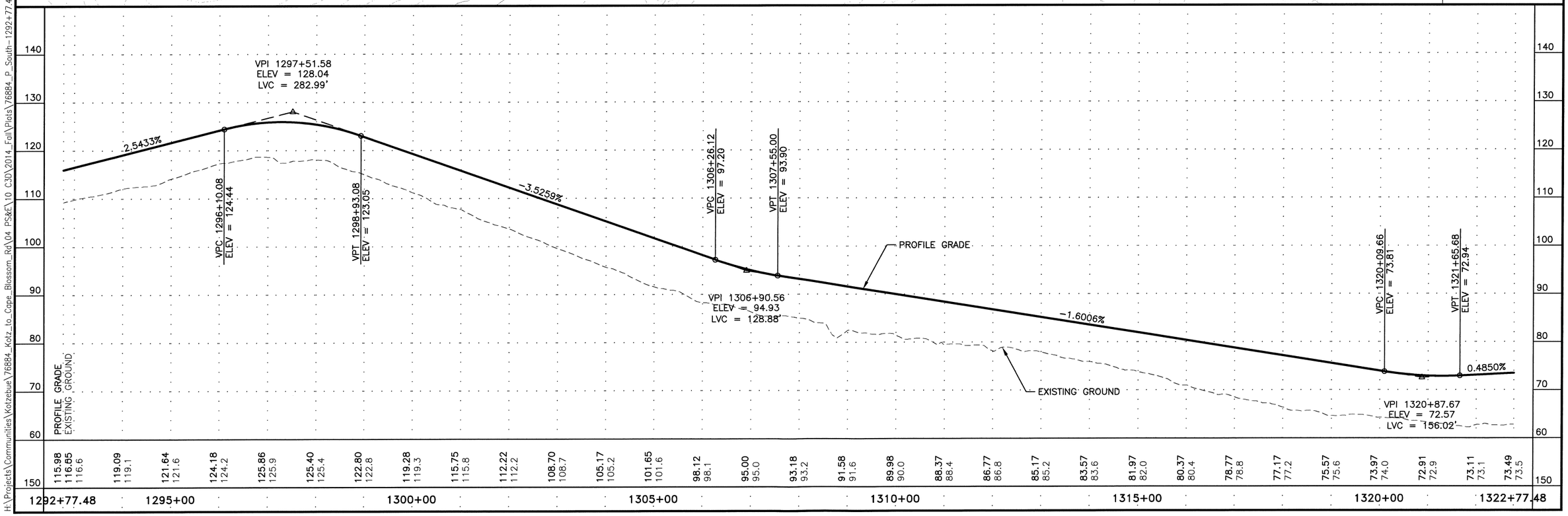

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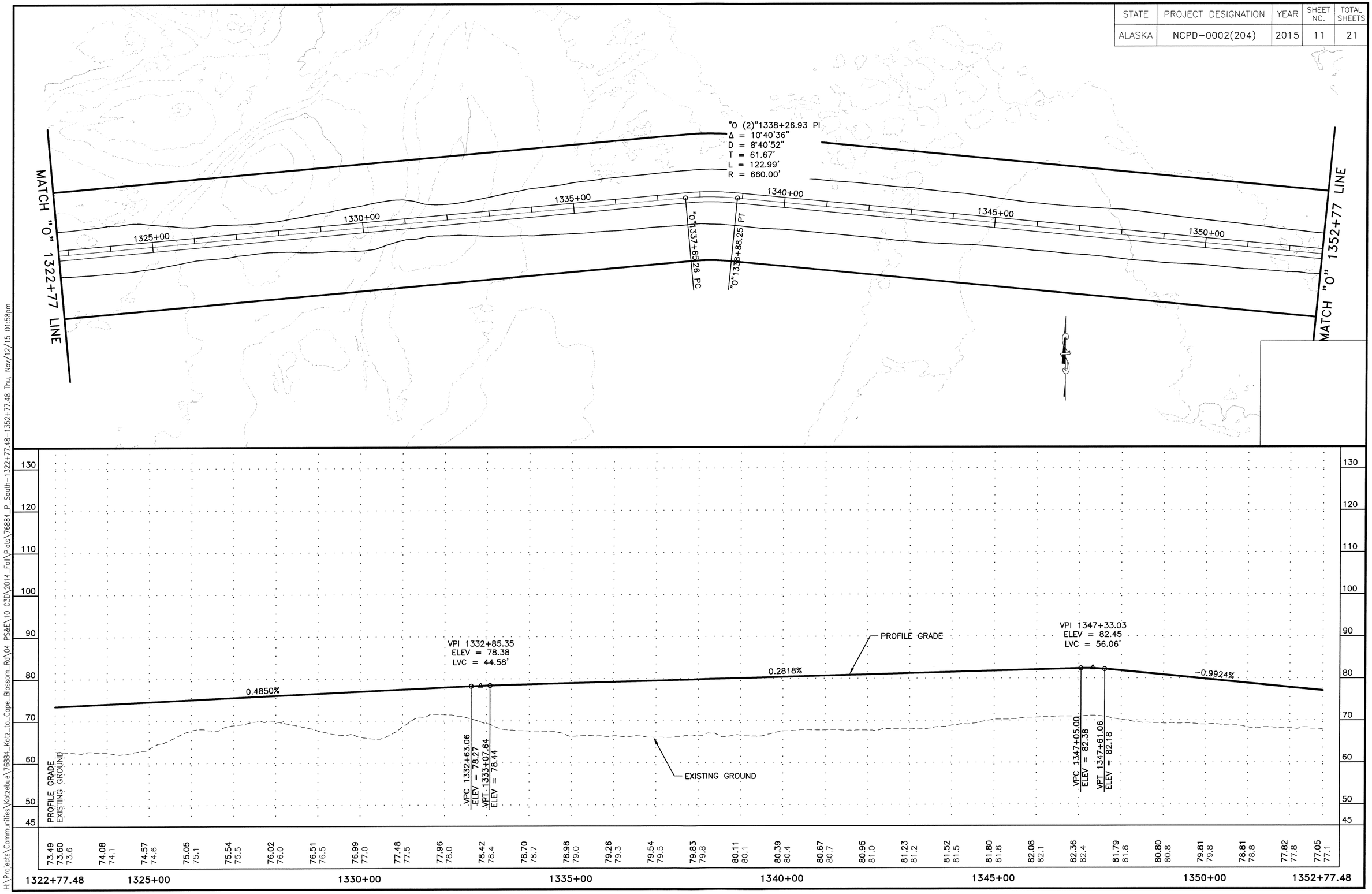

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ALASKA	NCPD-0002(204)	2015	12	21

MATCH "O" 1352+77 LINE

MATCH "O" 1382+77 LINE

1355+00 1360+00 1365+00 1370+00 1375+00 1380+00

PROFILE GRADE

-0.9924%

VPI 1365+17.34
ELEV = 64.75
LVC = 148.01'

-3.6930%

VPC 1367+57.36
ELEV = 55.88

VPT 1370+15.65
ELEV = 51.20

0.0683%

VPC 1364+43.34
ELEV = 65.48

VPT 1365+91.35
ELEV = 62.01

VPI 1368+86.50
ELEV = 51.11
LVC = 258.29'

EXISTING GROUND

PROFILE GRADE
EXISTING GROUND

110 100 90 80 70 60 50 40 30

77.05 76.83 75.84 75.8 74.84 74.8 73.85 73.9 72.86 72.9 71.87 71.9 70.87 70.9 69.88 69.9 68.89 68.9 67.90 67.9 66.90 66.9 65.91 65.9 64.63 64.6 61.70 61.7 58.00 58.0 54.44 54.4 52.10 52.1 51.21 51.2 51.26 51.3 51.33 51.3 51.40 51.4 51.47 51.5 51.53 51.5 51.60 51.6 51.67 51.7 51.74 51.7 51.81 51.8 51.88 51.9 51.94 51.9 52.01 52.0 52.07 52.1

1352+77.48 1355+00 1360+00 1365+00 1370+00 1375+00 1380+00 1382+77.48

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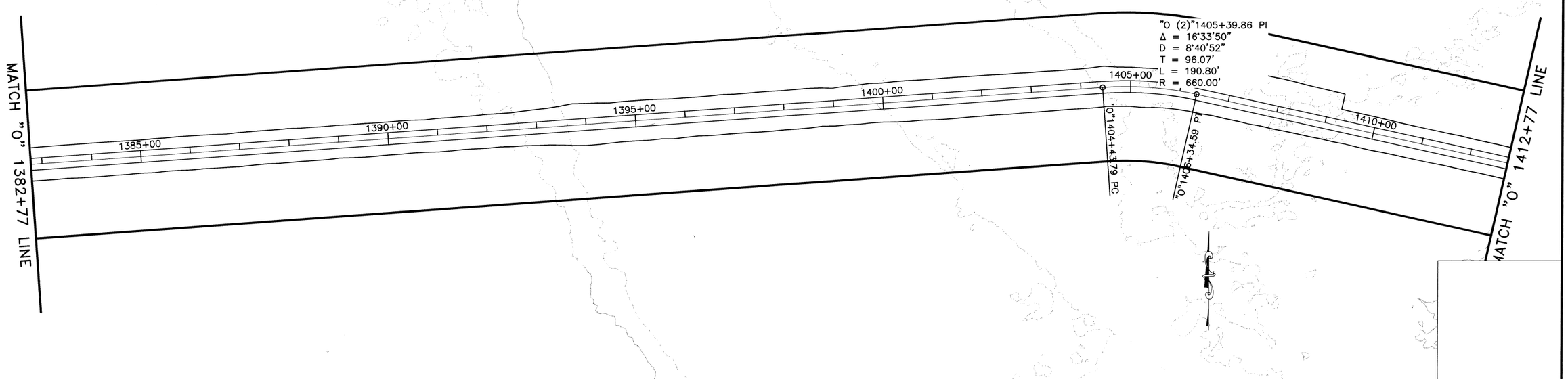

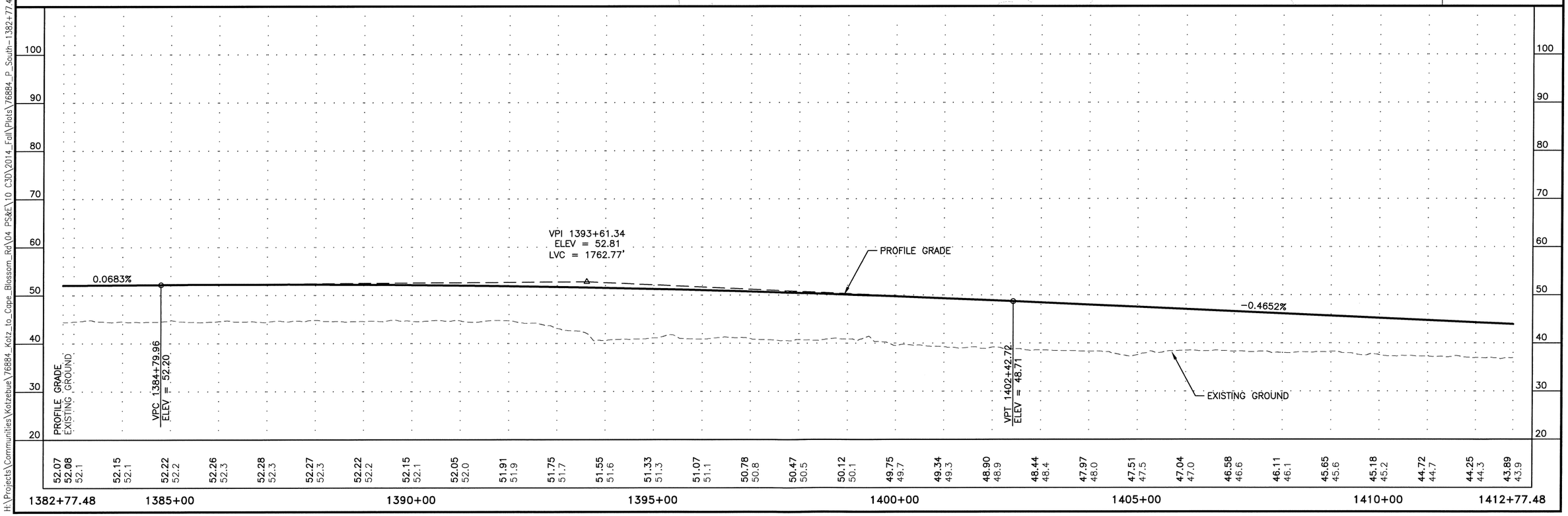

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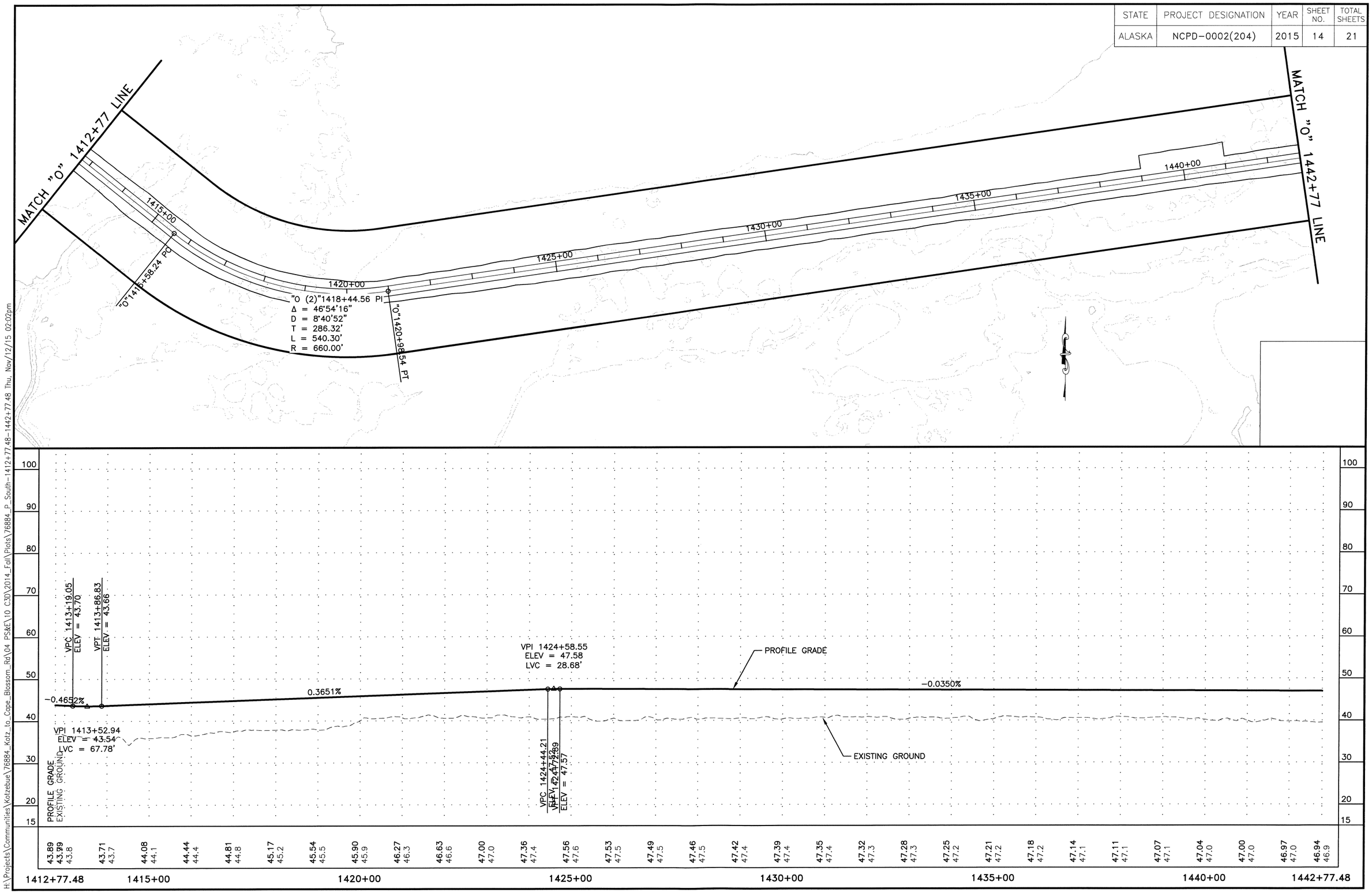

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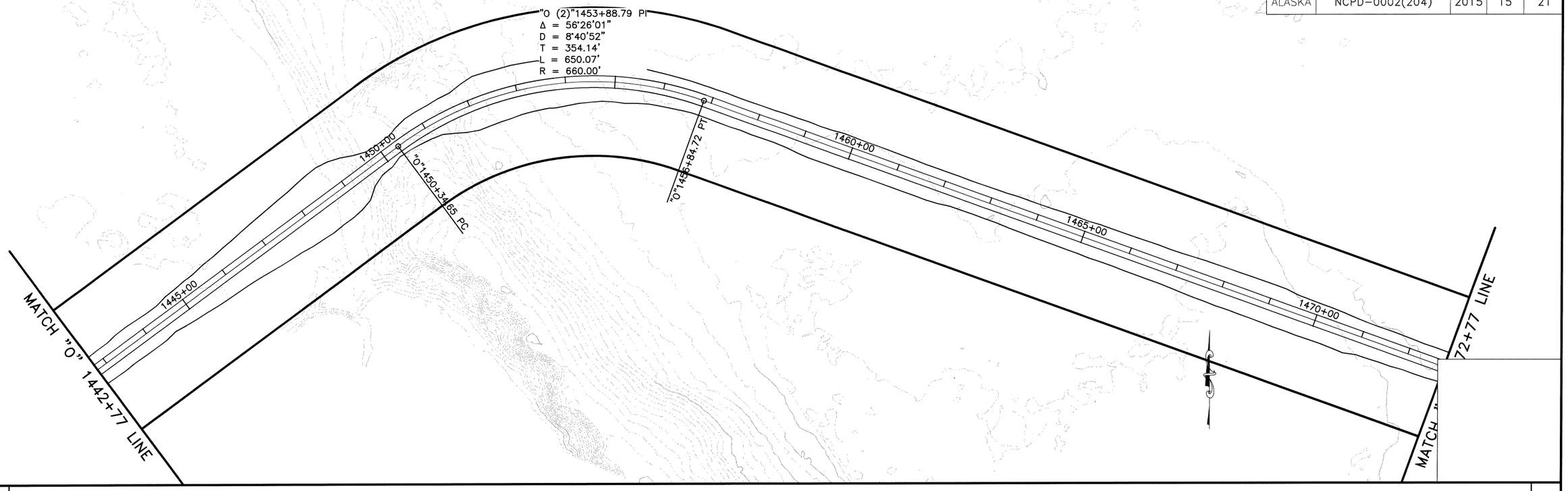

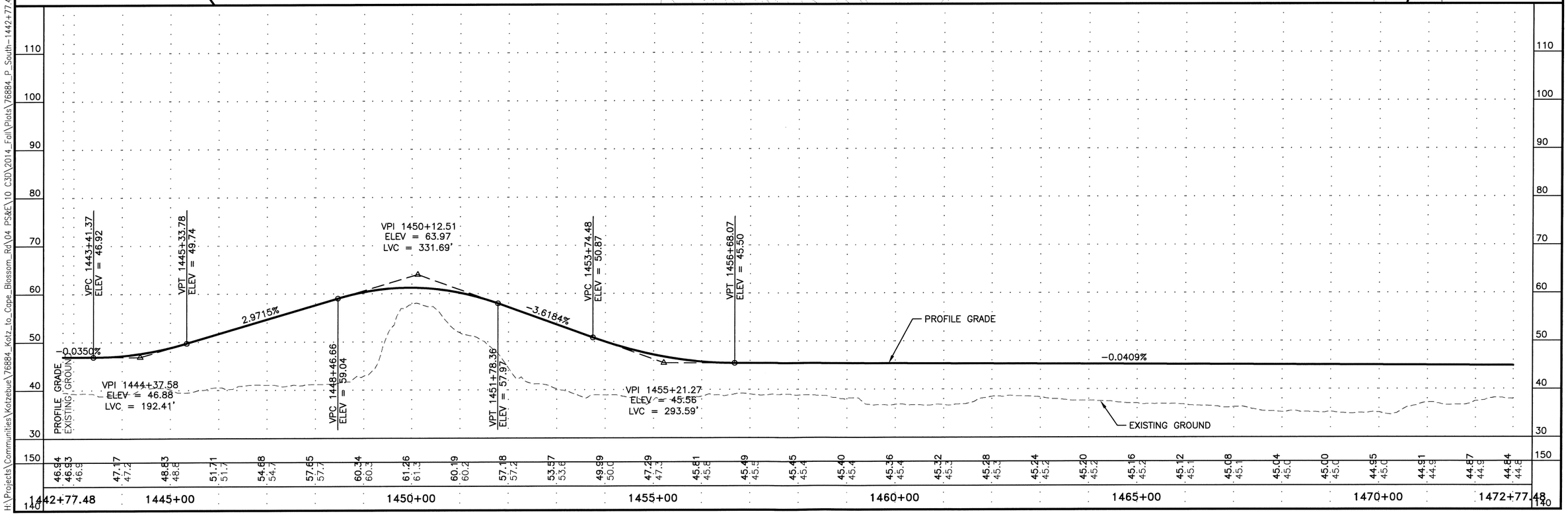

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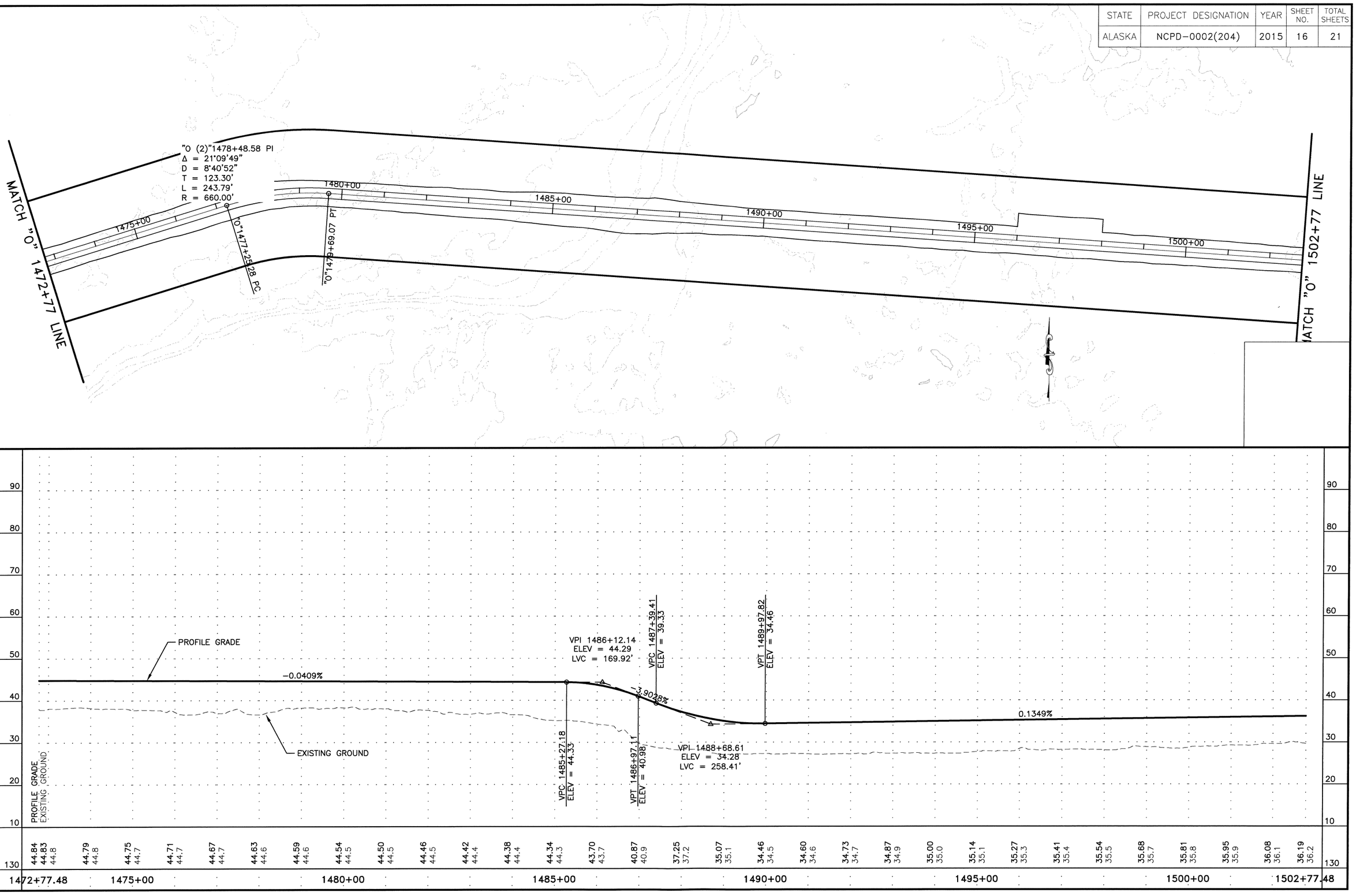

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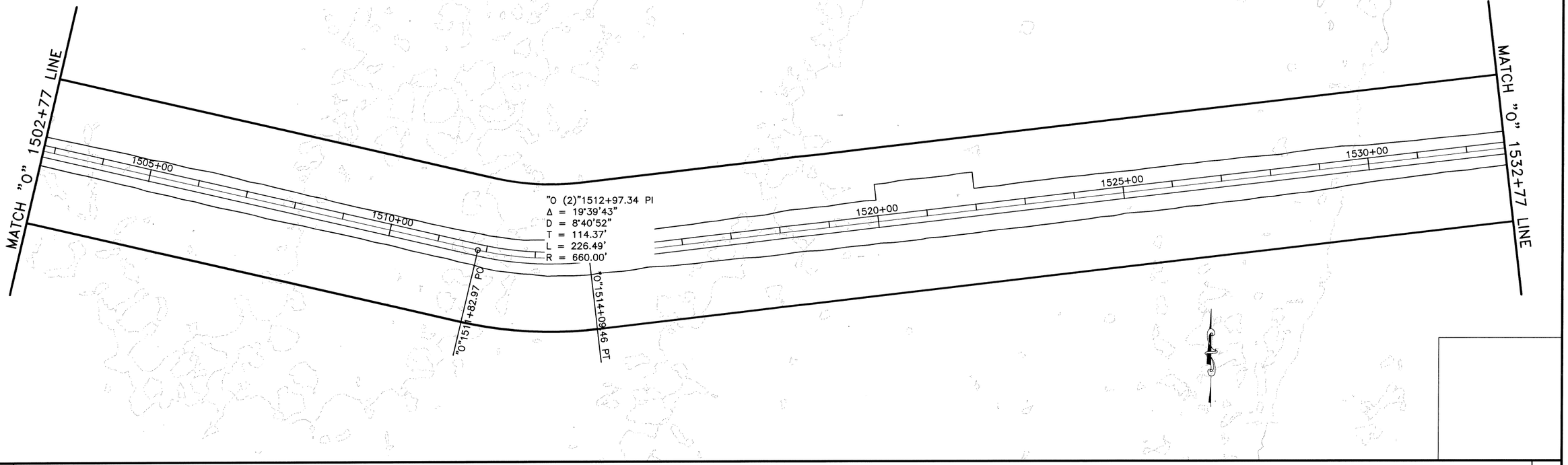

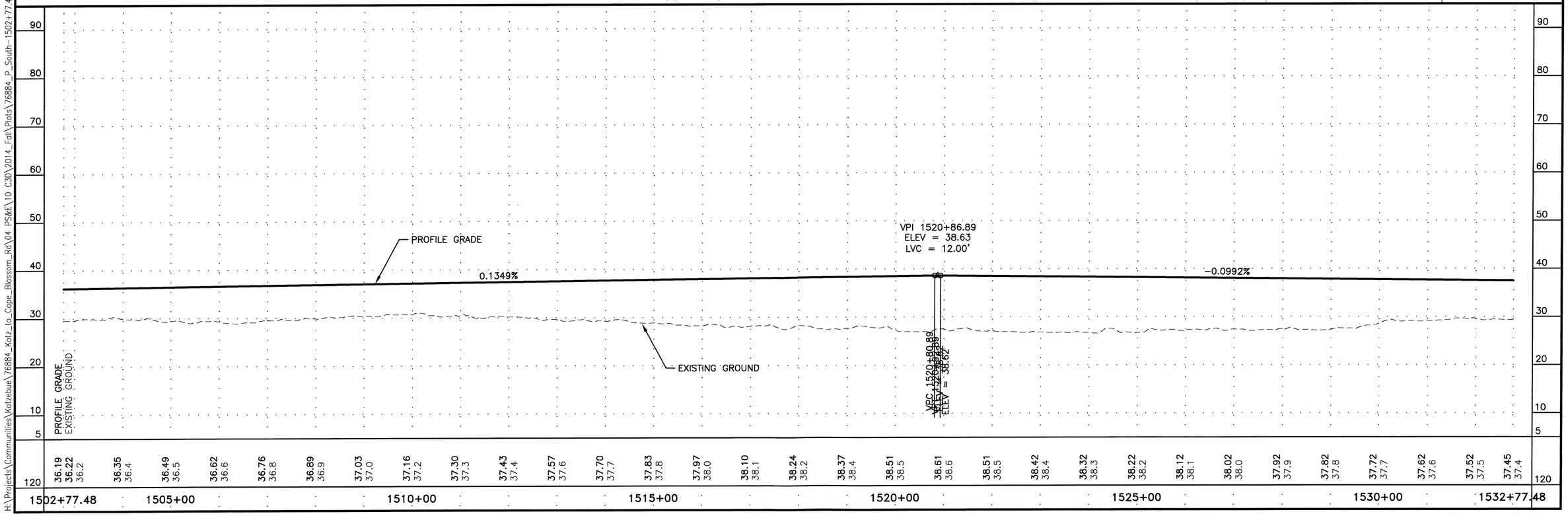

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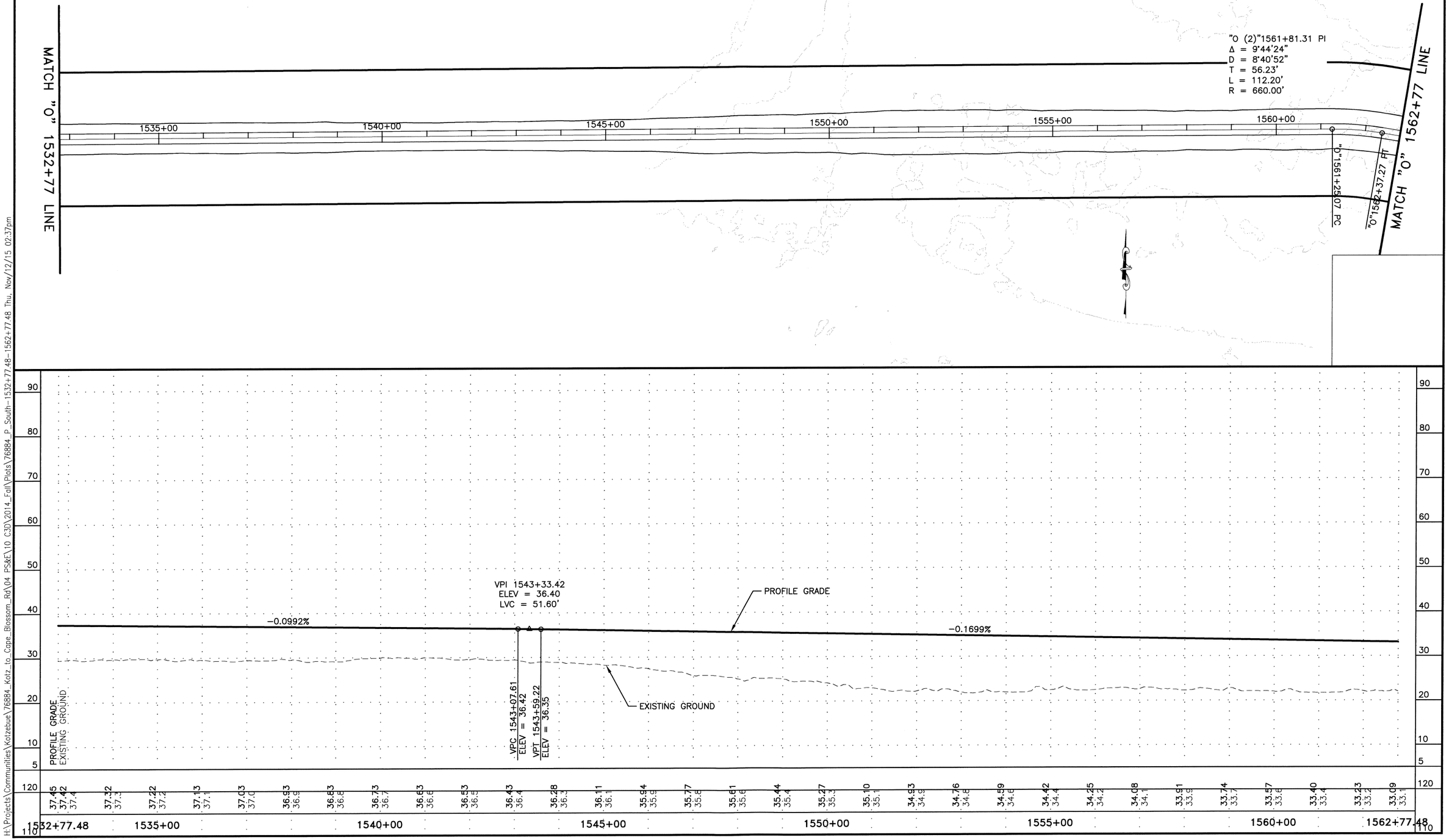

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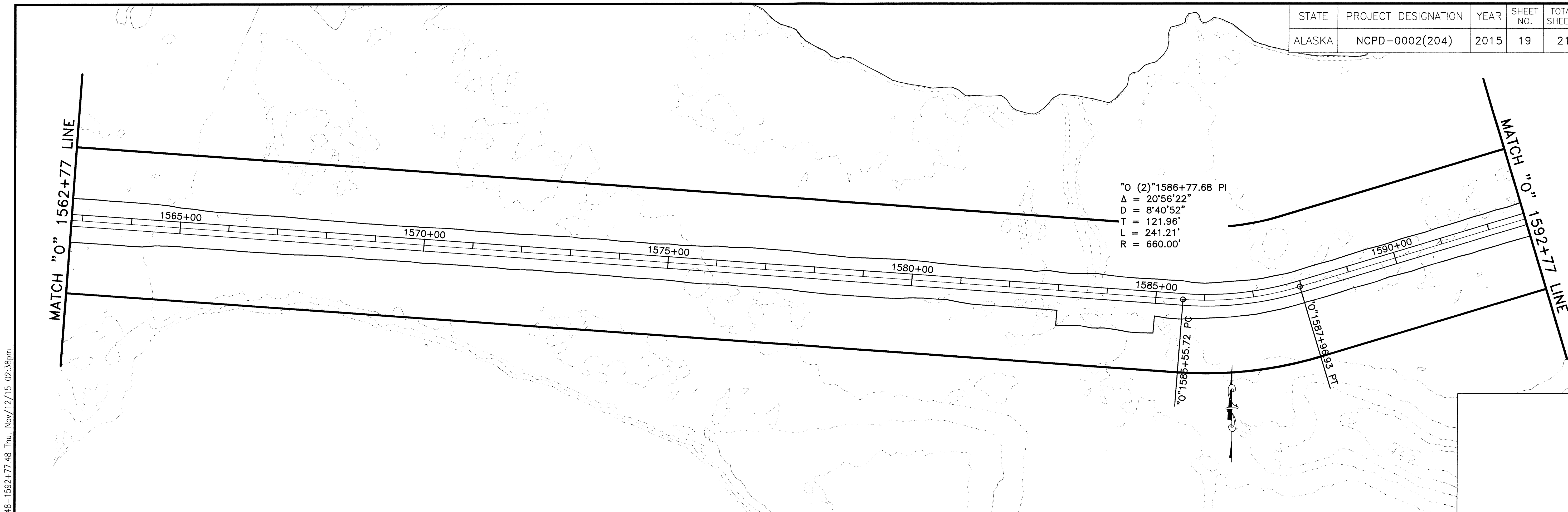

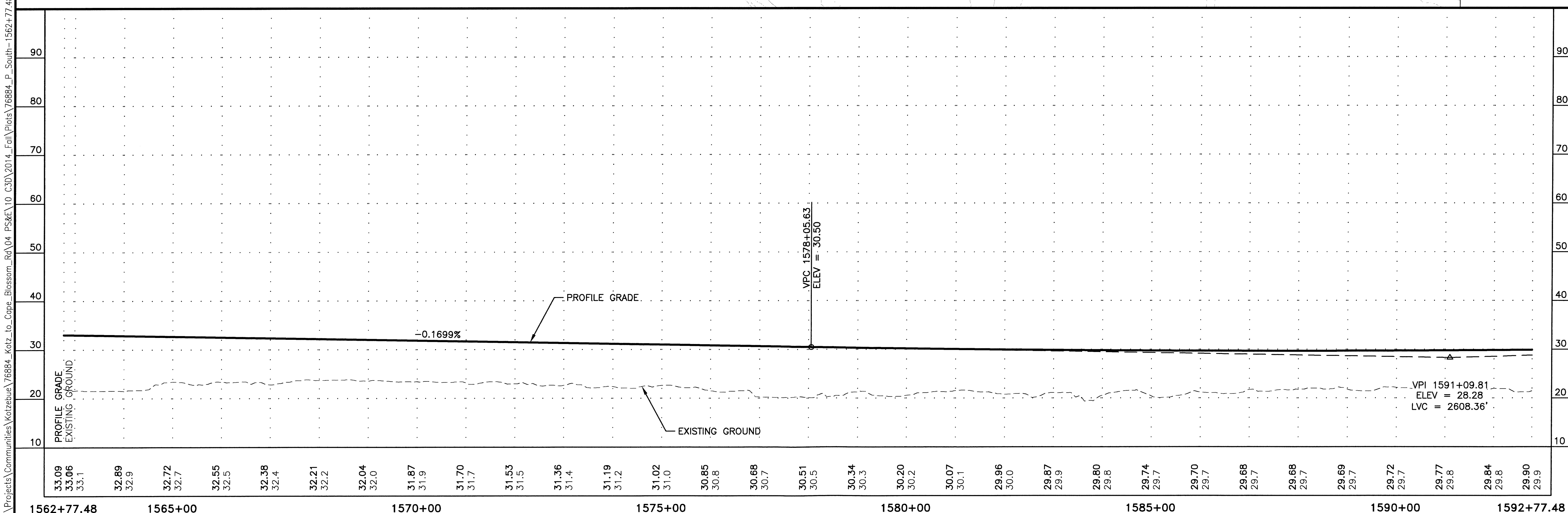

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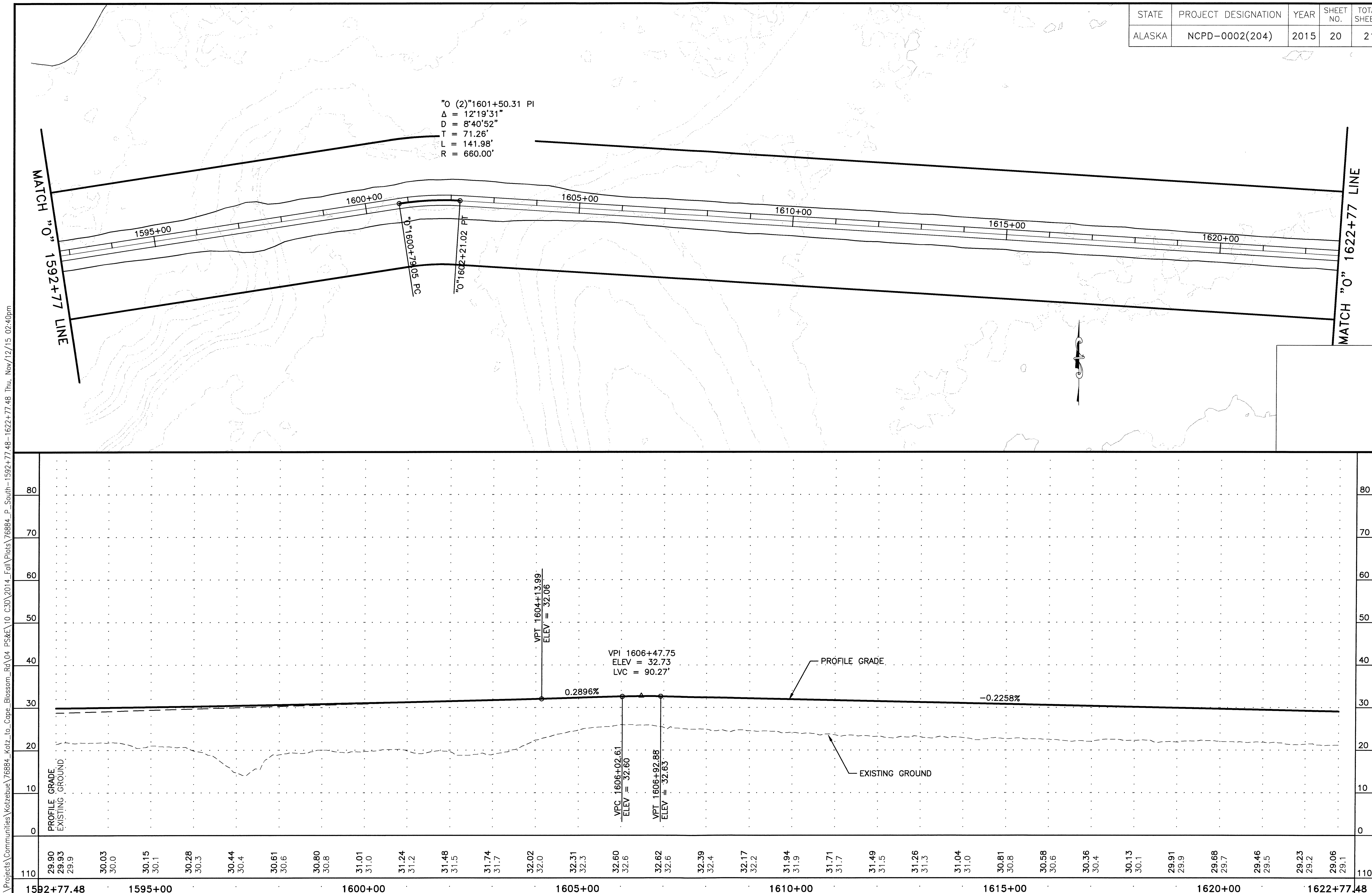

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APPENDIX D

PRELIMINARY BRIDGE PLANS

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
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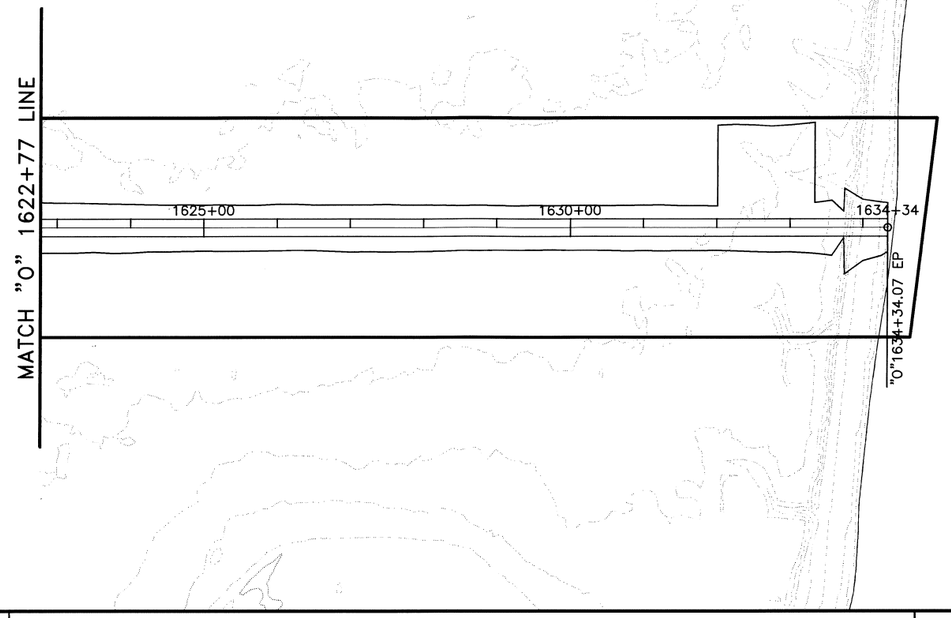

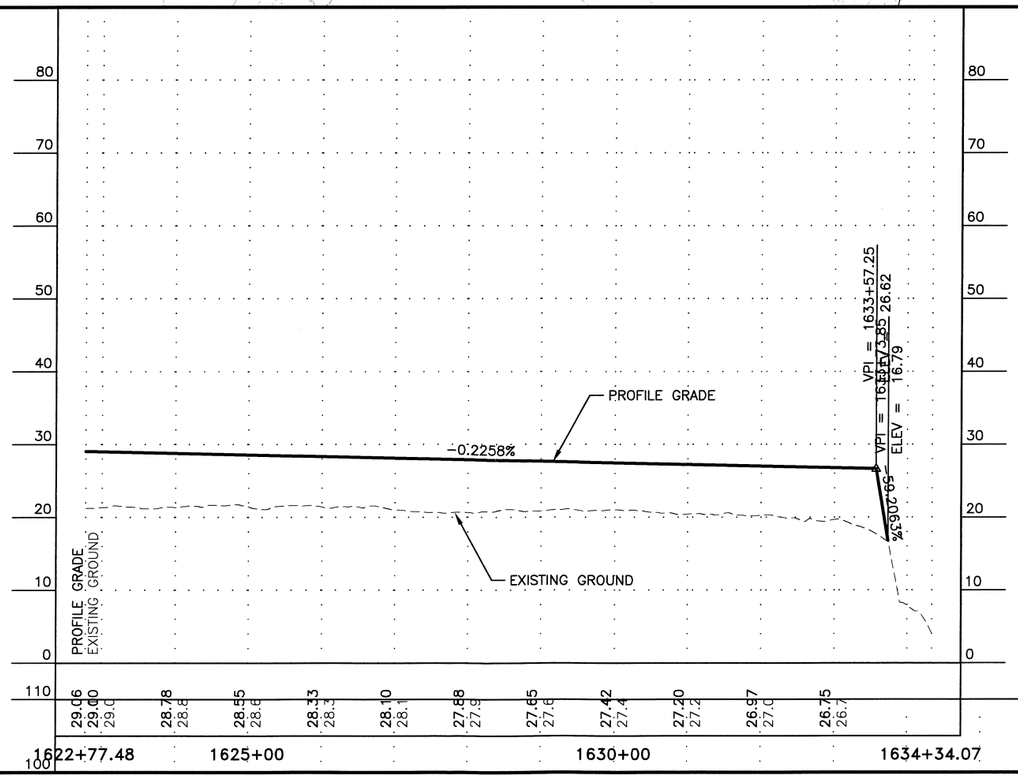

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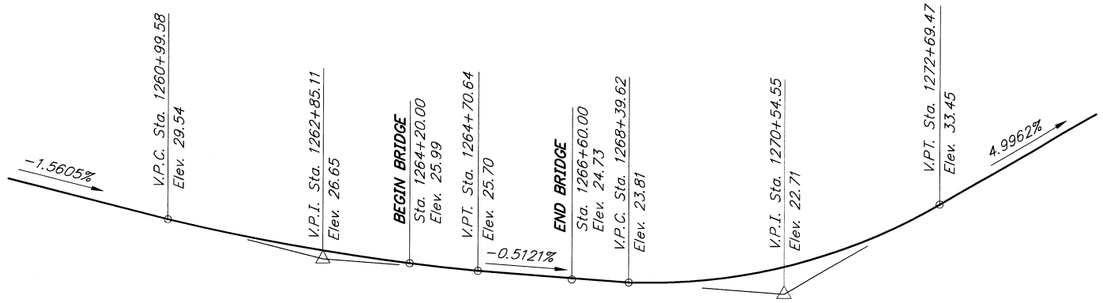
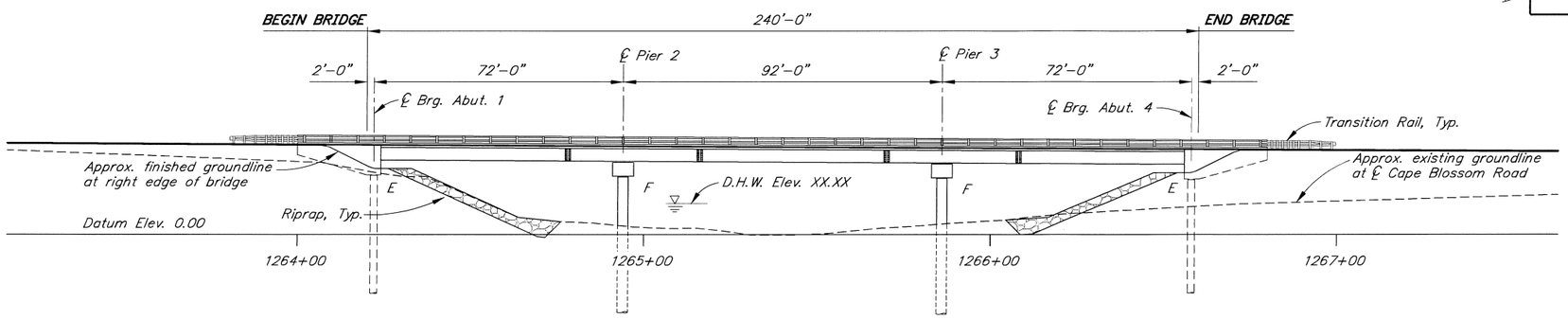


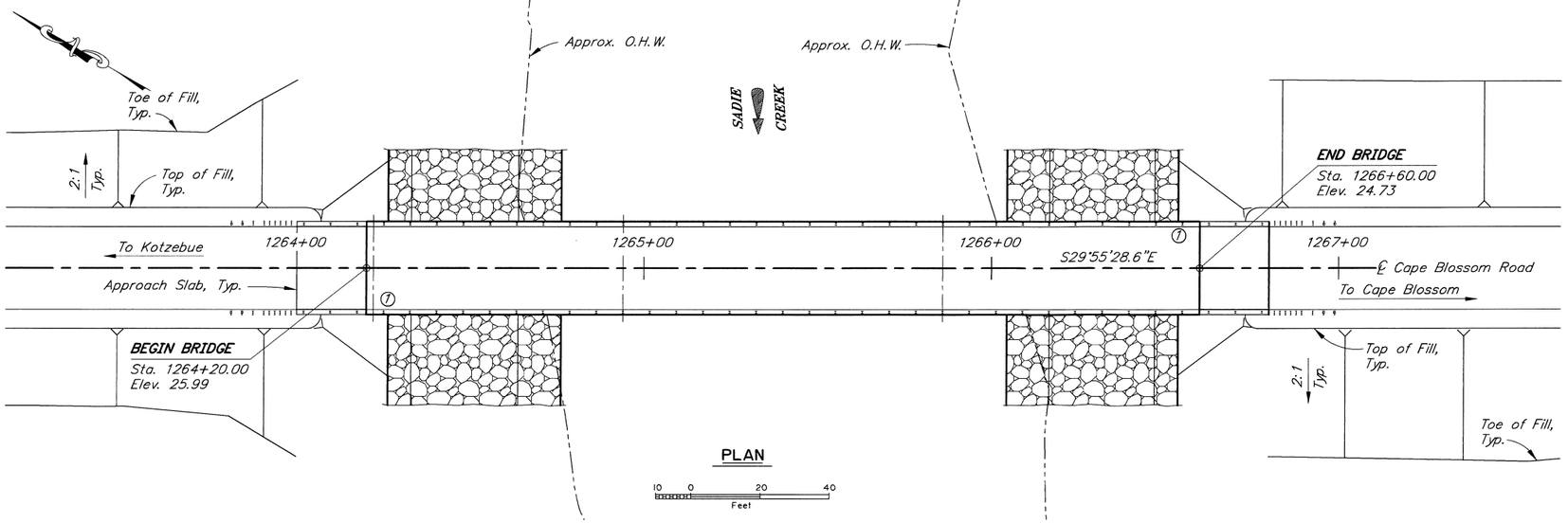
PROFILE GRADE DATA

No Scale



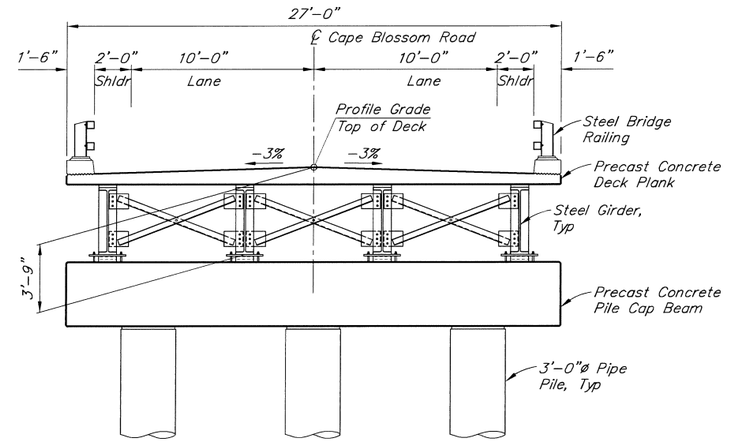
ELEVATION

10 0 20 40 Feet



PLAN

10 0 20 40 Feet



TYPICAL SECTION

12 0 4 8 In. Feet

BRIDGE DRAWING INDEX

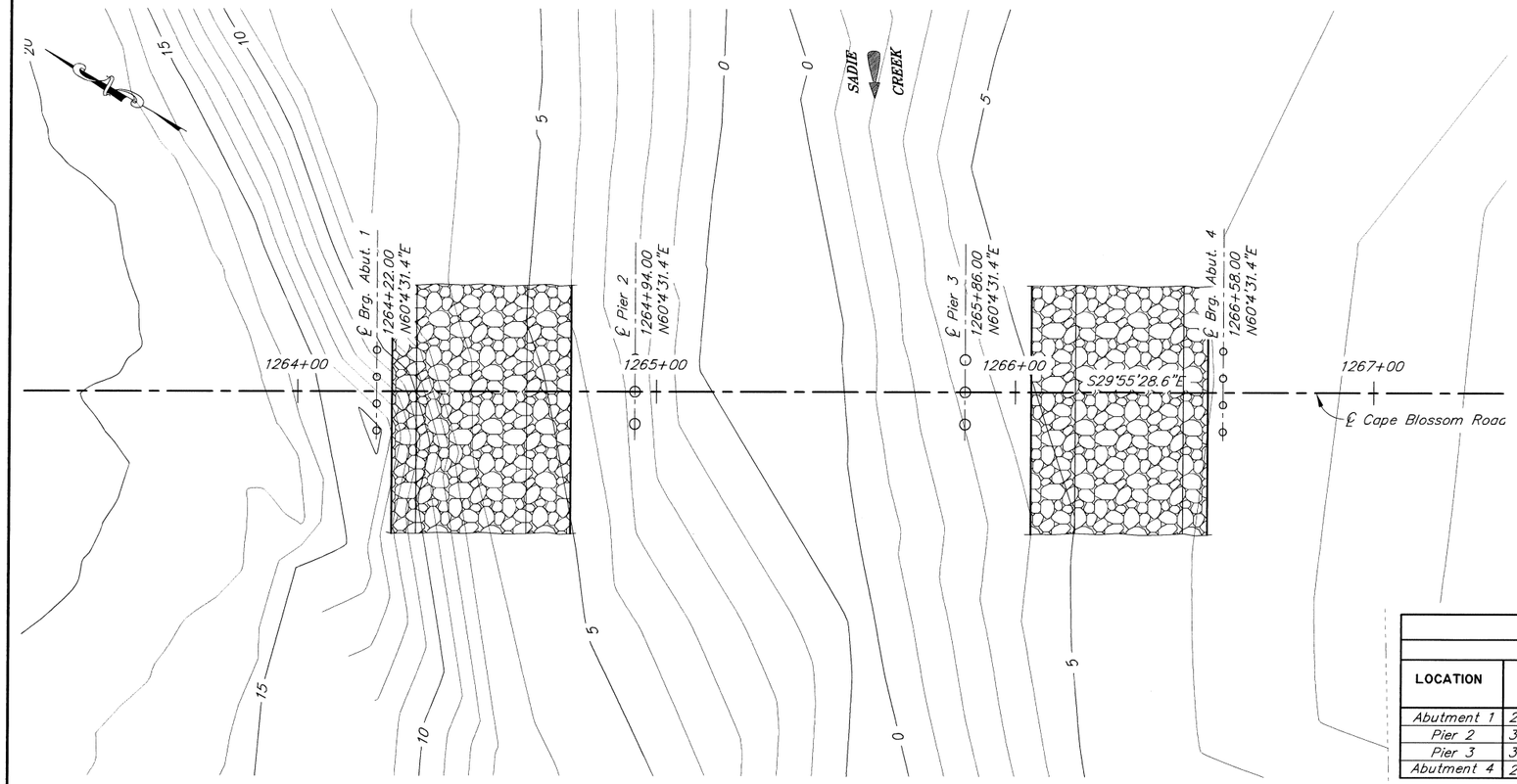
TITLE	DWG. NO.
GENERAL LAYOUT	1
SITE PLAN	2

PRELIMINARY PLAN

① *Approximate location of Bridge Number Plate.*

DESIGNED BY: *Elmer Marx*	CHECKED: *Engineer*	LAYOUT BY: *Elmer Marx*	CHECKED BY: *Engineer*	STATE OF ALASKA **DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES** BRIDGE SECTION	**SADIE CREEK BRIDGE** CAPE BLOSSOM ROAD **GENERAL LAYOUT**
DRAWN BY: *Sam Sollie*	CHECKED: *Elmer Marx*	SPECIFICATIONS BY: *Elmer Marx*	P S & E COMPARED: *Engineer*		BRIDGE NO. 1596 DWG. NO. 1
QUANTITIES BY: *Elmer Marx*	CHECKED: *Engineer*	APPROVAL RECOMMENDED BY: *Rich Pratt*			

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA		2015		



SITE PLAN

10 0 20 40
Feet

GENERAL NOTES

DESIGN:..... AASHTO LRFD Bridge Design Specifications, 2014 Edition, with latest interim specifications.
Seismic design per AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2011 with latest interim specifications.

LIVE LOAD:..... HL-93

DEAD LOAD:..... Includes 50 psf for all wearing surfacing.

SEISMIC PARAMETERS:..... PGA = 0.11
Ss = 0.25
S1 = 0.08
Site Class = D
Liquefaction Potential = Moderate
AASHTO 7% probability of exceedance in 75 years.

REINFORCEMENT:..... ASTM A706, Grade 60, Fy = 60,000 psi
Space reinforcement evenly unless otherwise noted.
Use ASTM A970 Headed bars, Class HA.

CONCRETE:..... Class A Concrete for all concrete unless otherwise noted, f'c = 4000 psi

STRUCTURAL STEEL:..... ASTM A709, Grade 36T3, Fy = 36,000 psi
Galvanize all structural steel in accordance with AASHTO M111 unless shown otherwise.

STRUCTURAL STEEL PILING:..... API 5L X52 PSL2, Fy = 52,000 psi for Pipe Piles.
Pile tip reinforcing is required.

PILE DATA TABLE

LOCATION	PILE TYPE	DRIVING CRITERIA: MINIMUM PENETRATION (ft)	DRIVING CRITERIA: ESTIMATED PILE TIP ELEVATION (ft)	DRIVING CRITERIA: DRIVING RESISTANCE (K)	DESIGN DATA: STRENGTH I FACTORED LOAD (K)	DESIGN DATA: NOMINAL RESISTANCE (K)	DESIGN DATA: RESISTANCE FACTOR, ϕ
Abutment 1	2'-0"øx1/2" Pipe						
Pier 2	3'-0"øx3/4" Pipe						
Pier 3	3'-0"øx3/4" Pipe						
Abutment 4	2'-0"øx1/2" Pipe						

BRIDGE BASIS OF ESTIMATE

ITEM NO.	ITEM	PAY UNIT	ESTIMATING UNIT	SUBST.	SUPERST.	TOTAL
205(3)	Structural Fill	CY	CY			
501(1)	Class A Concrete	LS	CY			
501(7A)	Precast Concrete Member (Deck Plank)	EA	EA			
501(7B)	Precast Concrete Member (Pile Cap Beam)	EA	EA			
503(1)	Reinforcing Steel	LS	LBS			
503(2)	Epoxy-Coated Reinforcing Steel	LS	LBS			
504(1)	Structural Steel	LS	LBS			
505(5A)	Furnish Structural Steel Piles (2'-0" Pipe)	LF	LF			
505(5B)	Furnish Structural Steel Piles (3'-0" Pipe)	LF	LF			
505(6A)	Drive Structural Steel Piles (2'-0" Pipe)	EA	EA			
505(6B)	Drive Structural Steel Piles (3-0" Pipe)	EA	EA			
505(11)	Pile Restrike	DAY	DAY			
507(1)	Steel Bridge Railing	LF	LF			
606(16)	Transition Rail	EA	EA			
611(1)	Riprap, Class II	CY	CY			
631(2)	Geotextile, Erosion Control, Class 1	SY	SY			

Item numbers are for reference only. Quantities shown are not necessarily the pay quantities nor the total quantity of the particular item.

PRELIMINARY PLAN

ABBREVIATIONS:

℄	= centerline	f.a.	= front/air face
ℙ	= plate	Hwy.	= highway
&	= and	ksf	= 1000 pounds per square foot
@	= at	LB	= pound
ø	= diameter	LF	= linear foot
Abut.	= abutment	LS	= lump sum
A.R.R.	= Alaska Railroad	Lt.	= left
Approx.	= approximate	max.	= maximum
b.f.	= back/dirt face	min.	= minimum
bot.	= bottom	n.f.	= near face
Br.	= bridge	No.	= number
btwn.	= between	o.c.	= on center
Brg.	= Bearings	PVC	= point of vertical curve
C.I.P.	= cast in place	PVI	= point of vertical intersection
Clr.	= clear, clearance	PVT	= point of vertical tangent
CY	= cubic yard	R.O.W.	= right of way
dia.	= diameter	Rt.	= right
Dwg.	= drawing	Rd.	= road
E	= expansion	S.I.P.	= stay in place
(E)	= existing	spc.	= space, spaces
EA	= each	Sta.	= station
Elev.	= elevation	SF	= square feet
e.f.	= each face	Symm.	= symmetric
e.w.	= each way	Typ.	= typical
F	= fixed		

DESIGNED BY: Designed	CHECKED: Engineer	HYDRAULICS BY: Engineer	CHECKED BY: Engineer
DRAWN BY: Drafter	CHECKED: Engineer	FOUNDATIONS REVIEWED BY: Engineer	
QUANTITIES BY: Engineer	CHECKED: Engineer		

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
BRIDGE SECTION

SADIE CREEK BRIDGE

CAPE BLOSSOM ROAD

SITE PLAN

BRIDGE NO. 1596

DWG. NO. 2