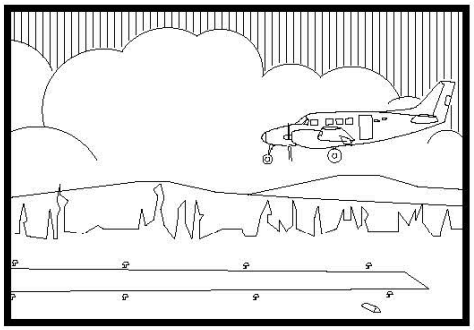
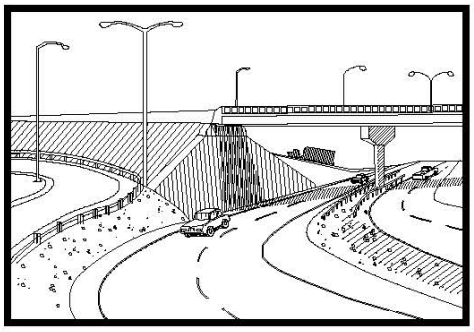
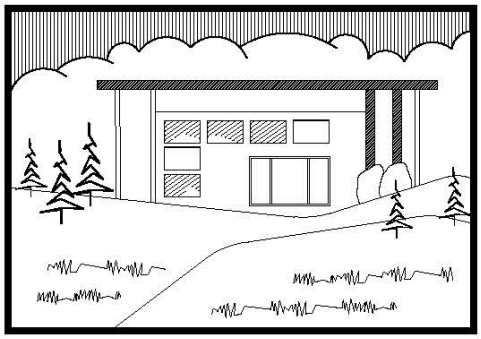
DESIGN STUDY REPORT

Richardson Highway
MP 351 Interchange

NFHWY00097/OA24(034)

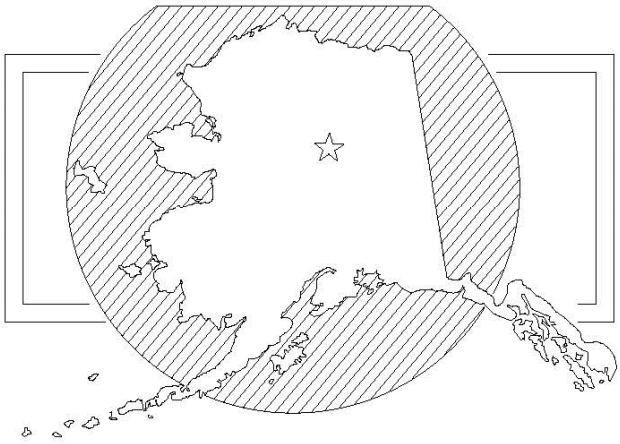






STATE OF ALASKA

Department of Transportation
and Public Facilities



NORTHERN REGION

July 2021

DESIGN APPROVAL

RICHARDSON HIGHWAY MP 351 INTERCHANGE

PROJECT NO. NFHWY00097/OA24(034)

Requested by:

David K. Fischer, P.E. — 7-12-2021
Engineering Manager — Date
Northern Region

Design Approval Granted:

Sarah Schacher, P.E. — 7/14/2021
Preconstruction Engineer — Date
Northern Region

Distribution: NR Design Directive 20-01 Distribution

DESIGN STUDY REPORT
FOR

RICHARDSON HIGHWAY MP 351 INTERCHANGE

PROJECT NO. NFHWY00097/OA24(034)

PREPARED BY: Erik Brunner

UNDER THE SUPERVISION OF: David K. Fischer, P.E.

7-12-2021

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NORTHERN REGION DESIGN AND ENGINEERING SERVICES
JULY 2021

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INTRODUCTION/HISTORY

The State of Alaska Department of Transportation & Public Facilities (DOT&PF) in cooperation with the Federal Highway Administration (FHWA) is proposing to improve access and safety of users of the Richardson Highway at the milepost 351 intersection with the Old Richardson. This section of the Richardson Highway was constructed in 1970 under the Fairbanks to Eielson A.F.B Section II F.-F.G.-4(20) project. That historic realignment and conversion to a four lane separated facility left remnant portions of the Old Richardson alignment with at-grade access points to the Richardson Highway.

The project is located within a four-lane, high-speed section of the Richardson Highway near milepost 351, on the Interstate Highway System. The objective of this project is to improve safety and functionality. This will be accomplished by constructing a grade separated crossing at milepost 351, a new access road on the south side of the Richardson Highway between Keeney Road and the extension of the Old Richardson. This will maintain access after the closure of the existing Keeney Road at grade intersection with the Richardson Highway.

Two existing Richardson Highway at-grade access points will be closed and one new grade separated access point will be constructed.

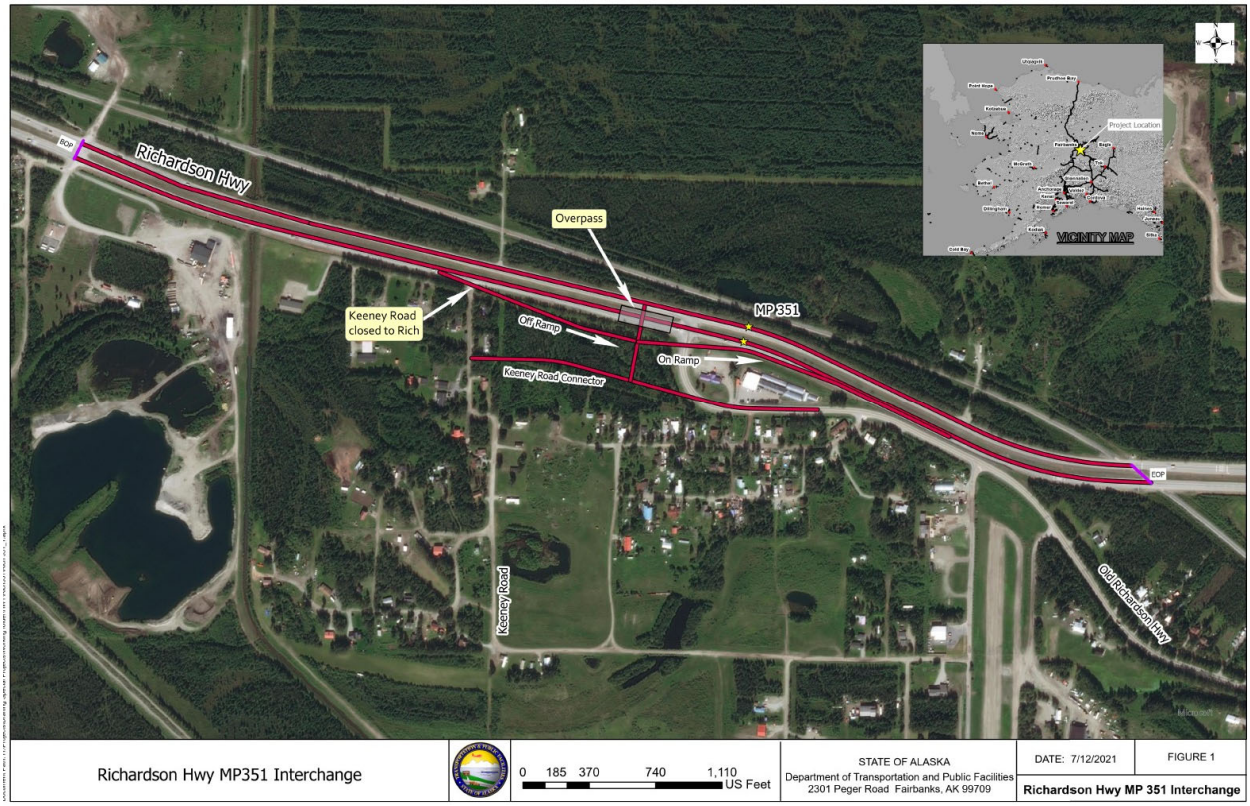


Figure 1.

PROJECT DESCRIPTION

The Richardson Highway is a four-lane divided facility oriented generally east-west. It is the only direct route between Fairbanks and Delta Junction, terminus of the Alaska Highway. The Richardson Highway at this location is on the Interstate Highway System.

The Richardson Highway is posted at 60 mph between Fairbanks and North Pole, with an operating speed of 60-65 mph. Due to the high speed nature of the facility, when crashes occur they have the potential to be severe. Between 2008 and 2014 there were 32 multi-vehicle crashes with one fatality, making it eligible for the Highway Safety Improvement Program (HSIP). In addition, there is heavy truck traffic at the intersection, often large double tractor-trailers. The high speeds and volumes make it very difficult for these trucks to safely cross two lanes of eastbound traffic and merge to head west toward Fairbanks.

The project will construct grade-separated access between the Richardson Highway and the Old Richardson Highway. Grade separation will be accomplished by elevating the eastbound lanes of the Richardson Highway, with westbound turning movements passing beneath. Conventional diagonal ramps will carry eastbound turning movements.

To address access considerations, the existing at grade intersection of Keeney Road and Richardson Highway will be closed. A connector between Keeney and the Old Richardson and the new overpass will be constructed.

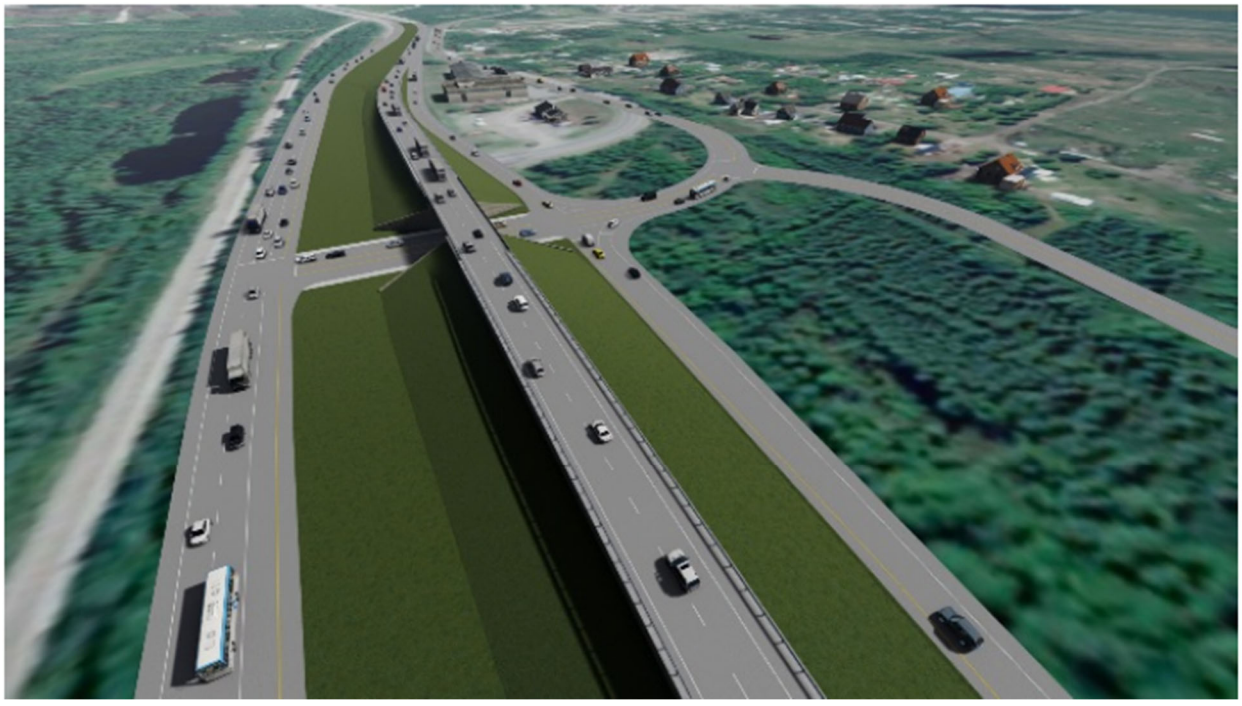


Figure 2.

DESIGN STANDARDS

The Design Criteria for this project are included in Appendix B. The project will be developed in accordance with the following standards:

Agency	Standard
DOT&PF	• Highway Preconstruction Manual (PCM) • Applicable Chief Engineer's Directives • Alaska Sign Design Specifications (ASDS) • Alaska Highway Flexible Pavement Design Manual (AKFPD) • Alaska Highway Drainage Manual • FHWA Hydraulic Engineering Circular No. 22, Third Edition • Alaska Traffic Manual, 2016 (ATM) • Standard Specifications for Highway Construction, 2020 • Alaska Bridges and Structures Manual (ABSM)
AASHTO	• A Policy on Geometric Design of Highways and Streets, 2011 (Green Book) • Guide Specifications for LRFD Seismic Bridge Design (2011) • Highway Capacity Manual (HCM) • Informational Guide for Highway Lighting, 1984 (IGRL) • LRFD Bridge Design Specifications (2020) • Roadside Design Guide, 2011 • Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 1994
ANSI	• Design of Roadway Facility Lighting (RP-8-14)

DESIGN EXCEPTIONS AND DESIGN WAIVERS

There are no design exceptions or design waivers for this project.

DESIGN ALTERNATIVES

An Interchange Access Justification Report was completed for this project as required by FHWA in July of 2018. Several design alternatives were investigated:

- Median closure at the intersection of the Old Richardson and Richardson highway.
- Partial interchange elevating the eastbound mainline of the Richardson highway eliminating its conflict with the Old Richardson highway
- Partial interchange with a southwesterly shift requiring additional right of way acquisition compared to the preferred alternative.
- Partial interchange at MP351.75 and a full interchange at MP 351.75 both require significant additional right-of way-acquisition and additional frontage road construction not within the scope of the project HSIP nomination.

A value analysis was also conducted (December 2017) as part of this effort with members of the Fairbanks North Star Borough, City of North Pole, FAST Planning and DOT&PF. The preferred alternative was selected as the best value.

PREFERRED DESIGN ALTERNATIVE

The preferred alternative is to shift approximately 15 feet north and elevate the eastbound lanes of the Richardson Highway, shift the westbound lanes north within the existing toes of slopes, construct new frontage south of the Richardson Highway, and construct on and off ramps utilizing existing acquired rights of way. This alternative minimizes right-of-way impacts and the acquisition of new right-of-way compared to the other interchange alternatives.

Approximately 6,400 feet of the eastbound Richardson Highway will be reconstructed including the overpass. Approximately 5,800 feet of the westbound Richardson highway will be reconstructed and shifted slightly while maintaining the existing roadway prism toe between the Alaska Railroad and the highway at its closest point.

The existing west-bound left turn lane will be replaced with a deceleration and turn lane and a westbound acceleration lane will be constructed as well.

A new 800 foot long connector roadway will connect Keeney road to the Old Richardson Highway as the at-grade intersection of Keeney Road and the Richardson Highway is being removed.

The preferred alternative does not preclude the eventual construction of a full interchange should future development on the north side of the Richardson Highway warrant it. However, such a consideration would require the Alaska Railroad realign and vacate their existing right-of-way.

3R ANALYSIS

Not applicable. This is a reconstruction project.

TRAFFIC ANALYSIS

The Design Designation's projected traffic volumes substantiates that the design alignments, design speed and typical sections are adequate to accommodate future traffic capacity. Between 2008 and 2012 there were 32 multi-vehicle crashes with one fatality associated with the Old Richardson and Richardson intersection. Two of the multi vehicle crashes were head on, five were side swipe, nine were rear end and 16 were angle. 29 were property damage only and 14 were injury accidents. This interchange will mitigate all injury and fatal crashes associated with this intersection.

Kittleson and Associates, Inc conducted intersection operational analysis indicating that all intersection will operate a level of service of C or better through 2040 and all merge diverge location are projected to operate acceptably. The analyses were prepared following Highway Capacity Manual 2000 procedures using Synchro 9 and Highway Capacity Software (HCS) 7 traffic analysis software.

HORIZONTAL/VERTICAL ALIGNMENT

All horizontal and vertical curves for the new Richardson Highway alignment meet the requirements for the 70 MPH design speed and the all horizontal and vertical curves for the new connector from the Keeney road alignment meet the requirements for the 40 MPH design speed.

The horizontal alignment of the westbound Richardson Highway will be shifted slightly to the north. The presence of the Alaska Railroad at this location means that the existing northern toe of the Richardson Highway fill is already at a minimum distance from the line and controls the amount the roadway can be shifted. The eastbound centerline will be shifted approximately 13 feet north of the existing centerline at the new bridge midpoint. The bridge structure will be in a horizontal tangent beyond any superelevation transition of the 5000 foot and 2040 foot radius curves used to shift the alignment and then transition it back to the existing alignment.

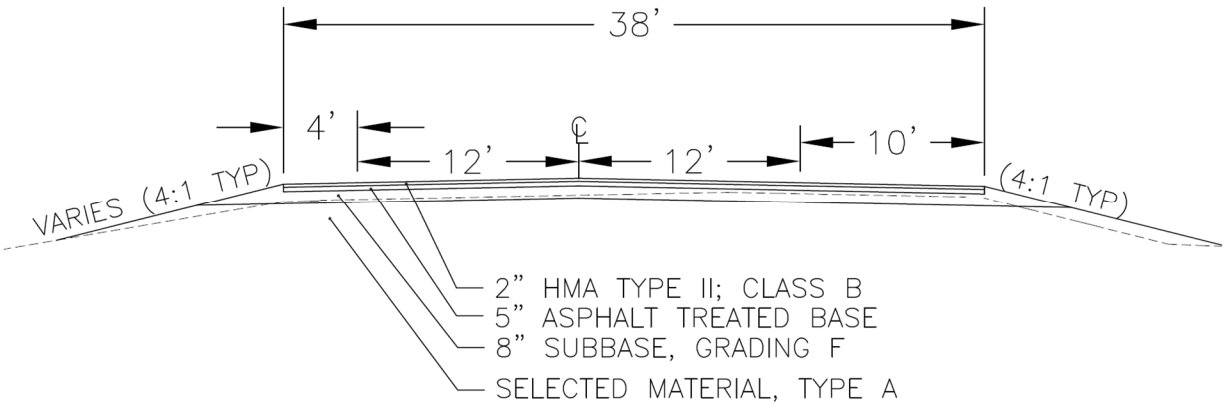
The vertical alignment of the eastbound Richardson Highway will be elevated to provide vertical clearance for the westbound turning movements passing below. The grades of the new profile are between +2.7% and -2.5%

TYPICAL SECTION(S)

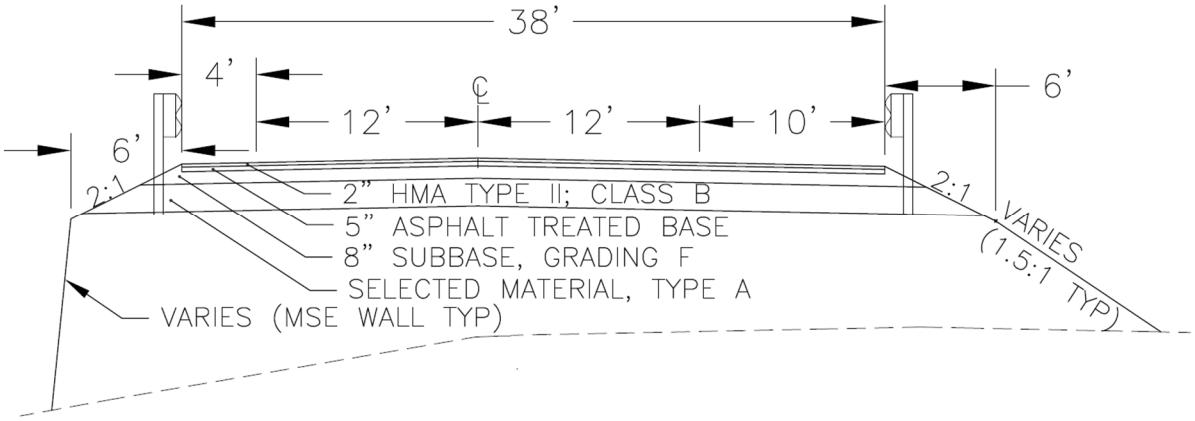
The typical sections were developed in accordance with the PCM, Green Book, and evaluation of area as-builts and assumptions about ground conditions in the area. Typical Sections will be refined in more detailed design once geotechnical investigations and recommendations are complete.

A 2-inch Asphalt Concrete Pavement layer over 3-inch Asphalt Treated Base over 8 inches of Subbase Grading "F" and Select Material Type A will be used for the structural section. Select Material will be used for additional fill material as needed. The pavement section is discussed in detail in Section 20, Pavement Design.

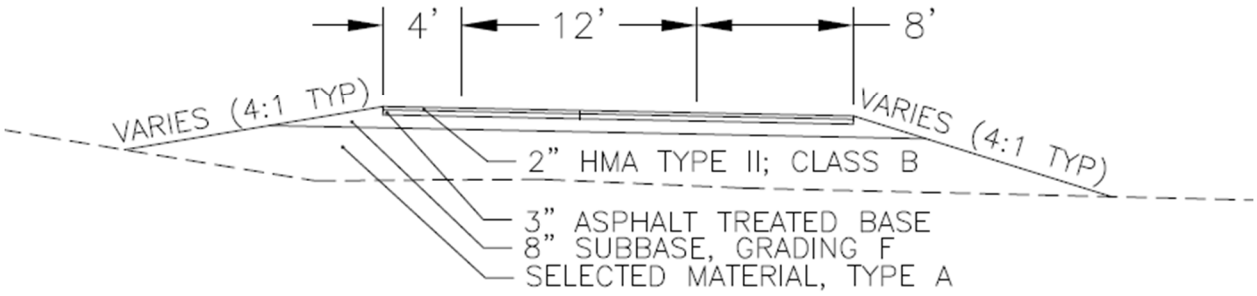
The connector road will have two 12 foot-wide lanes and 3-foot-wide paved shoulders to match recently constructed frontage roads in the Richardson MP 353-357 area.



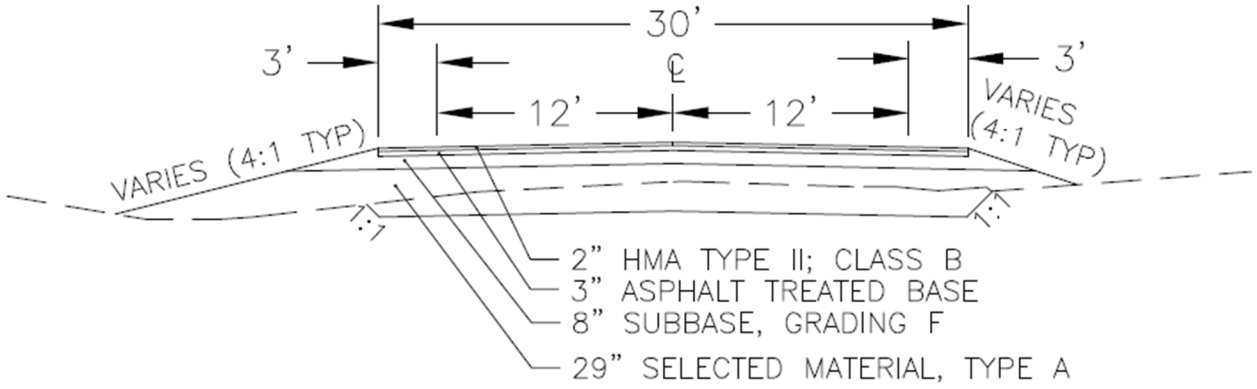
TYPICAL SECTION
RICHARDSON HIGHWAY
DIRECTIONAL LANE PAIR
Figure 3a.



TYPICAL SECTION-ELEVATED
RICHARDSON HIGHWAY
EASTBOUND LANES
Figure 3b.



TYPICAL SECTION
ON AND OFF RAMP
Figure 3c.



TYPICAL SECTION
CONNECTOR ROAD
Figure 3d.

PAVEMENT DESIGN

The selected pavement design was generated using the Alaska Flexible Pavement Manual and associated software. The design life of the pavement is 15 years. The pavement design was analyzed using the mechanistic design method. Design calculations and design approval is documented in Appendix E.

Any modification to this pavement design will be based off of the pending geotechnical report and recommendation from the Regional Geotechnical Engineer.

PRELIMINARY BRIDGE LAYOUT

A single span concrete girder bridge founded on spread footings is anticipated. Preliminary bridge plans are available in Appendix F. Bridge clearance will be maximized to the extent practical and 18' clearance is the design goal.

RIGHT-OF-WAY REQUIREMENTS

Several additional right of way acquisitions will be necessary to complete this project, as summarized in the table below. No residential or business relocations are anticipated to be necessary. Temporary Construction Permits will be obtained for driveway reconstruction. See appendix I for preliminary ROW plans.

Legal	Lot Size (SF)	Proposed Acquisition (SF)	Remainder (SF)	Reason
TL-519	348,480	206,644	141,836	Connector, off ramp
TL-532	146,971	146,971	0	Old Rich extension. underpass
TL-624	38,239	38,239	0	Keeney access construction

Table 1.

MAINTENANCE CONSIDERATIONS

DOT&PF owns and maintains the Richardson Highway and Old Richardson Highway at this location. The project will replace and install additional luminaires, signs, striping and a new bridge, but these features should not need additional maintenance work for many years. DOT&PF Maintenance & Operations will incur additional utility costs for lighting and will have a change in operations associated with snow removal of new bridge deck (taking care not to throw snow to below roadway). Snow removal at bridges requires M&O to more promptly remove snow stacked on the bridge decks against rails in order to eliminate lane width constraints and possible ramping caused by snow build up. It is estimated this additional effort would occur every 1-3 snow events with an average of 24 two-inch or greater snow accumulative events per year. They will also have additional lane miles associated with auxiliary lanes and ramps. For winter operations, Fairbanks M&O believes the proposed design does not impose significant alterations to their Priority 1 plow route and propose it will be handled in the same manner the Badger/6 mile, Dawson, and Eielson AFB interchanges are plowed. Detailed design will involve coordination with M&O personnel to minimize impacts to their operations and where possible, construct features that ease maintenance efforts. Approximately 1.1 new lane miles of ramp and auxiliary lanes will be added in this project.

FNSB will be responsible for maintenance of the newly constructed, 800 foot 2-lane connection between Keeney Road and the intersection with the extension of the Old Richardson highway. Coordination with FNSB and the Keeney Service Area will be ongoing through detailed design. FNSB will also be consulted on preferred naming conventions of this road as re-alignments of old roads or new connector roads need clear names established for emergency services response.

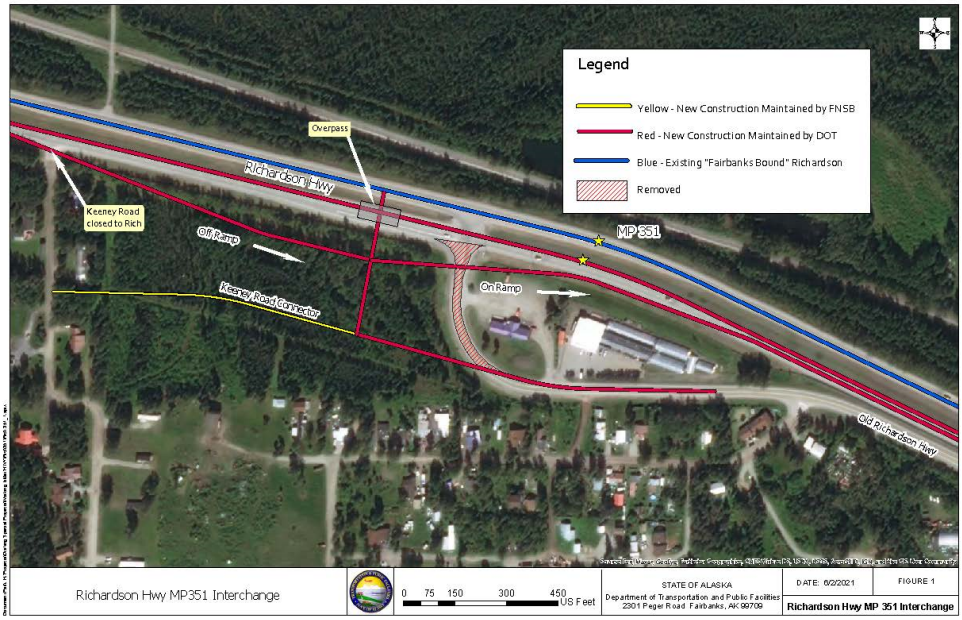


Figure 4.

MATERIAL SOURCES

All material sources will be contractor-furnished. Materials of appropriate quality are available in sufficient quantity from private and commercial sources in the project vicinity.

UTILITY RELOCATION & COORDINATION

There are numerous utilities within the corridor limits, both crossing and paralleling the

Richardson Highway and Frontage Roads. These utilities include:

- Golden Valley Electric Association (GVEA): Electric power
- Alaska Communications Systems (ACS): Telephone and fiber optics
- General Communications Inc. (GCI): Fiber optics and cable TV
- AT&T /Alascom (AT&T): Telephone and fiber optics
- City of North Pole water distribution
- Alaska Railroad Corporation (ARRC)

Overhead and underground power and communication will likely be completed in advance of construction by the utility companies. Water relocation will likely be included in PH4 construction.

ACCESS CONTROL FEATURES

The Richardson Highway is an access controlled facility and the Right of Way plans show the legal access points. This project will modify breaks in the access control line and the modifications will be documented in the Right of Way mapping process, in consultation with FHWA.

This project will close the access point at Keeney Road due to conflicts with the interchange off-ramp to Old Richardson Highway. The access control fence will be extended at the closed intersections. The access points at the Old Richardson will be revised with the new interchange.

PEDESTRIAN/BICYCLE (ADA) PROVISIONS

There are no specific pedestrian, bicycle or ADA features. The shoulders of the Richardson Highway will continue to accommodate bicyclists, Old Richardson Highway and Keeney Road Connector will accommodate pedestrians and bicycles.

SAFETY IMPROVEMENTS

The following features will increase safety in the project area:

- Consolidation and removal of at grade access points, and removal of left turns across eastbound traffic through grade-separation. This will result in a reduction in crossing maneuvers across multiple lanes of high speed traffic, reducing likelihood and severity of crashes.
- Construction of on and off ramps associated with the interchange will allow safer exiting and entering of the Richardson Highway.

INTELLIGENT TRANSPORTATION SYSTEM FEATURES

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

DRAINAGE

The project area is relatively flat and historical precipitation is generally low. Existing drainage swales infiltrate runoff.

SOIL CONDITIONS

The soils investigation and structural foundation exploration are both pending. Specific recommendations will be presented in the Geotechnical Report and Foundations Report. In general historic bores in the area show 2-6 feet of silty sand over sand and gravel.

EROSION AND SEDIMENT CONTROL

In accordance with the Alaska Pollutant Discharge Elimination System (APDES) General Permit for Alaska, an Erosion and Sediment Control Plan (ESCP) will be provided in the contract plan set. The contractor must submit the SWPPP before construction begins.

The area of disturbed ground is estimated to be 34 acres. The project area is largely developed through existing highway or frontage road system.

The fill slopes being constructed are the major potential erosion features. Embankment slopes will not be constructed steeper than 1.5:1. All slopes will be seeded to provide permanent erosion protection.
Construction features that will require temporary or permanent erosion and sediment control measures include, but are not limited to:

- Detours and new alignments
- Staging areas
- Embankment slopes abutting wetlands
- Disturbed areas around culvert inlets and outlets
- Disturbed roadside ditches draining from the construction site
- Stockpiles including, topsoil piles, spoil piles, and excess soil piles
- Cut/Fill slopes

Best management practices would be implemented during construction to minimize detachment and transport of sediment beyond the construction site. As necessary, in compliance with the APDES General Permit for Construction Activities, the construction contractor would issue a Notice of Intent to the ADEC for storm water discharges associated with construction activities and, before construction, a SWPPP, if needed, would be completed for ADEC review.

ENVIRONMENTAL COMMITMENTS

There are no environmental commitments and mitigation measures required that are unique to this project.

WORK ZONE TRAFFIC CONTROL

This project is not considered significant for traffic control per the Department's Policy and Procedure 05.05.015. The Richardson Highway is an Interstate, but the project is not in a Transportation Management Area; the AADT is less than 30,000 vpd, and work is not expected to fully close the highway for more than one hour at a time.

The Contractor will be required to develop an approved temporary traffic control plan. The plan will be developed to provide safety to motorists, bicyclists, pedestrians, workers and emergency vehicles as they pass through the work zone. The plan will identify and provide adequate warning, delineation and channelization to assist in guiding road users through the work zone. It is anticipated that this project will be constructed in a single season, with concurrent construction of connector roads and the bridge with all Richardson traffic shifted to the current east bound

lanes via cross overs. Out of direction travel will be required for some movements while the new interchange is constructed.

VALUE ENGINEERING

This project is not projected to meet the total project cost threshold requirement for Value Engineering and as such a VE study will not be conducted.

COST ESTIMATE

The estimated costs for this project are as follows:

Design	$1,545,000.00
Utilities	$700,000.00
Right of Way	$500,000.00
Construction (Includes 15% Engineering)	$19,850,000.000
Total Cost of Project	$22,595,000.00

APPENDIX A

DESIGN CRITERIA
AND
DESIGN DESIGNATION

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

Project Name:	Richardson Hwy MP 351 Interchange			
☑ New Construction/Reconstruction	☐ 3R	☐ PM	☐ Other:	
Project Number:	NFHWY00097/OA24(034)		☑ NHS	☐ Non NHS
Functional Classification:	Four Lane Divided Urban Interstate			
Design Year:	2045	**Present ADT:**		15500
Design Year ADT:	21400	**Mid Design Period ADT:**		18900
DHV:	12%	**Directional Split:**		35/65
Percent Trucks:	8%	**Equivalent Axle Loading:**		6,300,000
Pavement Design Year:	2045	**Design Vehicle:**		WB- 65
Terrain:	Level	**Number of Roadways:**		1
Design Speed:	70 MPH			
Width of Traveled Way:	**24 Feet with additional acceleration, deceleration and auxilary lanes**			
Width of Shoulders:	**Outside:**	**10 Feet**	**Inside:**	**4 Feet**
Cross Slope:	2%			
Superelevation Rate:	6%			
Minimum Radius of Curvature:	2040 Feet			
Min. K-Value for Vert. Curves:	**Sag:**	**207.83**	**Crest:**	**239.97**
Maximum Allowable Grade:	3%			
Minimum Allowable Grade:	0%			
Stopping Sight Distance:	730 Feet			
Lateral Offset to Obstruction:	4 Feet			
Vertical Clearance:	**17 Feet**			
Bridge Width:	**38 Feet**			
Bridge Structural Capacity:	**HL-93**			
Passing Sight Distance:	**2480 Feet**			
Surface Treatment:	**T/W:**	**Asphalt Concret**	**Shoulders:**	**Asphalt Concrete**
Side Slope Ratios:	**Foreslopes:**	**Varies, 6:1 to vertical**	**Backslopes:**	**4:1**
Degree of Access Control:	**Partial access control, with breaks.**			
Median Treatment:	Grass median			
Illumination:	Lighting at interchange, acceleration, deceleration and auxiliary lanes.			
Curb Usage and Type:	N/A			
Bicycle Provisions:	Shoulders			
Pedestrian Provisions:	Shoulders			
Misc. Criteria:				

Proposed - Designer/Consultant: Erik Brannon — **Date:** 07/08/2021

Endorsed - Engineering Manager: David K. Fischer — **Date:** 7/8/2021

Approved - Preconstruction Engineer: [signature] — **Date:** 7/9/2021

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.

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

Project Name:	RICHARDSON HIGHWAY MP351 INTERCHANGE			
☑ New Construction/Reconstruction	☐ 3R ☐ PM ☐ Other:			
Project Number:	NFHWY00097/OA24(034)		☐ NHS	☑ Non NHS
Functional Classification:	Rural collector			
Design Year:	2045	**Present ADT:**		
Design Year ADT:		**Mid Design Period ADT:**		
DHV:		**Directional Split:**	**45/55**	
Percent Trucks:		**Equivalent Axle Loading:**		
Pavement Design Year:	2045	**Design Vehicle:**	**WB-65**	
Terrain:	LEVEL	**Number of Roadways:**		1
Design Speed:	40 MPH			
Width of Traveled Way:	**24**			
Width of Shoulders:	**Outside:**	**3 Feet**	**Inside:**	**3 Feet**
Cross Slope:	2%			
Superelevation Rate:	6%			
Minimum Radius of Curvature:	545 Feet			
Min. K-Value for Vert. Curves:	**Sag:**	**1257.4**	**Crest:**	**465.77**
Maximum Allowable Grade:	7%			
Minimum Allowable Grade:	0%			
Stopping Sight Distance:	305 Feet			
Lateral Offset to Obstruction:	3 Feet			
Vertical Clearance:	**N/A**			
Bridge Width:	**N/A**			
Bridge Structural Capacity:	**N/A**			
Passing Sight Distance:	**1470 Feet**			
Surface Treatment:	**T/W:**	**Aspahlt Concrete**	**Shoulders:**	**Asphalt Concrete**
Side Slope Ratios:	**Foreslopes:**	**4:1 typical**	**Backslopes:**	**4:1**
Degree of Access Control:	**Common access control**			
Median Treatment:	N/A			
Illumination:	Lighting at intersections			
Curb Usage and Type:	N/A			
Bicycle Provisions:	Traveled Way			
Pedestrian Provisions:	Traveled Way			
Misc. Criteria:				

Proposed - Designer/Consultant: Eric Bryner **Date:** 07/08/2021

Endorsed - Engineering Manager: David K. Fischer **Date:** 7/8/2021

Approved - Preconstruction Engineer: **Date:** 7/9/2021

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MEMORANDUM

State of Alaska

Department of Transportation & Public Facilities

TO: Sarah E. Schacher, P.E.,
Preconstruction Engineer
Northern Region

DATE: July 8, 2020

FILE NO: I:\Traffic Data\Design\2020\RichHwyMP351_NFHWY00097

TELEPHONE NO: 451-5150

FROM: Scott Vockeroth
Traffic Data Manager
Fairbanks Field Office

SUBJECT: Richardson Highway MP 351 Interchange
NFHWY00097/OA24(034)
Design Designation Request

Please approve the attached design designation by signing the endorsement below which enables your staff to proceed.

Contact our office if you have any questions.

7/13/2020

Sarah E. Schacher, P.E., Preconstruction Engineer — Date

cc: Erik Brunner, P.E., Engineer, Northern Region
Dave Fischer, P.E., Engineer, Northern Region

Attachment

DESIGN DESIGNATION

Northern Region Planning

Traffic Data & Forecasting

ROUTE NAME: Richardson Highway
CDS NO: 190000
ROUTE ID: 1100000I000
MILEPOINT: 351.5-352.5
FUNCTIONAL CLASS: Interstate
URBAN/RURAL: Urban

	YEAR	AADT	%	
AADT	2019 2035 2045	15500 18900 21400		
DHV	2035 2045		12.60	2400 2700
D				35-65
T			**4.85** 0.10 1.05 1.00 1.50 0.40 0.65 0.15	**Total** Class 4 Class 5 Class 6 Class 8 Class 9 Class 10 Class 13
ESAL'S (Design Lane)	To Be Provided by Design			

Submitted Data Request Type: Design Designations Request (Northern)	
Latest Status Update:	**Data Request Record has been assigned to an email address.**
Assigned to the following e-mail address:	**jill.melcher@alaska.gov; scott.vockeroth@alaska.gov**
Record Creation:	**July 02, 2020 08:14:58 AM**
Routed to assigned e-mail address:	**July 02, 2020 02:41:35 PM**
Request Resolution:	**Resolution Pending**

Requestor

First Name: *	Erik	Last Name: *	Brunner
Email: *	erik.brunner@alaska.gov		
Additional Email Contacts:	dave.fischer@alasak.gov +		
Date Needed: (AKST)	07 / 10 / 2020		

Project Information

Project Name: *	Richardson Highway Milepost 351 Interchange
Project Engineer(s): *	Erik Brunner; Dave Fischer +
State Project Number: *	NFHWY00097
Federal Project Number: *	OA24(034)
Route ID: *	190000
Milepoint (To/From): *	351.5 to 352.5
Construction Year: *	2023

Please select the type of project. *

- ○ Reconstruction
- ○ Rehabilitation
- ● New Construction
- ○ Other (please describe): New Construction

Project Notes:

This project will construct an interchange similar to the Eielson single sided for east/south bound traffic and build a new frontage road from Sand Lot Court to the existing "frontage" road that starts at the church and upgrade the existing frontage to tie into the revised Old Richardson alignment

Please select the project's region to view the Data Fields that are available to request. *

- ○ Central
- ● Northern
- ○ Southcoast

Data Fields Requested: (please pick at least one) *

- ☑ Present AADT
- ☑ Design Year AADT (Please specify Year) 2045
- ☑ Mid-Design Year AADT (Please specify Year) 2035
- ☑ Design Hourly Volume (DHV)
- ☑ Directional Split (D)
- ☑ Percent Trucks
- ☐ Road Functional Classification
- ☐ Intersection Turning Movements (Please specify Locations)

Please specify any other requested data fields not listed above:

Traffic Data Request Form

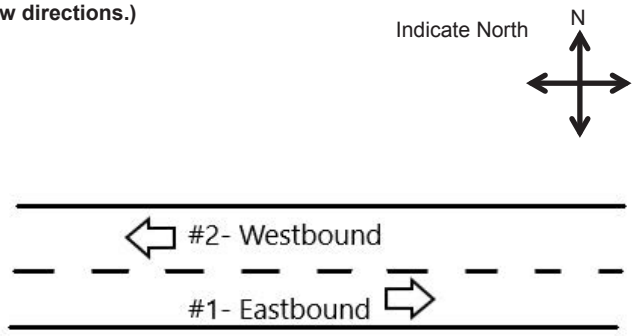
TDR Form-1-10/20/03

Alaska Department of Transportation & Public Facilities

Requested By: Erik Brunner	**Design Project Number:** NFHWY00097	**Date Requested:** 7/2/20
Base Year: 2019 **Base Year Total AADT:** 15500 **AADT Growth Rate** **Forward (%/yr):** 1.25 **End Year:** 2045 **Back Cast (%/yr):** **Begin Year:**	**Common Route Name:** Richardson Hwy **Functional Class:** Interstate **Urban/Rural** **Historic M.P. Interval:**	**CDS Route Name:** CDS- 190000 Route: 1100000I000 **CDS M.P. Interval:** 351.5-352.5

Truck Category	Load Factor (ESALs per Truck)	% of Total AADT in Truck Category
2-axle	See attached	
3-axle		
4-axle		
5-axle		
≥ 6-axle		

Lane Configuration Sketch:
(Designer: Provide sketch of lane layout. Number each lane and show directions.)



Percent of Base Year Total AADT for Each Numbered Lane in Configuration Sketch:

Lane # 1	%	35- Eastbound
Lane # 2	%	65- Westbound
Lane #	%	
Lane #	%	
Lane #	%	
Lane #	%	

Comments:

Data Provided By: Scott Vockeroth	**Provider's Signature:**	**Date Provided:** 7/8/2020

Figure 6-1. Traffic Data Request (TDR) Form

Route ID	Route Name	Measure	Feature	Location	Attribute1	Attribute2	Attribute3
1100000I000	Richardson Highway (Richardson Highway)	0		Route Begin			
1100000I000	Richardson Highway (Richardson Highway)	350		Report Begin			
1100000I000	Richardson Highway (Richardson Highway)	350	FHWA Urban Area	Begin	Urbanized Area Type: Urbanized Area	Urbanized Area Name: Fairbanks	
1100000I000	Richardson Highway (Richardson Highway)	350	Functional Class	Begin	Functional Class: Interstate		
1100000I000	Richardson Highway (Richardson Highway)	350	NHS	Begin	NHS: NHS Not Intermodal		
1100000I000	Richardson Highway (Richardson Highway)	350	Traffic Link	Begin	AADT: 13244	Traffic Link ID: AL200076	
1100000I000	Richardson Highway (Richardson Highway)	350.2079497	Intersections	Point	Intersection Name: Richardson Highway & Richardson NB Off-Ramp (Mission) 1		
1100000I000	Richardson Highway (Richardson Highway)	350.2829699	Intersections	Point	Intersection Name: Richardson Highway & Richardson NB On-Ramp (Mission) 1		
1100000I000	Richardson Highway (Richardson Highway)	350.7083685	Intersections	Point	Intersection Name: Richardson Highway & Richardson NB Off-Ramp (Badger)		
1100000I000	Richardson Highway (Richardson Highway)	350.9982125	Bridge	Begin	Bridge Name: BADGER LOOP ROAD UNDERCROSSING	Bridge Number: 1767	NBI: Yes
1100000I000	Richardson Highway (Richardson Highway)	351.0076605	Intersections	Point	Intersection Name: Richardson Highway & Badger Road 2		
1100000I000	Richardson Highway (Richardson Highway)	351.0215021	Bridge	End	Bridge Name: BADGER LOOP ROAD UNDERCROSSING	Bridge Number: 1767	NBI: Yes
1100000I000	Richardson Highway (Richardson Highway)	351.2887573	Intersections	Point	Intersection Name: Richardson Highway & Richardson NB On-Ramp (Badger)		
1100000I000	Richardson Highway (Richardson Highway)	351.2918758	Traffic Link	End	AADT: 13244	Traffic Link ID: AL200076	
1100000I000	Richardson Highway (Richardson Highway)	351.2918758	Traffic Link	Begin	AADT: 14673	Traffic Link ID: AL001292	
1100000I000	Richardson Highway (Richardson Highway)	351.8890504	Intersections	Point	Intersection Name: Richardson Highway & Peridot Street 1		
1100000I000	Richardson Highway (Richardson Highway)	352.7142707	Intersections	Point	Intersection Name: Richardson Highway & Old Rich @ North Pole 1		
1100000I000	Richardson Highway (Richardson Highway)	352.7173892	Traffic Link	End	AADT: 14673	Traffic Link ID: AL001292	
1100000I000	Richardson Highway (Richardson Highway)	352.7173892	Traffic Link	Begin	AADT: 19173	Traffic Link ID: AL001293	
1100000I000	Richardson Highway (Richardson Highway)	353	FHWA Urban Area	End	Urbanized Area Type: Urbanized Area	Urbanized Area Name: Fairbanks	
1100000I000	Richardson Highway (Richardson Highway)	353	Functional Class	End	Functional Class: Interstate		
1100000I000	Richardson Highway (Richardson Highway)	353	NHS	End	NHS: NHS Not Intermodal		
1100000I000	Richardson Highway (Richardson Highway)	353	Traffic Link	End	AADT: 19173	Traffic Link ID: AL001293	
1100000I000	Richardson Highway (Richardson Highway)	353		Report End			
1100000I000	Richardson Highway (Richardson Highway)	363.6531171		Route End			

Atlas Roadlog. 7/8/2020

Computations and Historical Data

Project: Richardson Hwy Milepost 351 Interchange

Historical AADTs

Link	Start CDS	Start Feature	End CDS	End Feature	Year 1980	1981	1982	1983	1984	1985
1	349.720	Dawson on-ramp	351.290	Badger on-ramp						
2	351.290	Badger on-ramp	352.717	Old Rich Intersection						
3	352.717	Old Rich Intersection	359.182	Badger on-ramp						

Link	Year 1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1		7037	8768	6962	12849	10483	11713	12089		11982		14122	11141	12358	15287
2	9093	9461	5860	10154	12817	10750	11965	11452		12030		14564	12082	12766	
3	11157	9118	11133	11248	14355	12088	13725	13993		16093		17670	15263	15637	18226

Link	Year 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
1	13164		11524	13331	15164	14579						13864	13082	9303	15026
2	13380		13829	14722	15080	15216				15224	14666	14773	14576	13519	16590
3		16381		16325	19401	19150			19318	19374	20072	17276	19768	16891	15621

Link	Year 2016	2017	2018	2019
1	14442	13862	14649	14839
2	15652	14951	16233	16429
3	20129	19300	19076	19076

Growth Rate 1.25% Traffic trends along Richardson Hwy corridor

Growth Factors

Year	Factor
2035	1.220
2045	1.381

Future AADT

Year	AADT
2019	15500
2035	18900
2045	21400

D Factor (30) 35-65

K-Factor (30) 12.60% Obtained from Continous Count at Richardson Hwy @ Moose Creek (MP 346)

Design Hourly Volume (DHV)

2035	2400
2045	2700

Class Data

Station ID	Station Description	MP	Year	Percent by Class 4	5	6	8	9	10	13	Total Truck %
13420514	Richardson Hwy at MP 359	329	2019	0.10	1.05	1.00	1.50	0.40	0.65	0.15	4.85
		Load Factor		1.00	0.50	0.85	1.20	1.55	2.24	2.24	
		Number of Axles		2/3	2	3	4	5	6	7+	

APPENDIX B

ENVIRONMENTAL DOCUMENT
(signature page only)

VII. Environmental Documentation Approval Signatures

Prepared by: _____ Date: 8/13/2019

[Signature] Environmental Impact Analyst

Kerri L. Martin

[Print Name] Environmental Impact Analyst

Reviewed by: _____ Date: 8/13/2019

[Signature] Engineering Manager

Lauren Little, P.E.

[Print Name] Engineering Manager

Programmatic CE

Approved by: _____ Date: _____

[Signature] Regional Environmental Manager

_____

[Print Name] Regional Environmental Manager

Non-Programmatic CE

Approval Recommended by: _____ Date: 8-13-19

[Signature] Regional Environmental Manager

Brett Nelson

[Print Name] Regional Environmental Manager

Approved by: _____ Date: 8.15.19

[Signature] NEPA Program Manager

Jill Taylor Jill Taylor Digitally signed by Jill Taylor Date: 2019.08.15 08:23:48 -08'00'

[Print Name] NEPA Program Manager

APPENDIX C

TRAFFIC ANALYSIS AND SPEED STUDIES
(cover pages only)

Interchange Access Justification Report

HSIP: Richardson Highway MP 351 Interchange Project

Project No. NFHWY00097/0A24034

Fairbanks North Star Borough, Alaska

Prepared For:
Alaska Department of Transportation and Public Facilities
2301 Peger Road
Fairbanks, AK 99709

Prepared By:
Kittelson & Associates, Inc.
851 SW 6th Avenue, Suite 600
Portland, OR 97205
(503) 228-5230

Project Analyst: Bryan Graveline
Project Designer: Darren Hippenstiel, P.E.
Project Manager: Kelly Laustsen
Project Principal: Marc Butorac, P.T.O.E.

July 2018

IACR FILE LOCATION:
\\dotfpgnas\Precon\Projects\Rich_Hwy\90097_Rich_351_Int\IACR\00097_IACR_Final_signed.pdf

RICHARDSON HIGHWAY MP 351 INTERCHANGE

Traffic Noise Analysis

Federal Project Number: 0A24304
State Project Number: NFHWY00097

Prepared for:

State of Alaska Department of Transportation and Public Facilities,
Northern Region, Division of Design and Engineering Services
2301 Peger Road,
Fairbanks, AK 99709

Prepared by:

DOWL
4041 B Street
Anchorage, Alaska 99503
(907) 562-2000
W.O. 1124.50126.01

August 2019

1524.50126.01

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by the State of Alaska Department of Transportation and Public Facilities pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated November 3, 2017, and executed by the Federal Highway Administration and the State of Alaska Department of Transportation and Public Facilities.

Noise analysis location:
file:///H:\Projects\Rich_Hwy\90097_Rich_351_Int\Consultant_DOWL\07_Deliverables\Noise_Study\NFHWY000097%20Traffic%20Noise%20Analysis%20Report_Final%208-2-19.pdf

KITTELSON & ASSOCIATES
851 SW 6th AVENUE, SUITE 600
PORTLAND, OR 97204
P 503.228.5230 F 503.273.8169

TECHNICAL MEMORANDUM #3
Richardson Highway MP 351 Preferred Alternative Build Operations and Safety Assessment

Date: March 12, 2018 Project #: 20218

To: Lauren Little, PE, Alaska Department of Transportation and Public Facilities
Michael Cain, PE, Federal Highway Administration

From: Bryan Graveline; Kelly Laustsen, PE; & Marc Butorac, PE, PTOE

This memorandum documents the preferred alternative build operations and safety assessment conducted as part of the Interchange Access Change Request (IACR) for the Richardson Highway Milepost 351 (Old Richardson Highway) intersection. The list of interim deliverables for the IACR includes:

- Technical Memorandum #1: Operational and Crash Analysis (Reference 1, dated August 2017)
- Technical Memorandum #2A: Concept Development and Initial Evaluation (Reference 2, dated November 2017)
- Technical Memorandum #2B: Alternative Operations, Staging, Right-of-Way Considerations and Cost Estimates (Reference 3, dated December 2017)
- **Technical Memorandum #3: Preferred Alternative Build Operations and Safety Assessment**

The incremental memoranda are being provided to allow the respective agencies an opportunity to review and comment on the transportation analysis and alternatives as they are prepared according to the Methods and Assumptions Memorandum dated June 2017 (Reference 4).

This memorandum documents the analysis performed on the preferred alternative as recommended at the Value Analysis workshop conducted at DOT&PF Fairbanks offices from December 19th through 21st, 2017. At this workshop, Alternative 2A (described in the "Preferred Alternative" section) was determined to be the most feasible option and was recommended to be moved forward for further analysis.

This memorandum includes a safety assessment, operational analysis, and conceptual design documentation for the preferred alternative. The report documenting the Value Analysis workshop is provided in *Appendix A.*

Tech Memo: ..\..\Consultant_KA\Deliverables\TechMemo3\20218 Tech Memo 3_final.pdf

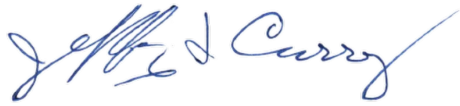
APPENDIX D

PAVEMENT DESIGN

Project Name: Rich 351 Interchange			Project Number: NFHWY00097/OA24(034)			Analysis Date: 10/8/2020		Project Status				
Design Type: New Design			Designer: Erik Brunner			Unit: US Customary		All layer damages less than 100%.				
Project Location: NORTH POLE			Tire Load (lbs) 4500	Load Description:			ESAL					
				Load Loc (in)								
		Design	Tire Press. (psi)	X:	0	13.5						
Design AADT: 15,500		Loadings	110	Y:	0	0						
Spring%: 9		318,426		Eval Loc (in)								
Summer%: 33		1,167,564		X:	0	6.75						
Fall%: 8		283,046		Y:	0	0						
Winter%: 50		1,769,036										
Total%: 100		3,538,072										
Layer	Critical Z Coordinate (in)	Asphalt Properties	Season	Modulus (Ksi)	Poisson's Ratio	Tensile Micro Strain	Compressive Stress (psi)	Million Cycles to Failure	Past Damage (%)	Future Damage (%)	Total Damage (%)	
		Air%: 5	Spring	450	0.30	66		93.64		0.34	0.34	
Thickness (in): 2	1.99	Asphalt%: 5.5	Summer	400	0.30	64		116.42		1.00	1.00	
Name: Asphalt Concrete (Modified Asph.)		Density (pcf) 148	Fall	400	0.30	64		116.42		0.24	0.24	
Use TAI: Yes			Winter	1200	0.30	19		2352.88		0.08	0.08	
								Total Damage:		1.66	1.66	
		Air%: 6	Spring	200	0.35	200		1.86		17.10	17.10	
Thickness (in): 5	6.99	Asphalt%: 4.5	Summer	200	0.35	189		2.26		51.58	51.58	
Name: 4-5% Asphalt Treated Base		Density (pcf) 145	Fall	200	0.35	189		2.26		12.50	12.50	
Use TAI: Yes			Winter	600	0.35	72		20.80		8.50	8.50	
								Total Damage:		89.68	89.68	
		Air%:	Spring	35	0.40		17.0	4.13		7.72	7.72	
Thickness (in): 8	7.01	Asphalt%:	Summer	40	0.40		18.4	4.97		23.51	23.51	
Name: Subbase F P200<6%		Density:	Fall	40	0.40		18.4	4.97		5.70	5.70	
Use TAI:			Winter	90	0.40		16.2	106.61		1.66	1.66	
								Total Damage:		38.59	38.59	
		Air%:	Spring	35	0.40		8.1	47.46		0.67	0.67	
Thickness (in): 48	15.01	Asphalt%:	Summer	40	0.40		8.5	62.43		1.87	1.87	
Name: Select A P200<6%		Density:	Fall	40	0.40		8.5	62.43		0.45	0.45	
Use TAI:			Winter	90	0.40		7.8	1167.85		0.15	0.15	
								Total Damage:		3.14	3.14	
			Spring	10	0.45		0.6	3274.85		0.01	0.01	
Thickness (in): 0	63.01		Summer	10	0.45		0.5	3888.78		0.03	0.03	
Name: Select C P200<30%			Fall	10	0.45		0.5	3888.78		0.01	0.01	
			Winter	10	0.45		0.3	21381.56		0.01	0.01	
								Total Damage:		0.06	0.06	

F:\AKDOT&PF\Alaska Flexible Pavement Design\My FPD Projects\Rich 351 Interchange.xml

OK-Jeff Currey, P.E.
NR Mat'ls Engr 10-8-20

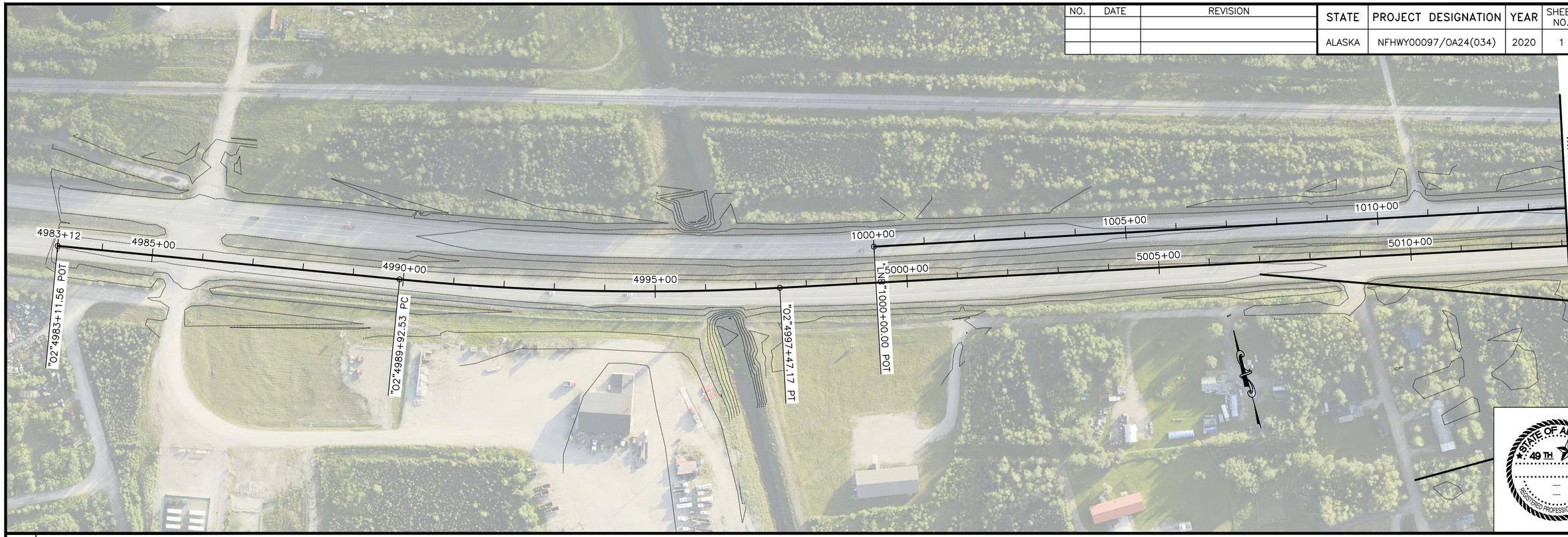


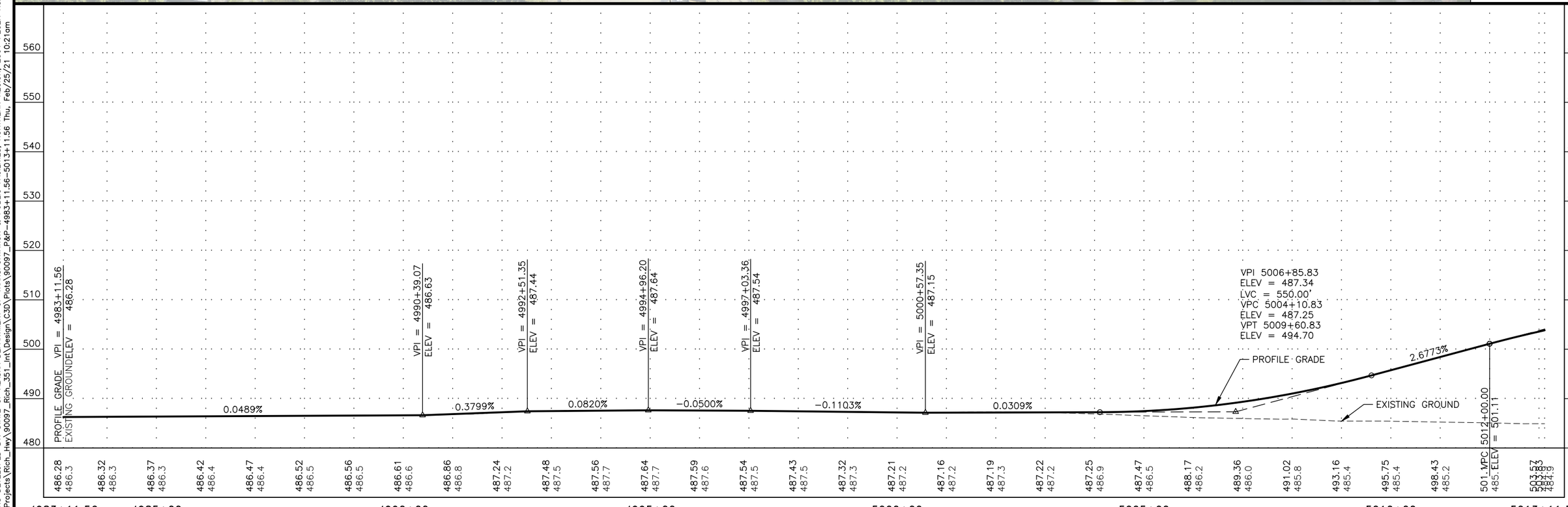
APPENDIX E

PRELIMINARY PLAN AND PROFILE SHEETS

NO.	DATE	REVISION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097/OA24(034)	2020	1	4





PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-2200
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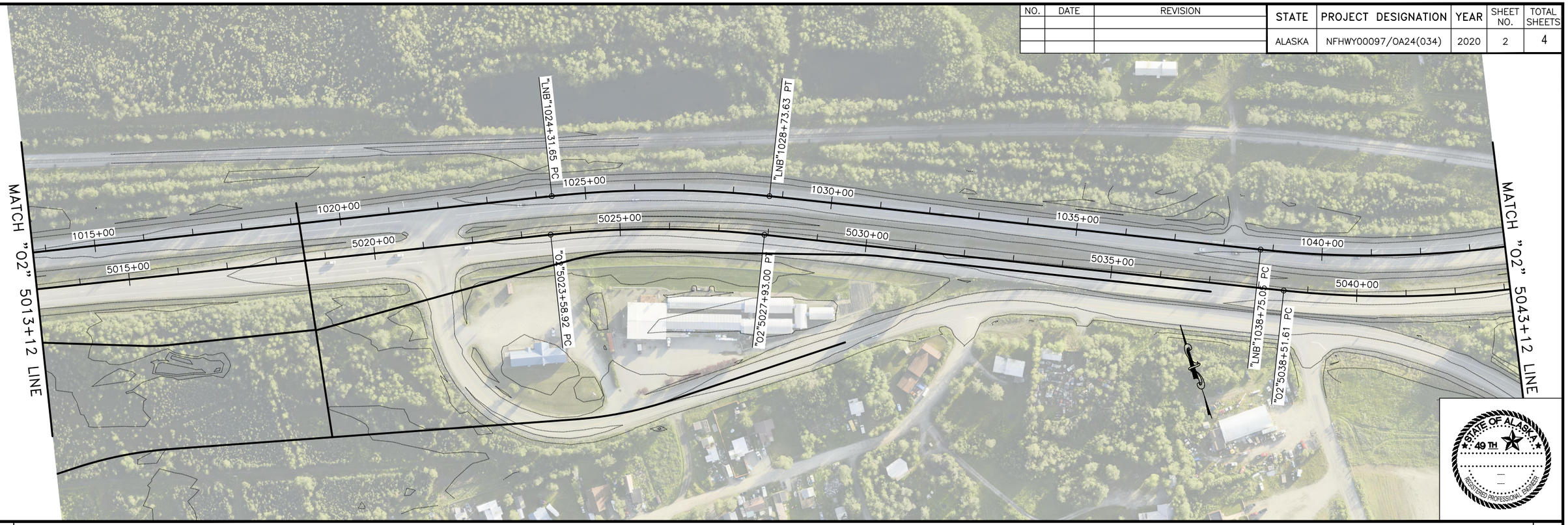
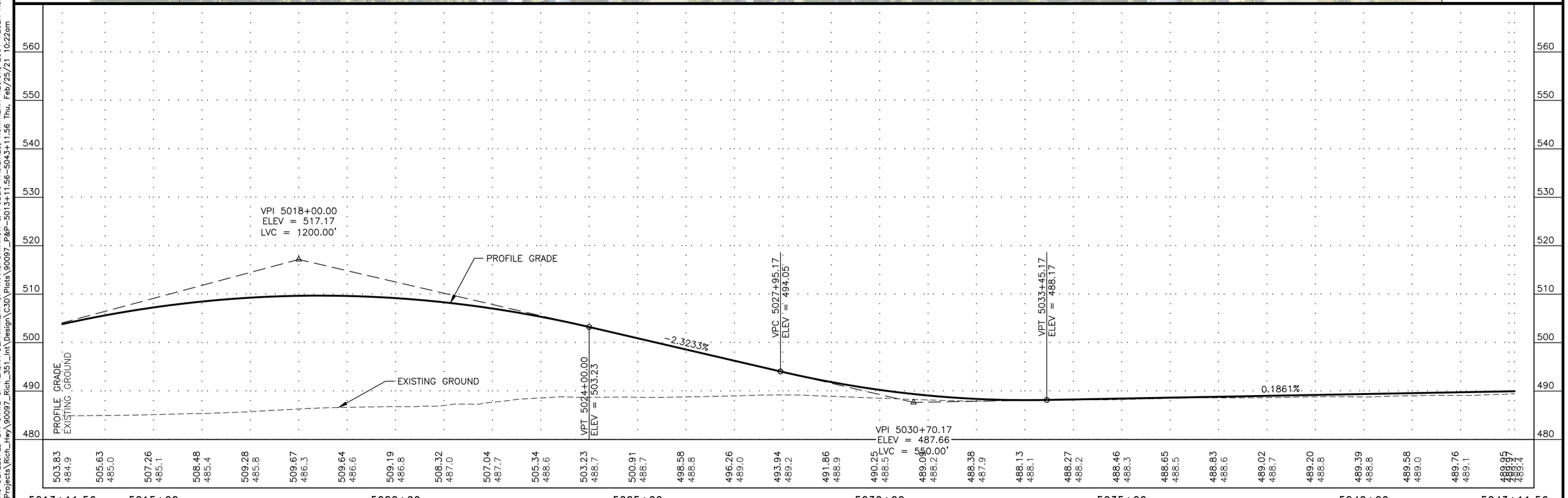
NO.	DATE	REVISION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097/0A24(034)	2020	2	4





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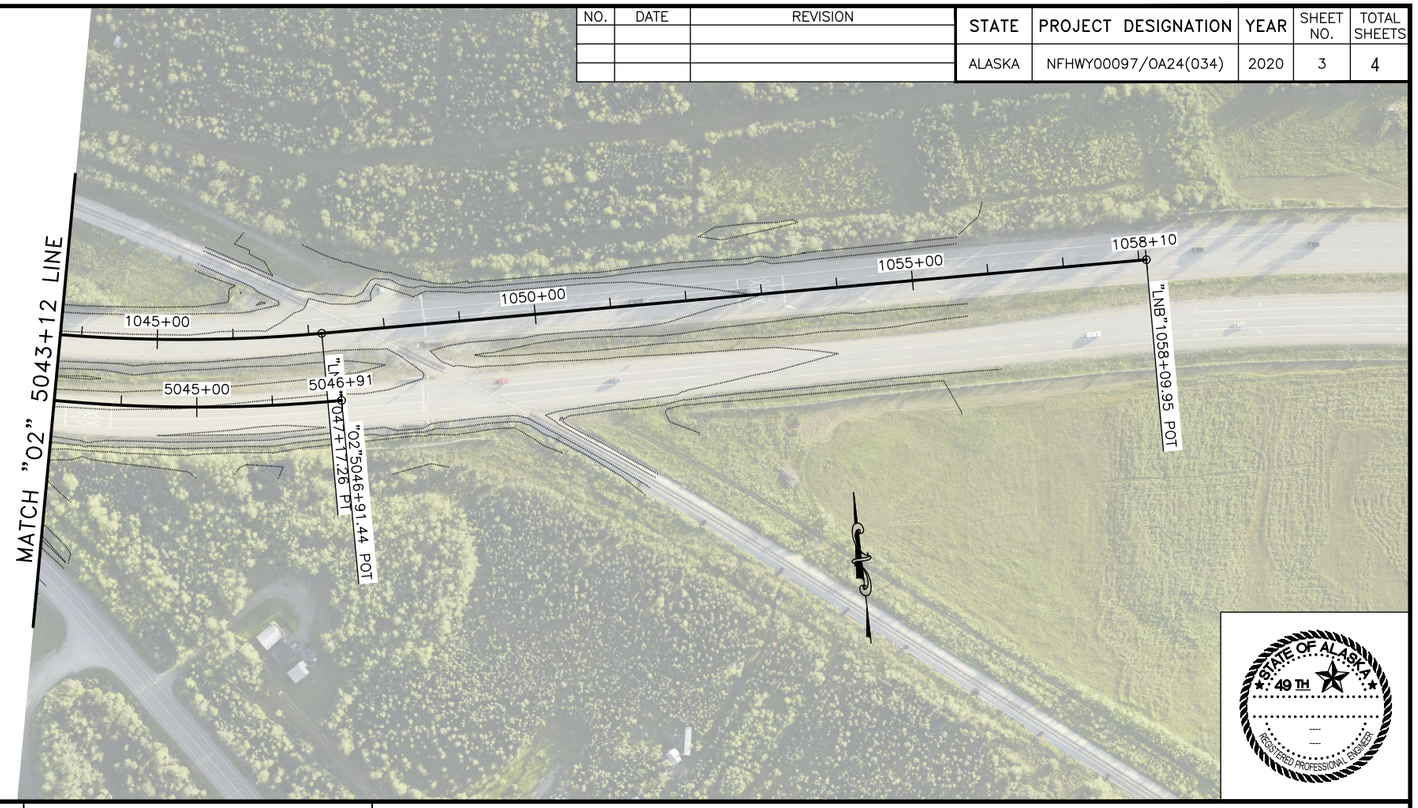
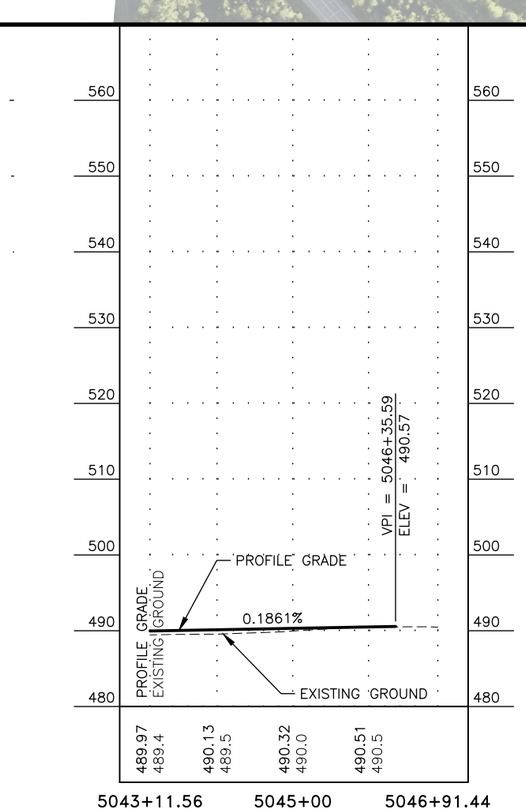
NO.	DATE	REVISION

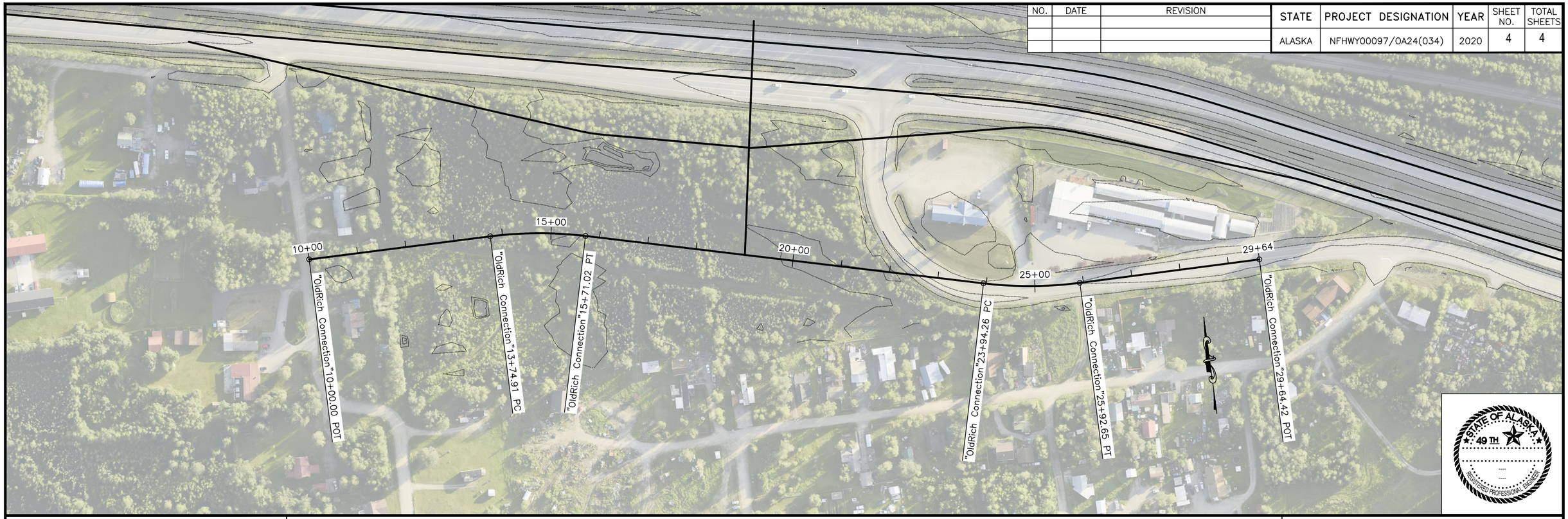
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097/0A24(034)	2020	3	4

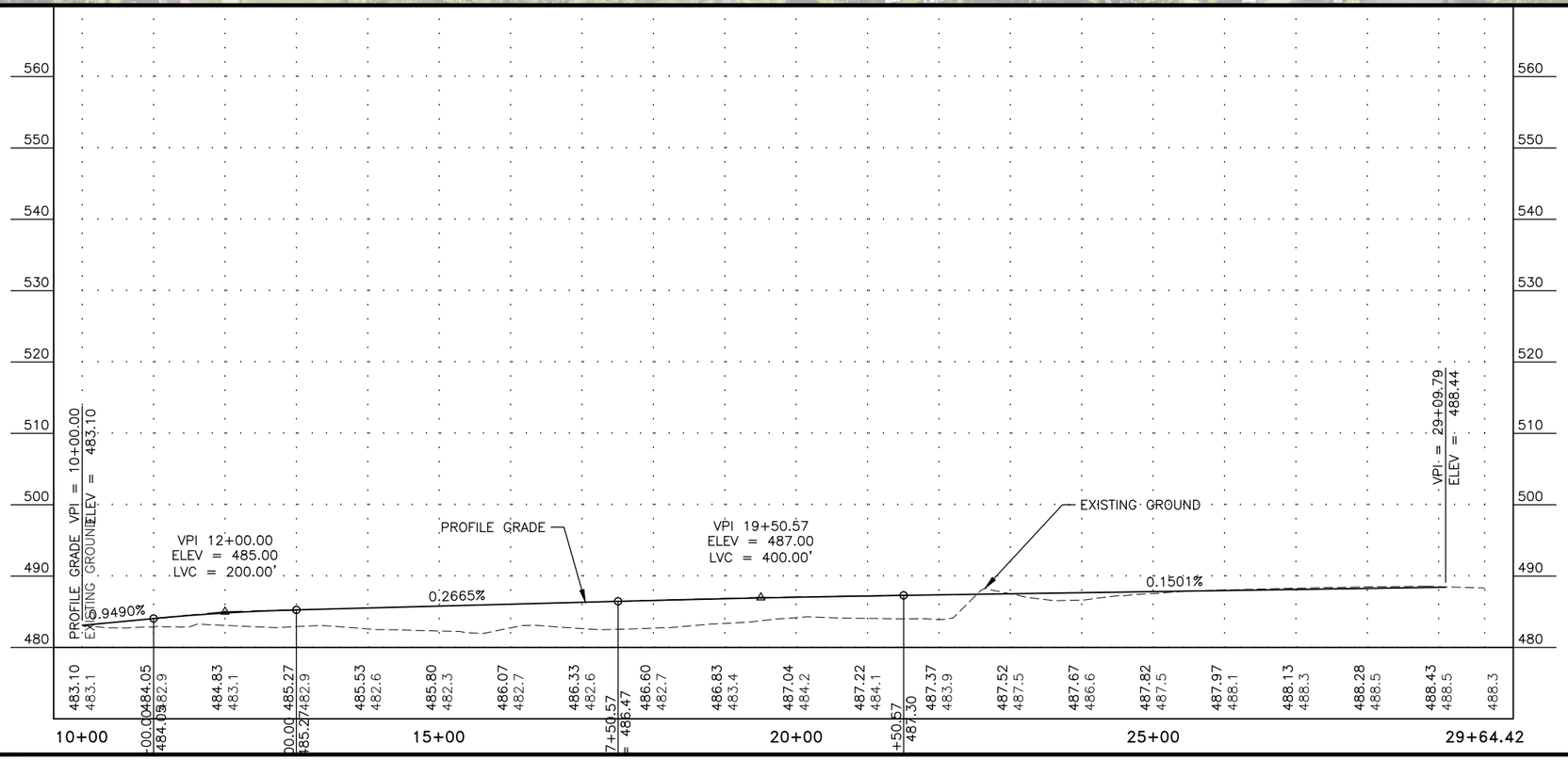




NO.	DATE	REVISION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097/OA24(034)	2020	4	4





PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-2200
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APPENDIX F

HSIP NOMINATION

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES
Northern Region Traffic & Safety Section

FFY16 Highway Safety Improvement Program Candidate Projects
Project Description and Cost Estimate

Candidate Project Name:

16NR04 Richardson Highway Milepost 351 Interchange

Candidate Project Location:

This project is located at the intersection of the Richardson Highway and the Old Rich at North Pole, near Milepost 351 of the Richardson Highway. The area around this intersection is known locally as 12-Mile Village. The CDS information for this intersection is:

	Richardson Highway	Old Rich @ North Pole
CDS Route	190000	188200
Milepoint at intersection	352.6256	4.9055

Figure 1. Project Location

Safety Problem Description:

The Richardson Highway is posted at 55 mph between Fairbanks and North Pole, with an operating speed between 60-65 mph, so potential for greater severity crashes is high. A speed limit increase is being considered. Due to the high speed of the roadway, crashes have the potential to be severe when they do occur. It should be noted that there are no signalized intersections on the

Richardson Highway (aside from the terminus at Airport Way). This intersection, like other major at grade intersections in the area has deceleration and acceleration lanes and is illuminated. Other area intersections, such as Badger Road were converted to interchanges over the past 15 years.

There were 24 multi-vehicle crashes at this intersection from 2008-2012, including 8 minor injury crashes and 1 fatal crash.

This intersection has a crash rate of 1.18 as compared to a statewide average of 0.47 for similar intersections, and a safety index of 1.71.

Proposed Mitigation:

To minimize the potential for multi-vehicle injury and fatal crashes, the proposed project would replace the existing intersection with an interchange. Due to the proximity of the ARRC tracks and the need to provide access only to the south side of the highway, design is anticipated to be similar to the "partial interchange" at the Eielson AFB entrance near Milepost 342 of the Richardson Highway. However, actual design of the interchange will be vetted through the design process.

Conformance with the Strategic Highway Safety Plan:

This project aligns with Action 2.5 of Strategy 2 (Implement infrastructure projects to address intersection crashes) of the Roadways Emphasis Area of the Strategic Highway Safety Plan.

Benefit/Cost Ratio:

On 4/27/15, HQ Traffic and Safety and NR Traffic and Safety agreed to the use of a CRF of 57% applied to injury crashes as found on the CMF Clearinghouse, (Elvik, R. and Erke, A., "Revision of the Hand Book of Road Safety Measures: Grade-separated junctions." (3-27-2007)) for the project nomination. The countermeasure "Convert at-grade intersection into grade-separated interchange" best fits the circumstances compared with other countermeasures and this CRF was one of only two countermeasures in the grouping to be given a five-star rating.

This project has a predicted benefit cost ratio of 0.22:1.

Cost Estimate:

Preliminary Engineering (Phase 2):	$1,545,000	FFY 16
Right of Way (Phase 3):	$500,000	FFY 18
Utilities (Phase 7):	$700,000	FFY 18
Construction (Phase 4):	$19,150,000	FFY 20
TOTAL:	**$21,895,000**	

HQ Reporting Information

	Richardson Highway	Old Rich @ North Pole
CDS Route	190000	188200
Milepoint at intersection	352.6256	4.9055
Ownership	100% State; 0% Local	100% State; 0% Local
Speed Limit	55 mph	40 mph
Functional Class	Interstate	Major Collector
2013 ADT	14549	2329

Attachments
Project Ranking Worksheet
Construction Cost Estimate
Crash Data

Alaska DOT/PF

Highway Safety Improvement Program

Project Ranking Worksheet

Red fields are input fields.
Black fields are fixed, computed, or derived.

HSIP Project Name:	**Richardson Hwy MP 351 Interchange**						
Analysis Period:	1/1/08	**to**	12/31/12	Form Completed by:	Pam Golden	Date:	6/22/15

Miscellaneous Data

Rate of Return:	3%
No of years of accident analysis	5

Accident Cost Data

Accident Severity	Accident Cost
Property Damage Only:	$13,700
Minor Injury:	$137,000
Major Injury:	$685,000
Fatality:	$1,370,000

Predicted Change in Accidents due to Improvement(s)

Imprv Type Num	Improvement	Type of Accident Susceptible to Reduction or Increase due to Improvement	Reduction Factor (+ or -)	No of Acc.s Susceptible to Reduction or Increase			
				PDO	Min	Maj	Fat
999	construct interchange to replace at-grade intersection	all injury crashes	-57%		6		1
		Total Accidents Susceptible to Reduction or Increase:			6		1
		Predicted Change in Accidents:			-3.4		-0.6
		Predicted Change in Accident Cost ($1,000):			-469		-781

Benefit/Cost of Improvements (Safety and M&O Benefits Only)

Improvement	Total Proj Cost (K)	Ann M/O Cost (K)	Life of Impvt (yrs)	Predicted Change in Accidents				Predicted Change in Accident Cost	Annualized Safety and M&O Benefits	Annualized Constr. and M&O Costs	Benefit Cost (Safety and M&O Benefits only)
				PDO	Min	Maj	Fat				
construct interchange	21895	1.0	30		-3.4		-0.6	-$1,249,440	**$249,888**	**$1,118,067**	**0.2 : 1**
Subtotals:					-3.4		-0.6				
Totals/Averages:	**21895**	**1.0**	**30.0**		**-4.0**			**-$1,249,440**	**$249,888**	**$1,118,067**	**0.22 : 1**

Benefit Cost Formula (Safety and M&O Benefits Only)

B/C Ratio = (Estimated Annual Reduction in Accident Cost)+(Decrease in Ann Maintenance Cost, 0 if increase) / (Annualized Construction cost)+(Increase in Ann Maintenance cost, 0 if decrease)

Combined Effects of Multiple Countermeasures

$$ARF_{combined} = \left[1 - \left(1 - \frac{ARF_1}{100}\right)\left(1 - \frac{ARF_2}{100}\right) \ldots \left(1 - \frac{ARF_n}{100}\right)\right] \times 100$$

Compute a combined Accident Reduction Factor only for crash types jointly influenced by dissimilar improvements at the location of interest. Consider limitations of this formula as discussed in TRB Special Report 214 Designing Safer Roads, 1987, pg. 253-255.

FFY16 Highway Safety Improvement Program
Construction Cost Estimate

16NR04: Richardson Highway MP 351 Interchange

6/29/2015

Work	Quantity	Unit	Unit Cost	Total Cost	Remarks
REMOVALS					
Unclassified Excavation	22,222	CY	$9.00	$199,998.00	
Remove Existing Pavement	31,250	SY	$4.00	$125,000.00	
INSTALLATION					
Borrow Type "A"	1,000,000	TON	$9.25	$9,250,000.00	
Aggregate Base Course		TON	$25.00	$0.00	
Asphalt Treated Base (ATB)	6,008	TON	$40.00	$240,320.00	
Asphalt Cement for ATB	270	TON	$650.00	$175,500.00	
Asphalt Concrete	4,006	TON	$55.00	$220,330.00	
Asphalt Cement	270	TON	$750.00	$202,500.00	
Ramp Modifications		LS	$70.00	$0.00	
Intersection Improvements		LS	All Req'd	$0.00	
Install Rumble Strips		MI	$3,000.00	$0.00	
Sidewalk / Pathway		SY	$60.00	$0.00	
Curb & Gutter		LF	$30.00	$0.00	
Bridge	4,920	SF	$350.00	$1,722,000.00	
Culverts	575	LF	$110.00	$63,250.00	
Guardrail End Treatments	4	EA	$4,500.00	$18,000.00	
Guardrail	4,250	LF	$35.00	$148,750.00	
TRAFFIC CONTROL DEVICES					
Relocated Electroliers		EA	$5,000.00	$0.00	
New Electroliers	15	EA	$15,000.00	$225,000.00	
New Load Center	2	EA	$7,000.00	$14,000.00	
Modify Existing Load Center		EA	$3,000.00	$0.00	
New Controller/Foundation		EA	$25,000.00	$0.00	
Relocate Traffic Structure Support		EA	$50,000.00	$0.00	
New Junction Boxes		EA	$500.00	$0.00	
Loop Detectors		EA	$750.00	$0.00	
New Traffic Signal Wiring		LS	All Req'd	$0.00	
New Signal Pole, Heads, Signs		EA	$70,000.00	$0.00	
Concrete Foundations		EA	$200.00	$0.00	
Sign Panels (installed no post)		SF	$25.00	$0.00	
2"x2" PST Sign Posts		EA	$100.00	$0.00	
2.5" x 2.5" PST Sign Posts	100	EA	$100.00	$10,000.00	
3" Pipe Posts/foundations		EA	$1,250.00	$0.00	
W 6x9 Posts/foundations		EA	$3,000.00	$0.00	
Striping Methyl		LS	$100,000.00	$100,000.00	
SUBTOTAL			Subtotal	$14,113,259.28	Plus 11% Incidentals
OTHER					
Erosion/Pollution Control		LS	All Req'd	$80,000.00	
Field Office		LS	All Req'd	$50,000.00	
Traffic Maintenance		LS	All Req'd	$900,000.00	includes temp crossover
Construction Survey		LS	All Req'd	$125,000.00	
Mobilization/Demobilization		LS	All Req'd	$465,000.00	
CONSTRUCTION CONTRACT COST			Subtotal	$15,890,591.87	Plus 1% contingency
UTILITIES					
Utility Preliminary Design		LS	All Req'd	$0.00	
Underground Telephone Relocate		LS	All Req'd	$0.00	
Electric Relocate		LS	All Req'd	$0.00	
Storm Drain		LS	All Req'd	$0.00	
Waterline Relocate		LS	All Req'd	$0.00	
Sewerline Relocate		LF	$150.00	$0.00	
Overhead Electric Relocate		LS	All Req'd	$0.00	
			Utilities Subtotal	$0.00	
COST ESTIMATE SUMMARY					
Preliminary Design (Phase 2)		LS	All Req'd	$1,545,000.00	Includes ICAP (4.79%)
Right-of-Way (Phase 3)		LS	All Req'd	$500,000.00	Includes ICAP (4.79%)
Utilities (Phase 7)		LS	All Req'd	$700,000.00	Includes ICAP (4.79%)
Construction (Phase 4)		LS		$19,150,000.00	Includes ICAP (4.79%) & Contract Admin
Contract Administration (%)	1.15				

Project Name:

16NR04: Richardson Highway MP 351 Interchange

Total: $21,895,000 Estimated Project Cost

Richardson Hwy MP 351 Interchange Crashes (12 Mile Village)

crashes susceptible to correction by proposed countermeasure

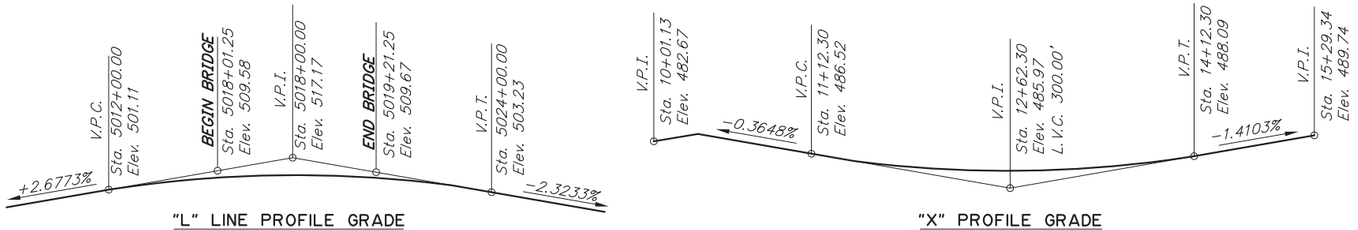
note that crashes are coded to near MP 15-16 - these crashes were miscoded to Milepost 12 on the Rich near Valdez
However, this area between Fairbanks and North Pole is known as "12-Mile", so crashes were miscoded.

ACCNUM	DATASOURCE	POLICEDEPT	PCASENUM	CDISRTE	CCMILP	ROADNAME	ACCDATE	Year	Jon	Day	ACCDAY	CTIME	ACCHOURS	STREET	CROSSSTREET	VERO	REFUNITS	INTERDIR	RDJUNCT	NUMVEH	ACCSEVERITY	TRAFWAY	EVETYPE	V1_VEHCI	V1_HUMANCIRC1	V1_HUMANCIRC2	V1_TRFCCONTDEV	V1_TRVDIREC	V1_ACTPREACT	V2_TRAFCONTDEV	V2_TRVDIREC	V2_ACTPREACT	V2_SECEVENT	TICKETCO	TICKETCO	V2_NONCOMCONFIG	DMCO	DMCO	BODYT	V2_DAMAGETYP
201070043	DATA IS ONLY FROM POLICE	BUREAU OF HIGHWAY PATRO	10-94382	190000	354.42	RICHARDSON HIGHWAY	20101001	2010	10	02	SATURDAY	1511	15:00-15:59	RICHARDSON HIGHWAY	OLD RICHARDSON HIGHWAY	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	T - INTERSECTION	2	FATALITY	2	0	2	1	VEH - ANGLE	NONE	DRIVER INATTENTION	FAILURE TO YIELD	STOP SIGN	NORTH	TURNING LEFT	NO CONTROL	EAST	STRAIGHT AHEAD	MISSING			PASSENGER CAR	NULL	NULL	NULL	TOTALED
201204967	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	15.254	RICHARDSON HIGHWAY	20121220	2012	12	20	THURSDAY	828	8:00-8:59	RICHARDSON HWY	12 MILE ROAD (ACCESS)	0	NOT APPLICABLE TO THIS LOCATION	UNKNOWN	2	NON-INCAPACITATING/POSSIBLE INJURY	2	0	2	0	VEH - REAR END	MISSING	MISSING	MISSING	OTHER	WEST	STOPPED	UNKNOWN	WEST	STRAIGHT AHEAD	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	TOTALED
201101374	DATA IS ONLY FROM POLICE	FAIRBANKS POLICE DEPT	116571	190000	15.726	RICHARDSON HIGHWAY	20111212	2011	12	12	MONDAY	1011	10:00-10:59	RICHARDSON HWY	OLD RICHARDSON	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	CROSSOVER	2	NON-INCAPACITATING/POSSIBLE INJURY	2	0	2	0	VEH - REAR END	NONE	UNSAFE SPEED	MISSING	NO CONTROL	NORTH	STRAIGHT AHEAD	NO CONTROL	NORTH	STOPPED	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	FUNCTIONAL
201101378	DATA IS ONLY FROM POLICE	FAIRBANKS POLICE DEPT	116209	190000	15.726	RICHARDSON HIGHWAY	20111114	2011	11	14	MONDAY	1300	13:00-13:59	RICHARDSON HWY	OLD RICHARDSON HWY	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	4-WAY INTERSECTION	2	NON-INCAPACITATING/POSSIBLE INJURY	2	0	2	0	VEH - REAR END	NONE	UNSAFE SPEED	MISSING	STOP SIGN	NORTH	STRAIGHT AHEAD	STOP SIGN	NORTH	STOPPED	MISSING			PASSENGER CAR	NULL	NULL	NULL	NONE/MINOR
200805566	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	16.058	RICHARDSON HIGHWAY	20080122	2008	01	22	TUESDAY	730	7:00-7:59	RICHARDSON HWY	MP 12		12 MILES	NORTH	UNKNOWN	2	NON-INCAPACITATING/POSSIBLE INJURY	1	0	1	0	VEH - REAR END	MISSING	MISSING	MISSING	NO CONTROL	NORTH	SLOWING	NO CONTROL	NORTH	OUT OF CONTROL	MISSING			PASSENGER CAR	NULL	NULL	NULL	FUNCTIONAL
200810879	DATA IS ONLY FROM POLICE	ALASKA STATE TROOPERS	819644	190000	354.01	RICHARDSON HIGHWAY	20080314	2008	03	14	FRIDAY	513	5:00-5:59	NB RICHARSON HWY	MILE 351	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	NOT A JUNCTION	2	NON-INCAPACITATING/POSSIBLE INJURY	1	0	1	0	RAN OFF ROAD	NONE	UNKNOWN	MISSING	NO CONTROL	NORTH	STRAIGHT AHEAD	NO CONTROL	NORTH	STRAIGHT AHEAD	RAN OFF ROA			PASSENGER CAR	NULL	NULL	NULL	NONE/MINOR
200908727	DATA IS ONLY FROM POLICE	ALASKA STATE TROOPERS	963169	190000	354.36	RICHARDSON HIGHWAY	20090719	2009	07	19	SUNDAY	1447	14:00-14:59	RICHARDSON HIGHWAY	MI 351	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	T - INTERSECTION	2	NON-INCAPACITATING/POSSIBLE INJURY	1	0	1	0	VEH - ANGLE	NONE	FAILURE TO YIELD	MISSING	STOP SIGN	NORTH	ENTERING TRAFFIC LANE	NO CONTROL	EAST	OTHER*	DITCH			PASSENGER CAR	NULL	NULL	NULL	TOTALED
200804035	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	354.42	RICHARDSON HIGHWAY	20080609	2008	06	09	MONDAY	1930	19:00-19:59	RICHARDSON HWY		12	MILES	SOUTH	NOT A JUNCTION	2	NON-INCAPACITATING/POSSIBLE INJURY	1	0	1	0	SIDESWIPE	MISSING	MISSING	MISSING	NO CONTROL	SOUTH	STRAIGHT AHEAD	NO CONTROL	SOUTH	CHANGING LANES	MISSING			PASSENGER CAR	NULL	NULL	NULL	NONE/MINOR
201101356	DATA IS ONLY FROM POLICE	ALASKA STATE TROOPERS	1165361	190000	354.42	RICHARDSON HIGHWAY	20110715	2011	07	15	FRIDAY	1308	13:00-13:59	MILE 351 RICHARDSON HIGHWAY	OLD RICHARDSON HIGHWAY	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	CROSSOVER	2	NON-INCAPACITATING/POSSIBLE INJURY	2	0	2	0	VEH - ANGLE	NONE	FAILURE TO YIELD	MISSING	STOP SIGN	NORTH	OTHER*	NO CONTROL	EAST	STRAIGHT AHEAD	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	DISABLING
201077430	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	15.636	RICHARDSON HIGHWAY	20101216	2010	12	16	THURSDAY	2130	21:00-21:59	OLD RICHARDSON HWY	RICHARDSON HWY	500	FEET	SOUTH	OTHER	2	PROPERTY DAMAGE ONLY	0	0	0	0	SIDESWIPE	MISSING	MISSING	MISSING	UNKNOWN	NORTH	SKIDDING	UNKNOWN	SOUTH	SKIDDING	MISSING			OTHER	NULL	NULL	NULL	FUNCTIONAL
201090402	DATA IS ONLY FROM POLICE	ALASKA STATE TROOPERS	10110264	190000	15.636	RICHARDSON HIGHWAY	20101122	2010	11	22	MONDAY	735	7:00-7:59	RICHARDSON_HWY	OLD RICHARDSON HWY	500	FEET	SOUTH	NOT A JUNCTION	3	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	NONE	UNSAFE SPEED	MISSING	NO CONTROL	NORTH	OTHER*	NO CONTROL	NORTH	STRAIGHT AHEAD	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	FUNCTIONAL
200912241	DATA IS ONLY FROM POLICE	FAIRBANKS POLICE DEPT	922446	190000	15.706	RICHARDSON HIGHWAY	20091026	2009	10	26	MONDAY	1640	16:00-16:59	RICHARDSON HWY	OLD RICHARDSON HWY	100	FEET	SOUTH	NOT A JUNCTION	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	NONE	UNSAFE SPEED	MISSING	NO CONTROL	SOUTH	OUT OF CONTROL	NO CONTROL	SOUTH	STRAIGHT AHEAD	MISSING			PASSENGER CAR	NULL	NULL	NULL	FUNCTIONAL
200962185	DATA IS ONLY FROM POLICE	ALASKA STATE TROOPERS	9101098	190000	15.726	RICHARDSON HIGHWAY	20091110	2009	11	10	TUESDAY	1749	17:00-17:59	RICHARDSON HWY	OLD RICHARDSON HWY	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	T - INTERSECTION	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	NONE	FAILURE TO YIELD	MISSING	NO CONTROL	WEST	TURNING LEFT	NO CONTROL	SOUTH	STRAIGHT AHEAD	SNOWBERM			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	TOTALED
201076717	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	15.944	RICHARDSON HIGHWAY	20101122	2010	11	22	MONDAY	740	7:00-7:59	RICHARDSON HIGHWAY	12 MILE POST	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	NOT A JUNCTION	3	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	MISSING	MISSING	MISSING	NO CONTROL	SOUTH	AVOIDING OBJECTS IN ROAD	NO CONTROL	NORTH	STRAIGHT AHEAD	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	DISABLING
201076718	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	15.944	RICHARDSON HIGHWAY	20101122	2010	11	22	MONDAY	800	8:00-8:59	RICHARDSON HIGHWAY	12 MILE	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	UNKNOWN	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	MISSING	MISSING	MISSING	NO CONTROL	SOUTH	STRAIGHT AHEAD	NO CONTROL	SOUTH	STOPPED	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	UNKNOWN
201076720	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	15.944	RICHARDSON HIGHWAY	20101122	2010	11	22	MONDAY	730	7:00-7:59	RICHERSON HWY	12 MILE EXIT	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	OTHER	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	MISSING	MISSING	MISSING	OFFICER/FLAGMAN/GUARD	EAST	SKIDDING	OFFICER/FLAGMAN/GUARD	EAST	SKIDDING	MISSING			OTHER	NULL	NULL	NULL	UNKNOWN
201101332	DATA IS ONLY FROM POLICE	ALASKA STATE TROOPERS	11125795	190000	15.944	RICHARDSON HIGHWAY	20111220	2011	12	20	TUESDAY	1314	13:00-13:59	RICHARDSON HWY (AK-2)	OLD RICHARDSON HWY MILEPOST 12	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	OFF RAMP	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	NONE	DRIVER INATTENTION	UNSAFE SPEED	NO CONTROL	SOUTH	LEAVING TRAFFIC LANE	NO CONTROL	UNKNOWN	STOPPED	MISSING			PASSENGER CAR	NULL	NULL	NULL	FUNCTIONAL
201203251	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	15.944	RICHARDSON HIGHWAY	20121111	2012	11	11	SUNDAY	0	0:00-0:59	RICHARDSON HIGHWAY	MP 12	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	UNKNOWN	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	MISSING	MISSING	MISSING	OTHER	NORTH	OTHER*	NO CONTROL	NORTH	PASSING	MISSING			PASSENGER CAR	NULL	NULL	NULL	FUNCTIONAL
201077692	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	15.944	RICHARDSON HIGHWAY	20101122	2010	11	22	MONDAY	830	8:00-8:59	RICHARDSON_HWY	M.P. 12	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	T - INTERSECTION	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - REAR END	MISSING	MISSING	MISSING	OFFICER/FLAGMAN/GUARD	SOUTH	STOPPED	OFFICER/FLAGMAN/GUARD	SOUTH	SKIDDING	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	UNKNOWN
201090391	DATA IS ONLY FROM POLICE	FAIRBANKS POLICE DEPT	102566	190000	15.976	RICHARDSON HIGHWAY	20100210	2010	02	10	WEDNESDAY	656	6:00-6:59	RICHARDSON HWY	OLD RICHARDSON EXIT	0.25	MILES	SOUTH	NOT A JUNCTION	2	PROPERTY DAMAGE ONLY	0	0	0	0	SIDESWIPE	NONE	UNKNOWN	MISSING	NO CONTROL	UNKNOWN	STRAIGHT AHEAD	NO CONTROL	NORTH	STRAIGHT AHEAD	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	NONE/MINOR
200903843	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	16.083	RICHARDSON HIGHWAY	20090304	2009	03	04	WEDNESDAY	725	7:00-7:59	RICHARDSON HWY	OLD RICH HWY	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	CROSSOVER	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - REAR END	MISSING	MISSING	MISSING	STOP SIGN	UNKNOWN	STOPPED	STOP SIGN	UNKNOWN	STARTING IN TRAFFIC	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	UNKNOWN
201104187	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	16.441	RICHARDSON HIGHWAY	20110225	2011	02	25	FRIDAY	1630	16:00-16:59	RICHARDSON HIGHWAY	EXIT OLD RICHARDSON HWY	0	NOT APPLICABLE TO THIS LOCATION	NOT APPLICABLE TO THIS LOCATION	CROSSOVER	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - REAR END	MISSING	MISSING	MISSING	STOP SIGN	UNKNOWN	STOPPED	STOP SIGN	UNKNOWN	SKIDDING	MISSING			PASSENGER CAR	NULL	NULL	NULL	NONE/MINOR
200809716	DATA IS ONLY FROM AN INDIVIDUAL PARTICIPANT			190000	354.42	RICHARDSON HIGHWAY	20081024	2008	10	24	FRIDAY	650	6:00-6:59	RICHARDSON HWY	OLD RICH HWY	0	NOT APPLICABLE TO THIS LOCATION	NOT APPLICABLE TO THIS LOCATION	T - INTERSECTION	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	MISSING	MISSING	MISSING	NO CONTROL	SOUTH	TURNING RIGHT	STOP SIGN	UNKNOWN	STOPPED	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	UNKNOWN
201101285	DATA IS ONLY FROM POLICE	ALASKA STATE TROOPERS	1112439	190000	354.42	RICHARDSON HIGHWAY	20110207	2011	02	07	MONDAY	1820	18:00-18:59	RICHARDSON HIGHWAY	OLD RICHARDSON HWY NEAR MP 351	0	AT INT. W/	NOT APPLICABLE TO THIS LOCATION	4-WAY INTERSECTION	2	PROPERTY DAMAGE ONLY	0	0	0	0	VEH - ANGLE	NONE	FAILURE TO YIELD	MISSING	STOP SIGN	EAST	TURNING LEFT	NO CONTROL	SOUTH	STRAIGHT AHEAD	MISSING			LIGHT TRUCK (ONLY 4 TIRES)	NULL	NULL	NULL	DISABLING

APPENDIX G

PRELIMINARY BRIDGE PLANS

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N1	N12

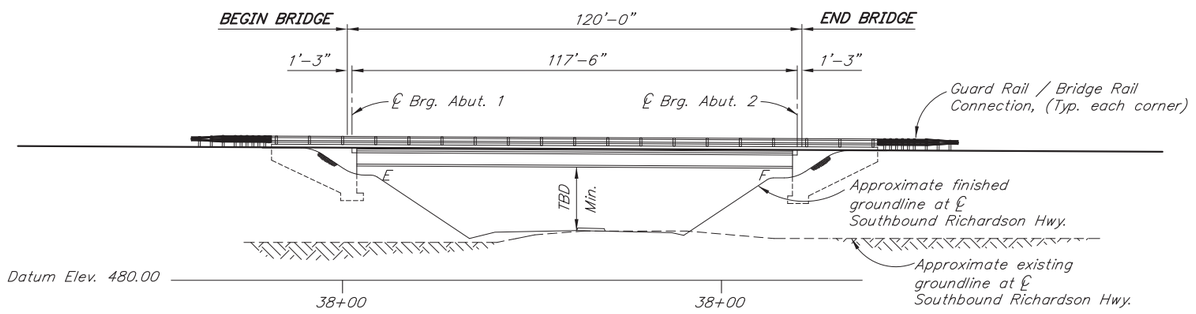


"L" LINE PROFILE GRADE

No Scale

"X" PROFILE GRADE

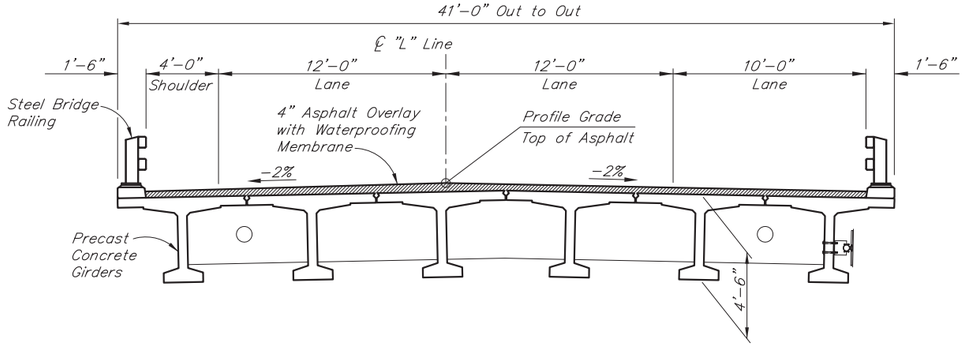
No Scale



ELEVATION

10 0 20 40

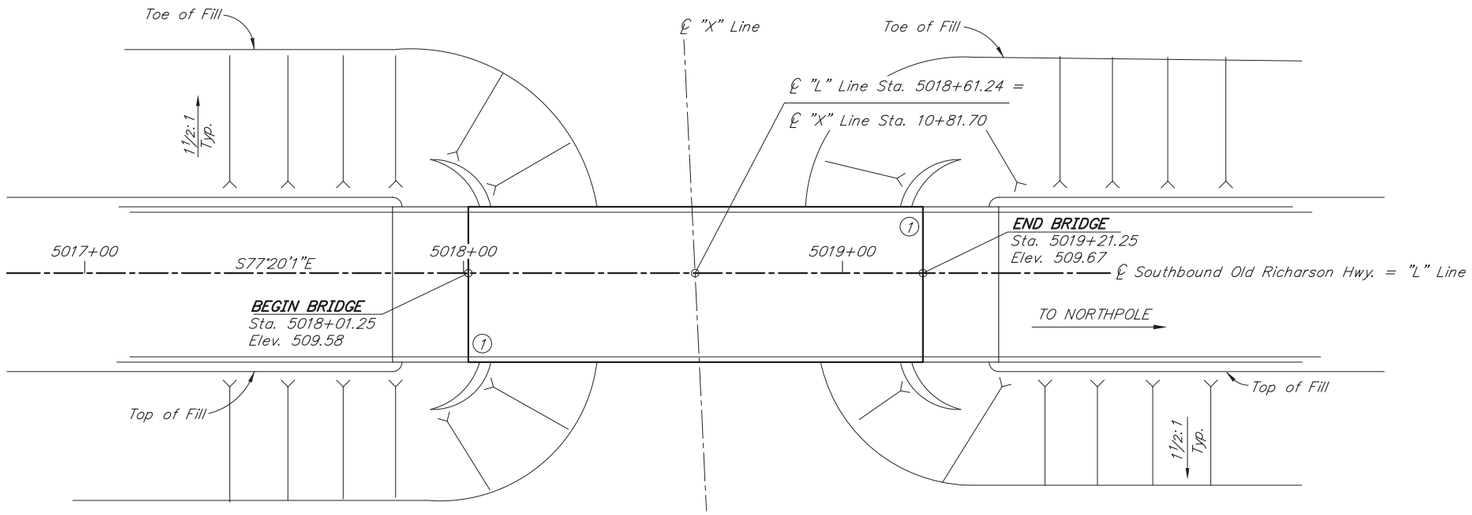
Feet



TYPICAL SECTION

12 0 4 8

In. Feet



PLAN

10 0 20 40

Feet

BRIDGE DRAWING INDEX

TITLE	DWG. NO.
GENERAL LAYOUT	1
SITE PLAN	2
ABUTMENT 1	3
ABUTMENT 2	4
WINGWALLS	5
TYPICAL SECTION	6
GIRDERS	7
APPROACH RAIL	8
STEEL BRIDGE RAILING	9
SIGN MOUNT BRACKET	10

NOTE:

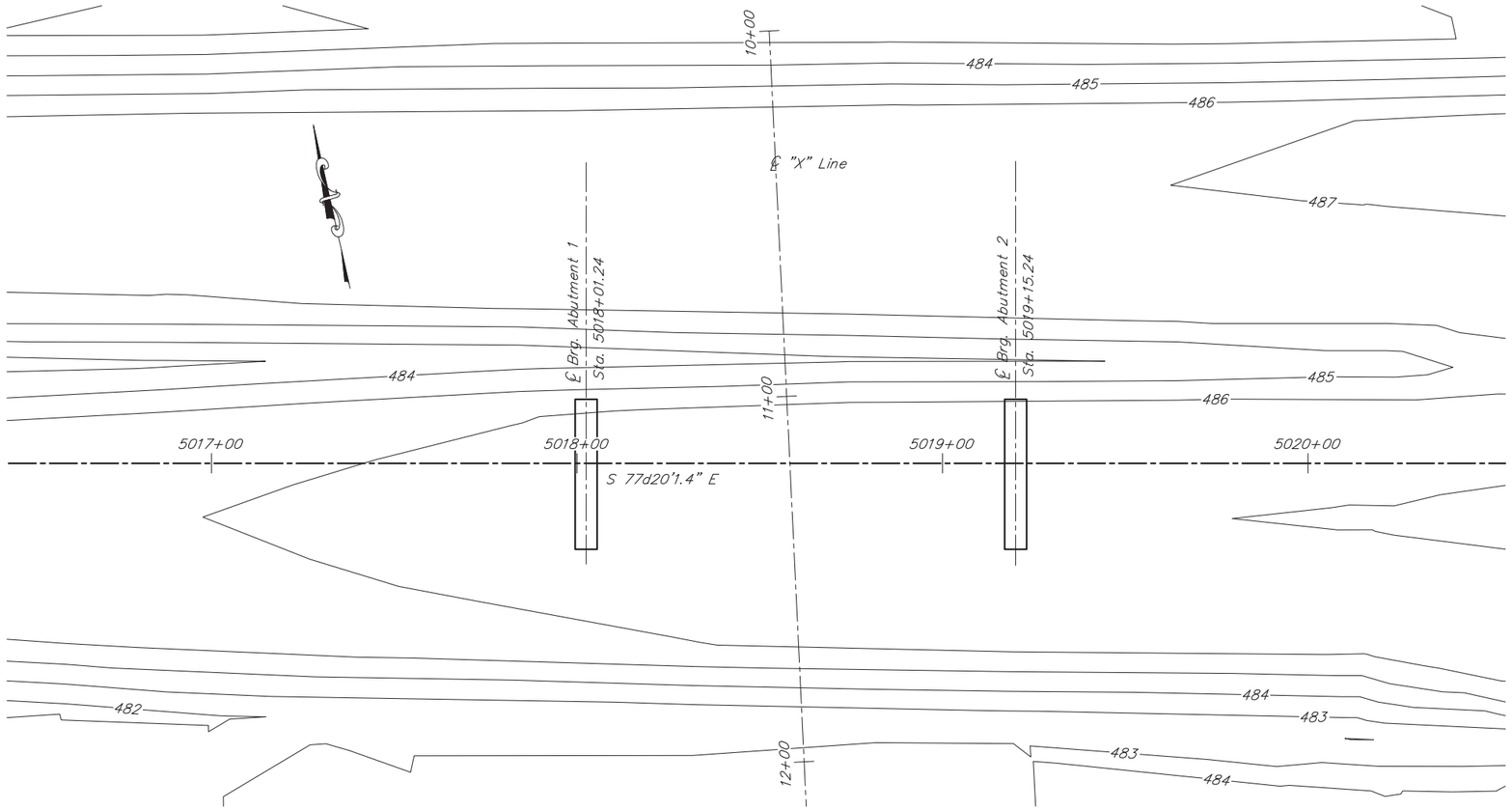
(1) Denotes location of bridge number plate.

⊕ = Point of Minimum Vertical Clearance

DESIGNED BY: Designer	CHECKED: Checker	LAYOUT BY: Designed	CHECKED BY: Checker	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES BRIDGE SECTION 3132 Channel Drive Juneau, Alaska 99801 907-465-2975		TWELVE MILE INTERCHANGE RICHARDSON HIGHWAY GENERAL LAYOUT	BRIDGE NO. 1371 DWG. NO. 1
DRAWN BY: Drafter	CHECKED: Designer	SPECIFICATIONS BY: DESIGNER	P S & E COMPARED: Checker				
QUANTITIES BY: Designer	CHECKED: Checker	APPROVAL RECOMMENDED BY: Engineer					

C:\Users\mcfoster1\appdata\local\temp\AcPublish_9908\1371-GENERAL LAYOUT Tue, May/28/19 04:17pm

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N2	N12



SITE PLAN

10 0 20 40
Feet

GENERAL NOTES

DESIGN: ..... AASHTO LRFD Bridge Design Specifications, 2017 Edition, with latest interim specifications.

Seismic design per AASHTO Guide Specifications for LRFD Seismic Bridge Design, 2011 with latest interim revisions.

LIVE LOAD: HL-93

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

SEISMIC PARAMETERS: ..... PGA = 0.274
Ss = 0.644
S1 = 0.205
Site Class = D
Liquefaction Potential = Low
AASHTO 7% probability of exceedance in 75 years.

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

PRESTRESSED CONCRETE: ..... See "GIRDERS" Dwg.

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

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

STRUCTURAL STEEL PILING: ..... Pipe Piles - API 5L X52 PSL2, Fy = 52,000 psi.
H-Piles - ASTM A709, GR50T3, Fy = 50,000 psi.
Pile Tip reinforcing is required.

202.0023.0000	Removal of Bridge	LS	SF			
203.0003.0000	Unclassified Excavation	CY	CY			
205.0006.0000	Structural Fill	CY	CY			
501.0001.0000	Class A Concrete	LS	CY			
501.0007.0000	Precast Concrete Member, 110'-0" Decked Bulb-Tee	EA	EA			
503.0001.0000	Reinforcing Steel	LS	LBS			
503.0002.0000	Epoxy-Coated Reinforcing Steel	LS	LBS			
606.0016.0000	Transition Rail	EA	EA			
611.0001.0002	Riprap, Class II	CY	CY			
631.0002.0001	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.

ABBREVIATIONS

℄	=	centerline	Glav.	=	galvanize
℗	=	plate	Hwy.	=	highway
&	=	and	Jt.	=	joint
@	=	at	ksf	=	1000 pounds per square foot
ø	=	diameter	LB	=	pound
±	=	approximate	LF	=	linear foot
Abut	=	abutment	LS	=	lump sum
Approx.	=	approximate	Lt.	=	left
b.f.	=	back/dirt face	max.	=	maximum
bot.	=	bottom	min.	=	minimum
Br.	=	bridge	n.f.	=	near face
btwn.	=	between	No.	=	number
Brg.	=	bearings	o.c.	=	on center
C.I.P.	=	cast in place	O.H.W.	=	ordinary high water
Clr.	=	clear, clearance	pcf	=	pounds per cubic foot
CY	=	cubic yard	psf	=	pounds per square foot
dia.	=	diameter	psi	=	pounds per square inch
Dwg.	=	drawing	PVC	=	point of vertical curve
E	=	expansion	PVI	=	point of vertical intersection
(E)	=	existing	PVT	=	point of vertical tangent
EA	=	each	R.O.W.	=	right of way
Elev.	=	elevation	Rt.	=	right
e.f.	=	each face	Rd.	=	road
e.w.	=	each way	spc.	=	space, spaces
F	=	fixed	Sta.	=	station
f.f.	=	front/air face	SF	=	square feet
f'c	=	specified concrete compressive strength	Symm.	=	symmetric
			Typ.	=	typical
Fy	=	yield stress	w/	=	with

DESIGNED BY: Designer	CHECKED: Checker	FOUNDATIONS REVIEWED BY: Engineer	STATE OF ALASKA **DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES** BRIDGE SECTION 3132 Channel Drive Juneau, Alaska 99801 907-465-2975		**TWELVE MILE INTERCHANGE** RICHARDSON HIGHWAY **SITE PLAN**
DRAWN BY: Drafter	CHECKED: Designer				
QUANTITIES BY: Designer	CHECKED: Checker				

BRIDGE NO. 1371
DWG. NO. 2

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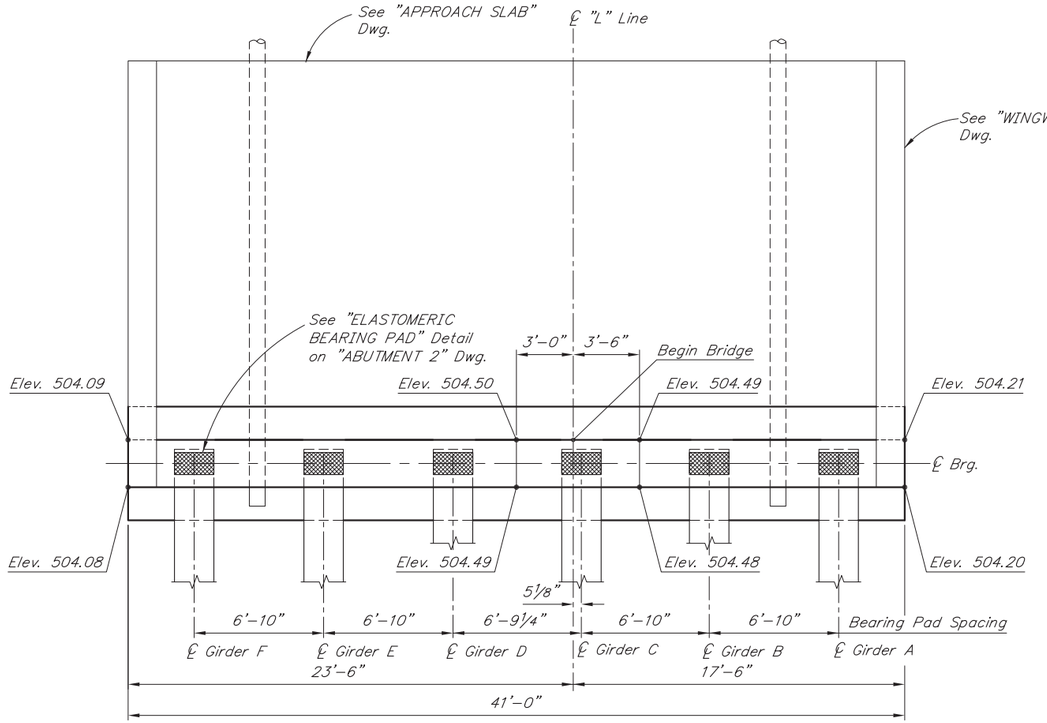
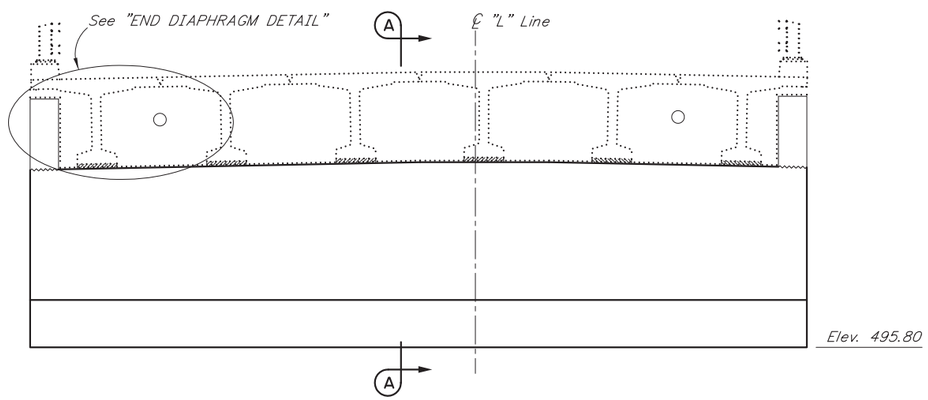


PLAN

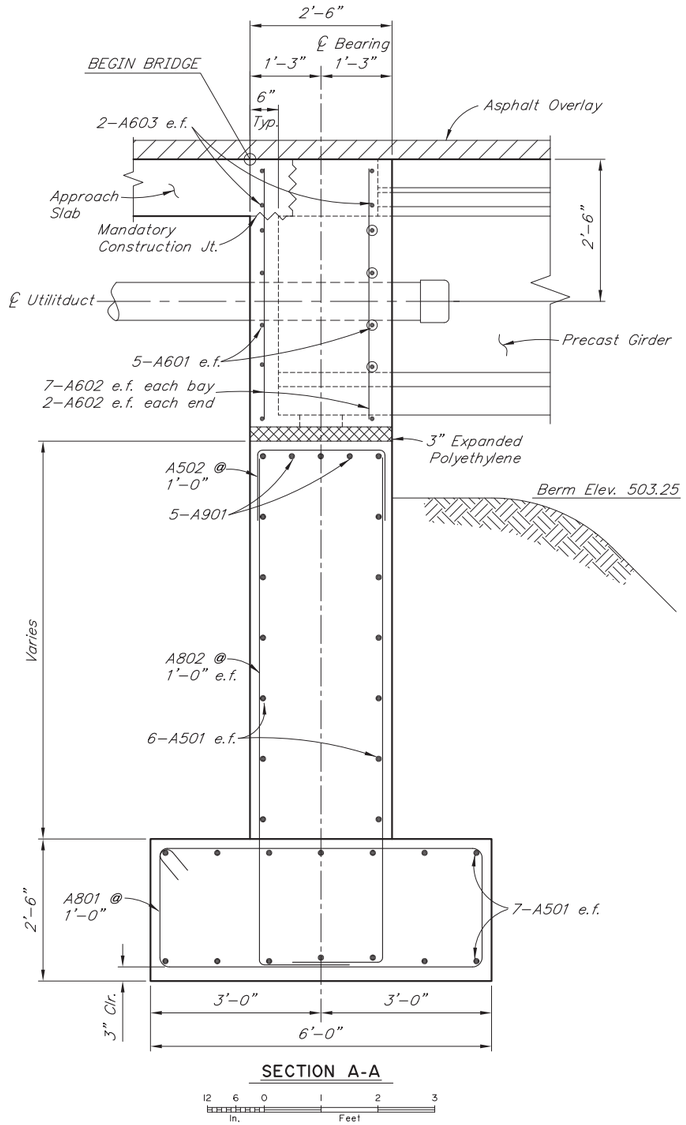
12 0 4 8
In. Feet



ELEVATION

(Looking Back at Station)

12 0 4 8
In. Feet



SECTION A-A

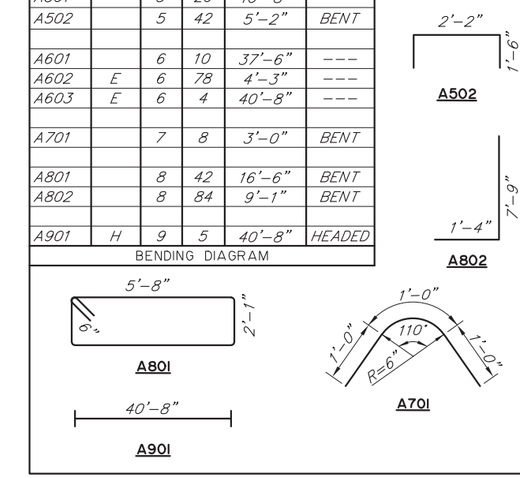
12 6 0 1 2 3
In. Feet

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N3	N12

REINFORCING STEEL - ONE ABUTMENT

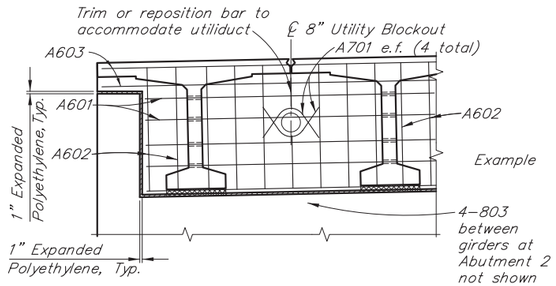
MARK	NOTE	SIZE	NO.	LENGTH	TYPE
A501		5	26	40'-8"	---
A502		5	42	5'-2"	BENT
A601		6	10	37'-6"	---
A602	E	6	78	4'-3"	---
A603	E	6	4	40'-8"	---
A701		7	8	3'-0"	BENT
A801		8	42	16'-6"	BENT
A802		8	84	9'-1"	BENT
A901	H	9	5	40'-8"	HEADED

BENDING DIAGRAM



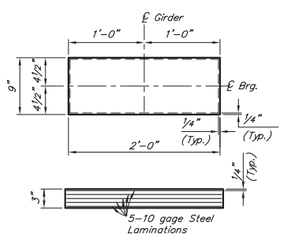
E - Epoxy coated

H - Use headed bars conforming to ASTM A970.



END DIAPHRAGM DETAIL

12 6 0 1 2 3 4
In. Feet



ELEVATION

ELASTOMERIC BEARING PAD

(50 Durometer)

12 6 0 1
In. Feet

DESIGNED BY: Designer	CHECKED: Checker		
DRAWN BY: Drafter	CHECKED: Designer		
QUANTITIES BY: Designer	CHECKED: Checker		

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
BRIDGE SECTION
3132 Channel Drive
Juneau, Alaska 99801
907-465-2975

TWELVE MILE INTERCHANGE

RICHARDSON HIGHWAY

ABUTMENT 1

BRIDGE NO. 1371

DWG. NO. 3

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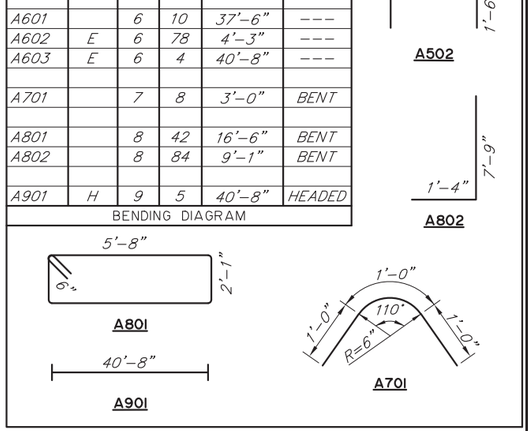
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N4	N12

REINFORCING STEEL - ONE ABUTMENT

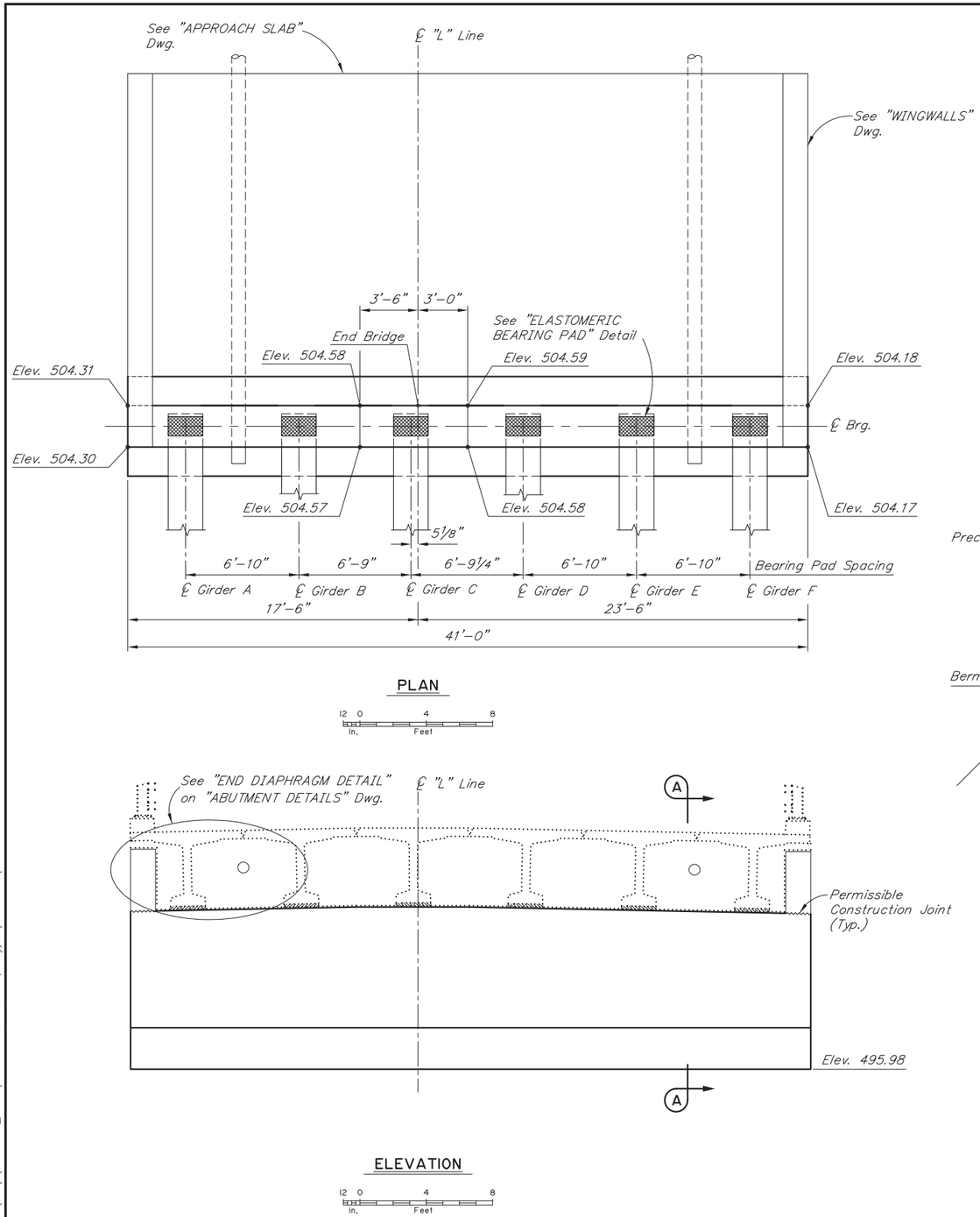
MARK	NOTE	SIZE	NO.	LENGTH	TYPE
A501		5	26	40'-8"	---
A502		5	42	5'-2"	BENT
A601		6	10	37'-6"	---
A602	E	6	78	4'-3"	---
A603	E	6	4	40'-8"	---
A701		7	8	3'-0"	BENT
A801		8	42	16'-6"	BENT
A802		8	84	9'-1"	BENT
A901	H	9	5	40'-8"	HEADED

BENDING DIAGRAM



E – Epoxy coat all Girder reinforcing

H – Use headed bars conforming to ASTM A970.

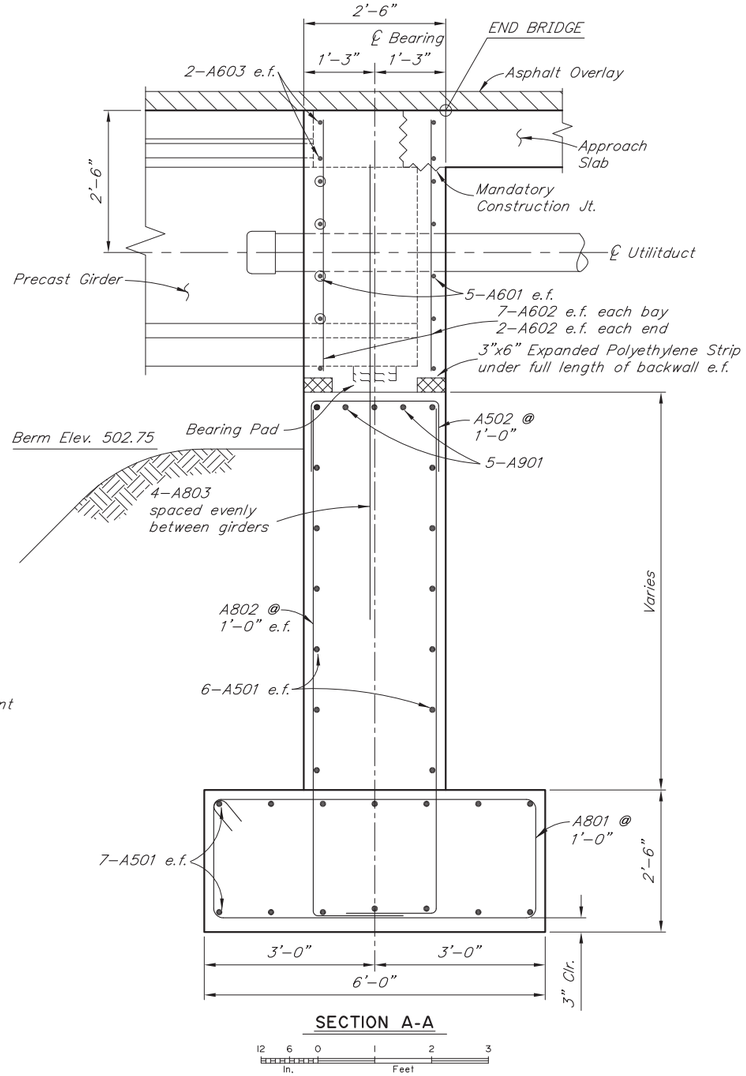


PLAN

12 0 4 8 In. Feet

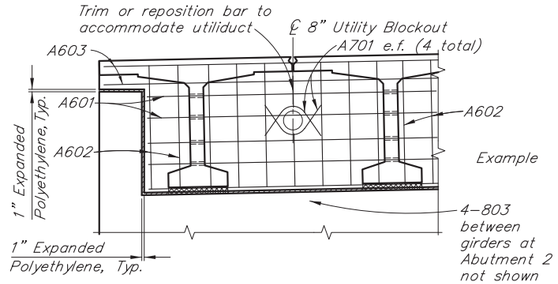
ELEVATION

12 0 4 8 In. Feet



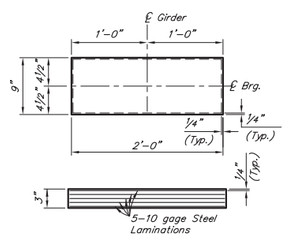
SECTION A-A

12 6 0 1 2 3 In. Feet



END DIAPHRAGM DETAIL

12 6 0 1 2 3 4 In. Feet



ELEVATION

ELASTOMERIC BEARING PAD

(50 Durometer)

12 6 0 1 In. Feet

DESIGNED BY:	Designer	CHECKED:	Checker
DRAWN BY:	Drafter	CHECKED:	Designer
QUANTITIES BY:	Designer	CHECKED:	Checker

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
BRIDGE SECTION
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TWELVE MILE INTERCHANGE

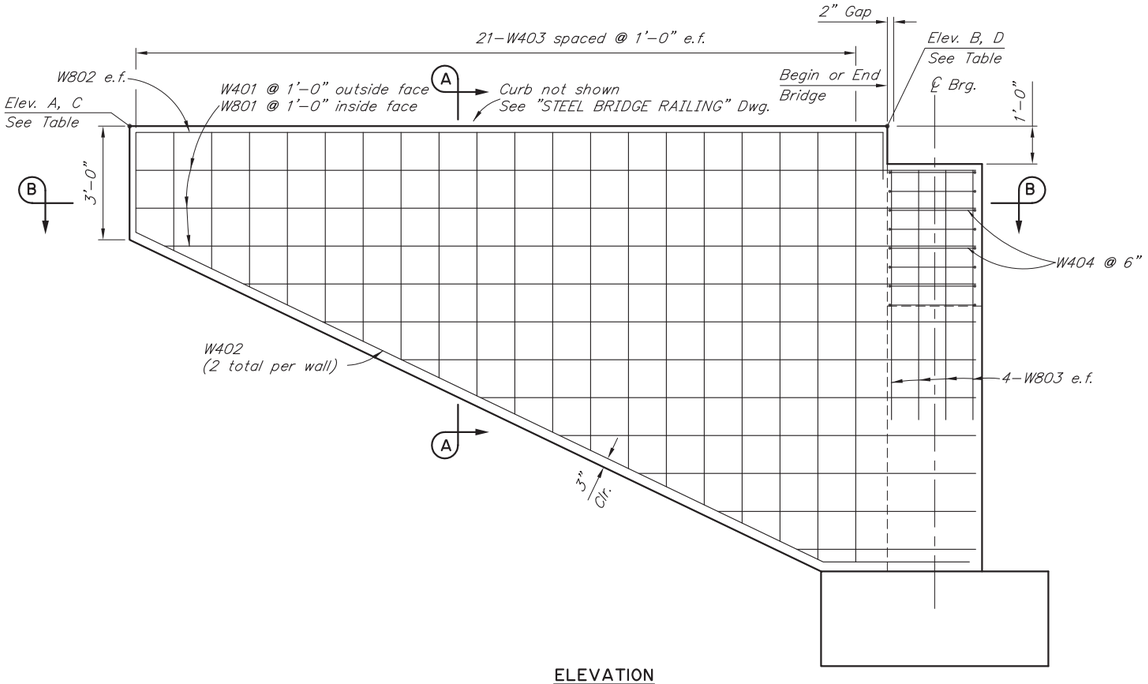
RICHARDSON HIGHWAY

ABUTMENT 2

BRIDGE NO. 1371

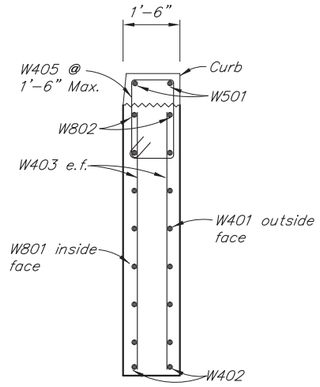
DWG. NO. 4

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N5	N12



ELEVATION

12 6 0 1 2 3 4
In. Feet



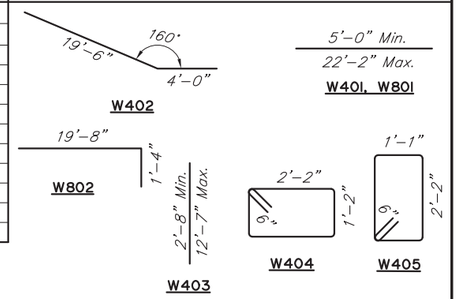
SECTION A-A

12 6 0 1 2 3 4
In. Feet

REINFORCING STEEL - ONE ABUTMENT

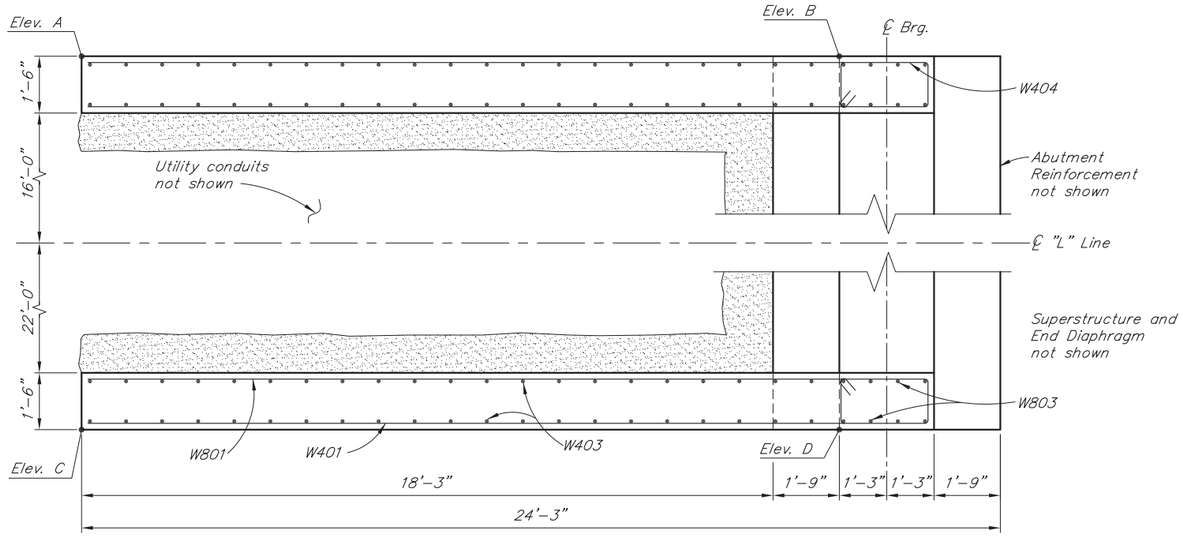
MARK	NOTE	SIZE	NO.	LENGTH	TYPE
W401		4	22	VARIES	---
W402		4	4	23'–6"	BENT
W403		4	42	VARIES	---
W404		4	16	7'–8"	BENT
W405	E	4	28	7'–6"	BENT
W501	E	5	4	19'–8"	---
W801		8	22	VARIES	---
W802		8	4	21'–0"	BENT
W803		8	16	7'–0"	---

BENDING DIAGRAM



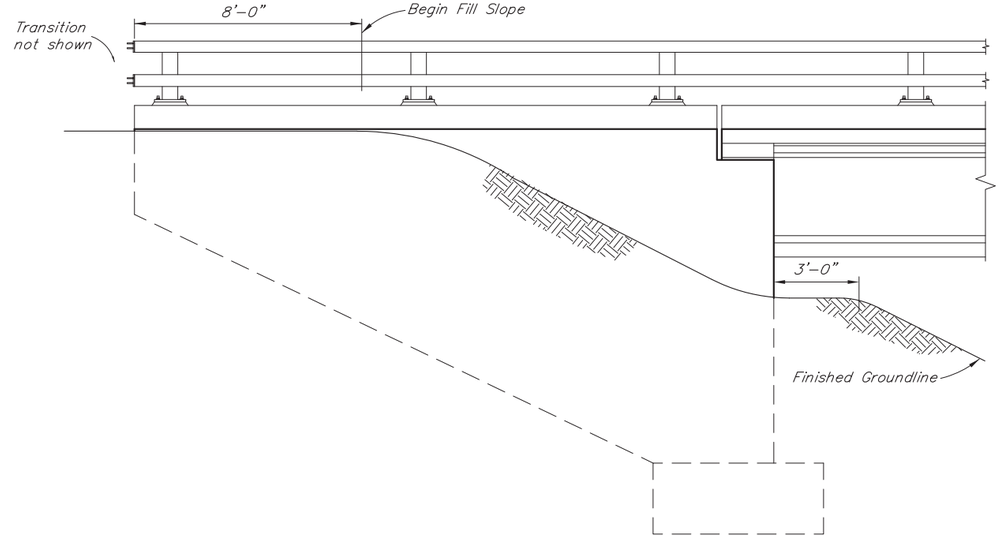
E – Epoxy coat all Wing Wall reinforcing

TOP OF WALL ELEVATION TABLE (FT)				
LOCATION	A	B	C	D
ABUTMENT 1	509.80	509.72	509.64	509.56
ABUTMENT 2	508.18	508.31	508.31	508.44



SECTION B-B

12 6 0 1 2 3 4
In. Feet



FINISHED ELEVATION

12 0 1 2 3 4
In. Feet

DESIGNED BY: Designer	CHECKED: Checker		
DRAWN BY: Drafter	CHECKED: Designer		
QUANTITIES BY: Designer	CHECKED: Checker		

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
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907–465–2975

TWELVE MILE INTERCHANGE

RICHARDSON HIGHWAY

WINGWALLS

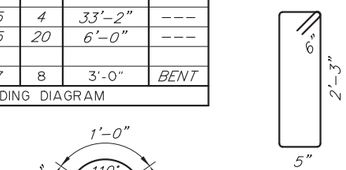
BRIDGE NO. 1371

DWG. NO. 5

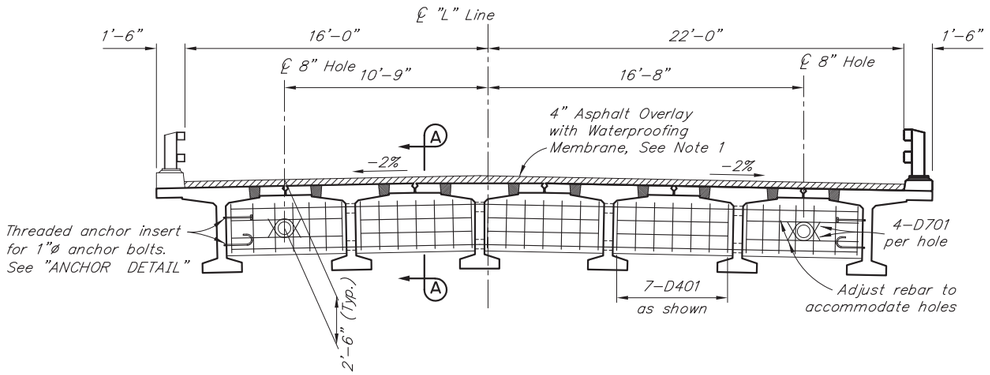
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N6	N12

REINFORCING STEEL - INTERMEDIATE DIAPHRAGM

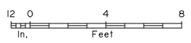
MARK	NOTE	SIZE	NO.	LENGTH	TYPE
D401		4	35	6'-4"	BENT
D501	E	5	4	33'-2"	---
D502		5	20	6'-0"	---
D701		7	8	3'-0"	BENT
BENDING DIAGRAM					

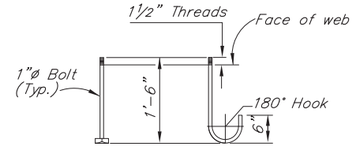


E – Epoxy coat all Girder reinforcing



TYPICAL SECTION

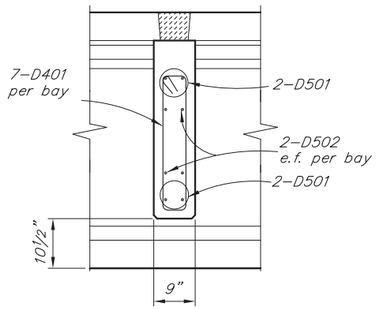




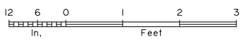
TOP ANCHOR BOTTOM ANCHOR

ASTM A307 GALVANIZED

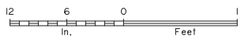
ANCHOR DETAIL



SECTION A-A



FRAMING PLAN



Note:

1. Taper asphalt overlay over girder 3 and approach slab to match roadway typical section.

DESIGNED BY: Designer	CHECKED: Checker		
DRAWN BY: Drafter	CHECKED: Designer		
QUANTITIES BY: Designer	CHECKED: Checker		

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
BRIDGE SECTION
3132 Channel Drive
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TWELVE MILE INTERCHANGE

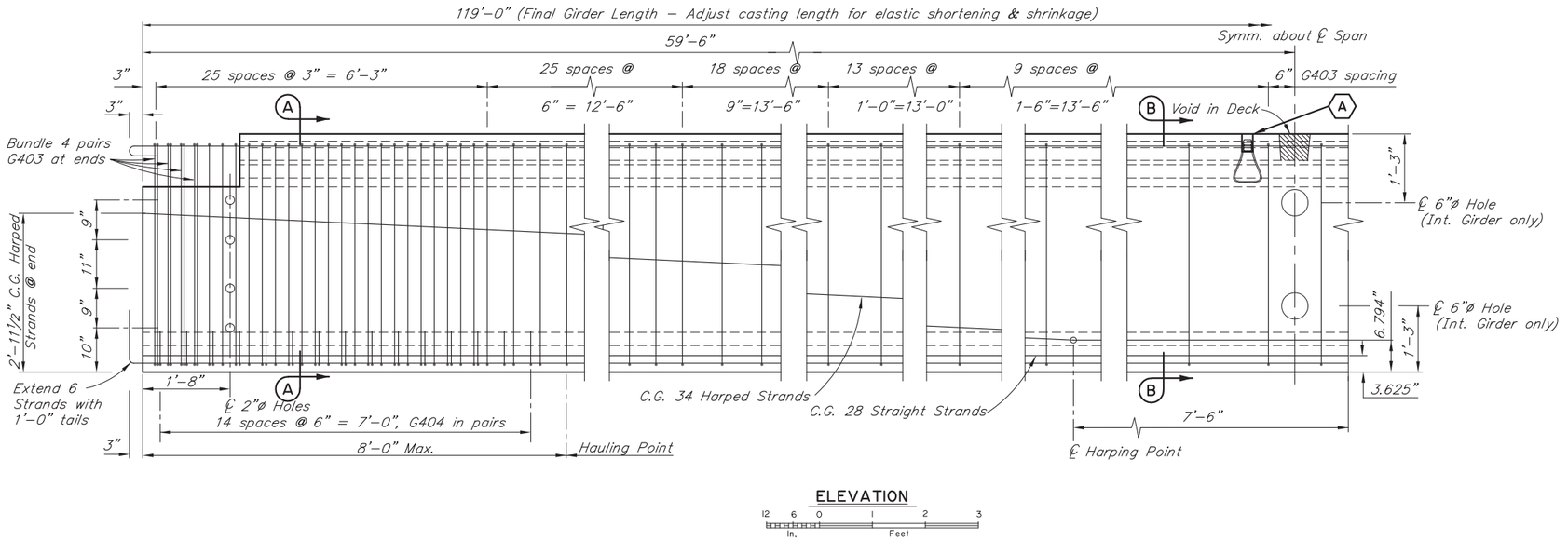
RICHARDSON HIGHWAY

TYPICAL SECTION

BRIDGE NO. 1371

DWG. NO. 6

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N7	N12



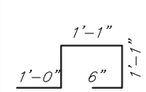
ELEVATION

12 6 0 1 2 3
In. Feet

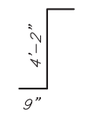
REINFORCING STEEL - ONE GIRDER

MARK	NOTE	SIZE	NO.	LENGTH	TYPE
G401		4	213	6'-6½"	BENT
G401E	G	4	252	6'-6½"	BENT
G402	L	4	10	115'-2"	---
G402E	L,G	4	12	115'-2"	---
G403		4	380	5'-8"	BENT
G404		4	60	3'-3"	BENT
G501		5	213	6'-4"	---
G501E	G	5	252	7'-0"	BENT
G502	L	5	10	120-8"	BENT
G502E	L,G	5	12	120-8"	BENT
C401	S,G	4	81	5'-9"	BENT
C501	L,G	5	2	159'-8"	---

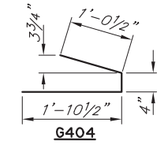
BENDING DIAGRAM



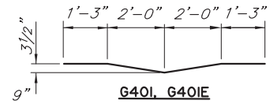
C401



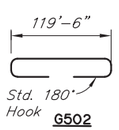
G403



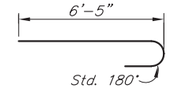
G404



G401, G401E



G502



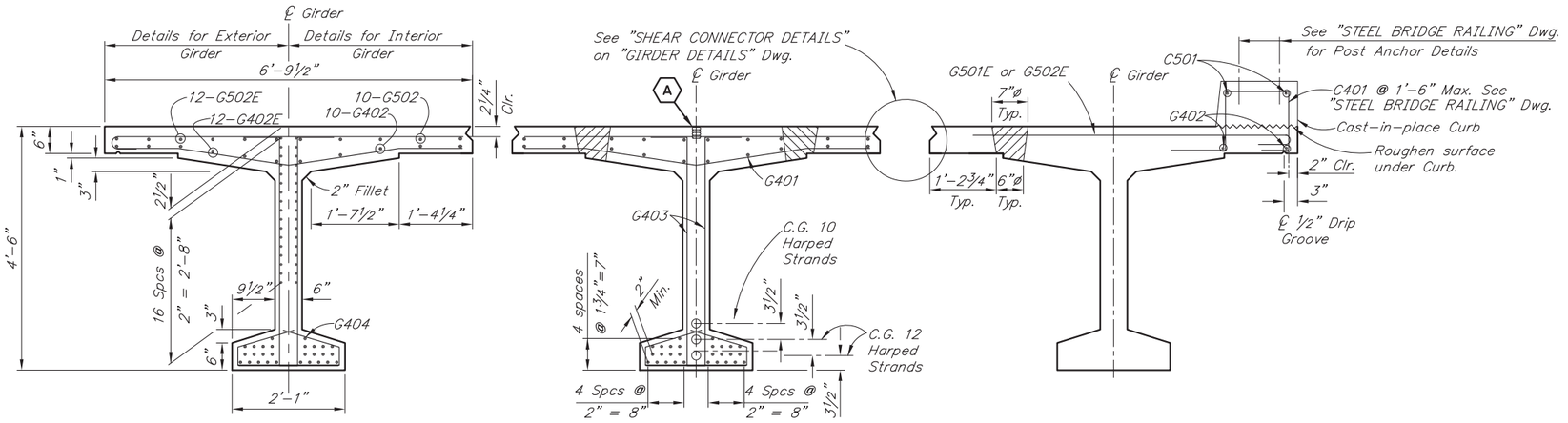
G501E

E – Epoxy coat all Girder reinforcing

L – Length does not include splices. Minimum lap splice length for splices shall be: 2'–0" for #4 bars, 2'–6" for #5 bars.

S – Ship 4 loose.

G – Exterior Girder only.



SECTION A-A

12 6 0 1 2 3
In. Feet

SECTION B-B

12 6 0 1 2 3
In. Feet

EXTERIOR GIRDER NEAR MID SPAN

(Unrelated Reinforcement not shown)

12 6 0 1 2 3
In. Feet

GIRDER NOTES

1. Use normal weight concrete having the following strengths:
   At Stress Transfer f'ci = 7000 psi
   At 28 days f'c = 7500 psi
2. Use ½" round low relaxation strands having an ultimatestrength of 270 ksi and a cross section area of 0.153 in^2.
3. Design is based on the following steel stresses: Pretensioning – Jacking Stress 189 ksi After initial losses – 169 ksi After all losses – 139 ksi
4. 1" clear on all reinforcing except as noted.
5. Deflect forms to compensate for camber and roadway grade.
6. Provide a magnesium float finish on the roadway surface of the precast member. Roughen the surface under the railing curbs.
7. Omit Shear Key and Shear Connector on outside of exterior girders.
8. Cast Girder ends plumb with respect to roadway grade.
9. See "SIGN MOUNT BRACKET" Dwg. for girder related details.

(A) 1"x1'–0" Coil Anchor Insert for vertical adjustment of girders. Recess 2". Prevent concrete from filling hole

DESIGNED BY: Designer	CHECKED: Checker		
DRAWN BY: Drafter	CHECKED: Designer		
QUANTITIES BY: Designer	CHECKED: Checker		

STATE OF ALASKA
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BRIDGE SECTION
3132 Channel Drive
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TWELVE MILE INTERCHANGE

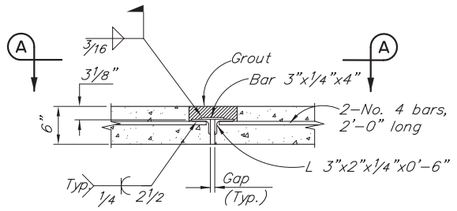
RICHARDSON HIGHWAY

GIRDERS

BRIDGE NO. 1371

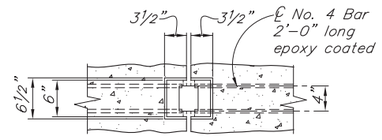
DWG. NO. 7

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N	N12



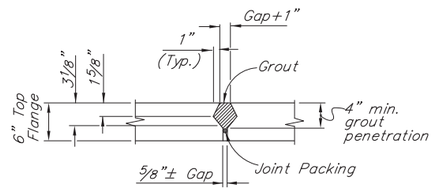
SHEAR CONNECTOR DETAIL

12 6 0 1 2
In. Feet



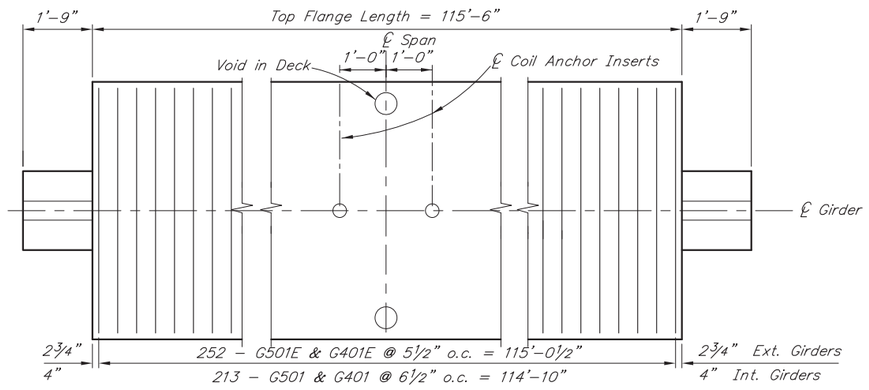
VIEW A-A

12 6 0 1 2
In. Feet



SHEAR KEY DETAIL

12 6 0 1 2
In. Feet



PLAN

12 6 0 1 2 3 4
In. Feet

DESIGNED BY: *Designer*	CHECKED: *Checker*		
DRAWN BY: *Drafter*	CHECKED: *Designer*		
QUANTITIES BY: *Designer*	CHECKED: *Checker*		

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TWELVE MILE INTERCHANGE

RICHARDSON HIGHWAY

GIRDER DETAILS

BRIDGE NO. 1371

DWG. NO. 8

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STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N9	N12

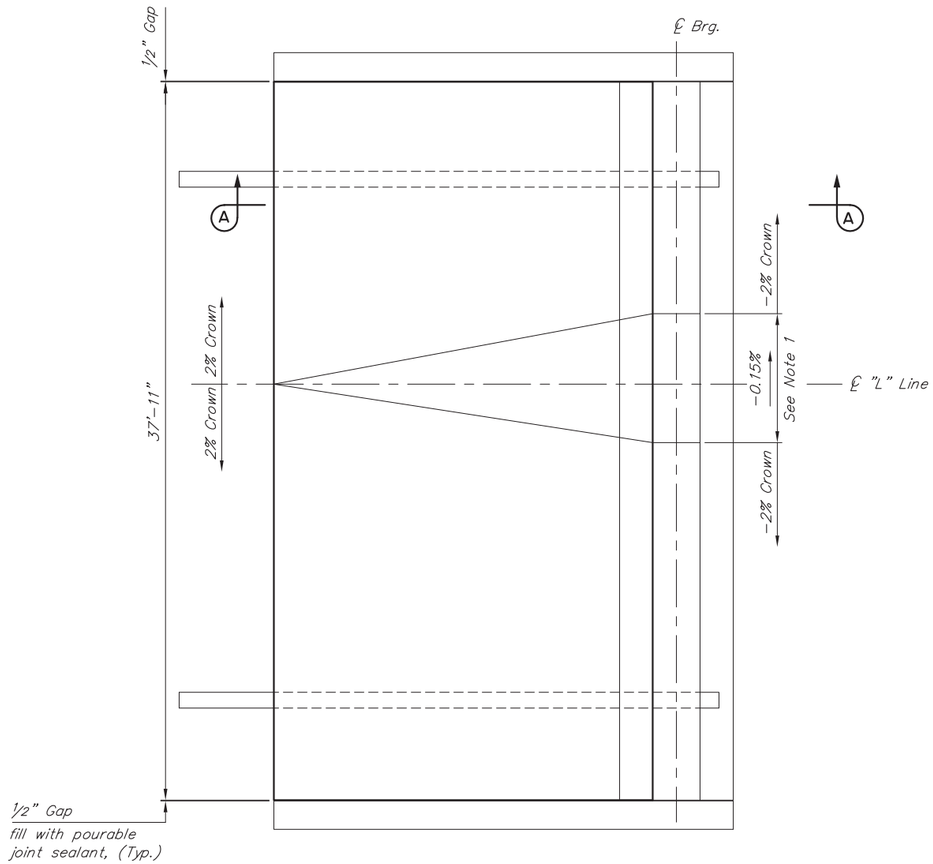
REINFORCING STEEL - ONE APPROACH SLAB

MARK	NOTE	SIZE	NO.	LENGTH	TYPE	BENDING DIAGRAM
S401	E,F	4	62	37'-7"	---	
S501	E	5	76	20'-5"	---	
S502	E	5	39	5'-0"	BENT	2'-0", 3'-0"
S801	E	8	76	20'-5"	---	

S502

E – Epoxy-coated reinforcing steel.

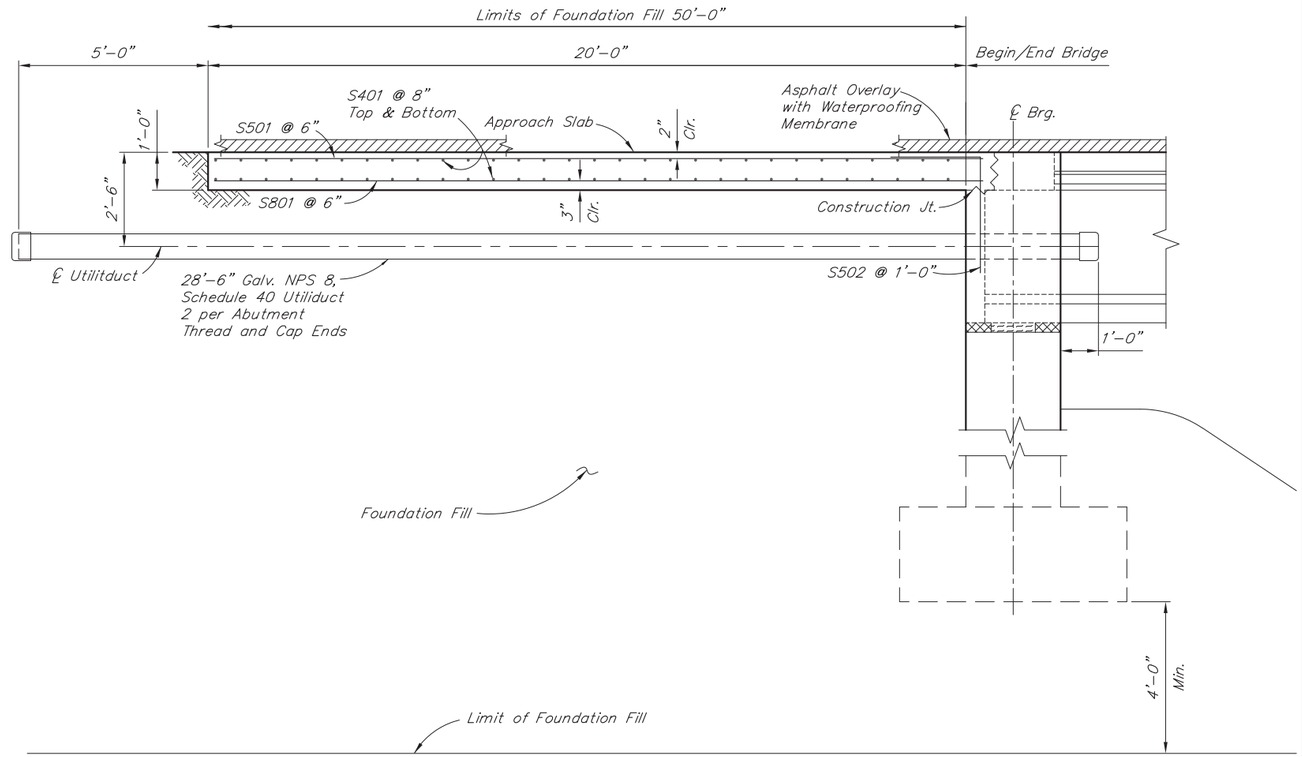
F – Field bend top mat of bars to match roadway profile.



PLAN

(Abutment 1 shown; Abutment 2 simliar)

12 0 4 8
In. Feet



SECTION A-A

12 6 0 1 2 3 4
In. Feet

Note:

1. Taper asphalt overlay over girder 3 and approach slab to match roadway typical section.

DESIGNED BY: Designer	CHECKED: Checker		
DRAWN BY: Drafter	CHECKED: Designer		
QUANTITIES BY: Designer	CHECKED: Checker		

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TWELVE MILE INTERCHANGE

RICHARDSON HIGHWAY

APPROACH SLAB

BRIDGE NO. 1371

DWG. NO. 9

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
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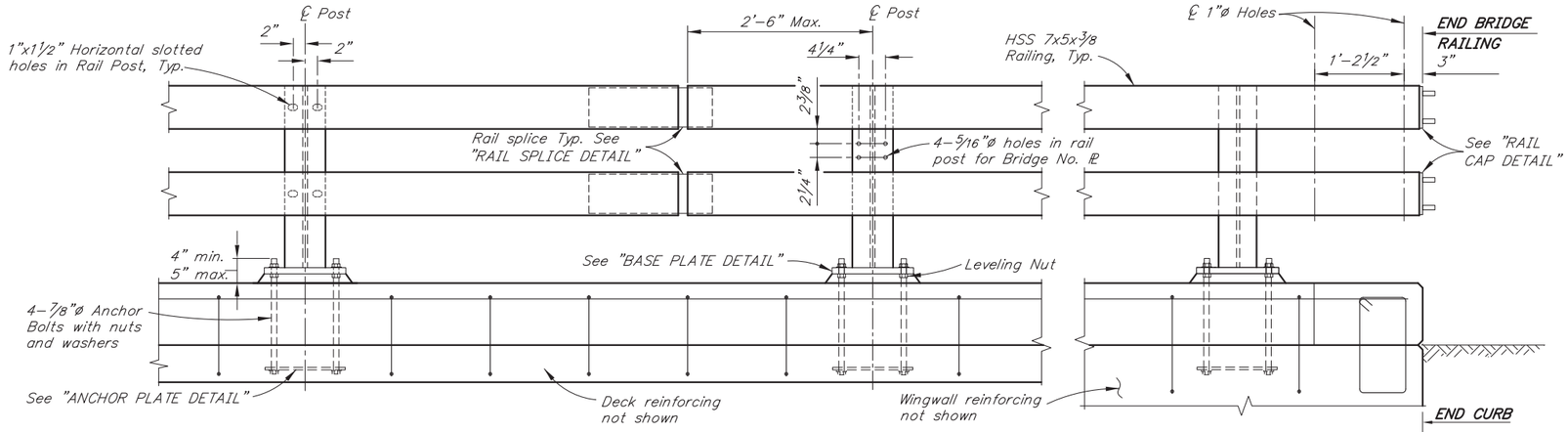
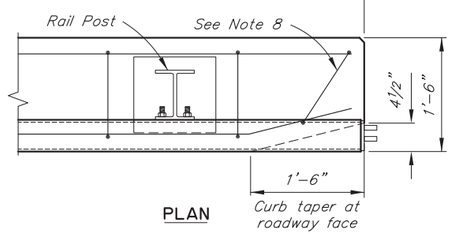
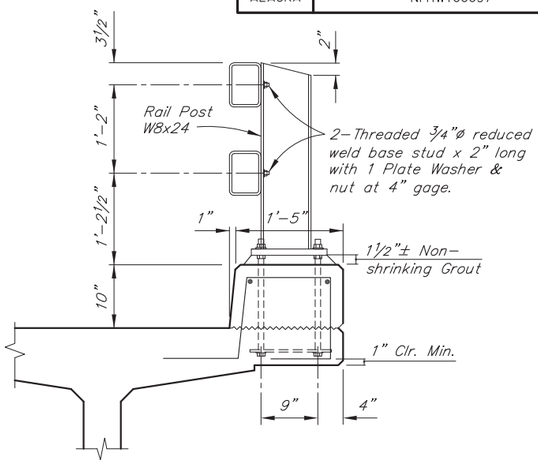


ELEVATION



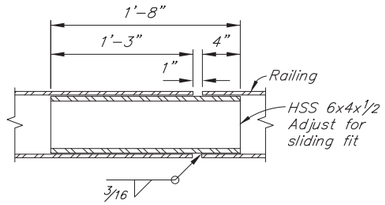
PLAN



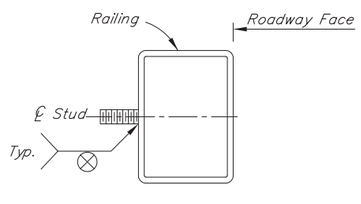
TYPICAL SECTION

TYPICAL POST ELEVATION

EXPANSION JOINT

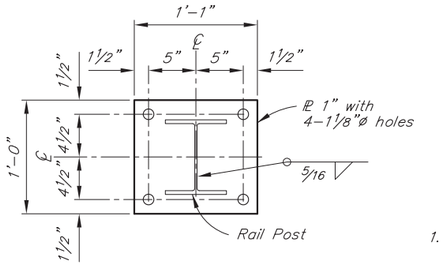


RAIL SPLICE DETAIL

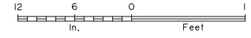


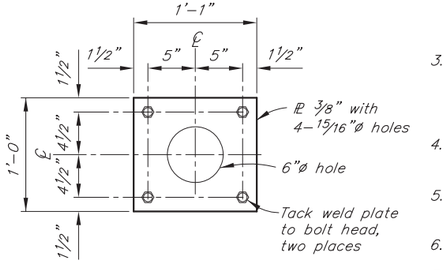
RAILING STUD DETAIL

END POST DETAIL

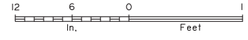


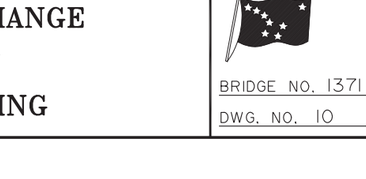
BASE PLATE DETAIL





ANCHOR PLATE DETAIL

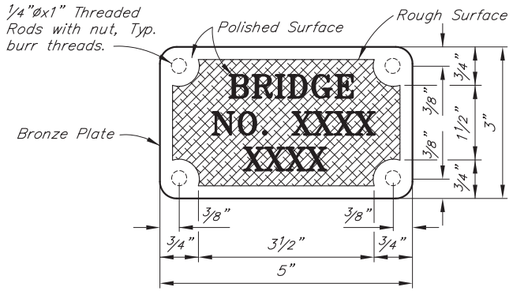




NOTE: Position washer to completely cover slotted hole.

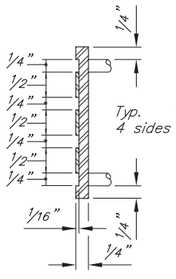
PLATE WASHER

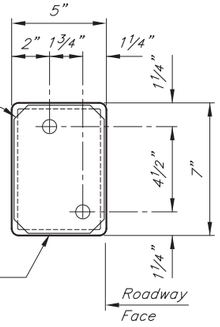
No Scale



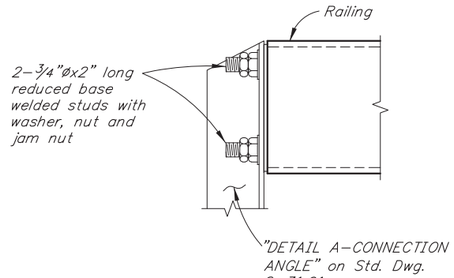
BRONZE BRIDGE NO. PLATE

No Scale





RAIL CAP DETAIL



NOTES

1. Locate bridge number plates on right hand side of approaching traffic near each end as shown on General Layout Dwg. (2 total).
2. Furnish bridge number plates. Use "Century" type style lettering. Use studs and nuts that conform to UNS C65100 or C65500. Braze ¼"ø threaded rod to back of plate with nut – 4 required. Use tamper proof nuts.
3. Provide railing expansion joints at 50'-0" maximum intervals. Railing shall be continuous over 2 posts minimum. Railing expansion joints are required in rail panels that span bridge expansion joints.
4. Use grout with a minimum 24-hour f'c of 3000 psi in single placement.
5. See "FRAMING PLAN AND TYPICAL SECTION" Dwg. for rail post spacing.
6. Install bridge rail posts plumb.
7. See Std. Dwg. G-31.01 for Thrie Beam Transition.
8. Adjust reinforcing to accommodate curb taper.

DESIGNED BY: Designer	CHECKED: Checker		
DRAWN BY: Drafter	CHECKED: Designer		
QUANTITIES BY: Designer	CHECKED: Checker		

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TWELVE MILE INTERCHANGE

RICHARDSON HIGHWAY

STEEL BRIDGE RAILING

BRIDGE NO. 1371

DWG. NO. 10

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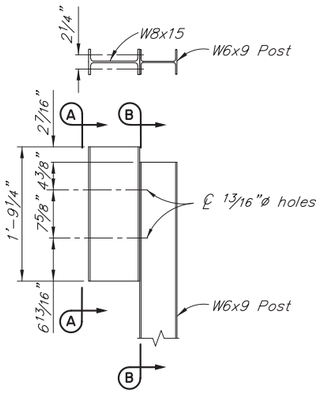
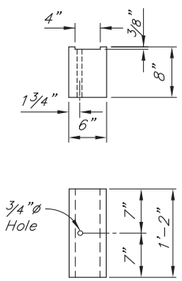
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N11	N12



THRIE BEAM STEEL BLOCKOUT

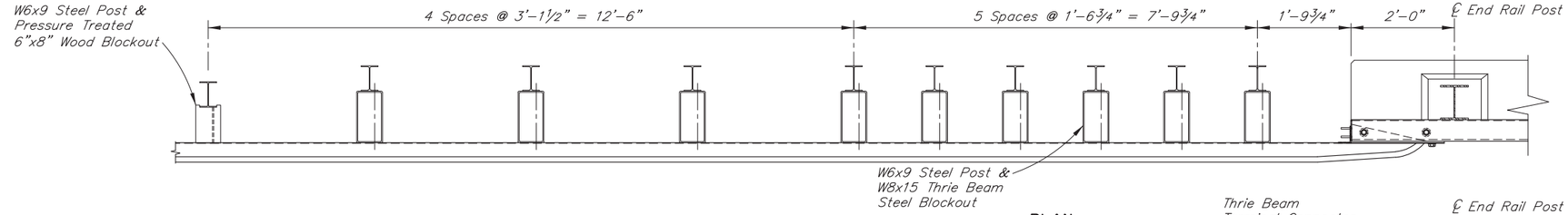
See Note 4 for additional details

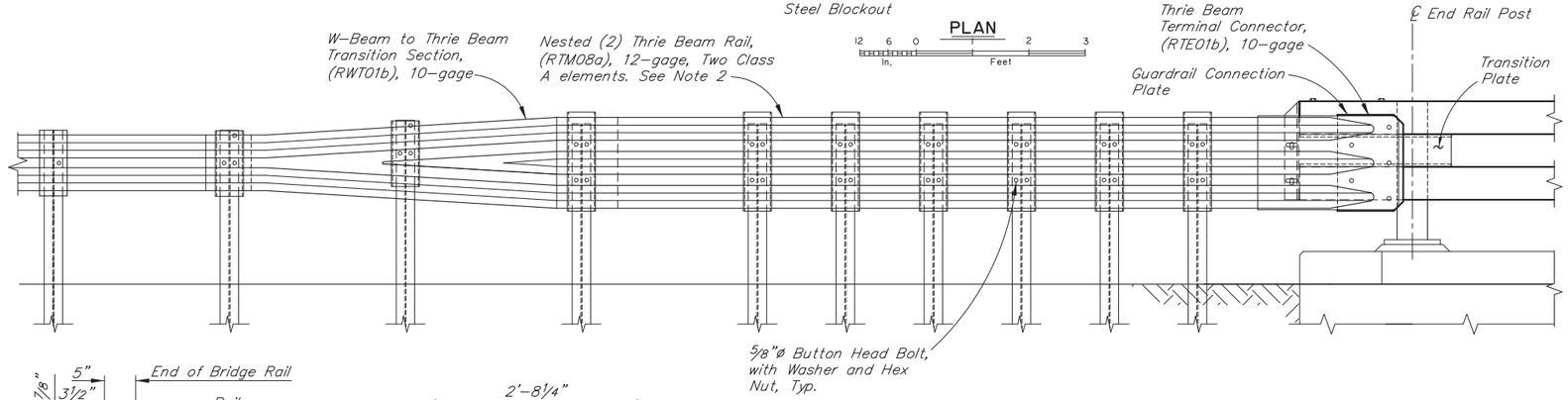
12 6 0 1 2
In. Feet



WOOD BLOCKOUT

12 6 0 1 2
In. Feet



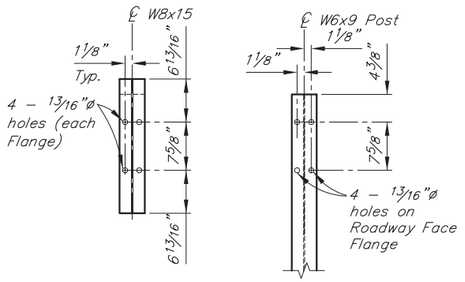


PLAN

12 6 0 2 3
In. Feet

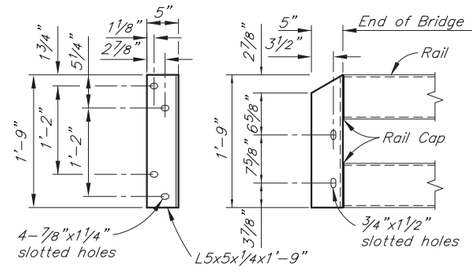
ELEVATION

12 6 0 2 3
In. Feet



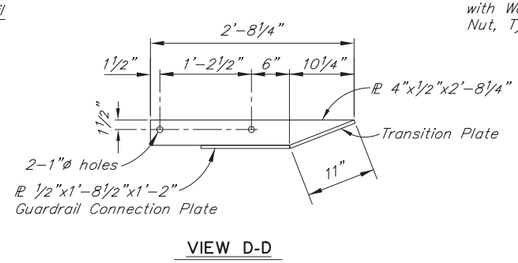
VIEW A-A SECTION B-B

12 6 0 1 2
In. Feet



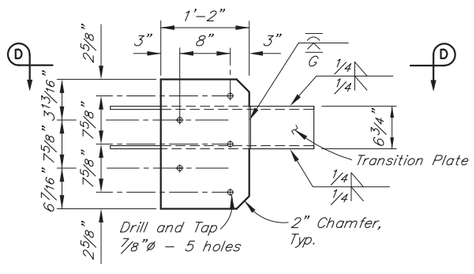
CONNECTION ANGLE A

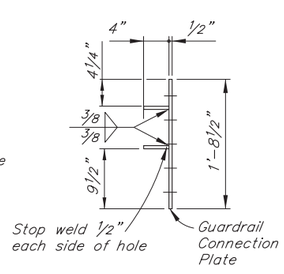
12 6 0 1 2
In. Feet



VIEW D-D

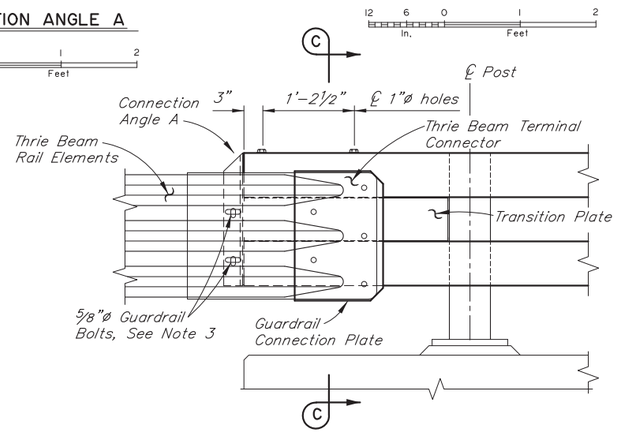
12 6 0 1 2
In. Feet





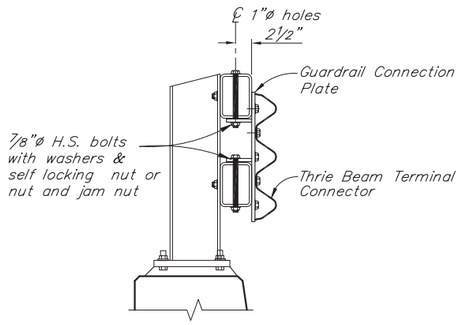
GUARDRAIL CONNECTION PLATE DETAILS

12 6 0 1 2
In. Feet



TRANSITION CONNECTION - ELEVATION

12 6 0 1 2
In. Feet



SECTION C-C

12 6 0 1 2
In. Feet

DETAIL F

No Scale

NOTES:

1. All guardrail and guardrail connection hardware to conform to AASHTO M 180. Use H.S. Bolts conforming to ASTM A325. All other steel conforms to ASTM A709 Grade 36.
2. Lap approach guardrail to prevent snags from oncoming traffic.
3. Provide 4½" horizontal slots in approach guardrail. Adjust guardrail bolts for sliding fit.
4. Conform to G–00, G–05S and G–10 of the Standard Plans for all guardrail details not shown. No backup plate is required.

DESIGNED BY: Designer	CHECKED: Checker		
DRAWN BY: Drafter	CHECKED: Designer		
QUANTITIES BY: Designer	CHECKED: Checker		

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TWELVE MILE INTERCHANGE

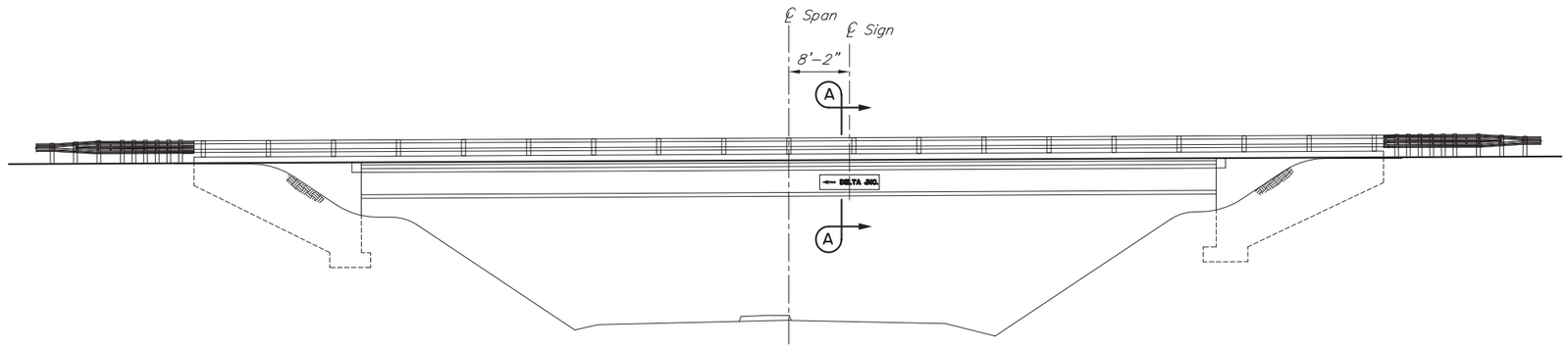
RICHARDSON HIGHWAY

TRANSITION RAIL

BRIDGE NO. 1371

DWG. NO. 11

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	NFHWY00097	2019	N12	N12

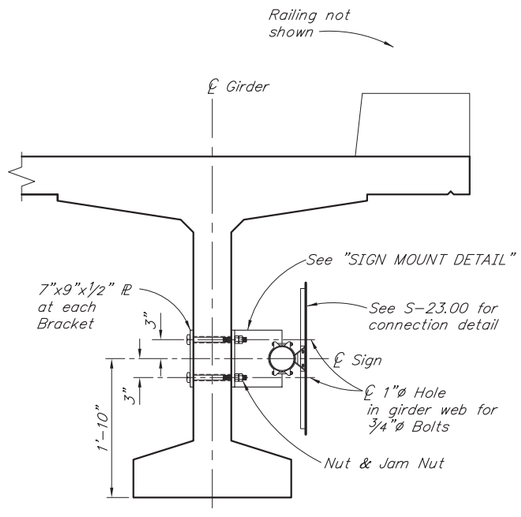


ELEVATION
(Looking West)

10 5 0 10 20
Feet

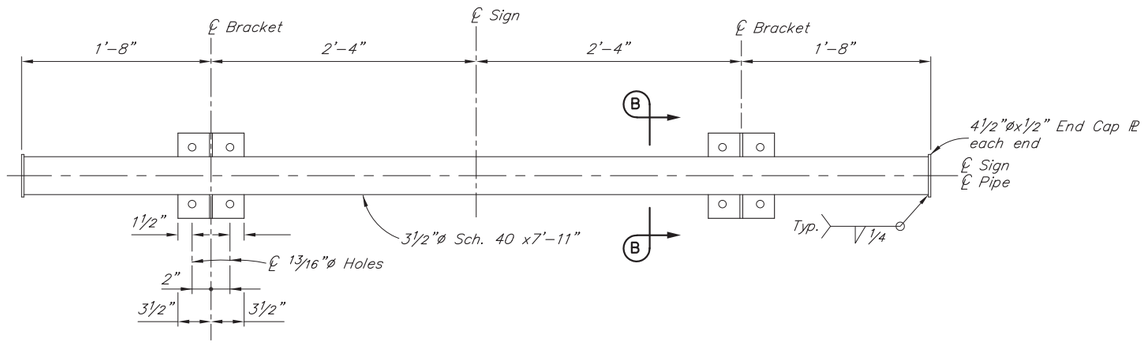
NOTES:

1. Galvanize all hardware in accordance with AASHTO M111 or AASHTO M232 as applicable.
2. Use ASTM A307 bolts that are snug tight.
3. Use ASTM A53 Grade B Pipe.
4. Use ASTM A709 Grade 36 for all other steel.



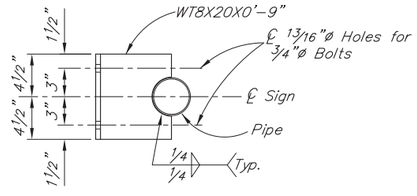
SECTION A-A

12 6 0 1 2
In. Feet



SIGN MOUNT DETAIL

12 6 0 1
In. Feet



SECTION B-B
(Typical each Bracket)

12 6 0 1
In. Feet

DESIGNED BY: Designer	CHECKED: Checker		
DRAWN BY: Drafter	CHECKED: Designer		
QUANTITIES BY: Designer	CHECKED: Checker		

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TWELVE MILE INTERCHANGE
RICHARDSON HIGHWAY
SIGN MOUNT BRACKET

BRIDGE NO. 1371
DWG. NO. 12

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APPENDIX H

VALUE ANALYSIS

value analysis study

richardson highway MP 351 interchange

alaska department of transportation and public facilities

value analysis study
december 19-21, 2017

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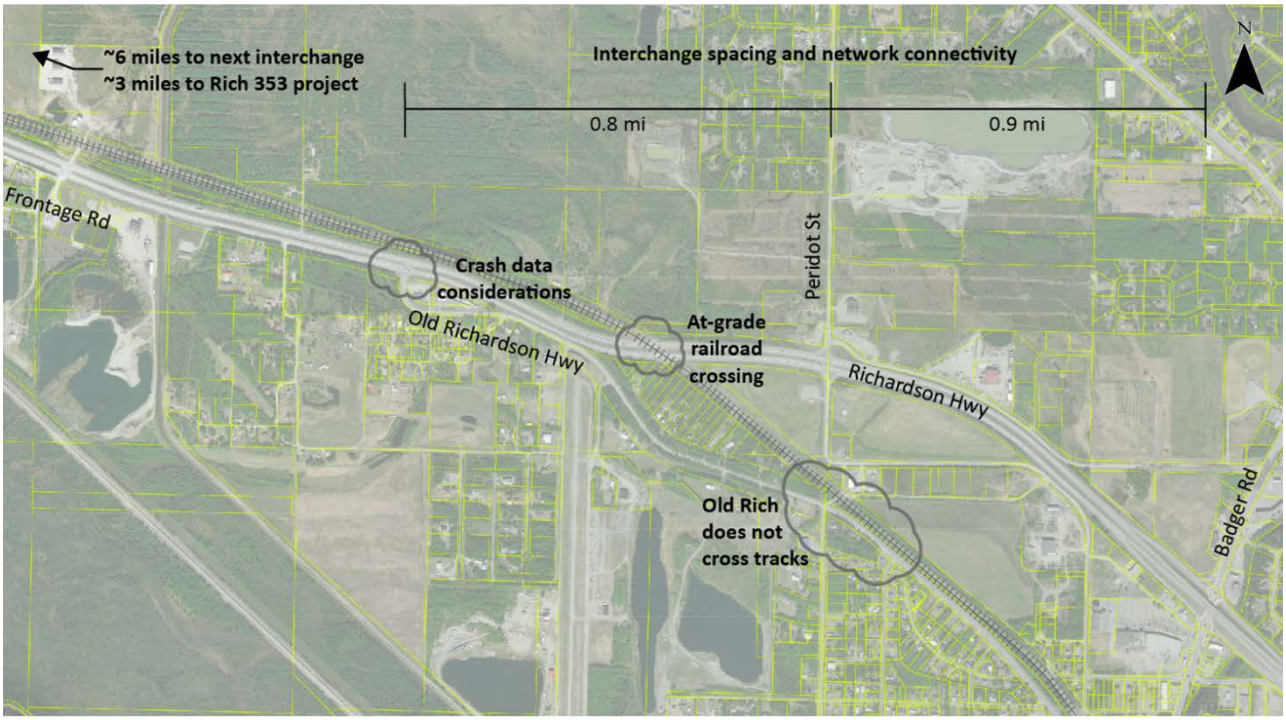
Value Analysis Study
Richardson Highway MP 351 Interchange

December 19-21, 2017

TABLE OF CONTENTS



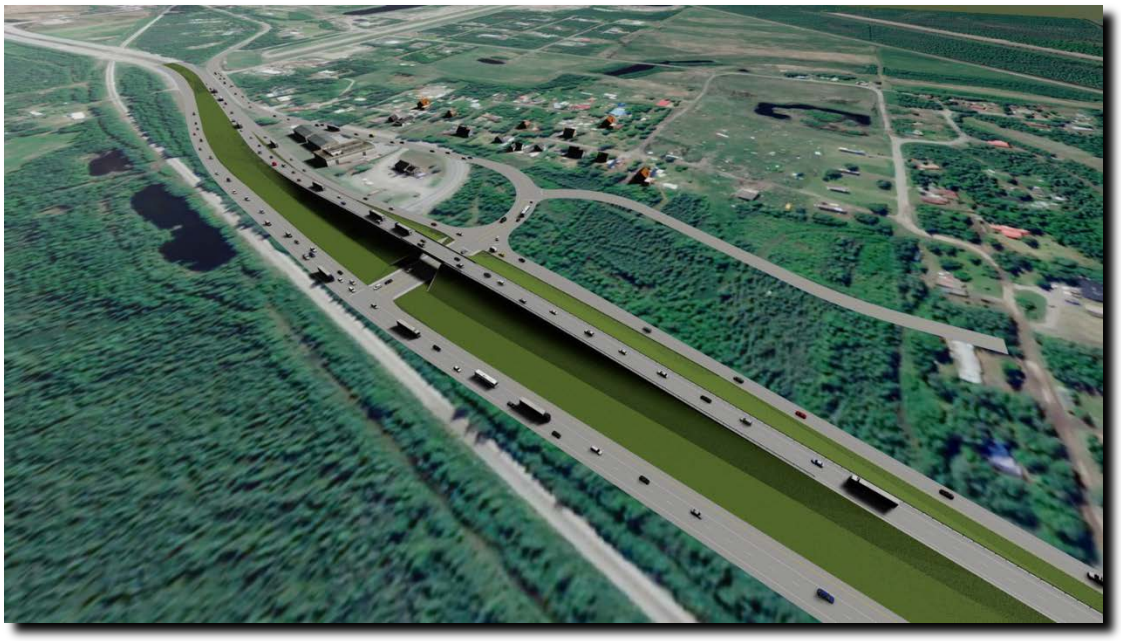
Aerial Photo showing McKinley Village area

FOREWORD

This Value Analysis Report presents the recommendations for the Richardson Highway Interchange project at MP 351 conducted on December 19-21, 2017 in Fairbanks, Alaska.

This is to certify that the Value Analysis Study was led by the undersigned National Park Service Value Analysis Facilitator and was conducted in accordance with standard value analysis principles and guidelines.

Paul Schrooten
Value Study Facilitator



EXECUTIVE SUMMARY

The State of Alaska Department of Transportation & Public Facilities (ADOT&PF), in cooperation with the Federal Highway Administration (FHWA) is proposing to construct intersection improvements at the MP 351 Richardson Highway/Old Richardson Highway intersection under the Highway Safety Improvement Program (HSIP). The project is intended to reduce severe crashes at this intersection on the Interstate Highway System.

The primary purpose of this project is to reduce crashes at the intersection of Richardson Highway and Old Richardson Highway near MP 351. Currently, the project team has conducted an initial safety and operational assessment of Richardson Highway within the study area. The project team worked with a Technical Advisory Committee to identify three design concepts to meet the project purpose: median closure, interchange at the MP 351 intersection, and interchange near MP 352.

The FHWA requires that modifications to access on the Interstate system be reviewed from a corridor safety and operations standpoint. Part of this project is evaluating an interchange or other access modifications at MP 351 for impacts to the Richardson Highway with regards to future development and interchange locations. Three design concepts were developed by considering the project objectives and criteria that will be used to evaluate proposed improvements. In addition, the overall corridor context was considered to assess whether alternatives are consistent with guidelines for interchange spacing (>1 mile) as Richardson Highway is upgraded over time to a freeway with access provided only via interchanges.

Interstate Access Change Objectives:

- Support the vision of Richardson Highway in the study area to be grade-separated
- Consider the potential to provide a full interchange in the study area in the future
- Consider future access and interchange spacing on Richardson Highway within the study area
- Safety
- Transportation Operations
- Accessibility and Connectivity
- Constructability
- Maintenance
- Land Use
- Multimodal Accessibility
- Environmental Impact
- Cost

A value analysis study of the project was conducted on December 19-21, 2017 at ADOT&PF Northern Region offices at 2720 Pickett Place, Fairbanks, AK.

Summary Description of Project

Highway 2 (Richardson Highway) runs east/west between Fairbanks and North Pole. It is a separated roadway with two lanes in both directions and a posted speed of 60 miles per hour. The existing three-leg intersection of Richardson Highway and Old Richardson Highway near milepost 351 is currently at grade with Old Richardson Highway stop-controlled. According to the Alaska Highway Safety Improvement Plan (HSIP), crash data at this intersection indicates 24 multi-vehicle crashes at this intersection from 2008 to 2012, including 8 minor injury crashes and 1 fatal crash. Overall, the intersection has experienced a crash rate 2.5 times higher than the statewide average for similar intersections. From a pure capacity standpoint, the existing interchange form is adequate to support existing development along the corridor. As a result of the intersection's crash history, this intersection has been included in the Alaska HSIP and an Interstate Access Change Request (IACR, also known as an Interchange Justification Report) has been requested.

Background Information:

The IACR will focus on the existing Richardson/Old Richardson Highway intersection and the area along the Richardson Highway corridor in proximity to this intersection. Based on conversations with FHWA and ADOT&PF, four study intersections (shown in Figure 1) have been selected for detailed operations and safety analysis. The project study area will extend to the existing adjacent interchanges on Richardson Highway to the east and west. In addition to the intersections called out below for detailed analysis, the IACR will assess consistency with future plans along the Richardson Highway corridor.

The **Richardson Highway** is a four-lane divided roadway along the length of the study area. It is defined as an Interstate per ADOT&PF functional classification. Traffic volumes along Richardson Highway in this area are approximately 15,000 per day and the speed limit is posted at 60 miles per hour. ADOT&PF has expressed a general preference towards grade separation where possible along this portion of the Richardson Highway corridor.

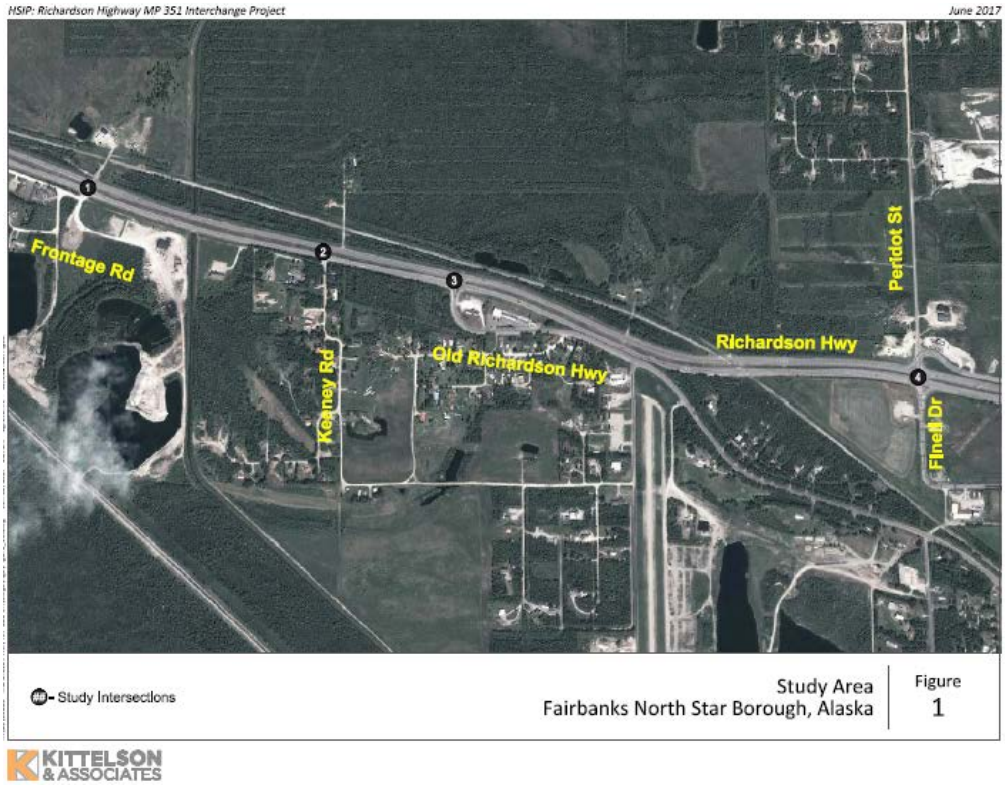
The **Richardson Highway and Old Richardson Highway** intersection is a three leg minor approach stop-controlled intersection located approximately 10 miles east of downtown Fairbanks and 2 miles west of North Pole. At this intersection, Richardson Highway includes turn-lanes and allows U-turns. There is an acceleration lane westbound for vehicles taking a northbound left-turn from Old Richardson Highway. Old Richardson Highway is a one-lane approach. It is classified by ADOT&PF as a major collector and the traffic volumes along its approach are approximately 2,000 per day. Old Richardson Highway continues southeast and runs roughly parallel to the railroad. The Petro Star refinery is located on Old Richardson Highway approximately 3 miles from the Richardson Highway intersection, leading to increased freight traffic at this intersection. Some carriers, however, do not permit their trucks to use this route based on safety concerns.

The **Richardson Highway and Frontage Road** intersection is a four leg minor approach stop-controlled intersection located approximately 0.75 miles west of the Richardson Highway/Old Richardson Highway intersection. At this intersection, Richardson Highway includes a left-turn

lane on both approaches and a westbound right turn lane. Frontage Road includes a single-lane approach in each direction. South of Richardson Highway it is classified by ADOT&PF as a local road and it is a private road north of Richardson Highway. The Frontage Road turns to gravel just south of Richardson Highway.

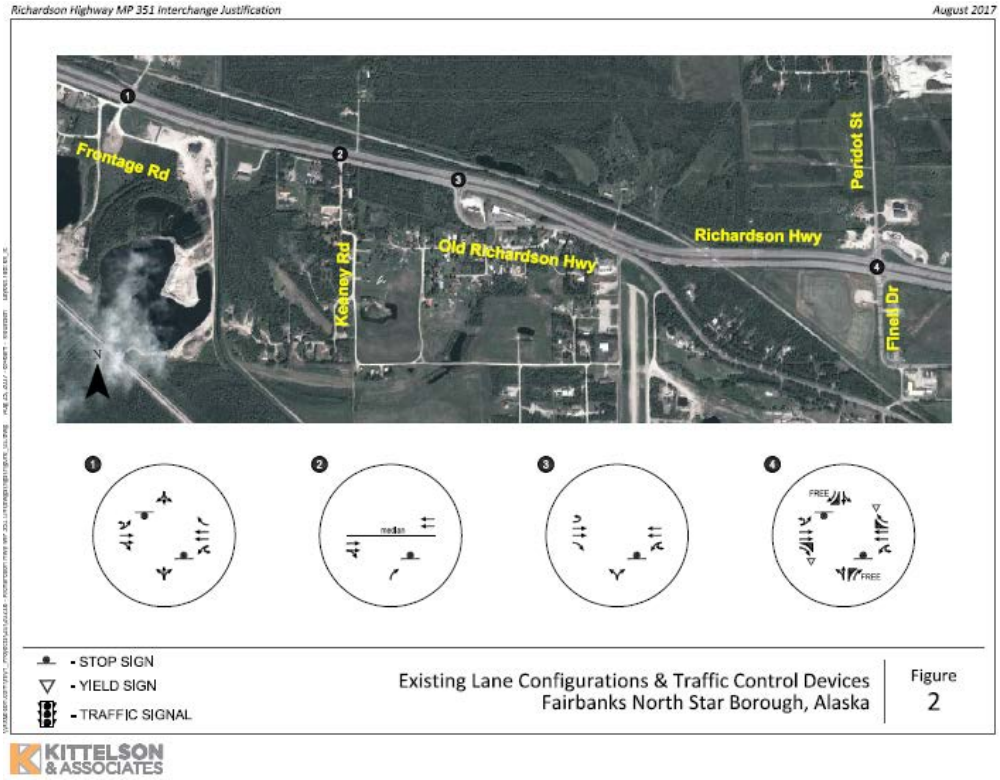
The **Richardson Highway and Keeney Road** intersection is a three leg minor approach stop-controlled intersection located approximately 0.25 miles west of the Richardson Highway/Old Richardson Highway intersection. The intersection is right-in/right-out. Keeney Road is classified by ADOT&PF as a local road and turns to gravel just south of the intersection with Richardson Highway. Keeney Road serves the residential area south of Richardson Highway and Bradly Sky-Ranch Airport, which is also accessible via Old Richardson Highway.

The **Richardson Highway and Peridot Street/Finell Drive** intersection is a four leg minor approach stop-controlled intersection located approximately 0.75 miles east of the Richardson Highway/Old Richardson Highway intersection. At this intersection, all approaches feature channelized right turn lanes. There are left turn lanes on Richardson Highway and acceleration lanes for northbound and southbound left-turning vehicles. Finell Drive and Peridot Street are both two lane roadways. Finnell Drive is classified by ADOT&PF as a local road and Peridot Street is classified as a minor collector.



Traffic Data:

Turning movements have been collected by ADOT&PF at the following nearby locations:



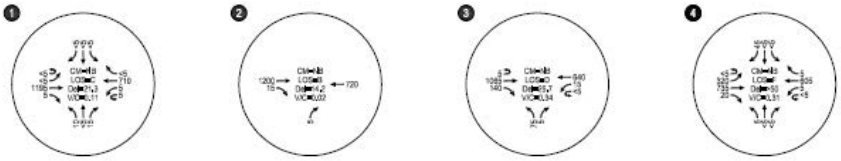
Existing Traffic Conditions:

CM = CRITICAL MOVEMENT
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE
Del = CRITICAL MOVEMENT CONTROL DELAY
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday AM Peak Hour
Fairbanks North Star Borough, Alaska

Figure 3

KITTELSON & ASSOCIATES



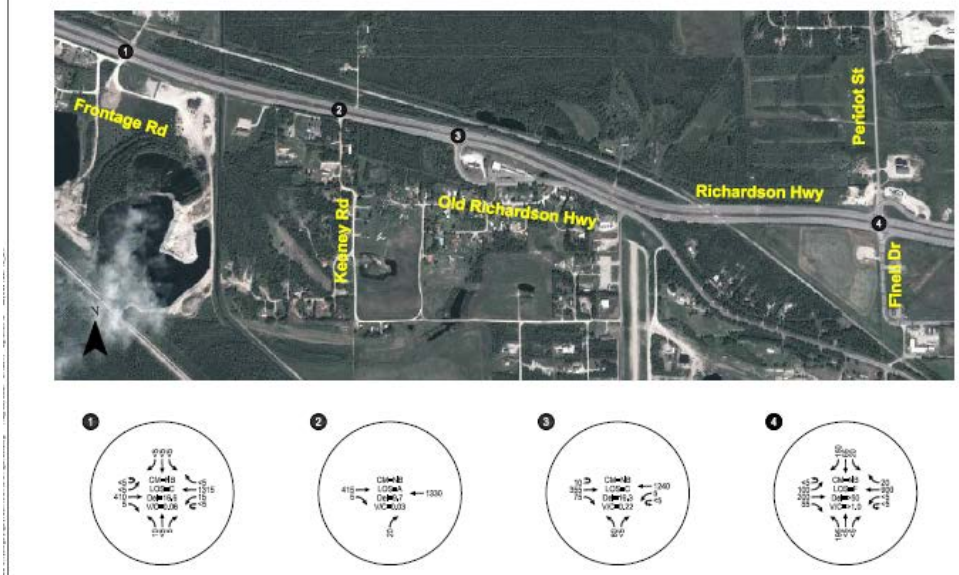
CM = CRITICAL MOVEMENT
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE
Del = CRITICAL MOVEMENT CONTROL DELAY
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday PM Peak Hour
Fairbanks North Star Borough, Alaska

Figure 4

KITTELSON & ASSOCIATES

2040 No Build Traffic Conditions:



CM = CRITICAL MOVEMENT
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE
Del = CRITICAL MOVEMENT CONTROL DELAY
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

2040 Traffic Conditions
Weekday AM Peak Hour
Fairbanks North Star Borough, Alaska

Figure 7

KITTELSON & ASSOCIATES

CM = CRITICAL MOVEMENT
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE
Del = CRITICAL MOVEMENT CONTROL DELAY
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

2040 Traffic Conditions
Weekday PM Peak Hour
Fairbanks North Star Borough, Alaska

Figure 8

KITTELSON & ASSOCIATES

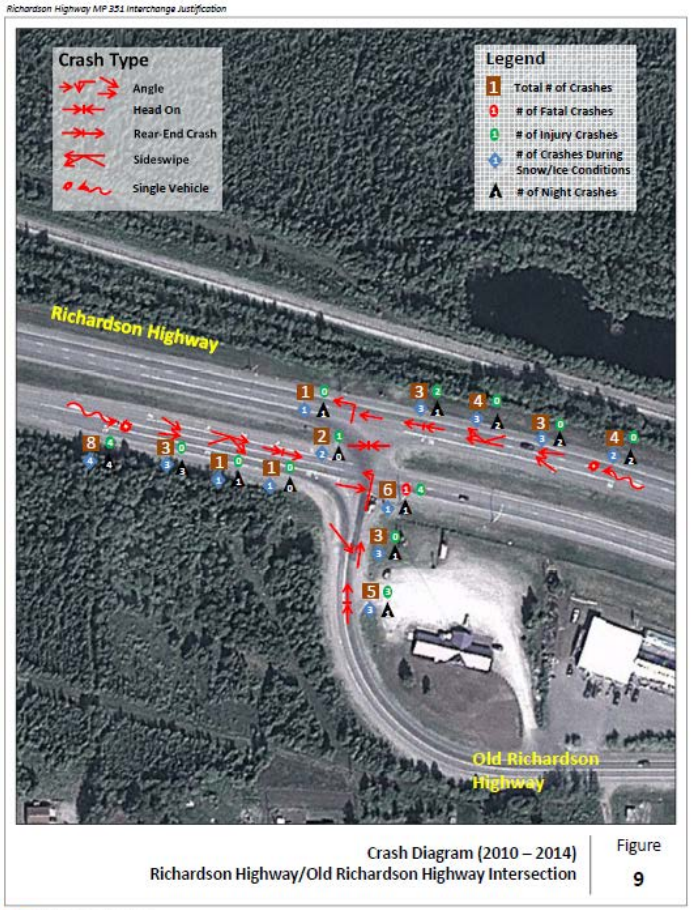
Intersection Crash Histories:

The crash histories at the study intersections were reviewed in an effort to identify potential safety issues. ADOT&PF provided crash records for the five-year period from January 1, 2010 through December 31, 2014.

Table 1: Study Intersection Crash Summary (January 1, 2010 – December 31, 2014)

Intersection	Total Crashes	Crash Type					Crash Severity		
		Angle	Rear End	Side-swipe	Single Vehicle	Head On	PDO[1]	Injury	Fatal
Frontage Road/Richardson Highway	1	0	0	0	1	0	1	0	0
Keeney Road/Richardson Highway	1	0	1	0	0	0	1	0	0
Old Richardson Highway/Richardson Highway	44	16	9	5	12	2	29	14	1
Peridot Street-Finell Drive/Richardson Highway	9	2	2	1	4	0	9	0	0

[1]PDO = Property Damage Only



Crash Diagram (2010 – 2014)
Richardson Highway/Old Richardson Highway Intersection

Figure 9

KITTELSON & ASSOCIATES

Project Schedule

Phase	Date
Startup and Scoping	March 2017 – June 2017 (complete)
Existing Conditions Analysis	May 2017 – September 2017 (complete)
Alternative Development and Evaluation	May 2017 – October 2017 (in-process)
Preferred Alternative Refinement	October 2017 – December 2017
IACR Report	November 2017 – February 2018

Strategic Meeting and Value Study Objectives

The general objectives of the meeting and value analysis study include:

- Arrive at an optimal design solution through a structured and reasoned analysis
- Confirm project meets functional requirements
- Ensure:
  - consideration of all viable alternatives
  - soundness of evaluation factors
  - consideration of benefits to cost
  - an independent second opinion project review
- Provide clear documentation of decision-making
- Develop confidence that best solution/best value is achieved

Alternatives Considered

- **Alternative 1: Median Closure at Old Richardson Highway/Richardson Highway Intersection**

  The Old Richardson Highway/Richardson Highway intersection is restricted to right-in/right-out movements through a median closure. This concept is low cost and addresses the safety concern associated with northbound left-turn movements. It also does not preclude future infrastructure improvements. In the near-term, it causes out of direction travel and limits access for uses along Old Richardson Highway.

- **Alternative 2A: Interchange at Old Richardson Highway/Richardson Highway (MP 351) (*HSIP Project Nomination*)**

  The eastbound mainline of Richardson Highway is elevated to eliminate its conflict with Old Richardson Highway. An at grade intersection remains between the westbound mainline of Richardson Highway and Old Richardson Highway. A full interchange could be developed in the future, as shown in the figure with dashed lines. This concept would require right-of-way acquisition to complete a frontage road system. Additionally, the Keeney Road access to Richardson Highway would be closed to accommodate the eastbound off-ramp.

- **Alternative 2B: Interchange at Old Richardson Highway/Richardson Highway (MP 351) (*Shifted Southwest*)**

  As with Concept 2A, the eastbound mainline of Richardson Highway is elevated to eliminate its conflict with Old Richardson Highway while the westbound mainline remains at grade. The concept is shifted south to provide greater separation from the existing railroad. This concept would require right-of-way acquisition to the south of the existing Richardson Highway right-of-way, including the existing 12 Mile Road House and Hawk's Greenhouse, as well as additional right-of-way to complete the frontage road system. Additionally, the Keeney Road access to Richardson Highway would be closed to accommodate the eastbound off-ramp.

- **Alternative 3A: Full Interchange at Frontage Road/Richardson Highway (MP 351.75) (*Mainline Moves North*)**

  A full interchange is implemented at the existing at grade intersection of Richardson Highway and Frontage Road. The Richardson Highway mainline is moved north and median width is decreased to keep all ramps within the existing available right-of-way. The existing Old Richardson Highway access to Richardson Highway is closed and a frontage road connection between Old Richardson Highway and the new interchange is created. The frontage road connection to the west may require right-of-way acquisition.

- **Alternative 3B: Full Interchange at Frontage Road/Richardson Highway (MP 351.75) (*Frontage Moves South*)**

  As with Concept 3B, a full interchange is implemented at the existing at grade intersection of Richardson Highway and Frontage Road. The interchange is shifted south to maintain the current alignment of Richardson Highway and create more space between the interchange and railroad. The frontage road connecting Old Richardson Highway and the new interchange is diverted south because of lack of right-of-way along the Richardson Highway mainline. The frontage road would require right-of-way acquisition.

Summary of Recommendations

The Value Analysis team evaluated five different alternatives representing a range of appropriate solutions. The alternatives were evaluated through the Choosing by Advantage (CBA) process. Using this process, the team recommends Alternative 2A, which provides the greatest combination of benefits for the most reasonable cost.

The advantages of the recommended alternative over the others include the following:

- Alternative 2A provides the least delay in transportation operations within the highway corridor.
- Alternative 2A meets access requirements with the least disruption to existing connections without precluding future access north of the Richardson Highway.

- Alternative 2A involves the least disruption to existing and future land uses.
- Alternative 2A has the least change to cost in that no additional effort is required related to approved funding sources.
- Alternative 2A fewer safety conflicts than Alternative 1 and 2B but not as much as Alternative 3A and 3B.
- Alternative 2A is more feasible to construct than 2B, 3A, and 3b, but less than the very simple Alternative 1.
- Alternative 2A is less maintenance than 2B, 3A, and 3b, but more than the very simple Alternative 1.
- Alternative 2A is less impact on the environment than 2B, 3A, and 3b based on footprint, but more impact than Alternative 1.

Alternative 1 Median Closure had an excellent benefit to cost ratio in the CBA analysis due mainly to very low initial cost of construction and low life cycle cost. However, Alternative 1 is not recommended by the VA team because it creates the greatest transportation operational delays along this segment of the highway corridor and is most disruptive to accessibility and connectivity of the area. Ultimately, the VA team felt the additional cost and additional benefit of Alternative 2A outweighed the lower costs of Alternative 1. The difference between the benefit scores (342 versus 506) along with the already budgeted and approved higher capital investment and manageable life cycle costs was acceptable. Therefore, the VA team felt that the additional $15,650,000 in initial cost and $244,480 in life cycle costs for Alternative 2A was worth the benefit of enhanced, safer interchange over the next fifty years.

Alternative 2B had higher cost for less benefit than Alternative 2A and Alternatives 3A, and 3B all had higher costs for less benefit due to the more extensive development and a change in approved budget that was eligible for the current fund source.

Additional recommendations if it is decided to construct Alternative 2A are as follows:

- Consider integrating an automated bridge de-icing system at a cost of about $200K (2017)
- Although not available with the current fund source, consider constructing frontage road west to the 3A/3B interchange location to improves accessibility and prepare for additional anticipated growth in the immediate area.
- Either close the Richardson Highway crossover at Peridot Street (which would require further functional analysis) or limit the crossover to east bound left turns only on to Peridot and eliminating left turns from Peridot on to the Richardson Highway; need to address this location independently in the near future.
- Update the circa 1980 Richardson Highway Corridor Study to confirm the importance and context of this project and to reaffirm other needs.
- Re-evaluate how to minimize impacts to the railroad right-of-way north of the proposed interchange, including use of retaining walls, median narrowing, etc.).
- Final design should consider future development north of the interchange.
- Consider applying high friction surface treatment to all approaches and acceleration/deceleration lanes at the proposed interchange.
- Collect and exchange crash data from both ADOT&PF and the City of North Pole.

value analysis study

STUDY SPECIFICS AND OBJECTIVES

The VA team consisted of staff from the State of Alaska Department of Transportation and Public Facilities (ADOT&PF) and the City of North Pole (CNP). A list of VA team participants is included on the following page.

The study team was composed of a mix of professional disciplines and individuals with experience in transportation planning, design, traffic and safety, highway and bridge engineering, operations and maintenance, municipal administration, and local emergency services. Members of the ADOT&PF staff grounded the team with knowledge of the intricacies of managing current issues at this site. None of the team members had experience working on prior VA studies so this was a learning experience as well as a determination of project value. It should be mentioned that consideration of a value analysis and use of the Choosing by Advantage methodology was also being considered for its merits and application for other ADOT&PF projects or program prioritization.

The specific value analysis objectives of this study included:

- Value enhancements including risk mitigation, quality/performance improvements, schedule/phasing coordination, etc.
- Improvements to the cost effectiveness of the project
- Creation of a higher level of confidence in the scope and implementation strategies for the project
- Identification of further opportunities for sustainability improvements

The team reviewed the design documents and budgetary cost estimates prepared by the project design team and the project consultant (Kittelson and Associates) as part of the workshop.

ATTENDANCE LIST

Value Study

Project: **Richardson Highway MP 351 Interchange**
Location: **Alaska Department of Transportation and Public Facilities North Region Office (Fairbanks, AK)**
Date: **12/19/17 to 12/21/17**

( ) Pre-Workshop
(X) Workshop
( ) Post Workshop

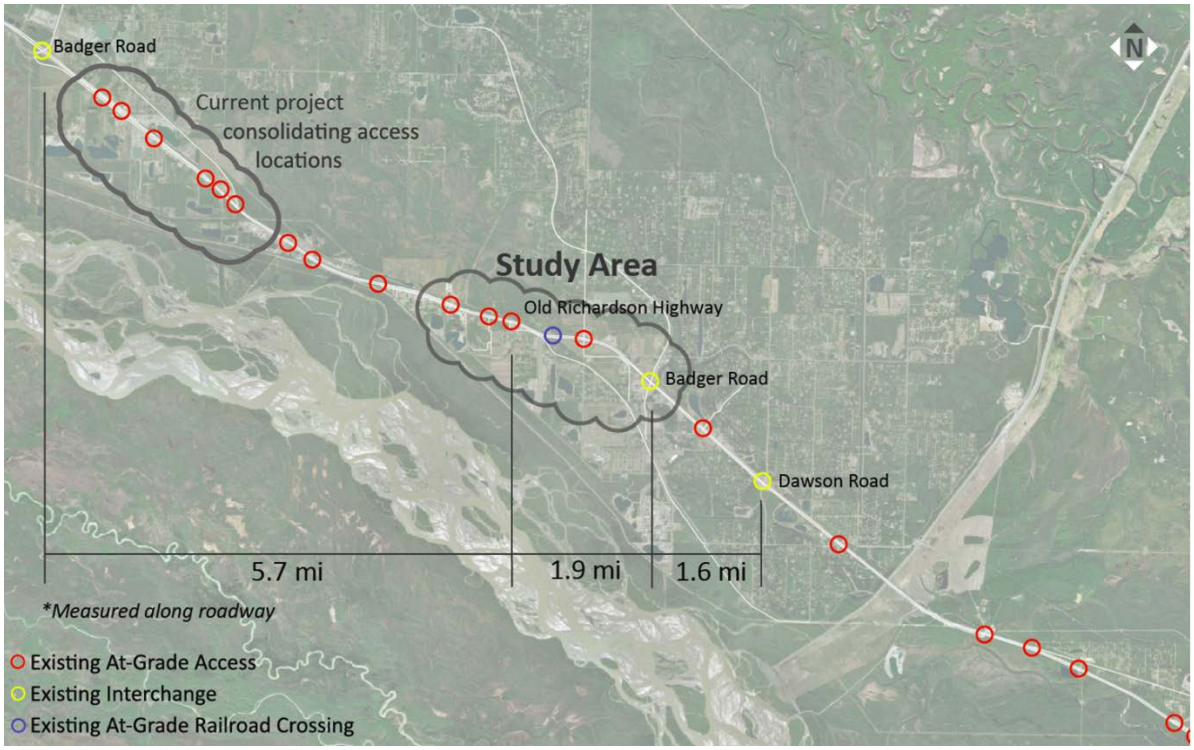
PARTICIPANTS:

Name/ Title:	Job Function:	Organization/Address:	Phone/ Fax/ e-mail:
Paul Schrooten	Facilitator	NPS, Alaska Regional Office	907-644-3388
Landscape Architect		240 W 5th Ave..	907-644-3304
		Anchorage AK 99501	paul_schrooten@nps.gov
Erik Brunner	Team Member	ADOT&PF	907-451-2286
	Design	Northern Region	
			erik.brunner@alaska.gov
Geoff Coon	Team Member	City of North Pole	907-488-2232
	Fire Chief/ Emergency Med Services		
			gcoon@northpolefire.org
Pam Golden	Team Member	ADOT&PF	907-451-2283
	Traffic and Safety	Northern Region	
			pamela.golden@alaska.gov
Randi Motsko	Team Member	ADOT&PF	907-451-2386
	Planning	Northern Region	
			randi.motsko@alaska.gov
Dan Schacher	Team Member	ADOT&PF	907-451-5276
	Maintenance and Operations	Northern Region	
			daniel.schacher@alaska.gov
Bryce Ward	Team Member	City of North Pole	907-488-8584
	Mayor		
			bryce.ward@northpolealaska.org

PHASE I – INFORMATION

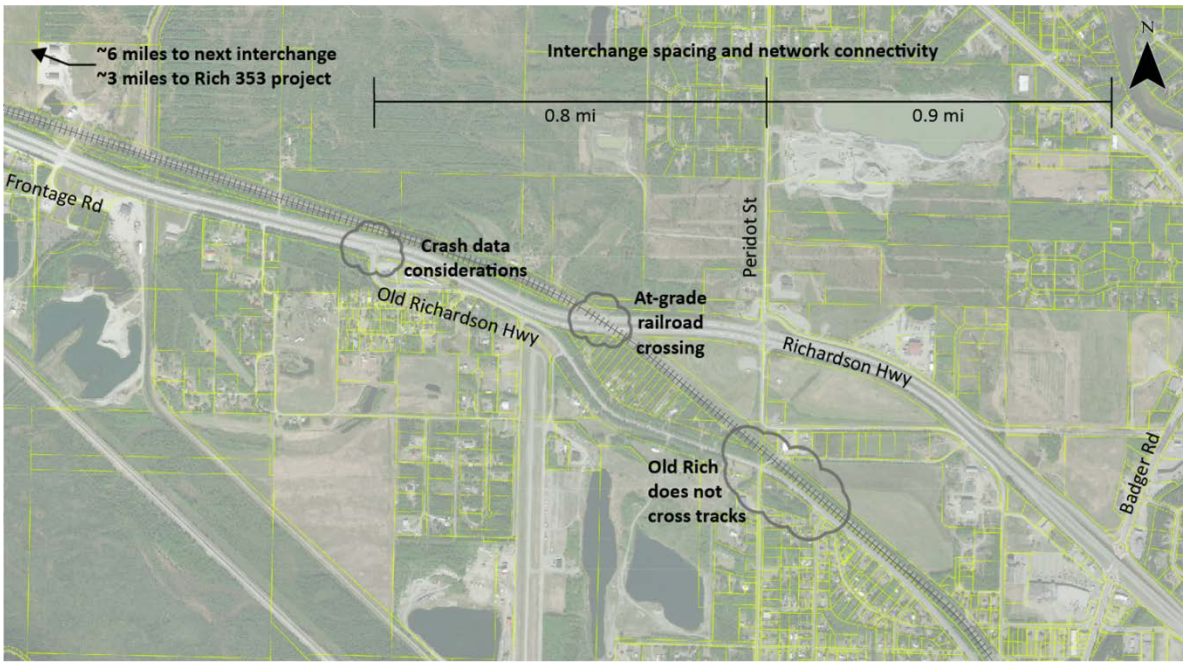
Background

Highway 2 (Richardson Highway) runs east/west between Fairbanks and North Pole. It is a separated roadway with two lanes in both directions and a posted speed of 60 miles per hour. The existing three-leg intersection of Richardson Highway and Old Richardson Highway near milepost 351 is currently at grade with Old Richardson Highway stop-controlled.



Project Study Area Location

According to the Alaska Highway Safety Improvement Plan (HSIP), crash data at this intersection indicates 24 multi-vehicle crashes at this intersection from 2008 to 2012, including 8 minor injury crashes and 1 fatal crash. Overall, the intersection has experienced a crash rate 2.5 times higher than the statewide average for similar intersections. From a pure capacity standpoint, the existing interchange form is adequate to support existing development along the corridor. As a result of the intersection's crash history, this intersection has been included in the Alaska HSIP and an Interstate Access Change Request (IACR, also known as an Interchange Justification Report) has been requested.



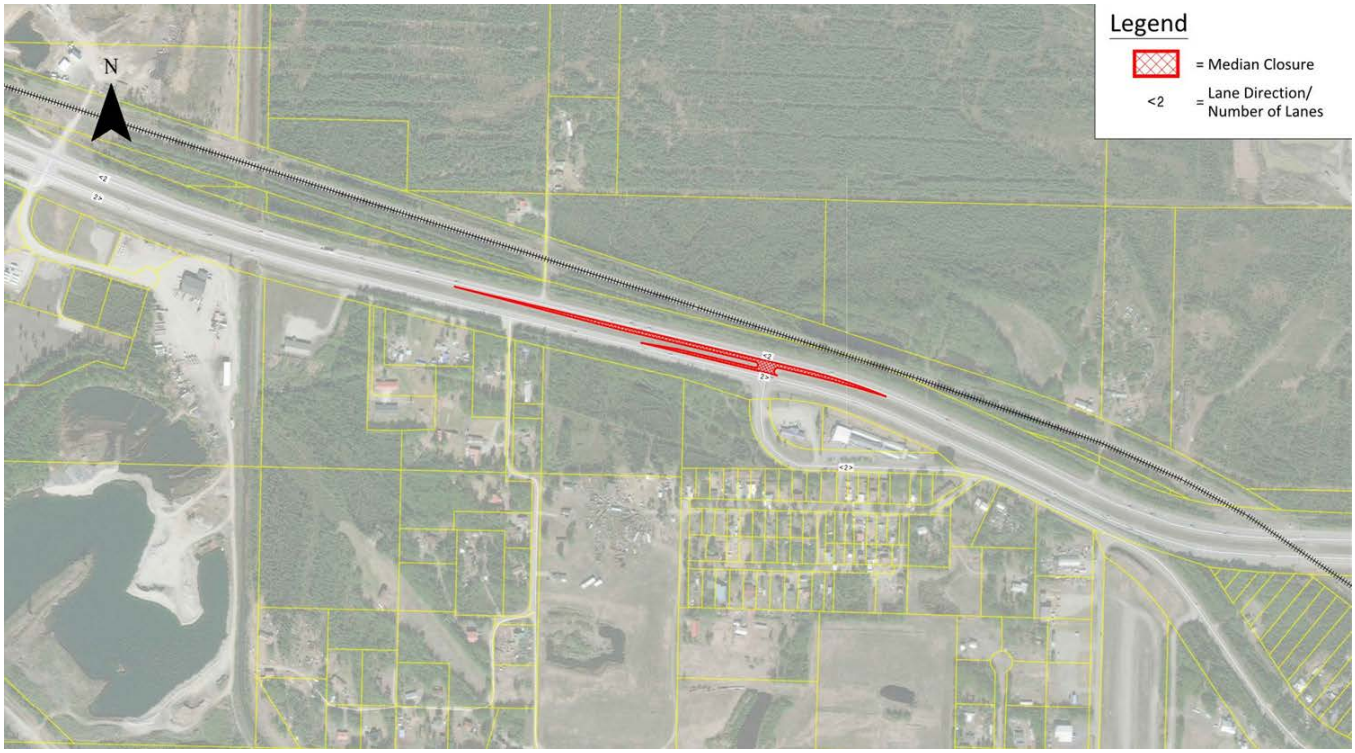
Project Study Area Setting

Alternatives Considered

The Value Analysis Team evaluated five different alternatives for resolving safety problems at MP 351 of the Richardson Highway.

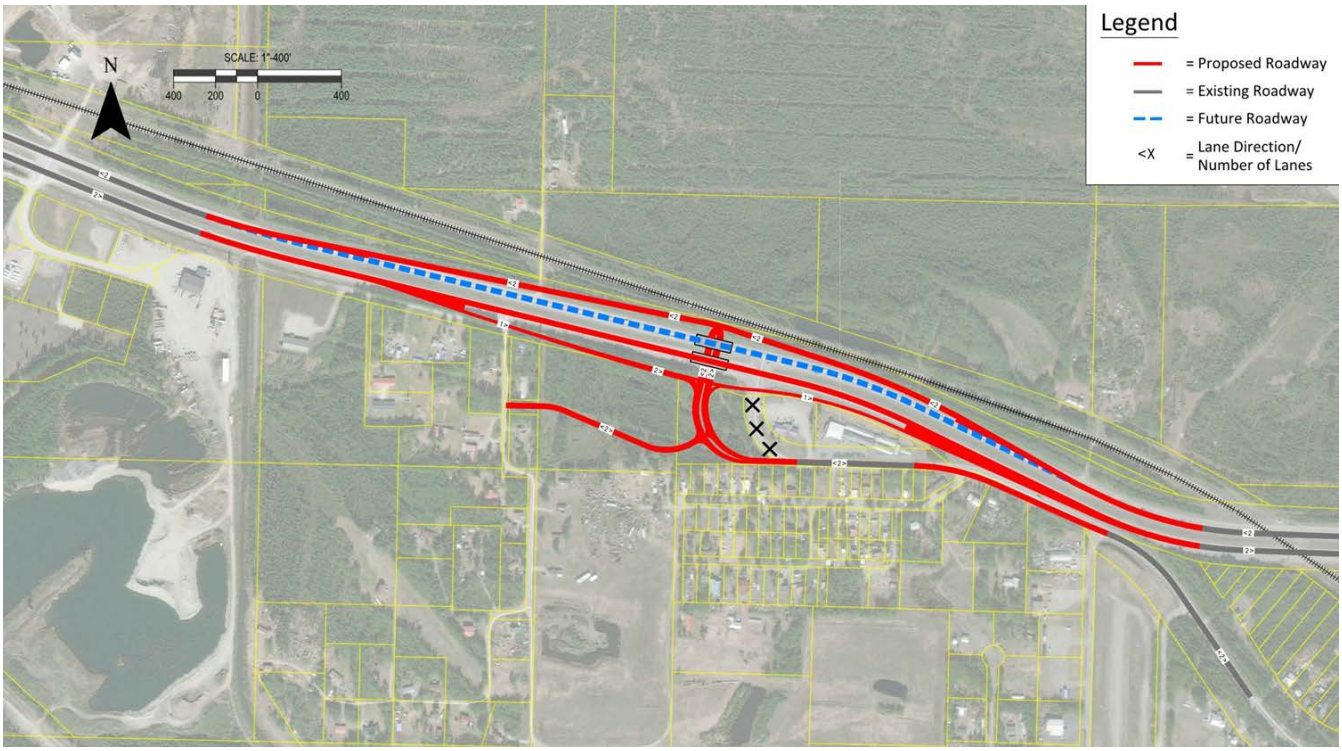
Alternative 1: Median Closure at Old Richardson Highway/Richardson Highway Intersection

The Old Richardson Highway/Richardson Highway intersection is restricted to right-in/right-out movements through a median closure. This concept is low cost and addresses the safety concern associated with northbound left-turn movements. It also does not preclude future infrastructure improvements. In the near-term, it causes out of direction travel and limits access for uses along Old Richardson Highway.



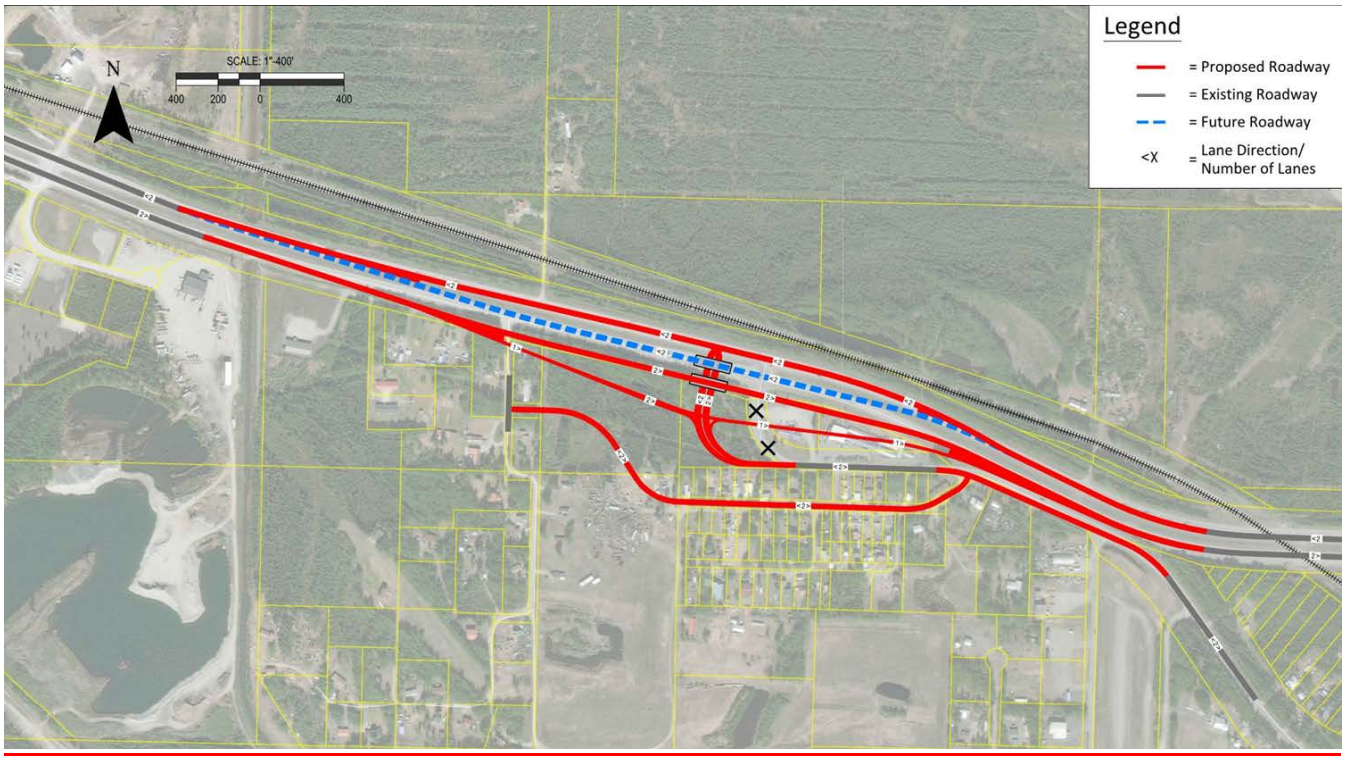
Alternative 2A: Interchange at Old Richardson Highway/Richardson Highway (MP 351) (*HSIP Project Nomination*)

The eastbound mainline of Richardson Highway is elevated to eliminate its conflict with Old Richardson Highway. An at grade intersection remains between the westbound mainline of Richardson Highway and Old Richardson Highway. A full interchange could be developed in the future, as shown in the figure with dashed lines. This concept would require right-of-way acquisition to complete a frontage road system. Additionally, the Keeney Road access to Richardson Highway would be closed to accommodate the eastbound off-ramp.



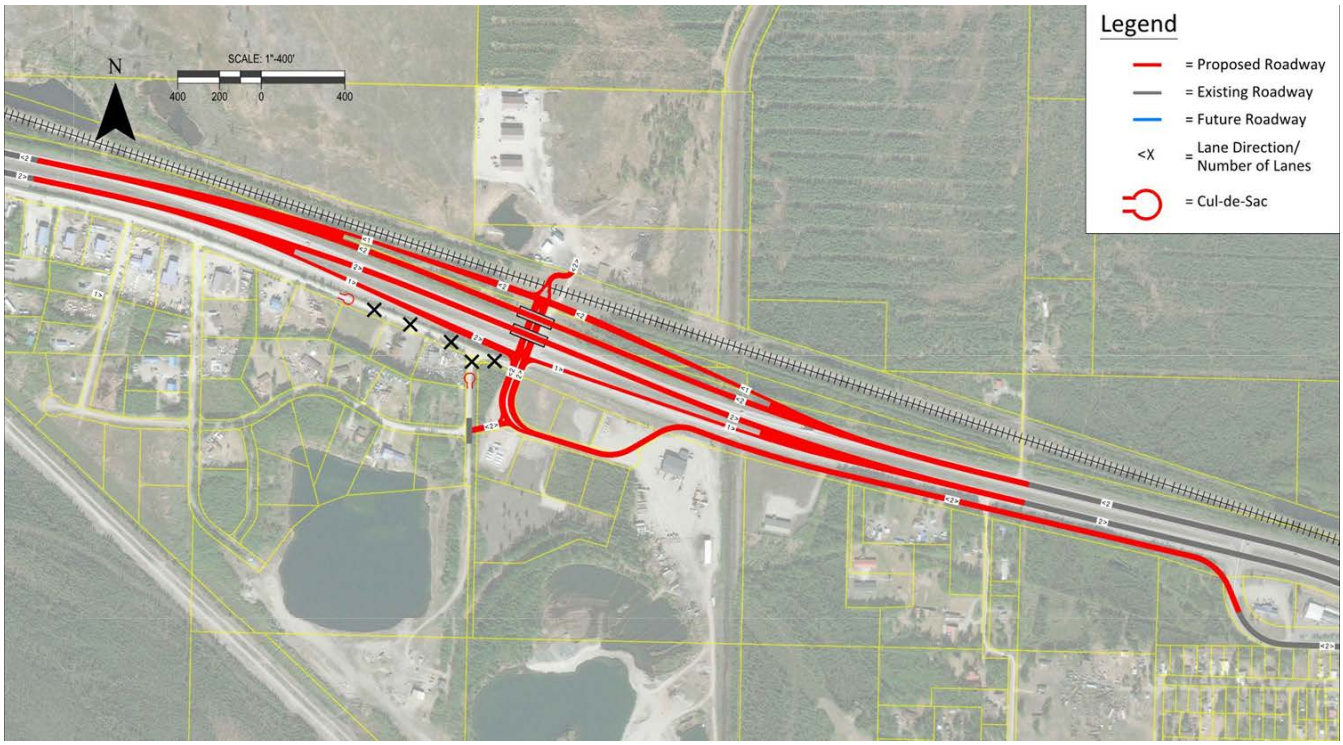
Alternative 2B: Interchange at Old Richardson Highway/Richardson Highway (MP 351) (*Shifted Southwest*)

As with Concept 2A, the eastbound mainline of Richardson Highway is elevated to eliminate its conflict with Old Richardson Highway while the westbound mainline remains at grade. The concept is shifted south to provide greater separation from the existing railroad. This concept would require right-of-way acquisition to the south of the existing Richardson Highway right-of-way, including the existing 12 Mile Road House and Hawk's Greenhouse, as well as additional right-of-way to complete the frontage road system. Additionally, the Keeney Road access to Richardson Highway would be closed to accommodate the eastbound off-ramp.



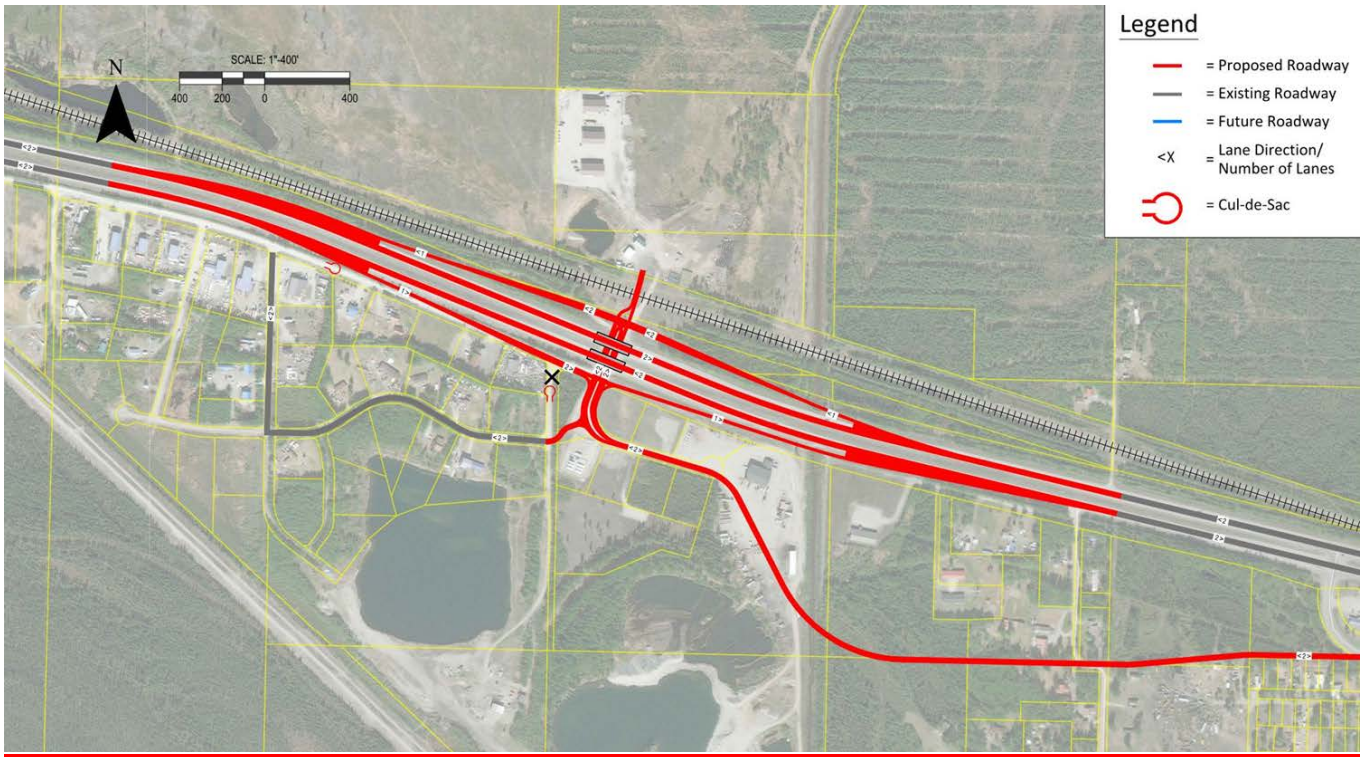
Alternative 3A: Full Interchange at Frontage Road/Richardson Highway (MP 351.75) (*Mainline Moves North*)

A full interchange is implemented at the existing at grade intersection of Richardson Highway and Frontage Road. The Richardson Highway mainline is moved north and median width is decreased to keep all ramps within the existing available right-of-way. The existing Old Richardson Highway access to Richardson Highway is closed and a frontage road connection between Old Richardson Highway and the new interchange is created. The frontage road connection to the west may require right-of-way acquisition.



Alternative 3B: Full Interchange at Frontage Road/Richardson Highway (MP 351.75) (*Frontage Moves South*)

As with Concept 3B, a full interchange is implemented at the existing at grade intersection of Richardson Highway and Frontage Road. The interchange is shifted south to maintain the current alignment of Richardson Highway and create more space between the interchange and railroad. The frontage road connecting Old Richardson Highway and the new interchange is diverted south because of lack of right-of-way along the Richardson Highway mainline. The frontage road would require right-of-way acquisition.



Engineering Pro Forma for All Alternatives

All three alternatives assume a 50 year life cycle cost.

Life cycle costs for all alternatives include annualized costs for repairing the systems assuming typical ADOT&PF maintenance practices.

Stakeholders

In an effort to understand the context for this project, the following list of "stakeholders", or persons with an active interest in the making of project decisions or the outcome of such decisions is provided:

#	Stakeholders	Primary Interest

1	• *Motoring Public*
	  • *Independent Travelers*
	  • *Commuters*
	  • *Local Users*
	  • *Business and Commercial*
		• *Safe Driving Experience*
		• *Unimpaired Access and Mobility*

2	• *Neighborhood*
	  • *Residents*
	  • *Business and Commercial Operators*
		• *Preventing Loss of Revenue Due to Lack of Access*
		• *Traffic Movement*
		• *Safety*

3	• *Congressional Delegations* • *Governor and Administration* • *State Legislative Delegations*	• *Local Economy* • *Project Cost*
4	• *State Government (ADOT&PF)* • *City of North Pole*	• *Bridge Construction* • *Safety Improvements* • *Resident Use* • *Local Economy*
5	• *Alaska Railroad*	• *Integrity of Rail Traffic* • *Separation from Highway and Interchange*

RISK MODEL

Richardson Highway MP 351 Interchange

ELEMENTS	RISK AREAS	N/A	LOW	MEDIUM	HIGH
A. MANAGEMENT, FINANCIAL & ADMINISTRATIVE RISKS					
	Changing government regulations (bridge inspection requirement)				
	Public and political perspectives (user community concerns)				
	Budget limitations, approvals process, & other constraints				
	Budget sequencing				
	Permitting delays				
	Agency jurisdictions and conflicts				
	Project mgt., organiz., decision-making processes, info flow				
	Labor issues				
	Other: staff workload				
B. ENVIRONMENTAL, GEOTECHNICAL RISKS					
	Inclement weather, storms, floods				
	Unanticipated hazardous waste				
	Environ. restrictions (air quality, noise, toxic mat., etc.)				
	Environmental Assessment schedule/decision				
	Contaminated soils remediation				
	Weed-free gravel acquisition				
	Groundwater remediation				
	Frozen ground construction				
	Inadequate subgrade testing				
	Unanticipated archaeological or historical findings				
	Wildlife closures (nesting/moose)				
	Wetlands				
	Backcountry zoning				
	Other: Wildlife interaction				
C. TECHNICAL RISKS					
	Systems, processes, and material				
	New, unproven systems, processes and materials				
	Other:				
D. IMPLEMENTATION RISKS					
1. Design	Design approvals and changes by departmental management				
	Design errors and omissions (inadequate as-builts)				
	Untested and unproven design features and innovations				
	Insufficient design contingencies				
	Other:				
2. Contractor					
	Availability of qualified contractors or skills (competitive environment)				
	Construction material requirements				
	Inadequate or unclear specs for mat'ls & workmanship				
	Labor negotiations/work stoppages				
	Operator training/certification				
	Management of subcontracts (shortage of subcontractors)				
	Low construction contingency				
	Cost impact of special contracting				
	Bidding climate				
	Other: Gas pipeline construction				
3. Change Orders					
	Design changes				
	Field changes, owner directed				
	Other: differing site conditions				
4. Equipment/Material					
	Availability:				
	Rejects, defects (items shipped)				

RISK MODEL

Richardson Highway MP 351 Interchange

ELEMENTS	RISK AREAS	N/A	LOW	MEDIUM	HIGH
	Malfunctions or failures				
	Other: Haul distances				
5. Project Controls					
	Planning: scope evolution				
	Scheduling (future funding uncertainties)				
	Accuracy of Estimating (SD, DD, CD)				
	Other:				
6. Logistics, Transportation					
	Laydown areas limitations				
	Traffic congestion at site or access to site (conflicts w/ local users)				
	Transportation difficulties for construction mat'ls (deliveries)				
	Other: Contractor camp				
7. Interference and Maintenance of Services					
	Interference with other work (Other road projects)				
	Maintenance of certain essential services during const.				
	Tie-ins/cutovers with utilities				
	Other:				
8. Condition of Existing (For renovation, rehab. repair projects)					
	Condition of existing structure and material				
	Tie-ins				
	Removals or restoration				
9. Safety and Hazards During Construction					
	Safety to contractor personnel				
	Safety to owner and non-project personnel				
	Other:				
10. Process start-up and Commissioning					
	Testings and test planning and scheduling				
	Malfunctions and failures				
	Inadequate documentation and/or training				
	Adequacy of operating budget				
	Other:				

Cost Projections

Cost projections summarizing the costs associated with the five alternatives was prepared to help focus on the elements of the design. This allowed the study team to identify and evaluate the major cost components contributing to alternatives.

Alternative	Description	Cost Estimate	New Proposed Lane Feet (Frontage/Ramps)
1	Median Closure	$90,000	0
2A	Interchange at Old Rich/Rich Hwy (Project Nomination)	$15,740,000	0.93
	Interchange at Old Rich/Rich Hwy (Full Interchange)	$27,660,000	0.27
2B	Interchange at Old Rich/Rich Hwy (Shifted Southwest)	$16,370,000	1.19
	Interchange at Old Rich/Rich Hwy (Shifted Southwest – Full Interchange)	$28,840,000	1.97
3A	Full Interchange at Frontage Road/Rich Hwy (Mainline Moves North)	$30,090,000	2.05
3B	Full Interchange at Frontage Road/Rich Hwy (Frontage Moves South)	$29,690,000	2.44

PHASE II – FORCE FIELD ANALYSIS/CREATIVITY

The value study team examined the five alternatives, evaluated the best and weakest features and developed proposals for improving the designs. The best features were identified so that they could be retained or incorporated into other alternatives. The weakest features were identified so that they could be improved. The findings are summarized on the following pages.

VALUE OPPORTUNITIES
Force Field Analysis

Richardson Highway MP 351 Interchange
ADOT&PF Northern Region
Alternative 1: Median Closure

BEST FEATURES	**WORST FEATURES**
1 quick to implement	1 reassignment of traffic to another location is inevitable
2 economical for ADOT&PF	2 may preclude future funding opportunities
3 improves safety	3 public response would be negative
4 leaves options open for grander plan	4 likely economic impact to private sector
5 lower maintenance costs	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15

IDEAS FOR VALUE ENHANCEMENT

1 doesn't preclude an overpass in the future
2 could still complete frontage roads if desired
3
4
5
6
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18
19

VALUE OPPORTUNITIES
Force Field Analysis

Richardson Highway MP 351Interchange
ADOT&PF Northern Region
Alternative 2A: Interchange at MP 351

BEST FEATURES	**WORST FEATURES**
1 addresses safety concern	1 doesn't address at grade rail crossing
2 could still be developed into full interchange	2 precludes future interchanges further west and at Peridot
3 comparatively less ROW impact	3
4 removes two at grade intersections	4
5 good level of service (LOS)	5
6 fits within available funding today	6
7 allows for safe turning by trucks	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15

IDEAS FOR VALUE ENHANCEMENT

1 frontage road extension possibilities
2 automatic bridge de-icer
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

VALUE OPPORTUNITIES
Force Field Analysis

Richardson Highway MP 351 Interchange
ADOT&PF Northern Region
Alternative 2B: Interchange at MP 351 - Shifted West Half or Full

	BEST FEATURES		WORST FEATURES
1	curve flattening (horizontal)	1	takes out two businesses and houses
2	further from rail ROW	2	significant frontage road impacts
3		3	larger acquisition of private lands required
4		4	
5		5	
6		6	
7		7	
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15		15	

IDEAS FOR VALUE ENHANCEMENT

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VALUE OPPORTUNITIES
Force Field Analysis

Richardson Highway MP 351 Interchange
ADOT&PF Northern Region
Alternative 3A: Interchange at MP 351.75 - Mainline Moves North

BEST FEATURES	**WORST FEATURES**
1 unifies entire area between dike and highway	1 more involvement in rail ROW
2 good interchange for local traffic heading to Fairbanks	2 longer connection for locals and trucks to Richardson Highway
3 additional frontage roads provides better access for commercial and trucking to west of interchange	3 will bring more commercial traffic into residential area
4 encourages thoughtful economic development	4 legitimizes at grade crossing to north
5 adds desired acceleration lanes	5
6 more space between future interchanges	6
7 eliminates three (maybe four) at grade intersections	7
8 creates opportunity for development north of Richardson Highway	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15

IDEAS FOR VALUE ENHANCEMENT

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VALUE OPPORTUNITIES
Force Field Analysis

Richardson Highway MP 351 Interchange
ADOT&PF Northern Region
Alternative 3A: Interchange at MP 351.75 - Frontage Moves South

BEST FEATURES	**WORST FEATURES**
1	1 major impact on residential properties
2	2 legitimizes at grade crossing to north
3	3 time required to implement (restarts the project process)
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15

IDEAS FOR VALUE ENHANCEMENT

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PHASE III - EVALUATION (Part 1 - Evaluation Factors)

As the first task of the evaluation phase the team developed and discussed the factors which would be used to evaluate the alternatives.

The ADOT&PF Objectives and Factors 1-9 shown below were established for the ADOT&PF Interchange Access Justification Report on the HSIP: Richardson Highway MP 351 Interchange Project priority setting process and formed a framework for evaluation.

The study team defined specific project considerations and subfactors to tailor the evaluation factors to the needs of this project.

Factor 1: Enhance Safety Performance

- Advantages in Protecting Public Health, Safety and Welfare
- Advantages in Protecting Employee Health, Safety and Welfare

Factor 2: Enhance Transportation Operations Level of Performance

- Advantages in Improving Effectiveness of Level of Service
- Advantages in Improving Effectiveness of Volume to Capacity Ratio

Factor 3: Improve Access and Connectivity

- Advantages in Improving Access Spacing Requirements
- Advantages in Improving Local Roadway Connectivity
- Advantages in Improving Access to Currently Developed Properties
- Advantages in Accommodating Future Access for Undeveloped Properties

Factor 4: Improve Constructability

- Advantages in Ability to Construct Improvements in Phases
- Advantages in Minimizing Local Impacts During Construction

Factor 5: Improve the Efficiency and Reliability of Maintenance and Operations

- Advantages in Level of Effort to Maintain
- Advantages in Reliability of Improvements with Longer Anticipated Lifetimes

Factor 6: Protect Existing and Proposed Land Uses

- Advantages in Minimizing Right-of-Way Impacts
- Advantages in Maintaining or Enhancing Consistency with Adopted Land Use and Economic Development Plans
- Advantages in Minimizing Impacts to Utilities
- Advantages in Minimizing Impacts to Existing Businesses/Developments

Advantages in Minimizing Impacts to the Alaska Railroad

Factor 7: Improve Multimodal Accessibility

Advantages in Enhancing Pedestrian and Bicycle Accessibility

Factor 8: Minimize Environmental Impact

Advantages in Minimizing Area of Disturbance

Factor 9: Minimize the Relative Cost of Construction

Advantages in Minimizing Cost of Construction
Advantages in Optimizing Applicable Fund Sources

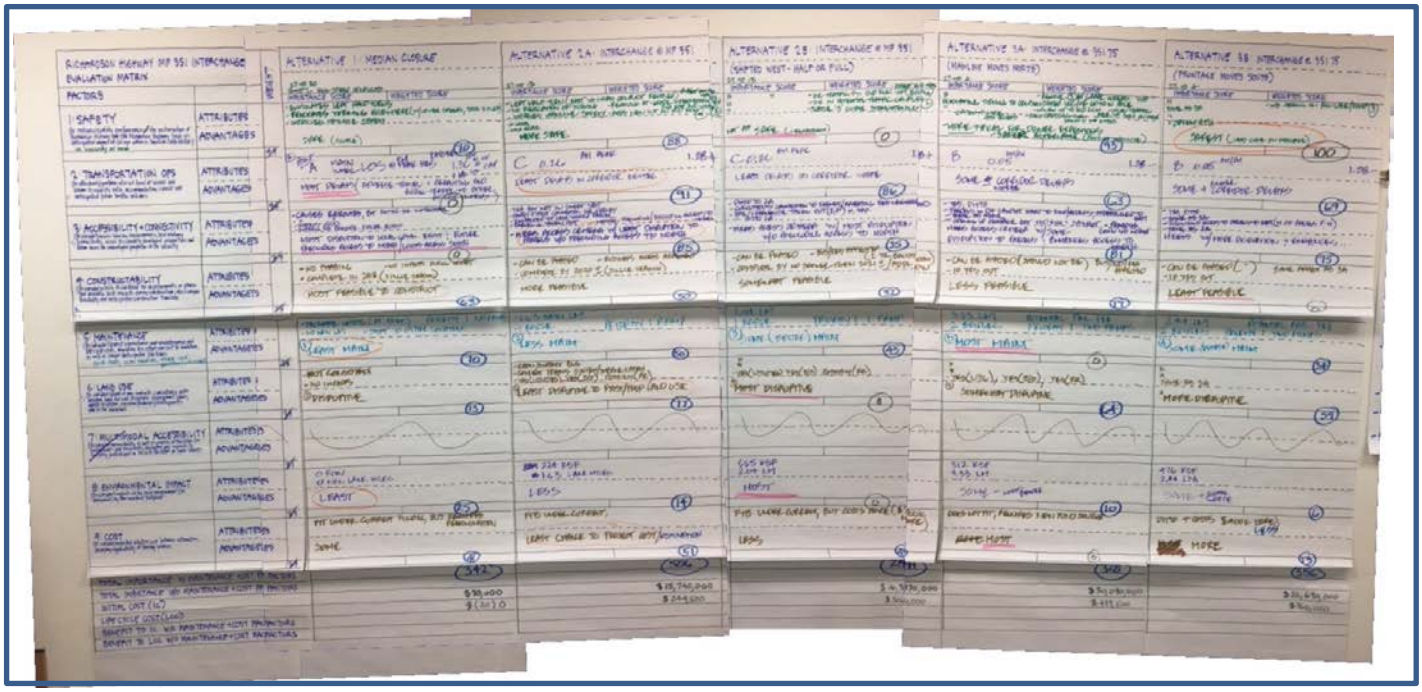
PHASE III - EVALUATION (Part 2 - Choosing by Advantages)

After evaluating the best and worst features of each of the alternatives and the evaluation factors, it was determined that all five alternatives were viable.

The alternatives were further evaluated using a process called Choosing by Advantages, where decisions are based on the importance of advantages between alternatives. The evaluation involves the identification of the attributes or characteristics of each alternative relative to the evaluation criteria, a determination of the advantages for each alternative within each evaluation factor, and then the weighing of importance of each advantage.

The highest importance advantage is identified in each factor. The paramount advantage, across factors, was determined and assigned a weight of 100. Remaining advantages were rated on the same scale. Rough cost estimates (Class C-) were developed for each alternative. Recommendations are based on a balance of cost and importance.

The evaluation sheets form the basis for presenting the location alternatives. The evaluation tables present many types of information. Attributes of an alternative are shown above the dotted line in the tables. Advantages between alternatives are shown below the dotted line. An anchor statement summarizes those advantages. The advantage with the highest importance within a factor is indicated by a bolding the text in the advantage cell. The advantages are all rated on a common scale.



ANALYSIS

The study team evaluated the benefit or importance of the advantages to be realized from each alternative, as well as the initial costs and life cycle costs. The results were graphed with importance or benefit on the vertical scale and cost on the horizontal scale. The analysis was performed using initial cost and life cycle cost separately. The results are summarized on charts in the preceding pages.

The negative slope of the increment from Alternative 1 to Alternative 2A indicates moderate value for the additional capital investment. This holds true when evaluating both initial costs and for life cycle costs. The positive slope from Alternative 1 to Alternative 2A at a higher cost merits consideration for the gain in the importance of the advantages.

Alternative 1 had the highest benefit to cost ratio in the CBA analysis due mainly to very low initial cost of construction and low life cycle cost. It is likely that the estimated life cycle cost does not adequately take into account the continued maintenance and redistributed traffic volumes that could occur to the area over a 50 year lifespan under this limited improvement. Alternative 1 is not recommended by the VA team because it causes the most transportation operational delays to corridor traffic; causes the most disruption to local connectivity, as well as existing and future development; and precludes access to the north and limits access to the south. Ultimately, the additional cost and additional benefit of Alternative 2A outweighs the lower costs of Alternative 1 (see Tables 4 and 5 on the preceding pages).

Alternatives 2A provides greater benefit at an additional cost that better meets the purpose and need for the project into the foreseeable future. The VA team felt that the difference between the ratios (506 versus 342) made it well worthwhile to pursue this level of development. The VA team felt that the additional $15,650,000 in initial cost and $244,480 in life cycle costs for Alternative 2A was worth the benefit of improving the location to provide the best value solution over the next fifty years.

The VA team recommends Alternative 2A: Interchange at MP 351, which provides the greatest combination of benefits for reasonable cost.

Richardson Highway MP 351 Interchange
Alaska Department of Transportation and Public Facilities - Northern Region

Evaluation Matrix	Alternative 1	Alternative 2A	Alternative 2B	Alternative 3A	Alternative 3B
	Median Closure	**Interchange at MP 351**	**Interchange at MP 351**	**Interchange at MP 351.75**	**Interchange at MP 351.75**
			Shifted West-Half or Full	*Mainline Moves North*	*Frontage Moves South*

	Factor		Weight	Importance Score	Weighted Score	Importance Score	Weighted Score	Importance Score	Weighted Score	Importance Score	Weighted Score	Importance Score	Weighted Score
1	**Safety:**												
	To enhance safety performance near the proximity of the intersection of Richardson Highway and Old Richardson Highway based on anticipated impact of design which is based on crash history	Attributes		•eliminates left turns and relocates turning maneuvers elsewhere (lower speed but still crossing) •improves mainline safety		•eliminates east versus north conflict for left turns •no relocation of turning elsewhere •improves mainline safety •removes at-grade intersection on Richardson Highway and eastbound intersection on a frontage road (2) and introduces new intersection on Old Richardson (1) •merging traffic directly on the mainline		•eliminates east versus north conflict for left turns •no relocation of turning elsewhere •improves mainline safety •removes at-grade intersection on Richardson Highway and eastbound intersection on a frontage road (2) and increases traffic on Old Richardson •creates conflicts with driveway on frontage road •flattens 's' curve on mainline •merging traffic directly on the mainline		•eliminates east versus north conflict for left turns •relocates turning due to consolidation of access •improves mainline safety •removes 3 at-grade crossings •allows local traffic to stay on frontage road network •creates at-grade rail crossing on the interchange that might become public •separation of westbound ramp and acceleration lane onto Richardson Highway •creates option to close 4th access		•eliminates east versus north conflict for left turns •relocates turning due to consolidation of access •improves mainline safety •removes 3 at-grade crossings •allows local traffic to stay on frontage road network •creates at-grade rail crossing on the interchange that might become public •separation of westbound ramp and acceleration lane onto Richardson Highway •creates option to close 4th access	
		Advantages		•immediate treatment •number of high speed conflicts reduced from 9 to 2 **•safe alternative**		•number of high speed conflicts reduced from 27 to 13 for 3 access points •less exposure to frontage **•more safe alternative**		•number of high speed conflicts reduced from 27 to 13 for 3 access points •less exposure to frontage **•not as safe alternative**		•number of high speed conflicts reduced from 27 to 4 for 3 access points •more traditional look and more acceptable by public •removes more at-grade crossings **•safer alternative**		•number of high speed conflicts reduced from 27 to 4 for 3 access points •removes more at-grade crossings **•safest alternative**	
			1		**70**		**88**		**0**		**93**		**100**
2	**Transportation Operations:**												
	(To effectively) perform at a (set) level of service and volume to capacity ratio, accommodating current and anticipated future traffic volumes	Attributes		All Worst Hour: •Main LOS = A •Badger Roundie LOS = F+ (v/c 1.28 to 1.36) •Badger EB Ramp LOS = E to F •Old Rich LOS = A •2020 data indicates median closure will fail Badger interchange(1.14 v/c), adversely affect travel, and create additional delay at Badger		•Main LOS = A •Badger (v/c 1.28+) •Old Rich LOS = C (A for full interchange) (v/c 0.26) •majority of cars at Old Rich results in least out of distance travel		•Main LOS = A •Badger (v/c 1.28+) •Old Rich LOS = C (A for full interchange) (v/c 0.26) •majority of cars at Old Rich results in least out of distance travel		•Main LOS = A •Badger (v/c 1.28-) •Frontage Road LOS = B (v/c 0.05)		•Main LOS = A •Badger (v/c 1.28-) •Frontage Road LOS = B (v/c 0.05)	
		Advantages		**•most delay to corridor traffic**		**•least delay to corridor traffic (best)**		**•less delay to corridor traffic**		**•somewhat worse delay to corridor traffic**		**•somewhat better delay to corridor traffic**	
			1		**0**		**91**		**86**		**63**		**69**
3	**Accessibility and Connectivity:**												

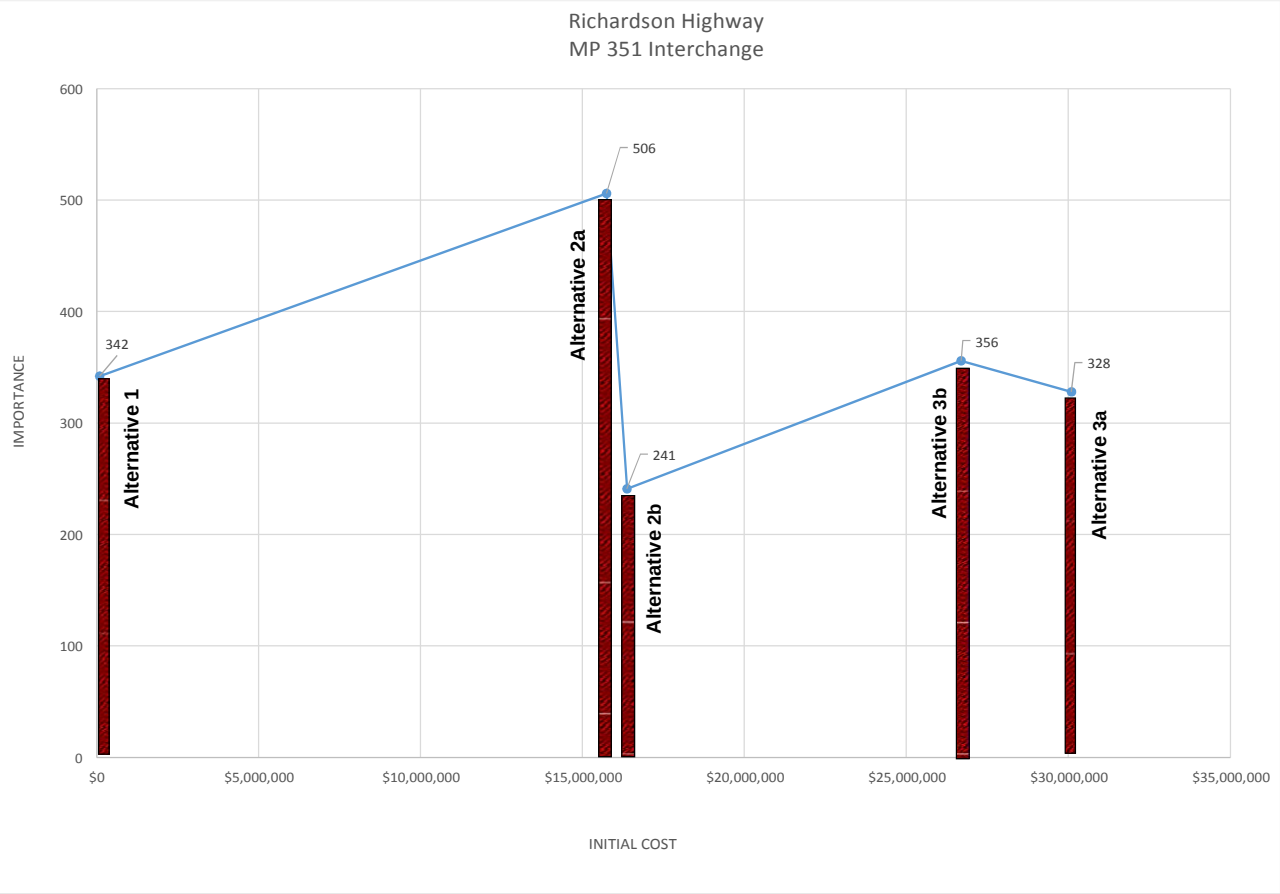
To consider access spacing requirements, local roadway connectivity, access to currently developed properties, and future access for undeveloped properties in the vicinity	Attributes		•spacing - causes re-routes, but better for Main through traffic •local connectivity - re-routes traffic •current development access - is maintained •future access - no change		•spacing - meets requirements but not in "sweet spot" •local connectivity - improves connectivity for Keeney Road •current development access - enhances access •future access - removes Parcel G and does not promote future access but also does not preclude		•spacing - meets requirements but not in "sweet spot" •local connectivity - improves connectivity for Keeney Road but more circuitously, accessing residential neighborhood •current development access - eliminates 2 developed properties (Road House & Greenhouse) •future access - removes Parcel H and does not promote future access but also does not preclude		•spacing - meets requirements •local connectivity - parcels west of Sandlot Court difficult to find or access, streamlined to east •current development access - same as local connectivity •future access - provides connection to north		•spacing - meets requirements •local connectivity - more difficult to find business entrances with backage system versus frontage system •current development access - circuitous access to lots between Old Rich and gravel pit (north of Parcels P and M) •future access - provides connection to north	
	Advantages		**•meets access requirements •most disruption to local connectivity, existing and future development •precludes access to the north and limits access to the south**		**•meets access requirements •least disruption to existing connections •does not preclude future north access**		**•meets access requirements •most disruption to existing connections •most disruption to existing development •does not preclude future north access**		**•meets access requirements •some disruption to existing connections •enhances future north access**		**•meets access requirement •more disruption to existing connections •enhances future north access**	
		1		**0**		**85**		**35**		**81**		**75**

4	**Constructability:**											
(To consider) ability to construct the improvements in phases and (minimize) local impacts during construction; also considers feasibility and anticipated construction timeline	Attributes		•no phasing •quick construction timeline (single season) •no local impacts during construction		•can be phased (half to full) •single construction season •funding secure (+/- FY20) •affects businesses during construction		•can be phased (half to full) •two construction seasons •funding secure, but ROW timeline is longer (+/- FY21) •affects businesses and residential areas during construction		•should not be phased (has to be full) •two construction seasons •ten years out for construction funding (+/- FY27) •affects businesses and residential areas during construction		•should not be phased (has to be full) •two construction seasons •ten years out for construction funding (+/- FY27) •affects businesses and residential areas during construction	
	Advantages		**•most feasible to construct**		**•more feasible to construct**		**•somewhat feasible to construct**		**•less feasible to construct**		**•least feasible to construct**	
		1		**63**		**50**		**32**		**17**		**0**

5	**Maintenance:**											
(To consider lowest) operational and life cycle costs, requiring less effort and cost to maintain, as well as longer anticipated lifetimes - **pavement preservation, snow removal, bridge inspection, illumination maintenance and utility costs**	Attributes		•0.00 new lane miles •decreased costs from cross-over, but shifts to other locations •no change to priority 1 areas (no ramps)		•1.63 new lane miles •1 new bridge •add 2 new priority 1 areas (ramps)		•2.04 new lane miles •1 new bridge •add 2 new priority 1 areas (ramps)		•3.33 new lane miles •2 new bridges •add 4 new priority 1 areas (ramps) •potential new rail fee		•2.44 new lane miles •2 new bridges •add 4 new priority 1 areas (ramps) •potential new rail fee	
	Advantages		**•least maintenance**		**•less maintenance**		**•somewhat more maintenance**		**•most maintenance**		**•more maintenance**	
		1		**70**		**50**		**43**		**0**		**34**

6	**Land Use:**											
To consider right-of-way impacts, consistency with adopted land use and economic development plans, impacts to utilities, impacts to existing businesses/developments and impacts to railroad	Attributes		•not consistent with local land use and economic development plans •no impacts to utilities, existing businesses or railroad		•grow and support businesses, connect transportation system, and improve safety •consistent with local land use and economic development plans •utility impacts exist •impacts to existing businesses/developments and potential impacts to railroad		•consistent with local land use and economic development plans •utility impacts exist •impacts to existing businesses/developments and potential impacts to railroad		•consistent with local land use and economic development plans •utility impacts exist •impacts to existing businesses/developments and potential impacts to railroad		•consistent with local land use and economic development plans •utility impacts exist •impacts to existing businesses/developments and potential impacts to railroad	
	Advantages		**•disruptive to existing and future land use**		**•least disruptive to existing and future land use**		**•most disruptive to existing and future land use**		**•somewhat disruptive to existing and future land use**		**•more disruptive to existing and future land use**	
		1		**73**		**77**		**0**		**64**		**59**

7	**~~Multimodal Accessibility:~~**											
	(To consider) accessibility as well as quality of facilities for pedestrians and bicyclists, including any impacts to existing pedestrian or bicycle facilities of cross streets (not considered)	Attributes										
		Advantages										
			1		**0**		**0**		**0**		**0**	**0**
8	**Environmental Impact:**											
	(To consider) impacts on the local environment (as measured by) the smallest footprint	Attributes		•ROW: 0 KSF •new lane miles: 0		•224 KSF •1.36 lane miles		•665 KSF •2.04 lane miles		312 KSF, 3.33 lane miles		476 KSF, 2.44 lane miles
		Advantages		**•least impact**		**•less impact**		**•most impact**		**•somewhat less**		**•somewhat more**
			1		**25**		**14**		**0**		**10**	**6**
9	**Cost:**											
	(To consider) expected relative cost between alternatives, **including applicability of funding sources**	Attributes		•could fit under current funding, some leg work required		•fits under current funding, no additional effort required		•fits under current funding, costs $630K more than 2A		•requires new funding source, costs $3.4M more than 3B		•requires new funding source
		Advantages		**•some change to project cost**		**•least change to project cost**		**•less change to project cost**		**•most change to project cost**		**•more change to project cost**
			1		**41**		**51**		**45**		**0**	**13**
	Total Importance *with* Maintenance and Cost Factors				342		506		241		328	356
	Total Importance *without* Maintenance and Cost				231		405		153		328.0	309
	Initial Cost				$90,000		$15,740,000		$16,370,000		$30,090,000	$26,690,000
	Life Cycle Cost				$20		$244,500		$306,000		$499,500	$366,000
	Benefit to Initial Cost *without* Maintenance and Cost Factors				**256.67**		**2.57**		**0.93**		**1.09**	**1.16**
	Benefit to Life Cycle Cost *without* Maintenance and Cost Factors				**1155000.00**		**165.64**		**50.00**		**65.67**	**84.43**


Richardson Highway
MP 351 Interchange
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IMPORTANCE
342
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328
Alternative 1
Alternative 2a
Alternative 2b
Alternative 3b
Alternative 3a
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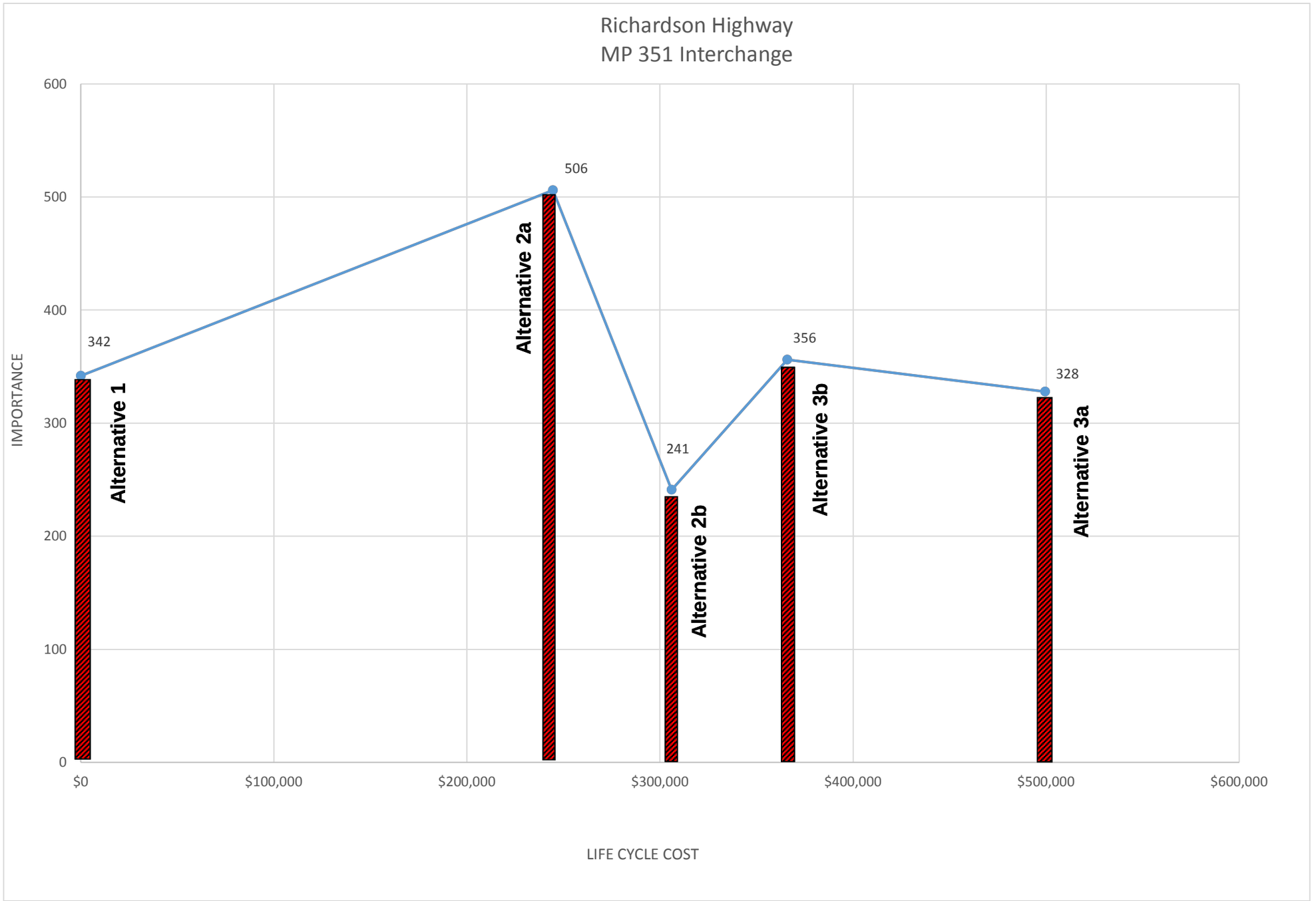
INITIAL COST


Richardson Highway
MP 351 Interchange
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Alternative 1
Alternative 2a
Alternative 2b
Alternative 3b
Alternative 3a
$0
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$500,000
$600,000
LIFE CYCLE COST

PHASE IV - DEVELOPMENT

The alternatives were considered sufficiently developed for design concepts. Each alternative was refined by the suggested ideas for value enhancement developed during the Creativity phase of the value study.

The team also developed a model to identify potential risks to the project and ways to mitigate those risks. Further development of risk mitigation may be necessary by the project management to implement a successful project.

PHASE V - RECOMMENDATIONS/ WRAP-UP

Specific recommendations for additional value enhancement included the following items:

- Consider integrating an automated bridge de-icing system at a cost of about $200K (2017)
- Although not available with the current fund source, consider constructing frontage road west to the 3A/3B interchange location to improves accessibility and prepare for additional anticipated growth in the immediate area.
- Either close the Richardson Highway crossover at Peridot Street (which would require further functional analysis) or limit the crossover to east bound left turns only on to Peridot and eliminating left turns from Peridot on to the Richardson Highway; need to address this location independently in the near future.
- Update the circa 1980 Richardson Highway Corridor Study to confirm the importance and context of this project and to reaffirm other needs.
- Re-evaluate how to minimize impacts to the railroad right-of-way north of the proposed interchange, including use of retaining walls, median narrowing, etc.).
- Final design should consider future development north of the interchange.
- Consider applying high friction surface treatment to all approaches and acceleration/deceleration lanes at the proposed interchange.
- Collect and exchange crash data from both ADOT&PF and the City of North Pole.

PHASE VI - IMPLEMENTATION

Implementation of the value study recommendations will rest with the project team, as work progresses on the next stages. Additional value analysis studies (mini-VA's) may be performed to evaluate specific project components such as road and bridge construction, buffering from the railroad ROW, and other interchange enhancements.

APPENDICES

- A. Value Study Agenda
- B. Project Fact Sheet

Appendix A.

Value Study Agenda

Value Analysis: Richardson Highway MP 351 Interchange

Alaska Department of Transportation and Public Facilities – Northern Region

December 19 – 21, 2017
ADOT&PF Northern Region Headquarters
2301 Peger Road
Fairbanks, AK 99709

Participants:

Paul Schrooten, NPS facilitator

Value Analysis Team

Erik Brunner, ADOT&PF, team member (design)
Geoff Coon, City of North Pole, team member (fire chief/emergency medical services)
Pam Golden, ADOT&PF, team member (traffic and safety)
Randi Motsko, ADOT&PF, team member (planning)
Dan Schacher, ADOT&PF, team member (maintenance and operations)
Bryce Ward, City of North Pole, team member (mayor)

Tuesday, December 19, 2017

8:00a **Project Meeting Purpose**

Opening Remarks/Introductions
Agenda Review
Meeting Overview

8:30a **Information Sharing/Gathering**

Project Site Overview (Photos and Mapping)
ADOT&PF Project Description

9:00a **Planning and Design Options**

Project Need
Background Information and Analysis
Introduction of Alternatives

9:30a *Break*

9:45a **Value Analysis Phase I: Introduction/Information**

Value Analysis Process Overview
Objectives of Study
Summary of Area (Physical, Land Use, Socioeconomic Setting)

11:15a **Value Analysis Phase II and III: Function/Speculation/Creativity**

Detailed Presentation of Site Alternatives and Cost Estimates
Brainstorm other Site Alternatives
Cost Model/Risk Model

12:30p *Lunch*

2:00p **Site Visit**

Caravan to Project Site
Tour Key Locations
Q&A

4:00p Close for the day

Wednesday, December 20, 2017

8:00a **Value Analysis Phase III: Speculation/Creativity (continued)**

Best Site Features
Weakest Site Features
Ideas to Enhance Alternatives
Identify High Cost Elements for Value Enhancement
Modify and Combine Ideas and Alternatives

9:45a *Break*

10:00a **Value Analysis Phase IV: Analysis/Evaluation of Alternatives**

Review of Standards, Criteria, and Regulatory Requirements
Evaluation of Alternatives (modified Choosing By Advantages)
- Review and Confirm Evaluation Factors and Ratings
- List Attributes
- List Advantages

11:00a *Lunch (extended midday break)*

3:00p **Value Analysis Phase IV: Analysis/Evaluation of Alternatives (continued)**

Evaluation of Alternatives (modified Choosing By Advantages)
- List Attributes
- List Advantages

4:30p Adjourn

Thursday, December 21, 2017

8:30a **Value Analysis Phase IV: Analysis/Evaluation of Alternatives (continued)**

Evaluation of Alternatives (modified Choosing By Advantages)
- Decide Importance
- Determine Total Importance

Identification/Confirmation of Best Value Alternative

9:45a *Break*

10:00a **Value Analysis Phase V: Development of Preferred Alternative**

Develop/Rank Ideas for Further Development (Mini-VA's)
- Aesthetics
- Sustainability Enhancements
- Other Value Enhancements

12:00 noon *Lunch*

1:30p **Value Analysis Phase VI: Summary Findings/Implementation**

Summary of Value Enhancement and Potential Cost Savings

Adjustments to Project Options (Funding, Planning and Design, Construction and Construction Management)

Presentation of findings/recommendations to others

3:30p Adjourn

Appendix B.

Project Fact Sheet

Fact Sheet

HSIP: Richardson Hwy MP 351 Interchange Project
Project No. NFHWY00097/0A24034

The State of Alaska Department of Transportation & Public Facilities (DOT), in cooperation with the Federal Highway Administration (FHWA) is proposing to construct intersection improvements at the MP 351 Richardson Highway/Old Richardson Highway intersection under the Highway Safety Improvement Program (HSIP). The project is intended to reduce severe crashes at this intersection on the Interstate Highway System.

Project Study Area

Project Purpose: Reduce crashes at the intersection of Richardson Highway and Old Richardson Highway near MP 351.

Current Status: The project team has conducted an initial safety and operational assessment of Richardson Highway within the study area. The project team worked with a Technical Advisory Committee to identify three design concepts to meet the project purpose: median closure, interchange at the MP 351 intersection, and interchange near MP 352. More information on the alternatives process is provided on the back of this handout.

Schedule:

Phase	Date
Startup and Scoping	March 2017 – June 2017 (complete)
Existing Conditions Analysis	May 2017 – September 2017 (complete)
Alternative Development and Evaluation	May 2017 – October 2017 (in-process)
Preferred Alternative Refinement	October 2017 – December 2017
IACR Report	November 2017 – February 2018

Public Meeting #2 – Early December 2017

For more information please contact:
Lauren Little, P.E., Engineering Manager
2301 Peger Road, Fairbanks, Alaska 99709
Phone: (907) 451-5371 / Email: lauren.little@alaska.gov

Fact Sheet

HSIP: Richardson Hwy MP 351 Interchange Project
Project No. NFHWY00097/0A24034

Interstate Access Changes

The FHWA requires that modifications to access on the Interstate system be reviewed from a corridor safety and operations standpoint. Part of this project is evaluating an interchange or other access modifications at MP 351 for impacts to the Richardson Highway with regards to future development and interchange locations.

Alternatives Development and Evaluation

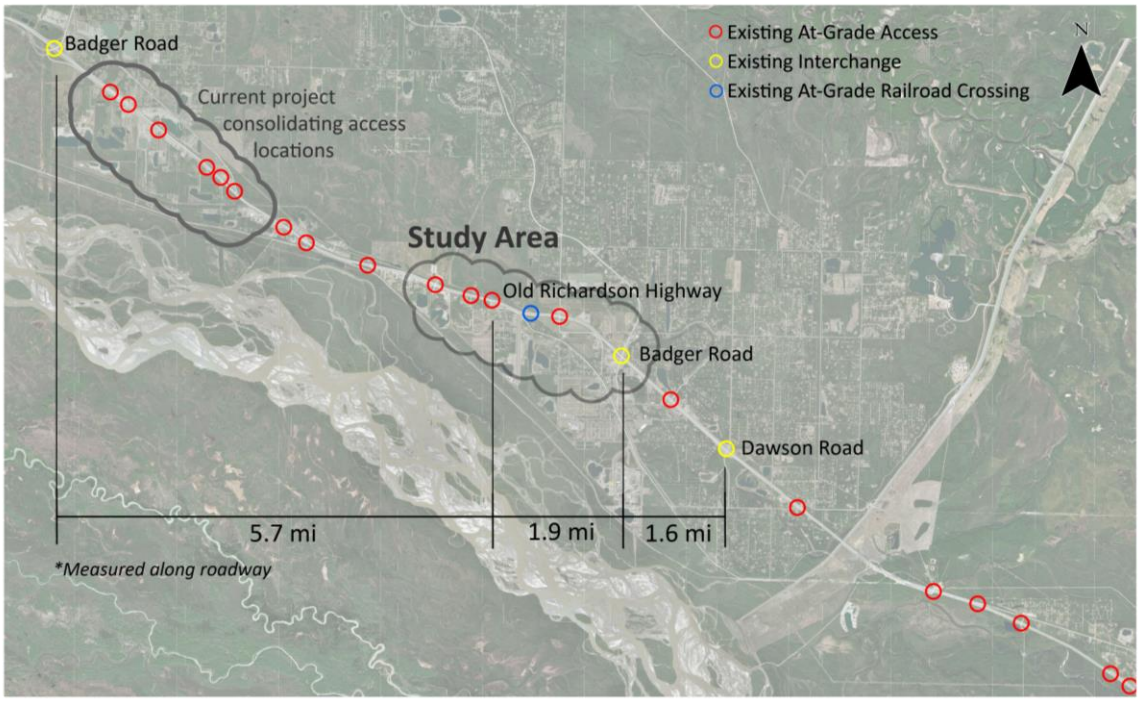
The three design concepts presented tonight were developed by considering the project objectives and criteria that will be used to evaluate proposed improvements, both provided below. In addition, the overall corridor context was considered to assess whether alternatives are consistent with guidelines for interchange spacing (>1 mile) as Richardson Highway is upgraded over time to a freeway with access provided only via interchanges. The current interchange spacing is shown on the graphic below.

Interstate Access Change Objectives:

- Support the vision of Richardson Highway in the study area to be grade-separated
- Consider the potential to provide a full interchange in the study area in the future
- Consider future access and interchange spacing on Richardson Highway within the study area

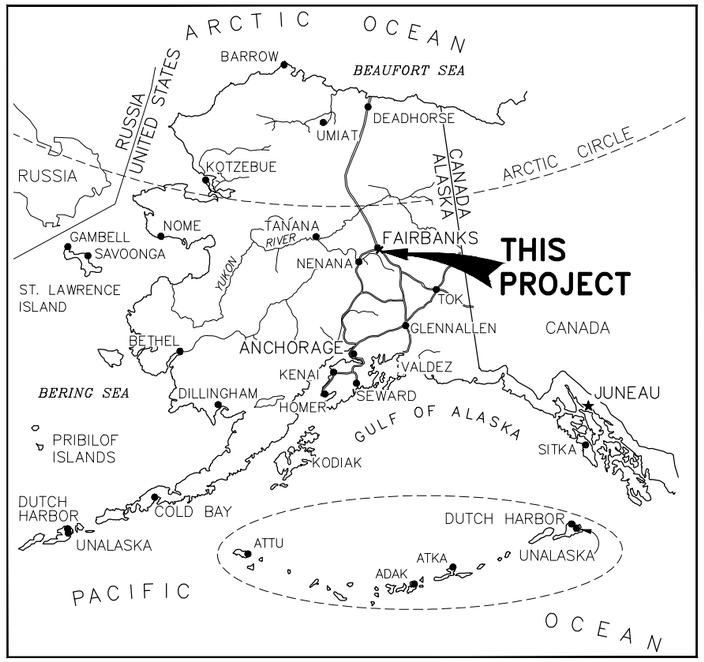
Evaluation Criteria:

- Safety
- Transportation Operations
- Accessibility and Connectivity
- Constructability
- Maintenance
- Land Use
- Multimodal Accessibility
- Environmental Impact
- Cost



APPENDIX I

PRELIMINARY ROW PLANS



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
&
PUBLIC FACILITIES

RIGHT OF WAY MAP
0A24034/NFHWY00097
HSIP: RICHARDSON HIGHWAY MP 351
INTERCHANGE

WITHIN SECTIONS 5, AND 6, T. 2 S., R. 2 E., F.M., ALASKA

FAIRBANKS RECORDING DISTRICT

STATE BUSINESS, NO CHARGE

LATEST REVISION 3/11/2021

RIGHT OF WAY SURVEYOR'S CERTIFICATE

I CERTIFY THAT I AM PROPERLY REGISTERED AND LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF ALASKA, THAT THE LOCATION OF ROAD RIGHTS OF WAY SHOWN ON THIS PLAT WERE DETERMINED BY ME OR UNDER MY DIRECT SUPERVISION. I DECLARE THAT THIS PLAT IS BASED ON INFORMATION COMPILED FROM RECORD DATA AND CONTROLLED BY RECOVERED MONUMENTATION AND THAT ALL DIMENSIONS AND OTHER DETAILS ARE ACCURATE.

(SEAL)

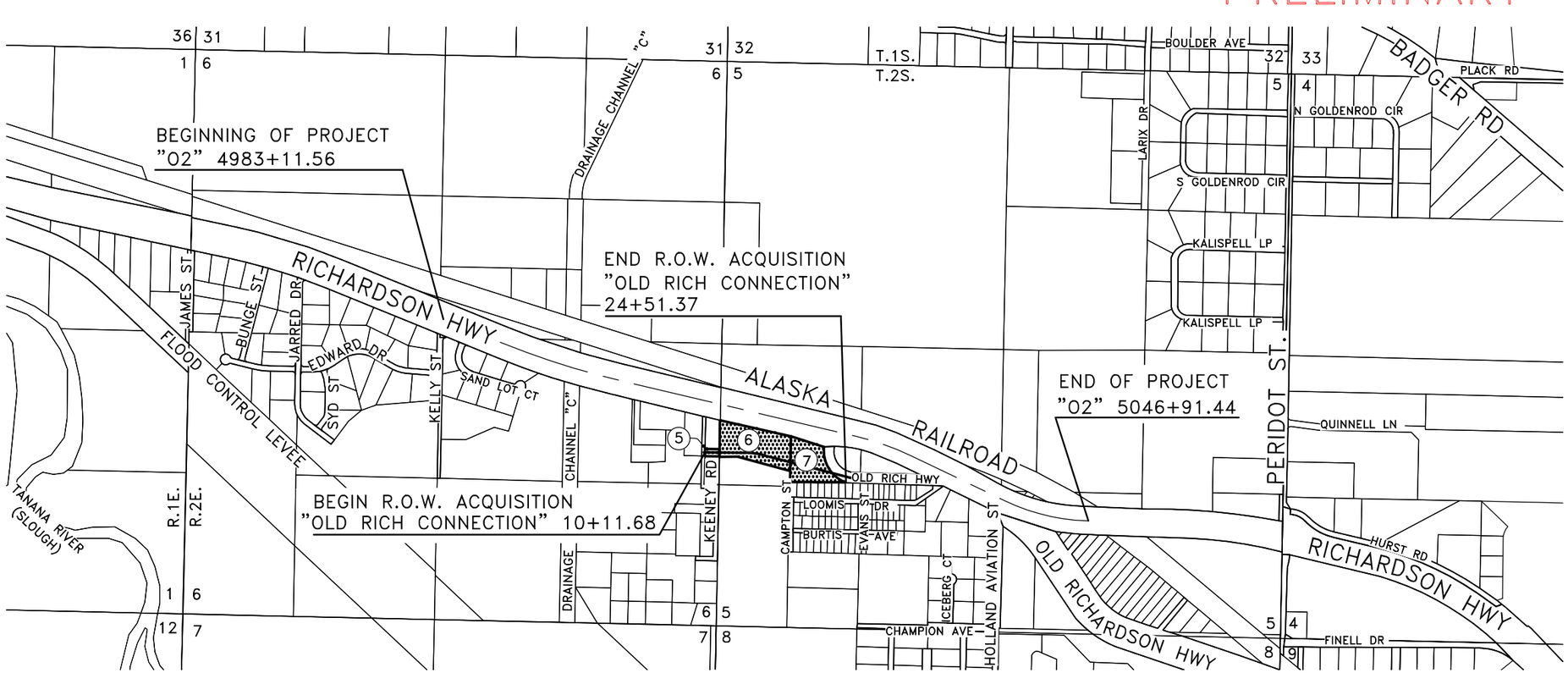
TIMOTHY L. SPROUT LS-10769 DATE

CERTIFICATE OF APPROVAL BY PLATTING AUTHORITY

I HEREBY CERTIFY THAT THIS RIGHT OF WAY PLAT HAS BEEN FOUND TO COMPLY WITH THE REGULATIONS OF CHAPTER 17.28, FNSBC, RIGHT OF WAY ACQUISITIONS PLATS, OF THE FAIRBANKS NORTH STAR BOROUGH CODE OF ORDINANCES, AND THAT SAID PLAT HAS BEEN APPROVED.

Date

PRELIMINARY



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
APPROVED _____

CHIEF, RIGHT OF WAY
NORTHERN REGION

1" = 600'

LENGTH OF PROJECT: 1.2 MILES

R:\ROWE\Eng\Hwys\NFHWY00097 Richardson MP 351 Interchange\Acad\ROWE\00097_RW Rich 351-ROW Map Cover Thu, Mar/11/21 12:32pm
PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-5400

	RECOVERED	SET
BLM MONUMENT	✠	
GLO MONUMENT	✠	
USC&GS MONUMENT	▲	
PRIMARY MONUMENT	✠	✠
CENTERLINE MONUMENT IN CASING	⊕	⊕
PRIMARY R.O.W. MONUMENT	⊕	◕
BEARING OBJECT	✳	
MISCELLANEOUS MONUMENT	Ⓧ	
LINE OF SIGHT MONUMENT		⊕
CONCRETE R.O.W. MONUMENT	■	
SURVEY PANEL POINT		✕
REBAR AND CAP	⊙	⊙
REBAR	⊕	●
IRON PIPE	✺	
PK NAIL		▽
SPIKE		✳
HUB AND TACK		⊡

SECTION LINE

1/4 SECTION LINE

1/16 SECTION LINE

SURVEY CONTROL LINE

TOWNSHIP & RANGE LINE — T. 2 N. / T. 1 N. — T. 1 E. — T. 2 E.

EXISTING SECTION LINE EASEMENT OR ACCESS EASEMENT

NEW RIGHT-OF-WAY LINE — NEW R.O.W.

EXISTING RIGHT-OF-WAY LINE — EXISTING R.O.W.

EXISTING PROPERTY LINE

ACCESS CONTROL LINE

EXISTING UTILITY EASEMENT LINE

PROPOSED UTILITY EASEMENT LINE

PROPOSED CUT SLOPE LIMIT

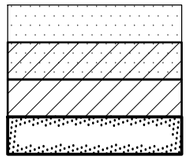
PROPOSED FILL SLOPE LIMIT

EXISTING ALASKA RAILROAD (AKRR) RIGHT-OF-WAY

EXISTING RIGHT-OF-WAY SHARED BY AKRR AND AK DOT & PF

EXISTING AK DOT & PF RIGHT-OF-WAY

RIGHT-OF-WAY REQUIRED



STATION EQUATION — "L"48+97.23 POT BK= / "O"48+97.23 PC AHD

DESIGN/CONSTRUCTION CENTERLINE — 5+00

OTHER CENTERLINE — 10+00

EXISTING RAILROAD CENTERLINE

EXISTING GUARD RAIL

EXISTING ROADWAY

WATER BOUNDARY

WETLANDS OR MARSH

OHW LINE

FLOW CENTERLINE

FLOW DIRECTION

MEANDER LINE — M1 M2 M3

EASEMENT ACQUISITION — E1

FEE ACQUISITION — 1

EXISTING SANITARY SEWER LINE — SS

EXISTING FUEL LINE — O

EXISTING GAS LINE — G

EXISTING WATER LINE — W

EXISTING STORM DRAIN LINE — SD

EXISTING FIBER OPTIC LINE — FO

EXISTING BURIED TELEPHONE CABLE — T

EXISTING BURIED ELECTRIC LINE — E

EXISTING OVERHEAD ELECTRIC LINE

EXISTING VEGETATION

PROPERTY TIE

EXISTING FENCE — X

EXISTING RISER

EXISTING CATCH BASIN OR DROP INLET

EXISTING MANHOLE — MH

EXISTING FIRE HYDRANT

EXISTING CULVERT PIPE

EXISTING POWER POLE

EXISTING SIGNAL POLE W/ MAST ARM

EXISTING LUMINAIRE

EXISTING POLE GUY ANCHOR

EXISTING POLE STUB TELEPHONE

EXISTING POLE STUB POWERLINE

EXISTING TELEPHONE PEDESTAL

EXISTING JOINT USE POWER & TELEPHONE

EXISTING TELEPHONE POLE LINE

EXISTING SIGNAL POST W/O MAST ARM

EXISTING MAILBOX

EXISTING GRAVE

EXISTING VEHICLE PLUG-IN OR HEADBOLT HEATER

EXISTING BURIED CABLE MARKER

EXISTING WATER METER

EXISTING WATER VALVE

EXISTING PIPELINE VALVE

EXISTING PIPELINE MARKER

EXISTING PARKING METER

EXISTING BUILDINGS — H

H = HOUSE
G = GARAGE
M = MERCHANT/STORE
B = BARN
S = SHED
P = PRIVY
SS = SERVICE STATION
W = WAREHOUSE

PRELIMINARY

EXISTING SIGN 1, 2, AND 3 POST

EXISTING POST OR BOLLARD

EXISTING SANITARY CLEAN OUT

EXISTING SEPTIC VENT — S

EXISTING WELL OR MONITORING WELL — W MW

EXISTINGFUEL TANK FILL PIPE/VENT — F

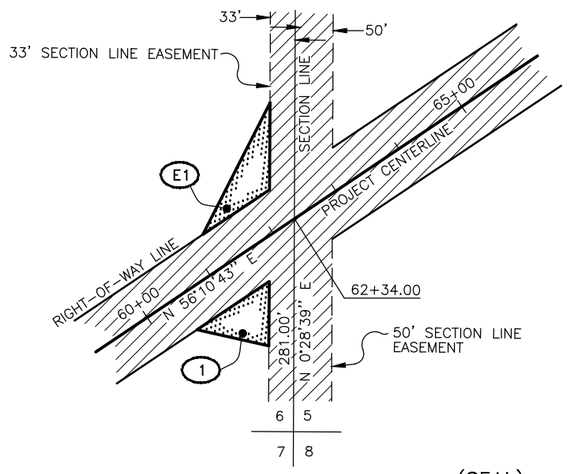
EXISTING SATELLITE DISH — SAT. DISH

TEST HOLE — TH

CONIFER TREE

DECIDUOUS TREE

SECTION LINE EASEMENT & SECTION LINE–CENTERLINE INTERSECTION



(SEAL)

PLAN SHEET MATCH LINES

MATCH 10+00 LINE

MATCH SHEET 5 LINE

DATE	REVISION	BY

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND
PUBLIC FACILITIES
RIGHT OF WAY MAP
ALASKA PROJECT NO.
0A24034/NFHWY00097
HSIP: RICHARDSON HIGHWAY MP 351
INTERCHANGE

SCALE: 1"= N/A

SHEET 2 OF 6

PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-5400

R:\ROWE\Eng\Hwys\NFHWY00097 Richardson MP 351 Interchange\Acad\ROWE\00097_RW Rich 351.dwg Mar 11, 2021 - 12:30pm

HORIZONTAL CONTROL SUMMARY

THIS PROJECT IS LOCATED ENTIRELY WITHIN THE FAIRBANKS LOW DISTORTION PROJECTION (LDP), A LOW DISTORTION PROJECTION CREATED BY THE ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES.
FAIRBANKS LDP DEFINITION:
LINEAR UNIT: U.S. SURVEY FOOT (SFT)
DATUM: NAD83(2011)
PROJECTION: LAMBERT CONFORMAL CONIC, (SINGLE PARALLEL)
STANDARD PARALLEL AND GRID ORIGIN: 64°51'00"N
CENTRAL MERIDIAN (GRID ORIGIN): 146°56'00"W
FALSE NORTHING: 200,000 SFT
FALSE EASTING: 800,000 SFT
STANDARD PARALLEL SCALE: 1.00003 (EXACT)

THE BASIS OF COORDINATES IS THE NAD83(2011)(EPOCH:2010.0000) OPUS AVERAGED POSITION OF RECOVERED PRIMARY MONUMENT "BADGER 1990", POINT #3.

NAD 83 LATITUDE AND LONGITUDE
LATITUDE 64°45'52.9706" N, LONGITUDE 147°22'33.0503" W

FAIRBANKS LDP COORDINATES (US SURVEY FEET)
N: 169044.76 FEET, E: 730906.45 FEET

NOTES:

1. THE PURPOSE OF THIS PLAT IS TO ESTABLISH EXISTING RIGHT OF WAY LIMITS AND SHOW NEW RIGHT OF WAY AND OR EASEMENT INTERESTS ACQUIRED BY ALASKA DOT&PF FOR THIS PROJECT THROUGH DEEDS, PERMITS, INTERAGENCY AGREEMENTS, AND OTHER DOCUMENTS. ADJOINING PROPERTY LINES AND PROPERTY CORNERS AS SHOWN ARE BASED ON A COMBINATION OF RECORD INFORMATION AND FOUND MONUMENTS. FURTHER EVIDENCE MAY NEED TO BE CONSIDERED BEFORE USING THIS DRAWING TO ESTABLISH PROPERTY LINES AND PROPERTY CORNERS.

2. THE BASIS OF STATIONING IS 10+00 AT THE COORDINATES SHOWN ON THE ATTACHED TABLE.

3. THE HORIZONTAL CLOSURE FOR THIS SURVEY MEETS OR EXCEEDS 1 PART IN 10,000. THE LARGEST NETWORK HORIZONTAL SEMI-MAJOR ERROR ELLIPSE OF 0.021 METERS AT THE 95% CONFIDENCE LEVEL WAS OBSERVED FOR THE STATIC GPS, AND THE MINIMUM LOOP MISCLOSURE MEETS OR EXCEEDS 1 PART IN 637,051.

4. COORDINATES, STATIONS, AND OFFSETS LISTED IN THE RECOVERED MONUMENT TABLES REFER TO THE POSITION OF THE PHYSICAL EVIDENCE. DIMENSIONS, STATIONS AND OFFSETS AS SHOWN ON THE PLAN SHEETS REFLECT ADJUSTED POSITIONS. ADJUSTED POSITIONS ARE BASED ON AN EVALUATION OF THE CONTROLLING EVIDENCE AND SENIOR RIGHTS AND MAY VARY FROM THE POSITION OF THE PHYSICAL EVIDENCE.

5. THE RIGHT OF WAY FOR THIS PORTION OF THE RICHARDSON HIGHWAY IS A 300 FOOT RIGHT OF WAY AS SHOWN ON THE ROW MAP FOR DOT PROJECT F-062-4(20). THE RIGHT OF WAY FOR THIS PORTION OF THE OLD RICHARDSON HIGHWAY IS PER THE ROW MAP FOR DOT PROJECT IM-0002(127)/61077 RECORDED AS PLAT #2010-119, FAIRBANKS RECORDING DISTRICT. THE RIGHT OF WAY FOR THE RICHARDSON HIGHWAY WAS ORIGINALLY WITHDRAWN FROM PUBLIC USE BY PUBLIC LAND ORDER 601 DATED AUGUST 10, 1949, AND TRANSFERRED TO THE STATE OF ALASKA AS FEDERAL AID PRIMARY ROUTE 71 PER THE 1959 OMNIBUS DEED.

POINTS OUTSIDE OF PLAN VIEW

MONUMENT TABLE

POINT NO.	NORTHING	EASTING	DESCRIPTION
1	171650.81	719543.12	PRIM MON FND PI 6
3	169044.76	730906.45	PRIM MON FND BADGER 1990
7822	168211.01	730863.63	MON IN CASE FND 5/4/8/9 T2S R2E RESET 1988
7823	168212.45	730693.73	PRIM MON FND C1 L3 S9073 T2S R2E 1987 BLM RR
7824	168074.61	730863.25	PRIM MON FND S59073 ROW/C2L3/C1L4/58/59 1987 BLM RR
7825	169531.59	730837.60	PRIM MON FND PARCEL II/33FT TO SL 705-S 1993
7826	169531.39	730903.24	REBAR FND
7827	170851.53	730910.76	REBAR FND
7828	170851.83	730843.80	REBAR FND
7830	168247.58	725582.77	PRIM MON FND 6/5/7/8 T2S R2E 603-S KALEN 2009
7839	169532.11	725423.48	REBAR CAP FND ROW/L1A 6484-S 2001
7840	169531.20	725548.00	REBAR FND
7841	169383.18	725547.71	REBAR CAP FND L1A/L1B/ROW 6484-S 2001
7842	169216.26	725546.97	REBAR CAP FND L1B/ROW 6484-S 2001
7859	169324.00	730795.70	REBAR CAP FND 1 705-S
7860	169398.79	730208.88	REBAR CAP FND 1A/1
7861	169403.07	730091.52	REBAR CAP FND PC A
7862	169536.59	730210.14	PRIM MON FND 1A/2/1 705-S 1993
7865	169415.24	729549.49	PRIM MON FND QUINNEL SUB 2ND 705-S 2006

"OLD RICH CONNECTION"

ALIGNMENT POINTS

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION	STATION	OFFSET
100	169870.07	725443.33	0.00	START		T
101	169866.89	725818.22	0.00	PC		T
102	169841.32	726012.17	0.00	PT		T
103	169634.76	726809.08	0.00	PC		T
104	169609.18	727005.30	0.00	PT		T
105	169607.08	727377.06	0.00	END		T

(LOCATIONS SEAL)

(ROW SEAL)

PRELIMINARY

DATE	REVISION	BY

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND
PUBLIC FACILITIES
RIGHT OF WAY MAP
ALASKA PROJECT NO.
0A24034/NFHWY00097
HSIP: RICHARDSON HIGHWAY MP 351
INTERCHANGE

SCALE: 1"= N/A

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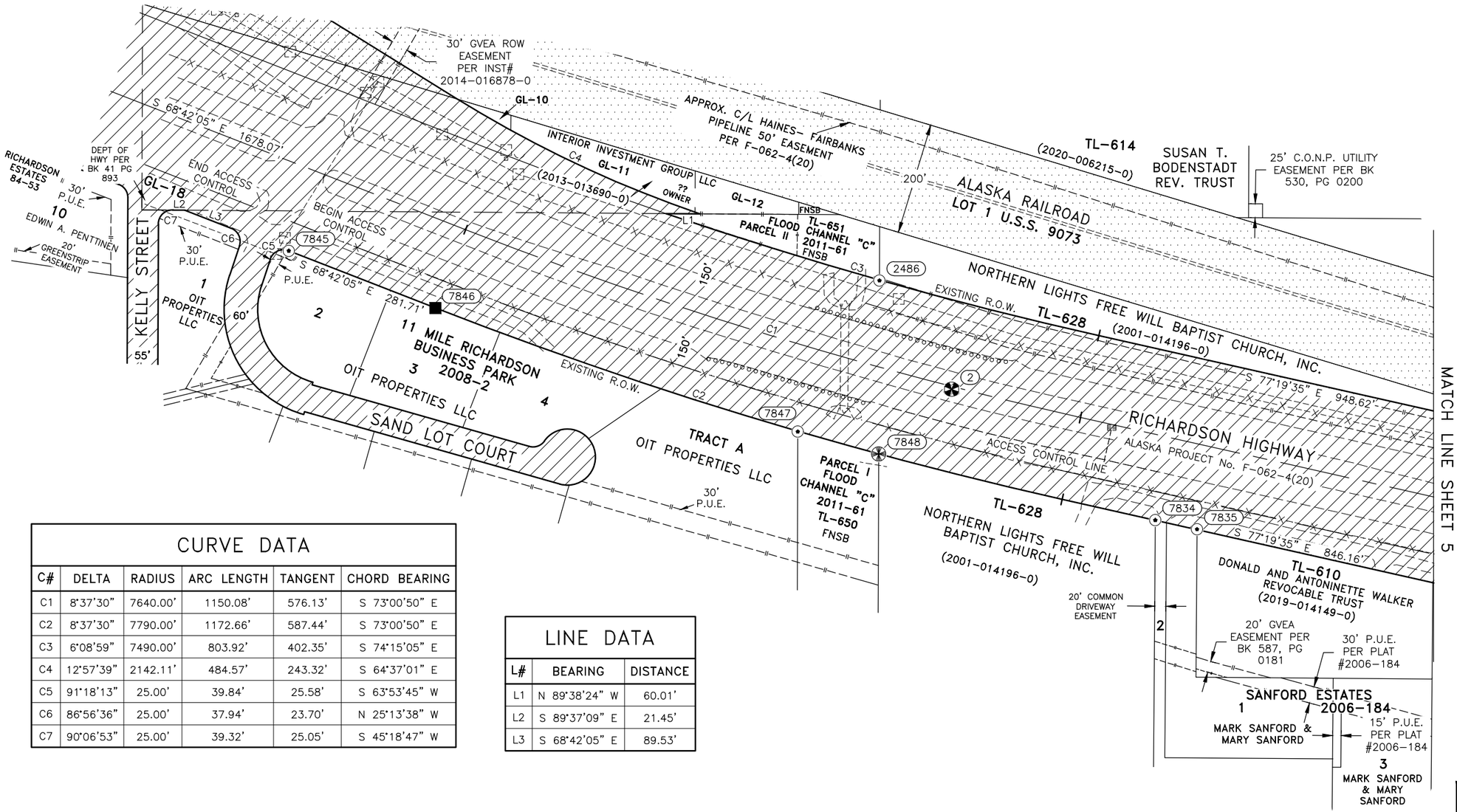
PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-5400



CURVE DATA

C#	DELTA	RADIUS	ARC LENGTH	TANGENT	CHORD BEARING
C1	8°37'30"	7640.00'	1150.08'	576.13'	S 73°00'50" E
C2	8°37'30"	7790.00'	1172.66'	587.44'	S 73°00'50" E
C3	6°08'59"	7490.00'	803.92'	402.35'	S 74°15'05" E
C4	12°57'39"	2142.11'	484.57'	243.32'	S 64°37'01" E
C5	91°18'13"	25.00'	39.84'	25.58'	S 63°53'45" W
C6	86°56'36"	25.00'	37.94'	23.70'	N 25°13'38" W
C7	90°06'53"	25.00'	39.32'	25.05'	S 45°18'47" W

LINE DATA

L#	BEARING	DISTANCE
L1	N 89°38'24" W	60.01'
L2	S 89°37'09" E	21.45'
L3	S 68°42'05" E	89.53'

MONUMENT TABLE

POINT NO.	NORTHING	EASTING	DESCRIPTION
2	170589.98	724403.41	PRIM MON SET RICH 351.5
2486	170784.28	724274.28	REBAR CAP FND ROW/FCC 4603-S 2009
7834	170356.07	724767.26	REBAR CAP FND ROW/2 6474-S 2005
7835	170339.54	724841.90	REBAR CAP FND ROW/1/* 6474-S 2005
7845	170837.34	723218.54	REBAR CAP FND 2 7204-S
7846	170735.12	723480.59	CONCRETE ROW MON FND
7847	170514.15	724128.25	REBAR CAP FND ROW/Tr A/FCC 4603-S 2010
7848	170474.42	724272.98	PRIM MON FND NE TR A/ROW 11 MILE RICH BUS. PARK 7204-S 2006

(ROW SEAL)

PRELIMINARY

0 100 200 300 400 500
SCALE 1"=100'

PARCEL NUMBER	INTEREST TO BE ACQUIRED	OWNER(S)	LARGER PARCEL	ACQUISITION INCL. EXISTING EASEMENTS	NET ACQUISITION	REMAINDER	INSTRUMENT NO.
1		DELETED					
2		DELETED					
3		DELETED					
4		DELETED					

DATE	REVISION	BY

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
RIGHT OF WAY MAP
ALASKA PROJECT NO.
0A24034/NFHWY00097
HSIP: RICHARDSON HIGHWAY MP 351 INTERCHANGE

SCALE: 1"= 100'

SHEET 4 OF 6

PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-5400

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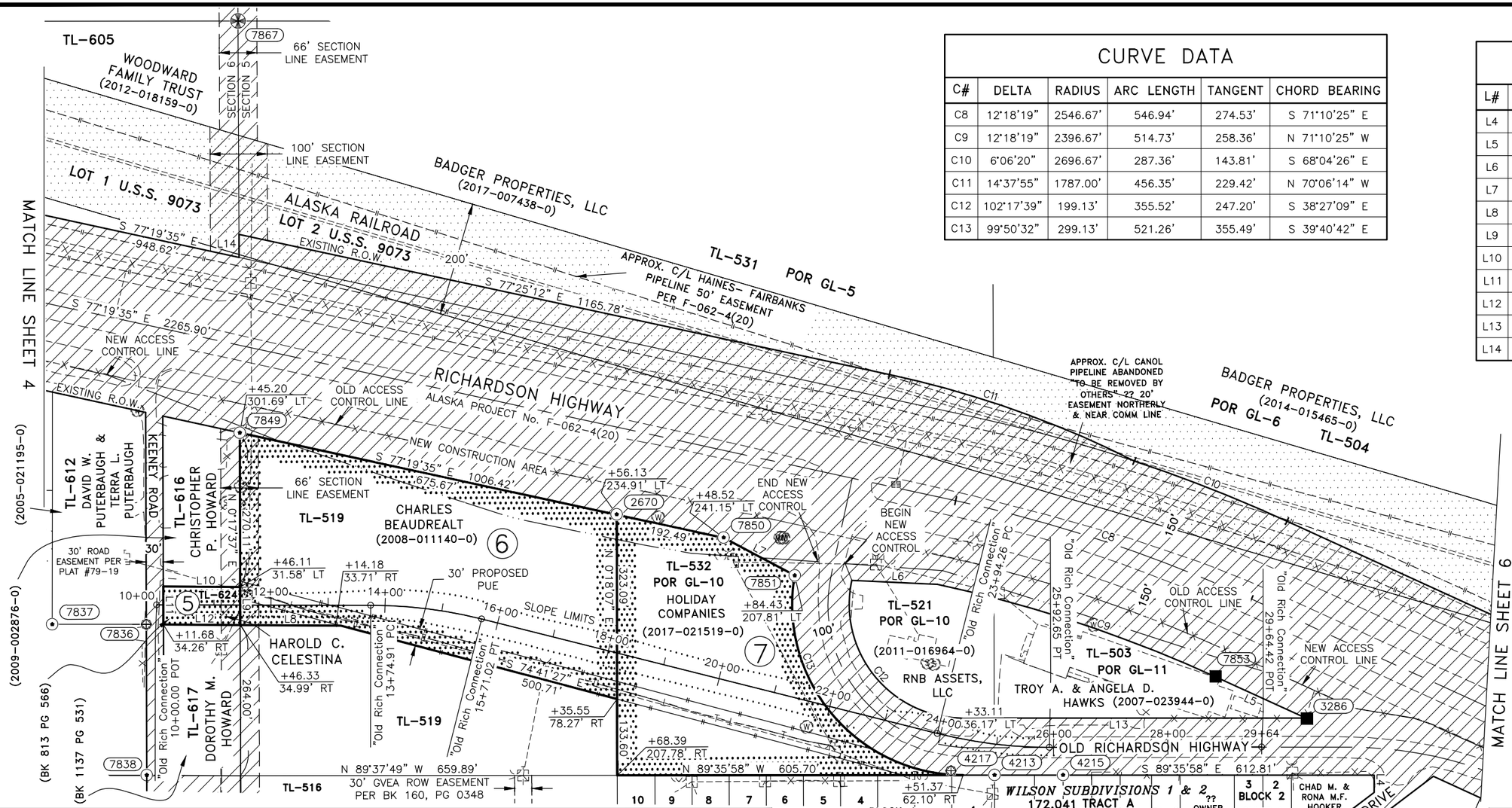


CURVE DATA

C#	DELTA	RADIUS	ARC LENGTH	TANGENT	CHORD BEARING
C8	12°18'19"	2546.67'	546.94'	274.53'	S 71°10'25" E
C9	12°18'19"	2396.67'	514.73'	258.36'	N 71°10'25" W
C10	6°06'20"	2696.67'	287.36'	143.81'	S 68°04'26" E
C11	14°37'55"	1787.00'	456.35'	229.42'	N 70°06'14" W
C12	102°17'39"	199.13'	355.52'	247.20'	S 38°27'09" E
C13	99°50'32"	299.13'	521.26'	355.49'	S 39°40'42" E

LINE DATA

L#	BEARING	DISTANCE
L4	S 0°24'02" W	30.31'
L5	N 65°01'16" W	173.26'
L6	N 86°53'45" W	150.20'
L7	S 61°41'09" E	139.95'
L8	S 89°12'10" E	176.31'
L9	S 0°17'37" W	66.57'
L10	S 89°12'10" E	134.73'
L11	N 0°13'55" E	66.57'
L12	N 89°12'10" W	134.66'
L13	S 89°35'58" E	600.43'
L14	S 0°10'18" W	40.50'

MONUMENT TABLE

POINT NO.	NORTHING	EASTING	DESCRIPTION
2670	170022.86	726250.30	REBAR CAP FND GL10 705-S
3286	169656.16	727456.71	CONCRETE ROW MON FND (DISTURBED)
4213	169561.44	726908.80	REBAR CAP FND ROW/L1/TL7 7621-S
4215	169560.59	727028.81	REBAR CAP FND ROW/TL6 7621-S
4217	169569.18	726832.46	REBAR FND
7836	169836.33	725424.72	REBAR FND
7837	169837.36	725260.08	REBAR CAP FND 3239 (PLASTIC)
7838	169572.13	725423.65	REBAR CAP FND (ILLEGIBLE PLASTIC)
7849	170170.80	725591.09	REBAR CAP FND 3246-S
7850	169980.63	726437.36	REBAR CAP FND
7851	169913.66	726561.30	REBAR CAP FND
7853	169731.14	727297.36	CONCRETE ROW MON FND
7867	170892.10	725593.25	PRIM MON FND GLO S6/S5 1/4 1920 (LEANING WEST)

PRELIMINARY

(ROW SEAL)

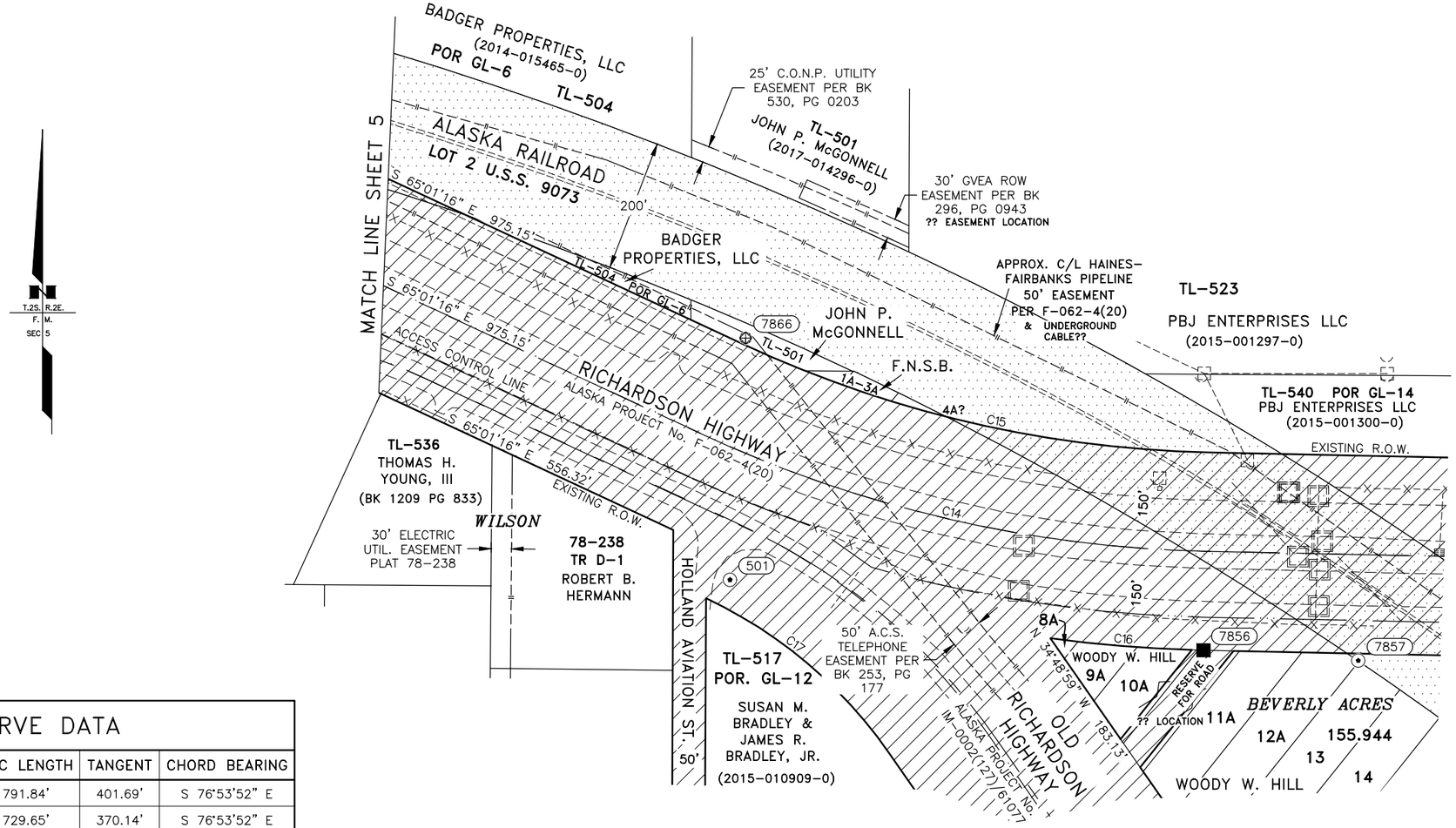
0 100 200 300 400 500
SCALE 1"=100'

PARCEL NUMBER	INTEREST TO BE ACQUIRED	OWNER(S)	LARGER PARCEL	ACQUISITION INCL. EXISTING EASEMENTS	NET ACQUISITION	REMAINDER	INSTRUMENT NO.
5	FEE PARCEL	HAROLD C. CELESTINA	8966	8966	?? SLE	0	X
6	FEE PARCEL	CHARLES BEAUDREALT	8.010	4.744	?? SLE	3.266	X
7	FEE PARCEL	HOLIDAY COMPANIES	3.374	3.374	3.374	0	X

DATE	REVISION	BY

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
RIGHT OF WAY MAP
ALASKA PROJECT NO.
0A24034/NFHWY00097
HSIP: RICHARDSON HIGHWAY MP 351 INTERCHANGE

SCALE: 1"= 100' SHEET 5 OF 6



CURVE DATA

C#	DELTA	RADIUS	ARC LENGTH	TANGENT	CHORD BEARING
C14	23°45'12"	1910.00'	791.84'	401.69'	S 76°53'52" E
C15	23°45'12"	1760.00'	729.65'	370.14'	S 76°53'52" E
C16	5°59'22"	2060.00'	215.34'	107.77'	S 85°16'03" E
C17	29°56'24"	703.04'	367.37'	187.98'	S 49°47'10" E

MONUMENT TABLE

POINT NO.	NORTHING	EASTING	DESCRIPTION
501	169232.99	728288.99	REBAR CAP FND (BLANK)
7856	169126.27	729006.69	CONCRETE ROW MON FND
7857	169110.38	729241.23	REBAR CAP FND L12/L13/ARR 3286-S 1982
7866	169599.50	728312.69	REBAR FND 3/8

(ROW SEAL)

PRELIMINARY

0 100 200 300 400 500

SCALE 1"=100'

PARCEL NUMBER	INTEREST TO BE ACQUIRED	OWNER(S)	LARGER PARCEL	ACQUISITION INCL. EXISTING EASEMENTS	NET ACQUISITION	REMAINDER	INSTRUMENT NO.

DATE	REVISION	BY

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
RIGHT OF WAY MAP
ALASKA PROJECT NO.
0A24034/NFHWY00097
HSIP: RICHARDSON HIGHWAY MP 351 INTERCHANGE

SCALE: 1"= 100'

SHEET 6 OF 6

PLANS DEVELOPED BY: STATE OF ALASKA DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES, NORTHERN REGION, 2301 PEGER ROAD, FAIRBANKS, AK 99709 (907)451-5400

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