Raspberry Road, Jewel Lake to Minnesota

Project No.: N/A – Alaska

DESIGN STUDY REPORT

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

PREPARED BY:

Seawolf Engineering 2015
3211 Providence Drive
Anchorage, AK 99503

Design Study Report

For

Raspberry Road, Jewel Lake to Minnesota

Prepared for:
Alaska Department of Transportation and Public Facilities
Central Region
411 Aviation Avenue
Anchorage, AK 99502

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SPECIAL THANKS TO

Seawolf Engineering 2015 would like to thank the Alaska Department of Transportation and Public Facilities (AKDOT&PF) and their designated mentors; James Amundsen, P.E., Eric Miyashiro, P.E., and Robert DeVassie, P.E. and the University of Alaska Anchorage – College of Engineering, Dr. Osama Abaza, C. Eng.

NOTICE TO USERS

This report is a compilation of opinions, calculations and recommendations of nine senior level students at the University of Alaska Anchorage. This design, calculations and costs expressed in this DSR are based off decisions, conversations, and team meetings up to April 24, 2015. Because this project is a fictitious project, with funding and design already complete by Kinney Engineering for the Alaska Department of Transportation & Public Facilities (AK DOT&PF), Central Region this report should serve as hands-on-learning experience for the group, and as free 3R project alternative analyses for the AK DOT&PF. Persons intending to use this document for planning purposes should be aware that changes may have occurred in the project since publication. Additionally, it should be noted that this design has been conducted by engineering students at the University of Alaska, Anchorage, and the design has not been certified by a registered Professional Engineer.

PLANNING CONSISTENCY

Seawolf Engineering 2015 hereby certifies that this document was prepared in accordance with Section 520.4.1 of the current edition of the Department's Highway Preconstruction Manual and CFR Title 23, Highways Section 771.111(h) and with feedback from Professors, Professional Certified Project Managers and Project Engineers. In addition, strides were made to ensure decisions considered the projects social and economic effects upon the community, its impacts on the environment and its consistency with planning goals and objectives as approved by the local community.

DOCUMENT RETENTION

This report will stay on file with the School of Engineering, 3211 Providence Drive, ENGR 201, Anchorage, AK 99508.

Stefanie Armstrong, PM	Date	Ryan Kim, TGL	Date
Corey Prewett, PE	Date	Brendan Hafele, TGL	Date
Amanda Del Frate, PE	Date	Christi Meyn, TGL	Date
George Randy Lenig, TGL	Date	Travis Thompson, TGL	Date
Andrew Gray, TGL	Date		

PURPOSE

The goals and course objectives for this project were to give students the necessary knowledge and practical training in the implementation of a multi-disciplinary engineering project in the field of Civil Engineering in partnership with the “client”, the Alaska Department of Transportation and Public Facilities through formal partnership and mentoring.

Through this project, and in additional course deliverables, students were expected to showcase and defend how they met the *Civil Engineering Program Learning Outcomes.*
This project alone provided ample opportunity. The table below will outline what student outcomes were met within the required deliverables of this project.

UAA Civil Engineering - Student Learning Outcomes	Yes	No
An ability to apply knowledge of mathematics through differential equations, probability and statistics, calculus-based physics, and general chemistry.	x	
An ability to apply knowledge in a minimum of four recognized major civil engineering areas.	x	
An ability to design and conduct experiments, as well as to analyze and interpret data, in more than one of the recognized major civil engineering areas.	x	
An ability to design a civil engineering system, component, or process to meet desired needs.	x	
An ability to function on multidisciplinary teams.	x	
An ability to identify, formulate, and solve engineering problems.	x	
An understanding of professional and ethical responsibility.	x	
An ability to communicate effectively.	x	
The broad education necessary to understand the impact of engineering solutions in a global and societal context.	x	
The broad education necessary to understand the impact of engineering solutions in a global and societal context.	x	
A knowledge of contemporary issues in professional practice.	x	
An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.	x	

CE 438 Student Learning Outcomes and Corresponding Methods of Assessment	
Outcome	**Method of Assessment**
1. Ability to identify problems and opportunities, develop related engineering design criteria, and formulate alternative solutions to meet client needs while protecting public health and safety using knowledge and skills learned in the civil engineering undergraduate curriculum.	Faculty and AK DOT&PF evaluations with multi-disciplinary team members, instructors, and course mentors, interim and final oral presentations or project progress and findings, and contributions of technical drawings, visualizations, and narrative text to interim and final reports.
2. Ability to function effectively on multi-disciplinary teams engaged in collaborative and iterative design of a complex civil engineering system with conflicting technical, social, economic, and aesthetic objectives.	Faculty evaluation of interactions with multidisciplinary team members, instructors, and course mentors, interim and final oral presentations of project progress and findings, and contributions of technical drawings, visualizations, and narrative text to interim and final reports. Peer evaluations of team performance.
3. Understanding of the professional, legal, and ethical responsibilities of practicing civil engineers.	Faculty evaluation of interactions with multidisciplinary team members, instructors, and course mentors, interim and final oral presentations or presentation progress and findings, and contributions of technical drawings, visualizations, and narrative text to interim and final reports.
4. Recognition of the need for and ability to engage in lifelong learning in the context of civil engineering professional practice.	Faculty evaluation of work products with emphasis on evidence of self-initiated learning of principles not covered in the curriculum to obtain needed information to solve the design problem.
5. Ability to communicate effectively with engineering drawings and technical visualizations, construction specifications, written technical reports, and public oral presentations.	Faculty evaluation of interim and final oral presentations of project progress and findings, and contributions of technical drawings, visualizations, and narrative text to interim and final reports.

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LIST OF ACRONYMS

AAC	Alaska Administrative Code
AADT	Annual Average Daily Traffic
AASHTO	American Association of State Highway and Transportation Officials
ABP	Anchorage Bike Plan
AC	American Concrete Institute
ACGP	Alaska Construction General Permit
ACS	Alaska Communication System
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
ADT	average daily traffic
AKFPD	Alaska Highway Flexible Pavement
AK DOT&PF	Alaska Department of Transportation and Public Facilities
AMATS	Anchorage Metropolitan Area Transportation Solutions
AMC	Anchorage Municipal Code
ANSI	American National Standards Institute
APDES	Alaska Pollutant Discharge Elimination System
AS	Alaska Statute
ASD	Anchorage School District
ASDS	Alaska Sign Design Specifications
ASME	Alaska Society of Mechanical Engineers
ASTM	American Society of Testing & Materials
ATM	Alaska Test Method (see Alaska Test Methods Manual)
ATP	Anchorage Trails Plan
ATSSA	American Traffic Safety Services Association
AWPA	American Wood Preservers Association
AWWU	Anchorage Water and Wastewater Utility
BMP	Best Management Practice
BOP	Beginning of Project
CAC	Citizen’s Advisory Committee
CEA	Chugach Electric Association
CFR	Code of Federal Regulations
COE	Cost Estimate
CRSI	Concrete Reinforcing Steel Institute
CSS	Context Sensitive Solutions
D	Diameter
DCM	Design Criteria Manual
DIP	Ductile Iron Pipe
DOLWD	Alaska Department of Labor and Workforce Development
DOT&PF	Alaska Department of Transportation and Public Facilities
DSR	Design Study Report
EA	Environmental Assessment
EIS	Environmental Impact Statement
EOP	End of Project
EPA	Environmental Protection Agency
ESCP	Erosion and Sediment Control Plan
FEED	Front-End Engineering Design
FEL	Front-End-Loading

FHWA	Federal Highway Administration
F/O	Fiber Optic
GCI	General Communication
HMCP	Hazardous Material Control Plan
HPS	High Pressure Sodium
HSIP	Highway Safety Improvements Program
HSM	Highway Safety Manual
ICD	Inscribed Circle Diameter
IES	Illuminating Engineering Society
LED	Light Emitting Diode
LID	Low Impact Development
LOS	Level of Service
MADT	Monthly Average Daily Traffic
mph	Miles Per Hour
MOA	Municipality of Anchorage
MP	Milepost
MTP	Metropolitan Transportation Plan
MUTCD	Manual of Uniform Traffic Control Devices
NPDES	National Pollutant Discharge Elimination System
OS&HP	Official Streets and Highway Plan
PCM	Alaska DOT&PF Highway Preconstruction Manual
PGDHS	A Policy on Geometric Design of Highways and Streets
PM&E	Project Management & Engineering
PZC	Planning and Zoning Commission
NEPA	National Environmental Policy Act
PDR	Preliminary Design Report
ROW	Right-of-Way
sta	station (100 ft)
STIP	State Transportation Improvement Plan
SWMM	Stormwater Management Model
SWPPP	Stormwater Pollution Prevention Plan
TMP	Traffic Management Plan
TRB	Transportation Research Board
UDC	Urban Design Commission
UGE	Underground Electric
USGS	United States Geological Survey
USPS	United States Postal Service
TLTW	Two Lane Two Way

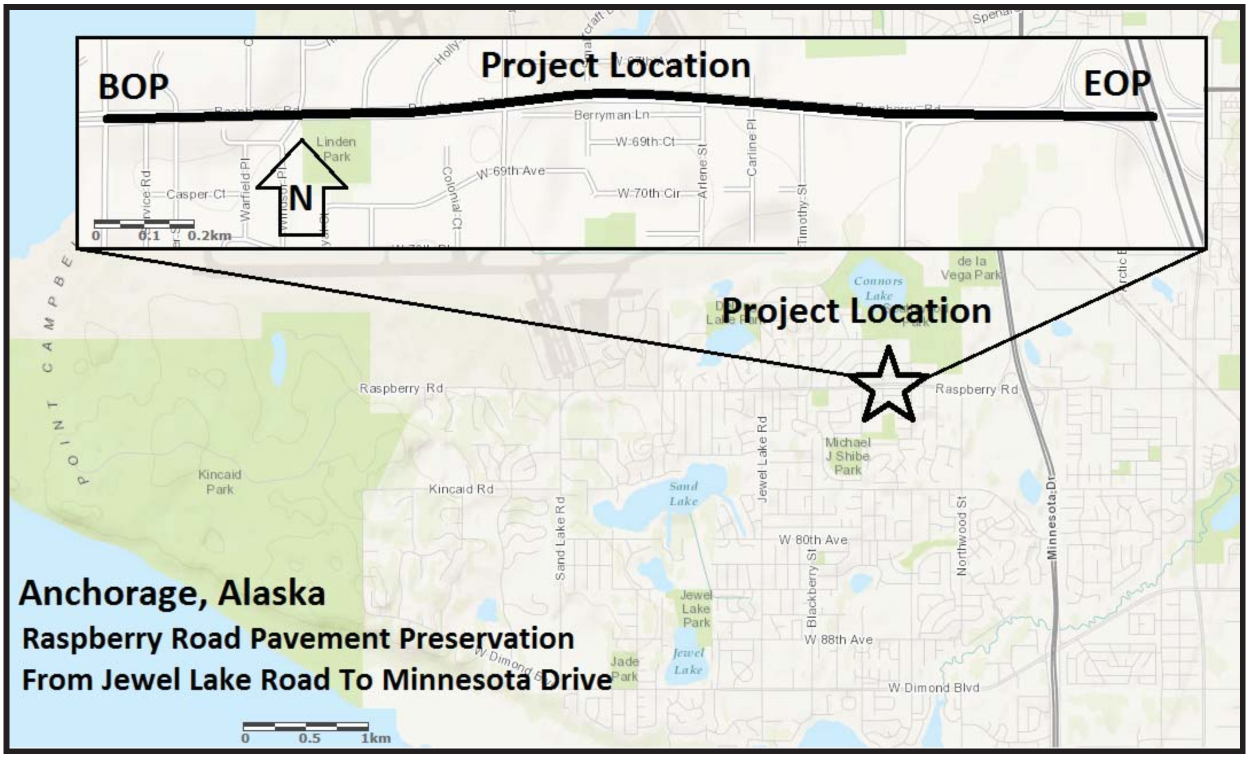
1.0 PROJECT DESCRIPTION

1.1 Project Location and Description

Seawolf Engineering 2015 is designing the Raspberry Road, Minnesota to Jewel Lake Road project to a 35% level, in cooperation with the Alaska Department of Transportation and Public Facilities (AKDOT&PF), the Federal Highway Administration (FHWA), and the Municipality of Anchorage (MOA). The project is located in Anchorage, Alaska, within the MOA, and is on the *Anchorage A-8 NW USGS Topographic Map* (USGS, 2015). See above Figure 1 for the Vicinity Map. Using the Department of Natural Resources *Alaska Mapper* application the project site beginning of project (BOP) is located at Latitude 61.159 N and Longitude 149.952 W, and end of project (EOP) is Latitude 61.159 N and Longitude 149.910 E.

An overview of the proposed improvements include:

- Realign the Minnesota Drive off-ramp to Northwood Drive,
- Design improvements to curb ramps, sidewalks, grade, drainage and lighting
- ADA Ramp Compliance
- Striping and signing
- Pedestrian sidewalks down the full-length of the roadway, providing for a seamless design
- Addition of bicycle lanes down the full-length of the roadway



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

FIGURE 1

RASPBERRY ROAD IMPROVEMENTS
PROJECT NO. SEAWOLF ENGR.2015

LOCATION AND VICINITY MAP

FIGURE 1: Location and Vicinity Map

1.2 Existing Facilities and Land Use

1.2.1 Facility Description, Context, and Setting

Beginning of project (BOP) is at Raspberry Road, located east under the Minnesota Highway at approximately Latitude 61.159 N and Longitude 149.952 W. The project runs west, entirely along Raspberry Road until Jewel Lake Road at Latitude 61.159 N and Longitude 149.910 E.

The project site is currently a four lane, divided arterial road with three traffic lights (east to west) at Northwood Street, Cranberry Street, and Jewel Lake Road. Traffic is not permitted to park along Raspberry Road. Raspberry Road services multiple schools and child development centers, businesses, churches, provides access to two recreational park areas, and access to three bus stops along the project site servicing eight stops daily (Monday - Friday).

<u>Schools</u>:

Raspberry Road services multiple school systems through bus routes and route access. A list of impacted schools within a 2.0 mile radius of the project EOP/BOP is below.

- Gladys Wood Elementary School, Cranberry Road
- Kincaid Elementary School, Raspberry Road
- Sand Lake Elementary, Jewel Lake Road
- Children's World Bilingual Montessori, Jewel Lake Road
- Lumen Christi, Jewel Lake Road
- Chinook Elementary School, W. 88th Ave.
- Dimond High School, W 88th Ave.
- Crystal Child Development Center/ Little Red School House, Raspberry Road
- Willow Loft Preschool, LLC,
- Bright Beginnings Early Learning Center, Jewel Lake Road
- Primrose Garden Preschool, W. 80th Ave.

<u>Businesses</u>:

A variety of businesses are located off of Raspberry Road. Some of them with access only via Raspberry Road. Additional businesses are listed as well, since accessibility will be impacted once in construction.

- Sun City Tanning (Salon West)
- Uncle Joe's Pizzeria
- Kaladi Brothers Coffee
- Wells Fargo
- Holiday Station Store
- Redbox
- Circle Plumbing and Heating
- Tastee Freez
- Kincaid Grill
- Crystal Child Development Center

Churches:
The Filipino Bible Church is located at 3340 Raspberry Road and provides a wide variety of services to local community members. Po*tential Construction Impacts* are bulleted below:

- Every Sunday morning services from 9 am - 12 pm
- Every other Tuesday 7 pm they hold evening services
- Every Thursday they hold Youth Group services
- Every Friday they hold College Bible Study

Figure 2: Bus stop in front of the Filipino Bible Church on Raspberry Road.

Contact Information:
Filipino Bible Church
(907) 243 - 9407
filipinobible.org
mail@filipinobible.org

Change Point Church is located at 6689 Change Point Drive, just past the Minnesota Highway overpass on Raspberry Road. Although out of the project site, the location of the church would impact traffic flow to and from the church. Change Point provides a variety of services to local community members, potential construction impacts could delay the following activities.

Potential Construction Impacts:

- Every Sunday Ministry Services at 9:30 am, 11:30 am, 1:30 pm, and 6:00 pm - 7:30 pm. As well as a variety of other services for children at the same time.
- Every Monday 6:30 & 6:45 pm Youth Programs
- Every Tuesday at 6:30 pm a Junior High School Program or High School Program.
- Every Wednesday
- Every Thursday

Figure 3: Raspberry Road intersection with Change Point Drive.

Contact Information:
Change Point Alaska
(907) 646 - 4800
changepointalaska.com
info@changepointalaska.com

Recreational Parks:
Linden Park is located at 3320 Raspberry Road, Anchorage, AK and is managed by the Anchorage Park Foundation. The park was purchased in 1982 with a Block Grant, and other funds and has park benches, and gravel trails.

Figure 4: Linden Park off of Raspberry Road.

Connors Lake Park is located at 5404 Jewel Lake Road, Anchorage, AK and is also managed by the Anchorage Park Foundation. Local resources have indicated the park was originally opened up in 1971. After years of abuse from snow machines the park was closed to motorized traffic in 1980. The figure below depicts the posted Connors Lake proclamation from the Mayor closing the park to motorized traffic.

Buses:
People Mover Bus operates buses within the Municipality of Anchorage (MOA). There are five bus stops along Raspberry Road that service 8 stops:

- 7A Outbound
    - Stop #0154 Jewel Lake and Raspberry Road SSW
- 7A Inbound
    - Stop #3686 Jewel Lake and Raspberry Road NNE
- 7J Outbound
    - Stop #0149 Raspberry Road and Cranberry WNW
    - Stop #0151 Raspberry Road and Blackberry WNW
    - Stop #0154 Jewel Lake and Raspberry Road SSW
- 7J Inbound
    - Stop #0218 Raspberry Road and Jewel Lake ESE
    - Stop #0219 Raspberry Road and Chevingy ESE
    - Stop #0220 Raspberry Road and Cranberry WSW

The following Figure is the bus route system for the People Mover Bus.

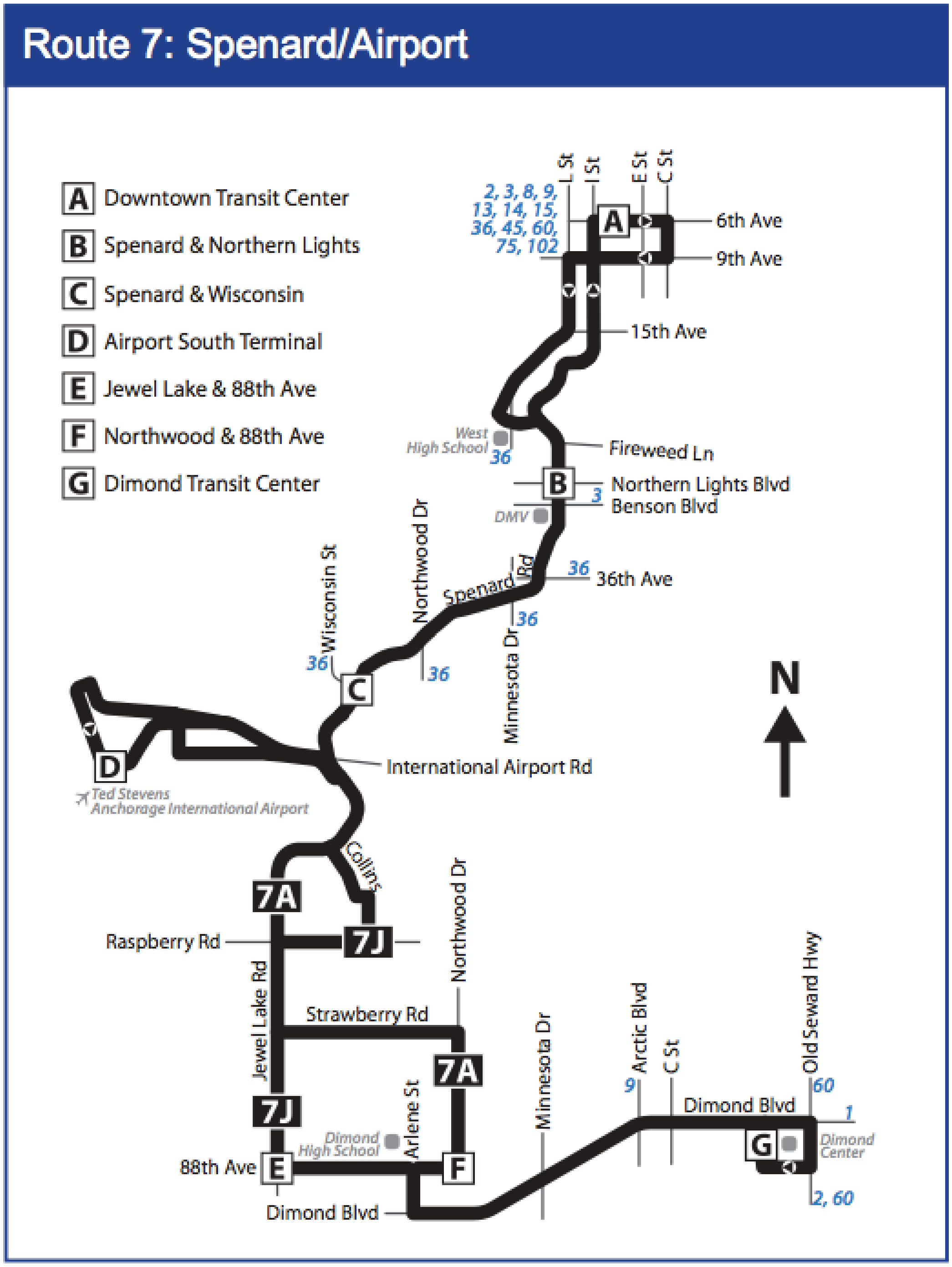


Figure 5: Route 7 (A and J) inbound and outbound Construction Impacts.

1.3 Purpose and Need

The purpose of a 3R project is to enhance safety and extend the service life of the facility. In addition, this projects proposed design includes the relocation of the Minnesota off-ramp at Raspberry to Northwood where it will transition into a 2-lane roundabout with slip lanes.

The need for the project segment includes:

- Expected increased traffic volumes as a result of the east-west corridor addition of Dowling Road
- Poor level of service (LOS) for left turning traffic from Minnesota Drive southbound off-ramp to Raspberry Road
- Addition of bicycle lanes along Raspberry Road,
- Weaving maneuvers for eastbound Raspberry Road drivers with slip lane traffic from Northwood,
- Weaving maneuvers for westbound Raspberry Road drivers and Off-Ramp drivers going to Northwood,
- Sidewalk degradation
- Need for Americans With Disabilities Act (ADA) sidewalk design and accommodation compliance,
- Noise Wall locations are inconsistent and in need of repair

2.0 DESIGN STANDARDS AND CRITERIA

Design standards that apply to Raspberry Road, Jewel Lake to Minnesota are contained in the following publications:

- ADA Standards for Accessible Design, United States Department of Justice, September 15, 2010.
- Alaska Department of Transportation and Public Facilities - Alaska Environmental Procedures Manual: Noise Policy, 2011.
- Alaska Highway Preconstruction Manual (HPCM), State of Alaska Department of Transportation and Public Facilities, 2005 (including all revisions thru February 2015).
- Alaska Flexible Pavement Design Manual,
- Alaska Preconstruction Manual,
- A Policy on Geometric Design of Highways and Streets (PGDHS or "Green Book"), American Association of State Highway and Transportation Officials (AASHTO), 2001.
- An Informational Guide for Roadway Lighting (IGRL), AASHTO, 1984.
- Guide for the Development of Bicycle Facilities, AASHTO, 1999.
- Guide for the Development of Bicycle Facilities, 4th Edition, AASHTO, 2012.
- Guide for the Planning, Design, and Operation of Pedestrian Facilities, AASHTO, 2004.
- Hard Aggregate Usage Policy,
- Proposed Accessibility Standards for Pedestrian Facilities in the Public Right of Way, United States Access Board, July 26, 2011.
- Roadside Design Guide, 3rd Edition, AASHTO, 2006.
- Systems Engineering for Intelligent Engineering Systems, FHWA, 2007.
- The Alaska Traffic Manual (ATM), consisting of the Manual on Uniform Traffic Control Devices (MUTCD), 2009 as amended, U.S. Department of Transportation, Federal Highway Administration (FHWA) and the Alaska Traffic Manual Supplement, 2012, State of Alaska, Department of Transportation and Public Facilities.

3.0 DISCUSSION OF ALTERNATIVES

3.1 No Build Alternative

The existing span of road from Northwood to Minnesota experiences high volumes of traffic heading east and west. Vehicles currently travel on a four-lane separated arterial where weaving movements are common and cause safety concerns, including a large number of rear-end accidents. With the West Dowling Road extension to the immediate east of Raspberry Road and Minnesota Drive, east/west traffic is expected to increase for both motorized and nonmotorized traffic. Currently, the lack of bicycle lanes and continuous pedestrian facilities are a public and safety concern.

3.2 Add Stoplight at Minnesota Southbound Exit Alternative

Adding a stoplight at the intersection of the exit ramp of southbound Minnesota and Raspberry would decrease weaving movements heading west. Level of service would improve for southbound and eastbound traffic; however southbound and westbound traffic would slow due to the added stoplight. Due to the minimal design, the impact on the wetlands would be marginal.

3.3 Southbound Off-Ramp Realignment to Northwood Alternative

Realigning the Minnesota southbound off-ramp to the Northwood and Raspberry intersection eliminates weaving movements in the west direction. The existing Raspberry Road corridor will remain with added bicycle and pedestrian facilities, and will align with the West Dowling Road Extension Phase II project. This proposed alternative also increases flow in all directions by removing the existing signalized intersection and replacing it with a two-lane roundabout with right turn slip lanes. However, roundabouts work best when implemented at the intersection of a major and minor street. At peak hours,this intersection has equal traffic volumes on all legs, which can cause level of service to decrease. Right-turn slip lanes can be added to alleviate congestion. This alternative will require a significant wetland impact.

4.0 PREFERRED ALTERNATIVE

The preferred alternative is to replace the existing signalized intersection at Northwood and Raspberry with a two-lane roundabout, and extend the Minnesota southbound off-ramp to the roundabout. The roundabout will have right turn slip lanes on Northwood heading east on Raspberry and from the Minnesota southbound off-ramp heading west on Raspberry. Adding a roundabout to the intersection will increase traffic flow to a LOS B for AM traffic and LOS C for PM traffic. Traffic analysis of the proposed roundabout is described in Section 11. Bicycle and pedestrian facilities will be extended within the project to align with the West Dowling Road Extension Phase II project. Signed and striped bike lanes will be added on Raspberry from Jewel Lake to Alaska's Best Place, where the lanes will connect with existing bike lanes. Existing pedestrian paths will be connected to allow for continuous paths on both sides of Raspberry. The roundabout and realigned Minnesota southbound off-ramp is shown in Figure 6. This alternative will require a significant wetland impact. Environmental considerations are discussed in Section 19.

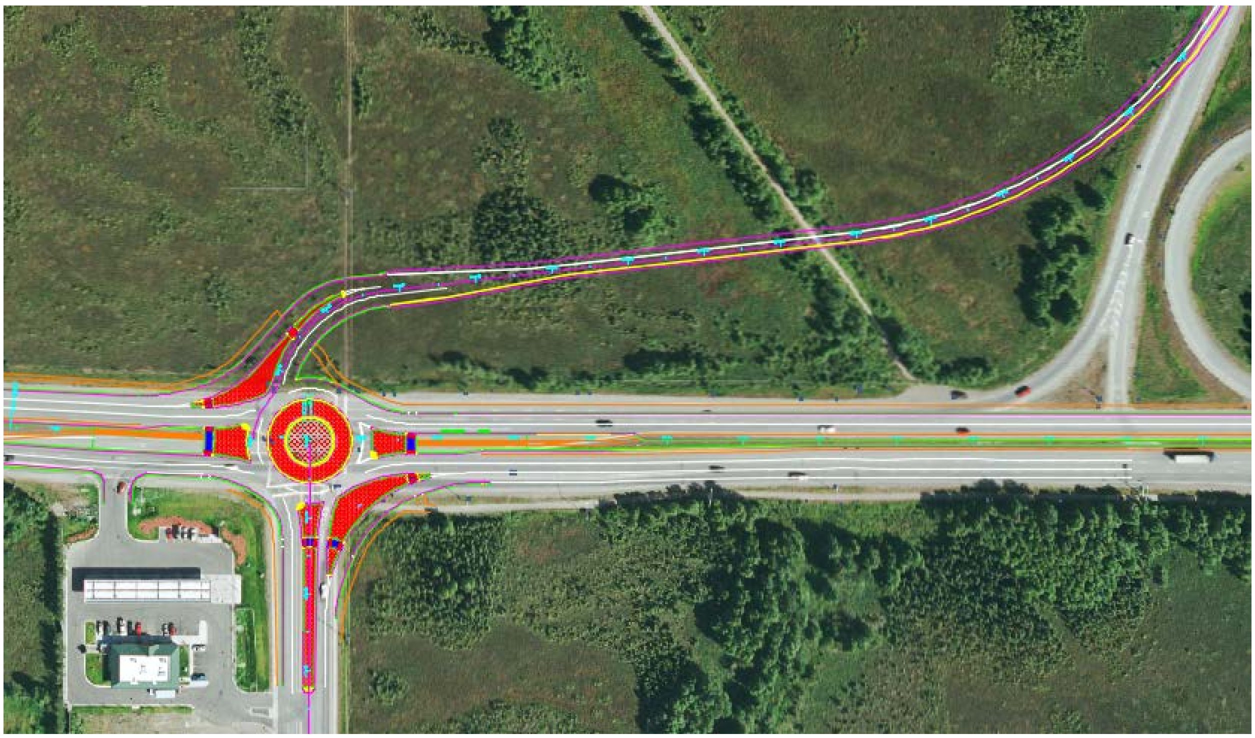


Figure 6. Preferred Alternative roundabout and realigned Minnesota southbound off-ramp.

5.0 TYPICAL SECTION

Raspberry Road will remain as is with two through lanes in each direction with 12-foot wide inside lane, and 12-foot wide outside lanes. A 5-foot bicycle lane has been added from Jewel Lake to Alaska's Best Place on the outside west-east corridor, and a 5-foot bicycle lane has been added from Alaska's Best Place to Jewel Lake on the east-west corridor. At Cranberry Road a bike box transitions the expert bicyclist to the inside lanes until crossing underneath Minnesota Drive at Alaska's Best Place intersection where the bicyclist will transition back to bicycle lanes on the outside lanes. The existing embankment slopes, ditch types, will remain the same. Sidewalk ramps and radiuses have been modified to accommodate ADA compliance.

6.0 HORIZONTAL AND VERTICAL ALIGNMENT

Horizontal and vertical alignment will be discussed in this section.

6.1 Horizontal Alignment

6.1.1 Raspberry Road

The horizontal alignment of the Raspberry Road will follow a fairly straight existing alignment from Jewel Lake Road to Minnesota Drive with ample space of stopping sight distance within the limited amount of Right-of-Way available. However, with the roundabout being place at the Raspberry Road and Northwood Street intersection, additional ROW will be required and wetland impacts.

6.1.2 Minnesota Southbound Off Ramp

With the realignment of the existing Minnesota Southbound off ramp, permitting will be required to access the neighboring wetlands to design the horizontal alignment of the ramp to connect to the Raspberry Road and Northwood Street crossroad. The placement of the first curve for traffic exiting the Minnesota Drive allows ample of space for traffic to decelerate from a recommended design speed of 65 mph to a design speed of 45 mph with a minimum distance of 325 feet. The first curve has radius of 643 feet with a design speed of 45 mph and a maximum superelevation rate of 6%. The second curve is designed with a radius of 144 feet for a design speed of 25 mph with a maximum superelevation rate of 6%, where drivers will have time to decelerate between the two horizontal curves. In addition, drivers will have sufficient space to also decelerate lower than the recommended design speed when approaching the roundabout following the SSD criteria.

6.2 Vertical Alignment

6.2.1 Raspberry Road

The vertical alignment of the Raspberry Road will follow the rolling and level terrain of the existing alignment from Jewel Lake Road to Minnesota Drive. The maximum grade for a rolling terrain with a design speed of 50 mph requires a 7% grade while a level terrain requires a 6% grade. The minimum required grade is 0.5%. The minimum K-values for a crest and sag vertical curve are 84 and 96 respectively for a 50 mph design speed.

6.2.2 Minnesota Southbound Off Ramp

The realigned Minnesota Southbound off ramp will have a maximum grade of 6% for a level terrain with a design speed of 45 mph. The minimum K-values for a crest and sag vertical curve are 61 and 79 respectively. The beginning and end of the Minnesota Southbound off ramp will match at the existing pavement elevations at where it begins on the ramp and when the alignment joins with the roundabout at Raspberry Road.

7.0 EROSION AND SEDIMENT CONTROL

The project includes temporary and permanent measures to control or prevent erosion and sedimentation during and post project construction. The Contractor will prepare a Stormwater Pollution Prevention Plan (SWPPP) prior to construction that conforms to the DOT&PF Best Management Practices (BMPs) for Erosion and Sediment Control, and in accordance with the DOT&PF contract specifications. It will follow the guidelines of the Erosion and Sediment Control Plan (ESCP) provided to the contractor. The contractor will submit the SWPPP for approval by the Construction Project Engineer and the Contractor will conduct construction activities in accordance with the approved SWPPP. Temporary BMP's will remain in place until permanent erosion and sediment control measures are in place and soil is permanently stabilized.

8.0 DRAINAGE

3R Project - Some widening throughout the project site, no significant changes to the current drainage patterns or discharge points however the relocation of Minnesota Off-Ramp to Northwood will have a 2% slopes and 50-feet of ROW on either side. Due to topographical constraints and spatial separation, there is no potential for storm water to flow beyond the roadside ditches and into the Class A wetland called Connor's Bog. An addition of two slip lanes and a roundabout at Northwood will change the lateral flow of water at Northwood. The roundabout will have a 2% slope down from the center island of the roundabout.   Generally within the project area, surface water moves into culverts via ditches.

8.1 MS4 Permit

The National Pollutant Discharge Elimination System (NPDES) Program originated under section 402 of the Clean Water Act (CWA, 33 USC §1251), requires that pollutant discharges to surface water be authorized by permit. Together, the Municipality of Anchorage (MOA) and the DOT&PF are authorized to do so through an Authorization to Discharge permit under the National Pollutant Discharge Elimination System.

This authorization, Alaska Pollutant Discharge Elimination System (APDES) is now governed by 18 AAC 83 and the State of Alaska assumed full primacy over these discharges on 10/31/2012.

In an effort to comply with the intent of the permit; the project will use, at a minimum, control measures to comply with Best Management Practices (BMPs) and the Stormwater Management Program (SWMP), and follow the Authorization to Discharge under the National Pollutant Discharge Elimination System (NPDES).

- The project follows the criteria set forth in the AK DOT&PF's Highway Drainage Manual and the Municipality of Anchorage's Drainage Design Guidelines.

- The Contractor will develop a SWPPP prior to construction that follows the guidelines of the Erosion and Sediment Control Plan (ESCP) provided to the Contractor. The SWPPP will comply with the Alaska Pollutant Discharge Elimination System (APDES) permitting program and the Alaska Construction General Permit (ACGP).

- The Contractor will describe how to minimize and manage to reduce pollution to stormwater in the Contractor's SWPPP.

- The Contractor will comply with all permit conditions with respect to installation and maintenance of control measures, inspections, monitoring (if necessary), corrective actions, reporting and recordkeeping.

- The Contractor will address all discharge in the SWPPP. The contractor will prepare a Hazardous Material Control Plan (HMCP).

- The maintenance of the pipes, sewers, and other conveyances will remain the responsibility of the AKDOT&PF.

- The State of Alaska will maintain outreach and education through the State of Alaska website. Project specific information will be posted at the project site once construction activity begins.

9.0 SOIL CONDITIONS

A Geotechnical Fieldwork Report was developed for this project thru Craig Boeckman, C.P.G. and from Anna Ferntheil. A copy is on file with Central Regional Library and was provided to Seawolf Engineering 2015 for reference. It is inserted in this package as Appendix K and is relevant because the report details soil conditions along Raspberry Road.

Appendix C is the Draft Geotechnical Recommendations Report as completed by the project team. Relevant information includes seven test holes drilled along the shoulder of the road in various locations. These test holes contain a vegetative organic layer from 0.5 feet to 1.5 feet thick in depth. Below this layer the soil types varied. Sand and silts were found in all of the test holes drilled, with peat layers in several test holes to 13 feet deep. Groundwater was also observed in all holes and ranged from 10 to 15.5 feet. This wetland material will have to be removed from site and off site material will be brought in for construction of the off ramp from Minnesota to Northwood Street.

10.0 ACCESS CONTROL FEATURES

The existing, raised median between Northwood Street and Minnesota Drive is proposed to remain. No changes to access control are expected with this project.

11.0 TRAFFIC ANALYSIS

As the population of the Municipality of Anchorage is growing every year, the traffic flowing within the City of Anchorage is constantly growing in volume; especially Raspberry Road spanning from Jewel Lake Road to Minnesota Drive with the construction of the West Dowling Road Extension Phase II: C Street to Minnesota Drive in the summer of 2015. The primary focus for the Raspberry Road Rehabilitation: Jewel Lake Road to Minnesota Drive is to resolve the traffic congestion and safety concerns from Northwood Street to the Minnesota Southbound off-ramp section for traffic exiting the ramp and entering into Northwood of the project. The preferred alternative in providing a solution to the problem is by installing a roundabout at the Raspberry Road and Northwood Street intersection with the realignment of the exiting Southbound off ramp to the intersection with impaction to the neighboring wetlands.

12.0 SAFETY IMPROVEMENTS

The proposed alternative to the Raspberry Road Rehabilitation provides solutions to many safety issues that are present on the current roadway. A majority of the safety concerns come from the existing Minnesota southbound off-ramp and at the intersection of Raspberry and Northwood. Previous crash analysis from these locations reveal a total of 97 crashes, although this number is relatively low it is predicted that the value would increase due to the increase in traffic on the roadway. To improve safety a roundabout has been added to the intersection of Raspberry and Northwood, and the Minnesota southbound off-ramp has been realigned to intersect with the new roundabout.

13.0 RIGHT-OF-WAY REQUIREMENTS

Existing right-of-way for this project varies from 100 feet wide to 145 feet between Jewel Lake Road and Minnesota Blvd.

The section of the proposed project between Northwood Street and Jewel Lake Road will have no impacts on right-of-way at all. This section will merely be resurfaced and remain in the same configuration.

East of the Holiday gas station at the Northwood Drive intersection, right-of-way will need to be acquired and expanded for accommodation of the proposed roundabout. Approximately 6 acres will need to be acquired to accommodate the new roundabout, redirected off-ramp and the land in between for maintenance access. The State of Alaska will be required to acquire the land from the M.O.A. Heritage Land Bank and compensate the municipality. No private land will need to be acquired. The land in the area of interest is forested marsh with no substantial development on it.

14.0 PEDESTRIAN AND BICYCLE FACILITIES

14.1 Existing Facilities

Existing facilities are limited but bulleted below:

- Sidewalks and multi-use paths range from approximately 4 ft to 8 ft.
- Sidewalk on the north side of Raspberry from Cranberry to Jewel Lake
- Multi-use pathway on the south side of Raspberry from Jewel Lake and Northwood
    - Separates from Raspberry at Cranberry; continues through neighborhood behind earthen noise wall; reconnects with Raspberry at Arlene.
    - Continues under Minnesota 400 ft south of Raspberry via a pedestrian tunnel; connects to Raspberry on east side of underpass.
    - No signs to indicate the existing pedestrian underpass, and from Raspberry on the west side of the Minnesota overpass the tunnel cannot be seen.
- Pedestrians and bicyclists have been observed to traverse the shoulder of the road under the Minnesota underpass rather than using the multi-use trail,
- Non-motorized users have also been seen traversing the shoulder on westbound Raspberry where no pedestrian or bike facilities exist.
- No striped or signed bicycle lanes on Raspberry

14.2 Proposed Additions

The addition of continuous bicycle and pedestrian facilities through the extent of this project will assist in safety concerns on the existing road, as well as assist in strong public interest of bike lanes in this area.

14.2.1 Bike Lanes

On street bike lanes will be 4 to 5 ft wide and will be signed and striped according to DOT standards. Due to the safety concerns of heavy traffic exiting and entering on the right side of the road, left side bike lanes will be implemented for a portion of this project. Transitions from right side to left side bike lanes will be accomplished through bike boxes installed at the intersections of Cranberry and Raspberry as well as Alaska's Best Place and Raspberry on the east side of the Minnesota underpass. Bike lanes will end approximately 300 ft before the pedestrian crossings at the roundabout. A bike ramp from the road up to the median will allow bicyclists to choose between navigating the roundabout as a vehicle or using the pedestrian crosswalks. Upon the exit of the roundabout, left side bike lanes will begin 100 ft after the pedestrian crosswalks, and a bike ramp will be installed to connect the crosswalk to the bike lane for bike users who have chosen to use the crosswalks.

Due to the addition of bike boxes, traffic loop replacement and/or movement will need to be considered. Currently, there are five traffic loops exist in the left turn lane of eastbound Raspberry at Cranberry. Two of these will be impacted by the addition of a bike box, as cars will be stopping further back and not able to activate the traffic loops. One option is to replace the current sensors with a sensor capable of detecting bike traffic. Traffic loops will be installed with the West Dowling Road extension at the intersection of Raspberry and Alaska's Best Place

14.2.2 Pedestrian Paths

A 5 ft pedestrian path on the north side of Raspberry from Cranberry to the new intersection at Alaska's Best Place will be implemented in this project. It will be separated from the road from Cranberry to Arlene by a minimum of 5 ft to accommodate snow storage in the winter. The roundabout at Northwood will have pedestrian crossings, and there will be an unmarked pedestrian crossing at the southbound on-ramp to Minnesota.

14.3 ADA Compliance

All pedestrian and bicycle facilities will be ADA compliant.

15.0 UTILITY RELOCATION AND COORDINATION

15.1 Purpose

The purpose of the Utility Conflicts Report is to indicate the current location of utilities located on Raspberry Road, between Jewel Lake Road and Minnesota Drive, and highlight the conflicts that may occur between the existing facilities and new construction.

15.2 Scope

The corridor under consideration is Raspberry Road between Jewel Lake Road and Minnesota Drive.

Utility owners with facilities within the project limits include:

- Alaska Waste Water Utility (AWWU)
- Enstar
- Chugach Electric Association (CEA)
- Alaska Communications Systems Group (ACSG)
- GCI
- Municipality of Anchorage (MOA)

Impacted facilities include water lines, wastewater lines, natural gas lines, electric lines, fiber optic cables, telephone lines, CATV lines, and traffic signals.

15.3 Utility Owners

Provided below alphabetically are the utility owners and the project conflicts, and/or their impacted facilities.

15.3.1 AWWU

<u>Permitting</u>

The AWWU 2012 Construction Practices Design Manual states that any projects within State Highway and State Maintained Roads (20.04.03.01) or Municipal Roads and Easements (20.04.03.02) require the issuance of an AWWU Permit. However, a MOA issued ROW permit is required before an AWWU permit will be issued. Additionally, 20.04.03.03 of the Design Manual states that any projects within State or Municipal ROWs must submit and obtain approval to a traffic control plan with the permit offices. This project includes a draft Traffic Control Plan.

There are no planned interruptions on the project site, however if at a later stage it is determined that service may be interrupted, AWWU requires notification of property owners and residents at a minimum 72 hours and a maximum of 144 hours in advance (20.04.03.07).

Design
Section 20.06.01 of the AWWU 2012 Construction Practices Design Manual states that the Municipality of Anchorage Standard Specifications (MASS) requires designing the sanitary sewer mains 5ft to 6ft south or west of the centerline of a road surface, and water mains 12ft north or east of the center line. Additionally, 10 foot horizontal and 18 inches of vertical clearance between water and storm or sanitary sewer mains and services are required. It has been thirty-four years since the last major design/construction of Raspberry Road occurred. Old plan sets were used to find the location of the the mains

Construction Impacts
All water valve boxes and manholes will have to be adjusted to grade, and installed or relocated to outside the wheel path throughout the project site. As noted above, a standard permit with AWWU will be required.

Additional AWWU construction impacts are outlined in Appendix F.

15.3.2 ACSG

Permitting
All telecommunications utilities must acquire a permit in accordance with 17 AAC 15.301

Design
Underground facilities must have a clearance of four feet from top of said facility to the surface of the pavement in accordance with 17 AAC 15.201 (c). Telecommunication facilities must be constructed in such a way that they are compatible the national communications network as outlined in 3 AAC 52.260.

Location
In accordance with AS 42.30.400 the Alaska Dig Line will be contacted so that ACSG facilities may be located before excavation.

Construction Impacts
Underground telephone cables belonging to ACSG are present on the southwest corner of the Northwood Street and Raspberry Road intersection. No conflict is foreseen, but care must be taken during site excavation.

15.3.3 CEA

Service Area
Chugach Electric Association (CEA) operates within the project site. A service map is provided in the figure below.

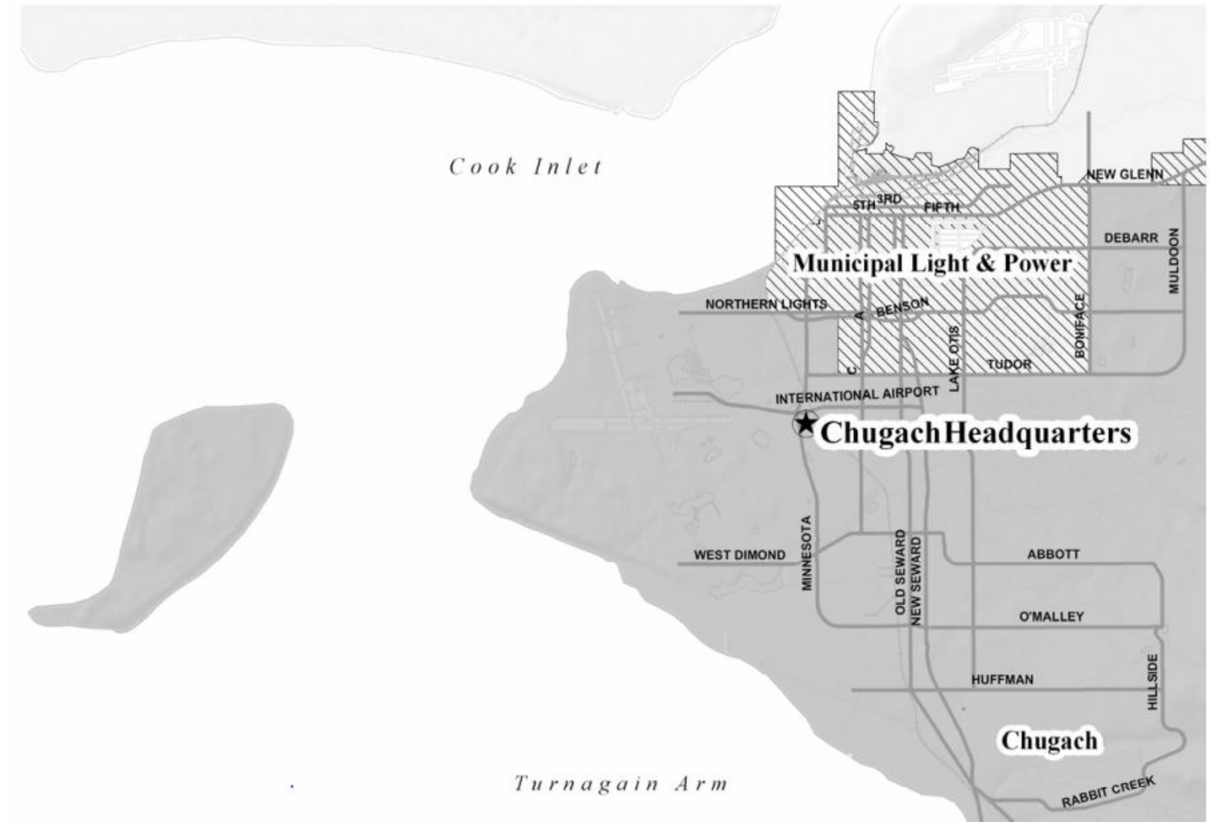


Figure 7: Chugach Electric Service Area Map

CEA is currently working on Cable Injection, Replacement, Undergrounding and Loop Closures however, their 2014 plan does not include any sites near the Raspberry Road, Jewel Lake to Minnesota arterial. So, service work on this project will not impact or interfere with this upgrade.

<u>Nature of Services</u>

Chugach offers a 60 cycle, alternating current, either single or three phase, at available standard voltages. Voltage, frequency, and waveform are regulated to conform to the standard practices of the industry.

<u>Design</u>

Underground facilities must have a clearance of four feet from top of said facility to the surface of the pavement in accordance with 17 AAC 15.201 (c). Existing overhead cables must have clearance of 18 feet while new construction overhead cables must have a clearance of 20 feet in accordance with 17 AAC 15.201 (a-b). In addition utility poles must be locate outside of the roadways clear zone as outlined in the Alaska Highway Preconstruction Manual (17 AAC 15.301 e-3). Minimum safety standards for design of electric facilities are set forth by the National Electrical Code and the National Electrical Safety Code per 8 AAC 70.025.

<u>Construction Impacts</u>

Existing under ground electric wires will need to be relocated and realigned with the proposed off ramp from Minnesota.

Wooden utility poles located at stations 83+86 121.5' RT and 83.86 68.3' LT will need to be relocated to meet clear zone criteria outlined in Section 1130 of the Alaska Highway Preconstruction Manual 2005, and relocated in accordance with Section 660 of the Standard Specifications for Highway Construction.

15.3.4 Enstar

Location Services

MOA operates "*811 Before You Dig*", a location services hotline for business and MOA residents. The 811 flyer is located in Appendix F for reference. A minimum of 2 days' notice is required for requests to locate service lines. Enstar operates with the policy "the excavator is responsible for any damage to ENSTAR pipelines, regardless of depth" but does not guarantee their location services or depth of the lines, and states "always hand-dig within two feet of any marked lines."

An ENSTAR representative must be present when digging within 10-feet of a high pressure transmission pipeline and will perform a safety stand-by while digging commences, at no cost to the project.

Safety

Within the Anchorage area, ENSTAR operates a Gas Leak Emergency Hotline. The telephone line is for emergencies and is available 24-hours a day and can be reached at:

ENSTAR Emergency Hotline
(907) 277-5551

Construction Impacts

This project requires location and protection in place services for regular service lines as well as high pressure gas mains. Notification and a request for a "stand-by" construction coordinator is required via the ENSTAR Engineering Department at:

ENSTAR
Engineering Department
401 E. International Airport Road
Anchorage, AK 99518
(907) 334-7740

Appendix F of this document outlines a list of existing ENSTAR gas lines within the project area.

15.3.5 GCI

Permitting

Before any work is done within the right of way a Right of way Permit must be acquired per AMC Title 24.30. All telecommunications utilities must acquire a permit in accordance with 17 AAC 15.301.

Design

Underground facilities must have a clearance of four feet from top of said facility to the surface of the pavement in accordance with 17 AAC 15.201 (c). Existing overhead cables must have clearance of 18 feet while new construction overhead cables must have a clearance of 20 feet in accordance with 17 AAC

15.201 (a-b). Telecommunication facilities must be constructed in such a way that they are compatible the national communications network as outlined in 3 AAC 52.260.

Location
In accordance with AS 42.30.400 the Alaska Dig Line will be contacted so that GCI facilities may be located before excavation.

Construction Impacts
In terms of the project, no GCI facilities extend east of Arleen Street and are not seen to have any impacts on the project.

15.3.6 MOA

Nature of Services
In terms of the project MOA is responsible for maintaining illumination of the roadway, and the operation of traffic signals.

Permitting
Before any utility work is done within the right of way a Right of way Permit must be acquired per AMC 23.40. Anchorage Municipal Code (AMC) 23.10 states that Electrical Permits must be acquired for any electric work done illumination facilities.

Design
New luminaires will meet lighting criteria set forth by chapter 5 of Anchorage DCM. New electroliers will be placed in accordance the clear zone criteria set forth 1130 of the Alaska Highway Preconstruction Manual.

Construction Impacts
To conform to the proposed electroliers and luminaires being installed on Raspberry east of the EOP, all new illumination facilities will be 400W HPS. New electroliers will be installed on the roundabout, off ramp, and roadway. They will be installed in accordance with Section 606 of the AK DOT&PF Standard Specifications for highway Construction.

Around round about				Off ramp stations		
Station	CL Offest			Station	CL Offset	
83+99	72'	LT		202+00	48'	LT
84+36	0'	CL		204+00	33'	LT
84+36	110'	RT		206+00	39'	LT
82+59	83'	RT		208+00	29'	LT
82+31	108'	LT		210+00	29'	LT
				212+00	29'	LT
Roady way				214+00	29'	LT
91+81	59'	LT				

Table 1: Utility locates.

The traffic signal at the Raspberry Road and Northwood Street intersection will be removed in accordance with Section 660 of the AK DOT&PF Standard Specifications for Highway Construction 2015.

15.4 Standard Specifications

Standard specifications were followed in accordance with AK DOT&PF, AASHTO, ASCE, AMATS, and MASS.

16.0 PRELIMINARY WORK ZONE TRAFFIC CONTROL

This Project will occupy Raspberry Road from Jewel Lake to Minnesota, the Minnesota off-ramp at Raspberry Road, as well as significant changes to the Raspberry Road at Northwood intersection. The project will require more than three days of continuous and intermittent lane closures on arterials. It will fully close an arterial for more than one hour at a time with no practical alternative route, and will require greater than normal attention to traffic control to eliminate sustained work zone impacts greater than what would be considered acceptable. Therefore, the project is considered a Category 2 “Significant Project” under Section 1400.2 of the Highway Pre-Construction Manual (HPCM) and a full Traffic Management Plan, including Transportation Operations, Public Information, and Traffic Control Plans, will be required.

A Traffic Management Plan will not be included in this report. Normally it would be submitted at the next phase of the project. Preliminary information could be provided to the client if requested earlier than the next phase.

16.1 Traffic Control Plan (TCP)

The Contractor will develop a Traffic Control Plan (TCP) during construction, to safely guide and protect the traveling public in work zones, in accordance with the ATM and the project specifications. The plan will be assessed and approved by the Construction Project Engineer and the Traffic Control Engineer.

The contractor is responsible for providing advance notice to the public, including local businesses, residents, and road travelers, of construction activities that could cause delays, detours, or affect access to adjacent properties.

People Mover Bus Re-Route:
The Municipality of Anchorage operates the People Mover Bus. Currently route number 7 operates services along Jewel Lake Road, and Raspberry Road, and Northwood.
It is recommended that that buses be re-routed temporarily. The Department will coordinate with People Mover Bus to will discuss and notification to the public will be done well in advance. Route 7 of the Municipality of Anchorage People Mover public bus system will require to follow the lane closure plans as set forth in the TCP.

16.2 Public Information Plan

Seawolf Engineering 2015 has developed a draft Public Information Plan that needs to be revised and updated at the next phase of this project. The Public Information Plan will inform stakeholders of project scope, expected work zone impacts, closure details, and recommended action to avoid impacts and changing conditions during construction. The traveling public should not be caught unawares by any closures, detours, delays, night work, or any potentially disruptive activity. See Appendix N.

16.3 Transportation Operations Plan

The Department will coordinate with relevant public agencies and event organizers, and incorporate means and methods for minimizing traffic impacts with the contractor not covered by the TCP and within the project plans.

The transportation operations plan is outside the scope of this phase gate.

17.0 STRUCTURAL SECTION AND PAVEMENT

Located below is a table depicting the ESAL calculations for the all roads impacted by the project rehabilitation, with growth rate, AADT for 2015 and the projected 2035 AADT.

Construction Year: 2015
Design Life: 20 years
Design Year: 2035

Segment	Jewel Lake-Cranberry	Cranberry-Northwood	Northwood-Minnesota	Minnesota Off Ramp
Growth Rate	2.31%	1.82%	1.45%	1.29%
AADT Construction Year (2015)	14,298	18,257	26,867	7,760
AADT Design Year (2035)	22,570	26,200	35,850	10,037
ESALS (Millions)	2.33E+06	2.83E+06	4.02E+06	2.12E+06

Table 2: ESAL calculations.

17.1 Pavement and Structural Section Recommendations

The following pavement design sections were calculated via the Mechanistic Design program in the Alaska Flexible Pavement Design Manual.

Minnesota Southbound off Ramp

- 4.5” HMA type II VH
- 6” Crushed Aggregate Base Course (P200 < 6%)
- 12” Select Material, Type A
- 24” (min) Select Material, Type B

Raspberry Road (Existing Roadway)

- 2” HMA type II, Class A PG 58-34

- STE-1 Tack Coat (over mill)
- Mill 1.5” of existing asphalt

Raspberry Road (Dig-outs)

- 2” HMA type II, Class A PG 58-34
  - STE-1 Tack Coat
  - 2.5” ATB, PG 58-34
  - 6” (min) Crushed Aggregate Base Course (P200 < 6%)
  - 24” (min) Select Material, Type A
  - Geogrid (Northwood – Minnesota)

18.0 COST ESTIMATE

The project cost estimate is as follows:

Preliminary Engineering	$ 270,000
Right-of-Way Acquisition	$ 180,000
Utility Relocation	$ 75,000
Construction	$7,300,000
Total	$7,825,000

19.0 ENVIRONMENTAL COMMITMENTS AND CONSIDERATIONS

This project does not involve unusual circumstances or significant environmental impacts, it meets the criteria for classification as a Categorical Exclusion per 23 CFR 771.117. Section 19.0 of this report explain in detail the processes required for a project of this size.

19.1 National Environmental Policy Act (NEPA)

“Title I of NEPA contains a Declaration of National Environmental Policy which requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony. Section 102 requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach.” (NEPA, 2015).

Under Section 402 of the Alaska State Highway Protection Program, federal funding can be used for project design to reduce crash rates, provide bicycle facilities, and provide education and training (Advocacy Advance, 2015). And, because federal money is tied to this project, compliance with Title I of the National Environmental Protection Agency policies are required.

For the Raspberry Road Redesign the desired goal would be to apply for a ‘Categorical Exclusion' because it is included in the state’s Highway Safety Plan under 23 U.S.C. 402. Additionally, the guidelines make it likely to achieve this declaration because 1) the project site will design and construct separated bicycle lanes and re-design and upgrade pedestrian paths, 2) redesign of the road surface, shoulders, auxiliary lanes, and modernization of the roadway will result in, 3) a final designed and constructed road that is compliant with the newest design standards and material design criteria, as well as environmental, structural and civil design standards that 4) will result in a safer road.

As the EPA explained on their website (EPA, 2015), if a proposal is within the above outlined guidelines it would fall under the categorical exclusion, meaning that the second level of analysis, the Environmental Assessment (EA) would not need to be completed. If however the acquisition of Right of Way (ROW) in the wetland area is deemed to be significant enough to warrant an EA, we will seek a 'Finding of No Significant Impact' (FONSI) from the Federal Highway Administration (FWHA). The figure below describes the NEPA Process.

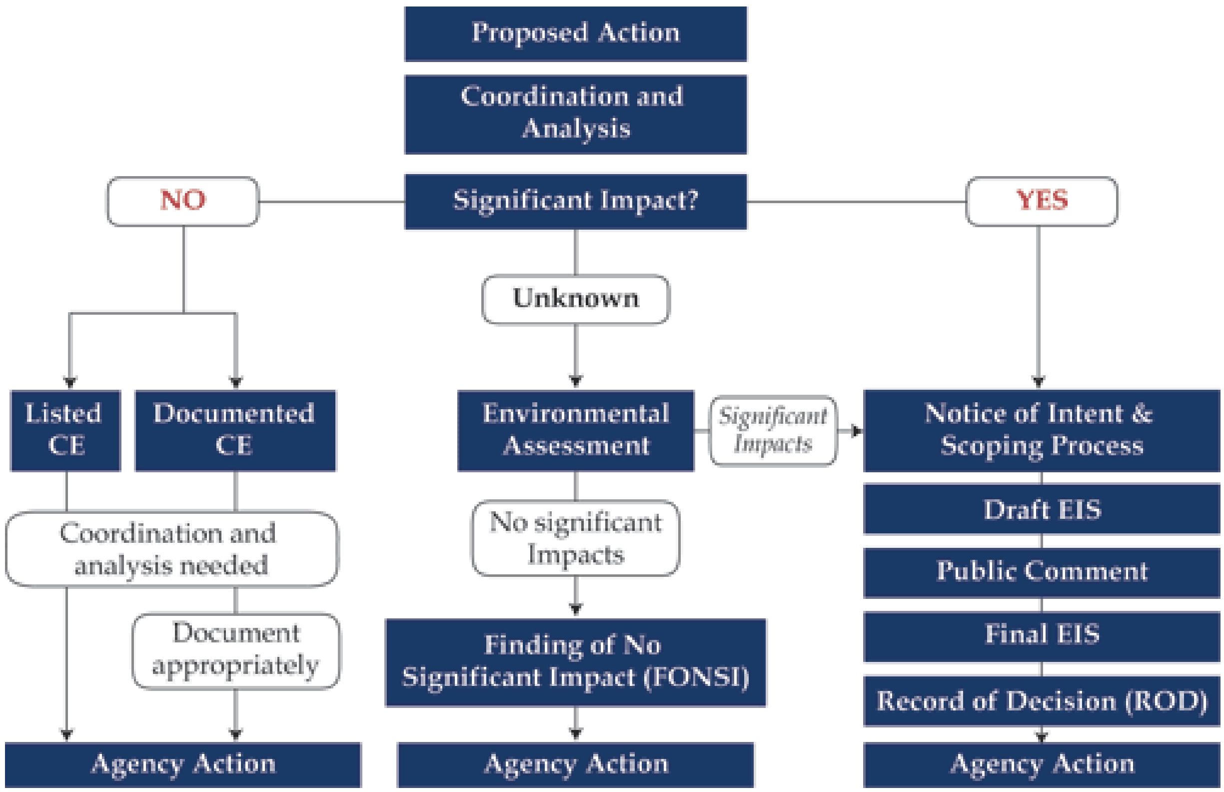


Figure 8: NEPA Process Diagram

Wetlands

Any filling of wetlands in the project will require a Section 404 permit from the U.S. Army Corps of Engineers and because the wetlands in question are Class A, compensation to a land bank will likely be necessary.

SWPPP

The Contractor will be required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) that conforms to the DOT&PF Best Management Practices (BMPs) for Erosion and Sediment Control in accordance with the DOT&PF contract specifications. Appropriate erosion and siltation controls will be used and maintained in optimal condition during construction and all other exposed soils/fills will be permanently stabilized.

The Contractor will be required to dispose of solid waste at an ADEC approved landfill. An Erosion and Sediment Control Plan (ESCP) will be made available to the Contractor to use as guidance in developing the SWPPP however it is outside the scope of this class.

The Contractor is responsible for obtaining all necessary permits and clearances for materials sites disposal sites, and staging areas unless DOT&PF has obtained all necessary permits. See the Environmental Document in Appendix I for specific commitments.

Land Status

The existing roadway is state right of way. The surrounding lands are owned by the MOA Heritage Land Bank and are Class A wetlands under the Anchorage Wetlands Management Plan. The sites are not designated as critical habitat or historic property.

Noise Control

In April of 2011 the AK DOT&PF came out with an Environmental Procedures Manual outlining the Noise Policy. The policy specifically describes the implementation of the requirements of the Federal Highway Administration (FHWA) Noise Standard at 23 CFR 772. The policy applies to both design-build and design-bid-build projects for State funded projects. AK DOT&PF had the noise policy reviewed and approved by FWHA.

Prior to Categorical Exclusion Approval or issuance of a FONSI or ROD for a Type 1 project, the DOT&PF must identify

- The noise abatement measures that are feasible and reasonable, and are likely to be incorporated into the project; Noise impacts for which no abatement appears to be feasible and reasonable; and
- The NEPA documentation shall identify the locations where noise impacts will occur, where noise abatement is feasible and reasonable, and the locations that have no feasible and reasonable abatement.

Noise Control Recommendations

Sections of missing noise wall areas along Raspberry Road will be estimated for construction and installation.

The existing noise walls are considered a Type II noise wall that does not currently receive federal funding for retrofitting. However because this project is "unlimited" in budget and classified as a 4R project, it is the recommendation by Seawolf Engineering that renovations and minor repairs be made all along both sides of Raspberry Road corridor.

As time progresses, if the project site incurs higher than expected traffic from the Dowling expansion to Raspberry, noise measurements may be required during peak morning or evening periods, or if the LOS deteriorates to E or F prior to expected volume calculations. Because the area is considered a Category B, residential area, noise receptors will be utilized on areas that receive frequent human use. In the event this happens, a separate project scope would have to address the Noise Abatement Measure Report and feasibility study.

20.0 BRIDGES

No bridges are within the project limits.

21.0 EXCEPTIONS TO DESIGN STANDARDS

An application for an "Exemption to Design Standards" is attached in the appendix.

22.0 MAINTENANCE CONSIDERATIONS

Maintenance will remain the responsibility of the State of Alaska and the local DOT&PF Maintenance and Operations Station.

The project will decrease maintenance costs by the addition of the roundabout at Raspberry and Northwood, however the addition of more surface area and paved bicycle lanes and extensions of the bicycle paths will result in more surface area for snowfall to accumulate.

The relocation of the off-ramp at Raspberry from Minnesota Drive south will result in more area to plow but the amount is assumed to be negligible.

23.0 ITS FEATURES

ITS is outside the scope and time constraints of this project.

REFERENCES

Advocacy Advance: Tools to Increase Biking and Walking. (n.d.). Retrieved March 9, 2015, from http://www.advocacyadvance.org/site_images/content/Alaska_Federal_Funding_Profile.pdf

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Annual Traffic Volume Report Central Region 2010-2011-2012. (n.d.). Retrieved March 11, 2015, from http://www.dot.alaska.gov/stwdplng/transdata/traffic_maps_home.shtml

HDP Pavement Management Data. (n.d.). Retrieved March 22, 2015, from http://www.dot.state.ak.us/hdpapp/forms/Reports.html?categoryId=HDP Pavement Management Data

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Appendix A

Approved Design Criteria and Design Designations

Within this section is a sample Project Design Criteria Form (1100-2 Project Design Criteria) from the Preconstruction Manual, effective November 15, 2013. In addition, specific to our design, is two sheets titled, Raspberry Road Rehabilitation: Jewel Lake Road to Minnesota Drive.

PROJECT DESIGN CRITERIA

Project Name:				
☐ New Construction/Reconstruction	☐ 3R	☐ PM	☐ Other:	
Project Number:			☐ NHS	☐ Non NHS
Functional Classification:				
Design Year:			Present ADT:	
Design Year ADT:			Mid Design Period ADT:	
DHV:			Directional Split:	
Percent Trucks:			Equivalent Axle Loading:	
Pavement Design Year:			Design Vehicle:	
Terrain:			Number of Roadways:	
Design Speed:				
Width of Traveled Way:				
Width of Shoulders:	Outside:		Inside:	
Cross Slope:				
Superelevation Rate:				
Minimum Radius of Curvature:				
Min. K-Value for Vert. Curves:	Sag:		Crest:	
Maximum Allowable Grade:				
Minimum Allowable Grade:				
Stopping Sight Distance:				
Lateral Offset to Obstruction:				
Vertical Clearance:				
Bridge Width:				
Bridge Structural Capacity:				
Passing Sight Distance:				
Surface Treatment:	T/W:		Shoulders:	
Side Slope Ratios:	Foreslopes:		Backslopes:	
Degree of Access Control:				
Median Treatment:				
Illumination:				
Curb Usage and Type:				
Bicycle Provisions:				
Pedestrian Provisions:				
Misc. Criteria:				

Proposed - Designer/Consultant: ________________________ Date: __________

Endorsed - Engineering Manager: ________________________ Date: __________

Approved - Preconstruction Engineer: ________________________ Date: __________

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.

Figure 1100-2
Project Design Criteria

Raspberry Road Rehabilitation
Jewel Lake Road to Minnesota Drive

DESIGN ELEMENT	CRITERIA	SOURCE/COMMENTS
Functional Classification	Urban Arterial	Design Designations (DOT&PF)
Terrain	Level - Rolling	AASHTO 2011 (Page 1-10 and 1-11)
Design Year	2035	Design Designations (DOT&PF)
Number of Lanes/Roadways Raspberry Road	4	DOT&PF
Number of Lanes/Roadways Southbound Off Ramp	1	DOT&PF
Existing Year AADT (2012) Jewel Lake Road to Cranberry Street	13,351	Design Designations (DOT&PF)
Construction Year AADT (2015) Jewel Lake Road to Cranberry Street	17,640	Design Designations (DOT&PF)
Mid-Life Year AADT (2025) Jewel Lake Road to Cranberry Street	20,000	Design Designations (DOT&PF)
Design Year AADT (2035) Jewel Lake Road to Cranberry Street	22,570	Design Designations (DOT&PF)
Existing Year AADT (2012) Cranberry Street to Northwood Street	17,295	Design Designations (DOT&PF)
Construction Year AADT (2015) Cranberry Street to Northwood Street	20,470	Design Designations (DOT&PF)
Mid-Life Year AADT (2025) Cranberry Street to Northwood Street	23,210	Design Designations (DOT&PF)
Design Year AADT (2035) Cranberry Street to Northwood Street	26,200	Design Designations (DOT&PF)
Existing Year AADT (2012) Northwood Street to Minnesota Ramps	25,731	Design Designations (DOT&PF)
Construction Year AADT (2015) Northwood Street to Minnesota Ramps	20,249	Seawolf Engineering
Mid-Life Year AADT (2025) Northwood Street to Minnesota Ramps	22,924	Seawolf Engineering
Design Year AADT (2035) Northwood Street to Minnesota Ramps	25,813	Seawolf Engineering
Existing Year AADT (2012) Minnesota Southbound Off Ramp	7,467	Design Designations (DOT&PF)
Existing/Construction Year AADT (2015) Minnesota Southbound Off Ramp	7,761	Design Designations (DOT&PF)
Mid-Life Year AADT (2025) Minnesota Southbound Off Ramp	8,826	Design Designations (DOT&PF)
Design Year AADT (2035) Minnesota Southbound Off Ramp	10,037	Design Designations (DOT&PF)
Design Hourly Volume Jewel Lake Road to Cranberry Street Cranberry Street to Northwood Street Northwood Street to Minnesota Ramps Minnesota Southbound Off Ramp	 2,257 2,620 3,585 N/A	Design Designations (DOT&PF)
Directional Distribution (%/%) Jewel Lake Road to Cranberry Street Cranberry Street to Northwood Street Northwood Street to Minnesota Ramps Minnesota Southbound Off Ramp	 45/55 45/55 45/55 0/100	Design Designations (DOT&PF) Design Designations (Seawolf Engineering)
Trucks (%T)	6%	Design Designations (DOT&PF)
20-Year Design ESAL (2035) Jewel Lake Road to Cranberry Street Cranberry Street to Northwood Street Northwood Street to Minnesota Ramps Minnesota Southbound Off Ramp	 2,330,000 2,830,000 4,020,000 2,120,000	Design Designations (Seawolf Engineering)
Pavement Design Year	2035	Design Designations (DOT&PF)
Design Vehicle	WB-67	Design Designations (DOT&PF)
Posted Speed (Existing) Raspberry Road	45 MPH	DOT&PF
Design Speed Raspberry Road Southbound Off Ramp	 50 MPH 45 MPH	 Seawolf Engineering AASHTO 2011 (Page 10-89)
Stopping Sight Distance Raspberry Road Minnesota Southbound Off Ramp Roundabout	 425 feet 400 feet 153 feet	 AASHTO 2011 (Page 3-4) AASHTO 2011 (Page 3-5) Roundabouts: An Informational Guide (Page 6-61)

Raspberry Road Rehabilitation
Jewel Lake Road to Minnesota Drive

DESIGN ELEMENT	CRITERIA	SOURCE/COMMENTS
Intersection Sight Distance		
Roundabout (Entering Stream)	184 feet	Roundabouts: An Informational Guide (Page 6-64)
Roundabout (Circulating Stream)	184 feet	
Maximum Grade	6%	AASHTO 2011 (Page 7-28 and 7-29)
Minimum Grade	0.5%	
Maximum Rate of Superelevation	6%	AASHTO 2011 (Page 3-30 and 3-31)
Minnesota Southbound Off Ramp		
Minimum Radius of Curvature 1 (e = 6)	643 feet	AASHTO 2011 (Page 3-32)
Minimum Radius of Curvature 2 (e = 6)	144 feet	
Roundabout		
Inscribed Circle Diameter	165 feet	Roundabouts: An Informational Guide (Page 6-18)
Entry Path Radius	65 to 120 feet	Roundabouts: An Informational Guide (Page 6-39)
Circulating Path Radius	Larger than 150 feet	Roundabouts: An Informational Guide (Page 6-39)
Exit Radius Path Radius	50 feet or larger	Roundabouts: An Informational Guide (Page 6-28)
Minimum K-Value for Vertical Curves (crest/sag)		
Raspberry Road	84/96	AASHTO 2011 (Page 3-155 and 3-161)
Minnesota Southbound Off Ramp	61/79	
Minimum Taper Ratio		
Raspberry Road	15:01	AASHTO 2011 (Page 9-128)
Minnesota Southbound Off Ramp	13.25:1	
Minimum Straight/Left-Turn Lane Storage Length		
Minnesota Southbound Off Ramp	184 feet	Roundabouts: An Informational Guide (Page 4-17)
Shoulder Width		
Minimum Paved	4 feet	AASHTO 2011 (Page 4-10 and 4-11)
Minimum Lane Width	12 feet	AASHTO 2011 (Page 7-29)
Surfacing, Lanes	AC Pavement	DOT&PF
Roadway Cross Slope	2% Typical, 1.5% Minimum	AASHTO 2011 (Page 3-29 and 7-29)
Roadway Vertical Clearance	16 feet	AHPM 2005 (Page 1130-5)
Side Slope Ratios		
Foreslope	3:1 or flatter (cut)	AHPM 2005 (Page 1130-4), AASHTO 2011 (4-24 to 4-27)
Backslope	3:1 or flatter (fill)	
Clear Zone	28 feet (fill) 16 feet (cut)	AHPM 2005 (Page 1130-6)
Median Treatment	Varies with median / left turn lane and bicyclist	AHPM 2005 (Page 1150-1)
Curb Return Radii	40 feet	AHPM
Pedestrian Provisions		
Sidewalk Width	5 feet	ADA
Pathway Width	10 feet	
Maximum Cross Slope	2%	
Minimum Vertical Clearance	8 feet	
Minimum Curb Ramp Landing Width	5 feet	
Bicyclist Provisions		
Bicycle Lane Width	5 feet	AASHTO

Proposed - Designer/Consultant: Seawof Engineering **Date:** 4/3/15
Accepted - Engineering Manager: **Date:**
Approved - Preconstruction Engineer: **Date:**

Design Designation

State Route Number: 133765 Route Name: Raspberry Road

Project Limits: Raspberry Road: Cranberry to Northwood

State Project Number: ____ Federal Aid Number: ____

Project Description: ____

Design Functional Classification: ☑ Urban Arterial ☐ Rural Arterial ☐ Major Collector ☐ Minor Collector ☐ Local

New Construction - Reconstruction: ☑ Rehabilitation (3R): ☐ Other ____

Project Design Life (Years) ☐ 5 ☐ 10 ☑ 20 ☐ 25 Other ____

	Existing Year	Construction Year	Mid-Life Year	Future Year
	2012	2015	2025	2035
AADT*	17,300	20,470	23,210	26,200
DHV	1,730	2,047	2,321	2,620
Peak Hour Factor	Varies	0.95	0.95	0.95
PM Directional Distribution(North/South)	45/55	45/55	45/55	45/55
Recreational Vehicle Percentage (RV%)	3%	1%	1%	1%
Commercial Vehicle Percentage (CV%)	3%	5%	5%	5%
Compound Growth Rate		1.2%	1.2%	1.2%
Pedestrians (Number/Day)				
Bicyclists (Number/Day)				

* If urban then ADT is not required. Intersection Diagrams shall be attached as part of this document.

Design Vehicles for Turning: WB-67

Design Vehicle Loading: ☐ HS15 ☑ HS20 ☐ HS25 Other ____

Equivalent Axle Loads: 1,415,000 (10 Years), 2,830,000 (20 Years)

APPROVED ____ DATE ____

Regional Preconstruction Engineer

Design Designation

State Route Number: 133765 Route Name: Raspberry Road

Project Limits: Raspberry Road: Jewel Lake to Cranberry

State Project Number: ______ Federal Aid Number: ______

Project Description: ______

Design Functional Classification: ☑ Urban Arterial ☐ Rural Arterial ☐ Major Collector ☐ Minor Collector ☐ Local

New Construction - Reconstruction: ☑ Rehabilitation (3R): ☐ Other ______

Project Design Life (Years) ☐ 5 ☐ 10 ☑ 20 ☐ 25 Other ______

	Existing Year	Construction Year	Mid-Life Year	Future Year
	2012	2015	2025	2035
AADT*	13,351	17,640	20,000	22,570
DHV	1,335	1,764	2,000	2,257
Peak Hour Factor	Varies	0.95	0.95	0.95
PM Directional Distribution(North/South)	45/55	45/55	45/55	45/55
Recreational Vehicle Percentage (RV%)	3%	1%	1%	1%
Commercial Vehicle Percentage (CV%)	3%	5%	5%	5%
Compound Growth Rate		1.2%	1.2%	1.2%
Pedestrians (Number/Day)				
Bicyclists (Number/Day)				

* If urban then ADT is not required. Intersection Diagrams shall be attached as part of this document.

Design Vehicles for Turning: WB-67

Design Vehicle Loading: ☐ HS15 ☑ HS20 ☐ HS25 Other ______

Equivalent Axle Loads: 1,165,000 (10 Years), 2,330,000 (20 Years)

APPROVED ______ DATE ______

Regional Preconstruction Engineer

Design Designation

State Route Number: 133765 Route Name: Raspberry Road

Project Limits: Raspberry Road: Northwood to Minnesota

State Project Number: ______ Federal Aid Number: ______

Project Description: ______

Design Functional Classification: ☑ Urban Arterial ☐ Rural Arterial ☐ Major Collector ☐ Minor Collector ☐ Local

New Construction - Reconstruction: ☑ Rehabilitation (3R): ☐ Other ______

Project Design Life (Years) ☐ 5 ☐ 10 ☑ 20 ☐ 25 Other ______

	Existing Year	Construction Year	Mid-Life Year	Future Year
	2012	2015	2025	2035
AADT*	25,730	28,010	31,750	35,850
DHV	2,573	2,801	3,175	3,585
Peak Hour Factor	Varies	0.95	0.95	0.95
PM Directional Distribution(North/South)	45/55	45/55	45/55	45/55
Recreational Vehicle Percentage (RV%)	3%	1%	1%	1%
Commercial Vehicle Percentage (CV%)	3%	5%	5%	5%
Compound Growth Rate		1.2%	1.2%	1.2%
Pedestrians (Number/Day)				
Bicyclists (Number/Day)				

* If urban then ADT is not required. Intersection Diagrams shall be attached as part of this document.

Design Vehicles for Turning: WB-67

Design Vehicle Loading: ☐ HS15 ☑ HS20 ☐ HS25 Other ______

Equivalent Axle Loads: 2,010,000 (10 Years), 4,020,000 (20 Years)

APPROVED ______ DATE ______

Regional Preconstruction Engineer

Design Designation

State Route Number: 133765 Route Name: Raspberry Road

Project Limits: Raspberry Road: Minnesota Offramp

State Project Number: ____ Federal Aid Number: ____

Project Description: ____

Design Functional Classification: ☑ Urban Arterial ☐ Rural Arterial ☐ Major Collector ☐ Minor Collector ☐ Local

New Construction - Reconstruction: ☑ Rehabilitation (3R): ☐ Other ____

Project Design Life (Years) ☐ 5 ☐ 10 ☑ 20 ☐ 25 Other ____

	Existing Year	Construction Year	Mid-Life Year	Future Year
	2012	2015	2025	2035
AADT*	7,467	7,760	8,826	10,037
DHV				
Peak Hour Factor	Varies	0.95	0.95	0.95
PM Directional Distribution(North/South)	0/100	0/100	0/100	0/100
Recreational Vehicle Percentage (RV%)		1%	1%	1%
Commercial Vehicle Percentage (CV%)		5%	5%	5%
Compound Growth Rate		1.3%	1.3%	1.3%
Pedestrians (Number/Day)				
Bicyclists (Number/Day)				

* If urban then ADT is not required. Intersection Diagrams shall be attached as part of this document.

Design Vehicles for Turning: WB-67

Design Vehicle Loading: ☐ HS15 ☑ HS20 ☐ HS25 Other ____

Equivalent Axle Loads: 1,060,000 (10 Years), 2,120,000 (20 Years)

APPROVED ____ DATE ____

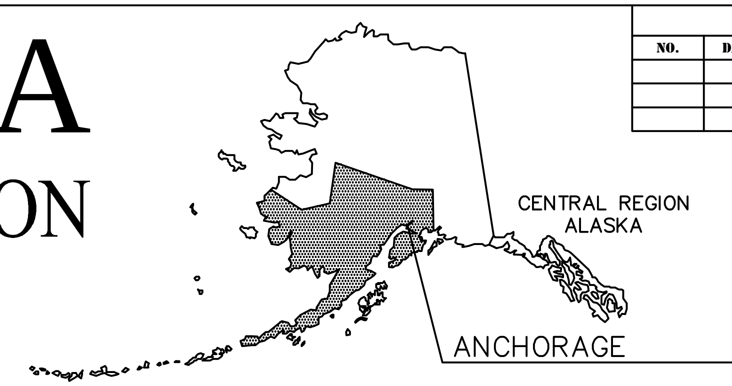
Regional Preconstruction Engineer

Appendix B

Typical Sections

STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES



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NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL 'A' SHEETS
ALASKA	0526(004)/56727	2014	A1	1
			PLAN SET TOTAL	16

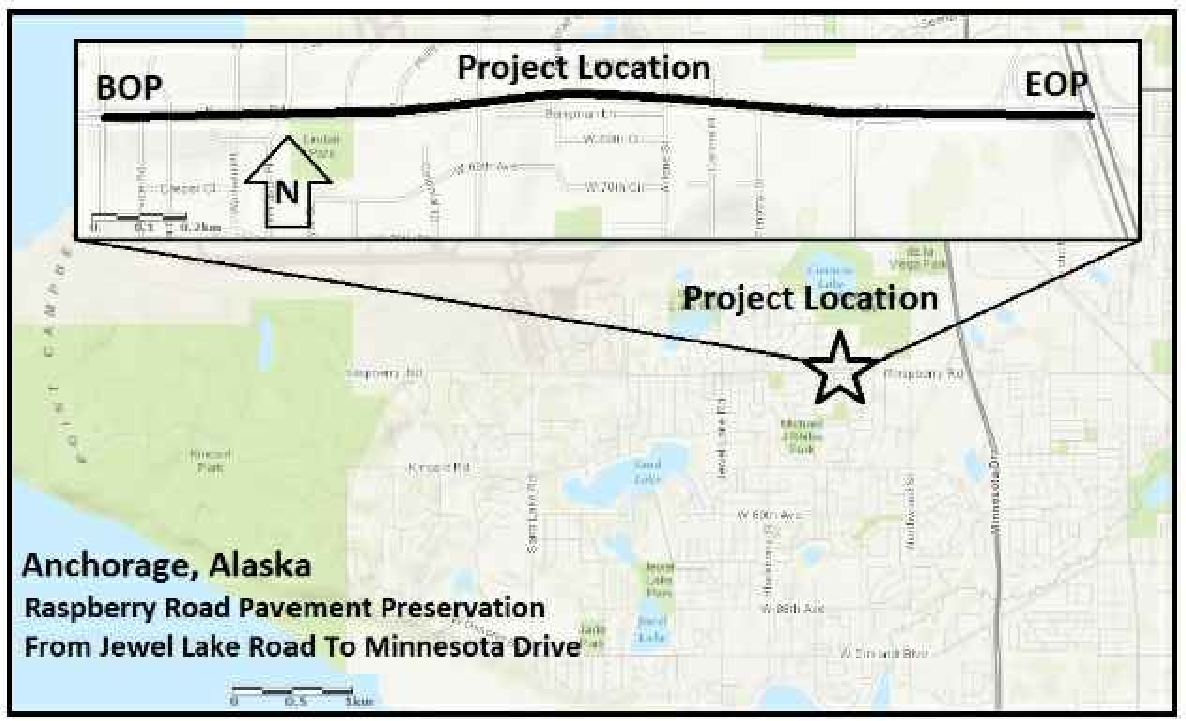
ROUTE: MILEPOINT:

PROPOSED ROADWAY PROJECT

RASPBERRY ROAD UPGRADES
JEWEL LAKE RD TO MINNESOTA DR
PROJECT NO. STP-0526(004)/56727

4R PROJECT

BEGIN PROJECT
DESCRIPTION
STA: 31+00

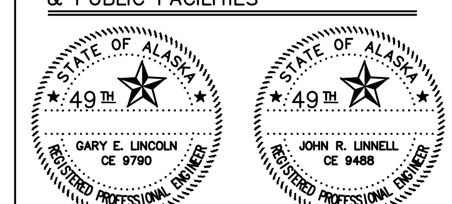


END PROJECT
DESCRIPTION
STA: 106+00

PROJECT SUMMARY		
ROADWAY SECTION	WIDTH	LENGTH
RASPBERRY ROAD	±110 FT	1.4 MILES

DESIGN DESIGNATIONS		
ROADWAY SECTION	A.A.D.T. 2009	DESIGN SPEED
RASPBERRY ROAD		45 MPH

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
& PUBLIC FACILITIES



APPROVED:

REGIONAL PRE-CONSTRUCTION ENGINEER DATE

CONCUR:

DIRECTOR, DESIGN & CONSTRUCTION DATE

CERTIFIED TRUE & CORRECT AS-BUILT OF ACTUAL FIELD CONDITION:

CONSTRUCTION PROJECT MANAGER DATE

DESIGNED BY DESIGNEDBY
CHECKED BY CHECKEDBY
DRAFTED BY DRAFTEDBY
XREFS XREF1 XREF2
SCALE SCALE
LAYOUT MODEL
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SHEET NO.	TOTAL SHEETS
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STATE	YEAR
ALASKA	2015

PROJECT DESIGNATION

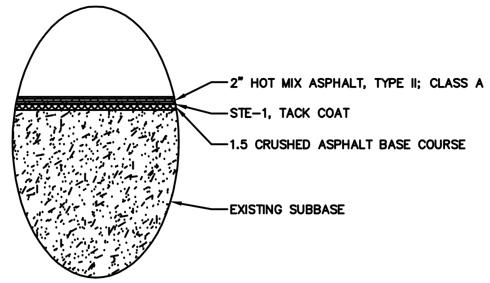
0526(004)/56727

ADDENDUM NO.

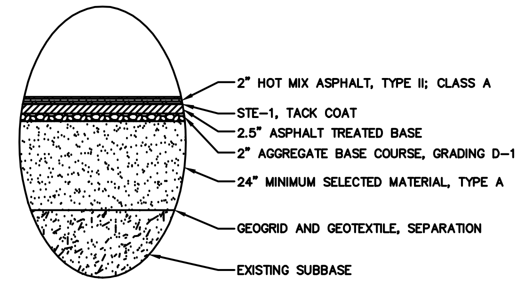
ATTACHMENT NO.

REVISIONS

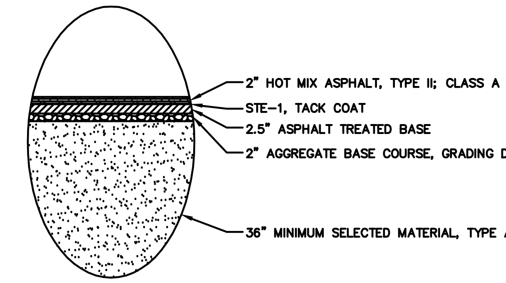
NO.	DATE	DESCRIPTION



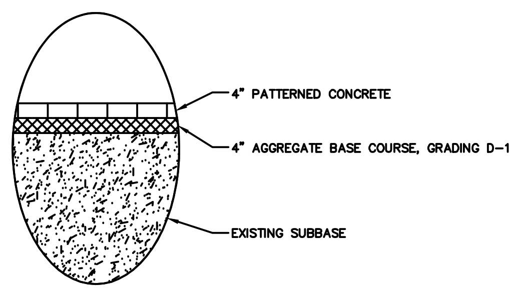
ROADWAY
PRESERVATION
STRUCTURAL DETAIL "A"



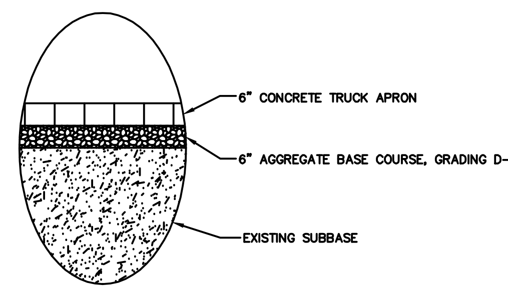
ROADWAY
DIGOUT
STRUCTURAL DETAIL "B"



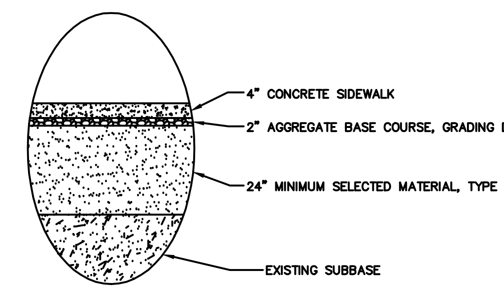
ROADWAY
STRUCTURAL DETAIL "C"



MEDIAN
STRUCTURAL DETAIL "D"



TRUCK APRON
STRUCTURAL DETAIL "E"



SIDEWALK
STRUCTURAL DETAIL "F"

GENERAL NOTES:

1. STARTING AND ENDING STATIONING FOR TYPICAL SECTIONS ARE APPROXIMATE AND MAY BE ADJUSTED BY THE ENGINEER.
2. MATCH EXISTING PAVEMENT AT THE BEGINNING AND END OF THE PROJECT AND ALL DRIVEWAYS AND APPROACHES.
3. MATCH EXISTING CROSS-SLOPES, SUPERELEVATIONS, AND TRANSITIONS. UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
4. GEOTEXTILE SHALL BE USED WHERE SEPARATION IS NEEDED BETWEEN SILTY SOIL AND ROADWAY SECTION AS DIRECTED BY THE ENGINEER.
5. ALL CLEARING AND GRUBBING SHALL EXTEND 10 FEET BEYOND CATCH POINTS OR THE EDGE OF ROW, WHICHEVER IS LESS UNLESS INDICATED OTHERWISE.
6. DIGOUT SECTIONS ON RASPBERRY ROAD WILL FOLLOW STRUCTURAL DETAIL "B" AND WILL BE LOCATED WHERE TRAFFIC IS DIRECTED WESTBOUND AT STATIONS: 39+30 TO 41+75, 47+40 TO 52+00, 59+20 TO 61+50, 66+40 TO 60+50, AND 81+60 TO 87+50. FOR TRAFFIC DIRECTED EASTBOUND DIGOUTS WILL BE LOCATED AT STATIONS: 47+50 TO 53+60, 57+50 TO 60+00, 64+30 TO 66+00, 76+80 TO 78+25, AND 80+75 TO 84+00.

LEGEND CURB AND GUTTER	
MOUNTABLE	1
EXPRESSWAY	2
GUTTER	3

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER Name Here CE #####

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
REHABILITATION

TYPICAL SECTIONS

DESIGNED BY
CHECKED BY
DRAFTED BY
XREFS
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STATE	YEAR
ALASKA	2015

PROJECT DESIGNATION

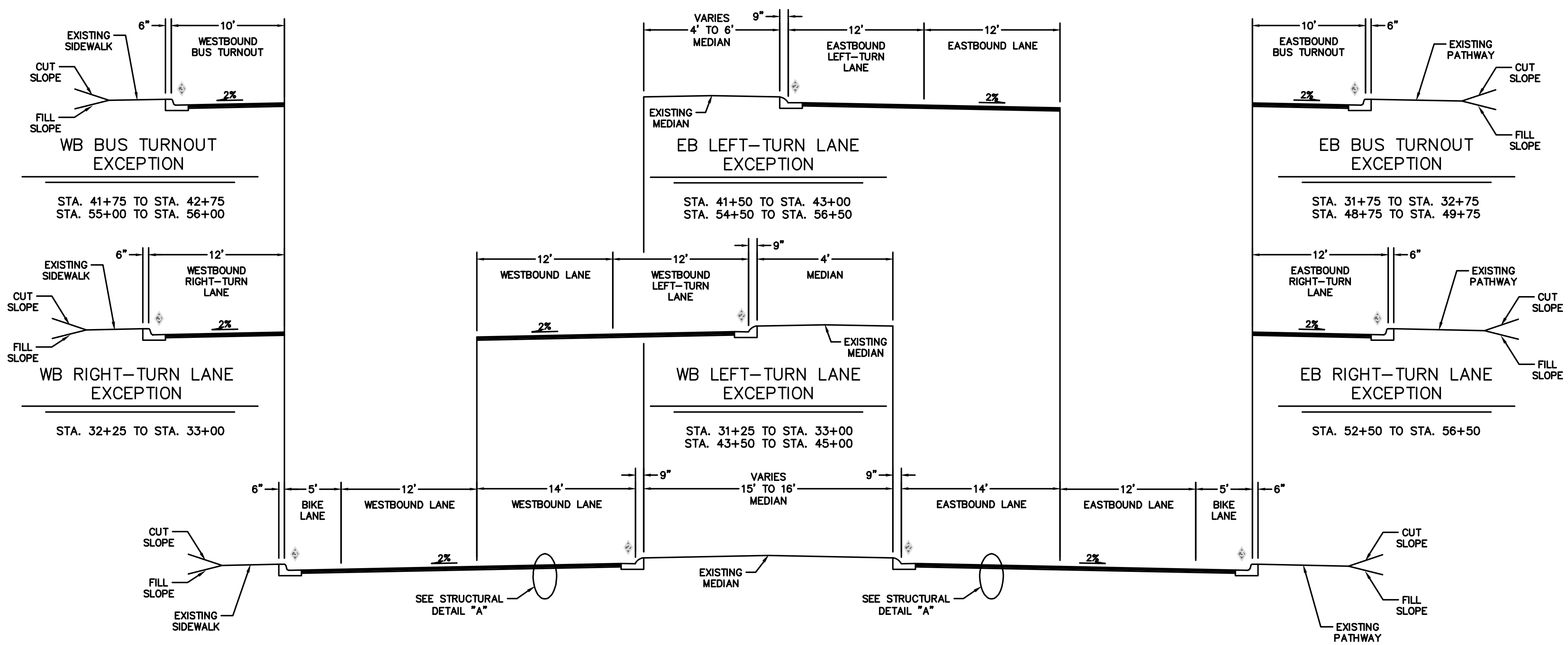
0526(004)/56727

ADDENDUM NO.

ATTACHMENT NO.

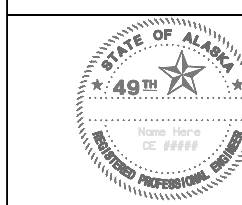
REVISIONS

NO.	DATE	DESCRIPTION



RASPBERRY ROAD

STA. 31+25 TO STA. 56+50



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
REHABILITATION

TYPICAL SECTIONS

DESIGNED BY | CHECKED BY | DRAFTED BY

XREFS

SCALE

LAYOUT B2

DATE TIME 4/13/2015 8:56 AM

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STATE	YEAR
ALASKA	2015

PROJECT DESIGNATION

0526(004)/56727

ADDENDUM NO.

ATTACHMENT NO.

REVISIONS

NO.	DATE	DESCRIPTION

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CHECKED BY
DRAFTED BY

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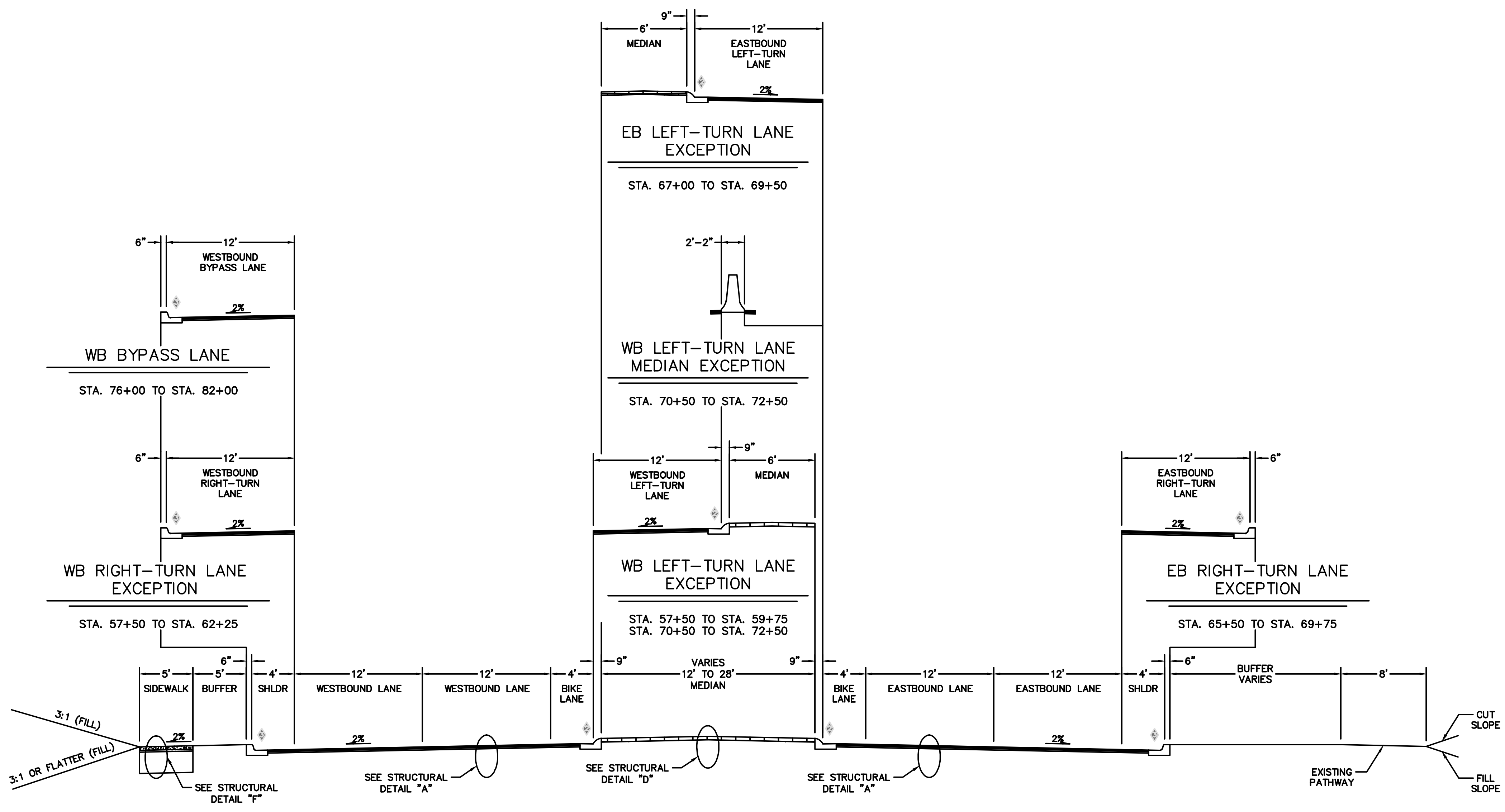
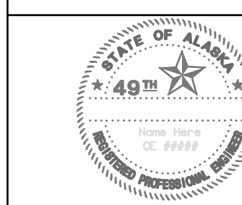


RASPBERRY ROAD

STA. 57+50 TO STA. 82+50



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
REHABILITATION

TYPICAL SECTIONS

SHEET NO.	TOTAL SHEETS
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STATE	YEAR
ALASKA	2015

PROJECT DESIGNATION

0526(004)/56727

ADDENDUM NO.

ATTACHMENT NO.

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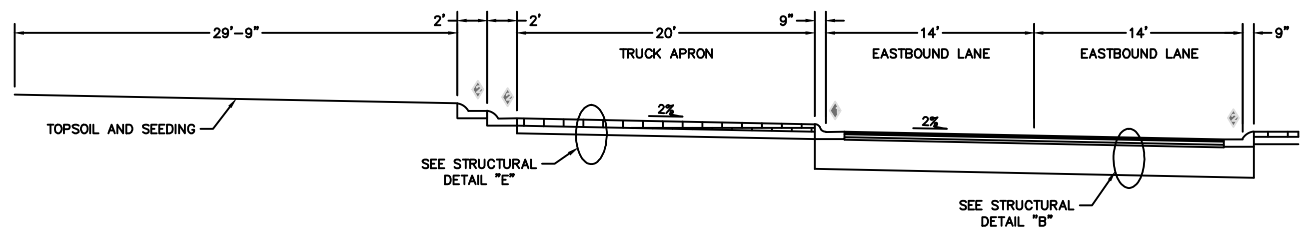

ROUNDABOUT

STA. 82+50 TO STA. 84+25

DESIGNED BY
CHECKED BY
DRAFTED BY

XREFS

SCALE

LAYOUT
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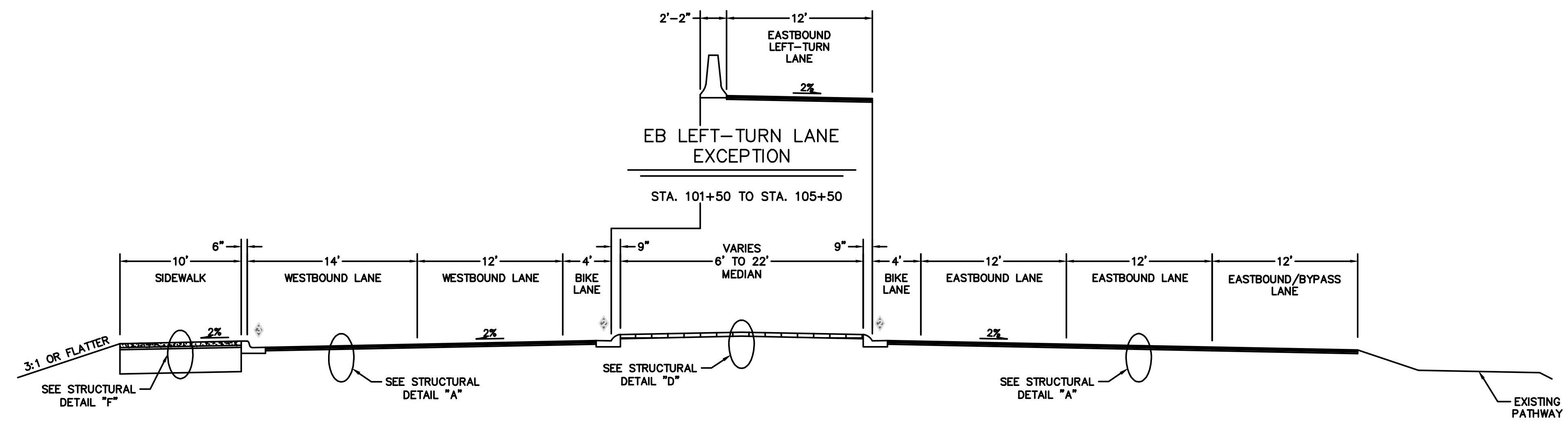
STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
REHABILITATION

TYPICAL SECTIONS



RASPBERRY ROAD

STA. 84+25 TO STA. 105+00

SHEET NO.	TOTAL SHEETS
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STATE	YEAR
ALASKA	2015

PROJECT DESIGNATION

0526(004)/56727

ADDENDUM NO.

ATTACHMENT NO.

REVISIONS

NO.	DATE	DESCRIPTION

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER Name Here CE #####

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
REHABILITATION

TYPICAL SECTIONS

DESIGNED BY | CHECKED BY | DRAFTED BY

XREFS

SCALE

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STATE	YEAR
ALASKA	2015

PROJECT DESIGNATION

0526(004)/56727

ADDENDUM NO.

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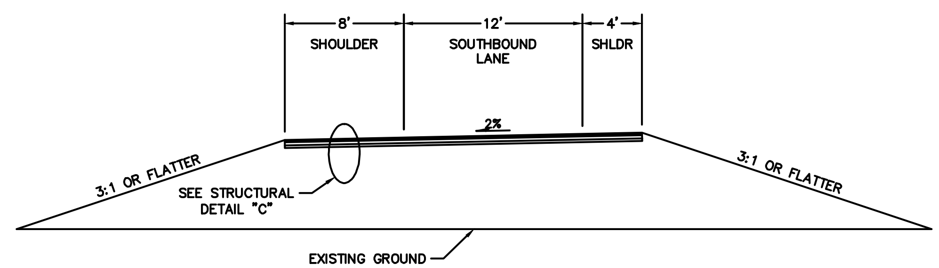
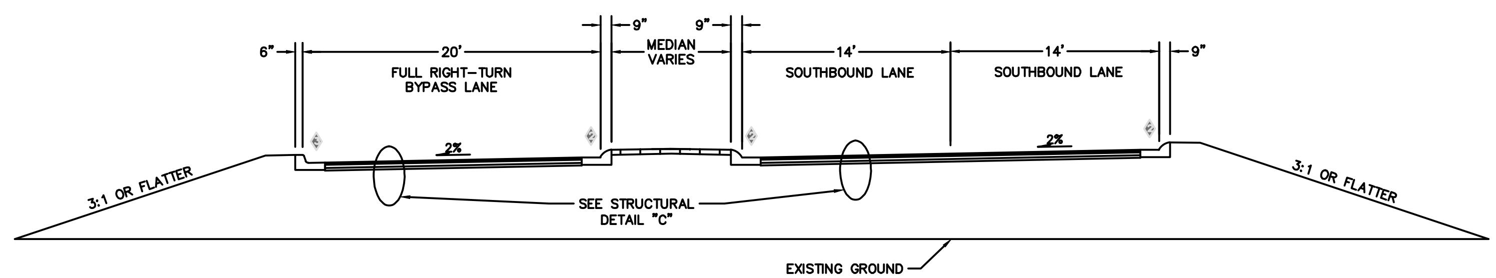


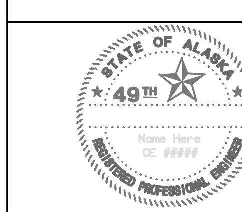
MINNESOTA SOUTHBOUND OFF RAMP

STA. 204+75 TO STA. 216+75



MINNESOTA SOUTHBOUND OFF RAMP

STA. 201+00 TO STA. 202+00



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
REHABILITATION

TYPICAL SECTIONS

DESIGNED BY
CHECKED BY
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XREFS

SCALE

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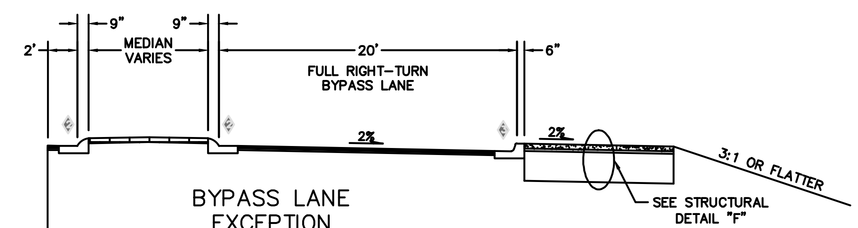
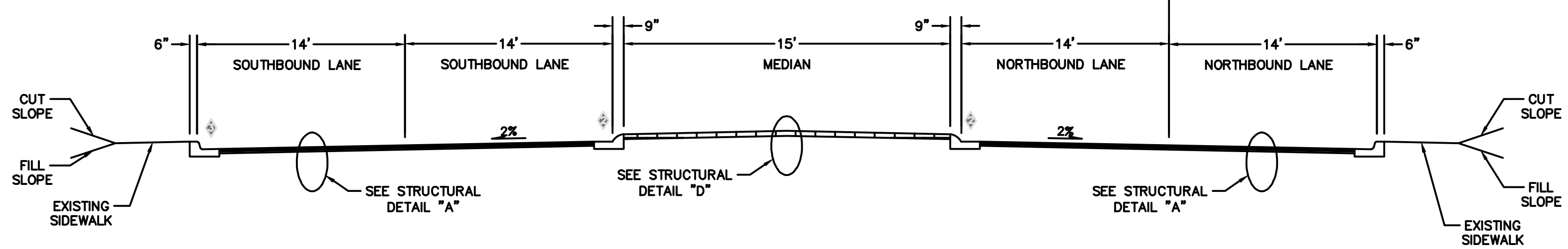


BYPASS LANE EXCEPTION

STA. 302+25 TO STA. 303+00



NORTHWOOD STREET

STA. 300+75 TO STA. 303+00

SHEET NO.	TOTAL SHEETS
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STATE	YEAR
ALASKA	2015

PROJECT DESIGNATION

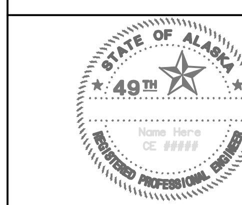
0526(004)/56727

ADDENDUM NO.

ATTACHMENT NO.

REVISIONS

NO.	DATE	DESCRIPTION



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
REHABILITATION

TYPICAL SECTIONS

Appendix C

Material Recommendations

ALASKA

Department of Transportation

And Public Facilities

DRAFT GEOTECHNICAL RECOMMENDATIONS

Raspberry Road:

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:

Seawolf Engineering 2015

3211 Providence Drive

Anchorage, AK 99503

Table of Contents

List of Figures

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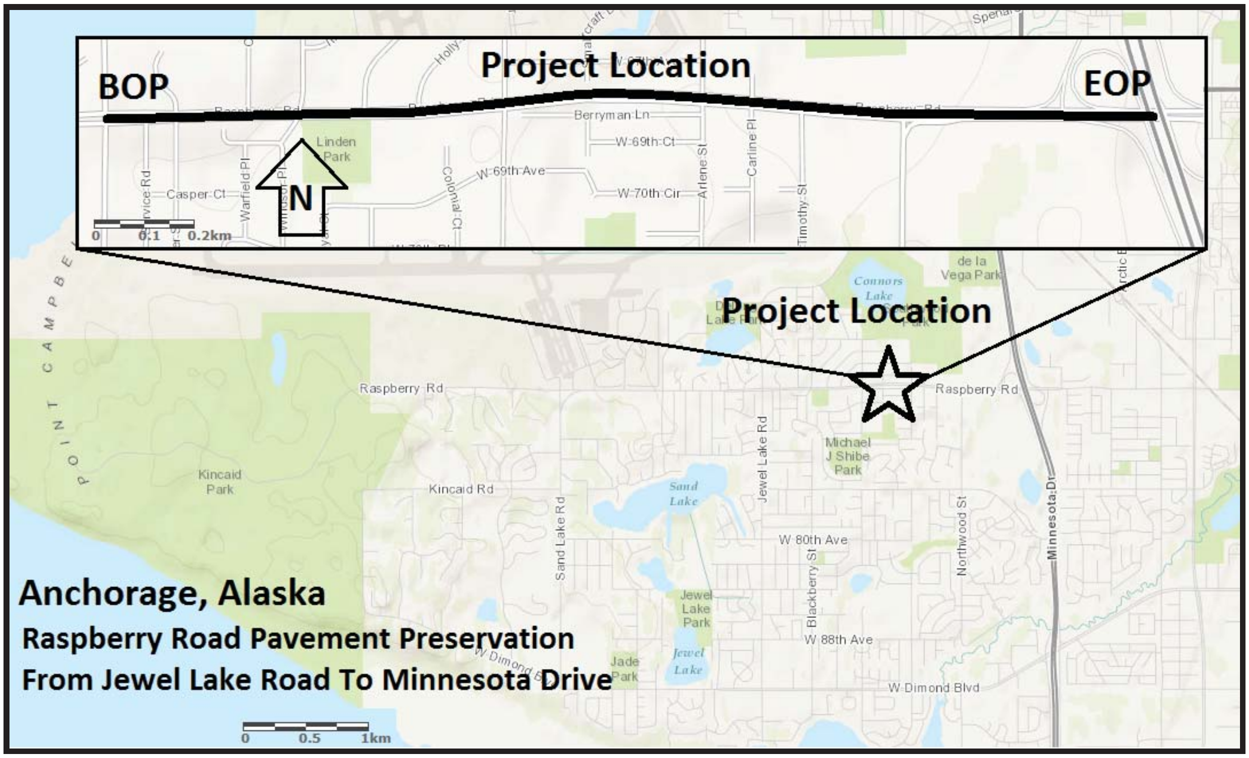

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

FIGURE 1

RASPBERRY ROAD IMPROVEMENTS
PROJECT NO. SEAWOLF ENGR.2015

LOCATION AND VICINITY MAP

FIGURE 1: Location and Vicinity Map

1.0 Introduction

1.1 Purpose
This report presents the findings of the pavement investigation conducted for the Raspberry Road Jewel Lake to Minnesota as well as the condition of the existing pavement and soil conditions of the area.

1.2 Scope
This general purpose of this report is to provide geotechnical and pavement recommendations for the project. Recommendations are based on the following:

- Visual evidence of cracking and pavement distresses,
- Asphalt depths provided by Alaska Department of Transportation and Public Facilities (AKDOT & PF) Central Region Materials Section (CR Materials),
- Test boring holes provided by CR Materials

(See Appendix A: Geotechnical Field Work prepared by Kinney Engineering, LLC)

1.3 Project Description
This project proposes to realign the Minnesota Drive southbound exit ramp at Raspberry Road to the intersection of Northwood Street where it will flow into a 2-lane roundabout, as well as resurface Raspberry Road from Minnesota to Jewel Lake Road. Pedestrian, bicycle, and ADA compliance features are included in the project. Wetlands will be impacted.

1.4 Historical Project Information
Historical project information was used in the development of this report:

- DOT & PF, As Built Plans: Raspberry Road, Northwood Street to Minnesota Drive, Project FM-0526(1)/53036, December 29, 1989
- DOT & PF, As Built Plans: Raspberry Road, Jewel Lake to Northwood Street, Project FM-0526(2)/58542, May 1, 1991.

1.5 Limitations
This report is a compilation of opinions, calculations and recommendations of nine senior level students at the University of Alaska Anchorage. This Design Basis, calculations and money expressed in this DSR are based off decisions, conversations, and team meetings up to April 1, 2015. Because this project is a fictitious project, with funding and design already complete by Kinney Engineering for the Alaska DOT & Public Facilities, Central Region this report should serve as hands-on-learning experience for the group, and as free 3R project alternative analyses for the AK DOT&PF. Persons intending to use this document for planning purposes should be aware that changes may have occurred in the project since publication. Additionally, it should be noted that this design has been conducted by engineering students at the University of Alaska, Anchorage, and the design has not been certified by a registered Professional Engineer.

2.0 CLIMATE
Climate in Alaska can be harsh and unforgiving with average temperatures in the air and soils much less than the rest of the country. Soils in Alaska can be susceptible to frozen soils and harsh conditions for

building and maintaining roadways. Climate and precipitation data was collected from usa.com. This website collected data from 18,000+ weather stations throughout the United States from 1980-2010.

2.1 Temperature

Average	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (℉)	15	19	26	37	47	55	59	56	48	34	21	17

Table 1: Average Annual Monthly Temperatures for the Anchorage Bowl

2.2 Precipitation

In Anchorage, Alaska the climate is typically in a transitional zone located between the Chugach Mountain range and Cook Inlet. Our design will adequately deal with the runoff and drainage of water through the new and existing roadway sections.

MONTH	PRECIPITATION (IN)
JANUARY	2.3
FEBRUARY	1.8
MARCH	1.6
APRIL	1.4
MAY	1.5
JUNE	1.8
JULY	2.6
AUGUST	3.5
SEPTEMBER	3.8
OCTOBER	3.4
NOVEMBER	2.7
DECEMBER	2.6
AVERAGE	2.4

Table 2: Monthly Precipitation for Anchorage

2.3 Snowfall

Snowfall in Alaska generally affects the design of new or existing sites including snow storage and removal in a safe and timely manner. Shown below is a table of the average monthly snowfall that affects our design.

MONTH	SNOWFALL (IN)
JANUARY	10.5
FEBRUARY	10.9
MARCH	7.8
APRIL	3.0
MAY	0.3
JUNE	0.0
JULY	0.0
AUGUST	0.0
SEPTEMBER	0.1
OCTOBER	7.8
NOVEMBER	13.2
DECEMBER	15.8
AVERAGE	5.8

Table 3: Monthly Snowfall for Anchorage

2.4 Permafrost

Permafrost is a phenomenon in which the soil and soil conditions are in a frozen state which severely impacts the ability to build a foundation for a structure. If permafrost exits in the proposed site considerations will be taken to ensure the preservation of the permafrost.

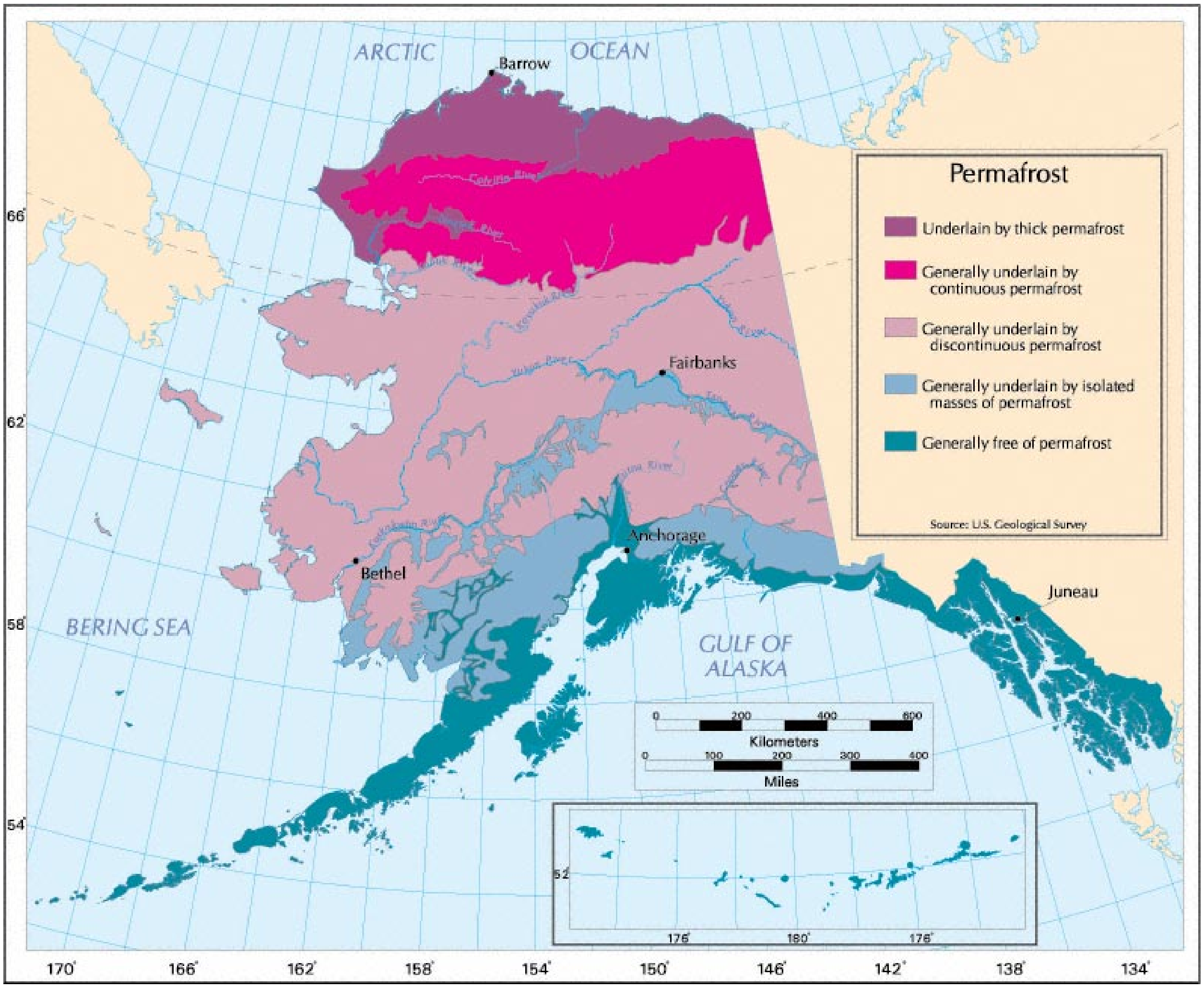

Figure 2: Permafrost map of Alaska

3.0 Existing Conditions

Soil conditions along Raspberry Road are concluded from seven test holes drilled along the shoulder of the road in various locations. These test holes were originally drilled for the purpose of structural support for the light pole foundations and do not represent any existing structural sections of Raspberry Road. These test holes contain a vegetative organic layer from 0.5 feet to 1.5 feet thick in depth. Below this layer the soil types varied. Sand and silts were found in all of the test holes drilled, with peat layers in several test holes to 13 feet deep. Ground water was also observed in all holes and ranged from 10 to 15.5 feet. Existing structural sections for Raspberry Road were determined using the Falling Weight Deflectometer (FWD) along with distresses visible along the road surface.

The peat material will have to be removed from site and offsite material will be brought in for construction of the off ramp from Minnesota to Northwood Street.

3.1 Pavement Management System Data

3.1.1 International Roughness Index (IRI)

Pavement Management System Data reports provided by the AKDOT state that the project site has an IRI range of 141 to 165 inch/mile for the pavement between Minnesota and Jewel Lake Road. Typical values for repair are those that are around 170 inch/mile. The report link can be found in the references.

3.1.2 Average Rut Depth

The average rut depth from the Pavement Management System Data report shows that between Minnesota and Jewel Lake range from 0.27 to 0.48 inches within existing driving lanes.

3.1.3 Existing Asphalt Depths

As per the As-built the typical asphalt depths along Raspberry Road range from 3.25 inches to 4.75 inches.

3.1.4 Existing Pavement Distresses

Pavement distresses can be seen along Raspberry Road from Jewel Lake to Minnesota. Dig outs are recommended per the structural section recommendations to reduce frost potential and increase stability within the current embankment.


Figures 3 and 4: Distresses in eastbound lanes


Figures 5 and 6: Distresses in westbound lanes

3.1.5 Subsurface Conditions

According to the as-built 58542 provided, there exists a 24-inch layer of type B selected material over a geotextile layer between the existing ground materials. The next layer up is a 12-inch Type A selected material followed by 6 inches of crushed aggregate and the asphalt layer.

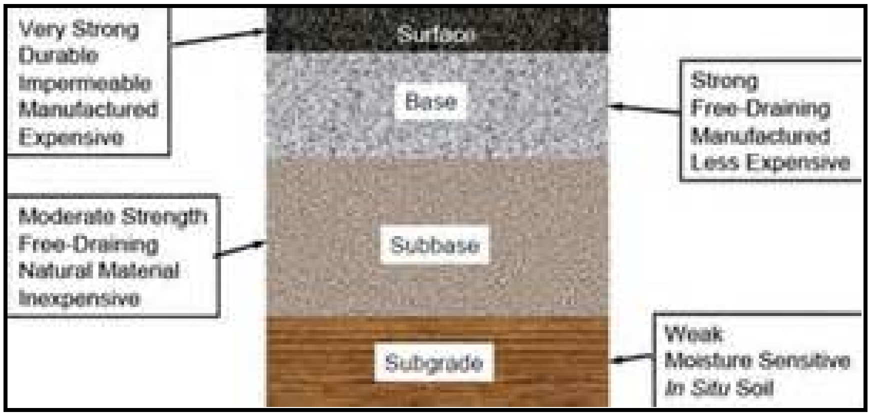

Figure 7: An example of pavement layer situation.

Some locations within the project site will require dig-out sections. These are recommended due to the visual pavement distresses seen. Those locations are noted in the table below:

WESTBOUND	**EASTBOUND**
Sta. 39+30 – 41+75	Sta. 47+50 – 53+60
STA. 47+40 – 52+00	Sta. 57+50 – 60+00
STA. 59+20 – 61+50	Sta. 64+30 – 66+00
STA. 66+40 – 69+50	Sta. 76+80 – 78+25
STA. 81+60 – 87+50	Sta. 80+75 – 84+00

Table 3: Recommended dig-out sections.

3.1.6 Drainage Recommendations

The Final Raspberry Road DSR states that “surface drainage from Raspberry Road is projected to sheet drain to the existing storm drains along Raspberry from Jewel Lake Road to Northwood Street portion.” As for the Northwood Street to Minnesota, Kinney Engineering states that the “water will drain into existing wetland vegetation.”

Figure 8: Water draining into existing vegetation

Figure 9: Storm drain along Raspberry Road

The Storm Water Prevention Plan (SWPPP), created at a later date in the project by the construction contractor will use Best Management Practices (BMPs) to minimize erosion, control sediment, and establish vegetation as the project continues.

4.0 Structural Section Recommendations

4.1 Pavement and Structural Section Design Criteria

Outlined within this section is the pavement and structural section design criteria for this project. The project construction year, design life, and design year are all important in the calculation process. The table below lists the segment information for Jewel Lake to Cranberry, Cranberry to Northwood, Northwood to Minnesota, and the Raspberry Road exit ramp from Minnesota Drive.

Construction Year: 2015 Design Life: 20 years Design Year: 2035

Outlined below in Table 4, is the segmented ESAL calculations for the project.

Segment	Jewel Lake-Cranberry	Cranberry-Northwood	Northwood-Minnesota	Minnesota Off Ramp
Growth Rate	2.31%	1.82%	1.45%	1.29%
AADT Construction Year (2015)	14,298	18,257	26,867	7,760
AADT Design Year (2035)	22,570	26,200	35,850	10,037
ESALS (millions)	2.33E+06	2.83E+06	4.02E+06	2.12E+06

Table 4: Segmented ESAL calculations.

4.2 Pavement and Structural Section Recommendations

The following pavement design sections were calculated via the Mechanistic Design program in the Alaska Flexible Pavement Design Manual.

4.2.1 Pavement and Structural Recommendations for Minnesota SB off Ramp

- 2.0” HMA type II, Class A PG 58-34
- STE-1 Tack Coat
- 2.5” ATB, PG 58-34
- 2.0” D-1 Crushed Aggregate Base Course
- 36” (min) Select Material, Type A

4.2.2 Pavement and Structural Recommendations for Raspberry Road

- 2.0” HMA type II, Class A PG 58-34
- STE-1 Tack Coat (over mill)
- Mill 1.5” of existing asphalt

4.2.3 Pavement and Structural Recommendations for the Raspberry Road Dig-Outs

- 2.0” HMA type II, Class A PG 58-34
- STE-1 Tack Coat
- 2.5” ATB, PG 58-34
- 2.0” D-1 Crushed Aggregate Base Course
- 24” (min) Select Material, Type A
- Geogrid (Northwood – Minnesota)
- Geotextile (Northwood – Minnesota)

4.2.4 Pavement and Structural Recommendations for the Northwood Roundabout

- 6.0” Concrete Truck Apron
- 6.0” D-1 Crushed Aggregate Base Course

4.2.5 Concrete Structural Recommendations

- 4.0” Concrete Sidewalk
- 2.0” D-1 Crushed Aggregate Base Course
- 24” (min) Select Material, Type A
- Existing Embankment

4.3 Material Sources

Materials for this project are assumed to come from local sources and are outside the scope of this project.

5.0 Structure Considerations

5.1 Signal Poles/High Mast Light Poles / Light Poles

DOT&PF maintains standard drawings for signal pole foundations. These standards are applicable to soils with an N-value of 10 or greater and that the water table is below the bottom of the foundation. The soils encountered during the investigation prove to be unworthy of such foundations; therefore it is recommended that soil meeting the standard drawing requirements be brought to the site for the foundations of any light poles.

5.2 Traffic Loops

Inductive loops for traffic detection will need to be moved as a result of this project, specifically at bike box transition points from left to right traveling bicycle lanes as well as dig out sites. Recommend the contractor to locate and replace existing traffic loops.

6.0 Specification Recommendations

The Annual Traffic Volume Report for 2012 shows the AADT along Raspberry Road that exceeds the 5000/lane maximum, therefore hard aggregate will be considered for this project. Hard coarse aggregate with a Nordic Abrasion Value (ATM 312) of 8.0% or less should be used.

703-2.04 AGGREGATE FOR HOT MIX ASPHALT PAVEMENT.

Description	Specification	Type IIA	Type I, IIB, III	Type IV	Type V	Type VH
Nordic Abrasion, max %	ATM 312	8	-	-	-	8

Table 5: Type of aggregate for hot mix asphalt pavement.

7.0 Construction Considerations

7.1 Traffic Restrictions

As a result of the proposed construction traffic will be adversely affected. Recommend discussion with DOT& PF Construction to resolve any special considerations included in the plans and specs.

8.0 References

Alaska Flexible Pavement Design Manual
Alaska Preconstruction Manual
Hard Aggregate Usage Policy

9.0 Geotechnical Fieldwork Report

The Geotechnical Fieldwork Report is in Appendix K. It holds the bore hole map and data sheets provided by AKDOT & PF and were conducted from 8/23/13 to 8/26/13.

Appendix D

Draft Design Exceptions and Design Waivers

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA DOT&PF PRECONSTRUCTION
DESIGN EXCEPTION/DESIGN WAIVER FORM

Type of Request: (select one or both)

☒ Design Exception (FHWA controlling design criteria only)

☐ Design Waiver (all other design criteria)

PROJECT INFORMATION:

Project Name: Raspberry Road, Jewel Lake to Minnesota Redesign and Pavement Preservation

Project Number:

☐ NHS ☒ Non NHS

Functional Classification:	Arterial
Design Year:	2015
Present ADT:	13,351
Design Year ADT:	17,640
Mid Design Period ADT:	20,000
DHV:	1,764
Directional Split:	45/55
Percent Trucks:	1%
Equivalent Axle Loading:	1,165,000
Pavement Design Year:	2015
Design Vehicle:	WB-67
Terrain:	Flat
Number of Roadways:	2
*Design Speed:	45

* *If requesting a design exception for design speed, use existing not proposed design speed here.*

PROJECT INFORMATION:

It is required that a location map, as a minimum, be provided with your package. It is highly recommended that other exhibits be provided to support your request. Exhibits may include typical sections, geometric details, correspondence from other sections, agency correspondence, etc.

1. ***Design Exception requested for the following design criteria. Mark the criteria to be discussed:***

- ☐ Design Speed
- ☐ Lane width
- ☐ Shoulder Width
- ☐ Cross Slope
- ☐ Superelevation Rate
- ☐ Horizontal Alignment (minimum radius of curvature)
- ☐ Vertical Alignment (minimum sag and/or crest K values)
- ☐ Grade (minimum and/or maximum allowable grades)
- ☐ Stopping Sight Distance
- ☐ Lateral Offset to Obstruction
- ☐ Vertical Clearance
- ☐ Bridge Width
- ☐ Bridge Structural Capacity

These 13 design criteria are commonly referred to as the *FHWA 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 Waiver requested for the following design criteria.

☒ Other

Explain: In Feb. 2015 AMATS submitted a request to include NACTO as a design

Standard policy acceptable within the Municipality of Anchorage. Currently, the only design acceptable standard for Bicycle and Pedestrian facilities is AASHTO. This request is for an exception to the AASHTO Design standards for Bicycle and Pedestrian facilities on Raspberry Road.

Design Waivers are required for any design criteria, other than the *FHWA 13 controlling criteria*, which do not meet the minimums established in the *Alaska Highway Preconstruction Manual*.

2. Provide a synopsis of the project scope, the situation you are encountering, and the problem you are attempting to mitigate.

Seawolf Engineering 2015 is designing to 35%, in cooperation with the Alaska Department of Transportation and Public Facilities (AKDOT&PF), the Federal Highway Administration (FHWA), and the Municipality of Anchorage (MOA) Raspberry Road, Minnesota to Jewel Lake Road. The project is located in Anchorage, Alaska, apart of the MOA, and is on the *Anchorage A-8 NW USGS Topographic Map* (USGS, 2015). See above Figure 1 for the Vicinity Map. Using the Department of Natural Resources *Alaska Mapper* application the project site BOP is located at Latitude 61.159 N and Longitude 149.952 W, and EOP is Latitude 61.159 N and Longitude 149.910 E.

An overview of the proposed improvements include: r

- Relocation the Minnesota Highway off-ramp to Northwood,
- Design improvements to ramps, sidewalks, grade, drainage, lighting, and
- ADA Ramp Compliance,
- Striping and signing
- Pedestrian facilities down the full-length of the roadway, providing for a seamless design
- Bicycle facilities down the full-length of the roadway

The purpose of a 4R project is to enhance safety and extend the service life of the facility. In addition, this projects proposed design includes the relocation of the Minnesota off-ramp at Raspberry to Northwood where it will transition into a 2-lane roundabout with slip lanes.

The need for the project segment includes:

- Expected increased traffic volumes as a result of the east-west corridor addition at Dowling Road
- Poor level of service (LOS) for left turning traffic from Minnesota Drive southbound off-ramp to Raspberry Road
- Addition of bicycle lanes along Raspberry Road,
- Weaving maneuvers for eastbound Raspberry Road drivers with slip lane traffic from Northwood,
- Weaving maneuvers for westbound Raspberry Road drivers and Off-Ramp drivers going to Northwood,
- Sidewalk degradation
- Need for Americans With Disabilities Act (ADA) sidewalk design and accommodation compliance,
- Noise Wall locations are inconsistent and in need of repair

3. Provide a concise written description of the proposed Design Exception(s)/Design Waiver(s). It is required to be specific in stating which design standard(s) is being requested to be excepted or waived and the location (either the entire project length or a station range). State the standard and proposed values of the design criteria exception/waiver citing AASHTO, Department, or other standards. Include the date of the design standard references cited. Whenever possible, reference AASHTO guidelines to support your design decisions.

Proposed Design Exceptions/Design Waivers Summary			
Criteria	**Standard**	**Proposed**	**Location** ***(entire project or station range)***

4. Discuss the terrain in the area of the project and the proposed Design Exception(s)/Design Waiver(s).

The road surface slope is -2%/+2%. The road vertical alignment is relatively flat with an elevation of approximately 89 ft above sea level. The area with which the proposed design standard deviation is requested for, is from Cranberry Road intersection to the east, flowing under the Minnesota Drive underpass and converting at the new light being installed in 2015.

5. Discuss the traffic characteristics in the area of the project and the proposed Design Exception(s)/Design Waiver(s).

The State of Alaska Department of Transportation does not have a solution to dealing with 45 mile an hour right lane merging traffic with bicycle lanes.

6. Discuss the crash history of the project and the proposed Design Exception(s)/Design Waiver(s). State if any anomalies are present within the project limits.

The proposed bike box following NACTO Bike Box standards is a new and innovative way to deal with high speed merging traffic and bicyclists in lanes parallel to the motorized vehicles. The solution brings them from the right side of motorized vehicles to the left side of the motorized vehicles.

7. Discuss the degree to which a standard is being reduced, whether the exception/waiver will affect other standards, and are they any additional features being introduced, e.g., signing or delineation that would mitigate the deviation and the proposed Design Exception(s)/Design Waiver(s).

8. Discuss the cost of the project and the proposed Design Exception(s)/Design Waiver(s). Provide information that reflects the cost with and without the Design Exception(s)/Design Waiver(s). Attach detailed cost estimates.

Project Cost Summary	
To Standards	**With approved Design Exceptions/ Design Waivers**

Proposed – Designer/Consultant: ______________________________________ **Date:** ___________

Endorsed – Engineering Manager: ______________________________________ **Date:** ___________

Approved – Preconstruction Engineer: ___________________________________ **Date:** ___________

Concur – FHWA: _______________________________________ **Date:** ___________

FHWA concurrence required for high profile projects only.

APPENDIX E

Traffic Analysis

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

DRAFT TRAFFIC ANALYSIS RECOMMENDATIONS

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

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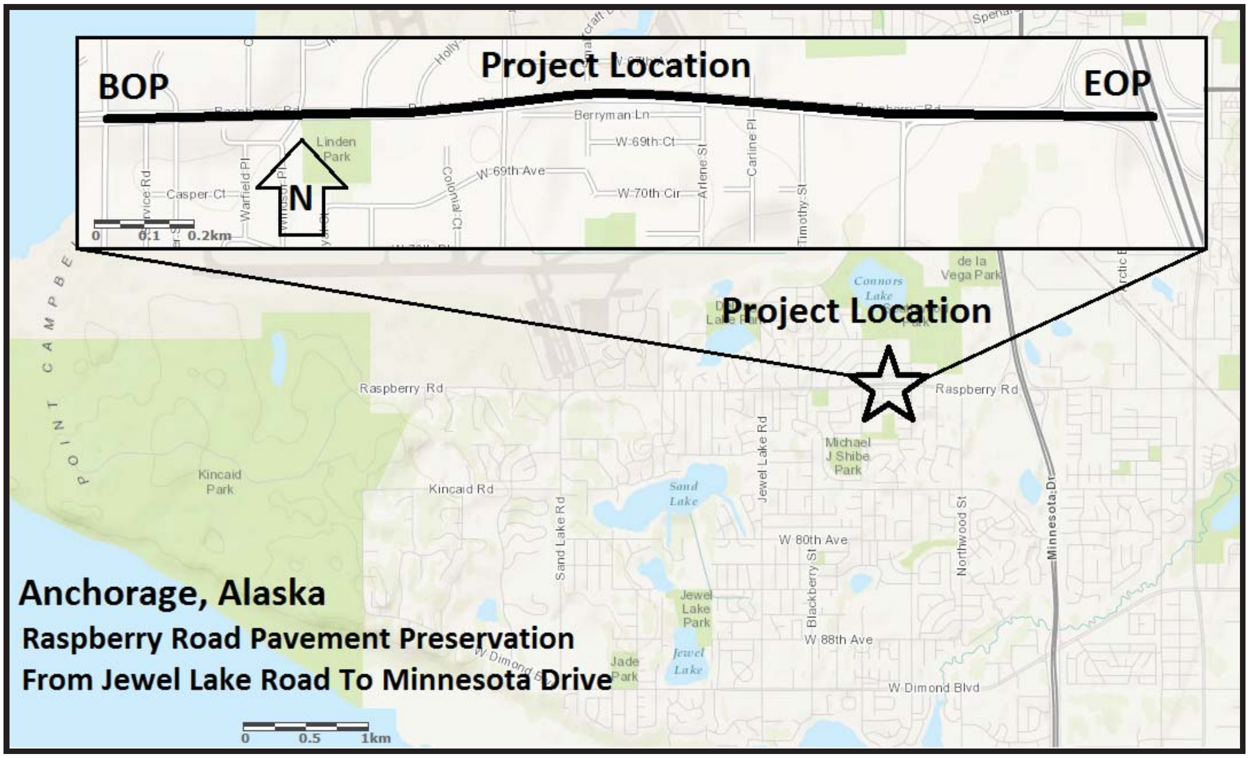

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

FIGURE 1

RASPBERRY ROAD IMPROVEMENTS
PROJECT NO. SEAWOLF ENGR.2015

LOCATION AND VICINITY MAP

FIGURE 1: Location and Vicinity Map

1.0 INTRODUCTION

As the population of the Municipality of Anchorage is growing every year, the traffic flowing within the City of Anchorage is constantly growing in volume; especially Raspberry Road spanning from Jewel Lake Road to Minnesota Drive with the construction of the West Dowling Road Extension Phase II: C Street to Raspberry Road in the summer of 2015. The primary focus for the Raspberry Road Reconstruction: Jewel Lake Road to Minnesota Drive is to resolve the traffic congestion and safety concerns from Northwood Street to the Minnesota Southbound off ramp section for traffic exiting the ramp and entering into Northwood of the project. The preferred alternative in providing a solution to the problem is by installing a roundabout at the Raspberry Road and Northwood Street intersection with the realignment of the exiting Southbound off ramp to the intersection with the notion of disturbing the neighboring wetlands.

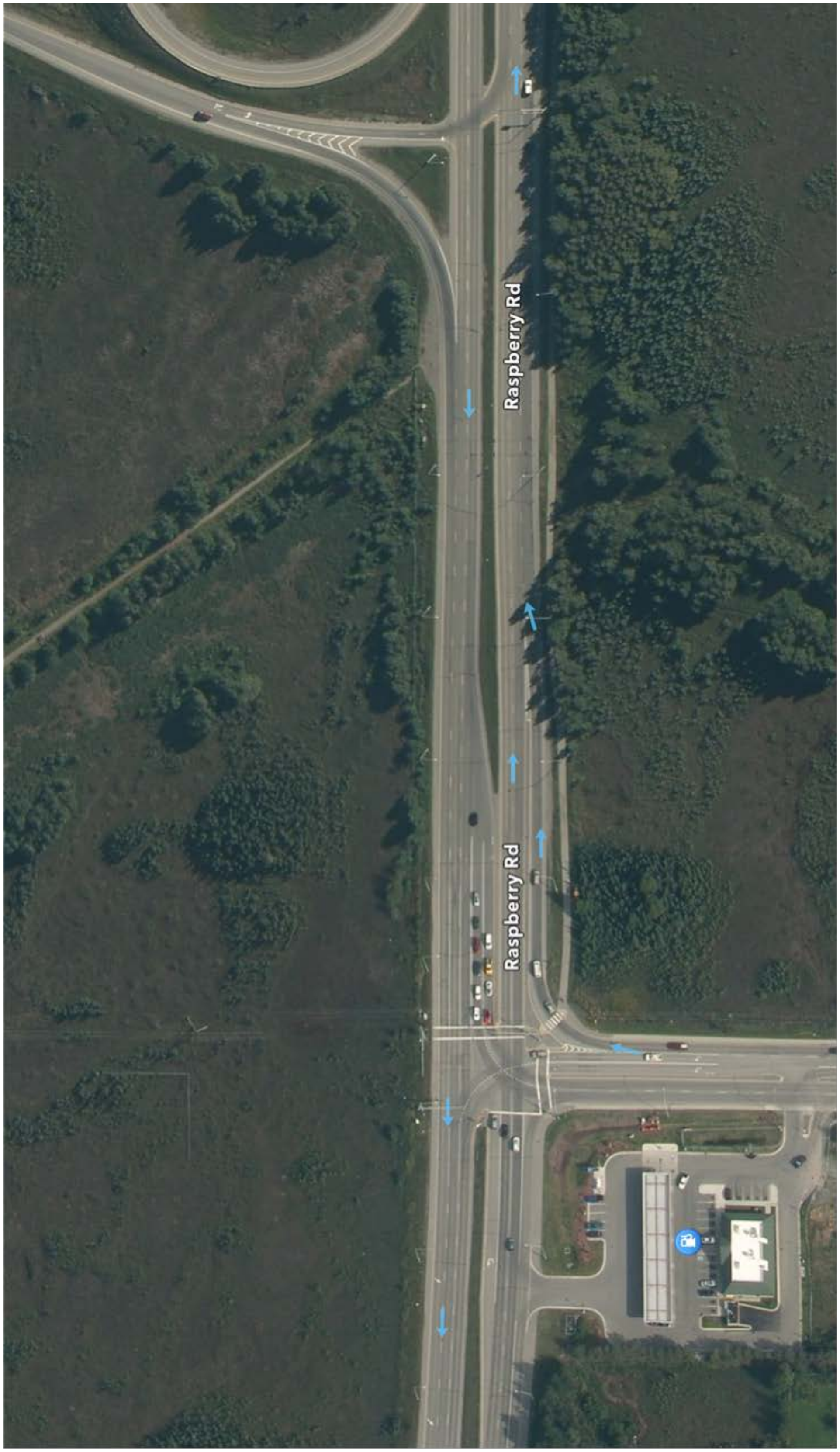

Figure 2 - Traffic Analysis, Raspberry Road: Northwood Street to Minnesota Southbound Off Ramp

2.0 EXISTING CONDITIONS

The current layout along Raspberry Road from Northwood Street to the Minnesota Southbound off ramp features unique devices at both the intersection and the ramp approach. The existing condition at the Southbound off ramp approach to the Raspberry Road consists an unsignalized left-turn lane heading Eastbound and a full right-turn bypass lane heading Westbound with its own individual lane when approaching the Raspberry Road and Northwood Street intersection. As for the intersection, the existing condition at Raspberry Road and Northwood Street is a signalized intersection. Along Raspberry Road, the traffic directing Westbound consists two left-turn lanes, two-through lanes, and one lane from the Minnesota Southbound off ramp bypass lane, which will merge into the main roadway shortly after passing the intersection. The traffic directing Eastbound consists one U-turn lane, two-through lanes, and one left-turn lane. While the Northwood Street approach consists two left-turn lanes heading Westbound and a full right-turn bypass lane heading Eastbound with its own individual lane. As for the pedestrian amenities, the signalized intersection features two crosswalks at the Northwood Street approach and the Raspberry Road Westbound approach.

3.0 AADT SUMMARY

3.1 Historical AADT

The following tables below summarizes the historical AADT for the last 10 years (2003 to 2012) retrieved from the Alaska Department of Transportation and Public Facilities (ADOT&PF) Central Region Average Daily Traffic Map Archives for Raspberry Road, Cranberry Street, Northwood Street, and the Minnesota Southbound off ramp.

Raspberry Road										
Segment	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Jewel Lake to Cranberry	12,415	13,667	12,185	12,981	13,473	14,152	14,420	17,064	15,823	13,351
Cranberry to Northwood	14,501	16,285	14,195	14,220	15,696	17,409	19,735	17,624	17,578	17,295
Northwood to Minnesota	23,870	22,484	22,482	22,530	23,430	21,889	27,274	27,825	27,947	25,731

Table 1 – Historical AADTs: Raspberry Road, 2003 to 2012

Cranberry Street										
Segment	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
64th to Raspberry	2,168	1,931	1,920	1,976	2,050	1,648	1,587	1,571	1,435	1,550
Raspberry to 71st	2,440	2,390	2,105	1,701	1,760	1,866	1,914	2,186	1,549	1,560

Table 2 – Historical AADTs: Cranberry Street, 2003 to 2012

Northwood Street										
Segment	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Raspberry to Strawberry	11,195	11,350	10,955	10,980	10,097	9,279	10,057	11,177	11,330	11,092

Table 3 – Historical AADTs: Northwood Street, 2003 to 2012

Minnesota Southbound Off Ramp										
Segment	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Minnesota to Raspberry	-	-	-	-	-	-	-	-	7,106	7,467

Table 4 – Historical AADTs: Minnesota Southbound Off Ramp, 2003 to 2012

3.2 AADT for No-Build Alternative

The AADT for the no-build alternative was provided by the ADOT&PF from the Design Designation Form in Appendix A. Each segment of Raspberry Road was determined by AADT provided by DOT&PF while the AADT for the Northwood Street and the Minnesota Southbound off ramp were calculated by looking over the historical data provided through the ADOT&PF Central Region Average Daily Traffic Map Archives and generating an average growth rate for the construction, midlife, and design year for a project design life of 20 years. The formula used to determine the growth rate for the AADT is displayed below:

$$CAGR = \left(\frac{EV}{BV}\right)^{\left(\frac{1}{n}\right)} - 1 \qquad \text{(Eq. 1)}$$

Where:

- *CAGR* = Compound Annual Growth Rate
- *BV* = Beginning AADT Value
- *EV* = Ending AADT Value
- *n* = Number of Periods (years)

Figure 3 displays the historical and projected AADT for the no-build alternative for the whole project with 2012, 2015, 2025, and 2035 being the existing, construction, mid-life, and design year respectively.

3.3 AADT for Preferred Alternative

The AADT for the preferred alternative was determined by using similar methods when calculating the AADT for the no-build alternative. The only exception is the existing Minnesota Southbound off ramp is realigned to the Raspberry Road and Northwood Street intersection, directing majority of the traffic flow away from the Northwood Street to Minnesota Drive segment of Raspberry Road. Figure 4 displays the historical and projected AADT for preferred alternative for the whole project.

Figure 3 – Historical and Projected AADTs for No-Build Alternative

Figure 4 – Historical and Projected AADTs for Preferred Alternative

4.0 TRAFFIC VOLUMES

The data collected to generate the traffic flow volumes were provided by Kinney Engineering, LLC during the AM and PM peak hours to determine the existing year volumes and to project the construction and design year. The given peak hour factor (PHF) used during traffic volume calculations for a 15-minute design flow rate of 0.95 was used provided by ADOT&PF in the Design Designation Form. As for the heavy vehicle value provided by Kinney Engineering, LLC, the commercial heavy vehicle percentage of 5.0% was used and 1.0% for recreational heavy vehicle percentage. The passenger-car equivalents for commercial and recreational vehicles for a level terrain are 1.5 and 1.2 respectively. The following figures shown below displays Raspberry Road from Northwood Street to Minnesota Drive segment of the roadway, which cause the most concern for traffic accumulation.

4.1 Turning Movement Volumes for No-Build Alternative

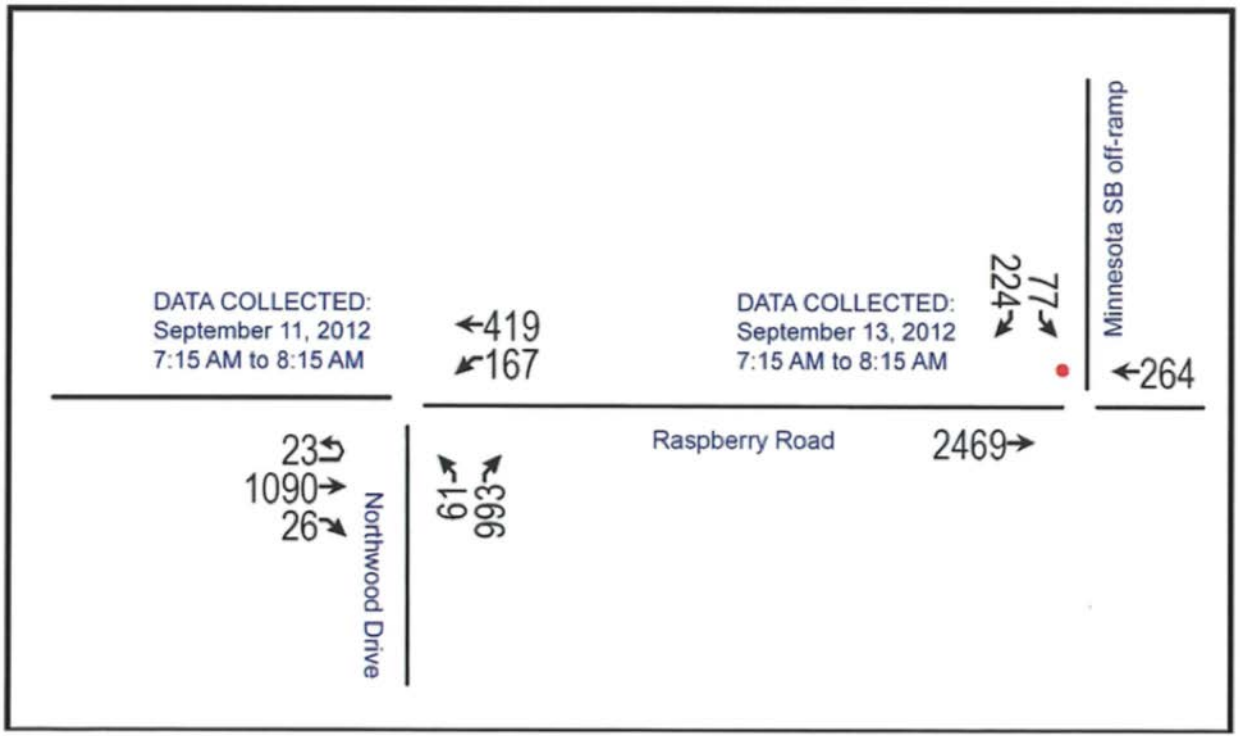

Figure 5 – 2012 AM Peak Hour Turning Movements

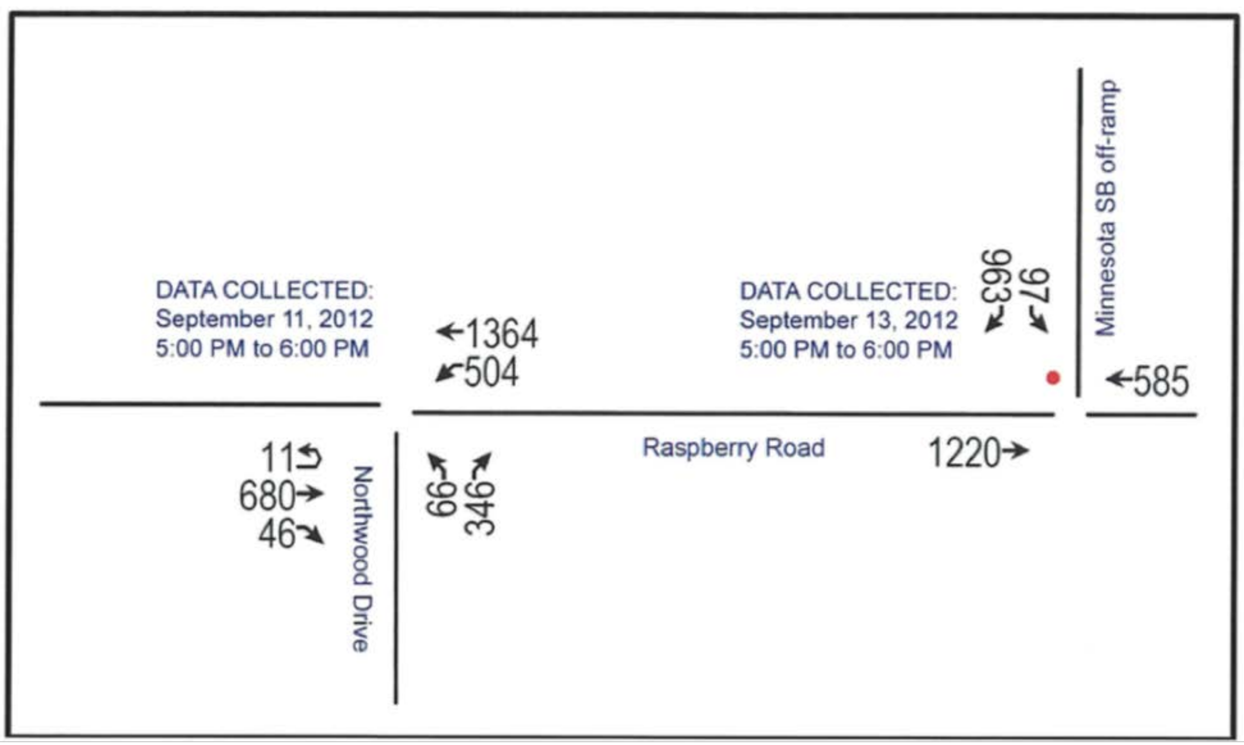

Figure 6 – 2012 PM Peak Hour Turning Movements

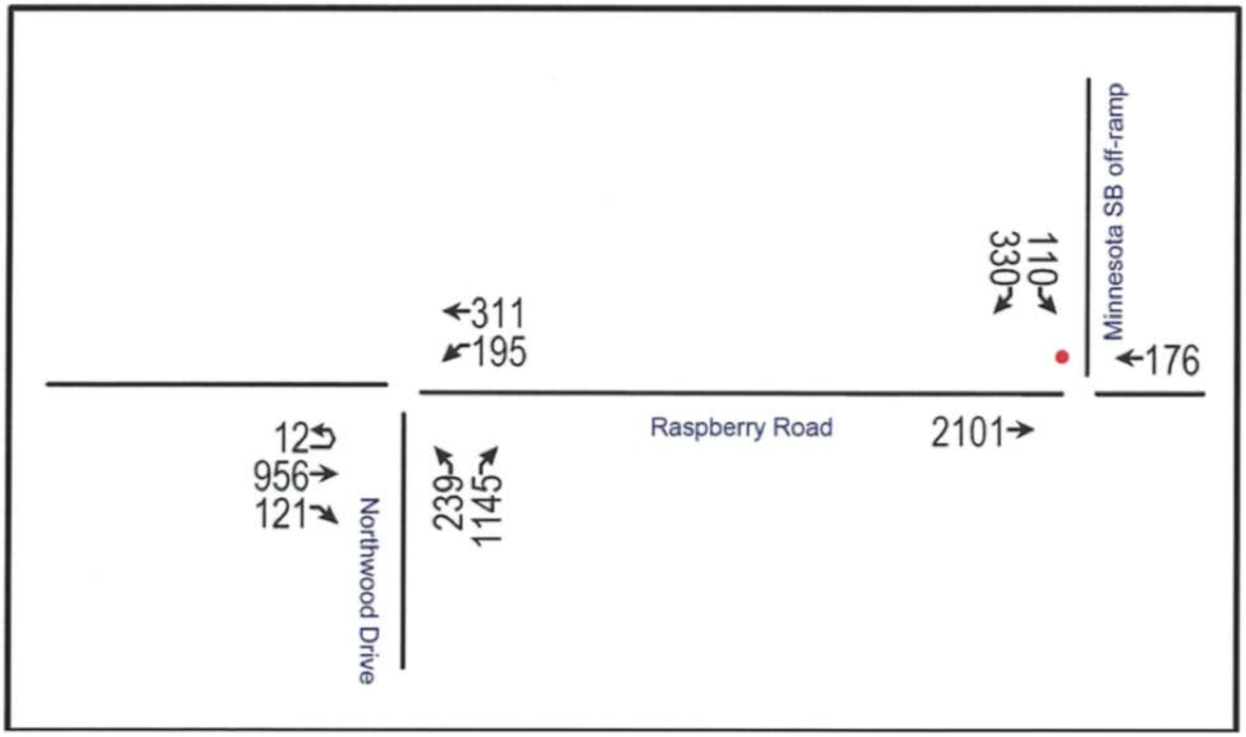

Figure 7 – 2015 AM Peak Hour Turning Movements

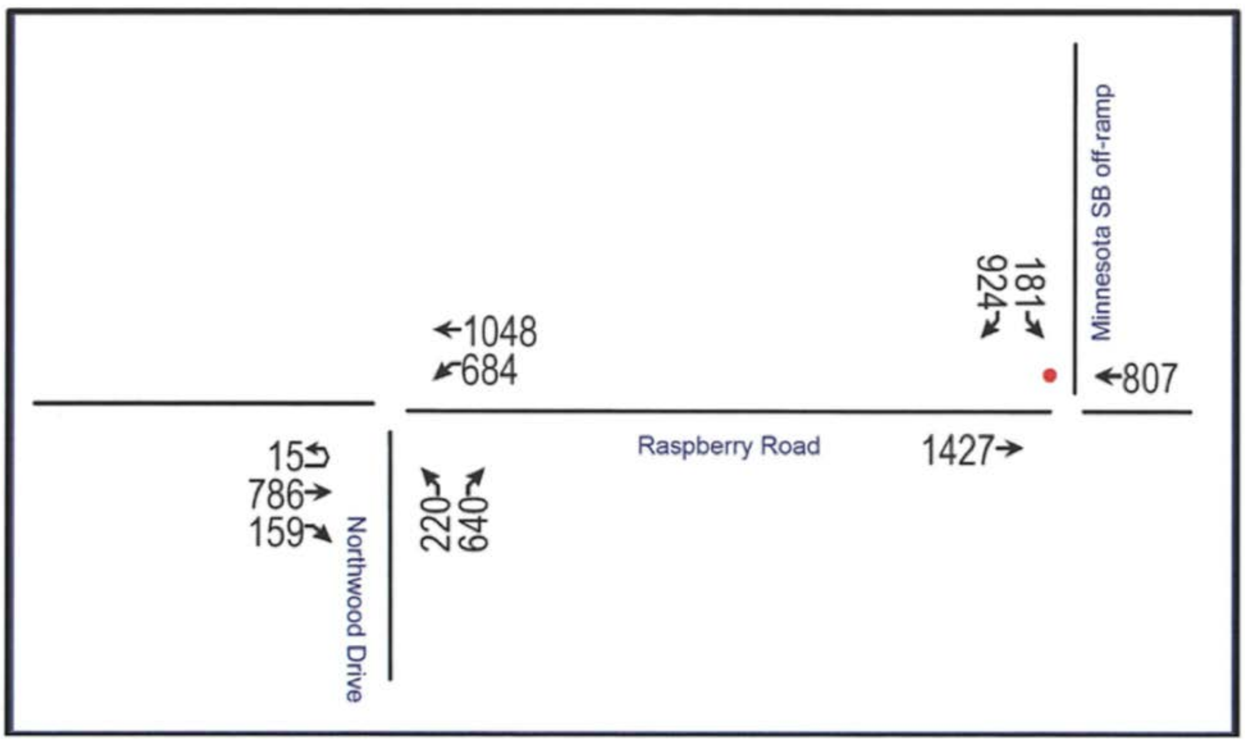

Figure 8 – 2015 PM Peak Hour Turning Movements

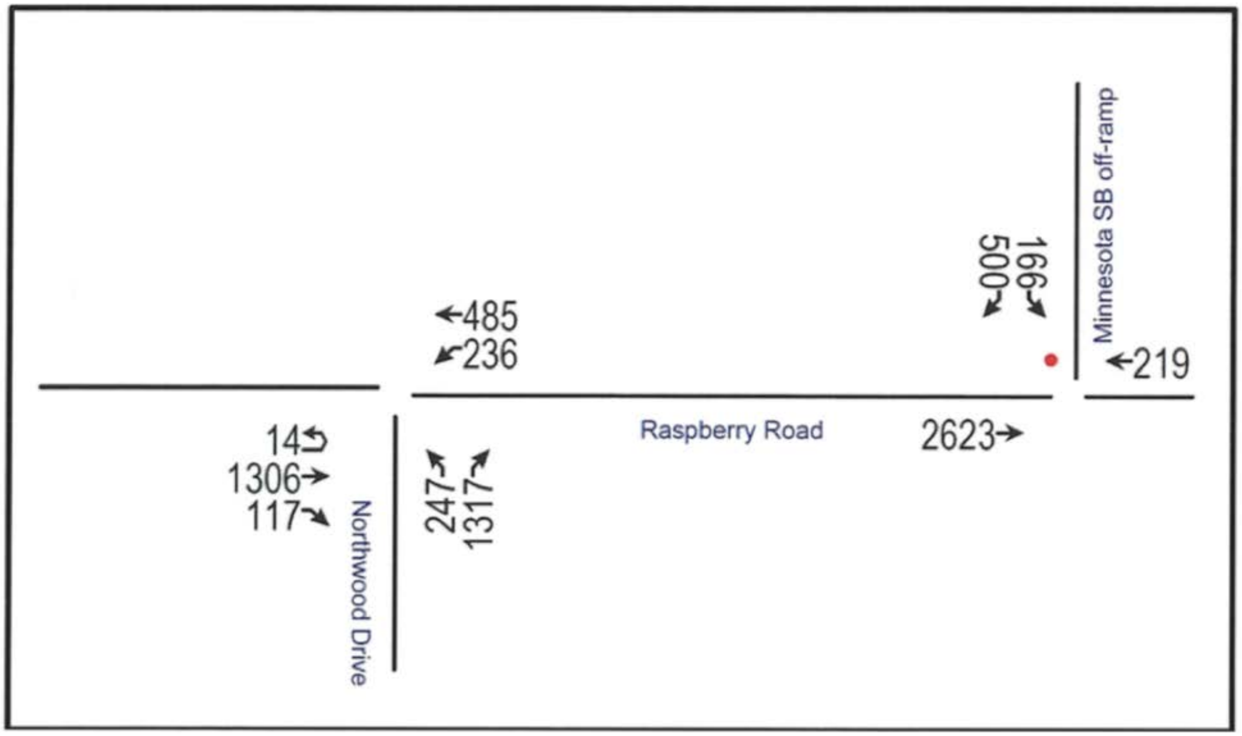

Figure 9 – 2035 AM Peak Hour Turning Movements

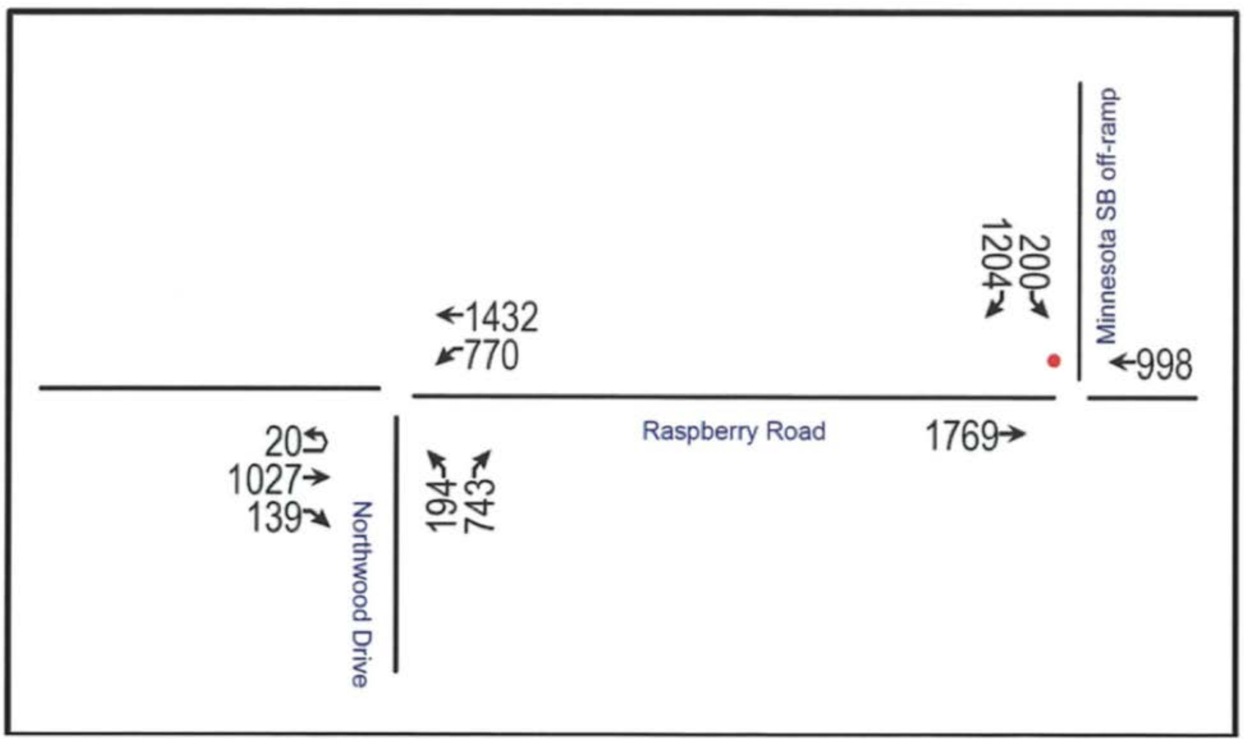

Figure 10 – 2035 PM Peak Hour Turning Movements

4.2 Roundabout Movement Volumes for Preferred Alternative

The existing 2012 AM and PM peak hour turning movements traffic flow volumes follow Figure 4 and Figure 5 for the no-build alternative. For the construction and design year, the preferred alternative was adjusted to the roundabout movements. Since the preferred alternative will install a roundabout at the Raspberry Road and Northwood Street intersection with the realignment of the existing Minnesota Southbound off ramp and the traffic flow into the intersection. Using the turning movement volumes provided by Kinney Engineering, LLC, the following formulas were used to convert into the roundabout movement volumes.

$$v = \frac{V}{PHF} \qquad \text{(Eq. 2)}$$

Where:

- v = Flow Rate, pc/h
- V = Movement Demand Volume for Each Turning Movement
- PHF = Peak Hour Factor (0.95)

$$f_{HV} = \frac{1}{1 + P_T(E_T - 1) + P_R(E_R - 1)} \qquad \text{(Eq. 3)}$$

Where:

- f_{HV}= Heavy Vehicle Factor
- P_T= Commercial Heavy Vehicle Percentage, %
- P_R= Recreational Heavy Vehicle Percentage, %
- E_T= Passenger-Car Equivalents for Commercial Vehicles
- E_R= Passenger-Car Equivalents for Recreational Vehicles

$$v_{pce} = \frac{v}{f_{HV}} \qquad \text{(Eq. 4)}$$

Where:

- v_{pce}= Modified Flow Rate, pc/h
- v = Flow Rate, pc/h
- f_{HV}= Heavy Vehicle Factor

After calculating the modified flow rates for each turning movement, the entry, circulating, and existing flow rates were determined in respect to the roundabout movement volumes. The following figures below display the roundabout volumes at the intersection generated from the projected construction and design year turning movement volumes.

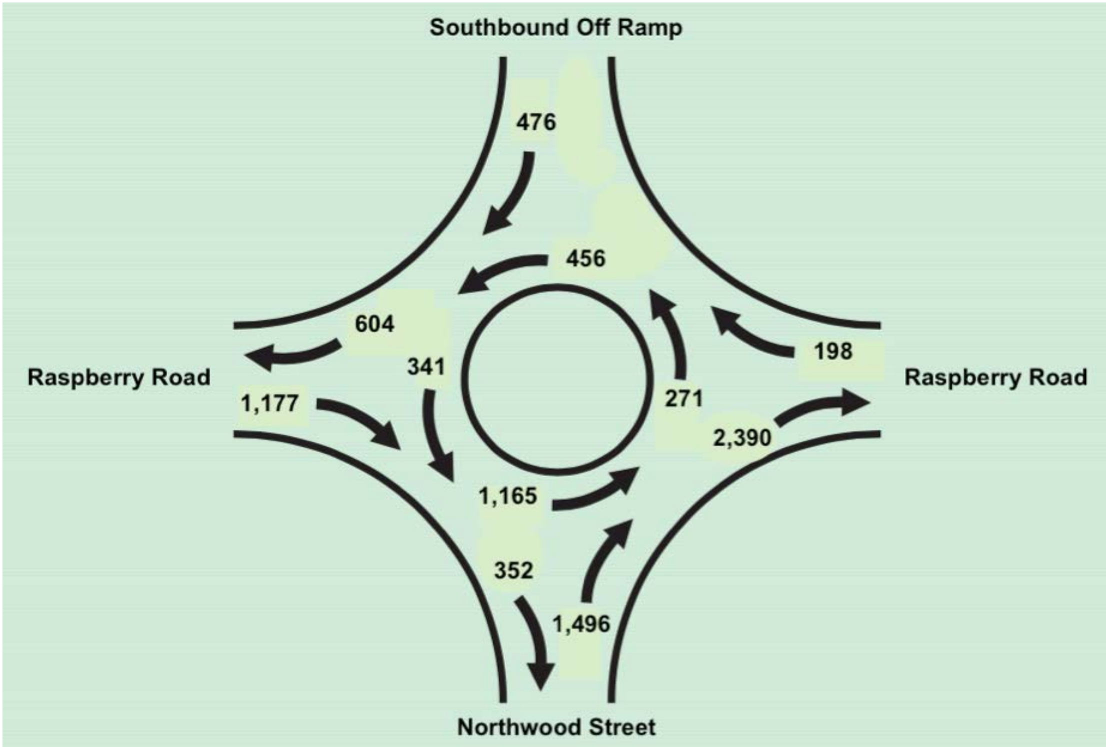

Figure 11 – 2015 AM Peak Hour Roundabout Movements

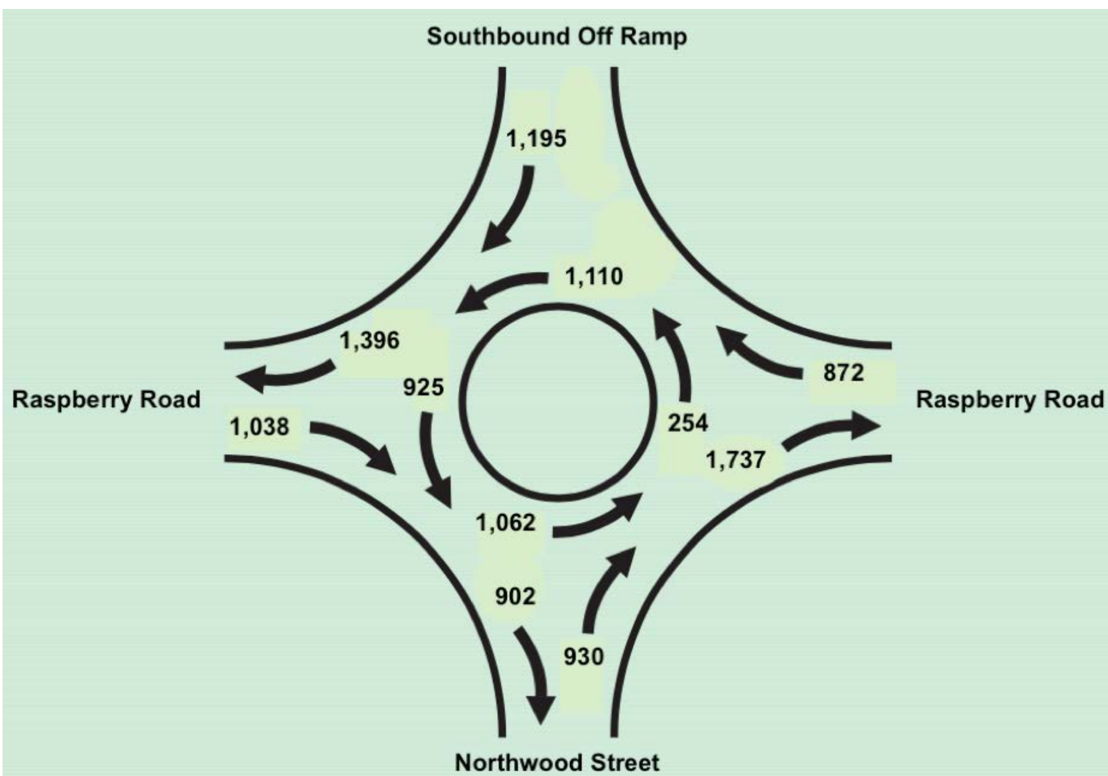

Figure 12 – 2015 PM Peak Hour Roundabout Movements

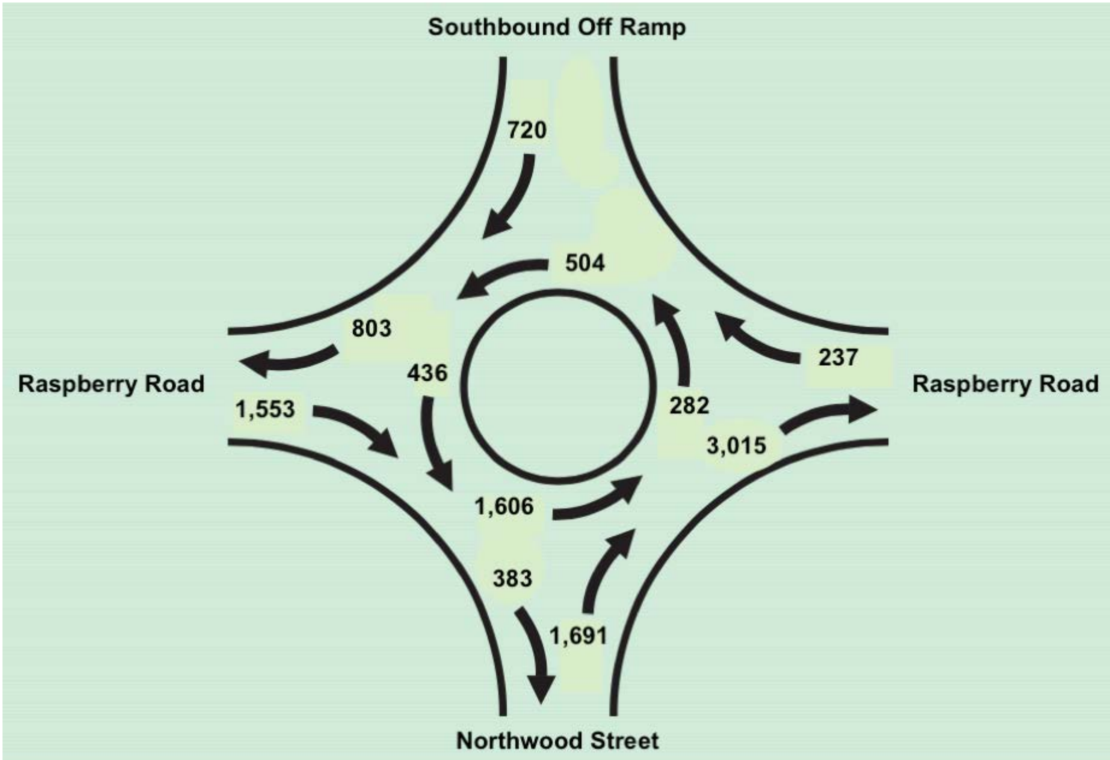

Figure 13 – 2035 AM Peak Hour Roundabout Movements

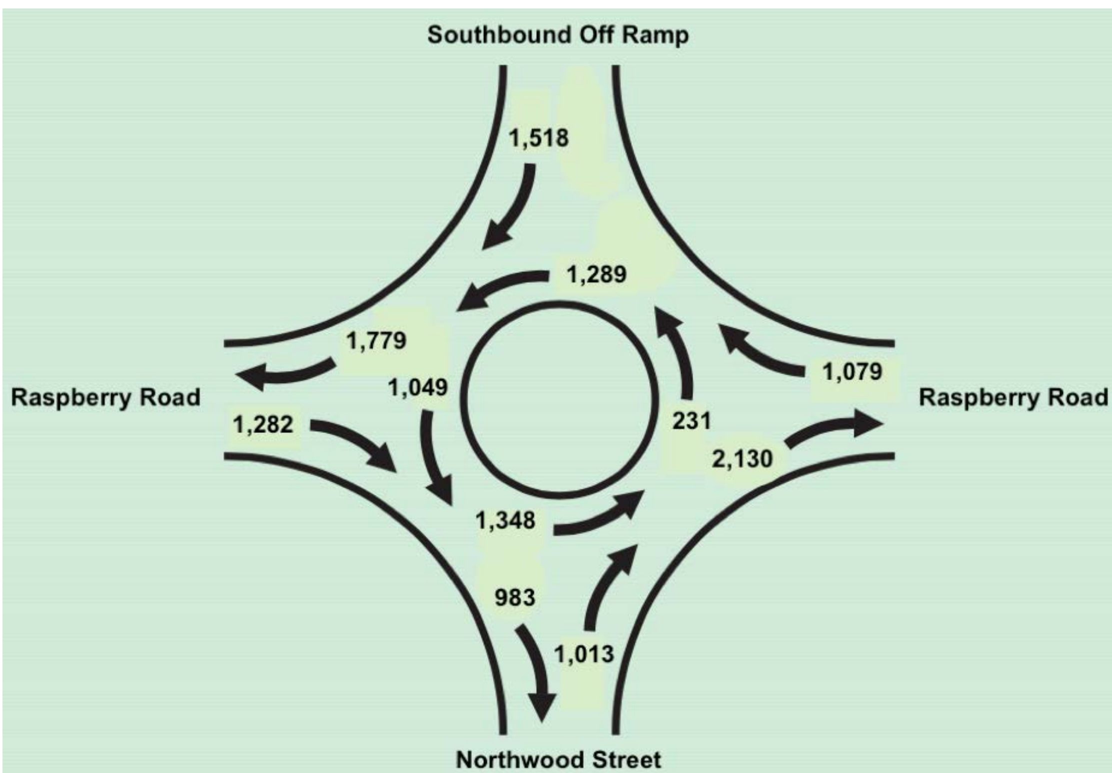

Figure 14 – 2035 PM Peak Hour Roundabout Movements

5.0 LEVEL OF SERVICE AND CAPACITY ANALYSIS

5.1 LOS and Capacity for No-Build Alternative

The following figures provided by Kinney Engineering summarize the level of service (LOS) with the no-build alternative for the existing, construction, and design year.

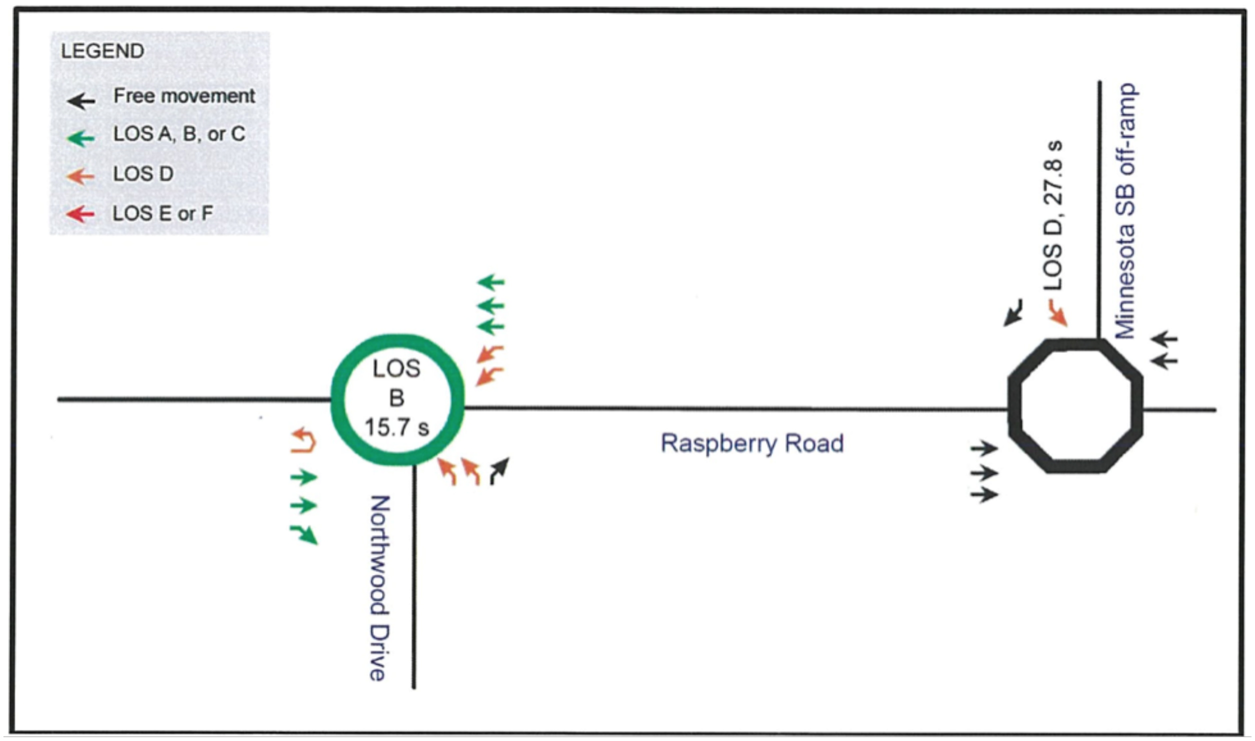

Figure 15 – 2012 AM Peak Hour Level of Service

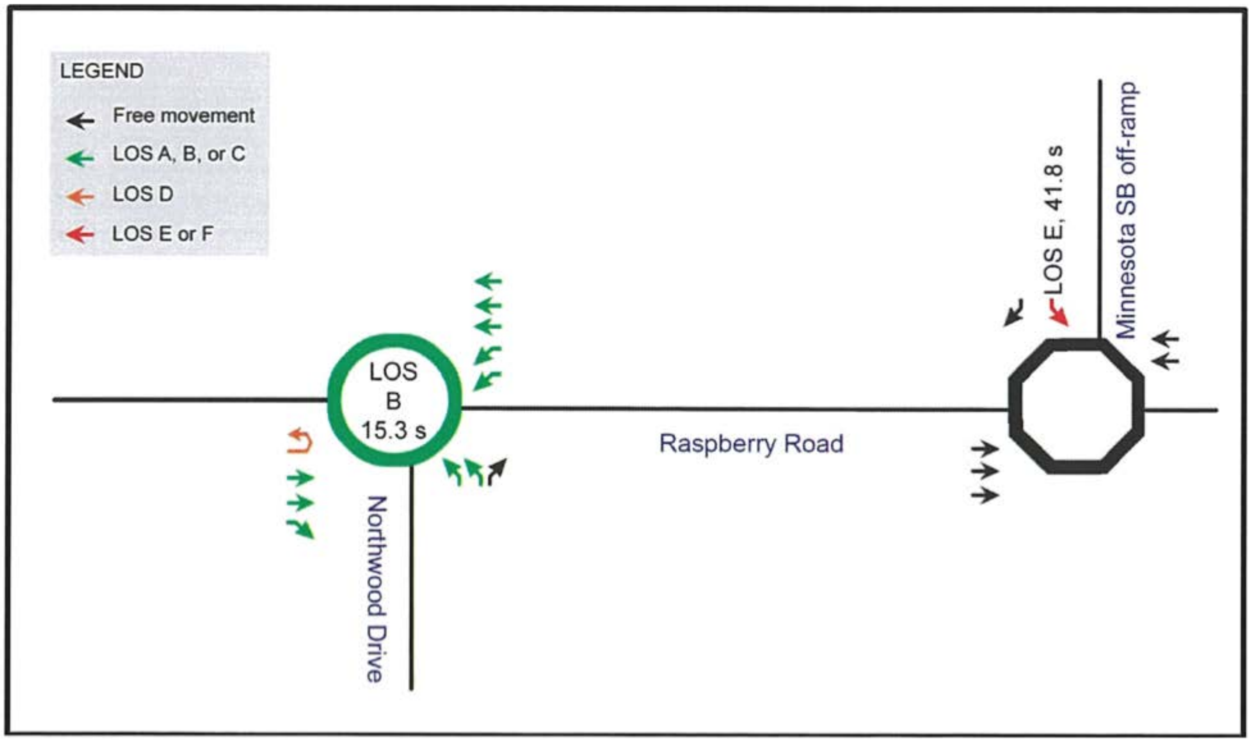

Figure 16 – 2012 PM Peak Hour Level of Service

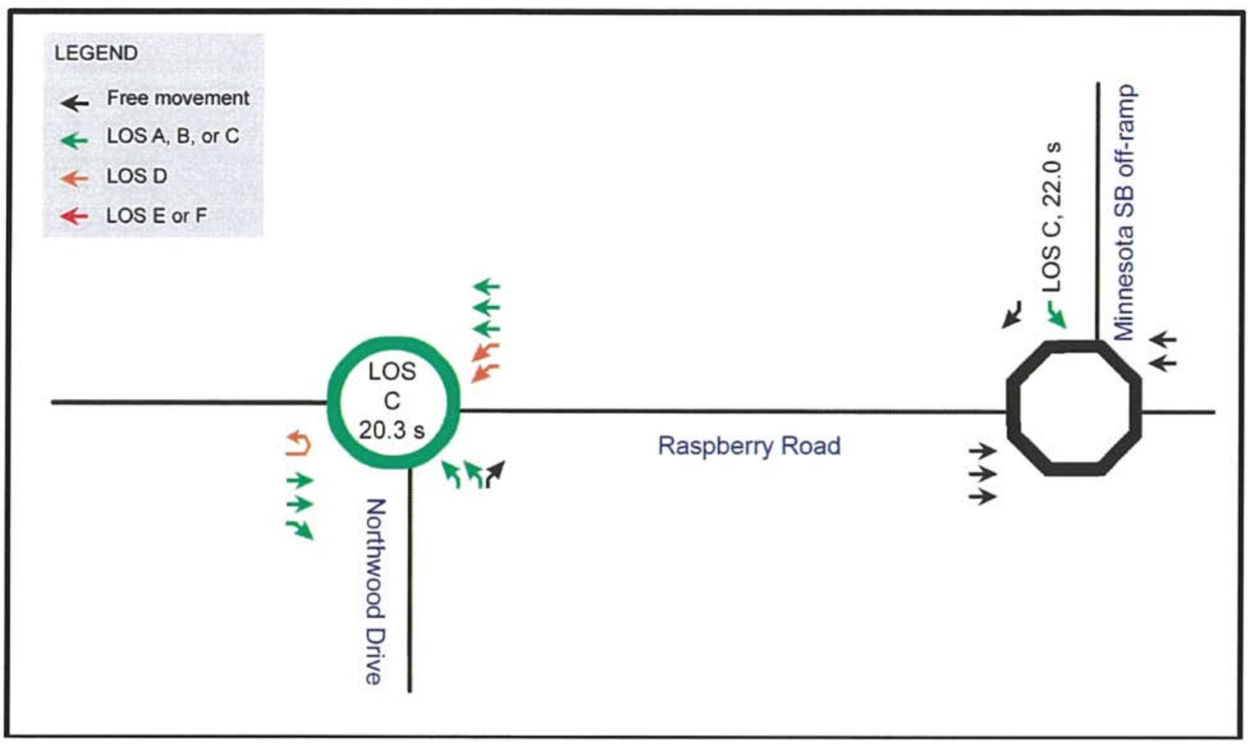

Figure 17 – 2015 AM Peak Hour Level of Service

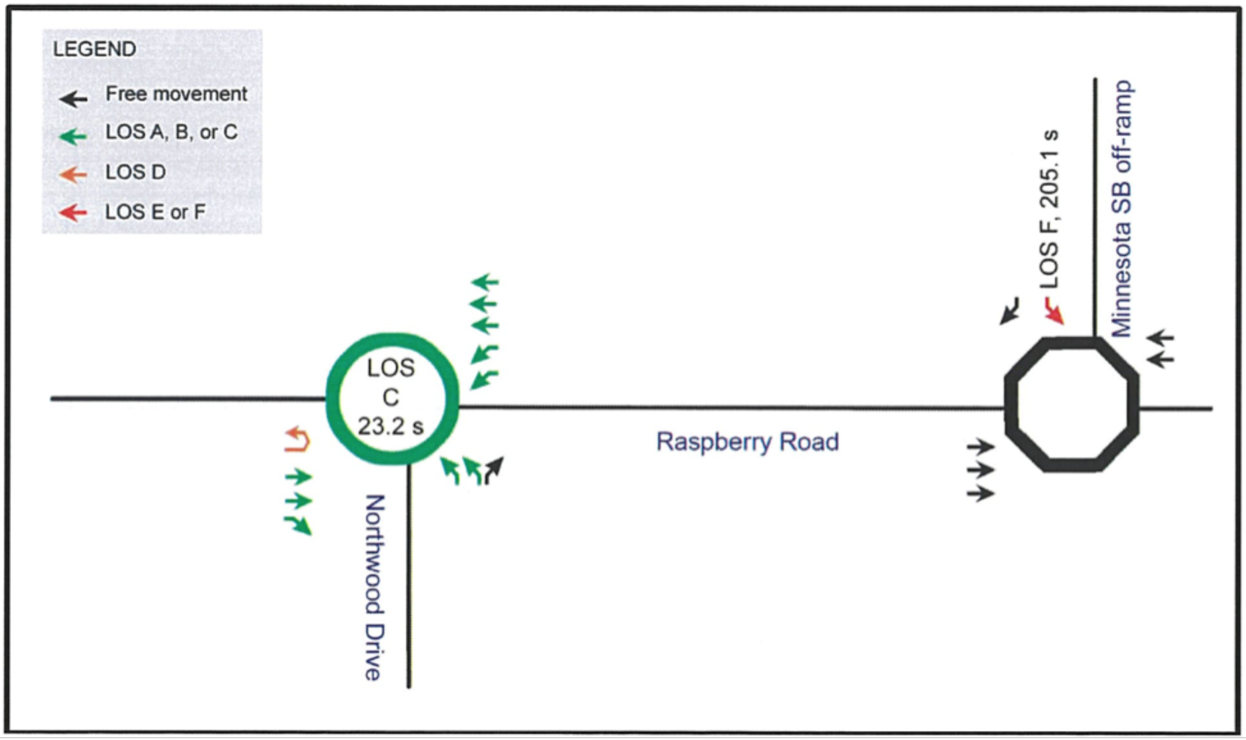

Figure 18 – 2015 PM Peak Hour Level of Service

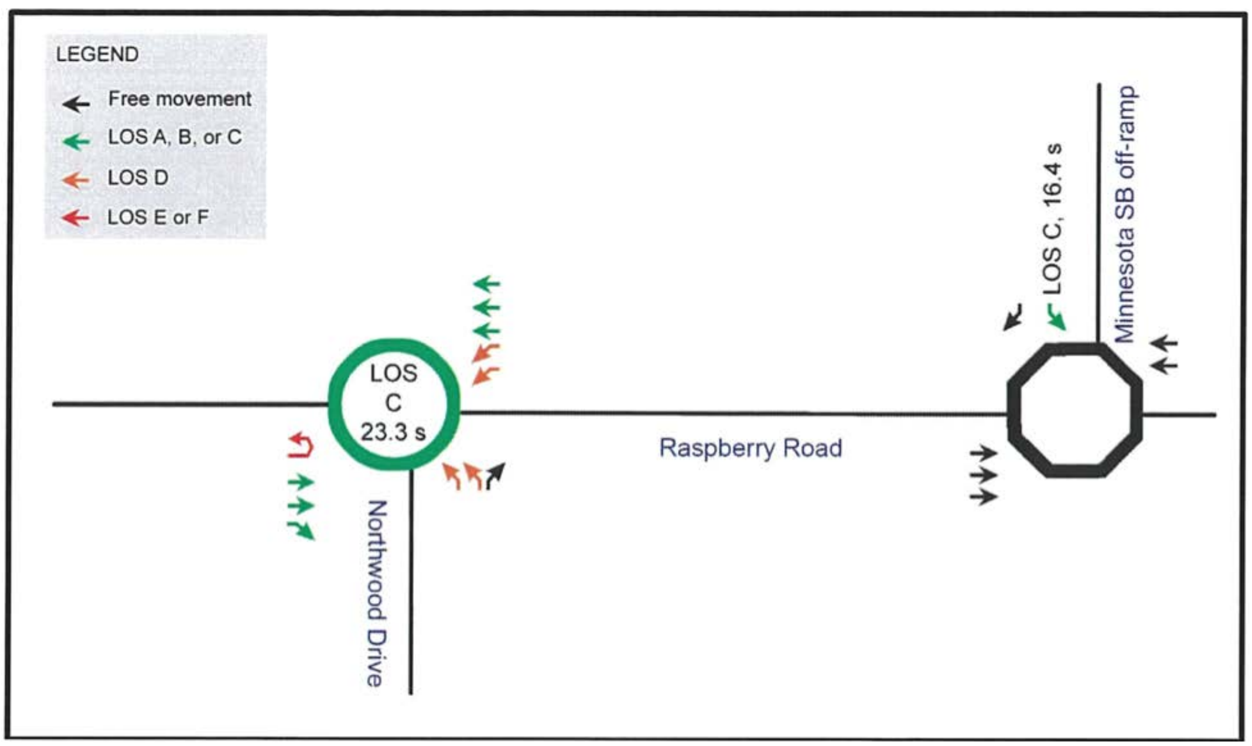

Figure 19 – 2035 AM Peak Hour Level of Service

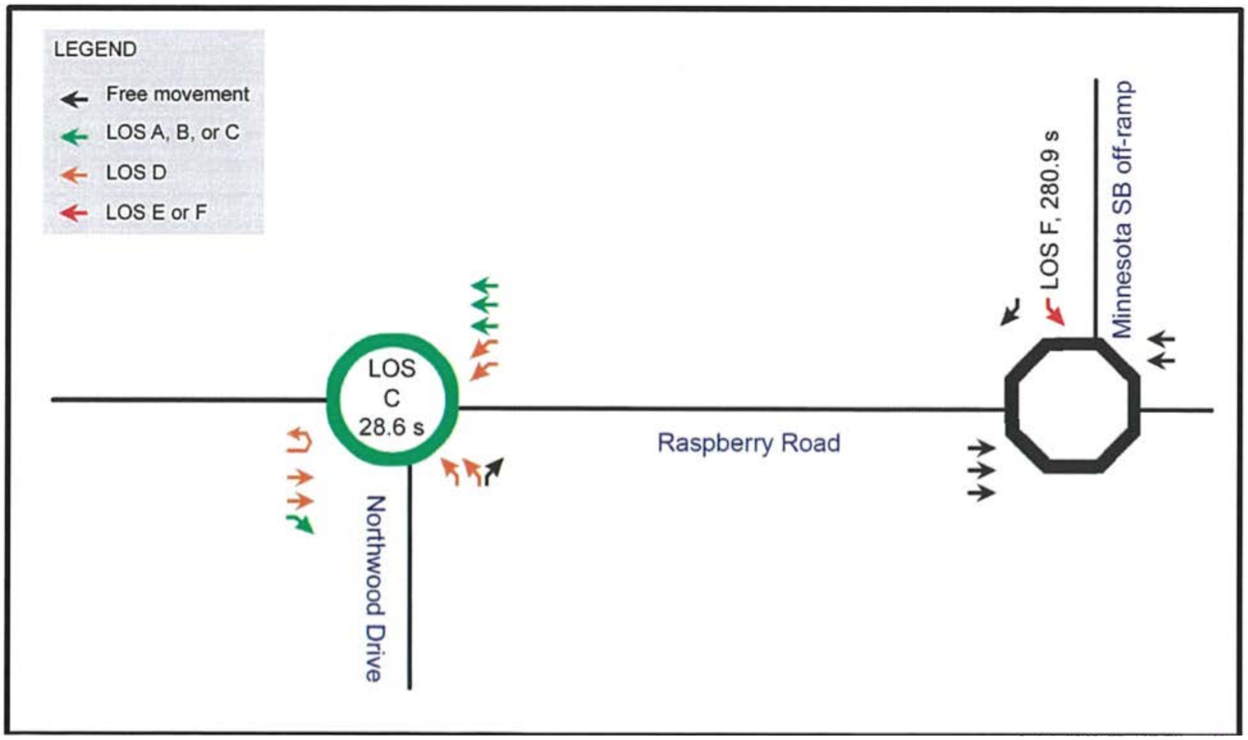

Figure 20 – 2035 PM Peak Hour Level of Service

As shown, the LOS for the no-build alternative will start to deteriorate in the design year of 2035 with majority being classified as a level of service of D or worse. The current issue in the existing intersection is the Minnesota Southbound off ramp already having a LOS of F for traffic turning left on an unsignalized approach heading Eastbound on Raspberry Road.

5.2 LOS and Capacity for Preferred Alternative

The proposed alternative of resolving the existing LOS issue is by installing a multi-lane roundabout at the Raspberry Road and Northwood Street intersection consisting two lanes directing East and West on Raspberry, one lane designated for a left turn and a full right-turn bypass lane on Northwood, and two lanes directing South and a full right-turn bypass lane for the Minnesota off ramp. To compute the LOS for the preferred alternative, the entry capacity of the roundabout needed to be determined. The capacity of a one-lane roundabout entry opposed by two conflicting lanes for the Northwood Street entry was determined following the formula below.

$$c_{e,pce} = 1{,}130e^{(-0.7\ x\ 10^{-3})}v_{c,pce} \qquad \text{(Eq. 5)}$$

Where:

- $c_{c,pce}$= Lane Capacity, Adjusted for Heavy Vehicles, pc/h
- $v_{c,pce}$ = Conflicting Flow, pc/h

The capacity of the right and left lanes of a two-lane roundabout entry opposed by two conflicting lanes for the Raspberry Road Eastbound and Westbound and Minnesota Southbound off ramp entries were determined following the formulas below.

$$c_{e,R,pce} = 1{,}130e^{(-0.7 \times 10^{-3})}v_{c,pce} \qquad \text{(Eq. 6)}$$

$$c_{e,l,pce} = 1{,}130e^{(-0.75 \times 10^{-3})}v_{c,pce} \qquad \text{(Eq. 7)}$$

Where:

- $c_{e,R,pce}$= Capacity of the Right Entry Lane, Adjusted for Heavy Vehicles, pc/h
- $c_{e,l,pce}$ = Capacity of the Left Entry Lane, Adjusted for Heavy Vehicles, pc/h
- $v_{c,pce}$= Conflicting Flow, pc/h

After calculating the capacity of each lane the control delay was then determined by following the formula below.

$$d = \frac{3{,}600}{c} + 900T\left[\frac{v}{c} - 1 + \sqrt{\left(\frac{v}{c} - 1\right)^2 + \frac{\left(\frac{3{,}600}{c}\right)\frac{v}{c}}{450t}}\right] \qquad \text{(Eq. 8)}$$

Where:

- d = Average Control Delay, s/veh
- v = Volume of Subject Lane, pc/h
- c = Capacity of Subject Lane, veh/h
- T = Time Period, h (T = 0.25 for a 15-min Analysis)

The LOS for the preferred alternative for the construction and design year are summarized in the tables below at the Raspberry Road and Northwood Street roundabout with the realignment of the existing Minnesota Southbound off ramp following the figure below as the standard in determining the LOS.

Control Delay (s/veh)	Level of Service by Volume-to-Capacity Ratio*	
	v/c ≤ 1.0	v/c >1.0
0–10	A	F
>10–15	B	F
>15–25	C	F
>25–35	D	F
>35–50	E	F
>50	F	F

Figure 21 – Level of Service Criteria

Level of Service				
	2015 AM Peak Hour		2015 PM Peak Hour	
Lane	Control Delay (s/veh)	LOS	Control Delay (s/veh)	LOS
EBU/EBT	9	A	16	C
EBT/EBR	8	A	9	A
NBL	8	A	8	A
NBR*	-	-	-	-
WBL/WBT	5	A	10	A
WBT	4	A	5	A
SBL/SBT	6	A	17	C
SBT	4	A	5	A
SBR*	-	-	-	-

*Full right-turn bypass lanes with free movement do not have a LOS classification.

Table 5 – 2015 AM/PM Peak Hour Level of Service

Level of Service				
	2035 AM Peak Hour		2035 PM Peak Hour	
Lane	Control Delay (s/veh)	LOS	Control Delay (s/veh)	LOS
EBU/EBT	20	C	45	E
EBT/EBR	14	B	13	B
NBL	12	B	9	A
NBR*	-	-	-	-
WBL/WBT	5	A	14	B
WBT	4	A	6	A
SBL/SBT	7	A	28	D
SBT	4	A	5	A
SBR*	-	-	-	-

*Full right-turn bypass lanes with free movement do not have a LOS classification.

Table 6 – 2035 AM/PM Peak Hour Level of Service

As shown from Table 6, none of the entry lanes will have a failing LOS at the roundabout. The 2035 PM peak hours the Southbound left-turn/through lane on the Minnesota Southbound off ramp will have a LOS of D and the Eastbound U-turn/through lane on Raspberry Road will have a LOS of E. The traffic flow within the roundabout will continue to function properly during the duration of the roundabout's design year even with the low LOS for the two entry lanes. Additionally, the full right-turn bypass lanes on the

North and Southbound entries of the roundabout does not apply to the LOS classification because of the continuous traffic flow and having its individual lane when merging into the main roadway of Raspberry Road.

6.0 QUEUE LENGTH

6.1 Queue Length for No-Build Alternative

The current queue length for the existing conditions of the no-build alternative at the Raspberry Road and Northwood Street signalized intersection and the Minnesota Southbound off ramp are shown in the figures provided by Kinney Engineering, LLC below.

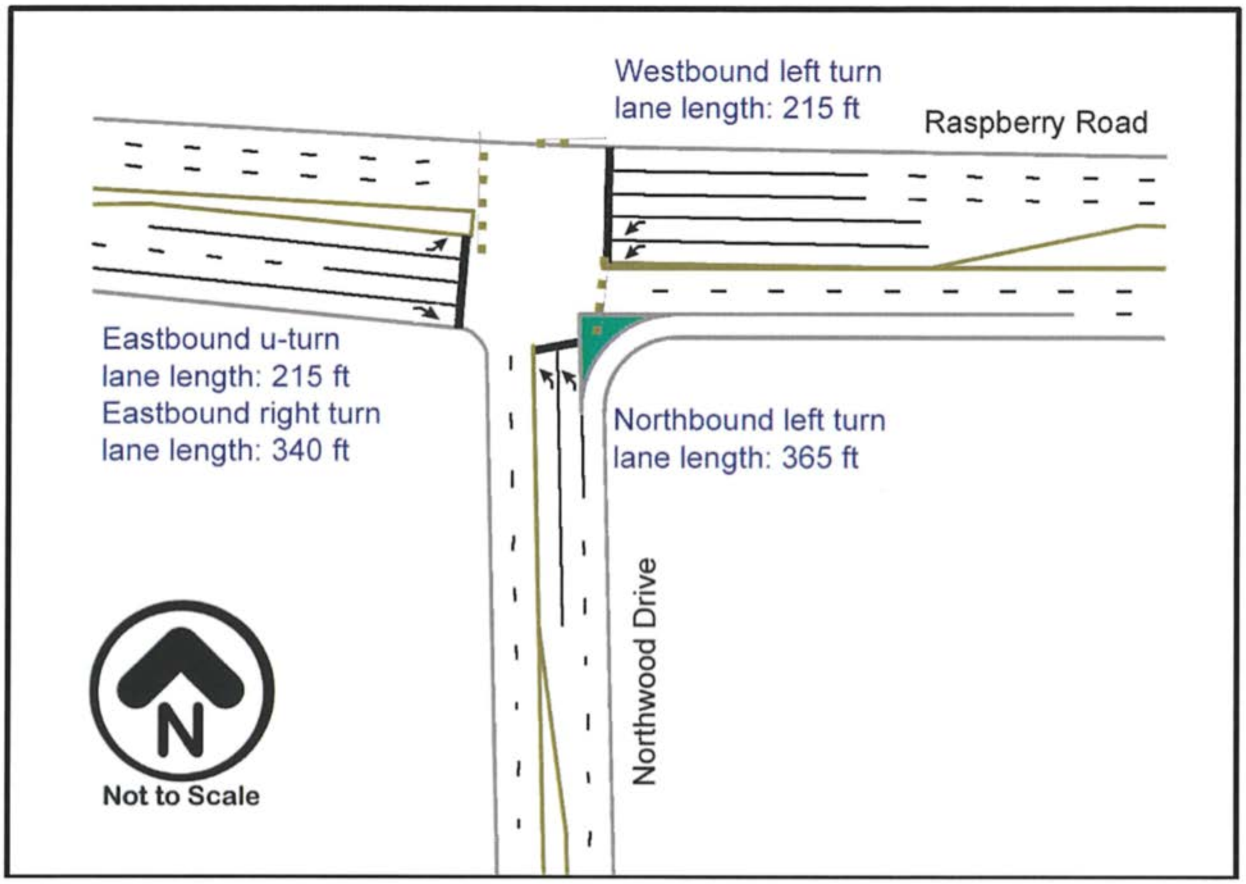

Figure 22 – Queue Length for Existing Raspberry Road and Northwood Street Intersection

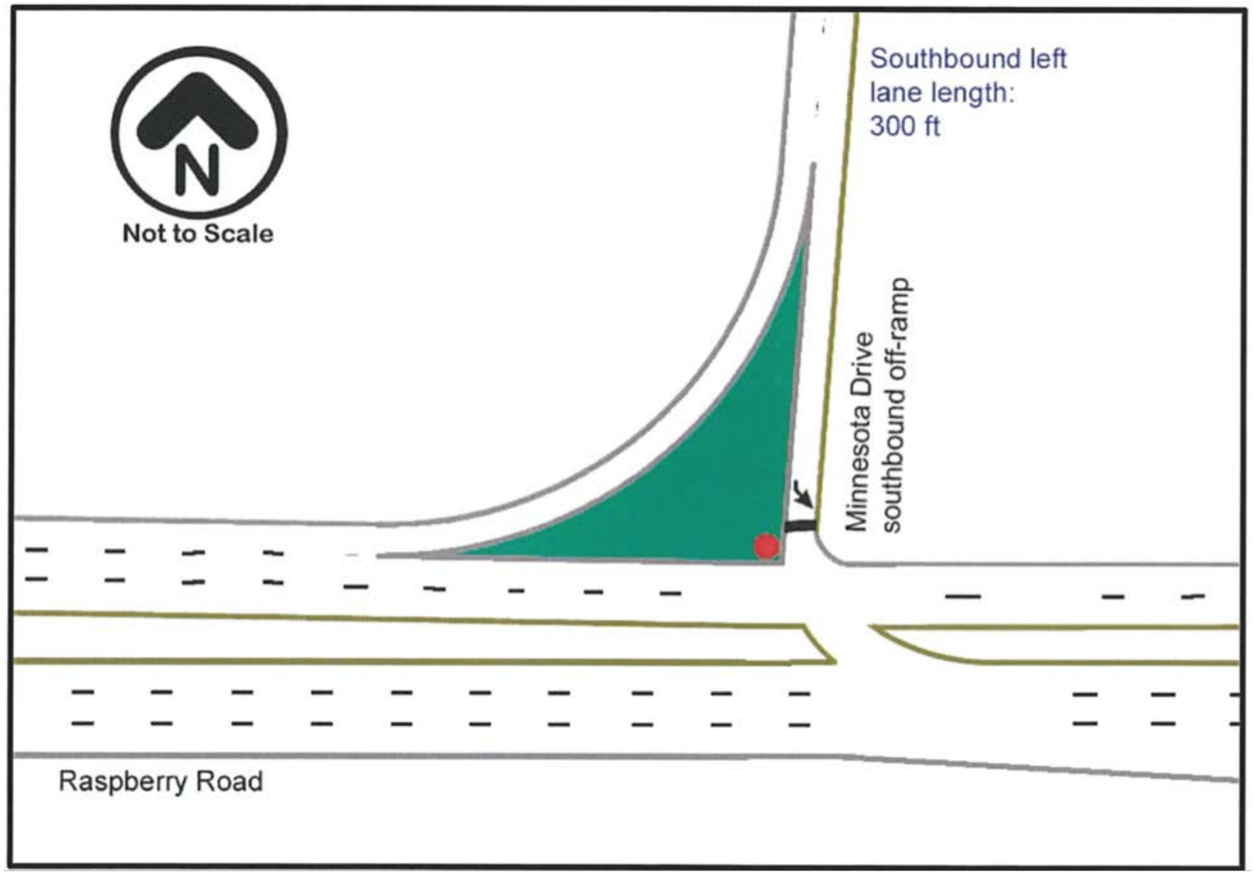

Figure 23 – Queue Length for Existing Minnesota Southbound Off Ramp

6.2 Queue Length for Preferred Alternative

The queue lengths for the preferred alternative at all four entries of the roundabout were calculated by using the following formula for a 95th percentile queue given by the number of vehicles. Therefore, to determine the length of the actual queue, one-passenger vehicle was the default length of each vehicle at 19 feet with 5 feet of gap between queued vehicles.

$$Q_{95} = 900T\left[\frac{v}{c} - 1 + \sqrt{\left(1 - \frac{v}{c}\right)^2 + \frac{\left(\frac{3{,}600}{c}\right)\frac{v}{c}}{150T}}kl\right]\left(\frac{c}{3{,}600}\right) \quad \text{(Eq. 9)}$$

Where:

- Q_{95} = 95th Percentile Queue, veh
- v = Volume of Subject Lane, pc/h
- c = Capacity of Subject Lane, veh/h
- T = Time Period, h (T = 0.25 for a 15-min Analysis)

The queue length for all the entry lanes were determined for the AM and PM design year shown in the table below with the exception of the full right-turn bypass lanes at the Northwood Street and the Minnesota Southbound off ramp approaches, since the traffic flow is continuous and does not require a queue length.

Queue Length (ft)		
	2035 AM Peak Hour	2035 PM Peak Hour
EBU/EBT	224	301
EBT/EBR	197	158
NBL	54	30
NBR*	-	-
WBL/WBT	10	174
WBT	2	35
SBL/SBT	30	184
SBT	2	20
SBR*	-	-

*Full right-turn bypass lanes does not require a queue length.

Table 7 – 2035 AM/PM Peak Hour Queue Length

All entry lanes at the roundabout follow the minimum required queue length and does not require additional storage and taper lanes since the lanes all fall under the main roadway with the exception of the Minnesota Southbound off ramp left-turn/through lane. The lane will require an additional storage and taper lane of a minimum of 184 feet of queue length though the duration of the project design life.

7.0 SIGNALIZED INTERSECTION ANALYSIS

Further analysis will be required at the Raspberry Road and Alaska's Best Place / Minnesota Northbound off ramp intersection with the construction of the West Dowling Road Extension project. The project is currently proposing in installing traffic lights at the intersection which will affect the timing and queue length at the signalized intersection from the Raspberry Road Rehabilitation project with the placement of the roundabout at the Raspberry Road and Northwood / Minnesota Southbound off ramp intersection. Other traffic analysis that maybe required is the signalized intersection at Raspberry Road and Cranberry Street or Northwood Street and Strawberry Street.

8.0 PEDESTRIANS AND BICYCLISTS

The existing conditions for the pedestrian and bicyclist facilities along Raspberry Road for the no-build alternative have sidewalks and pathways along the South side of the roadway and an underpass for pedestrians to cross under Minnesota Drive. While the North side of Raspberry Road has sidewalks and pathways from Jewel Lake Road to Cranberry Street and discontinuous from Cranberry Street to

Minnesota Drive. There are also no designated bicycle lanes for bicyclist to bike along the shoulder of Raspberry. For the preferred alternative, using the existing pedestrian amenities, the project will install a pathway for pedestrians to walk from Cranberry Street to Minnesota Drive. Bicycle lanes will be incorporated in the design at the existing shoulders of the roadway and cut into the median for additional space for bicycle lanes as needed. Further analysis will be required to determine the volume, level of service, and the capacity of the pedestrian and bicycle facilities with the high request for bike lanes from the community.

9.0 CONCLUSION

The Raspberry Road Rehabilitation, Jewel Lake Road to Minnesota Drive will improve the increase in traffic flow with the construction of the West Dowling Road Extension Phase II from C Street to Minnesota Drive. The installation of a roundabout at the Raspberry Road and Northwood Street intersection with the realignment of the existing Minnesota Southbound off ramp to the intersection will have the traffic flowing continuously with a productive level of service and will improve safety within the project area for the duration of the project's design year 2035. The traffic data provided were analyzed and generated from Kinney Engineering, LLC, ADOT&PF, and the guide of the NCHRP 672, *Roundabouts: An Informational Guide* in determining the preferred alternative best suitable for the Raspberry Road Rehabilitation project.

10.0 REFERENCES

A Policy on Geometric Design of Highways and Streets (Green Book), 6E. Washington, D.C.: American Association of State Highway and Transportation Officials (AASHTO), 2011.

"Average Daily Traffic Map Archives." Transportation Geographic Information Section. 2011. Alaska Department of Transportation and Public Facilities. (January 31, 2015) <http://www.dot.state.ak.us/stwdplng/mapping/trafficmaps/adtarchives.shtml>

"Capacity & LOS Analysis." (March 14, 2015) <http://www.webpages.uidaho.edu/niatt_labmanual/Chapters/capacityandlos/theoryandconcepts/HeavyVehicleAdjustmentFactor.htm>

"Compound Annual Growth Rate – CAGR." 2015. Investopedia. (January 31, 2015) <http://www.investopedia.com/terms/c/cagr.asp>

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"Raspberry Road, Jewel Lake to Minnesota Pavement Preservation" Design Designation Forms Provided by Alaska Department of Transportation and Public Facilities.

Roundabouts: An Informational Guide (NCHRP 672), 2E. Washington, D.C.: Transportation Research Board of the National Academics, 2010.

"2013 Annual Average Daily Traffic (AADT) GIS Map." Transportation Information Group. 2011. Alaska Department of Transportation and Public Facilities. (January 31, 2015) <http://www.dot.alaska.gov/stwdplng/transdata/traffic_AADT_map.shtml>

APPENDIX F

3R Analysis

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

In the 3R analysis, you will find that Appendix F includes Roadway Geometry and Utilities reports.

ALASKA
Department of Transportation
And Public Facilities

DRAFT ROADWAY GEOMETRY RECOMMENDATIONS

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

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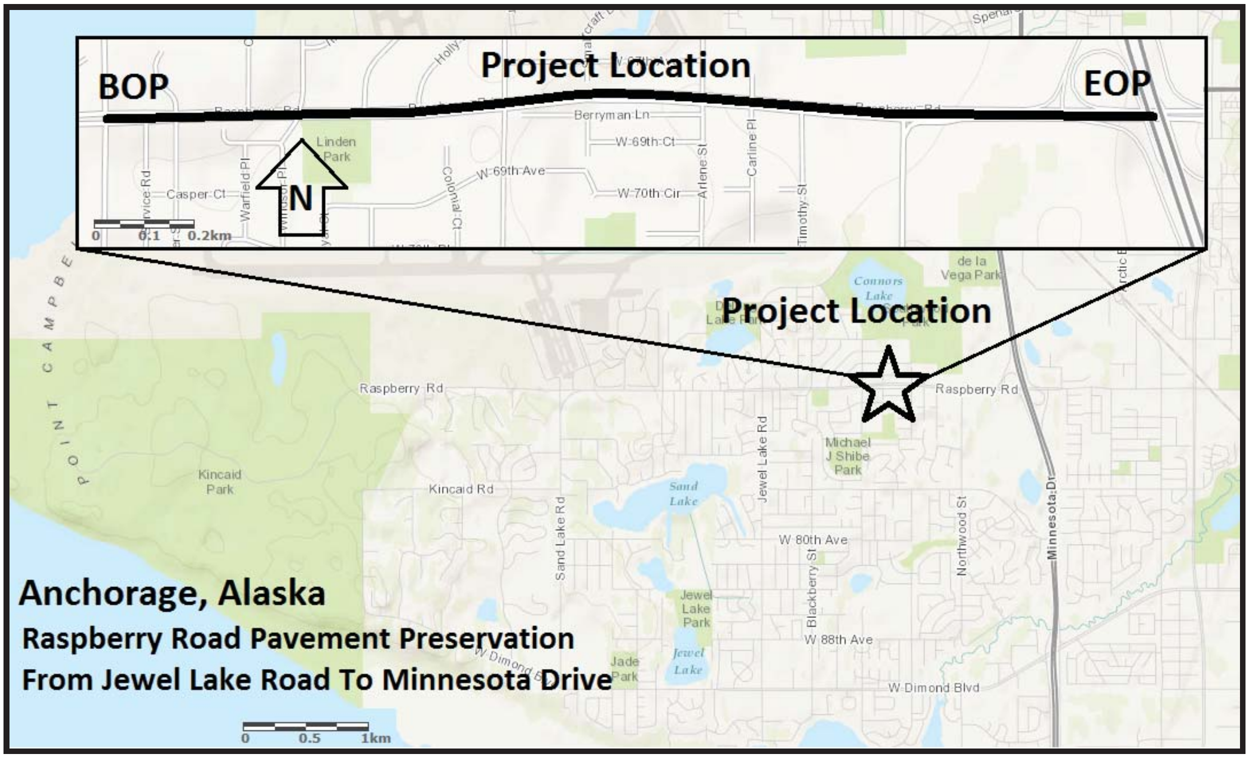

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

FIGURE 1

RASPBERRY ROAD IMPROVEMENTS
PROJECT NO. SEAWOLF ENGR.2015

LOCATION AND VICINITY MAP

FIGURE 1: Location and Vicinity Map

1.0 INTRODUCTION

The Raspberry Road Rehabilitation: Jewel Lake Road to Minnesota Drive is a state funded project and the design must follow in accordance with the Federal Highway Administration (FHWA) guidelines which requires federal aid projects to be designed in agreement with the state laws and design standards. The design standards that apply in designing the preferred alternative for the project will follow the Alaska Department of Transportation and Public Facilities (ADOT&PF) *Alaska Highway Preconstruction Manual* (HPCM). The HPCM references information related to the project from the American Association of State Highway and Transportation Officials (AASHTO): *A Policy on Geometric Design of Highways and Streets* (PGDHS), the AASHTO *Roadside Design Guide*, and the AASHTO *Guide for the Development of Bicycle Facilities.*

2.0 ROADWAY CLASSIFICATION

The entire Raspberry Road within the project's limits is classified as an urban arterial roadway defined from the design designations provided by ADOT&PF. The Minnesota Southbound off ramp is also considered a functional classification as an urban arterial. Other roadways that fold into the main roadway are Northwood Street and Cranberry Street, classified as a major and minor collector roadway respectively. In addition, local roads like Blackberry Street are connected everywhere with the project area of Raspberry Road, since the area is mainly residential.

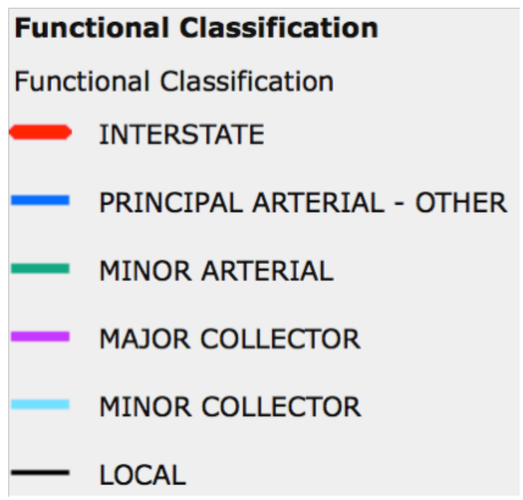

Figure 2 - Functional Classification Legend

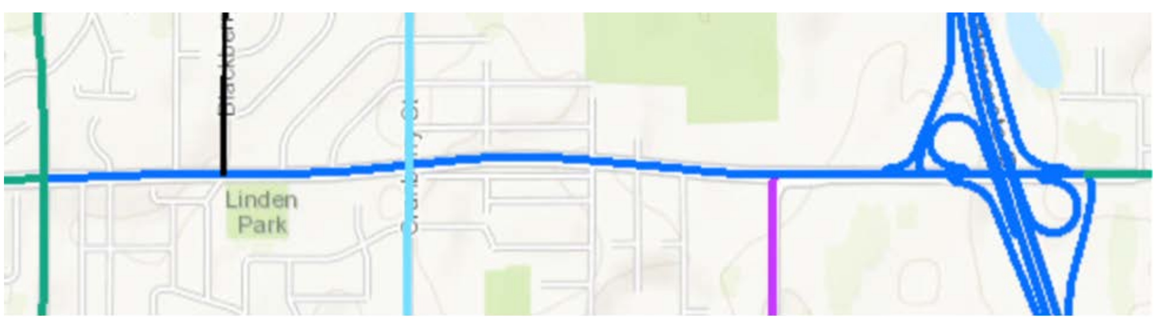

Figure 3 – Raspberry Road Functional Classification Map

3.0 DESIGN ALTERNATIVES

3.1 No-Build Alternative

The no-build alternative for the Raspberry Road Rehabilitation project will consist with routine signing, striping, and pavement rehabilitation maintenance work. The current condition for the Raspberry Road is a separated four-lane highway with pedestrian walkways along the South side of the main roadway and along the North side between Jewel Lake Road to Cranberry Street. The roadway currently does not have functional bicycle facilities and will not be addressed to the no-build alternative. Additionally, the no-build alternative will not resolve the traffic congestion and level of service (LOS) issue from Northwood Street to the Minnesota Southbound off ramp segment of the roadway.

3.2 Preferred Alternative

The preferred alternative for the Raspberry Road Rehabilitation will follow the existing corridor of the main roadway with the existing Minnesota Southbound off ramp realigned to the Raspberry Road and Northwood Street intersection with a placement of a multi-lane roundabout. The project will address the need of placing pedestrian/bicycle facilities throughout the project at the shoulder of the roadway and within the medians. Furthermore, the preferred alternative will resolve the LOS issue and safety concerns with the accommodation of the West Dowling Road Extension Phase II: C Street to Minnesota Drive project that is being construction in the summer of 2015.

4.0 DESIGN CONTROLS AND CRITERIA

4.1 Design Vehicle

The selected design vehicle for the Raspberry Road Rehabilitation project is a WB-67 classified as a interstate semitrailer, also stated in the design designation provided by ADOT&PF. The table below describes the dimensions of a WB-67 design vehicle.

Design Vehicle Type	Symbol	Dimensions (ft)				
		Overall			Overhang	
		Height	Width	Length	Front	Rear
Interstate Semi Trailer	WB-67	13.5	8.5	73.5	4.0	4.5

Table 1 – Design Vehicle Dimensions

4.2 Design Speed

The recommended design speed for the Raspberry Road Rehabilitation project upon roadway classification, accessibility, terrain, expected traffic volumes, and the driver's physiological mind is a 50 mph design speed with an existing posted speed of 45 mph. The Minnesota Southbound off ramp requires a 45 mph design speed stated in the AASHTO *A Policy on Geometric Design of Highways and Streets*. The multi-lane roundabout being placed at the Raspberry Road and Northwood Street / Minnesota Southbound off ramp will have a minimum 25 mph design speed with a posted speed of 15 mph from the NCHRP 672 *Roundabouts: An Informational Guide*.

5.0 DESIGN ELEMENTS

A summary of the preferred alternative of the Raspberry Road Rehabilitation: Jewel Lake Road to Minnesota Drive design criteria is included in Appendix A.

5.1 Horizontal Alignment

Raspberry Road

The horizontal alignment of the Raspberry Road will follow the fairly straight existing alignment from Jewel Lake Road to Minnesota Drive with ample space of stopping sight distance within the limited amount of Right-of-Way available. However, with the roundabout being place at the Raspberry Road and Northwood Street intersection, additional ROW will be required and wetland permitting.

Minnesota Southbound Off Ramp

With the realignment of the existing Minnesota Southbound off ramp, permitting will be required to access the neighboring wetlands to design the horizontal alignment of the ramp to connect to the Raspberry Road and Northwood Street crossroad. The placement of the first curve for traffic exiting the Minnesota Drive allows ample of space for traffic to decelerate from a recommended design of 65 mph to a design speed of 45 mph with a minimum distance of 325 feet. The first curve has radius of 643 feet with a design speed of 45 mph and a maximum superelevation rate of 6%. The second curve is designed with a radius of 144 feet for a design speed of 25 mph with a maximum superelevation rate of 6%, where drivers will have time to decelerate between the two horizontal curves. In addition, drivers will have sufficient space to also decelerate lower than the recommended design speed when approaching the roundabout following the SSD criteria.

5.2 Vertical Alignment

Raspberry Road

The vertical alignment of the Raspberry Road will follow the rolling and level terrain of the existing alignment from Jewel Lake Road to Minnesota Drive. The maximum grade for a rolling terrain with a design speed of 50 mph requires a 7% grade while a level terrain requires a 6% grade. The minimum required grade is 0.5%. The minimum K-values for a crest and sag vertical curve are 84 and 96 respectively for a 50 mph design speed.

Minnesota Southbound Off Ramp

The realigned Minnesota Southbound off ramp will have a maximum grade of 6% for a level terrain with a design speed of 45 mph. The minimum K-values for a crest and sag vertical curve are 61 and 79 respectively. The beginning and end of the Minnesota Southbound off ramp will match at the existing pavement elevations at where it begins on the ramp and when the alignment joins with the roundabout at Raspberry Road.

5.3 Roundabout

The design of the multi-lane roundabout that is being emplaced at the Raspberry Road and Northwood Street / Minnesota Southbound off ramp will be a two-lane roundabout with an entry point at all four legs and an exit point for all three legs excluding the exit heading Northbound near the ramp. The maximum amount of traffic flowing with the 2035 AM/PM peak hours within the roundabout will fall within the volume range of 1,300 to 1,800 veh/h, making the design sufficient for a two-lane roundabout as shown in the figure below.

Volume Range (sum of entering and conflicting volumes)	Number of Lanes Required
0 to 1,000 veh/h	▪ Single-lane entry likely to be sufficient
1,000 to 1,300 veh/h	▪ Two-lane entry may be needed ▪ Single-lane may be sufficient based upon more detailed analysis.
1,300 to 1,800 veh/h	▪ Two-lane entry likely to be sufficient
Above 1,800 veh/h	▪ More than two entering lanes may be required ▪ A more detailed capacity evaluation should be conducted to verify lane numbers and arrangements.

Figure 4 – Roundabout Entry Lanes Required

With the design vehicle determine as a WB-67, the required common inscribed circle diameter for a two-lane roundabout ranges from 165 to 220 ft but because of ROW constraints and nearby wetlands within an urban area, the minimum 165 ft diameter was selected for the design of the preferred alternative. The combined circular roadway width for the two-lane roundabout will have a 28 ft wide roadway with expressway and standard curb and gutter all around the roundabout except the central island. The truck apron that is being placed at the central island of the roundabout will be 20 ft wide with mountable curb and gutter to provide adequate room for the design vehicle, WB-67 to make the appropriate turning movements. At the inner side of the truck apron, two layers of expressway curb and gutter will be place to avoid commercial trucks to go over the central island.

Located below is the table of details for the vertical curves of the off-ramp.

	Curve 1 (ft)	Curve 2 (ft)
R	643	144
BOP	216+14.28	
PC	216+14.28	202+73.58
PT	209+03.38	200+93.03
EOP		200+93.03

Table 2: Curve Details

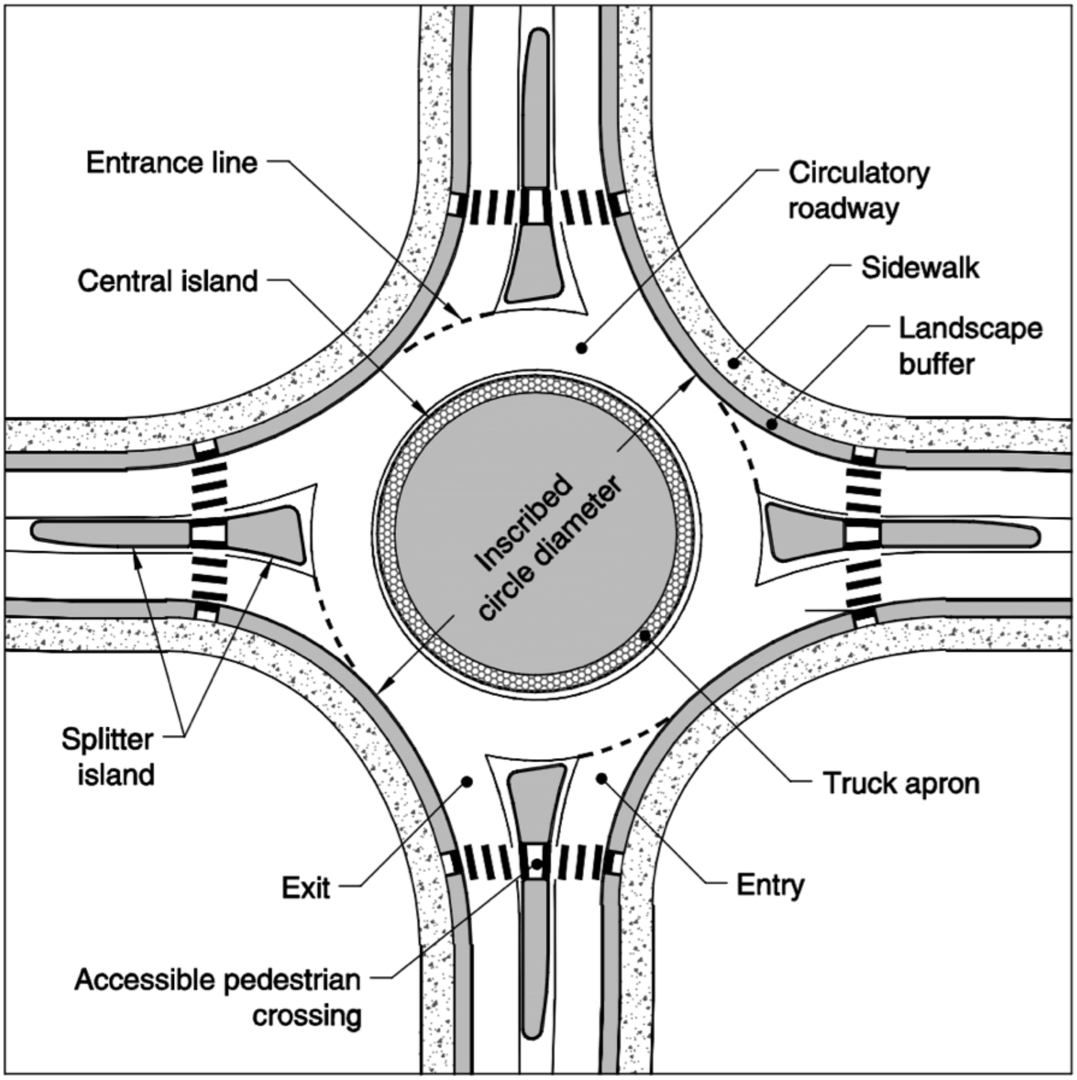

Figure 5 – Basic Geometric Elements of a Roundabout

All entry and exit points of the roundabout will have two lanes except the Northwood Street entry with only a one-lane entry to the roundabout. The one-lane entry at Northwood Street will have a roadway with of 14 ft wide while the majority of the two-lane entry and exit lanes will be 28 ft wide with a typical 2% roadway cross slope directed toward the outside of the roundabout.

The radius of the entry and exit curves that connect the legs of the roundabout for the preferred alternative is designed with an entry path radius between 65 to 120 ft, the circulating path radius larger than 150 ft, and an exit path radius of 50 ft or larger. All the entry lanes around roundabout follow the main two-lane roadway except Minnesota Southbound off ramp. The ramp is a one-lane roadway but approach the roundabout as two-lane roadway with queue length of 184 ft and a taper ratio of 13.25:1.

The length of the splitter island is the recommended 200 ft from the inscribed circle diameter for a comfortable deceleration for traffic approaching the roundabout. Pattern concrete will be emplaced with the splitter island to allow additional visual cues to the drivers. The splitter island will incorporate accessible pedestrian crossing, which will be located 65 ft away from the entry line to at least place two vehicles ahead of the crosswalk and to provide ample space pedestrians to cross safely away from the circular roadway. The pedestrian crossing platform will be at least 6 ft wide for pedestrians to refuge with detectable warning tiles emplaced.

The multi-lane roundabout will also include a full right-turn bypass lane at the Northwood Street entry as well as the Minnesota Southbound off ramp where each bypass lane will have its own individual lane when entering Raspberry Road, either Eastbound or Westbound. However, the individual lane from the ramp bypass lane will merge into the main Raspberry Road where the lane will provide enough acceleration length of 650 ft and a taper ratio of 15:1.

6.0 PEDESTRIAN AND BICYCLIST

6.1 Bicycle Facilities

Typical 5 ft bicycle lanes will be added to the right side of Raspberry Road heading east and west. Lanes will be striped and signed in accordance with AASHTO standards. Due to safety concerns with bicycle lanes on the right and conflicts with on- and off-ramp traffic from Minnesota, left side bike lanes will be implemented for a section of the project. Left side bicycle lanes are NACTO recommended for arterial roads with high volumes of cars entering and exiting on the right side of the road. The left side bicycle lanes will span from Cranberry Street on the west to Alaska's Best Place on the east side of the project. At these intersections, bicyclists will transition either from the right to the left or back using bicycle boxes. Bicycle boxes will stretch from the bike lane across the furthest through lane of motorized traffic, and will be 11 ft deep to accommodate bicycle traffic. All bicycle ramps will be ADA compliant.

6.2 Pedestrian Facilities

The existing 5 ft pedestrian path will be extended on the north side of Raspberry Road from Cranberry Street to Alaska's Best Place. At Cranberry Street, the path will separate from the road by 5 ft to 25 ft to accommodate snow storage in the winter. The path connects to Raspberry Road as a sidewalk at Arlene Street, and continues as a 5 ft sidewalk until the roundabout at Northwood Street. At Northwood Street and Raspberry Road, the sidewalk expands to 10 ft to accommodate pedestrian crossings. All pedestrian curb-ramps will be ADA compliant.

7.0 STOPPING SIGHT DISTANCE

The SSD is the distance along a roadway required for a driver to perceive and react to an object in the roadway and to brake to a complete stop prior to reaching to the object. For the Raspberry Road Rehabilitation project the SSD required for cars approaching the crosswalk and the yield line also referred, as the entry line of the roundabout is 425 ft for a design speed of 50 mph. The SSD for Raspberry Road at both entries and the Northwood Street will have enough distance for the driver to react. However, the Minnesota Southbound off ramp will have enough SSD but since the horizontal alignment of the ramp is curved, tall vegetation like trees cannot be placed in the line of sight. The required SSD for drivers to see traffic across the central island of the roundabout is 153 ft for a design speed of 25 mph, leaving little space for objects to be place at the center of the roundabout as shown in the below figure.

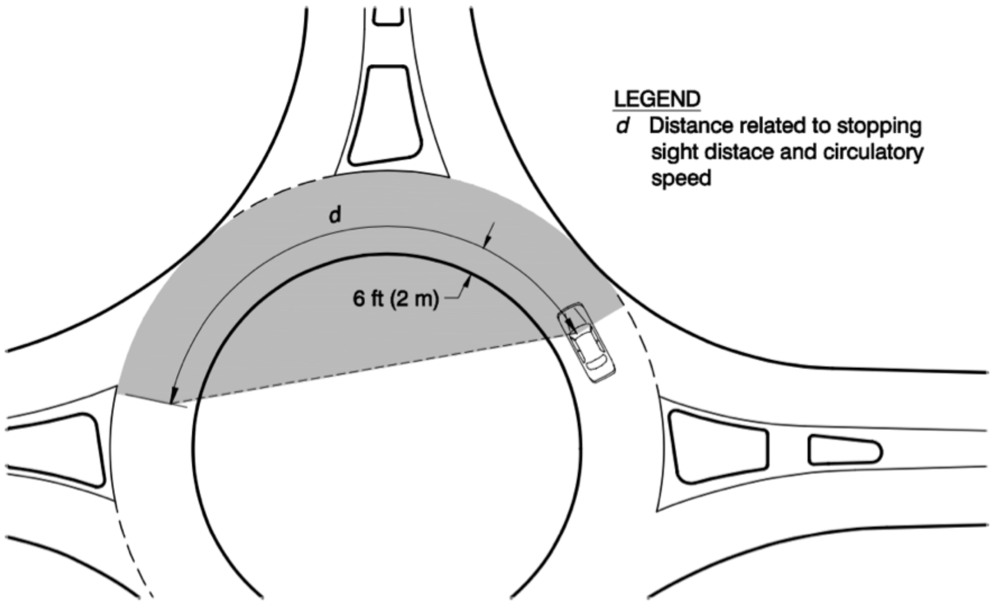

Figure 6 – SSD on Circulatory Roadway

The required intersection sight distance (ISD) for traffic entering the roundabout is 184 ft for a design speed of 25 mph as depicted in the figure below, which follows the design of the preferred alternative. The driver must also be able to see the crosswalk on the exit lane on their next right when entering the roundabout to visually see any nearby pedestrians crossing.

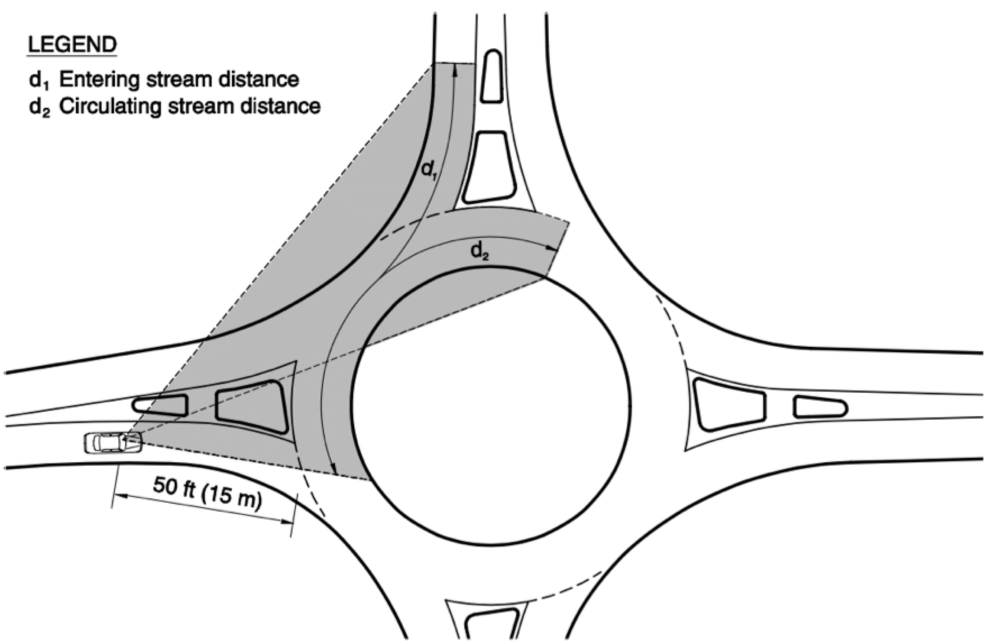

Figure 7 – ISD in Roundabout

As the ISD is important for drivers to see incoming traffic, the angle of visibility is another important factor to allow drivers to comfortably turn their heads to the left to view oncoming traffic, especially older drivers. The recommended minimum intersection angle required is 75°, which is sufficient for traffic approaching the roundabout from the Minnesota Southbound off ramp at an angle of intersection of 80°.

8.0 BARRIERS

Guardrail will not be required in the Raspberry Road Rehabilitation project in relation to the Minnesota Southbound off ramp since guardrail is required where fill slopes are 3:1 or steeper and a fill section about 10 ft or higher. The proposed ramp being place in the wetlands does have a 3:1 slope but the depth of the fill section is less than the 10 ft.

Jersey barriers however will be required at certain areas of the project to replace existing medians that are not sufficient to make the roadway safe with the placement of bicycle lanes. The location of the jersey barriers that are being installed in the project is to replace the existing median at the left-turn lane entering Arlene Street at Raspberry Road heading Westbound and the existing median at the left-turn entering Alaska's Best Place on Raspberry Road heading Eastbound when the West Dowling Road Extension project is constructed.

9.0 TYPICAL SECTIONS

The typical cross-sections for the Raspberry Road Rehabilitation project for Raspberry Road, the Minnesota Southbound off ramp, and the multi-lane roundabout will be addressed in the figures below.

<u>Raspberry Road</u>
The Raspberry Road typical cross-section consists the following dimensions and design elements.

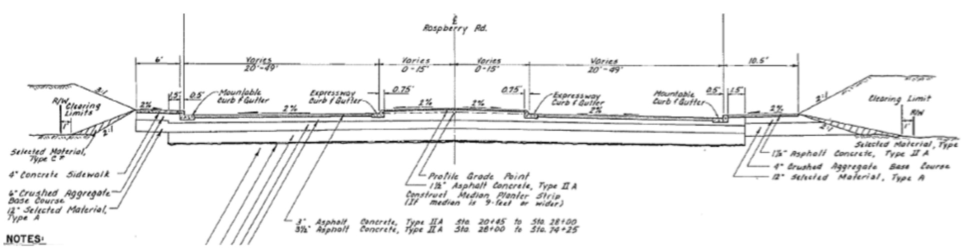

Figure 8 – Raspberry Road Typical Section

<u>Minnesota Southbound Off Ramp</u>
The Minnesota Southbound off ramp typical cross-section consists the following dimensions and design elements.

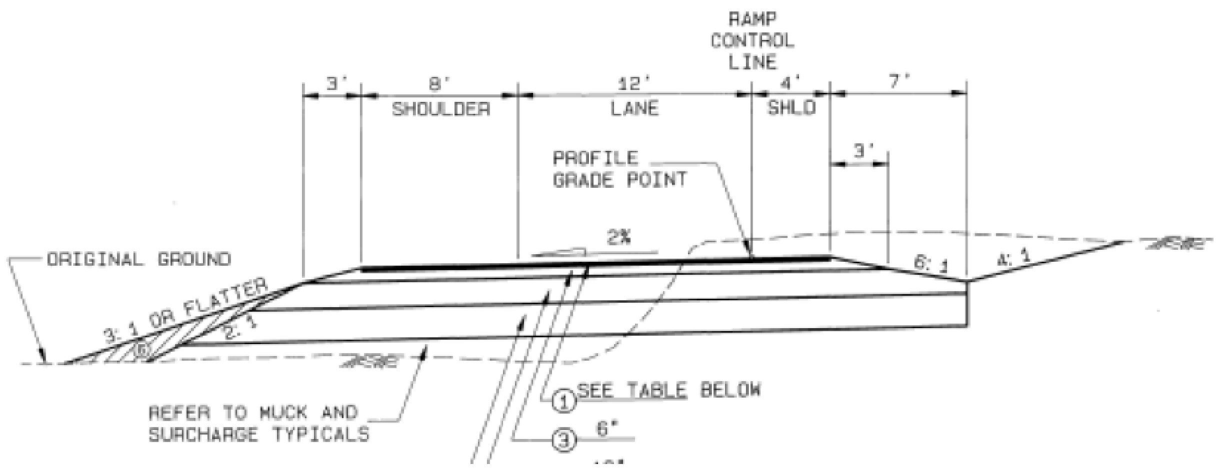

Figure 9 – Minnesota Southbound Off Ramp Typical Section

<u>Roundabout</u>

The roundabout typical cross-section consists the following dimensions and design elements.

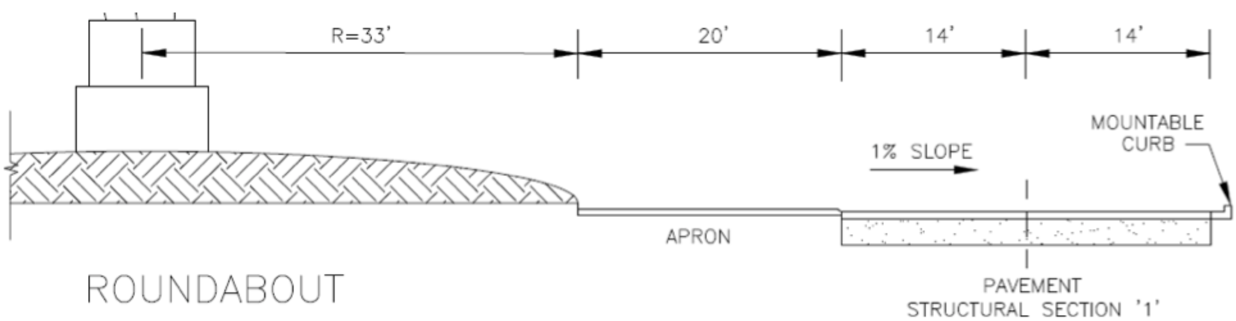

Figure 10 – Roundabout Typical Section

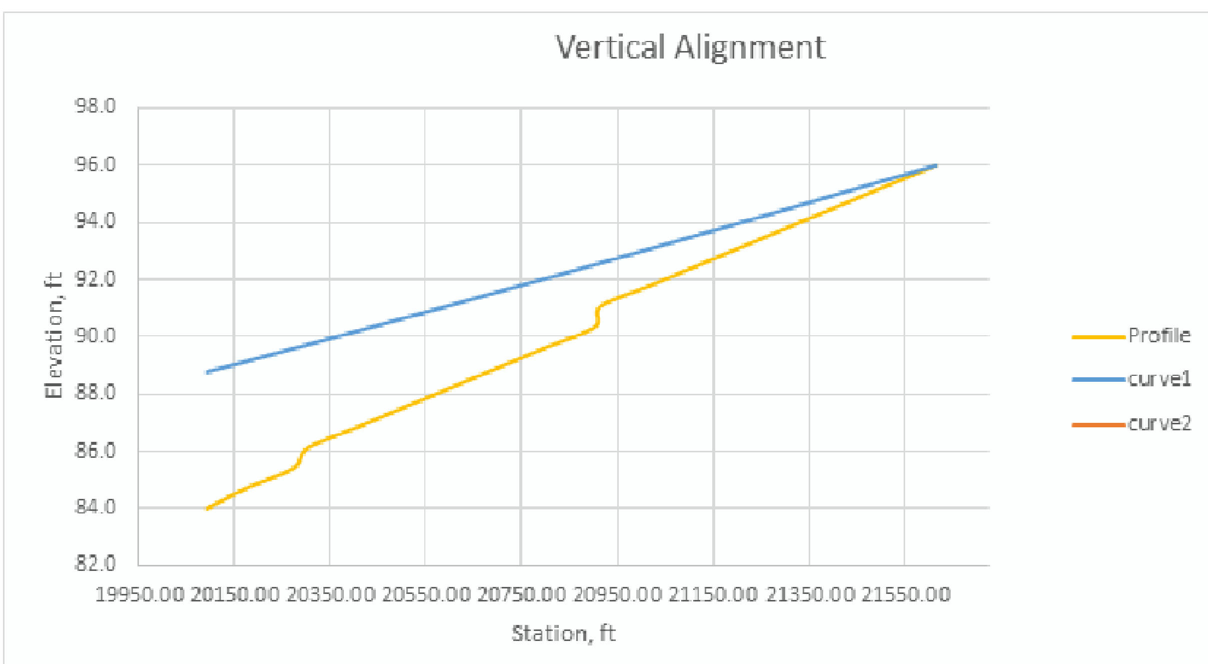

Figure 11 - Vertical Alignment

Vertical Alignment of Minnesota Offramp					G1 =	-0.500	G2=	-0.55	
				CL	Station	Dist from BVC	Tangent Elevation	Offset ϒ=Ax^2/200L	Curve Elev (Tan Elev
Marker	Description	Station	Station in ft	Elevation		x(ft)	(ft)		Offset (ft))
	BOP(PC1)	216+14.28	21614.28	96.0	21614.28	0.00	96.00	0.00	96.00
		215+14.28	21514.28	95.3	21514.28	-100.00	95.50	0.00	95.50
		214+14.28	21414.28	94.6	21414.28	-200.00	95.00	0.01	95.01
		213+14.28	21314.28	93.9	21314.28	-300.00	94.50	0.01	94.51
		212+14.28	21214.28	93.2	21214.28	-400.00	94.00	0.03	94.03
		211+14.28	21114.28	92.5	21114.28	-500.00	93.50	0.04	93.54
		210+14.28	21014.28	91.8	21014.28	-600.00	93.00	0.06	93.06
		209+14.28	20914.28	91.1	20914.28	-700.00	92.50	0.08	92.58
	PT1	209+03.38	20903.38	90.4	20903.38	-710.90	92.45	0.08	92.53
		208+03.38	20803.38	89.6	20803.38	-810.90	91.95	0.11	92.05
		207+03.38	20703.38	88.9	20703.38	-910.90	91.45	0.14	91.58
		206+03.38	20603.38	88.2	20603.38	-1010.90	90.95	0.17	91.11
		205+03.38	20503.38	87.5	20503.38	-1110.90	90.45	0.20	90.65
		204+03.38	20403.38	86.8	20403.38	-1210.90	89.95	0.24	90.19
		203+03.38	20303.38	86.1	20303.38	-1310.90	89.45	0.28	89.73
	PC2	202+73.58	20273.58	85.4	20273.58	-1340.70	89.30	0.30	89.59
		201+73.58	20173.58	84.7	20173.58	-1440.70	88.80	0.34	89.14
	EOP	200+93.03	20093.03	84.0	20093.03	-1521.25	88.39	0.38	88.77
					L_1=	-1521.25			
					A_1=	-0.05			

Table 12: Vertical Alignment of Minnesota off-ramp

10.0 REFERENCES

A Policy on Geometric Design of Highways and Streets (Green Book), 6E. Washington, D.C.: American Association of State Highway and Transportation Officials (AASHTO), 2011.

Alaska Highway Preconstruction Manual. Alaska: Alaska Department of Transportation and Public Facilities (ADOT&PF), 2005.

Guide for the Development of Bicycle Facilities. Washington, D.C.: American Association of State Highway and Transportation Officials (AASHTO), 1999.

"Raspberry Road, Jewel Lake to Minnesota Pavement Preservation" Design Designation Forms Provided by Alaska Department of Transportation and Public Facilities.

Roadside Design Guide, 3E. Washington, D.C.: American Association of State Highway and Transportation Officials (AASHTO), 2006.

Roundabouts: An Informational Guide (NCHRP 672), 2E. Washington, D.C.: Transportation Research Board of the National Academics, 2010.

"Statewide Functional Classification GIS Map." Transportation Information Group. 2011. Alaska Department of Transportation and Public Facilities. (January 31, 2015) < http://www.dot.alaska.gov/stwdplng/fclass/fclassmaps.shtml>

ALASKA
Department of Transportation
And Public Facilities

Utility Considerations

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
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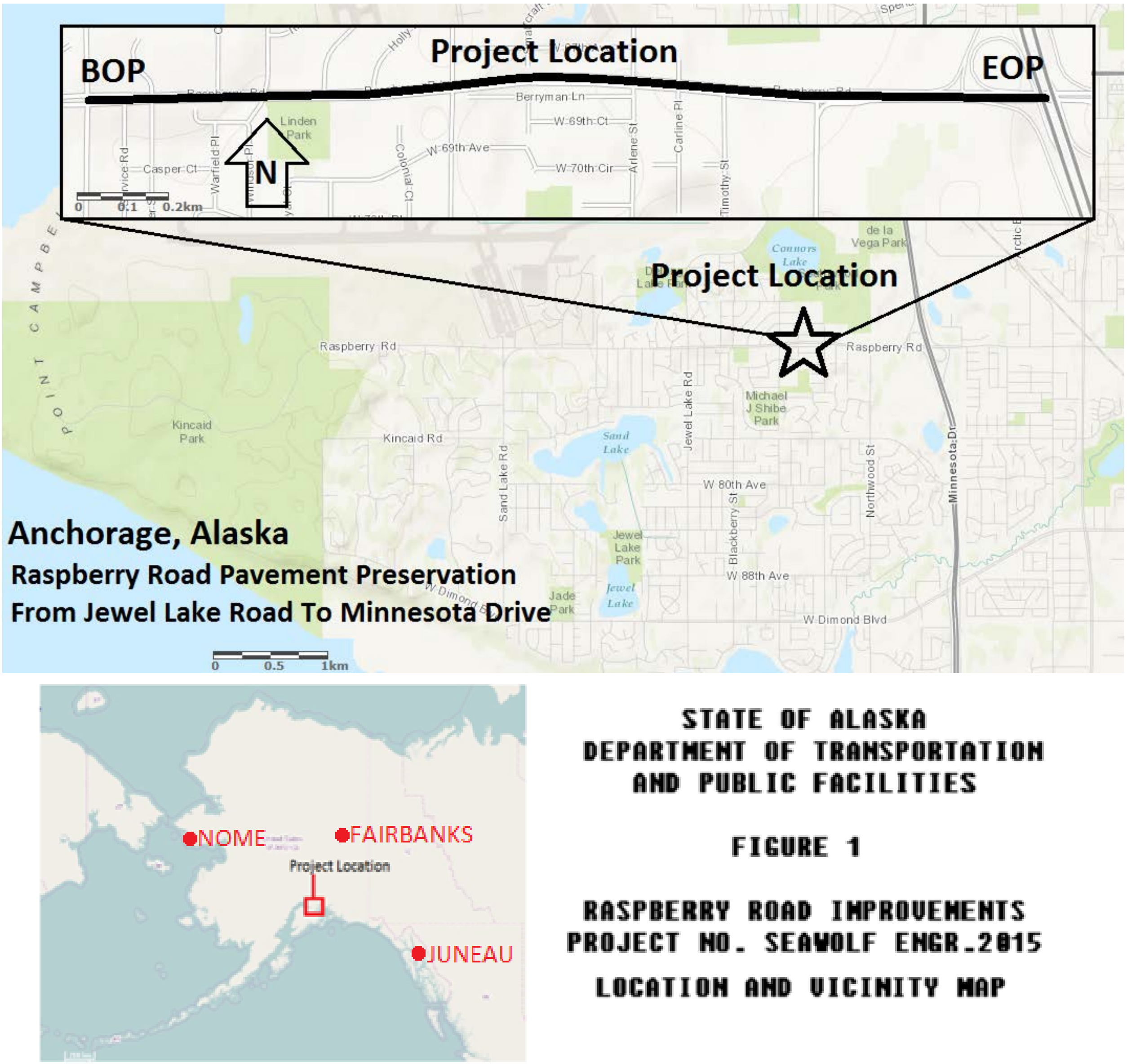

FIGURE 1: Location and Vicinity Map

ACRONYMS

AAC	-	Alaska Administrative Code
AC	-	Asbestos Concrete
ACS	-	Alaska Communications
AKDOT&PF	-	Alaska Department of Transportation & Public Facilities
AWWU	-	Alaska Waste Water and Utility
CEA	-	Chugach Electric Association
CI	-	Cast Iron
CIP	-	Cast Iron Pipe
CN	-	Concrete
DCM	-	Design Criteria Manual
DIP	-	Ductile Iron Pipe
EOP	-	End of Project
GCI	-	General Communications Inc.
HPS	-	High Pressure Sodium
LC	-	Load Center
LT	-	Left
MOA	-	Municipality of Anchorage
OH	-	Overhead
PCM	-	Preconstruction Manual
PL	-	Plastic Distribution Main
PSC	-	Pad Mount Switch Cabinet
RC	-	Reinforced Concrete
RT	-	Right
SB	-	Switch Box
ST	-	Steel Distribution Main
TP	-	Steel Transmission Pipeline
TR	-	Transformer
UG	-	Underground

EXECUTIVE SUMMARY

A utilities conflict report was compiled to highlight major utility conflicts that will occur with the construction of a new off ramp from southbound Minnesota to Raspberry, construction of a round- about at Northwood and Raspberry, resurfacing of the existing roadway within the project boundaries. Significant findings are listed below:

- New UG electrical wire along the off ramp
- Installation of new electroliers along the new off ramp and new roundabout
- New man holes will need to be installed
- All curb boxes will be replaced for consistency
- Removal of traffic signal at Raspberry & Northwood
- Removal of a curb box located within the proposed roundabout
- The load center, transformer, and switch box in the vicinity of or the Northwood/Raspberry intersection will need to be relocated
- Relocation of utility poles located at the current intersection of Raspberry and Northwood
- All man holes will need to be leveled with resurfaced roadway, medians, and pathways.
- AWWU plans to install a 36” main down the length of the project in 2019, coordinate as necessary
- Traffic signals at Cranberry need replacing per STIP AK DOT & PF project HHE-000S(773)/53480

1.0 INTRODUCTION

1.1 Purpose

The purpose of the Utility Conflicts Report is to indicate the current location of utilities located on Raspberry Road, between Jewel Lake Road and Change Point Drive, and highlight the conflicts that may occur between the existing facilities and new construction.

1.2 Scope

The corridor under consideration is Raspberry Road between Jewel Lake Road and Change Point Drive.

Utility owners with facilities within the project limits include Alaska Waste Water Utility (AWWU), Enstar, Chugach Electric Association (CEA), Alaska Communications Systems Group (ACSG), GCI, and Municipality of Anchorage (MOA). Impacted facilities include water lines, wastewater lines, natural gas lines, electric lines, fiber optic cables, telephone lines, CATV lines, and traffic signals.

1.3 Standards and Specifications

1.3.1 Standards

- Alaska Department of Transportation and Public Facilities Standard Specifications for Highway Construction 2015
- Municipality of Anchorage Standard Specifications 2009
- Anchorage Design Criteria Manual 2007
- Alaska Highway Preconstruction Manual

1.3.2 Specifications

Specification No.	Description	Revision No.
3 AAC 52.260	Specifies specifics of telecommunications design	N/A
17 AAC 15.201(a-b)	Overhead facilities – new facilities must have an overhead clearance of 20 feet while existing facilities must have an overhead clearance of at least 18 feet	N/A
17 AAC 15.201 (c)	Underground facilities – under roadways underground facilities must be buried four feet from the top of the pavement	N/A
AMC Title 23.10	Any work done on electrical systems of a illumination facility's electrical components requires an Electrical Permit	N/A
AMC Title 24.30	Requires the obtainment of a Right-of-way Permit before any work is done within Right-of-way	N/A
AS 42.30.400	States that the Anchorage Dig Line (811) must be contacted before any excavations take place	N/A
AWWU 20.04.03.01	Any sewer or water work within the State of Alaska's right-of-way requires a AK DOT&PF permit	N/A
AWWU 20.06.01	MASS state that sewer lines must be sewer lines must be 5'-6' west or south of the center line while water lines must be 12' east or north of the centerline	N/A
PCM 1130	Defines cleat zone criteria for different roadway facilities	N/A

Table 1: Standard specifications

2.0 UTILITY OWNERS

2.1 Alaska Water and Wastewater Utility (AWWU) - Water

Alaska Water and Wastewater Utility is owns and maintains the water utilities on the segment of interest.

2.1.1 Water Mains

Conflicts: Currently, the position of the water main does not meet criteria set forth in the M.A.S.S, however this will be addressed in AWWU's plans to install a 36" water main along the south side of Raspberry Road along the entirety of the project in 2019.

Existing: The figure below lists out existing water main infrastructure within the project site.

Beginning Station	CL Offset		Ending Station	CL Offset		Type	
30+56	53.5'	RT	31+74	41.3'	RT	12"	CI
31+74	41.3'	RT	34+88	41.2'	RT	12"	CI
35+16	61.1'	RT	40+00	80.0'	RT	12"	CI
35+29	129.1'	RT	35+29	62.1'	LT	6 "	DI
38+23	69.03'	RT	38+23	116.0'	RT	6"	AC
39+95	70.9'	RT	39+95	145.3'	LT	6"	AC
39+95	36.5'	RT	43+50	33.4'	RT	12"	DI
43+50	33.4'	RT	43+55	72.9'	RT	6"	DI
43+41	113.8'	LT	43+41	166.4'	LT	6"	DI
43+50	33.4'	LT	47+51	37.3'	RT	12"	DI
47+51	37.3 '	LT	47+54	100.7'	LT	8"	DI
47+51	37.3 '	LT	54+91	81.2'	RT	12"	DI
51+04	40.2'	LT	51+07	138.8'	RT	8"	DI
54+91	81.2 '	LT	56+60	98.5'	RT	12"	DI
56+86	102.5'	LT	57+47	103.0'	RT	12"	DI
56+86	88.02'	LT	56+86	208.05'	LT	6"	AC
56+86	88.02'	LT	56+86	161.8'	RT	8'	CI
57+47	103.0'	LT	59+54	124.0'	RT	12"	DI
68+27	139.2'	LT	70+29	122.8'	RT	12"	DI
70+29	122.8'	LT	70+29	87.1'	RT	8"	DI
70+18	70.7'	LT	70+18	126.0'	LT	8"	DI
70+29	18.8'	RT	73+31	19.5'	RT	12"	DI
73+31	19.5'	RT	73+31	101.9'	LT	8"	DI
73+31	19.5'	RT	73+31	149.3'	RT	8"	DI
73+31	19.5'	RT	77+22	19.6'	RT	12"	DI
76+90	20.5'	RT	76+82	167.4'	RT	8"	DI
77+22	19.6'	RT	79+52	21.8'	RT	12"	DI

Table 2: Existing water main locations

2.1.2 Fire Hydrants

Conflicts: No conflicts

Existing: The table below outlines the location of the fire hydrants located within the project site.

Station	CL Offset	
31+51	69.2'	RT
47+45	55.8'	RT
55+50	61.7'	RT
57+45	99.0'	RT
73+21	121.1'	RT
74+14	139.1'	RT
80+39	134.7'	RT
43+31	114.0'	LT
39+81	114.1'	LT

Table 3: Fire hydrant locations

2.1.3 Abandoned Water Facilities

Abandoned water facilities exist within the project site, located between Cranberry and Arlene on the north side of Raspberry.

Beginning Station	CL Offset		Ending Station	CL Offset		Type	
23+00	50.0'	LT	32+08	28.3'	LT	12"	DI
32+08	28.3'	LT	32+08	165.0'	RT	12'	CI

Table 4: Abandoned Water Facilities

2.2 Alaska Water and Wastewater Utility (AWWU) – Wastewater

2.2.1 Sewer Piping Lines

Alaska Water and Wastewater Utility owns and maintains the sewer utilities.

Conflicts: Project construction may interfere with AWWU sewer maintenance at the sewer interceptor running north west to south east through Connor's BOG.

Existing: The figure below is a table of piping locations within the project site.

Beginning Station	CL Offset		Ending Station	CL Offset		Type	
31+90	12.9'	RT	31+90	77.6'	LT	8"	DI
31+90	12.9'	RT	35+07	7.1'	RT	8"	DI
35+07	7.1'	RT	35+07	82.8'	LT	8"	AC
35+07	7.1'	RT	37+44	13.8'	RT	8"	DI
37+44	13.8'	RT	37+44	152.6'	LT	8"	CI
37+44	13.8'	RT	38+46	15.9'	RT	8"	DI
38+46	15.9'	RT	38+46	119.7'	RT	8"	AC
38+46	15.9'	RT	40+10	20.1'	RT	8"	AC
40+10	20.1'	RT	40+10	140.2'	LT	8"	AC
43+71	48.9'	RT	43+79	157.0'	LT	8"	AC
43+71	48.9'	RT	45+83	45.0'	RT	8"	AC
45+83	45.0'	RT	51+55	60.84'	RT	8"	CN
51+55	60.84'	RT	51+55	60.5'	RT	10"	AC
51+55	60.5'	RT	51+52	175.6'	LT	8"	CN
51+55	60.5'	RT	54+75	88.8'	RT	10"	AC
54+75	88.8'	RT	57+06	111.4'	RT	10"	AC
57+06	111.4'	RT	57+06	253.8'	RT	10"	AC
57+06	111.4'	RT	57+06	81.5'	RT	8"	AC
57+06	81.5'	RT	59+56	103.8'	RT	8"	AC
59+56	103.8'	RT	70+17	108.0'	RT	8"	AC
70+17	108.0'	RT	71+95	91.0'	RT	8"	AC
73+46	205.8'	RT	73+50	80.7'	LT	8"	AC
91+41	9.7'	RT	90+68	118.6'	LT	84"	RC
91+42	9.7'	RT	EOP	4.14'	RT	74"	RC

Table 5: AWWU sewer piping locations

2.2.2 Manholes

Manholes are located intermittently throughout the project site. Manhole locations are found on roadways, medians, and pathways. Table 7 shows manholes that will need to be readjusted to grade upon completion of roadway construction

Station	CL offset		Location
31+90	12.9'	LT	Median
37+44	10.9'	RT	Roadway
38+46	15.8'	RT	Roadway
40+10	20.1'	RT	Median
43+73	48.9'	RT	Pathway
51+55	60.8'	RT	Pathway
54+14	82.6'	RT	Pathway
57+05	81.5'	RT	Roadway
90+64	118.6'	LT	Wetlands
90+84	84.1'	LT	Wetlands
91+41	3.9'	RT	Median
109+61	4.9'	RT	Roadway

Table 6: Manhole locations

2.2.3 Storm Water Discharge

Strom water collection systems are needed to protect local watersheds and wetlands. The Municipality of Anchorage maintains storm water facilities to collect run off from roadways. The project site falls within the Campbell Creek watershed with major outfall point at Campbell Creek.

2.3 Chugach Electric Association (CEA)

CEA owns and operates the electric facilities within the project site.

2.3.1 Underground Wiring

Conflicts: Utility poles carry OH electrical wires run north-south through Connor's Bog adjacent to the project site. Utility poles existing within the clear zone and roadway of the proposed project will need to be relocated.

- Utility pole at station 83+86, 68.3 LT Does not meet clear zone criteria

- Utility pole at station 83+86, 122.4 RT is located in slip lane. Relocate to island

- Relocate underground electric located under roundabout to new electroliers

-UG electric relocation around roundabout

Existing: Underground wires are traced within the project site at the following location.

Beginning Station	CL Offset		Ending Station	CL Offset		Type
30+67	68.3'	LT	30+67	210.7'	RT	3Θ4 Wire
30+67	36.8'	LT	30+84	53.3'	LT	3Θ4 Wire
30+67	153.4'	LT	31+33	148.6'	LT	3Θ4 Wire
31+37	71.0'	LT	31+59	87.0'	LT	3Θ4 Wire
31+59	87.0'	LT	33+41	42.3'	LT	3Θ4 Wire
32+69	46.0'	LT	32+95	68.5'	RT	3Θ4 Wire
32+12	64.8'	LT	36+19	46.7'	RT	3Θ4 Wire
33+41	42.3'	LT	36+15	45.5'	LT	3Θ4 Wire
38+83	46.0'	LT	44+22	46.4'	LT	3Θ4 Wire
42+41	83.3'	RT	43+13	49.4'	RT	1Θ2 Wire
42+41	83.3'	RT	43+88	48.2'	LT	1Θ2 Wire
42+41	83.3'	RT	43+32	57.4'	RT	1Θ2 Wire
42+76	51.2'	LT	43+96	58.4'	LT	1Θ2 Wire
46+78	38.4'	LT	59+49	57.6'	LT	3Θ4 Wire
47+09	52.6'	LT	48+46	104.8'	LT	3Θ4 Wire
47+38	52.2'	LT	48+59	44.6'	LT	3Θ4 Wire
50+51	46.2'	LT	52+10	52.8'	LT	3Θ4 Wire
55+37	106.8'	RT	57+81	125.2'	RT	1Θ2 Wire
57+86	125.6'	RT	59+78	132.2	RT	1Θ2 Wire
69+67	12.6'	RT	69+75	139.7'	RT	1Θ2 Wire
69+71	50.7'	RT	70+68	63.7'	RT	1Θ2 Wire
72+88	52.0'	LT	75+20	62.8'	LT	3Θ4 Wire
72+79	56.1'	LT	84+43	61.8'	RT	1Θ2 Wire
79+23	182'	RT	82+60	162.0'	RT	1Θ2 Wire
82+52	74.5'	LT	82+70	275.9'	RT	1Θ2 Wire
82+60	161.2'	RT	82+90	668'	RT	1Θ2 Wire
82+80	76.7'	LT	87+00	56.5'	LT	3Θ4 Wire
87+00	56.5'	LT	90+85	70.7'	LT	1Θ2 Wire
87+01	61.9'	LT	96+56	61.5'	LT	1Θ2 Wire

Table 7: Underground CEA wire locations

2.3.2 Overhead Wires & Poles

Overhead wires run through Connor's Bog, N-S wire run along Northwood and through the bog, crosses Raspberry Road at Northwood Road, and continues south along Northwood Road.

Beginning Station	CL Offset		Ending Station	CL Offset		Type
83+87	323.3'	LT	83+84	853.7' RT	RT	Trans Line
75+09	92.1'	RT	75+05	220.6'	RT	Trans Line
57+71	110.9'	LT	70+79	87.5'	LT	Shared

Table 8: Overhead electrical facilities

Figure 2: Connors Bog, overhead wires. A photo taken facing north at Northwood and Raspberry of existing overhead facilities

2.3.3 Switch Boxes/Vault Boxes/Junction Boxes/Transformers/Load Centers/Street Light Conductors

In addition to wires there are a number of other utilities that help distribute electric current in the project site. Junction boxes host electrical connections, transformers transfer energy between two or more circuits, load centers divide energy among circuits, switch boards allow for the division of current and vaults are underground rooms that provide access to electrical utilities.

Beginning Station	CL Offset		TYPE
40+81	70'	LT	PSC
45+41	70'	LT	PSC
49+50	53'	LT	PSC
59+50	64'	LT	PSC
69+00	62'	LT	PSC
69+25	65'	LT	PSC
82+97	73'	LT	PSC
31+59	66'	LT	TR
34+62	63'	LT	TR
45+41	75'	LT	TR
68+88	56'	LT	TR
70+67	58'	LT	TR
82+79	75'	LT	TR
90+71	74'	LT	TR
31+37	77'	LT	LC
34+56	62'	LT	LC
68+68	62.3'	LT	LC
90+88	70'	LT	LC
55+32	65'	LT	VAULT
69+50	66'	LT	VAULT
31+37	73.1'	LT	SB
56+05	69.0'	RT	SB
83+95	67.6'	LT	SB

Table 9: Location of switch boxes, vault boxes, junction boxes, transformers, & load centers

2.4 Alaska Communications (ACSG)

2.4.1 Telephone and Internet

Alaska Communications owns and operates utilities to provide phone and internet to local residents.

Conflicts: No conflicts

Existing: Major features of the wiring network are outlined in the following table.

Beginning Station	CL Offset		Ending Station	CL Offset		Type
33+59	117.4'	RT	33+90	71.0'	LT	cable in duct
33+59	117.4'	RT	33+80	91.5'	RT	cable in duct
42+08	45.0'	RT	43+56	75.3'	RT	cable in duct
43+56	75.3'	RT	44+59	55.5'	RT	buried cable
47+16	51.3'	LT	48+36	45.9'	LT	buried cable
50+56	51.0'	LT	52+03	56.9'	LT	buried cable
50+76	50.7'	LT	51+66	61.6'	LT	buried cable
81+96	165.8'	LT	82+93	166.4'	RT	buried cable
82+93	166.4'	RT	82+97	947.1'	RT	buried cable
82+50	167.3'	RT	82+72	328.8'	RT	buried cable

Table 10: Phone cable locations

Position of OH phone cables are on utility poles with CEA wires position indicated in Table 8

2.5 General Communication Inc. (GCI)

2.5.1 Phone, Internet, and Cable

General Communications Inc. provides facilities exclusive for internet and cable use.

Conflicts: No GCI facilities exist to the east of Arlene. No conflicts

Existing: On the north side of Raspberry both 0.75 inch cable and fiber optics have been laid. General Communications Inc. and shares utility poles with CEA on the north side of Raspberry from Cranberry Street to Arlene.

2.6 ENSTAR

2.6.1 Natural Gas

ENSTAR provides natural gas to the Anchorage area, and maintains natural gas facilities.

Conflicts: No major conflicts are expected. A high pressure gas main runs east-west under Northwood Street. While excavations are taking place, an ENSTAR personnel must be present.

Existing:

Beginning	CL Offset		Ending Sta	CL Offset		Type	
30+56.13	72.2'	RT	32+20	80.4'	RT	6	PL
32+14	39.9'	RT	32+08	77.8'	LT	6	PL
32+13	66.9'	RT	34+91	58.5'	RT	6	PL
34+91	58.5'	RT	34+88	81.1'	LT	2	ST
34+91	58.5'	RT	36+46	49.6'	RT	6	PL
34+91	58.5'	RT	35+48	89.5'	RT	4	ST
35+47	70.5'	RT	35+67	70.8'	RT	4	ST
41+94	41.3'	RT	44+65	52.1'	RT	6	PL
54+79	82.5'	RT	59+45	120.1'	RT	6	PL
56+21	101.1'	RT	56+44	66.4'	LT	4	ST
56+44	66.4'	LT	65+71	62.0'	LT	4	ST
65+71	62.5'	LT	56+77	248.8'	LT	4	ST
56+34	79.1'	LT	56+79	75.6'	LT	4	ST
56+48	149.5'	LT	56+79	148.9'	LT	4	ST
59+45	120.1'	RT	69+47	132.9'	RT	6	ST
69+47	132.9'	RT	70+40	136.6'	RT	6	ST
70+39	189.8'	RT	70+40	92.9'	LT	2	PL
70+44	69.0'	LT	70+60	56.0'	LT	2	PL
70+40	136.6'	RT	72+20	119.0'	RT	6	ST
72+20	119.0'	RT	73+15	113.1'	RT	6	ST
73+15	113.1'	RT	73+15	155.1'	RT	2	PL
73+15	113.1'	RT	80+81	107.4'	RT	6	ST
80+81	107.4'	RT	80+28	198.3'	RT	6	TP
80+81	107.4'	RT	84+06	88.9'	RT	6	TP
80+66	65.4'	RT	83+70	76.8'	RT	6	PL
83+70	76.8'	RT	83+71	73.5'	LT	4	PL
80+48	103.7'	RT	82+56	94.0'	RT	2	ST
82+56	94.0'	RT	82+94	697.4'	RT	4	PL
82+56	94.0'	RT	84+04	92.2'	RT	6	PL
84+06	83.4'	RT	98+45	65.6'	RT	6	TP

Table 11: Natural gas main locations

Insulation is required for pipe diameters less than 30 inches if the depth of cover is less than 4 feet.

2.7 Municipality of Anchorage (MOA) - Traffic Signalization

Traffic signalization coordinates the flow of traffic.

Existing: Traffic lights are located at Jewel Lake Road and Raspberry Road, Cranberry Road and Raspberry Road, and Northwood and Raspberry Road intersections.

Conflicts: This project will require the removal of the traffic signals at Raspberry Road and Northwood Street. According to a STIP released in 2013 the traffic signals must be changed at the Raspberry Road and Cranberry Road Intersection.

2.8 Municipality of Anchorage (MOA) – Drainage Facilities

Drain covers are not consistent throughout the project site.

Conflicts: A curb box exists in the proposed right-of-way at station 82+85 2.5’ RT. It will need to be removed. Based on hydrology needs it may be replace with a storm drain or will need to be removed in accordance with AK DOT&PF Standard and Specifications 202-30.3.

Existing:

Drains (roadway)	CL Offset		Drains (roadway)	CL Offset		Drains (Off Roadyway)	CL Offset	
32+94	134.9'	LT	51+82	41.5'	RT	40+29	106.2' LT	LT
34+45	43.8'	LT	51+40	82.2'	LT	39+83	122.3' LT	LT
35+32	64.6'	LT	51+12	82.8'	LT	42+43	96.0' RT	RT
34+50	127.1'	RT	54+60	49.2'	RT	50+40	0	CL
37+30	40.5'	LT	54+94	43.3'	LT	51+72	55.0' LT	LT
40+60	41.1'	RT	56+38	43.5'	LT	54+64	6.8' RT	RT
42+68	44.6'	LT	57+67	50.8'	LT	55+50	61.7' RT	RT
44+19	40.2'	LT	57+21	17.3'	LT	60+10	81.8' LT	LT
43+17	71.63'	RT	57+05	71.4'	LT	79+48	57.6' RT	RT
42+53	80.4'	RT	60+43	2.4'	LT	82+53	55.8' RT	RT
45+40	40.4'	LT	60+55	41.3'	LT			
45+40	39.8'	RT	62+75	108.5'	RT			
47+50	47.1'	LT	73+20	61.5'	RT			
47+97	41.2'	RT	73+62	59.5'	RT			
49+70	39.8'	LT	76+68	79.7'	RT			
50+38	40.6'	LT	77+00	78.5'	RT			
50+42	9.9'	RT	82+85	2.0'	RT			

Table 12 Location of storm water drains

Beginning Station	CL Offset		Ending Station	CL Offset		Type	
32+94	134.9'	LT	34+45	43.8'	LT	18	CM
32+98	46.0'	RT	32+94	54.5'	LT	18	CM
34+45	43.8'	LT	35+32	64.6'	LT	18	CM
34+45	43.8'	LT	34+50	127.1'	RT	18	CM
34+45	43.8'	LT	37+30	40.5'	LT	18	CM
37+30	40.5'	LT	40+60	41.1'	RT	18	CM
40+29	106.2'	LT	39+83	122.3'	LT	18	CM
40+60	41.1'	RT	40+29	106.2'	LT	18	CM
40+60	41.1'	RT	42+68	44.6'	LT	18	CM
42+53	80.4'	RT	42+43	96.0'	RT	24	CM
42+68	44.6'	LT	44+19	40.2'	LT	18	CM
43+17	71.6'	RT	42+53	80.4'	RT	24	FPCM
44+19	40.2'	LT	43+17	71.63'	RT	18	CM
44+19	40.2'	LT	45+40	40.4'	LT	24	FPCM
45+40	40.4'	LT	45+40	39.8'	RT	18	CM
45+40	40.4'	LT	47+50	47.1'	LT	24	FPCM
47+50	47.1'	'LT	47+97	41.2'	RT	18	FPCM
47+50	47.1'	'LT	49+70	39.8'	LT	30	FPCM
49+70	39.8'	LT	50+38	40.6'	LT	12	CM
50+38	40.6'	LT	50+40	0	0	30	FPCM
50+38	40.6'	LT	51+82	41.5'	RT	18	FPCM
50+40	0	0	50+42	9.9'	RT	18	FPCM
51+40	82.2'	LT	51+12	82.8'	LT	36	FPCM
51+72	55.0'	LT	51+40	82.2'	LT	36	FPCM
54+60	49.2'	RT	55+50	61.7'	RT	18	FPCM
54+64	6.8'	RT	53+69	6.5'	'RT	18	FPCM
54+64	6.8'	RT	54+60	49.2'	RT	18	FPCM
54+64	6.8'	RT	54+94	43.3'	LT	36	FPCM
54+94	43.3'	LT	56+38	43.5'	LT	36	FPCM
56+38	43.5'	LT	57+67	50.8'	LT	36	FPCM
57+21	17.3'	LT	57+05	71.4'	LT	18	FPCM
57+67	50.8'	RT	57+21	17.3'	LT	36	FPCM
57+67	50.8'	LT	60+43	2.4'	LT	18	FPCM
60+43	2.4'	LT	60+55	41.3'	LT	18	CM
60+43	2.4'	LT	60+10	81.8'	LT	18	CM
63+29	9.3'	LT	62+75	108.5'	RT	18	FPCM
72+93	43.1'	LT	73+20	61.5'	RT	18	FPCM
73+20	61.5'	RT	73+62	59.5'	RT	18	FPCM
73+62	59.5'	RT	76+68	79.7'	RT	18	FPCM
76+68	79.7'	RT	77+00	78.5'	RT	18	FPCM
77+00	78.5'	RT	79+48	57.6'	RT	18	FPCM
79+48	57.6'	RT	82+53	55.8'	RT	18	FPCM
82+53	55.8'	RT	82+85	2.0'	RT	18	FPCM
82+53	55.8'	RT	84+13	102.1'	RT	24	FPCM

Table 13: Location of storm water drainage pipes

Figure 3: Current curb boxes

2.9 Alaska Department of Transportation & Public Facilities (AKDOT&PF)

2.9.1 Moose Fence

A fence structure was installed along Minnesota Drive in 2013 to reduce moose vehicle interaction. There are no recorded moose vehicle collisions along the Minnesota off ramp, however; the added moose fence may push the moose towards Raspberry Road instead of Minnesota where they were originally crossing. There are not currently any recorded collisions along Raspberry Road, but the amount of moose crossings along the project site should be monitored after completion to see if there is a need for crash mitigation.

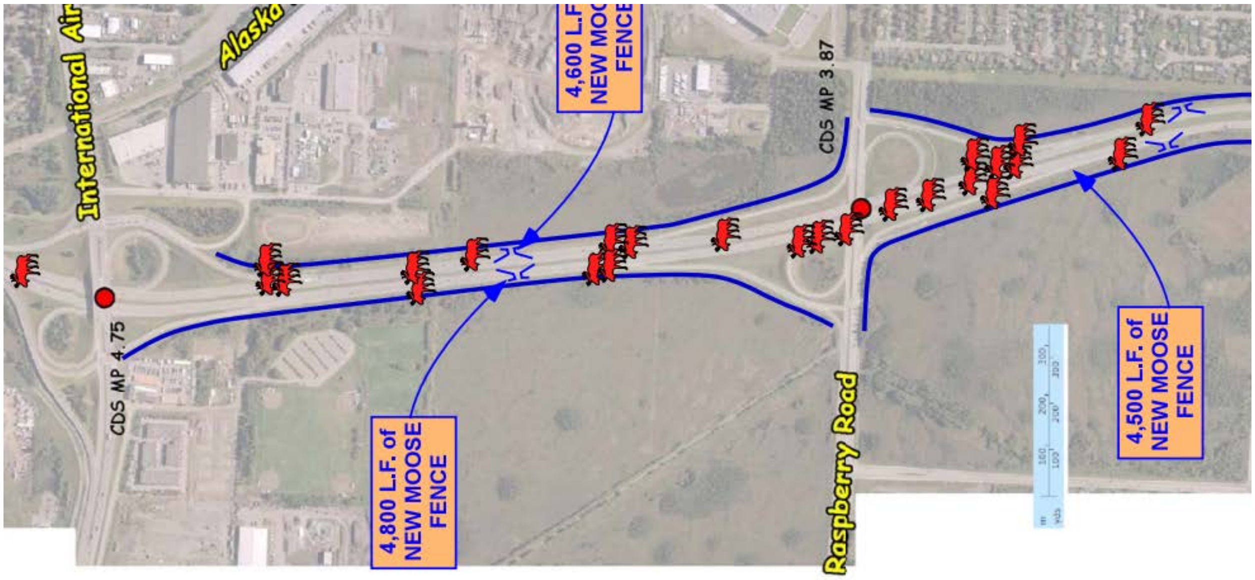

Figure 4: Recorded moose collisions

Existing: The moose fence runs along the west side of the southbound Raspberry Road exit (see Figure 3 below). Additionally, it runs along the west side of the southbound on-ramp (see Figure 4 below).

Conflicts: The moose fence must be realigned with the new off-ramp.

2.10 Street Lights

The MOA street maintenance website states that, “Maintenance of street lights is divided between MOA’s Street Maintenance Section and three electric utility agencies; CEA, Municipal Light and Power (ML&P), and Matanuska Electric Association (MEA).

If the street lights are controlled by a meter, they are maintained by the Street Maintenance Section (approximately 8,000 lights). If they are fed directly from a utility transformer, they are maintained by one of the three electric utility agencies listed above. Chugach Electric has approximately 4,500, Municipal Light & Power has some 3,500, and Matanuska Electric Association has 30 light poles.”

The Anchorage DCM recommends that roadways with design speeds lower than 30 mph utilize the illuminance method measure the amount of light striking the surface of the roadway) while roads with design speeds up to 45 mph use the luminance method (measuring the amount of light reflected from the roadway surface). Lighting for the roundabout will be determined using the illuminance method while the off ramp will be determined with the luminance method.

TABLE 5-1 ILLUMINANCE METHOD – RECOMMENDED VALUES				
Roadway Classification	Pedestrian Conflict Area	Illuminance (lux or footcandles) (minimum)	Uniformity Ratio (avg/min) (maximum)	Veiling Luminance Ratio (vmax/min) (maximum)
Freeway Class A	--	9.0 / 0.9	3.0	0.3
Freeway Class B	--	6.0 / 0.6	3.0	0.3
Expressway	High	14.0 / 1.4	3.0	0.3
	Medium	12.0 / 1.2	3.0	0.3
	Low	9.0 / 0.9	3.0	0.3
Arterials	High	17.0 / 1.7	3.0	0.3
	Medium	13.0 / 1.3	3.0	0.3
	Low	9.0 / 0.9	3.0	0.3
Collector	High	12.0 / 1.2	4.0	0.4
	Medium	9.0 / 0.9	4.0	0.4
	Low	6.0 / 0.6	4.0	0.4
Local	High	9.0 / 0.9	6.0	0.4
	Medium	7.0 / 0.7	6.0	0.4
	Low	4.0 / 0.4	6.0	0.4

Table 14: Anchorage DCM illuminance recommended values

TABLE 5-2 LUMINANCE METHOD – RECOMMENDED VALUES					
Roadway Classification	Pedestrian Conflict Area	Average Luminance (cd/m^2) (minimum)	Uniformity Ratio (avg/min) (maximum)	Uniformity Ratio (max/min) (maximum)	Veiling Luminance Ratio (vmax/min) (maximum)
Freeway Class A	--	0.6	3.5	6.0	0.3
Freeway Class B	--	0.4	3.5	6.0	0.3
Expressway	High	1.0	3.0	5.0	0.3
	Medium	0.8	3.0	5.0	0.3
	Low	0.6	3.5	6.0	0.3
Arterials	High	1.2	3.0	5.0	0.3
	Medium	0.9	3.0	5.0	0.3
	Low	0.6	3.5	6.0	0.3
Collector	High	0.8	3.0	5.0	0.4
	Medium	0.6	3.5	6.0	0.4
	Low	0.4	4.0	8.0	0.4
Local	High	0.6	6.0	10.0	0.4
	Medium	0.5	6.0	10.0	0.4
	Low	0.3	6.0	10.0	0.4

Table 15 Anchorage DCM luminance recommended values

Existing: Lighting on the project site include standard street lighting as well as high-mast street lighting.

Conflicts: New lighting will need to be put along the exit ramp, as well as appropriately placed in the roundabout.

2.10.1 High Mast Lighting

A high mast light is located within before the Minnesota overpass on the north side of Raspberry.

Figure 5: Existing high mast lighting

2.10.2 Street lighting

The roundabout and off ramp will both be equipped with 40ft masts with cobra type arms and 400W HPS luminaires. Masts and arms will be in accordance with AK DOT&PF standard drawing L-03.10
The existing luminaires are 400W HPS. To maintain consistent lighting the luminaire will be GE#MDCL25S0M12FMC32U. Luminaire specifications can be seen in the pamphlet from the manufacturer below. The below luminaire meets light pollution limitations put forth in Chapter 5 of the Anchorage DCM.

To maximize pedestrian safety all new luminaires on Raspberry will be installed on non-breakaway bases while new luminaires on the off ramp will have breakaway poles to maximize driver safety in the occurrence of a crash. Breakaway pole foundations may be found in AK DOT&PF standard drawing L-30.10.

Ordering Number Logic

M-400A Powr/Door™ with Cutoff Optics (MDCA & MDCL)

____ __ _ _ _ _ 2 _ _ _ _

PROD. ID	WATTAGE	LIGHT SOURCE	VOLTAGE	BALLAST TYPE SELECTION	PE FUNCTION	IGNITOR MOUNTING	LENS TYPE	IES DISTRIBUTION TYPE	FILTER	OPTIONS
MDCA = M-400A with Cutoff* Optics 4-Bolt Slipfitter **MDCL** = M-400A with Cutoff* Optics 2-Bolt Slipfitter * = Previously IESNA Full Cutoff Optics	**10** = 100 **15** = 150 (55V) **17** = 175 **20** = 200 **24** = 250/400 **25** = 250 **31** = 310 **32** = 320 **35** = 350 **40** = 400 **NOTE:** Dual wattage connected for lower wattage	**E** = Energy Act Compliant Pulse MH (EPMH) **S** = HPS **P** = PMH **Standard:** Lamp not included.	**60Hz** **0** = 120/208/240/ 277 Multivolt **1** = 120 **2** = 208 **3** = 240 **4** = 277 **5** = 480 **7** = 120X240 **8** = 240V Ballast 120V PE Receptacle not reconnectable **D** = 347 **F** = 120X347 **T** = 220 **W** = 230 **50Hz** **6** = 220 **R** = 230 **Y** = 240 **NOTE:** Dual voltage connected for lower voltage	See Ballast Selection Table **A** = Autoreg **H** = HPF Reactor or Lag **M** = Mag-Reg **N** = NPF Reactor or Lag **P** = CWI with Grounded Socket Shell	**1** = None **2** = PE Receptacle **NOTE:** Receptacle connected same voltage as unit except as noted. Order PE Control separately.	**2** = Plug-in base and Ignitor	**A** = Acrylic Clear Globe (250 watt Maximum) **F** = Flat Glass* **G** = Shallow Glass Globe **L** = Polycarbonate Clear Globe (250 watt) HPS only * = Previously IESNA Full Cutoff Optics	See Photometric Selection Table **S** = Short **M** = Medium **C** = Cutoff* **1** = Type I **2** = Type II **3** = Type III * = Previously IESNA Full Cutoff Optics	**1** = Fiber gasket **2** = Charcoal with elastomer gasket	**F** = Fusing (Not available with multivolt or dual voltage) **J** = Line Surge Protector, Expulsion Type (UL not available) **N** = Meets proposed ANSI C136.31 requirements for Bridge and Underpass Vibration **U** = UL listed glass lens (60Hz only)

Figure 6: Luminaire brochure

REFERENCES

AK DOT&PF, Alaska Highway Preconstruction Manual, AK DOT&PF, Juneau, AK, 2013.

AK DOT&PF, Alaska Utilities Manual, AK DOT&PF, Juneau, AK, 2014.

AK DOT&PF, http://www.dot.alaska.gov/creg/design/highways/Projects/53455.pdf

Alaska State Legislature, Alaska Administrative Code 2015-2016, Juneau, AK, 2015.

AWWU, AWWU Master Plan, AWWU, Anchorage , AK, 2012.

MOA, Municipality of Anchorage Standard Specifications, MOA, Anchorage, AK, 2015.

MOA, Design Criteria Manual, MOA, Anchorage, AK, 2007.

R. Holta, Personal Communication, March 2, 2015.

S. Nuss, Personal Communication, April 15, 2015.

TRB, NCHRP 672: Roundabouts – An Informational Guide, Washington DC, 2015.

APPENDIX G

ITS SYSTEM ENGINEERING

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

DRAFT ITS SYSTEM ENGINEERING
Raspberry Road
Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

Table of Contents

1.0 INTRODUCTION

Attached in this section is information pertaining to Intelligent Transportation Systems or ITS. Though this project is limited in time and work loading, Seawolf Engineering explored briefly FHWA final policies applicable to ITS projects. Included in this section are:

- Systems Engineering Checklist and Instructions for completing it
- AK DOT&PF Systems Engineering Analysis Form (SEA Form)

This project will not include ITS in its design or its construction.

2.0 SYSTEMS ENGINEERING CHECKLIST & INSTRUCTIONS

Located on the following page is the approved Systems Engineering Checklist, and the instructions for completing the form. This group did not fill out/complete the form, but attached for group review.

3.0 AK DOT&PF SYSTEMS ENGINEERING ANALYSIS FORM

The Systems Engineering Analysis Form, also known as the SEA form is used for the determination of scope of an ITS project. Since this project is not an ITS project, the form will not be completed. The group however has attached the blank form for proof of review of the processes.

Systems Engineering Checklist & Instructions

Background

On January 8, 2001 the Final Rule on Intelligent Transportation Systems (ITS) Architecture and Standards Conformity (Final Rule) and the Final Policy on Architecture and Standards Conformity (Final Policy) were enacted by the FHWA and FTA respectively. The Final Rule/Final Policy ensures that ITS projects or ITS elements within a project carried out using funds from the Highway Trust Fund including the Mass Transit Account conform to the National ITS Architecture and applicable ITS standards.

The Final Rule requires that all ITS projects or ITS elements within a project that use Federal Funds be developed using a systems engineering analysis. Section 23 CFR 940.11 specifies seven activities that are to be preformed to accomplish a systems engineering analysis. These seven activities are identified on the attached Systems Engineering (SE) Checklist under the column labeled “Systems Engineering Element”.

Project managers are required to complete a systems engineering analysis for “...any project in whole or in part that funds the acquisition of technologies or systems of technologies, that provide or significantly contribute to the provision of one or more ITS user services, as defined in the National ITS Architecture. In other words, an ITS project is any project that may provide an opportunity for integration at any point during its life.” This applies to all projects or portions of projects. Systems that stand alone, that are not and will not integrate with another system is not subject to a systems engineering analysis.

Instructions for Completing the Systems Engineering Checklist

Project managers are required to use the attached SE Checklist to demonstrate that their ITS project(s) or ITS element within a project were developed using a systems engineering approach. (This checklist is a required Appendix to Design Study Report for projects with ITS elements that require a DSR. See section 450.5.2 of the Preconstruction Manual.

The SE checklist can be found at http://iways.alaska.gov or http://web.dot.state.ak.us The Checklist is also included in this document for convenience.

For larger projects, there may be separate documents that cover one or more of the systems engineering requirements. In those cases, a summary of the relevant information should be included in the SE Checklist and the document should be referenced. References should include: the full name of the plan or document; date and year the document was prepared; and the heading/heading number of the section within the document where the information is provided. Upon entering the reference, enter the date the information was verified in the far right column.

If documents or plans do not exist for the necessary information, all the relevant information must be entered in the SE Checklist. For minor or straightforward projects, the required information may only be one or two paragraphs to for each of the seven required systems engineering elements. For complex projects, documentation for some of the elements will likely be much longer and a separate document that can be attached to the checklist may be in order.

Two example SE Checklists are available on the Department's intranet (http://web.dot.state.ak.us). More detailed instructions for documenting each of the required systems engineering elements is provided in this package, on the pages following the checklist.

Questions? **Alaska DOT&PF, Transportation Data Services**

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	Date:			
Alaska Iways Architecture	**Project Name:**			
Systems Engineering Checklist	**Project No.:**			
	Project Manager:			
Systems Engineering Element	**How Element is Met/Fulfilled**		**Date Completed**	
1. Portions of the Regional ITS or Statewide Iways Architecture being implemented. Must identify the Program Area(s) and a brief description of the functional needs to meet that Program Area(s).				
2. Participating agencies roles and responsibilities.				
3. Requirements definitions.				
4. Analysis of alternative system configurations and technology options to meet requirements.				
5. Procurement option(s).				
6. Applicable ITS standards that are being implemented and testing procedures that will be used upon project implementation.				
7. Procedures and resources necessary for operations and management of the system.				

1) Identify portions of the Regional ITS or Statewide Iways Architecture being implemented.

Summarize and reference the document(s) that describe the new ITS project or elements and how they meet the functional needs of one or more of the ITS Program Areas identified in the ITS Architecture. Chapter 4 (Operational Concept), and more specifically Section 4.6 of the AIA Update may provide an initial starting point for meeting this requirement. Also, check to see if there is a project level or system concept of operations that might include a discussion of the portions of the architecture being implemented.

If there are no existing documents that describe new ITS project or elements and how they meet the functional needs of one or more of the ITS Program Areas identified in the ITS Architecture, then this section of the Systems Engineering Checklist should provide this description.

2) Identify participating agencies roles and responsibilities.

Summarize and reference the document(s) that define agency roles and responsibilities as they pertain to ITS system design, purchase, installation, operation, maintenance, and modification. Chapters 4 and 5 of the latest version of the Alaska Iways Architecture (Operational Concept and Physical ITS Architecture respectively) may provide an initial starting point for satisfying this requirement. Also, check to see if there is a project level or system concept of operations that might discussion of participating roles and responsibilities.

If there are no existing documents that define agency roles and responsibilities as they pertain to ITS system design, purchase, installation, operation, maintenance, and modification, then this section of the Systems Engineering Checklist should provide this description.

3) Identify requirements definitions

Summarize and reference the documents(s) that define "what" the subject ITS project or element is required to do. This includes all items necessary to complete a fully operational system including hardware, software, installation, training, etc. For many projects, there may be a formal requirements document that is developed. For example, you might have a requirements list included with an RFP. If there is no existing requirements document, this section should identify high-level requirements for the project. Please note that requirements are "what" statements. They are later further developed into "how" statements (or specifications) during the design process. Refer to the U.S. Department of Transportation report titled *Developing Functional Requirements for ITS Projects* for specific guidance on developing functional requirements.

4) Conduct analysis of alternative system configurations and technology options to meet requirements.

Summarize and reference the document(s) that list the alternatives that were considered during the development of the ITS project or element. Such a document should list strengths and weaknesses, technical feasibility, institutional compatibility, and life cycle costs of each alternative, and the preferred alternative. If there is a project level or system concept of operations that covers this project, it should include an alternatives analysis that could be referenced here.

If there are no existing documents that list the alternatives that were considered, then this section of the Systems Engineering Checklist should provide this listing.

5) Identify procurement options.

Summarize and reference the document(s) that identify procurement options for the ITS project or element, or list the procurement method used on the attached Systems Engineering Checklist.

If there are no existing documents that identify procurement options, then this section of the Systems Engineering Checklist should describe the procurement options.

6) Identify applicable ITS standards that are being implemented and testing procedures that will be used upon project implementation.

Summarize and reference the document(s) that identify the ITS standards that apply to new ITS projects or elements. A list of standards applicable to projects identified in the Alaska Iways Architecture can be found in Appendix E (ITS Standards). Depending on the elements of the new ITS project, additional ITS standards may have been approved since the initial development of the AIA. Also, check to see if there is a project level or system concept of operations that might include a discussion of standards.

If there are no existing documents that identify the ITS standards that apply, then this section of the Systems Engineering Checklist should identify the applicable standards.

7) Identify procedures and resources necessary for operations and management of the system.

Summarize and reference the document(s) that identify the internal policies or procedures necessary to recognize and incorporate the new system into current operations and decision processes. Resources that support continued operations, including staffing and training should also be referenced.

If there are no existing documents that identify the procedures and resources necessary to operate and manage the ITS elements of the project, then this section of the Systems Engineering Analysis form should identify the needed O&M procedures and resources.

SYSTEMS ENGINEERING ANALYSIS FORM (SEA Form)

ITS managers must complete a systems engineering analysis (SEA) for all ITS projects or ITS elements within a project. See the ADOT&PF Highway Preconstruction Manual section 450.5.2 for guidance on completion of the ITS Systems Engineering Analysis.

1. Identify the ITS elements and program areas included in the project.

2. Identification of agencies and positions that will participate in designing, purchasing, installing, operating, maintaining, expanding or removing the system and what their responsibility will be.

3. Identify what is needed to complete each system. This includes all items necessary to complete a fully operational system including hardware, software, installation, training, etc.

4. Evaluate alternatives that will meet systems configuration and technology requirements and determine preferred alternatives.

5. Identify and evaluate procurement options.

6. Identify what standards from the regional ITS architecture standards section apply to the projects ITS elements.

7. Identify all procedures and resources that are needed to manage, operate and maintain the projects ITS elements.

Appendix H

FWHA Concurrence Documentation for Non-Significant ITS Project Determinations

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

FWHA Concurrence Documentation for Non-Significant ITS Project Determinations

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

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1.0 Introduction
Appendix H is the extracted Section 485 of the Alaska Preconstruction Manual. It is a copy of the Intelligent Transportation System (ITS) Project policy. Within Section 485.4 it stipulates that the Project Engineering Manager must contact the ITS System Manager to consult with him/her to determine if our project is an ITS Project. It also notes that if it is federally funded and contains any of the elements listed within Table 430-1 of the policy then it must be developed as an ITS project.

1.1 Determination of Non-ITS Project Status
After review of Table 430-1 of the Preconstruction Manual, the project is deemed a non-ITS project.

1.2 Section 485 of the Alaska Preconstruction Manual
On the following page is Section 485 of the Alaska Preconstruction Manual for (student) review.

485. Intelligent Transportation System (ITS) Projects

485.1. Introduction

Intelligent Transportation System (ITS) projects improve transportation safety and efficiency, and enhance productivity through the integration of advanced communication technologies into the transportation infrastructure and in vehicles.

ITS includes a broad range of wireless and wire line communications-based information and electronic technologies. MAP-21 encourages the use of ITS to improve the safety and efficiency of transportation systems.

485.2. Policy

23 CFR Subchapter K, Part 940 on ITS System Architecture and Standards and FHWA policy on Architecture and Standards Conformity requires all ITS projects or ITS elements within a project using federal funds be developed using systems engineering.

23 CFR 940 provides policies and procedures for implementing that part of section 52001(6) of Map-21 pertaining to conformance with the National Intelligent Transportation Systems Architecture and Standards. 23 CFR 940 requires that ITS projects conform to the National ITS Architecture and Standard through the regional ITS architecture. Two regional architectures have been established in Alaska:

- The Alaska regional architecture (Alaska Iways Architecture), and
- The Anchorage regional architecture.

Develop ITS projects in accordance with the applicable regional architecture. The Alaska regional ITS architecture is available on line at:

http://www.dot.state.ak.us/iways/architecture.shtml

This section provides guidance to meet those requirements.

485.3. Definitions

Archived Data Management System: An automated computer system that collects and stores traffic data from roadway sensors or detectors.

Automated Anti-Icing and De-Icing System: An automated system that remotely applies anti-icing or de-icing chemicals to the roadway. The system uses atmospheric and pavement sensors to provide early warning of changing conditions. Technology includes environmental sensors to detect weather conditions, telecommunications to transmit data from the environmental sensor, and computer software to generate criteria and trigger the anti-icing and de-icing system built into roadway infrastructure.

Automated Pedestrian Detection System: A system that detects the presence of pedestrians as they approach the curb prior to crossing the street, and automatically calls the “Walk” signal. These systems can also extend the clearance interval in order to allow more crossing time for slower persons.

Automated Work Zone Safety System: System of dynamic message signs, low-power FM radio, Highway Advisory Radio, and cameras used to relay real-time information to travelers about traffic delays and assist highway agencies in identifying and reducing delays.

Avalanche Detection System: A system that provides nearly immediate notification and real-time mapping of current avalanche activity. It uses sound sensor arrays which transfers sound information to data loggers and then to a local computer for processing. The computer generates a map of avalanche activity and forwards this to avalanche staff.

AVL: Automatic Vehicle Location. Systems that incorporate positioning technologies, mapping, and communications to allow the location of a vehicle to be determined. Examples include route guidance, computer-aided dispatch, transit traveler information, commercial vehicle fleet management, “Mayday” or motorist assist technologies, congestion detection and stolen vehicle recovery systems.

AVL often uses Global Positioning Systems (GPS), radio frequency triangulation, proximity beacons, and cellular telephone systems.

Crash Data Reporting System: A computerized system that allows the electronic transfer of crash data from incident/accident response agencies to transportation agencies for analysis to benefit traffic safety.

Credentials Administration System: An Internet site that allows commercial vehicle operators to apply for and receive credentials online.

Dynamic Message Signs: Signs that display information and can electronically vary the display as traffic or environmental conditions warrant. Also known as changeable or variable message signs.

Electronic Screening: An electronic data interchange system that transmits safety and credentials history data from an information infrastructure to a roadside system. It typically involves vehicles equipped with transponders and roadside readers to either receive messages from the vehicles or send messages to vehicle.

Emergency/Incident Management System: A system using traffic sensors and detectors, cameras, telecommunications, computers, dynamic message signs, low-power FM, and Highway Advisory Radio to help restore the full capacity of a highway as soon as possible after an incident occurs.

Environmental Sensors: A system used by transportation agencies to make winter maintenance decisions and to provide traveler information to the public, consisting of:

- Surface sensors, which monitor pavement temperature and surface conditions including presence of ice, frost, water, and snow
- Atmospheric-condition sensors, which monitor air temperature, dew point, relative humidity, precipitation, wind direction, wind speed, and visibility
- Remote processing units, which collect and transmit the surface and atmospheric data from the sensors to a central processing unit
- Central processing units that contain data for graphic presentation and transmit data to remote terminals

Ferry Tracking: Online vessel tracking system using GPS, satellite, and a computer-based information system. The vessel's status, location, speed, arrival, and departure information is displayed on a website in near real-time.

Freight Management System: The application of automated vehicle location systems using GPS, telecommunications, computer-based information systems, and mobile communications to improve efficiencies in shipping freight.

Fleet Management System: The application of automated vehicle location using GPS, telecommunications, computer-based information systems, and an automated vehicle detection system (sensors on the vehicle that detect diagnostics and maintenance) to improve the efficiency, reliability, and safety of transit systems.

HAR: Highway Advisory Radio. Radio transmission-based traffic advisory system consisting of a communications system using antennas or buried cable and live messages, preselected taped messages, or synthesized messages based on information from a traveler information database. Information is transmitted to motorists within range of its signal.

Infrared Inspection System: Infrared camera and computer based system used at commercial vehicle weigh stations to detect malfunctioning brakes.

Intelligent Specialty Vehicle System: A system of differential GPS, telecommunications, computers, radar detectors, and a heads-up video monitor display ("smart snowplow/snow blower" or "driver-assistive systems technology") in the cab of maintenance vehicles to provide drivers with information under difficult driving conditions, such as low visibility, severe weather, and narrow and congested roadways.

ITS: Intelligent Transportation System. Electronics, communications, or information processing used to improve the efficiency or safety of a surface transportation system.

ITS Project: Any project that in whole or in part funds the acquisition of technologies that provide or significantly contribute to the provision of one or more ITS user services as defined in the National ITS Architecture.

ITS System Manager: The individual position responsible for the design standards, integration, and operational standards of specific ITS components. This position may, or may not, be the one responsible for day-to-day maintenance and operation of the system.

ITS Telecommunication Projects: Telecommunication technology used in Intelligent Transportation Systems.

Land Mobile Radio System: High-frequency, two-way radios that allow both voice and data transmission to communicate with other emergency service agencies and access data from other intelligent transportation systems, such as road weather information systems, maintenance management systems, etc.

LPFM: Low Power FM Radio. A communications system using antennas or buried cable and broadcasting messages based on information from a traveler information database to motorists within range of its signal. This system is similar to Highway Advisory Radio, but provides a stronger signal, less interference and uses non-commercial radio frequencies not requiring FCC licensing.

Maintenance Decision Support System: A computer-based system that collects information from various weather databases and disseminates it electronically to transportation-related agencies with the intent of improving road weather forecasting.

Maintenance Management Systems: A computer-based system that allows transportation agencies to manage and monitor maintenance activities electronically by collecting information in the field using laptops and transmitting the information to a central computer system where the data is stored and retrieved for analysis.

Multi-Modal Real Time Schedule and Reservation System: Internet-based information storage and distribution system that provides online schedule and reservations for more than one mode (i.e. rail, air, and marine) and that allows travelers to plan their connections between modes in real-time, either before, or during a trip.

Onboard Safety and Security System: A commercial vehicle system that uses automated sensors on the vehicle to collect and process on board vehicle and driver safety and security information for detection of unsafe equipment or load conditions.

Overheight Vehicle Detection: An infrared sender/receiver system with a transmitter that activates blank-out signs, static signs with flashers, and audible warning devices to warn overheight vehicles approaching overpasses, tunnels, parking garages, etc.

Parking Management System: A computer-based electronic parking information and guidance system that tracks available parking spaces using sensors and transmitters. That information is typically conveyed to motorists seeking a parking space.

Safety Information Exchange: An automated system using electronic data transfer software and the internet to enable roadside collection and exchange of interstate/intrastate commercial vehicle safety information.

SCADA: System Control and Data Acquisition. A system for which the primary purpose is the control of devices and physical flows.

Signal Operations Center: A location from which signals can be controlled and monitored.

Signal Preemption: Event driven system of signal control at intersections typically used to reduce delays for emergency services or to prevent conflicts with Railroad operations.

Signal Priority: Event driven system of signal control at intersections typically used to reduce delays for mass transit vehicles.

Smart Call Boxes: Call boxes that, in addition to serving as a motorist aid telephone, gather traffic data by video, speed, or traffic counts and serve as a telemetry device to relay the traffic information back to a central station.

TOC: Traffic Operations Center. A physical location or virtual facility for the control, monitoring and management of traffic signal, freeway, and corridor control, and traveler information systems within its jurisdiction using data gathered from ITS technologies. Also referred to as Traffic Management Center (TMC).

Traffic Management System: A Traffic Management System is used to monitor, control, and manage traffic more effectively. A Traffic Management System includes a Traffic Management Center and links to other ITS components in a metropolitan area.

Examples of a Traffic Management System include:

- ramp metering
- signal operations center (SOC)
- ramp closures
- lane control
- variable speed control
- priority control for high-occupancy vehicles
- vehicle detectors
- call boxes
- weather and environmental dectectors
- overheight vehicle dectectors
- automatic truck warning system
- closed circuit television (CCTV)
- video
- lane-use control signals
- highway advisory radio (HAR)
- in-vehicle systems
- highway/railway intersection control
- communications (including real-time communications received from police and maintenance personnel, as well as cellular telephone reports called in from drivers)

Traffic Signal Control System: A system of devices that work together to operate a single traffic signal or to provide coordination between multiple signal systems and optimize roadway operations.

Transportation Infrastructure Monitoring System: A security system used to monitor strategic transportation infrastructure, such as major bridge crossings. Technologies include video cameras and telecommunications to relay images back to a central server.

Traveler Reporting System: (Also known as Traveler Information System.) A system of computers that centralizes information from various databases, traffic sensors and detectors, environmental sensors, and cameras and disseminates the data in the form of information such as road conditions, traffic advisory reports, and weather advisories to the traveling public via internet or telephone (511) systems. 511.Alaska.gov is an example of such a system.

TSM: Transportation Systems Management. TSM is an approach to congestion mitigation that seeks to identify improvements to enhance the capacity of an existing system through better management and operation of existing transportation facilities. TSM techniques are designed to improve traffic flow, accessibility, and safety.

TMS strategies are generally low-cost but effective in nature and eliminate the need for major projects.

Vehicle Detection System: A system used to indicate the presence or passage of a vehicle, providing volume, speed, and occupancy data. They include weigh in motion systems, traffic recorders, classifier detectors, and other similar technologies.

Vehicle Warning System: A system that incorporates vehicle detection systems such as overheight warning systems, lane departure warning systems, or collision avoidance warning systems that use flashing lights and variable message signs to warn drivers of possible hazards.

Video: Video is used for traffic detection and roadway surveillance. Video is an integral part of many ITS services such as Transportation Infrastructure Monitoring System, Traffic Management System, Traffic Operations Center, et. al.

485.4. Identification of ITS Projects

An ITS project is one that includes elements or systems of elements contributing to one or more ITS program area.

The engineering manager determines whether the scope of the project includes ITS elements. Table 430-1 lists ITS elements, the associated ITS program area, and system manager. Consult with the ITS system manager(s) to determine which, if any, ITS elements to include in your project. If a project is federally funded and contains any of the elements listed in Table 430-1, it must be developed as an ITS project. Non-federally funded projects that contain any of the elements listed in Table 430-1 are considered ITS projects and should be developed in accordance with this Section.

An ITS project can be either a significant, or non-significant one. A non-significant ITS project contains ITS elements, but represents a minor modification or upgrade to any existing system. A non-significant ITS project does not require a Systems Engineering Analysis.

Examples of a non-significant ITS project are:

- Upgrade of a traffic signal controller from an ASC/2 to ASC/3.
- Upgrade of opticom sensors and controller equipment to prevent unauthorized users or devices from activating the system while maintaining authorized users activation capabilities.
- A traffic signal installation that only includes technologies already present in the current system.
- A Temporary Traffic Control device not interconnected with the ITS Architecture or one with an established interconnection protocol.
- Connecting a device to a system that does not provide new technological capabilities or alter the relationships of similar previously installed devices or the system.

Request concurrence from FHWA on all non-significant ITS project determinations. Include concurrence documentation in the Design Study Report (DSR) (See Section 450.5.1)

Contact the State ITS Coordinator if any part of a project may be an ITS element (as presented in the regional ITS architecture) but is not included in the elements listed in Table 485-1. A portion of a project that is not listed as an ITS element but which contains or interfaces with electronic components should also be referred to the State ITS Coordinator for evaluation for ITS element status.

485.5. Systems Engineering Analysis

The purpose of a System Engineering Analysis is to deliver a project that:

- Is constructible
- Fulfills anticipated benefits
- Can be operated and maintained
- Capable of communicating and integrating with other systems now, or in the future.

All significant ITS projects require a Systems Engineering Analysis (SEA). Non-significant ITS projects do not require an SEA. See 485.4 for the differentiation between significant and non-significant ITS Projects.

In consultation with the ITS systems managers, complete a Systems Engineering Checklist (SE Checklist) for all significant ITS projects. . The SE Checklist includes:

1. Portions of the Regional ITS or Statewide Iways Architecture being implemented and, identification of the program area(s), including a brief description of the functional needs to meet that Program Area(s).

   Consult the Statewide ITS Coordinator if any ITS element in your project does not fit in with the goals of the program area.

2. List of participating agencies and a discussion of their roles and responsibilities.
3. Definition of system requirements.
4. Analysis of alternative system configurations and technology options to meet the system requirements.
5. Identification of procurement options.
6. Identification of applicable ITS standards and testing procedures.
7. Identification of procedures and resources necessary for operations and management of the system. Some ITS O&M costs qualify for Federal Participation. Identify those costs in this section. If a project would otherwise qualify as non-significant, it might be desirable to perform an SEA to qualify these costs.

The following online table provides contact information for individual ITS system managers:

http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/its/022205_itstable.pdf

The SE Checklist and instructions are found online at:

http://www.dot.state.ak.us/iways/sys-eng.shtml

SE checklist examples are provided on the DOT&PF internal webpage (go to Intelligent Transportation Systems – Iways):

http://www.dot.state.ak.us/iways/links.shtml

Include the completed SE Checklist as an appendix to the DSR. Provide an electronic copy of all SE Checklists to the statewide Iways/ITS coordinator and the FHWA ITS coordinator.

Appendix I

Sample Environmental Documents and Considerations

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

Sample Environmental Documents and Considerations

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
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Anchorage, Alaska 99508

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1.0 Introduction

Within Appendix I is a examples of forms and processes that a normal project would have to go through..

1.1 Application for Categorical Exclusion for FWHA Projects

Located on the following page is a copy of the State of Alaska Department of Transportation and Public Facilities application for Categorical Exclusion for Federal Highway Administration Projects.

1.2 Application for 404 Permit

Attached after the Categorical Exclusion Application is the Section 404 Permit. The Permit is not completed but was reviewed by the group to see how the processes, and the steps that projects have to go through.

State of Alaska
Department of Transportation & Public Facilities

CATEGORICAL EXCLUSION DOCUMENTATION FORM
FOR FEDERAL HIGHWAY ADMINISTRATION PROJECTS

Project Name: Raspberry Road
Project Number (state/federal):Alaska
Date: 4/3/2015
CE Designation: 23 CFR 771.117( )( )
23 CFR 771.117( )( )
List of Attachments:

I. Project Purpose and Need

The purpose of a 4R project is to enhance safety and extend the service life of the facility. In addition, this projects proposed design includes the relocation of the Minnesota off-ramp at Raspberry to Northwood where it will transition into a 2-lane roundabout with slip lanes.

The need for the project segment includes:

- Expected increased traffic volumes as a result of the east-west corridor addition at Dowling Road
- Poor level of service (LOS) for left turning traffic from Minnesota Drive southbound off-ramp to Raspberry Road
- Addition of bicycle lanes along Raspberry Road,
- Weaving maneuvers for eastbound Raspberry Road drivers with slip lane traffic from Northwood,
- Weaving maneuvers for westbound Raspberry Road drivers and Off-Ramp drivers going to Northwood,
- Sidewalk degradation
- Need for Americans With Disabilities Act (ADA) sidewalk design and accommodation compliance,
- Noise Wall locations are inconsistent and in need of repair

II. Project Description

Seawolf Engineering 2015 is designing to 35%, in cooperation with the Alaska Department of Transportation and Public Facilities (AKDOT&PF), the Federal Highway Administration (FHWA), and the Municipality of Anchorage (MOA) Raspberry Road, Minnesota to Jewel Lake Road. The project is located in Anchorage, Alaska, apart of the MOA, and is on the *Anchorage A-8 NW USGS Topographic Map* (USGS, 2015). See above Figure 1 for the Vicinity Map. Using the Department of Natural Resources *Alaska Mapper* application the project site BOP is located at Latitude 61.159 N and Longitude 149.952 W, and EOP is Latitude 61.159 N and Longitude 149.910 E.

An overview of the proposed improvements include: r

- Relocation the Minnesota Highway off-ramp to Northwood,
- Design improvements to ramps, sidewalks, grade, drainage, lighting, and
- ADA Ramp Compliance,

- Striping and signing
- Pedestrian facilities down the full-length of the roadway, providing for a seamless design
- Bicycle facilities down the full-length of the roadway

III. Environmental Consequences

- For each yes, summarize the activity evaluated and the magnitude of the impact.
- For any consequence category with an asterisk (*), additional information must be attached such as an alternatives analysis, agency coordination or consultation, avoidance measures, public notices, or mitigation statement.
- Include direct and indirect impacts in each analysis.

A. Right-of-Way Impacts

	N/A	YES	NO
1. Additional right-of-way required.		☐	☒
• Permanent easements required.	☒	☐	☐
• Estimated number of parcels: ______			
• Full or partial property acquisition required.	☒	☐	☐
• Estimated number of full parcels: ______			
• Estimated number of partial parcels: ______			
• Property transfer from state or federal agency required. *If yes, list agency in No. 4 below.*	☒	☐	☐
• Business or residential relocations required. *If yes, summarize the findings of the conceptual stage relocation study in No. 4 below and attach the conceptual stage relocation study.*	☒	☐*	☐
• Number of relocations: ______			
• Type of relocation: Residential: ☐ Business: ☐ Residential (Indicate number: ______) Business (Indicate number: ______)			
• Last-resort housing required.	☒	☐	☐
2. Will the project or activity have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations as defined in E.O. 12898 (DOT Order 6640.23, December 1998)?		☐	☒
3. The project will involve use of ANILCA land that requires an ANILCA Title XI approval. *If yes, the project is not assigned to the State per the 6004 MOU and the CE must be processed by FHWA.*		☐	☒
4. Summarize the right-of-way impacts, if any:			

B. Social and Cultural Impacts

	N/A	YES	NO
1. The project will affect neighborhoods or community cohesion.		☐	☒
2. The project will affect travel patterns and accessibility (e.g. vehicular, commuter, bicycle, or pedestrian).		☐	☒
3. The project will affect school boundaries, recreation areas, churches, businesses, police and fire protection, etc.		☐	☒

B. Social and Cultural Impacts

	N/A	YES	NO
4. The project will affect the elderly, handicapped, nondrivers, transit-dependent, minority and ethnic groups, or the economically disadvantaged.		☐	☒
5. There are unresolved project issues or concerns of a federally-recognized Indian Tribe [as defined in 36 CFR 800.16(m)]. *If yes, the project is not assigned to the State per the 6004 MOU and the CE must be processed by FHWA.*		☐	☒

6. Summarize the social and cultural impacts, if any:

The project would provide long term benefit to the traveling public, pedestrians, and bicyclists. Buses would have larger turnout spaces, pedestrians would have complete and seamless designed sidewalks that are ADA compliant, and throughout the Raspberry Road (Minnesota to Jewel Lake) corridor. Construction will occur in the summer months when school is out. Road users may be temporarily affected by traffic delays caused by construction activities.

C. Economic Impacts

	N/A	YES	NO
1. The project will have adverse economic impacts on the regional and/or local economy, such as effects on development, tax revenues and public expenditures, employment opportunities, accessibility, and retail sales.		☐	☒
2. The project will adversely affect established businesses or business districts.		☐	☒

3. Summarize the economic impacts, if any:

Local businesses include small businesses providing retail services and a restaurant. Other businesses include: plumping and heating, convenience store, and two strip malls. Multiple businesses are housed in neighborhood centers along the corridor. The project would not permanently change access patterns to businesses and all local access would be maintained during construction. No adverse impacts to the local economy, established businesses, or business districts are anticipated because the traffic signal at the southbound Minnesota off-ramp and intersection geometry and operation modifications at Northwood Street. Due to this enhanced access, economic benefits to these businesses and the local community may occur.

D. Land Use and Transportation Plans

	N/A	YES	NO
1. Project is consistent with land use plan(s).	☐	☒	☐
a. Identify the land use plan(s) and date Anchorage 2020: Anchorage Bowl Comprehensive Plan, 2001.			
2. Project is consistent with transportation plan(s).	☐	☒	☐
a. Identify the transportation plan(s) and date. AMATS 2035 Metropolitan Tranportation Plan (May 2012), and the Alaska Statewide Transportation Improvement Program (STIP) 2012-2015.			
3. Project would induce adverse indirect and cumulative effects on land use or transportation. *If yes, attach analysis.*		☐	☒

4. Summarize how the project is consistent or inconsistent with the land use plan(s) and transportation plan(s):
The prosed project is within a mixed district. It is a mixture of multi-family residential and commercial zoned land.

Anchorage 2020: Anchorage Bowl Comprehensive Plan (2001)
The plan identifies safe, efficient movement of people and goods for vital support to life and quality. The project would improve safety by removing ruts, cracks, and localized settling, thereby, providing more even driving surface. It will remove signalized lights at Northwood and Raspberry and replacing it with a 4 way, 2-lane roundabout.

Anchorage Metropolitan Area Transportation Solutions (AMATS) 2035 Metropolitan Transportation Plan (2012).
The plan sets policies for safe and energy-efficient improvements and/or upgrades to existing facilities.

Alaska Statewide Transportation Improvement Program (STIP)
Portions of the roadway are listed under the STIP and are consistent with the project scope.

E. Impacts to Historic Properties	N/A	YES	NO
1. Does the project involve a road that is included on the "List of Roads Treated as Eligible" in the Alaska Historic Roads PA? *If yes, follow the Interim Guidance for Addressing Alaska Historic Roads.*		☐	☒
2. Does the project qualify as a listed activity that has no potential to cause effects to historic properties? *If yes, attach concurrence from the FHWA Area Engineer (non-assigned projects) or Statewide NEPA Manager for 6004-assigned projects.*		☐*	☒
a. Indicate the appropriate policy directive or memo that identifies the project as an action with no potential to cause effects to historic properties: N/A			
3. Is a National Register of Historic Places listed or eligible property in the Area of Potential Effect?	☐	☐	☒

4. Date Consultation/Initiation Letters sent N/A *Attach copies to this form.*

   a. List consulting parties N/A

   b. If no letters were sent, explain why not. *Attach "Section 106 Proceed Directly to Findings Worksheet", if applicable* Not sure what this is.

5. Date "Finding of Effect" Letters sent N/A *Attach copies to this form*

   a. State any changes to consulting parties N/A

6. List responding consulting parties, comment date, and summarize:

E. **<u>Impacts to Historic Properties</u>**	N/A	YES	NO
N/A			
7. Are there any unresolved issues with consulting parties? a. If yes, list N/A	☐	☐	☒
8. Date SHPO concurred with "Finding of Effect" N/A *Attach copy to this form.*			
9. Will there be an adverse effect on a historic property? *If yes, attach correspondence (including response from ACHP) and signed MOA. If yes, Programmatic Agreements (PCEs) do not apply.*	☐	☐	☒
10. Summarize any effects to historic properties. *List affected sites (by AHRS number only) and any commitments or mitigative measures. Include any commitments or mitigative measures in Section VI.* N/A			

F. **<u>Wetland Impacts</u>**	N/A	YES	NO
1. Project affects wetlands as defined by the U.S. Army Corps of Engineers (USACE). *If yes, document public and agency coordination required per E.O. 11990, Protection of Wetlands.*		☒*	☐
2. Are the wetlands delineated in accordance with the *"Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Alaska Region (Version 2.0) Sept. 2007"?*	☐	☒	☐
3. Estimated area of wetland involvement (acres): ______			
4. Estimated fill quantities (cubic yards): ______			
5. Estimated dredge quantities (cubic yards): ______			
6. Is a USACE authorization anticipated? *If yes, identify type*: NWP ☐ Individual ☐ General Permit ☐ Other ☐	☒	☐	☐

7. Wetlands Finding *Attach the following supporting documentation as appropriate:*
- *Avoidance and Minimization Checklist, and Mitigation Statement*
- *Wetlands Delineation.*
- *Jurisdictional Determination.*
- *Copies of public and resource agency letters received in response to the request for comments.*

	N/A	YES	NO
a. Are there practicable alternatives to the proposed construction in wetlands? *If yes, the project cannot be approved as proposed.*	☐	☒	☐
b. Does the project include all practicable measures to minimize harm to wetlands? *If no, the project cannot be approved as proposed.*	☐	☒	☐
c. Only practicable alternative: Based on the evaluation of avoidance and minimization alternatives, there are no practicable alternatives that would avoid the project's impacts on wetlands. The project includes all practicable measures to minimize harm to the affected wetlands as a result of construction. *If no, the project cannot be approved as proposed.*	☐	☐	☒

8. Summarize the wetlands impacts and mitigation, if any. *Include any commitments or mitigative measures in Section VI.*

A review of the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapper, the MOA wetlands mapper, and the Anchorage wetlands Management Plan indicated the project corridor is adjacent to areas currently catalogued as wetlands. A portion of the wetlands will be impacted as steps to relocate the Minnesota off-ramp through a portion of the wetlands. The wetlands are seasonally flooded with palustrine deciduous shrubbery, and saturated palustrine evergreen shrubbery.

G. Water Body Involvement	N/A	YES	NO
1. Project affects a water body.		☐	☒
2. Project affects a navigable water body as defined by USCG, (i.e. Section 9).	☒	☐*	☐
3. Project affects Waters of the U.S. as defined by the USACE, Section 404.	☒	☐*	☐
4. Project affects Navigable Waters of the U.S. as defined by the USACE (Section 10)	☒	☐*	☐
5. Project affects fish passage across a stream frequented by salmon or other fish (i.e. Title 16.05.841)	☒	☐	☐
6. Project affects a cataloged anadromous fish stream, river or lake (i.e. Title 16.05.871).	☒	☐*	☐
7. Project affects a designated Wild and Scenic River or land adjacent to a Wild and Scenic River. *If yes, the Regional Environmental Manager should consult with the Statewide NEPA Manager (assigned CEs) or FHWA Area Engineer and FHWA Environmental Program Manager (non-assigned CEs) to determine applicability of Section 4(f).*		☐	☒
8. Proposed water body involvement: Bridge ☐ Culvert ☐ Embankment Fill ☐ Relocation ☐ Diversion ☐ Temporary ☐ Permanent ☐ Other ☐	☒		
9. Type of stream or river habitat impacted: Spawning ☐ Rearing ☐ Pool ☐ Riffle ☐ Undercut bank ☐ Other ☐	☒		
10. Amount of fill below (cubic yards): OHW N/A MHW N/A HTL N/A			
11. Summarize the water body impacts and mitigation, if any. *Include any commitments or mitigative measures in Section VI.*			

H. Fish and Wildlife	N/A	YES	NO
1. Anadromous and resident fish habitat. *Any activity or project that is conducted below the ordinary high water mark of an anadromous stream, river, or lake requires a Fish Habitat Permit.*			
a. Database name(s) and date(s) queried:			
b. Anadromous fish habitat present in project area.		☐*	☒
c. Resident fish habitat present in project area		☐*	☒
d. Adverse effect on spawning habitat.	☒	☐*	☐
e. Adverse effect on rearing habitat.	☒	☐*	☐
f. Adverse effect on migration corridors.	☒	☐*	☐
g. Adverse effect on subsistence species.	☒	☐*	☐
2. Essential Fish Habitat (EFH). *EFH includes any anadromous stream used by any of the five species of Pacific salmon for migration, spawning or rearing, as well as other coastal, nearshore and offshore areas as designated by NMFS.*			
a. Database name(s) and date(s) queried:			
b. EFH present in project area		☐	☒
c. Project proposes construction in EFH. *If yes, describe EFH impacts in H.6.*	☒	☐	☐
d. Project may adversely affect EFH. *If yes, attach EFH Assessment.*	☒	☐*	☐

H.	**Fish and Wildlife**	N/A	YES	NO
	e. Project includes conservation recommendations proposed by NMFS. *If NMFS conservation recommendations are not adopted, formal notification must be made to NMFS. Summarize the final conservation measures in H.6 and list in Section VI.*	☒	☐	☐
3.	Wildlife Resources:			
	a. Project is in area of high wildlife/vehicle accidents.		☐	☒
	b. Project would bisect migration corridors.		☐	☒
	c. Project would segment habitat.		☐	☒
4.	Bald and Golden Eagle Protection Act. *If yes to any below, consult with USFWS and attach documentation of consultation.*			
	a. Eagle data source(s) and date(s) : USFWS			
	b. Project visible from an eagle nesting tree?		☐*	☒
	c. Project within 330 feet of an eagle nesting tree?		☐*	☒
	d. Project within 660 feet of an eagle nesting tree?		☐*	☒
	e. Will the project require blasting or other activities that produce extreme loud noises within 1/2 a mile from an active nest?		☐*	☒
	f. Is an eagle permit required?		☐*	☒
5.	Is the project consistent with the Migratory Bird Treaty Act?		☒	☐

6. Summarize fish and wildlife impacts and mitigation, including timing windows, if any. *Include any commitments or mitigative measures in Section VI.*
Effects on wildlife will be negligible.

I.	**Threatened and Endangered Species (T&E)**	N/A	YES	NO
1.	Database name(s) and date(s) queried: USFWS Maps for Critical Habitat and Endangered Species			
2.	Listed threatened or endangered species present in the project area.		☐*	☒
3.	Threatened or endangered species migrate through the project area.		☐*	☒
4.	Designated critical habitat in the project area.		☐*	☒
5.	Proposed species present in project area.		☐*	☒
6.	Candidate species present in project area.		☐*	☒
7.	What is the effect determination for the project? *Select one.*			
	a. Project has no effect on listed or proposed T&E species or designated critical habitat.		☒	
	b. Project is not likely to adversely affect a listed or proposed T&E species or designated critical habitat. *Informal Section 7 consultation is required. Attach consultation documentation, including concurrence from the Federal agency, to this form.*		☐	
	c. Project is likely to adversely affect a listed or proposed T&E species or designated critical habitat. *If yes, consult the FHWA Area Engineer (non-assigned projects) or Statewide NEPA Manager for 6004-assigned projects.*		☐	

8. Summarize the findings of the consultation, conferencing, biological evaluation, or biological assessment and the opinion of the agency with jurisdiction, or state why no coordination was conducted. *Include any commitments or mitigative measures in*

Section VI.
Compensatory mitigation will be paid through land banks.

J. Invasive Species	N/A	YES	NO
1. Database name(s) and date(s) queried:			
2. Does the project include all practicable measures to minimize the introduction or spread invasive species, making the project consistent with E.O. 13112 (Invasive Species)? *If yes, list measures in J.3.*		☒	☐
3. Summarize invasive species impacts and minimization measures, if any. *Include any commitments or mitigative measures in Section VI.*			

N/A

K. Hazardous Waste	N/A	YES	NO
1. Database name(s) and date(s) queried: AKDOT			
2. There are potentially contaminated sites within or adjacent to the existing and/or proposed ROW.		☐	☒
3. There are identified contaminated sites within or adjacent to the existing and/or proposed ROW.		☐	☒
4. Extensive excavation is proposed adjacent to, or within, a known hazardous waste site, or the potential for encountering hazardous waste during construction is high. *If yes, attach the hazardous waste investigation report and approved ADEC Corrective Action Plan.*		☐*	☒
5. Summarize the hazardous waste impacts and mitigation, if any. *Include any commitments or mitigative measures in Section VI.*			

See Appendices

L. Air Quality (Conformity)	N/A	YES	NO
1. The project is located in an air quality maintenance area or nonattainment area (CO or PM-10 or PM-2.5). *If yes, indicate CO ☐ or PM-10 ☐ or PM-2.5 ☐, and complete the remainder of this section.*		☐	☒
2. The project is included in a conforming Long Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP).	☒	☐	☐
a. List dates of FHWA/FTA conformity determination: ______			
3. The project is exempt from an air quality analysis per 40 CFR 93.126 (Table 2 and Exempt Projects). *If no, a project-level air quality conformity determination is required for CO nonattainment and maintenance areas, and a qualitative project-level analysis is required for both PM-2.5 and PM-10 nonattainment and maintenance areas.*	☐	☒	☐
4. Have there been a significant change in the scope or the design concept as described in the most recent conforming TIP and LRTP? *If yes, describe changes in L.8. In addition, the project must satisfy the conformity rule's requirements for projects not from a plan and TIP, or the plan and TIP must be modified to incorporate the revised project (including a new conformity analysis).*	☐	☐	☒

L.	**Air Quality (Conformity)**	N/A	YES	NO
5.	A CO project-level analysis was completed meeting the requirements of Section 93.123 of the conformity rule. The results satisfy the requirements of Section 93.116(a) for all areas or 93.116(b) for nonattainment areas. *Attach a copy of the analysis.*	☐	☐*	☒
6.	A PM-2.5 project-level air quality analysis was completed meeting the requirements of Section 93.123 of the conformity rule. The results satisfy the requirements of Section 93.116. *Attach a copy of the analysis.*	☐	☐*	☒
7.	A PM-10 project-level air quality analysis was completed meeting the requirements of Section 93.123 of the conformity rule. The results satisfy the requirements of Section 93.116. *Attach a copy of the analysis.*	☐	☐*	☒
8.	Summarize air quality impacts, mitigation, and agency coordination, if any. *Include any commitments or mitigative measures in Section VI.*			

M.	**Floodplain Impacts (23 CFR 650, Subpart A)**	N/A	YES	NO
1.	Project encroaches into the base (100 year) flood plain in fresh or marine waters. Identify floodplain map source and date : _____ *If yes, attach documentation of public involvement conducted per E.O. 11988 and 23 CFR 650.109. Consult with the regional or Statewide Hydraulics/Hydrology expert. Attach the required location hydraulic study developed per 23 CFR 650.111. Answer questions M.1.a through d.* *If no, skip to M.2.*		☐*	☒
	a. Is there a longitudinal encroachment into the 100-year floodplain?	☐	☐*	☐
	b. Is there significant encroachment as defined by 23 CFR 650.105(q)? *If yes, the project cannot be approved as proposed without a finding that the proposed action is the "Only Practicable Alternative" as defined in 23 CFR 650.113. Attach the finding for approval.*	☐	☐*	☐
	c. Project encroaches into a regulatory floodway.	☐	☐*	☐
	d. The proposed action would increase the base flood elevation one-foot or greater.	☐	☐*	☐
2.	Project conforms to local flood hazard requirements.	☒	☐	☐
3.	Project is consistent with E.O. 11988 (Floodplain Protection). *If no, the project cannot be approved as proposed.*		☒	☐
4.	Summarize floodplain impacts and mitigation, if any. *Include any commitments or mitigative measures in Section VI.*			

N.	**Noise Impacts (23 CFR 772)**	N/A	YES	NO
1.	Does the project involve any of the following? *If yes, complete N.1.a.* *If no, a noise analysis is not required. Skip to section O.*		☒	☐

- Construction of highway on a new location.
- Substantial alteration in vertical or horizontal alignment as defined in 23 CFR

N. Noise Impacts (23 CFR 772) N/A YES NO

772.5.

- An increase in the number of through lanes.
- Addition of an auxiliary lane (except a turn lane).
- Addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange.
- Restriping existing pavement for the purpose of adding a through-traffic lane or an auxiliary lane.
- Addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

a. Identify below which category of land uses are adjacent: *A noise analysis is required if any lands in Categories A through E are identified, and the response to N.1 is 'yes'.*

	N/A	YES	NO
Category A: Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.	☐	☐	☒
Category B: Residential. *This includes undeveloped lands permitted for this category.*	☐	☐	☒
Category C (exterior): Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings. *This includes undeveloped lands permitted for this category.*	☐	☐	☒
Category D (interior): Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.	☐	☐	☒
Category E: Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not listed above. *This includes undeveloped lands permitted for this category.*	☐	☐	☒

2. Does the noise analysis identify a noise impact? *If yes, explain in N.3* ☐ ☒

3. Summarize the findings of the attached noise analysis and noise abatement worksheet, if applicable:

O. Water Quality Impacts N/A YES NO

1. Project would involve a public or private drinking water source. *If yes, explain in O.7* ☐ ☒
2. Project would result in a discharge of storm water to a Water of the U.S. (per 40 CFR 230.3(s)) ☐ ☒
3. Project would discharge storm water into or affect an ADEC designated Impaired Waterbody. *If any of the Impaired Waterbodies have an approved or established Total Maximum Daily Load, describe project impacts in O.7* ☐ ☒
   a. List name(s), location(s), and pollutant(s) causing impairment:

O. Water Quality Impacts

	N/A	YES	NO
4. Estimate the acreage of ground-disturbing activities that will result from the project? 6 acres			
5. Is there a municipal separate storm sewer system (MS4) APDES permit, or will runoff be mixed with discharges from an APDES permitted industrial facility?		☐	☒
a. If yes, list APDES permit number and type*:* ______			
6. Would the project discharge storm water to a water body within a national park or state park; a national or state wildlife refuge? *If yes and Alaska Construction General Permit applies to the project, consultation with ADEC is required at least 30 days prior to planned start of construction activities.*		☐	☒
7. Summarize the water quality impacts and mitigation, if any. *Include any commitments or mitigative measures in Section VI.*			

P. Construction Impacts

	N/A	YES	NO
1. There will be temporary degradation of water quality.		☐	☒
2. There will be a temporary stream diversion.		☐	☒
3. There will be temporary degradation of air quality.		☒	☐
4. There will be temporary delays and detours of traffic.		☒	☐
5. There will be temporary impacts on businesses.		☒	☐
6. There will be temporary noise impacts.		☒	☐
7. There will be other construction impacts.		☒	☐
8. Summarize construction impacts and mitigation for each 'yes' above. *Include any commitments or mitigative measures in Section VI.* See Appendices			

Q. Section 4(f)/6(f)

	N/A	YES	NO
1. Section 4(f) (23 CFR 774)			
a. Does a Section 4(f) resource exist within the project area; or is the project adjacent to a Section 4(f) resource? *If yes, attach consultation with the Statewide NEPA Manager (assigned CEs) or FHWA Environmental Program Manager (non-assigned CEs) to determine applicability of Section 4(f)*		☐	☒
b. Does an exception listed in 23 CFR 774.13 apply to this project? *If yes, attach consultation with the Statewide NEPA Manager (assigned CEs) or FHWA Environmental Program Manager (non-assigned CEs), and documentation from the official with jurisdiction, if required.*	☒	☐	☐
c. Does the project result in the "use" of a Section 4(f) property? *"Use" includes a permanent incorporation of land, adverse temporary occupancy, or constructive use.*	☒	☐	☐
d. Has a *de minimis* impact finding been prepared for the project? *If yes, attach the finding.*	☒	☐	☐
e. Has a Programmatic Section 4(f) Evaluation been prepared for the project? *If yes, attach the evaluation.*	☒	☐	☐

Q. Section 4(f)/6(f)

	N/A	YES	NO
f. Does the project require an Individual Section 4(f) Evaluation? *If yes, the project is not assigned to the State per the 6004 MOU and the CE must be processed by FHWA. Attach the evaluation.*	☐	☐	☒

2. Section 6(f) (36 CFR 59)

	N/A	YES	NO
a. Were funds from the Land and Water Conservation Fund Act (LWCFA) used for improvement to a property that will be affected by this project?	☐	☐	☒
b. Is the use of the property receiving LWCFA funds a "conversion of use" per Section 6(f) of the LWCFA? *Attach the correspondence received from the ADNR 6(f) Grants Administrator.*	☐	☐	☒

3. Summarize Section 4(f)/6(f) involvement, if any:

IV. Permits and Authorizations

	N/A	YES	NO
1. USACE, Section 404/10 *Includes Abbreviated Permit Process, Nationwide Permit, and General Permit*		☒	☐
2. Coast Guard, Section 9		☐	☒
3. ADF&G Fish Habitat Permit (Title 16.05.871 and Title 16.05.841)		☐	☒
4. Flood Hazard		☐	☒
5. ADEC Non-domestic Wastewater Plan Approval		☐	☒
6. ADEC 401		☐	☒
7. ADEC APDES		☒	☐
8. Noise		☐	☒
9. Eagle Permit		☐	☒
10. Other. *If yes, list below.*		☐	☒

V. Comments and Coordination

	N/A	YES	NO
1. Public/agency involvement for project. *Required if protected resources are involved.*		☒	☐
2. Public Meetings. Date(s): TBD		☒	☐
3. Newspaper ads. *Attach certified affidavit of publication as an appendix.* Name of newspaper and date: ______		☒	☐
4. Agency scoping letters. Date sent: ______		☒	☐
5. Agency scoping meeting. Date of meeting: ______		☒	☐
6. Field review. Date: ______		☒	☐

7. Summarize comments and coordination efforts for this project. Discuss pertinent issues raised. *Attach correspondence that demonstrates coordination and that there are no unresolved issues.*

VI. Environmental Commitments and Mitigation Measures

List all environmental commitments and mitigation measures included in the project.

VII. Environmental Documentation Approval

		N/A	YES	NO
1.	Do any unusual circumstances exist, as described in 23 C.F.R. 771.117 (b)? *If yes, the CE Documentation form cannot be approved.*		☐	☒
2.	Does this 6004 Program approval statement apply? "The State has determined that this project has no significant impact(s) on the environment and that there are no unusual circumstances as described in 23 CFR 771.117(b). As such, the project is categorically excluded from the requirements to prepare an environmental assessment or environmental impact statement under the National Environmental Policy Act. The State has been assigned, and hereby certifies that it has carried out, the responsibility to make this determination pursuant to Chapter 3 of title 23, United States Code, Section 326 and a Memorandum of Understanding dated September 20, 2012, executed between the FHWA and the State." *If no, the CE must be approved by FHWA.*		☐	☒
3.	**For 6004 projects:** The project meets the criteria of the DOT&PF Programmatic Approval 2 authorized in the November 6, 2012 "CE Directive – Delegation of Approval Authority for Certain CEs under 6004 MOU". *If* yes, *the CE may be approved by the Regional Environmental. If no, the CE may be approved by a Statewide NEPA Manager.*	☒	☐	☐
4.	**For non-assigned projects:** The project meets the criteria of the April 13, 2012 "Programmatic Categorical Exclusion for Use on Federal-Aid Highway Projects in Alaska" between FHWA and DOT&PF. *If yes, the CE may be approved by the Regional Environmental Manager. If no, the CE may be approved by FHWA Area Engineer.*	☐	☒	☐

VIII. Environmental Documentation Approval Signatures

Prepared by: ______________________________ Date: _____
[Sign] Environmental Impact Analyst

____
[Print Name] Environmental Impact Analyst

Reviewed by: ______________________________ Date: _____
[Sign] Engineering Manager

____
[Print Name] Engineering Manager

Approved by: ______________________________ Date: _____
[Sign] Regional Environmental Manager

____
[Print Name] Regional Environmental Manager

Assigned CE
Approved by: ______________________________ Date: _____
[Sign] DOT&PF Statewide NEPA Manager

____
[Print Name] DOT&PF Statewide NEPA Manager

Non-Assigned CE
Approved by: ______________________________ Date: _____
[Sign] FHWA Area Engineer

____
[Print Name] FHWA Area Engineer

Sample Section 404 Application for Department of Army Permit/Application

1. Sample Cover Page
2. Sample Table of Contents
3. Sample USACE, 404 Permit Application
4. Sample Table A: Impacts to Streams/Ponds
5. Sample Table B: Impacts to Wetlands
6. Sample Table C: Discharge Quantities
7. Sample Table D: Lowering of Water Quality
8. Sample Table E: Stream Mitigation
9. Sample Table F: Wetland Mitigation
10. Sample Ohio EPA 401 Water Quality Certification
11. Sample Standard Drawings
12. Sample Natural Channel Design for Stream Mitigation
13. Sample Natural Design for Wetland Mitigation
14. Sample Photo Log
15. Sample Ohio Rapid Assessment Method (ORAMs v5.0)
16. Sample Qualitative Habitat Evaluation Indexes (QHEIs)
17. Sample Headwater Habitat Evaluation Indexes (HHEIs)
18. Sample Agency Coordination

Section 404 Application for Department of Army Permit

Prepared for:
Alaska Department of Transportation

Date: 4/19/2015

By: Seawolf Engineering

Table of Contents

Sample USACE, 404 Permit Application

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)	OMB APPROVAL NO. 0710-003 Expires October 1996

Public reporting burden for this collection of information is estimated to average 5 hours per response, including the time for reviewing the instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302: and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: 33 USC 401, Section 10; 1413, Section 404. Principal Purpose: These laws require permits authorizing activities in, or affecting, navigable waters of the United States, the discharge of dredged or fill material into waters of the United States, and the transportation of dredged material for the purpose of dumping it into ocean waters. Routine Uses: If information is not provided, however, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME Jolene M. Molitoris, Director	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required) Michael A. Pettegrew, OES Waterway Permits Supervisor
6. APPLICANT'S ADDRESS Ohio Department of Transportation Office of Environmental Services, Third Floor 1980 West Broad Street Columbus, Ohio 43223	9. AGENT'S ADDRESS Ohio Department of Transportation Office of Environmental Services, Third Floor 1980 West Broad Street Columbus, Ohio 43223
7. APPLICANT'S PHONE NOS. W/AREA CODE a. Residence b. Business: Tim Hill (614) 644-0377	10. AGENT'S PHONE NOS. W/AREA CODE a. Residence b. Business: Michael A. Pettegrew (614) 466-7102

11. STATEMENT OF AUTHORIZATION

I hereby authorize, Michael A. Pettegrew to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT'S SIGNATURE   DATE

NAME, LOCATION AND DESCRIPTION OF PROJECT

12. PROJECT NAME OR TITLE (see instructions)

JEF-213-16.40, PID 20526

13. NAME OF WATERBODY, IF KNOWN (if applicable) Yellow Creek (HUC #########)	14. PROJECT STREET ADDRESS (if applicable)
15. LOCATION OF PROJECT Jefferson — COUNTY Ohio — STATE	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN, (see instructions)

Section 18, Saline Township, Jefferson County, Ohio

17. DIRECTIONS TO THE SITE
From Columbus take 70 E to State Route 7 to State Route 213 east. Travel east on State Route 213 for approximately 2.0 miles.
From the east take IR 70 or US 22 to State Route 7. Travel north on State Route 7 to State Route 213. Travel east on State Route 213 for approximately 2.0 miles.

18. Nature of Activity (description of project, include all features)

This project proposes to improve 0.10 miles of State Route 213 by:
1. replacing the existing bridge deck,
2. replacing the existing rear bridge abutment,
3. replacing the existing bridge approach slabs, and
4. reconstructing the approaches to the bridge

19. Project Purpose (describe the reason or purpose of the project, see instructions)

The purpose of the proposed project is to rehabilitate a structurally deficient bridge in order to maintain a safe route of travel.

The existing structure was built in 1900. The bridge was last inspected on 5/16/01. The bridge received a sufficiency rating of 71.1SD, which indicates that this bridge is structurally deficient due to the deteriorated condition of the deck and severe cracking present on the rear bridge abutment. The deck suffers from very severe cracking and saturation. The superstructure suffers from loss of section.

Based on the 5/16/01 inspection, the District Bridge Engineer determined that rehabilitation of the bridge is needed in order to halt the deterioration of the existing structure and to maintain a safe route of travel.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

There are both temporary & permanent discharges associated with this project. The temporary discharge is necessary for the replacement of the existing bridge's rear abutment. Fill material will be used to create a temporary work area for the contractor to work from while replacing the abutment. All temporary fill material will be removed upon completion of the project and the area will be restored to its original condition. A note has been added to the plan to ensure that all material is removed and the area restored.

The permanent fill material consists of concrete which will be used to construct the footer for the new rear bridge abutment and rock channel protection (RCP) which will be used to protect the embankment around the new abutment.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards

At this time, ODOT does not know exactly what construction method(s) the contractor will use to reconstruct the rear abutment. Therefore, worst case impacts have been estimated for the temporary fill based on the experience of the District's Construction Engineer and the following figures have been developed:

1. Approximately 1763 cubic yards of large granular material, shale, rock, and/or random material and will be temporarily discharged into the water body to construct a cofferdam. The cofferdam is shown on the attached plan sheets.
2. 63 cubic yards of concrete material will be permanently discharged into the water body to construct the footer of the new rear bridge abutment.
3. 44 cubic yards of RCP will be permanently discharged into the water body.

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

1. Approximately 0.08 acres of Yellow Creek will be temporarily impacted by the proposed cofferdam.
2. Approximately 0.02 acres of Yellow Creek will be permanently impacted by the proposed RCP and rear bridge abutment.

23. Is Any Portion of the Work Already Complete? Yes ____ No ✔ IF YES, DESCRIBE THE COMPLETED WORK

24. Addresses of Adjoining property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).

Ohio Department of Transportation
1980 West Broad Street
Columbus, Ohio 43223

25. List of Other Certifications or Approval/Denials Received from other Federal, State or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes false, fictitious or fraudulent statements or represents or makes or uses any false writing or document knowingly same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

Sample Tables

1. **Table A: Impacts to Streams/Ponds**
2. **Table B: Impacts to Wetlands**
3. **Table C: Discharge Quantities**
4. **Table D: Lowering of Water Quality**
5. **Table E: Stream Mitigation**
6. **Table F: Wetland Mitigation**

404 / 401 TABLE A
Streams Affected by the Proposed Project

Site # / Feature	USGS Coord.	Description and Length Impacted	Drainage Basin	Total Length	Receiving Stream	Distance to Receiving Stream	Drainage Area / Area at Impact Site	QHEI Score / OEPA Use Designation	Riparian Corridor and Adj. Habitats

USACE 404 Permit and OEPA 401 Water Quality Certification Application
Description of Project
County, Route, Section, PID
Date

404 / 401 TABLE B
Wetlands Affected by the Proposed Project

Wetland #	USGS Coordinate	Drainage Basin	Wetland Description	Cowardin et al., 1979 Classification	ORAM v5.0 Score	OEPA Category	Total Size (Area Impacted)	Adjacent Habitats	Proximity to Other Surface Waters

404 / 401 TABLE C
Nature of Proposed Activities by Impacted Feature for the Preferred Alternative

A. STREAMS

Site / Feature	Approx. Station Location	Proposed Structure or Action	Existing Channel Disturbed Due to Placement of Proposed Structure, Highway Fill, Channel Change or Channel Protection [1]					Existing Channel Disturbed Due to Temporary Crossing		
			Length of Channel Disturbed	Excavation Below OHW		Fill Below OHW		Length of Channel Disturbed	Excavation / Fill Below OHW	
				Volume	Area	Volume	Area		Volume	Area

B. WETLANDS

Feature(s)	Location	Description	Total Area Impacted	Proposed Action	Direct Impacts (within construction limits)			Indirect Impact Area (outside construction limits)
					Volume Excavated	Volume Filled	Area Excavated and/or Filled	

C. WHOLE PROJECT SUMMARY OF ACTIVITIES

Total Project Lineal Stream Disturbances			Total Project Excavation						Total Project Fill					
Total Length Disturbed due to Proposed Structures, Highway Fill, Channel Change or Channel Protection	Length Disturbed due to Temporary Crossing	Net Length Disturbed [3]	Stream Excavated		Wetland Excavated		Total Excavation		Stream Filled (standard roadfill, channel protection, temp crossing & other materials)		Wetland Filled		Total Filled	
			Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area	Volume	Area

404 / 401 TABLE D
Proposed Lowering of Water Quality by the Preferred and Antidegradation Alternatives

Alternative	Expected Impacts by Alternative						
	Direct Stream Impacts	Aquatic Hab. (QHEI) / Use Designation / Stream Flow	Aquatic Biota	T & E Species [1]	Terrestrial Plant/Animals (Riparian Area)	Wetlands	Summary for Alternative

[1] Impact footprint of the Preferred Alternative includes areas upstream and/or downstream of proposed structures where energy and erosion control components (channel protection) are required to achieve pre-construction stream velocity, water surface elevation and channel stability conditions; no impact to stream flow patterns are expected.

404/401 TABLE E
Proposed Stream Mitigation for the Preferred and Antidegradation Alternatives

Stream Name	Impacted Length	Type of Mitigation	Watershed (8 Digit HUC)		QHEI Score	HHEI Score	Mitigated Length	
			Impacted	Mitigated			On-site	Off-site

404/401 TABLE F
Proposed Wetland Mitigation for the Preferred and Antidegradation Alternatives

Wetland ID Number	Impacted Area	Type of Wetland (Isolated/Non-Isolated)	Watershed (8 Digit HUC)		ORAM v5.0 Score	OEPA Category	Mitigated Area	
			Impacted	Mitigated			On-site	Off-site

Appendix J

Value Engineering Considerations

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation And Public Facilities

Value Engineering Considerations

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

Table of Contents

1.0 Introduction

Within Appendix J are examples of forms and processes that a normal project would have to go through. Value Engineering is outside the scope of this senior design project, however the group has included the AKDOT&PF policy and procedures for conducting a Value Engineering Program.

1.1 Policy and Procedure

Located on the following page is the Policy and Procedure as of April 12, 2013 for Value Engineering. The document itself is 11 pages long and outlines key definitions, organization, FAA Project procedures (which does not apply to this project), and defines the Value Engineering Program. As well as how to conduct a VE Analysis, reviewing, implementing, and reporting.

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES **Policy and Procedure**		POLICY AND PROCEDURE NUMBER **05.01.030**	PAGE 1 of 11
		EFFECTIVE DATE April 12, 2013	
SUBJECT **Value Engineering Program**		SUPERSEDES **DPOL 05.01.030** **DPDR 05.01.030**	DATED October 24, 1991 April 15, 1994
CHAPTER **Design and Construction**	SECTION **General Design and Construction**	APPROVED BY	

PURPOSE

This formalizes the policy and procedure (P&P) of the department on a Value Engineering (VE) Program for capital improvement projects in order to maximize the use of limited funds for their construction and operation.

POLICY

It is the policy of the department to utilize VE techniques in the pre-construction, construction, and operation of selected projects that provide the necessary function, safety, and maintenance of the facility at the lowest life-cycle cost.

1. Every program and activity of the department may use the VE program. The primary emphasis, however, is in the design and construction of selected Department of Transportation & Public Facilities (DOT&PF) projects under the Statewide Transportation Improvements Program (STIP). Projects that are solely state funded and meet the criteria for a VE analysis shall be included in the VE program.

2. Conduct all VE activities authorized under this policy in accordance with these procedures.

3. Activities of a similar nature, whether performed by DOT&PF employees or consultants, but not in accordance with this procedure, shall not be referred to as "value engineering." This avoids confusion about the VE program.

PROCEDURE

This procedure establishes the organization, implementation, and evaluation of a program for using recognized techniques of VE in order to reduce costs and to increase quality and function of selected projects or activities.

A. Definitions

Bridge Project: A bridge project shall include any project where the primary purpose is to construct, reconstruct, rehabilitate, resurface, or restore a bridge.

Design Study Report: The Design Study Report (DSR) is the formal report that documents the basis for the preferred design alternative being selected.

Final Design: Any design activities following preliminary design and expressly includes the preparation of final construction plans and detailed specifications for the performance of construction work.

Final Plans, Specifications and Estimates (PS&E): The final plans, specifications, and estimate assembly, with corrections made from the PS&E review, ready for advertisement.

Function: The performance feature of a project, item, or activity. Its purpose or what it is designed to do.

Life-Cycle Cost: The total cost of a project or item over its useful life. This includes all of the relevant costs that occur throughout the life of a project or item, including initial acquisition costs (such as right-of-way, planning, utilities, design, and construction), operation, maintenance, modification, replacement, demolition, financing, taxes, disposal, and salvage value as applicable.

Major Project: A project receiving federal financial assistance 1) with an estimated cost of $500 million or more, or 2) that has been identified by the Secretary of the U.S. Department of Transportation as being “Major” as a result of special interest.

Project: A portion of a highway, airport or facility that the department or public authority proposes to construct, reconstruct, or improve as described in the preliminary design report or applicable environmental document. A project is defined as the logical termini in the environmental document and may consist of several contracts, or phases of a project or contract, which are implemented over several years.

Region/System: Refers to the Central Region, Northern Region, Southeast Region, and Alaska Marine Highway System (AMHS).

Total Project Costs: The costs of all phases of a project including environment, design, right-of-way, utilities and construction.

Value Engineering (VE) Analysis: The systematic process of reviewing and assessing a project by a multidisciplinary team not directly involved in the planning and development phases of a specific project that follows the VE Job Plan and is conducted to provide recommendations for:

1. Providing the needed functions, considering community and environmental commitments, safety, reliability, efficiency, and overall life-cycle cost.

2. Improving the value and quality of the project.

3. Reducing the time to develop and deliver the project.

Value Engineering (VE) Job Plan: A systematic and structured action plan for conducting and documenting the results of the VE analysis. While each VE analysis shall address each phase in the VE Job Plan, the level of analysis conducted and effort expended for each phase should be scaled to meet the needs of each individual project. The VE Job Plan shall include and document the following seven phases:

1. *Information Phase* - gather project information including project commitments and constraints.

2. *Function Analysis Phase* - analyze the project to understand the required functions.

3. *Creative Phase* - generate ideas on ways to accomplish the required functions which improve the project's performance, enhance its quality, and lower project costs.

4. *Evaluation Phase* - evaluate and select feasible ideas for development.

5. *Development Phase* - develop the selected alternatives into fully supported recommendations.

6. *Presentation Phase* - present the VE recommendations to the project stakeholders.

7. *Resolution Phase* – evaluate, resolve, document and implement all approved recommendations.

Value Engineering Change Proposal (VECP): A construction contract change proposal submitted by the construction contractor based on a VECP provision in the contract. These proposals may improve the project's performance, value and/or quality, lower construction costs, or shorten the delivery time, while considering their impacts on the project's overall life-cycle cost and other applicable factors.

B. Organization

1. The **State Value Engineer** will be appointed by the Chief Engineer for the Statewide Design and Engineering Services (D&ES) Division, and will:

    a. Develop and implement statewide VE policy and procedures

    b. Coordinate VE training

    c. Maintain the headquarters VE program files

    d. Monitor, evaluate, and report on the VE activities of the department

2. The **VE Coordinators** will be appointed by the Regional Preconstruction Engineers for the Central Region, Northern Region, and Southeast Region; and the Director of the AMHS will:

    a. Each VE Coordinator may develop guidelines or desk manuals, as necessary, to supplement this procedure for their respective regional, or system's operations.

    b. Establish the Annual VE Study Schedule of projects, utilizing the criteria given under Section C (FHWA or FTA applicable projects), Section D (FAA Projects) and Section F (VE analysis selection) below, to be considered for analysis.

    c. The project manager, design engineer or VE Coordinator will appoint a study team and team leader for each VE analysis.

    d. Ensure that each study is conducted in accordance with the approved VE analysis procedure under Section F, Conducting VE Analysis.

    e. Maintain records of each VE analysis conducted and each VECP received.

    f. Monitor projects after the VE analysis and report on the implementation of the VE recommendations.

    g. Follow up after project completion on selected projects to verify accuracy of assumed operating and maintenance costs and value improvement.

C. Federal Highways Administration (FHWA) or Federal Transit Administration (FTA) applicable projects

1. A VE analysis shall be conducted prior to the completion of final design on each applicable project that utilizes Federal-aid highway or transit funding, and all

approved recommendations shall be included in the project's plans, specifications and estimates.

2. VE studies will be proposed for those projects in the department's three year STIP that will likely show substantial benefits from the application of VE principles. In general, these will be high cost, complex projects or projects with budgetary problems. As a minimum, all projects to exceed $40 million (for project development, design, utilities, right-of-way, and construction costs) will be considered. Reasons for a non-selection of projects which meet selection criteria, but are not selected shall be documented.

3. Applicable projects shall include the following:

   a. Each project located on the National Highway System (NHS) where the estimated total project cost is $50 million or more that utilizes Federal-aid highway or transit funding.

   b. Each bridge project located on the NHS where the estimated total project cost is $40 million or more that utilizes Federal-aid highway funding.

   c. Any ***Major Project*** on or off the NHS that utilizes Federal-aid highway funding in any contract or phase comprising the ***Major Project***.

   d. Any project for which a VE analysis has not been conducted and a change is made to the project's scope or design between the final design and advertise which results in an increase in the project's total cost that exceeds the thresholds as identified on paragraph 3 of this section.

   e. Any other Federal-aid project, the FHWA determines to be appropriate.

4. An additional VE analysis is not required if, after conducting the VE analysis required under Section C.3, the project is subsequently split into small projects in the design phase or if the project is programmed to be completed by advertising multiple construction projects. However, the department may not avoid the requirement to conduct a VE analysis on an applicable project by splitting the project into smaller projects, or multiple construction projects.

5. The department's P&P shall identify when any additional VE analysis should be considered or conducted in the planning and development of transportation projects.

6. For projects utilizing alternative project delivery methods for which final design is not complete prior to the release of the final request for proposals or other applicable solicitation documents, the estimated total cost for purposes of the thresholds identified in Section C.3 (a) and (b), shall be based on the best estimate of the cost to construct the project.

7. Design-Build projects do not require a VE analysis.

8. The FHWA or FTA may require a VE analysis, if the department or public agency encounters instances when the design of a project is complete, but the project does not immediately proceed to construction. In accordance with Section C.1:

    a. If a project that met the criteria identified in Section C.1 encounters a three year delay or longer in advancing to advertise for construction, and a substantial change to the project's scope or design is identified when the required re-evaluation of the design study report or the environmental document is performed, the FHWA or FTA may encourage or require a new VE analysis or an update to the previously completed VE analysis.

    b. If a project's estimated cost is initially below the criteria identified in Section C.1 but the project advances to advertise for construction, and a substantial change to the project's scope or design is the basis for an increase in the project cost above the criteria identified in Section C.1 when the required re-evaluation of the environmental document is performed, the FHWA or FTA requires a VE analysis.

    c. When the design of a project is complete, but the project does not immediately proceed to construction, the requirement to conduct a VE analysis is considered to be satisfied, or not necessary, if:

        (1) A project met the criteria identified in Section C.1 and had a VE analysis conducted, and the project advances to advertise for construction without needing any substantial changes in its scope or its design; or

        (2) A project's estimated cost initially is below the criteria identified in Section C.1, but when advancing to advertise for construction, falls above the criteria due to inflation, standard escalation of costs, or minor modifications to the project's design or contract.

D. Federal Aviation Administration (FAA) Projects

1. **Required VE analysis:** VE is required in the project formulation for new primary airports (airports over 10,000 passenger enplanements). Use of a formal VE analysis team during planning, project formulation, or construction design may also be required by the department for the following work:

    a. Substantially changed airfield configurations at a hub airport that annually enplanes 0.25 percent or more of U.S. passengers (medium and large hubs).

    b. Modifications of design standards proposed by DOT&PF that would result in significantly increased cost.

c. The preparation of Statewide Preconstruction Standards proposed to be approved by FAA and used for development of non-primary airport projects.

d. Multi-year projects.

e. Projects exceeding $10 million federal share, unless this work is part of a larger unit such as a new airport where the VE analysis was already considered or completed.

f. The department should consult with FAA prior to formulation of a VE analysis to determine if they require a VE analysis.

2. **VE analysis procedures:** Specific concurrence on the scope of work by the FAA is required prior to the use of VE analysis by the department or local agency in Airport Improvement Program (AIP) projects. The cost of work performed on VE analysis will not be allowed unless incurred after the date of the FAA concurrence on the scope. VE analysis guidance is contained in Advisory Circular 150/5300-15A, *Use of Value Engineering for Engineering and Design of Airport Grant Projects, and Advisory Circular 150/5370-10E Standards for Specifying Construction of Airports,* contain additional guidance on VE analysis.

E. Value Engineering Program

1. The department shall establish and sustain a VE program under which VE analysis are conducted for all applicable projects. The department's VE program shall:

   a. Establish and document VE program policies and procedures that ensure the required VE analysis is conducted on all applicable projects, and encourage conducting VE analysis on other projects that have the potential to benefit from this analysis.

   b. Ensure the VE analysis is conducted and all approved recommendations are implemented and documented in a final VE report prior to the project being authorized to proceed to a construction letting.

   c. Monitor and assess the VE program, and disseminate an annual report to the FHWA consisting of a summary of all approved recommendations implemented on applicable projects requiring a VE analysis, the accepted VECPs, and VE program functions and activities.

   d. Establish and document policies, procedures, and contract provisions that identify the analysis, documentation, basis, and process for evaluating and accepting a VECP; and determine how the net savings of each VECP may be shared between the department or local agency and contractor.

e. Establish and document policies, procedures, and controls to ensure a VE analysis is conducted and all approved recommendations are implemented for all applicable projects administered by local public agencies; and ensure the results of these analyses are included in the VE program monitoring and reporting.

f. Provide for the review of any project where a delay occurs between when the final plans are completed and the project advances to advertise for construction to determine if a change has occurred to the project's scope or design where a VE analysis would be required to be conducted as required in Section C.3.

2. The department shall ensure the required VE analysis has been performed on each applicable project including those administered by sub-recipients, and shall ensure approved recommendations are implemented into the project's plans, specifications, and estimate.

F. Conducting VE analysis

1. A VE analysis should be conducted as early as practicable in the planning or development of a project, preferably before the completion of the project's preliminary design. At a minimum, the VE analysis shall be conducted prior to completing the project's final design.

2. The VE analysis should be closely coordinated with other project development activities to minimize the impact of approved recommendations might have on previous agency, community, or environmental commitments; the project's scope; and the use of innovative technologies, materials, methods, plans or construction provisions.

3. For projects utilizing alternative project delivery methods that will be advertised prior to the completion of final design, the department or local public agency shall conduct a VE analysis prior to the release of the final request for proposals or other applicable solicitation documents.

4. The department shall ensure the VE analysis meets the following requirements:

   a. Use a multidisciplinary team not directly involved in the planning or design of the project, with at least one individual who has the training and experience with leading a VE analysis.

   b. Develop and implement the VE Job Plan.

   c. Produce a formal written report outlining, at a minimum:

   (1) Project information.

(2) Identification of the VE analysis team.

(3) Background and supporting documentation, such as information obtained from other analysis conducted on the project (e.g., environmental, safety, traffic operations, and constructability).

(4) Documentation of the stages of the VE Job Plan which would include documentation of the life-cycle costs that were analyzed.

(5) Summarization of the analysis conducted.

(6) Documentation of the proposed recommendations and approvals received at the time the report is finalized.

(7) The formal written report shall be retained for at least 3 years after the completion of the project.

5. For bridge projects, in addition to the requirements in Section F.4, the VE analysis shall:

   a. Include bridge substructure and superstructure requirements that consider alternative construction materials.

   b. Be conducted based on:

      (1) An engineering and economic assessment, taking into consideration acceptable designs for bridges.

      (2) An analysis of life-cycle costs and duration of project construction.

6. The department and local public agencies may employ qualified consultants to conduct a VE analysis. The consultant shall possess the training and experience required to lead the VE analysis. A consulting firm or individual shall not be used to conduct or support a VE analysis if they have a conflict of interest.

G. VECPs

1. The department and local public agencies are encouraged to use the VECP clause in an applicable project's contract, allowing the construction contractor to propose changes in the department and local authority will consider changes that could improve the project's performance, value and quality, shorten the delivery time, or lower construction costs, while considering impacts on the project's overall life-cycle cost and other applicable factors. The basis for the department or local authority to consider a VECP is the analysis and documentation supporting the proposed benefits that would result from implementing the proposed change in the project's contract or project plans.

2. Proposals to accelerate construction after the award of the contract will not be considered a VECP and will not be eligible for Federal-aid highway program funding participation. Where it is necessary to accelerate construction, the department and local public agencies are encouraged to use the appropriate incentive or disincentive clauses so that all proposers will take this into account when preparing their bids or price proposals.

3. The project engineer shall report to the Regional VE Coordinator the number and value of VECPs received and the number and value of VECPs approved. The in-house and contractor savings from the approved VECPs shall be reported.

H. Review, Implementation and Verification

1. The VE Coordinator will ensure the expedited review of all VE analysis and will facilitate the decision and implementation mechanism whenever possible.

2. The project engineer will monitor the implementation of all approved VE recommendations and report back to the VE Coordinator.

3. Where feasible, actual savings or other value improvements will be checked against those estimated during the VE analysis.

I. Reports

1. Each VE Coordinator will provide the State Value Engineer:

   a. A copy of the region/system VE guidelines and all changes.

   b. A copy of the region/system Annual VE Study Schedule (due October 1st).

   c. Copies of all VE analysis reports (due 15 days after the analysis).

   d. An annual report for each federal fiscal year which will summarize the activities, achievements, problems, and costs of the VE program (due on October 15th). The report will summarize each of the VE analysis recommendations that were actually implemented. Achievements will, in addition to cost savings, indicate other benefits to the public, the user, or the department.

2. The State Value Engineer will prepare an annual report to the Chief Engineer, Statewide Design & Engineering Services Division summarizing the activities, achievements, and problems of the statewide program (due on November 1st). The report will show the average benefit/cost ratio for VE analysis and make conclusions and recommendations regarding the overall program.

J. Training

1. The 40-hour FHWA/NHI Value Engineering Workshop or its equivalent will be offered from time to time to department employees. As an alternative, a two or three-day VE course, approved by the State Value Engineer, may be submitted when it is determined that the 40-hour workshop is unavailable or not appropriate.

2. One or two positions on each team should be available for untrained individuals, for on-the-job training.

3. A team-leader training course will be offered as deemed necessary to develop a roster of in-house VE team leaders.

AUTHORITY

U.S. DOT Order 1395.1
23 USC 106(e)(2) and (3)
23 CFR Part 627
23 USC 101(a)(23)

IMPLEMENTATION RESPONSIBILITY

Statewide D&ES Division Chief Engineer, Regional Preconstruction Engineers, and the Director of the Alaska Marine Highway System or designee

DISTRIBUTION

All department employees via the DOT&PF website

Appendix K

Design Memos

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

Design Memos

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

Table of Contents

1.0 Introduction

Within Appendix K are design memos that were found applicable to this project. Additional memos maybe applicable but were not made aware to the group.

1.1 Field Report – Bore Hole Data

This is a memo dating May 21, 2014 that outlines the necessary information for bore holes and geotechnical work on this project. Since our group was not responsible or able to do our own surveys or collect our own data this data was used.

1.2 Existing Asphalt Depths and Pavement Distresses

Six figures outlining the pavement distress of Raspberry Road. This data was provided via online research and reports.

1.3 AMATS Technical Advisory Committee Memo

This memo seeks to recommend to the AMATS Policy Committee that the National Association of City transportation Officials (NACTO) Urban Bikeway Design Guide be integrated into AMASTS road project design to serve as an additional tool when designing urban streets within the AMATS area. If integrated this policy would allow for use of NACTO design guides on Municipality of Anchorage projects. Most particularly this would allow for our left lane bicycle lane.

1.4 Noise Policy

This memo written April 14, 2011 outlines the Noise Policy that was submitted for approval. The Noise Policy has since been approved and updated, though the group was not able to find the design memo approving the Policy.

FIELD REPORT

State of Alaska

Department of Transportation & Public Facilities
Central Region Materials

To:	FILE Central Region Library	**Date:**	May 21, 2014
Thru:	Craig Boeckman, C.P.G. CB Regional Geologist Central Region Materials	**Telephone Number:**	907-269-6243
		Fax Number:	907-269-6201
		Project Number:	56727
From:	Anna Ferntheil Field Geotechncial Engineer Central Region Materials		

Subject: Raspberry Road Pavement Preservation

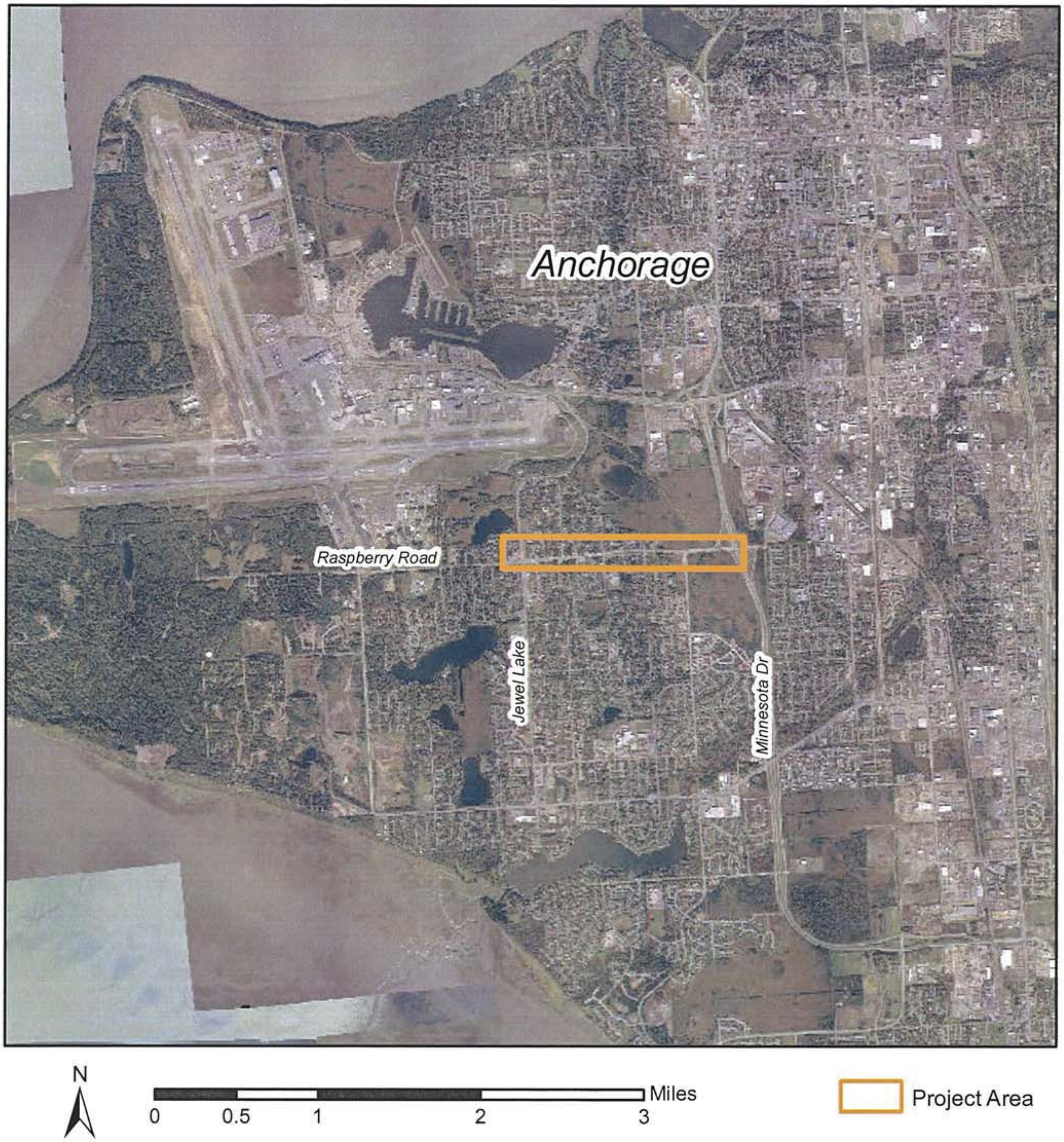
Fieldwork Date: August 2013

Scope:
Alaska Department of Transportation and Public Facilities Central Region Materials Section performed a limited geotechnical field exploration of Raspberry Road near Northwood Drive and the Minnesota Interchange in Anchorage, Alaska. Seven test holes were drilled along the shoulder of the road in support of the originally proposed lighting structures. The scope of the project has changed since the time of drilling.

Test holes contained a vegetative organic layer .5 to 1.5 feet thick. Below the organic layer, soil types varied. Sands and silts were found in all test holes, with peat layers in several. N values ranged from 0 to 50+. Ground water was observed in all holes during drilling; depths ranged from 10 to 15.5 feet bgs.

FWD data was also collected for the entirety of the project. This data is not included in this report.

Attachments: Vicinity Map
Test Hole Location Map
Test Hole Logs

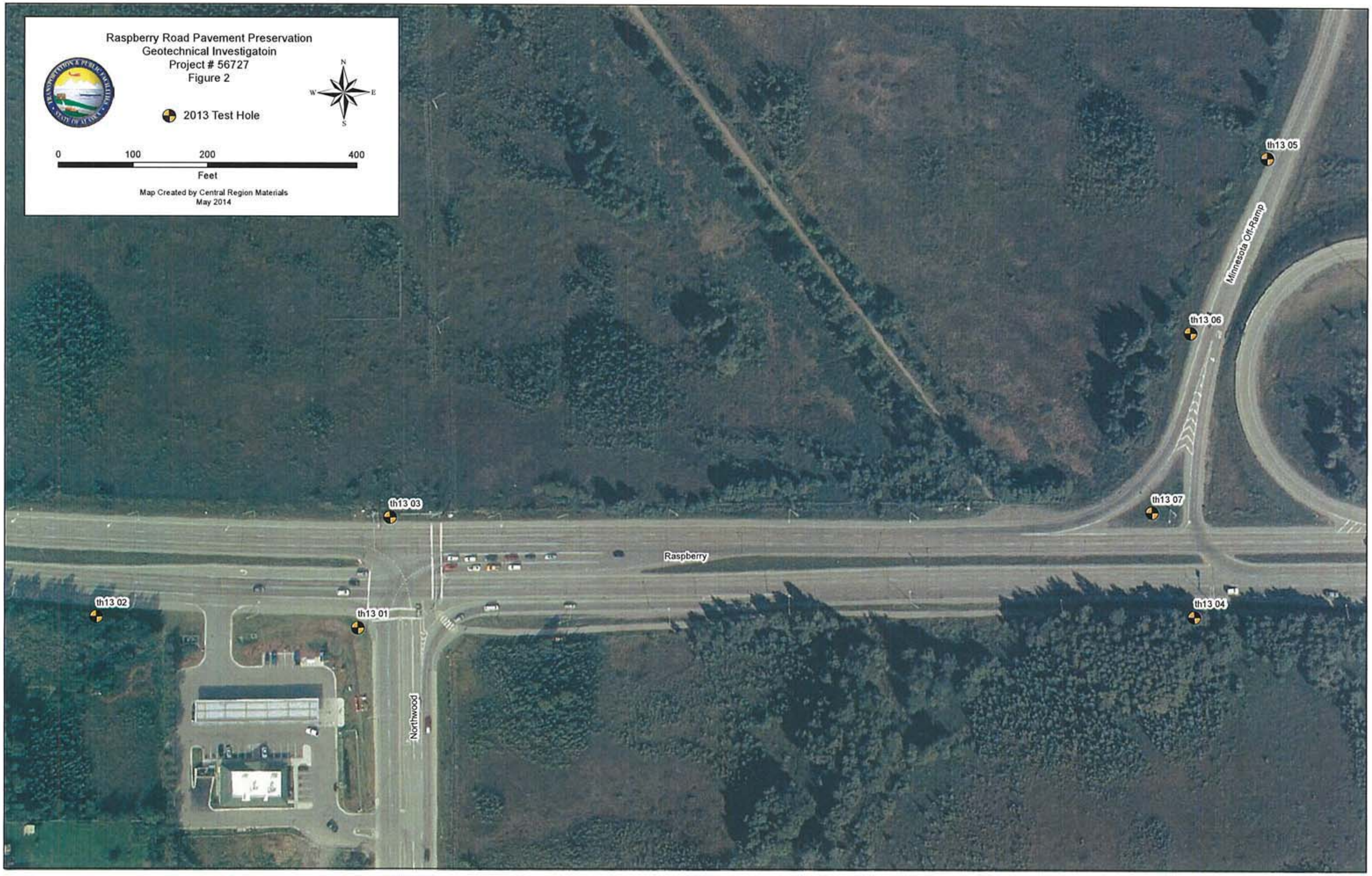


State of Alaska
Department of Transportation
and Public Facilities

Raspberry Road Pavement Preservation
Project No 56727

Vicinity Map
Figure 1

Map Created By CRM Materials May 2012


Raspberry Road Pavement Preservation
Geotechnical Investigatoin
Project # 56727
Figure 2
2013 Test Hole
N
S
E
W
0
100
200
400
Feet
Map Created by Central Region Materials
May 2014
th13 01
th13 02
th13 03
th13 04
th13 05
th13 06
th13 07
Raspberry
Northwood
Minnesota Off-Ramp

LOG OF TEST HOLE

HOLE # TH13-01

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER : *55148*
PROJECT : *West Dowling Phase 3*
Latitude : *1248838.441*, **Longitude :** *218936.891*

Station / Location: *See TH Map*
Offset: *WT estimated during drilling*
Elevation: *Northing/Easting in Alaska Albers*

Equipment_Type: *CME 75 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *[Statewide] R. Wagster + J. Young*

Total Depth: *22.0 feet*
Date: *8/23/2013 -*
Geologist: *A. Ferntheil/C. Boeckman*

Ground Water Data		
Depth in (ft.)	13.5	
Time		
Date	8/23/13	
Symbol	▼	

Weather: Sun, 60s

grass

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	SUBSURFACE MATERIAL	Depth
0						**Vegetative Mat**	0.0
0.5					SM	**SILTY SAND with Gravel** (SM) Brown Red, dry to moist, organic traces	0.5
3	SPT	FS01	2, 2, 2, 5	4		FS01 p200=17%, Sa=68%, Gr=15%, Moisture=8.2% Geotextile Fabric	3.0
4.5					SM	**SILTY SAND with Gravel** (SM) Brown, dry to moist, no organics FS02 combined with FS03 for grad, p200=14%, Sa=59%, Gr=27%, Moisture=5.3%	4.5
6	SPT	FS02	4, 4, 4, 7	8			
11	SPT	FS03	7, 10, 8, 8	18		FS03 Moisture=7%	
12.5					SW-SM	**SAND with Silt** (SW-SM) coarse grained sand, Grey, wet, some small gravel pieces	12.5
13.5 ▼							
16	SPT		2, 2, 7, 11	9			
21	SPT	FS04	6, 5, 17			FS04 Moisture=15.5%	
21.5					SW	**SAND** (SW) medium grained sand, Grey, wet	21.5
22	SPT	FS05	40			BOH 22	22.0

☒ CME Auto Hammer ☐ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

LOG OF TEST HOLE

HOLE # TH13-02

PROJECT NUMBER : *55148*
PROJECT : *West Dowling Phase 3*
Latitude : *1248765.317*, **Longitude :** *218909.2051*

Station / Location: *See TH Map*
Offset: *WT estimated during drilling*
Elevation: *Northing/Easting in Alaska Albers*

Equipment_Type: *CME 75 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *[Statewide] R. Wagster + J. Young*

Total Depth: *22.0 feet*
Date: *8/23/2013 -*
Geologist: *A. Ferntheil/C. Boeckman*

Ground Water Data		
Depth in (ft.)	15.5	
Time		
Date	8/23/13	
Symbol	▼	

Weather: Sun, 60s

grass

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	SUBSURFACE MATERIAL	Depth
0						**Vegetative Mat**	0.0
0.5					SM	**SILTY SAND with Gravel** (SM) Brown, moist	0.5
3	SPT		3, 13, 25, 16	38			
6	SPT	FS07	9, 13, 15, 20	28		FS07 combined with FS07 for grad, p200=13%, Sa=64%, Gr=23%, Moisture=5.8%	
11	SPT	FS08	5, 6, 5, 4	11		FS08 Moisture=5.5%	
13					SP	**SAND** (SP) very soft soil-no organics shown in spinup	13.0
16	SPT		1, 1, 1, 1	2		No Recovery	
18					SP-SM	**SAND with Silt and Gravel** (SP-SM) coarse grained sand, Grey, wet	18.0
21	SPT	FS09	12, 11, 8			FS09 Moisture=14.3%	
21.5					SW	**SAND** (SW) medium grained sand, Grey, wet	21.5
22	SPT	FS10	7		BOH 22	Notes: install 1 in PVC monitering well slotted 7.5-20 ft bgs	22.0

☒ CME Auto Hammer ☐ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # TH13-03

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER : *55148*
PROJECT : *West Dowling Phase 3*
Latitude : *1248691.346*, **Longitude :** *218897.1026*

Station / Location: *See TH Map*
Offset: *WT estimated during drilling*
Elevation: *Northing/Easting in Alaska Albers*

Equipment_Type: *CME 75 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *[Statewide] R. Wagster + J. Young*

Total Depth: *24.0 feet*
Date: *8/24/2013 -*
Geologist: *C. Boeckman*

Ground Water Data

Depth in (ft.)	11	
Time		
Date	8/24/13	
Symbol	▼	

Weather: fog then pt cloudy

grass

Sample Data

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Subsurface Material
0.0–2.0					SM-OL	**SILTY SAND with Organics** (SM-OL) Brown, moist
2.0–13.0					SP-SM	**SAND with Silt and Gravel** (SP-SM) Grey, moist FS11 combined with FS12 for grad, p200=9%, Sa=70%, Gr=21%, Moisture=5.1%
2.5–4.5	SPT	FS11	4, 4, 4, 5	8		
4.5–6.5	SPT	FS12	3, 4, 3, 4	7		FS12 Moisture=4.5%
9.5–11.5	SPT		3, 0, 0, 1	0		
13.0–24.0					SP	**SAND** (SP) Grey, wet, some small gravel
14.5–16.5	SPT	FS13	12, 13, 12, 16	25		FS13 p200=4%, Sa=90%, Gr=6%, Moisture=20%
19.0–21.0	SPT	FS14	3, 8, 14, 23	22		

BOH 24

Notes:
install 1 in PVC monitering well slotted 7.5-20 ft bgs

☒ CME Auto Hammer ☐ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # TH13-04

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER : *55148*
PROJECT : *West Dowling Phase 3*
Latitude : *1248674.377,* ***Longitude :*** *218587.5866*

Station / Location: *See TH Map*
Offset: *WT estimated during drilling*
Elevation: *Northing/Easting in Alaska Albers*

Equipment_Type: *CME 75 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *[Statewide] R. Wagster + J. Young*

Total Depth: *21.0 feet*
Date: *8/24/2013 -*
Geologist: *C. Boeckman*

Ground Water Data

Depth in (ft.)	10	
Time		
Date	8/24/13	
Symbol	▼	

Weather: pt. cloudy

grass

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Subsurface Material
0.0					SM	**SILTY SAND with Organics** (SM)
1.5					PT	**Peat** (PT) Brown, moist
3–4.5	SPT	FS15	3, 2, 2, 2	4		FS15 combined with FS16 for organic, Moisture=201.7%, Org=60.2%
4.5–6.5	SPT	FS16	0, 1, 1, 1	2		FS16 Moisture=293.6%
9–11 (▼ 10)	SPT	FS17	0, 0, 1, 6	1		FS17 Moisture=163.6%
11.0					SP-SM	**SAND with Silt** (SP-SM) Brown, wet
12.5					ML	**SANDY SILT** (ML) Gray Brown, wet, thin layers of sand
15–17	SPT	FS18	12, 12, 13, 14	25		FS18 p200=56%, Sa=44%, Gr=0%, Moisture=19.7%
17.5					SP-SM	**SAND with Silt** (SP-SM) wet, slightly organic
19–21	SPT	FS19	0, 4, 10, 17	14		
21.0					BOH 21	

Notes:
install 1 in PVC monitering well slotted 7.5-20 ft bgs

☒ CME Auto Hammer ☐ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # TH13-05

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER : *55148*
PROJECT : *West Dowling Phase 3*
Latitude : *1248628.151,* ***Longitude :*** *218470.2746*

Station / Location: *See TH Map*
Offset: *WT estimated during drilling*
Elevation: *Northing/Easting in Alaska Albers*

Equipment_Type: *CME 75 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *[Statewide] R. Wagster + J. Young*

Total Depth: *22.0 feet*
Date: *8/26/2013 -*
Geologist: *A. Ferntheil*

Ground Water Data		
Depth in (ft.)	10	
Time		
Date	8/26/13	
Symbol	▼	

Weather: sun, 60s

grass

SUBSURFACE MATERIAL

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	Subsurface Material	Depth
0.0–1.5					OL	**ORGANIC SILT** (OL)	0.0
1.5–9.5					SP-SM	**SAND with Silt** (SP-SM) Brown, moist	1.5
2.5–4	SPT	FS20	4, 6, 8, 9	14		FS20 combined with FS21 for grad, p200=11%, Sa=84%, Gr=5%, Moisture=10.5%	
5–6.5	SPT	FS21	4, 4, 4, 5	8		FS21 Moisture=18.3%	
9.5–13.5					PTf	**Peat (fibric)** (PTf) Brown, moist	9.5
10–11.5	SPT	FS22	0, 1, 1, 2	2		FS22 Moisture=280.2%	
13.5–22.0					SP-SM	**SAND with Silt** (SP-SM) coarse grained sand, Gray, wet	13.5
15–16.5	SPT	FS23	5, 14, 11, 17	25		FS23 Moisture=18.5%	
20–21.5	SPT	FS24	5, 10, 15, 30	25			
22					BOH 22	Notes: install 1 in PVC monitering well slotted 7.5-20 ft bgs	22.0

☒ CME Auto Hammer ☐ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # TH13-06

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER : *55148*
PROJECT : *West Dowling Phase 3*
Latitude : *1248628.627*, ***Longitude :*** *218576.7085*

Station / Location: *See TH Map*
Offset: *WT estimated during drilling*
Elevation: *Northing/Easting in Alaska Albers*

Equipment_Type: *CME 75 Truck*
Drilling Method: *Hollow-Stem Auger*
Field Crew: *[Statewide] R. Wagster + J. Young*

Total Depth: *22.0 feet*
Date: *8/23/2013 -*
Geologist: *A. Ferntheil*

Ground Water Data

Depth in (ft.)	10	
Time		
Date	8/26/13	
Symbol	▼	

Weather: sun, 60s

grass

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	SUBSURFACE MATERIAL	Depth
0–1.5					OL	**ORGANIC SILT** (OL)	0.0
1.5–4.5	SPT	FS25	4, 7, 12, 12	19	SP-SM	**SAND with Silt and Gravel** (SP-SM) Black, moist FS25 p200=9%, Sa=62%, Gr=29%, Moisture=5%	1.5
4.5–13.5	SPT	FS26	5, 6, 6, 6	12	SP-SM	**SAND with Silt** (SP-SM) Black, moist FS26 combined with FS27 for grad, p200=9%, Sa=90%, Gr=1%, Moisture=6.8%	4.5
	SPT	FS27	1, 1, 2, 3	3		FS27 Moisture=19.1%	
13.5–18.0	SPT	FS28	4, 8, 12, 19	20	SP	**SAND** (SP) Gray, moist to wet	13.5
18.0–22.0	SPT	FS29	8, 17, 23, 38	40	SW	**SAND with Gravel** (SW) Gray, wet	18.0
22					BOH 22	Notes: install 1 in PVC monitering well slotted 7.5-20 ft bgs	22.0

☒ CME Auto Hammer ☐ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

LOG OF TEST HOLE

HOLE # TH13-07

STATE OF ALASKA DOT&PF
Central Region Materials
Geology Section

PROJECT NUMBER : 55148
PROJECT : West Dowling Phase 3
Latitude : 1248649.395, **Longitude :** 218916.481

Station / Location: See TH Map
Offset: WT estimated during drilling
Elevation: Northing/Easting in Alaska Albers

Equipment_Type: CME 75 Truck
Drilling Method: Hollow-Stem Auger
Field Crew: [Statewide] R. Wagster + J. Young

Total Depth: 22.0 feet
Date: 8/26/2013 -
Geologist: A. Ferntheil

Ground Water Data

Depth in (ft.)	10	
Time		
Date	8/26/13	
Symbol	▼	

Weather: sun, 60s

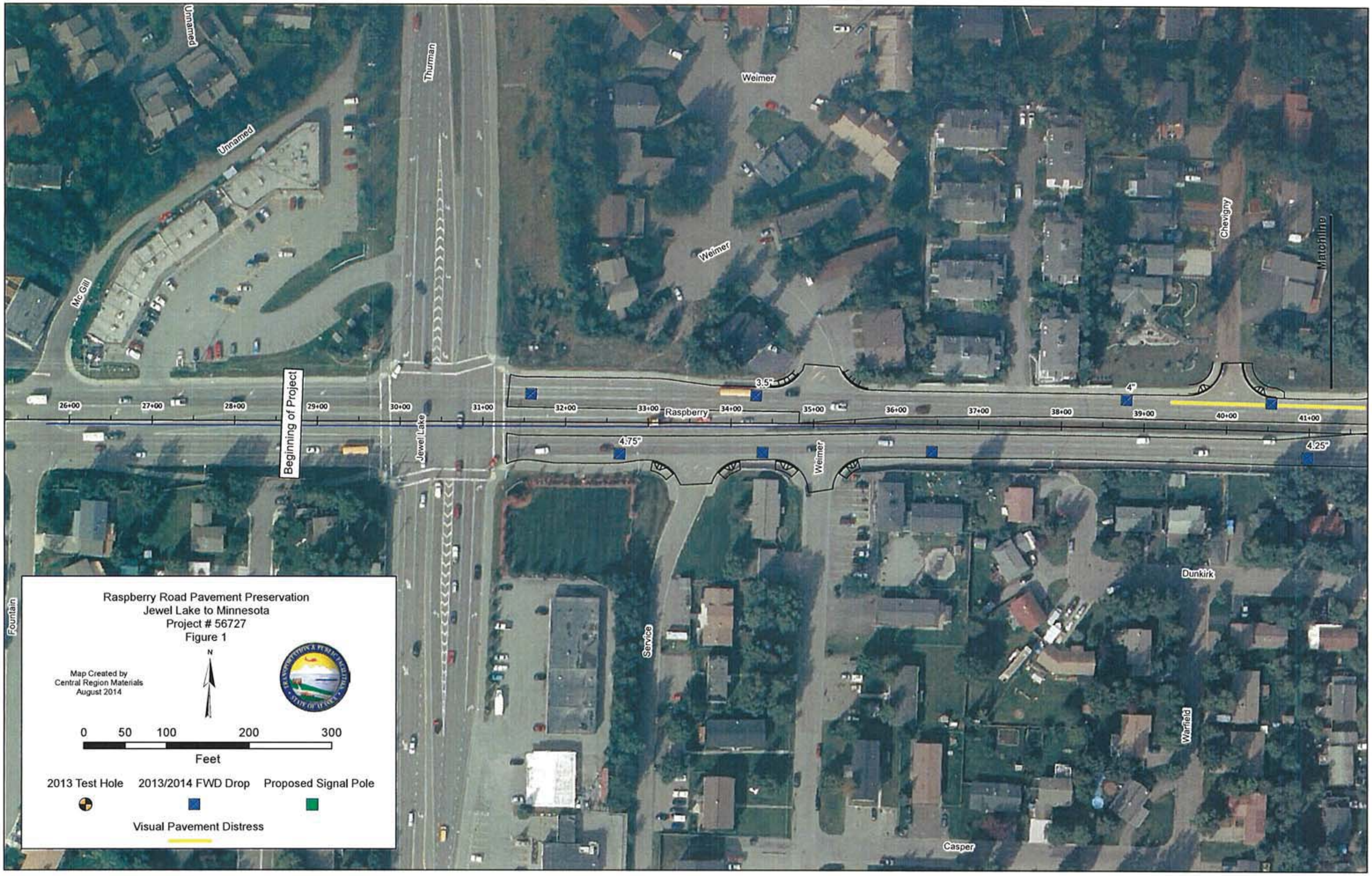
grass

Depth (Feet)	Sample Type	Number	Blow Count	N-Value	USCS Classification	SUBSURFACE MATERIAL	Depth
0						**Vegetative Mat**	0.0
1					SW-SM	**SAND with Silt and Gravel** (SW-SM) Brown, moist to wet	1.0
3–4	SPT	FS30	16, 24, 30, 23	54		FS30 combined with FS31 for grad, p200=7%, Sa=50%, Gr=43%, Moisture=3.3%	
5–7	SPT	FS31	5, 14, 17, 13	31		FS31 Moisture=4.1%	
10–12	SPT	FS32	2, 2, 2, 3	4		FS32 p200=6%, Sa=55%, Gr=39%, Moisture=12%	
13					SP	**SAND** (SP) coarse grained sand, Gray, wet	13.0
15–17	SPT	FS33	6, 15, 27, 42	42		FS33 Moisture=15.4%	
17					SP	**SAND with Gravel** (SP) coarse grained sand, Gray, wet	17.0
20–22	SPT	FS34	9, 21, 26, 14	47			
22						BOH 22	22.0

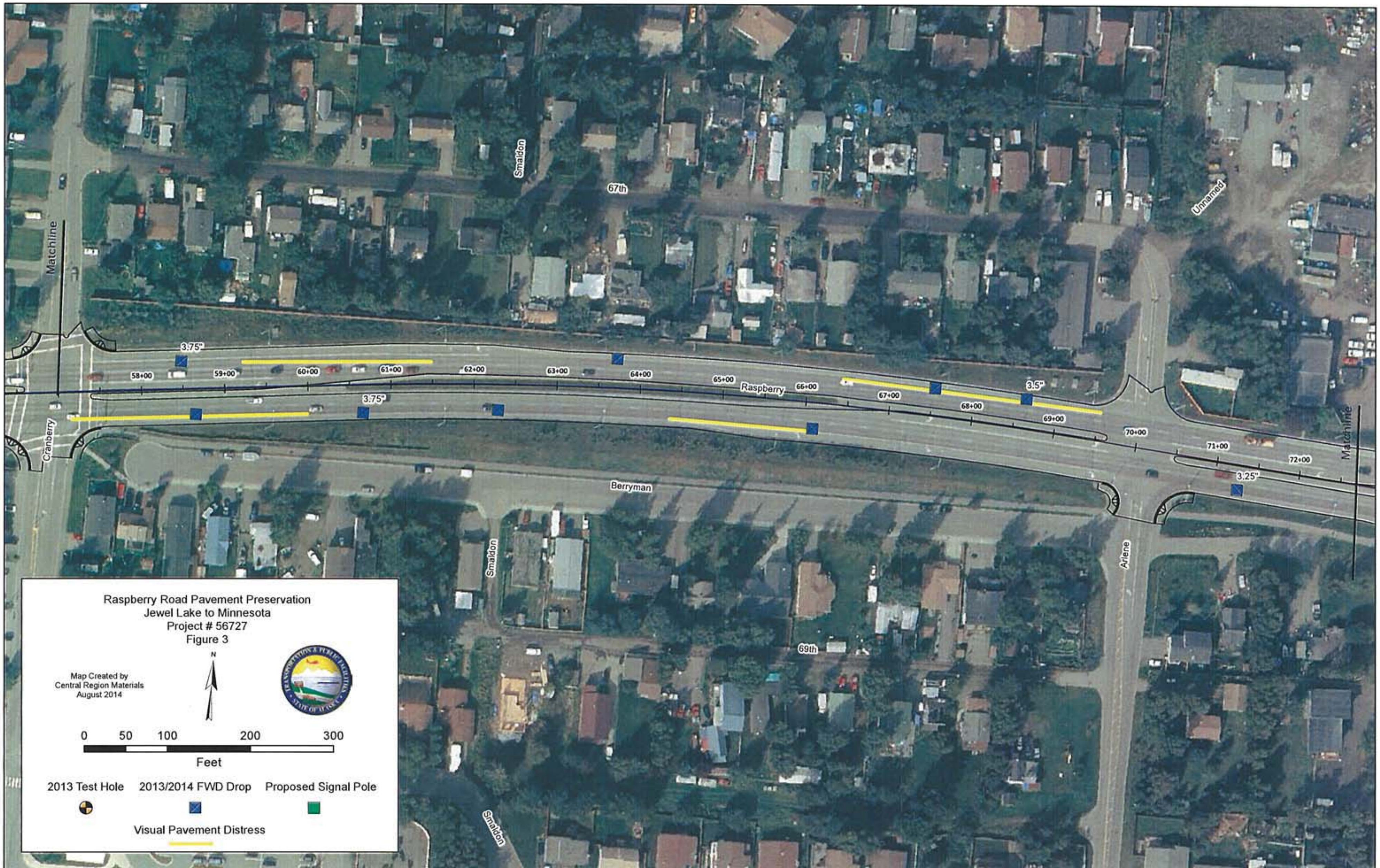
Notes:
install 1 in PVC monitering well slotted 7.5-20 ft bgs

☒ CME Auto Hammer ☐ Cathead Rope Method ☒ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

EXISTING ASPHALT DEPTHS & PAVEMENT DISTRESSES


Raspberry Road Pavement Preservation
Jewel Lake to Minnesota
Project # 56727
Figure 1
Map Created by
Central Region Materials
August 2014
N
0 50 100 200 300
Feet
2013 Test Hole
2013/2014 FWD Drop
Proposed Signal Pole
Visual Pavement Distress
Beginning of Project
Matchline
Raspberry
Jewel Lake
Thurman
Weimer
Chevigny
Dunkirk
Warfield
Casper
Service
Mc Gill
Unnamed
Fountain
3.5"
4"
4.75"
4.25"
26+00
27+00
28+00
29+00
30+00
31+00
32+00
33+00
34+00
35+00
36+00
37+00
38+00
39+00
40+00
41+00

Raspberry Road Pavement Preservation
Jewel Lake to Minnesota
Project # 56727
Figure 2
Map Created by
Central Region Materials
August 2014
N
0
50
100
200
300
Feet
2013 Test Hole
2013/2014 FWD Drop
Proposed Signal Pole
Visual Pavement Distress
Matchline
Blackberry
Imlach
Linden
Holly
67th
Matchline
Raspberry
Cranberry
Colonial
69th
3.75"
4"
4.25"
41+00
42+00
43+00
44+00
45+00
46+00
47+00
48+00
49+00
50+00
51+00
52+00
53+00
54+00
55+00
56+00


Raspberry Road Pavement Preservation
Jewel Lake to Minnesota
Project # 56727
Figure 3
Map Created by
Central Region Materials
August 2014
N
0
50
100
200
300
Feet
2013 Test Hole
2013/2014 FWD Drop
Proposed Signal Pole
Visual Pavement Distress
Matchline
Cranberry
Raspberry
Berryman
Smaldon
67th
69th
Arlene
Unnamed
3.75"
3.5"
3.25"
58+00
59+00
60+00
61+00
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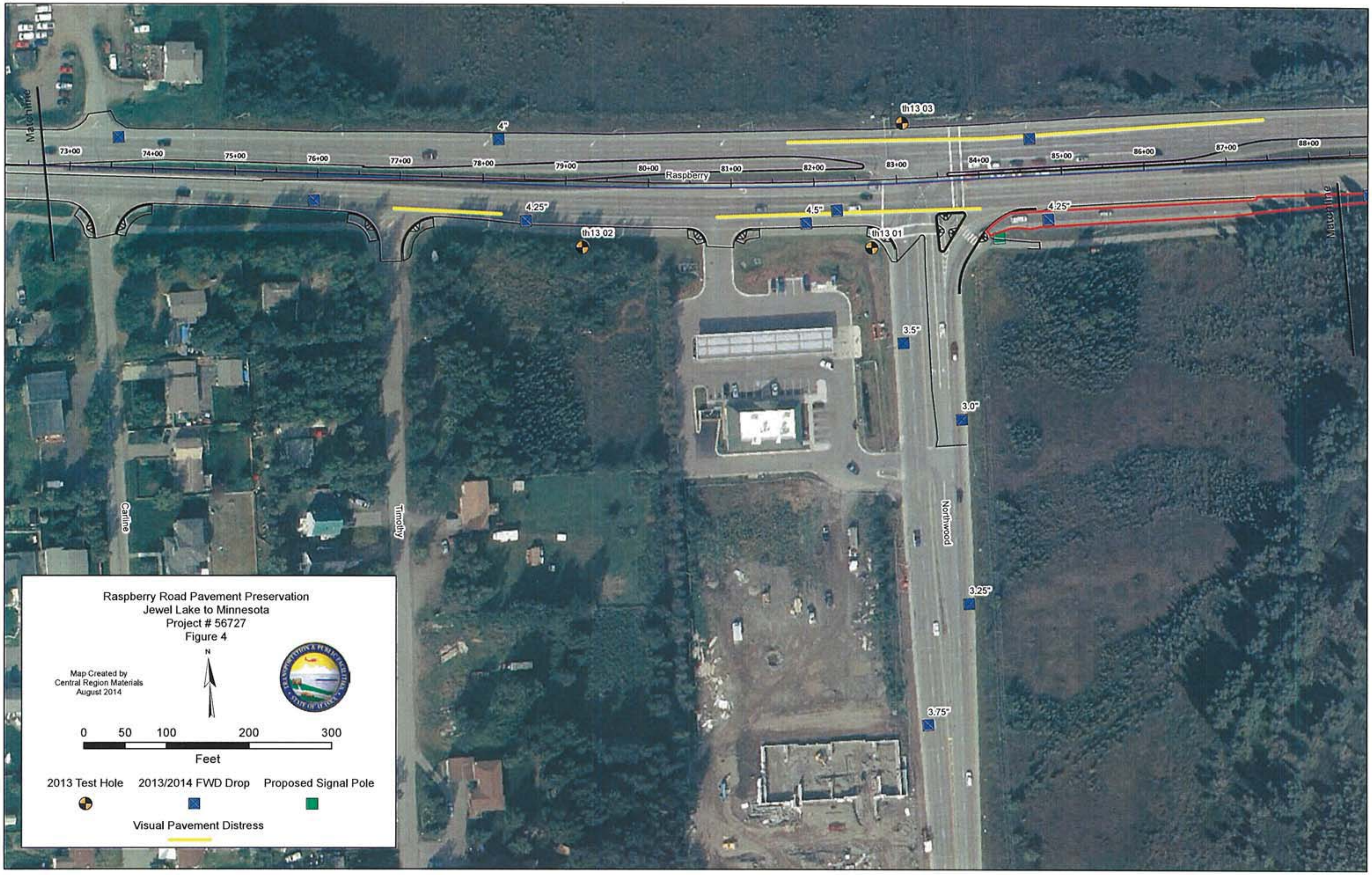
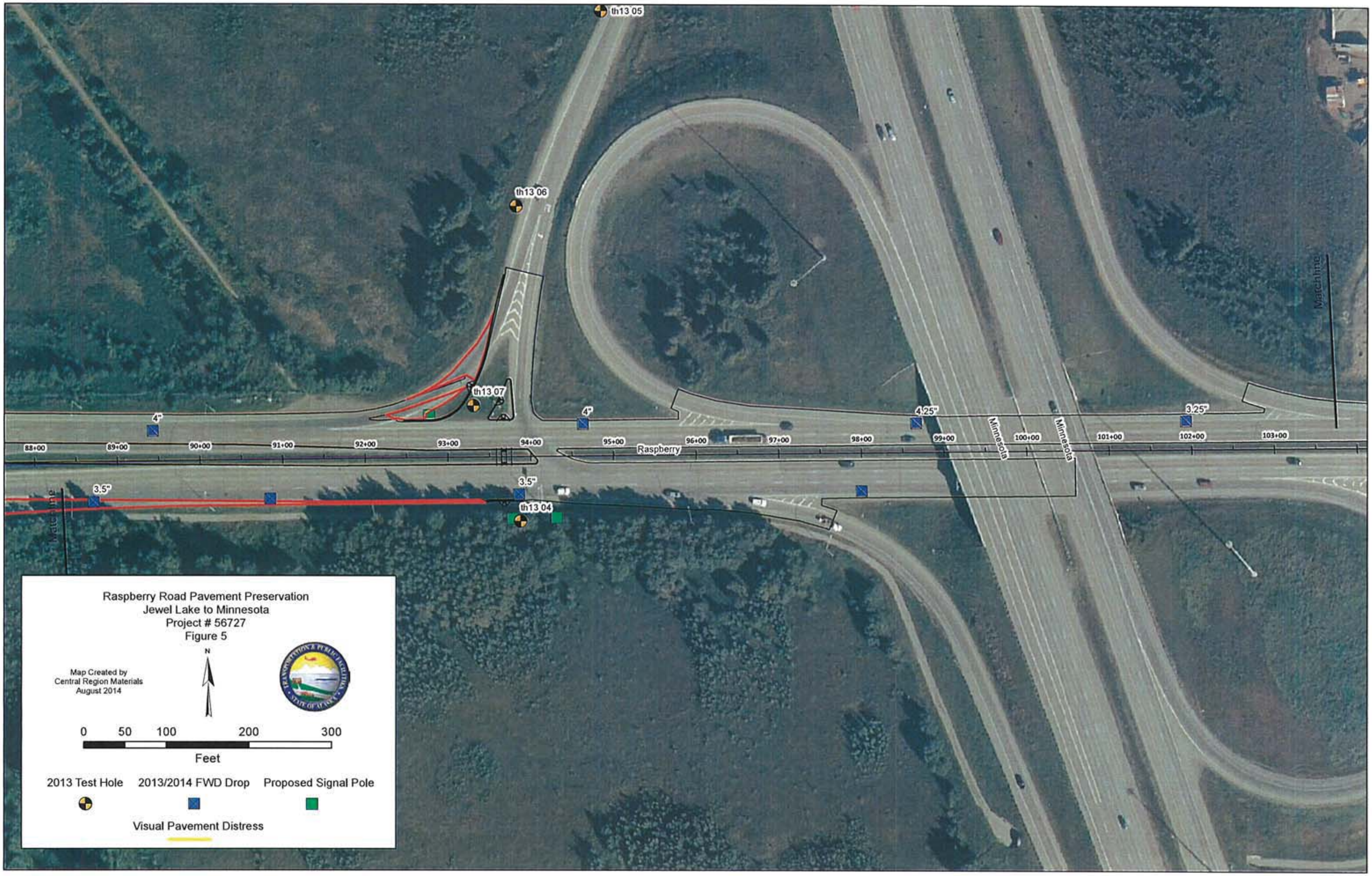
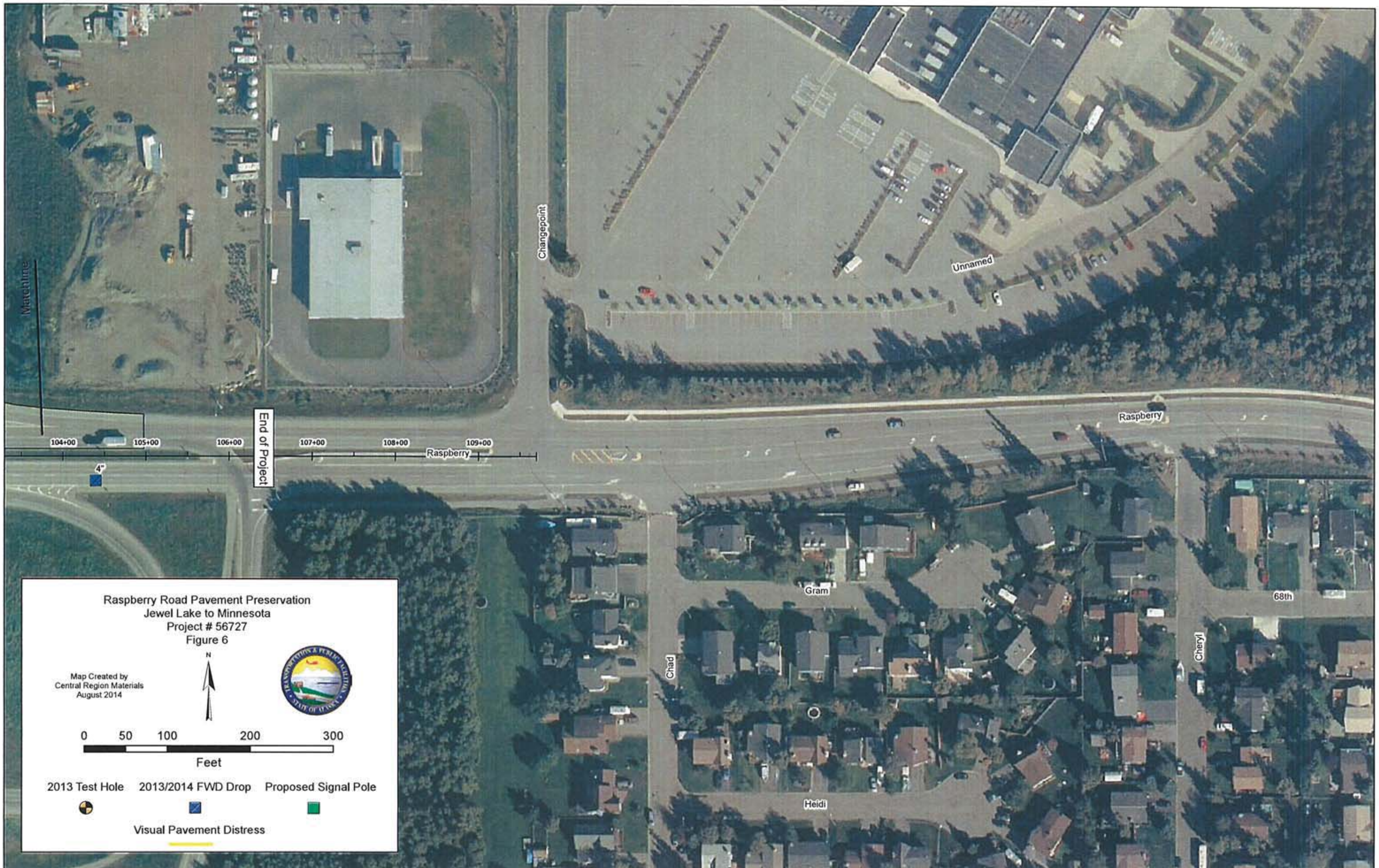
69+00
70+00
71+00
72+00


Raspberry Road Pavement Preservation
Jewel Lake to Minnesota
Project # 56727
Figure 4
Map Created by
Central Region Materials
August 2014
N
0 50 100 200 300
Feet
2013 Test Hole
2013/2014 FWD Drop
Proposed Signal Pole
Visual Pavement Distress
Matchline
73+00
74+00
75+00
76+00
77+00
78+00
79+00
80+00
81+00
82+00
83+00
84+00
85+00
86+00
87+00
88+00
Raspberry
4"
4.25"
4.5"
3.5"
3.0"
3.25"
3.75"
th13 01
th13 02
th13 03
Northwood
Timothy
Carline



Raspberry Road Pavement Preservation
Jewel Lake to Minnesota
Project # 56727
Figure 5
Map Created by
Central Region Materials
August 2014
N
0 50 100 200 300
Feet
2013 Test Hole
2013/2014 FWD Drop
Proposed Signal Pole
Visual Pavement Distress
th13 05
th13 06
th13 07
th13 04
4"
4"
4.25"
3.25"
3.5"
3.5"
88+00
89+00
90+00
91+00
92+00
93+00
94+00
95+00
96+00
97+00
98+00
99+00
100+00
101+00
102+00
103+00
Raspberry
Minnesota
Minnesota
Matchline
Matchline



Matchline
104+00
105+00
106+00
107+00
108+00
109+00
Raspberry
End of Project
4"
Changepoint
Unnamed
Raspberry
Gram
Chad
Heidi
Cheryl
68th
Raspberry Road Pavement Preservation
Jewel Lake to Minnesota
Project # 56727
Figure 6
Map Created by
Central Region Materials
August 2014
N
0
50
100
200
300
Feet
2013 Test Hole
2013/2014 FWD Drop
Proposed Signal Pole
Visual Pavement Distress

Anchorage Metropolitan Area Transportation Solutions

Municipality of Anchorage
Community Development Department
Transportation Planning Section
Permit & Development Center, 4700 Elmore Road
P.O. Box 196650, Anchorage, AK 99519-6650
Voice(907)343-7996, facsimile (907)343-7998
Email: lyonch@muni.org

MEMO

To: AMATS Technical Advisory Committee
From: AMATS Bicycle and Pedestrian Advisory Committee
Date: February 12, 2015
Subject: NACTO Urban Bikeway Design Guide

This memo seeks to recommend to the AMATS Policy Committee that the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide be integrated into AMATS road project design to serve as an additional tool when designing urban streets within the AMATS area. Currently for both Municipality of Anchorage and ADOT&PF owned roadways, the design of bikeway projects only utilize AASHTO and MUTCD guidelines, which are not as well suited for urban streets as those represented in the NACTO guide. The AMATS Bicycle and Pedestrian Advisory Committee seek the concurrence of the AMATS Technical Advisory Committee in recommending this new policy to the AMATS Policy Committee. The BPAC also makes an additional recommendation that AMATS encourage the Municipality to ask that ADOT&PF utilize the NACTO Guide when considering options for bicycle infrastructure in ADOT&PF projects.

FHWA Support of NACTO Urban Bikeway Design Guide:
The NACTO Urban Bikeway Design Guide was developed by city transportation officials for cities, since unique urban streets require innovative solutions. Most of these treatments included in the NACTO guide are not directly referenced in the current version of the AASHTO Guide to Bikeway Facilities, although they are virtually all (with two exceptions) permitted under the Manual on Uniform Traffic Control Devices (MUTCD). The Federal Highway Administration (FHWA) has posted information regarding MUTCD approval status of many of the bicycle related treatments in the guide and in August 2013 issued a memorandum (ATTACHMENT A) officially supporting use of the document. The FHWA memo stated that it **"encourages agencies to appropriately use [all three of] these guides and other resources to help fulfill the aims of the 2010 U.S. DOT Policy Statement** (ATTACHMENT B) **on Bicycle and Pedestrian Accommodation Regulations and Recommendations."** That policy in turn states that DOT **"encourages transportation agencies to go beyond minimum requirements, and proactively provide convenient, safe, and context-sensitive facilities that foster increased use by bicyclists and pedestrians of all ages and abilities, and utilize universal design characteristics when appropriate."**

Current Bicycle and Pedestrian Infrastructure Design Guidelines:
The Municipality of Anchorage (MOA), AMATS and ADOT&PF seek to improve safety for transportation mode users to the greatest extent possible. Currently, these two entities rely on

AASHTO guidelines when designing infrastructure for bicycle and pedestrian improvement projects. Consequently, options found in the NACTO Urban Bikeway Design Guide are not considered by ADOT&PF when evaluating bicycle infrastructure for ADOT&PF projects within the Municipality. Disregarding the NACTO Urban Bikeway Design Guidelines often leads to installing infrastructure that is not compatible with urban environments.

Recent ADOT&PF Statements Regarding Bicycle and Pedestrian Infrastructure Design:
In October 2014, the State of Alaska Department of Transportation and Public Facilities issued a meeting log to address "concurrence on best available practices which improve safety within maintenance capabilities at this time." The meeting log noted that it applied to "active DOT/PF projects including Raspberry Road repaving, O'Malley Road Reconstruction and the AMATS Bicycle Plan Implementation Projects (DOT Managed)."

Scott Thomas, Central Region Traffic Engineer presented the meeting log to the AMATS Bicycle and Pedestrian Advisory Committee (BPAC) on November 18, 2014. The meeting log identifies two design guides that ADOT&PF will refer to for evaluation of best available practices. Specifically, ADOT&PF identifies the 2012 AASHTO Guide for the Development of Bicycle Facilities and the 2014 Institute of Transportation Engineers Design Guidelines to Accommodate Pedestrians and Bicycles at Interchanges. The greatest concern to the BPAC is that the meeting log fails to recognize the 2012 National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide. ADOT&PF's decision to not consider the options identified in the NACTO Guide will result in options being left off the table that would help ADOT&PF meet its goal of using the "best available practices" to make our roadways safer for all users.

** Among other best available practices, painting bike lanes is an important element to make intersections safer for all users. Painted bike lanes are supported by the FHWA. (SEE ATTACHMENT C)

Use of NACTO Urban Bikeway Design Guide in Other Cities:
NACTO Urban Bikeway Design Guide treatments are being implemented successfully in many cities in the U.S. and internationally. To create the Guide, the authors conducted an extensive worldwide literature search from design guidelines and real-life experience. They worked closely with a panel of urban bikeway planning professionals from NACTO member cities, as well as traffic engineers, planners, and academics with deep experience in urban bikeway applications. The result is a document that highlights the best options cities have found to date to deal with common problems.

The treatments described in the NACTO Urban Bikeway Design Guide include **bike lanes**, **cycle tracks, intersection design**, **signal design**, **bicycle boulevards** and a section on **signing and marking**. For each of these treatments, there are the following sub-sections:

- Benefits
- Typical Applications
- Required Features
- Recommended Features

- Optional Features
- Multiple 3D model illustrations of the treatment
- Maintenance guidelines, treatment adoption and a map showing where in the United States this treatment is being implemented successfully.

The guide also includes instruction on the best methods for implementing colored pavement materials such as paint, durable liquid pavement markings and thermoplastics. In addition, embedded materials are also discussed which include colored asphalt, spot treatments and corridor treatments. The cities that are listed as successfully implementing these NACTO treatments are below. **Please note that the underlined cities exhibit cold weather climates where snow and ice are a factor in maintenance.**

Albuquerque, NM
Alexandria, VA
Ann Arbor, MI
Arlington, VA
Atlanta, GA
Austin, TX
Baltimore MD
Bellevue, WA
Bend, OR
Berkeley, CA
Billings, MT
Bloomington, IN
Boise, ID
Boulder, CO
Boston, MA
Brookline, MA
Cambridge, MA
Cape Coral, FL
Chicago, IL
Colorado Springs, CO
Columbus, OH
Columbia, MO
Davis, CA
Decatur, GA
Denton, TX
Denver, CO
Emeryville, CA
Eugene, OR
Fort Collins, CO
Indianapolis, IN
Kona, HI
Las Cruces, NM
Long Beach, CA
Los Angeles, CA
Madison, WI
Marin County, CA
Memphis, TN
Miami-Dade, FL
Milipitas, CA
Minneapolis, MN
Missoula, MT
Nampa, ID
Naples, FL
New Orleans, LA
New York, NY
Oakland, CA
Ocean City, NJ
Olympia, WA
Palo Alto, CA
Pasadena, CA
Pasadena, CA
Philadelphia, PA
Phoenix, AZ
Portland, OR
Provo, UT
Rapid City, SD
Roswell, GA
Roswell, NM
Sacramento, CA
Salt Lake City, UT
San Francisco, CA
San Luis Obispo, CA
San Juan Capistrano, CA
Santa Clara Valley, CA
Seattle, WA
St. Petersburg, FL
Syracuse, NY
Tacoma, WA
Teton County, ID
Tucson, AZ
Washington, DC
West Bloomfield Township, MI
Wilmington, NC

In summary, the AMATS BPAC seeks the concurrence of the AMATS Technical Advisory Committee in recommending that the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide be integrated into AMATS road project design to serve as an additional tool when designing urban streets within the AMATS area. The BPAC also makes an additional recommendation that AMATS encourage the Municipality to ask that ADOT&PF utilize the NACTO Guide when considering options for bicycle infrastructure in ADOT&PF projects.

STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

STATEWIDE DESIGN & ENGINEERING SERVICES DIVISION

SEAN PARNELL, GOVERNOR

3132 CHANNEL DRIVE
P.O. Box 112500
JUNEAU, ALASKA 99811-2500
PHONE: (907) 465-6958
FAX: (907) 465-2460

April 14, 2011

Mr. David Miller
Division Administrator
Federal Highway Administration
Alaska Division
709 West 9th Street, Rm 851
P.O. Box 21648
Juneau, AK 99802

Reference: DOT&PF Noise Policy

Dear Mr. Miller:

The Alaska Department of Transportation and Public Facilities (ADOT&PF) hereby submits a copy of the DOT&PF Noise Policy dated April 2001 for review and approval by the Federal Highway Administration Alaska Division. We would like to thank your staff and Mark Ferroni of your Washington D.C. office for your review and comments on previous drafts. These comments have been incorporated into this version of the document. This policy is in response to changes in 23 CFR 772. It is our intent that this noise policy will go into effect upon your approval of this policy.

Your approval of the attached noise policy is hereby requested. If you have any questions or wish to discuss this further do not hesitate to contact Ben White of my office.

Approved: ______________________________
(David Miller, Division Administrator, FHWA Alaska Division)

Sincerely,

Roger Healy
Chief Engineer, P.E.

Enclosure: DOT&PF Noise Policy (April 2011)

<table>
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DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES
Policy and Procedure</td><td>POLICY AND PROCEDURE NUMBER
05.05.030</td><td>PAGE
1 of 8</td></tr>
<tr><td colspan="2"></td><td colspan="2">EFFECTIVE DATE
April 20, 2000</td></tr>
<tr><td colspan="2">SUBJECT
Beautification of the Highway Right of Way</td><td>SUPERSEDES</td><td>DATED</td></tr>
<tr><td>TITLE
Design and Construction</td><td>CHAPTER
Highways</td><td colspan="2">APPROVED BY</td></tr>
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PURPOSE

The purpose of this policy is to provide guidance in administering the provisions of 17 AAC 10.011(e), which states:

> After the completion of construction of a highway, the department will, in its discretion, issue at no cost a beautification permit to a government agency, a municipality, an individual, or a non-profit organization to allow planting of trees, shrubs, grasses, or flowers within the highway right-of-way. A beautification permit will be issued on a form that the department prescribes. The department will, in its discretion, attach to a beautification permit any condition that is necessary to protect the integrity and safety of a highway's design, and to protect the traveling public or the persons planting trees, shrubs, grasses, and flowers within the highway right-of-way. The department will, in its discretion, remove trees, shrubs, grasses, or flowers planted in a highway right-of-way under a beautification permit that become a hazard to the traveling public, interfere with a highway's maintenance or operation, interfere with construction on a highway, or threaten to damage a highway embankment.

POLICY

Roadsides are an important component of highway design, operation and maintenance. Well-designed and maintained roadsides are safe, easy to maintain, and aesthetically pleasing. It is the policy of the Department of Transportation and Public Facilities (Department) to assist applicants who wish to beautify certain roadsides within state highway rights-of-way in accordance with the provisions of 17 AAC 10.011(e).

Applicants must obtain a beautification permit from the Statewide Design and Engineering Services Division's (D&ES) Right of Way permits section in order to conduct any beautification work (see addresses below for application information).

PROCEDURE

A. Department Contacts

Regional offices of the D&ES Right of Way permits sections are responsible for coordinating review of beautification permit applications and issuing the permits.

The Alaska Scenic Byways program in the Division of Statewide Planning will provide technical assistance for grant applications, plant materials, and program promotion.

B. Funding

Other than issuing a permit at no charge, the Department will not provide funds to support a beautification permit, except if obtained through a grant for the purpose of purchasing plant materials (which may be made available at the discretion of the Director of the Division of Statewide Planning). Applicants are encouraged to seek federal enhancement funds for landscape projects (for more information, contact the Alaska Scenic Byways coordinator).

C. Process

Interested applicants should send a beautification permit application to the Department office nearest the proposed beautification site (addresses below). Applications are also available on the Department's website (see address below).

D. Application Review

A D&ES Right of Way permits section representative will coordinate the application review and issue the permit. As appropriate, planning, design, traffic/safety, right of way, utilities, construction and maintenance staff will review and comment on applications. The review will ensure that an area will be safe and properly designed and maintained, so that the roadside complements the operational function of the roadway. We will consider traffic volumes, speed, highway geometrics, and maintenance concerns in selecting appropriate permit sites. The Department has the discretion to determine whether or not to issue a permit based on these and other factors.

Regional Right of Way permits section representatives will forward a copy of each permit application to the Scenic Byways Coordinator, Statewide Planning, with the disposition of the application noted.

E. Program Guidelines

General

Beautification must complement and enhance safe highway travel. Wide hazard-free areas must be maintained within the right-of-way. Sight distances must be unobstructed. Changes to roadsides may not introduce slopes that are steeper than existing slopes and no abrupt slope changes may be introduced. Beautification may be permitted in the median.

Items installed under a beautification permit shall not restrict stopping and passing sight distance to less than the requirements given in the 1994 *A Policy on Geometric Design of Highways and Streets*, by the American Association of State Highway and Transportation Officials**.** Intersection sight distance shall not be restricted to less than the "desirable" values given in the Driveway Standards section of the Alaska DOT&PF *Preconstruction Manual*. Plants must be installed and maintained so that they do not obstruct traffic signs.

Permanent irrigation systems are not permitted.

If workers, vehicles, or materials will be on the shoulder or within 15 feet (4.6 meters) of the edge of pavement during initial planting or on-going maintenance, the applicant must contact the Regional Traffic Engineer to determine whether a Traffic Control Plan is needed and, if so, what it should consist of. Traffic obstructions must be minimized, and no work may be conducted on the road itself. The applicant is responsible for preparing a Traffic Control Plan if one is required.

The Department will furnish the permittee safety vests for use during planting and maintenance if the vests are available and the permittee has arranged for their use in advance. Advance warning signs may be provided if the permittee is trained in their use.

Trees and Shrubs and Other Fixed Hazards

Trees and shrubs and other fixed hazards (collectively referred to as "fixed hazards") are not allowed on controlled access facilities. Trees with trunk diameters at maturity of less than 4 inches (10 centimeters) are not considered fixed hazards. Fixed hazards must be offset from the road by at least the distance shown in the following table. Sight distance considerations will require greater clearances in some cases.

Clearance Requirements for Fixed Hazards		
Posted Speed Limit (mph)	*Curb*	*No Curb*
	Minimum Offset from face of curb (feet)/(m)	Minimum Offset from shoulder stripe (feet)/(m)
20	10/3	16/5
25	10/3	16/5
30	10/3	20/6
35	10/3	26/8
40	10/3	30/9
45	N/A	36/11
50	N/A	43/13
55	N/A	49/15
60	N/A	59/18
65	N/A	69/21

Fixed hazards may be placed closer than specified in the above table only where they are located behind:

1. a non-traversable ditch (see Chapter 1130 of the ADOT&PF PreConstruction Manual) at least 2 feet deep,
2. a 3:1 or steeper cut slope at least 4 feet high, or
3. a guardrail.

Where these conditions are met, fixed hazards may be installed no closer than 10 feet (3 meters) to the top of the cut slope or back of guardrail.

Ditches, slopes, guardrail, or curb and gutter may not be installed for the purpose of reducing the required clearance for fixed hazards.

No trees are allowed close enough to the road to allow root systems to undermine or damage any roadway structure, such as curb, sidewalk, or drainage components, at any time during the tree's life. A biological or physical root barrier system may be considered in extenuating circumstances.

Applicants should not use trees that may cause future operational or maintenance problems, such as:

1. Trees or shrubs that attract wildlife near the roadway, especially plants that attract moose.
2. Trees or shrubs with brittle or weak branches or trees that drop materials such as fruit, sap, or fluff.
3. Trees with forms that are unsuitable for street-planting situations.

For a list of recommended native trees and shrubs to plant along Alaska highways, contact:

Alaska Plant Materials Center, Alaska Department of Natural Resources, Division of Agriculture, HC04 Box 7440, Palmer, AK 99645 (907) 745-4469

Alaska Urban and Community Forestry Council, State of Alaska Department of Natural Resources, Division of Forestry, 550 West 7th Avenue, Suite 1450, Anchorage, AK 99501 Phone (907) 269-8465 Fax 907-269-8921 Contact: Patricia Joyner

Alaska Cooperative Extension Service, University of Alaska-Fairbanks (see resources at end)

Grasses

Any use of grass should blend with existing roadside character, and require little or no maintenance. Native grass seed is preferred. Consideration should be given to grass height and its effect on sight distance. Applicants may not use grasses that may cause future operational or maintenance problems by attracting wildlife near the roadway. For grass seed suggestions and a list of Alaska retailers, contact:

Alaska Plant Materials Center, Alaska Department of Natural Resources, Division of Agriculture, HC04 Box 7440, Palmer, AK 99645 (907) 745-4469

Directory of Alaska Native Plant Sources, Second Edition, Alaska Plant Materials Center -- January, 2000.

Alaska Cooperative Extension Service, University of Alaska-Fairbanks (see resources at end)

Flowers

Native forbs (wildflowers) are recommended in landscape designs. Applicants may use non-native ornamental plants. Consideration should be given to plant height at maturity and its effect on sight distance. Applicants may not use plants that may cause future operational or maintenance problems by attracting wildlife near the roadway. Plants that discourage wildlife foraging near the roadway are recommended.

For information on native plant species and the use of native plants in landscaping, contact:

Ladybird Johnson Wildflower Center, 4801 La Crosse Avenue, Austin, TX 78739-1702 (512) 292-4200 www.wildflower.org

Alaska Plant Materials Center, Alaska Department of Natural Resources, Division of Agriculture, HC04 Box 7440, Palmer, AK 99645 (907) 745-4469

Directory of Alaska Native Plant Sources, Second Edition, Alaska Plant Materials Center -- January, 2000.

Alaska Cooperative Extension Service, University of Alaska-Fairbanks (see resources at end)

Resources

Alaska Cooperative Extension Service - University of Alaska Fairbanks

District Offices
Anchorage District 279-5582
2221 E. Northern Lights Blvd., Suite 118
Anchorage, AK 99508-4140

Bethel District 543-4555
Box 556, Kuskokwim Campus,
Yupik Language Center Bldg
Bethel, AK 99559

Delta Junction District 895-4215
PO Box 349, Jarvis Building
Delta Junction, AK 99737

Fairbanks/Tanana District 452-1530
1255 Airport Way, Suite 203
Fairbanks, AK 99701

Juneau District 465-8749
1108 "F" Street, Suite 130
Juneau, AK 99801

Ketchikan District 225-3290
2030 Sea Level Drive, Suite 210A
Ketchikan, AK 99901

Kodiak District 486-6369
202 Center Street, Suite 206
Island Insurance Building
Kodiak, AK 99615

Nome/Northwest District 443-2320
Box 400, Northwest Community College
Nome, AK 99762

Palmer/Copper River/Mat-Su District 745-3360
809 South Chugach Street, Suite 2
Palmer, AK 99645

Palmer Research Center 746-9467
533 E. Fireweed
Palmer, AK 99645

Sitka District 747-6065
700 Katlian Street, Suite D
Sitka, AK 99835

Soldotna/Kenai District 262-5824
34824 K-Beach Road, Suite A
Soldotna, AK 99669-9728

State Offices

Anchorage State Office 279-6575
2221 E. Northern Lights Boulevard, Suite 118
Anchorage, AK 99508-4140

Anchorage State Office 276-2433
Community Development Program
2221 E. Northern Lights Boulevard, Suite 132
Anchorage, AK 99508-4140

Fairbanks State Office 474-7246
University of Alaska Fairbanks
ACE Building
P.O. Box 756180
Fairbanks, AK 99775-6180

Department Offices

Beautification permits may be obtained at the following Department offices:

Central Regional Office
Statewide Design and Engineering Services Division
Right of Way Section
4111 Aviation Avenue
P.O. Box 196900
Anchorage, AK 99519-6900

Northern Regional Office
Statewide Design and Engineering Services Division
Right of Way Section
2301 Peger Road
Fairbanks, AK 99709-5316

Southeast Regional Office
Statewide Design and Engineering Services Division
Right of Way Section
6860 Glacier Highway
Juneau, AK 99801-7999

Or, on the internet, at:
http://www.dot.state.ak.us/external/state_wide/dnc/eos.d/row/row.html

AUTHORITY

AS 19.05.020, AS 19.05.070, AS 19.25.200, and 17 AAC 10.011(e).

IMPLEMENTATION RESPONISIBILITY

Statewide Design and Engineering Services Division, Right of Way permits sections, and Statewide Planning Division, Alaska Scenic Byways program, in cooperation with other functional groups within the Department.

DISTRIBUTION

All holders of the Policy and Procedure Manual

Appendix L

Bicycle & Pedestrian Facilities

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

Bicycle and Pedestrian Facilities

Raspberry Road
Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

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List of Figures

1.0 Introduction

1.1 Purpose and Scope

Due to the safety concerns of heavy traffic exiting and entering on the right side of the road, left side bike lanes will be implemented for a portion of this project. Transitions from right side to left side bike lanes will be accomplished through bike boxes installed at the intersections of Cranberry Street and Raspberry Road as well as Alaska's Best Place and Raspberry Road on the east side of the Minnesota underpass. Bike lanes will end approximately 300 feet before the pedestrian crossings at the roundabout. A bike ramp from the road up to the median will allow bicyclists to choose between navigating the roundabout as a vehicle using the pedestrian crosswalks. Upon the exit of the roundabout, bike lanes will begin 100 feet after the pedestrian crosswalks, and a bike ramp will be installed to connect the crosswalk to the bike lane for bike users who have chosen to use the crosswalks.

Figure 1: Left Lane bicycle facility courtesy of NACTO

1.2 Bike Lanes

Bike lanes will be implemented along Raspberry Road from Jewel Lake Road to Alaska's Best Place, where they will meet with existing bike lanes. Left side bike lanes will be introduced to Alaska through this project in order to alleviate safety concerns. Advantages of left side bike lanes and design considerations are discussed below.

1.2.1 Advantages of Left Side Bike Lanes

A left side bike lane is a conventional bicycle lane placed on the left side of a one-way or median divided road. Left-side bicycle lanes are advantageous for travel corridors with heavy high speed traffic and parking facilities and decrease risk of driver side door and bicyclist collisions. Due to the large volumes of traffic entering and exiting Raspberry Road on the right side of the road due to the on- and off-ramps of Minnesota, left side bicycle lanes provide a safe route for utility bicyclists.

1.3 Design Guidance/Features

- Typical 5 ft lanes will be used on the right and left side of the road where space allows; otherwise 4 ft lanes will be provided.
- Transition from right to left side heading east and left to right side heading west will occur at the intersection of Cranberry Street and Raspberry Road. Transition from left to right heading east and right to left heading west will occur at Alaska's Best Place and Raspberry Road.
- Signage will follow MUTCD guidelines and standards. To alleviate bicyclist and vehicle confusion, clear and concise signage will be used along the corridor. Typical signs are shown below.

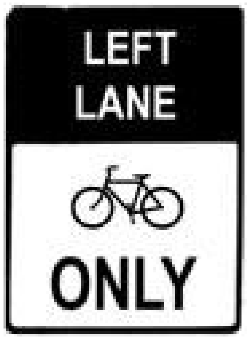

Figure 2: Placed along bike lane (MUTCD R3)

Figure 3: Placed on signal mast-arm to warn drivers of upcoming bike lane

- At intersections with left or right turning access, a bicycle through lane must be added to accommodate the motorized vehicles need to travel left. A typical bicycle through lane is shown in Figure 5.

Figure 4: Through bicycle lane

1.3.1 Bike Boxes

Bike boxes at signalized intersections will be utilized to transition bicyclists from the right side bicycle lane to the left side. A typical bike box is shown in Figure 6. Bike lanes will continue on the left side of road on the far side of the intersection pictured here.

Design Features

- Bike boxes will be 11 ft deep.
- Thermoplastic will be used as a durable pavement marking within the bike boxes as well as 50 ft before and after the intersection to signal to users a change in bike lane location. Thermoplastic was chosen for its high durability and easy maintenance.
- Striping and signing at the bike box will indicate to motorized vehicles to stop behind the colored pavement.

1.4 MUTCD Considerations

Due to federal funding for the project, MUTCD standards must be followed. Currently bike boxes are not within MUTCD standards, so a request for experimentation will need to be applied for through the FHWA. An experimentation request states that upon approval, the traffic control device will be implemented under the condition that a study will be performed to assess the effectiveness of the device and how well the public understands and uses it. Currently, 28 cities have approved experimentation requests for bike boxes.

Figure 5: Bicycle Box

1.5 Maintenance Considerations

Maintenance of bicycle and pedestrian facilities is limited to upkeep of the durable pavement marking, plowing of the bike lanes, and plowing of the pedestrian and multi-use paths. Thermoplastic is easy to maintain due to the simple application of spot treatments. Plowing of the bike lanes will be performed at the same time as street plowing.

Appendix M

Right of Way Forms

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

Right of Way Forms

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

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1.0 Introduction

Appendix M is provided to show proof that our group looked up the required forms for Right of Way. Within this section you will find sample forms and templates from the Preconstruction Manual as well as a template for Notice to Acquire.

1.1 Form 25ar205 Right of Way Assurances Form

See attached.

1.2 Form 25ar205 Parcel Report Form

See attached.

1.3 Form 25ar715 Notice to Acquire

See attached.

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RIGHT-OF-WAY CERTIFICATION AND RELOCATION PROGRAM ASSURANCES

PROJECT NAME: RASPBERRY ROAD

STATE PROJECT #: ___________________________

FEDERAL-AID PROJECT #: ______________________

There are _____ parcels on this project and _____ temporary easements and permits.

All individuals and families have been relocated to decent, safe, and sanitary housing or the State of Alaska has made available to displaced persons adequate replacement housing in accordance with the provisions of the current FHWA directives and one of the following applies:

☐ All necessary rights-of-way, including control of access rights when pertinent, have been acquired including legal and physical possession. There are ___________ parcels in condemnation.

☐ Although all necessary rights-of-way have not been fully acquired, the right to occupy and to use all rights-of-way required for the proper execution of the project has been acquired. There are _____ parcels with right of entry only.

☐ The acquisition or right of occupancy and use of a few remaining parcels is not complete, but all occupants of the residences on such parcels have had replacement housing made available to them in accordance with 49 C.F.R. 24.204. A listing of these parcels with their anticipated acquisition date is shown on the attached sheet.

☐ Construction will be contained within existing right-of-way.

Date _________________________ ____
Regional Chief Right-of-Way Agent

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

PARCEL REVIEW REPORT

PROJECT NAME: RASPBERRY ROAD

STATE PROJECT #: ______________________

FEDERAL-AID PROJECT #: ____________________

PARCEL #: ____________ **UNIT #:** ___________

Check One: ☒ **FHWA** ☐ **FAA** ☐ **State**

Name of property owner ____

1. Authority to appraise and acquire date: ________________________________

2. Area of take ____________ square feet
   Outside ROW: __________ acres

3. Uneconomic Remnant? ☐ **Yes** ☐ **No**

4. Is conveyance document free of encumbrances? ☐ **Yes** ☐ **No** (If no, attach explanation of exceptions)

5. **Appraisers/Value Estimators** **Amount** **Date** **Certification (Not required for WV)**

Appraisers/Value Estimators	Amount	Date	Certification (Not required for WV)
________________________	$________	__________	____________________________
________________________	$________	__________	____________________________
________________________	$________	__________	____________________________

6. **Reviewer's:**
☐ **Determination** ☐ **Waiver Valuation** $________ __________ Date approved for acquisition: __________

7. First offer $________ __________ Date of FMV letter _________________

8. Revised offer $________ __________ Date of Revised letter _______________

Reason for revision ____

9. Date Administrative Settlement/Condemnation Recommendation approved by Pre-construction Engineer or State ROW Chief: ______________________________

10. Acquisition Agent ______________

11. Did Appraiser or Reviewer acquire the parcel? ☐ **Yes** ☐ **No**

12. Condemnation settlement concurred in by Director

Date	Land & Improvements	Total interest	Costs
_____________	$__________________	$___________	$____________

13. Retention Value $__________________ Date approved__________________________

Offered to owner? ☐ **Yes/Date ____________** ☐ **No**

14. Value of acquired improvements $_____________Improvements retained? ☐ **Yes** ☐ **No**

Retention amount withheld $__________________

15. Relocation Asst offered to all relocatees? ☐ **Yes** ☐ **No** (Explain) ___________________________

If yes, complete Relocation Parcel Review Report (Form 25A-R240)

16. Settlement Amount $ ____________________
17. Final Reviewer's Determination $ ____________________
18. Difference $ ____________________

19. Total Federal Participation $ ____________________

20. Nonparticipating items: ______________________________________ $ ____________________

______________________________________ $ ____________________

Total nonparticipating $ ____________________

I have reviewed the documentation for this acquisition and believe that costs have been distributed correctly.

Date ____________________ Reviewer ____

The majority of entries are self-explanatory. The following are for clarification:

1. Examine the authority to proceed with appraisal and acquisition and enter the date of authority. This date is available on Federal Authority to Proceed paperwork or on AKSAS Third Party Billing System. Usually authority to appraise and acquire is given concurrently; however, if they are given separately, note the two dates. All appraisal or acquisition costs incurred prior to this date are to be nonparticipating under Item 20.

2. Examine the approved right-of-way plans to determine whether the taking was entirely within the right-of-way limits. If any portion was outside the limits, enter square footage or area of take outside the limits.

4. If all title exceptions have been cleared, enter "yes." Examples of title exceptions are Deeds of Trust, Local or Federal Tax Liens. A partial or full Request for Reconveyance will clear title for the Deeds of Trust and a Tax Release, due to payment, will clear a tax lien.

5. Enter the appraiser's name, amount of appraisal, and date of each report. Compare dates with appraisal authorizations dates. Any appraisal costs incurred prior to such authorization are to be coded as nonparticipating under Item 20. Determine whether the appraiser included a Certificate of Appraiser for each appraisal. If not, refer such appraisals to the Review Appraiser for action. Waiver Valuations are exempt from this requirement.

6. If $25,000 or less ($10,000 for airport parcels and $50,000 for state-funded projects), enter the amount approved by the Regional Chief ROW Agent.

7. Enter the date of the first offer to the grantor. Compare the date of the first offer with the approved for acquisition date and the acquisition authorization date (Item 1). If the date of the first offer was prior to the authorization date, the costs shall be listed as nonparticipating under Item 20. Examine the Diary and Record of Negotiations for evidence that a verbal and written offer was made of the established fair market value amount to the grantor. A copy of the written offer (letter, contract, and option) should be in the parcel file showing the amount offered in writing. Enter the date of the fair market value letter. If verbal or written offer was not made, the costs are to be listed as nonparticipating under Item 20.

8. Compare the amount of each offer with the established fair market value. If the offered amount is different from fair market value, the file should indicate approval of the revised offer by the Regional Chief ROW Agent and contain either a Revised Reviewer's Determination or Waiver Valuation.

9. If the payment amount is more than $25,000 over the Reviewer's Determination or the Waiver Valuation, the Pre-Construction Engineer signs the Administrative Settlement approval. If the payment is $25,000 or less over the Reviewer's Determination or the Waiver Valuation, the ROW Chief signs the administrative settlement memo. (See Delegation of Authority Matrix)

11. Determine if the Appraiser or Review Appraiser who established the fair market value of more than $25,000 ($10,000 for airport parcels and $50,000 for state-funded projects), either acquired or participated in the acquisition with the property owner. If the answer is yes, immediately call it to the attention of the Regional Chief ROW Agent and code the cost of the acquisition and related incidentals to nonparticipating.

14. Refer to the approved appraisal for the valuation of the improvements being acquired by the Department through the Memorandum of Agreement. Enter the value of only those being acquired.

15. Refer to the relocation file to determine that all relocatees have been offered Relocation Advisory Assistance Services. If Yes, complete the Relocation Parcel Review Report.

20. Nonparticipating items are found by completing the Parcel Review Report; however, other items must also be included in the nonparticipating items. The review appraiser has the responsibility for setting forth items considered compensable under State law, but not eligible for Federal reimbursement. Some of the items considered compensable under State law, but not eligible for Federal reimbursement, are: (1) Personal property costs. Such items should be set forth in the appraisal reports. If a question arises, refer to the Review Appraiser for determination as to the amount applicable to personal property; and (2) Loss of business, circuitry of travel, or possible duplicate payments. Refer to Review Appraiser for determination.

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

NOTICE OF INTENT TO ACQUIRE

PROJECT NAME: ______________________________

STATE PROJECT #: ___________________________

FEDERAL-AID PROJECT #: ______________________

PARCEL #: _____________ **UNIT #:** ____________

This notice is to inform you that the State of Alaska, Department of Transportation & Public Facilities, intends to acquire a portion or all of the property you are personally occupying as right-of-way for the captioned project.

This notice also establishes your eligibility for the benefits you may qualify to receive as outlined in the enclosed relocation brochure. You are eligible if you are a U. S. citizen or an alien who is lawfully present in the United States (or if you are an illegal alien who has proved that there would be exceptional and extremely unusual hardship to your spouse, parent, or child who is a U.S. citizen or lawful resident alien).

The Department anticipates initiating acquisition for the property on or before ________________________.

If for some reason we are delayed, we will contact you and set a new date.

You may obtain additional information concerning the State's relocation assistance payments and services available by contacting the Regional Right-of-Way Office at the telephone number or address listed below.

Regional Right-of-Way Office Telephone Number ____

Regional Right-of-Way Office Address ____

____

Date: _____________________ Right-of-Way Agent's signature: _______________________________

Appendix N

Preconstruction Planning Forms

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

Preconstruction Planning Forms

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
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3211 Providence Drive
Anchorage, Alaska 99508

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1.0 Introduction

Appendix N is provided to show proof that our group looked up the required forms for Preconstruction Permitting requirements.

1.1 Application for Temporary Construction Permit

See attached.

1.2 Instructions for Temporary Construction Permit

See attached.

1.3 Completed Permit Form

See attached.

1.4 Application for Lane Closure Permit

See attached.

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES **APPLICATION FOR TEMPORARY CONSTRUCTION PERMIT** **(Property Management)**	RECEIVED _______________

☐ $200 Application Fee **See attached instructions and other information, including applicable regulations.**

Complete electronic form, print and sign:

☐ Governmental Agency ☐ Business ☐ Private	
Applicant Name: E-mail Address:	Phone:
Business / Organization Name: Email Address: Business License #:	Phone:
Physical Address (*include City and Zip Code*): ☐ Business ☐ Private	
Legal description of adjoining property (*attach separate sheet if necessary*):	
Assessor's tax identification number for adjoining property:	
Do you own the property adjoining the right-of-way? ☐ Own ☐ Lease (*if lease, provide name & complete mailing address of landowner in this box.*)	
Location of Proposed Permit Area (*road name, milepost, nearest cross street, etc. and attach site plan showing location of proposed permit area*):	
Proposed Dates and Times Work to be Performed:	
Proposed use of right-of-way (*Detailed Description of work or activities to be performed including placing fill, grading, digging, equipment to enter/drive through, what improvements will be placed/removed from the right of way, etc.*):	
Attach any pertinent permits, letters of non-objection, or traffic control plans necessary to perform the work	How many feet from the edge of the pavement will the proposed work area be located?

Applicant's Certification

I certify that the above information and attachments are true and correct. The undersigned agrees and understands that a TCP can be denied or a bond required, and that, if permitted, the work will be done in accordance with AKDOT&PF rules and regulations, and be subject to final inspection and approval.

Applicant Signature: ____________________________________ Date: ________________________

INSTRUCTIONS AND OTHER INFORMATION

- **Temporary Construction Permit (TCP) General Information**

A Temporary Construction Permit (TCP) may be used when needing to enter onto State highway right of way for a temporary, short term, time period, for such temporary uses such as crossing the right of way, temporary access to adjoining property, utility work, etc.

- **Request for a TCP**

A request for a TCP must include a $200 nonrefundable processing fee, a complete application and any traffic control plans, or permits provided from other agencies (i.e., utility permits). At no expense to the State, the Permittee shall secure and keep in force during the term of this Permit adequate Commercial General Liability insurance in the amount of $1 Million to protect both the State and the Permittee against comprehensive public liability and property damage. Where specific limits are set, it is understood that they shall be the minimum acceptable limits. If the Permittee's policy contains higher limits the State shall be entitled to coverage to the extent of the higher limits. All insurance provided by the Permittee under this provision shall be endorsed to name the State of Alaska as an additional insured, to waive subrogation against the State of Alaska, and to provide that such insurance shall not be cancelled without at least thirty (30) day written notice to the State. Before occupation of the Permit Area, the Permittee shall provide to the State a certificate of insurance showing the coverage provided. The Permittee agrees to provide a copy of any insurance policy to the State upon request. Please provide or attach any information which is pertinent to the work to be performed in the right of way.

Before any filling activities take place within the right of way, or on the property adjacent to the right of way affected by this application, please contact the U.S. Army Corps of Engineers (USACE) to see if any further authorization is necessary. Placement of fill material in waters of the U.S., including wetlands and streams, requires prior authorization in most cases. You can reach the USACE at - Anchorage: (907) 753-2712, Fax: (907) 753-5567 Toll Free 1-800-478-2712; Fairbanks: (907) 474-2166, Fax: (907) 474-2164; Juneau: (907) 790-4490, Fax: (907) 790-4499; Kenai: (907) 283-3519, Fax: (907) 283-3981. The website is http://www.poa.usace.army.mil/reg

Please mail or take your application to:

Southeast Region Mailing Address:	Central Region Mailing Address:	Northern Region Mailing Address:
DOT&PF ROW 6860 Glacier Hwy Juneau AK 99801-7909	DOT&PF ROW PO Box 196900 Anchorage AK 99519-6900	DOT&PF ROW 2301 Peger Road Fairbanks AK 99709-5316
Voice: (907) 465-4540 or 1-800-575-4540 Fax: (907) 465-3506 TDD: (907) 465-4410	Voice: (907) 269-0700 or 1-800-770-5263 Fax: (907) 269-0828 TDD: (907) 269-0473	Voice: (907) 451-5400 or 1-800-475-2464 Fax: (907) 451-5411 TDD: (907) 451-2363
Southeast Region Physical Address:	**Central Region Physical Address:**	**Northern Region Physical Address:**
DOT&PF ROW 6860 Glacier Hwy Juneau AK 99801-7909	DOT&PF ROW 4111 Aviation Drive Anchorage AK 99502-1058	DOT&PF ROW 2720 Picket Place Fairbanks AK 99709

View Example

Please Print or Type

Applicant's Name and Complete Mailing Address

Seawolf Engineering 2015
3211 Providence Drive, Anchorage, AK 99503

Phone: (907) 786-1500

Applicant's Email Address:

Fax:

Contact Person's Name and Complete Mailing Address

Stefanie Armstrong, Project Manager
3211 Providence Drive, Anchorage, AK 99503

Phone: (907) 947-9148

Contact Person's Email Address: sander38@alaska.edu

Fax:

Business License # (*for businesses only*)

Permit Activity Location (Include all routes that will be affected)

Minnesota off-ramp, at Raspberry Road; Raspberry Road at Northwood; Raspberry Road at all cross streets

Reason for Permit (Also describe the proposed use of the highway right-of-way including the location of the right-of-way, described by its centerline stationing on the particular highway)

Raspberry Road Reconstruction will be replacing existing road surface with a roundabout at Northwood, realigning the Minnesota off-ramp to the new roundabout, and resurfacing the road.

Start Date for Lane Closure: April 13, 2017 End Date for Lane Closure: April 15, 2017

Schedule details (start times, end times, days of the week, exceptions, continuous or daily operation):

April 13 6:00 am until April 15 10:00 pm
Continuous shutdown for those days.

Traffic Control will be provided by: Armstrong, LLC

24-hour Traffic Control contact person: Abe Armstrong, Lead Traffic Manager

Phone: (907) 947-8626 Fax:

Applicant's Certification

I acknowledge that I am acting on behalf of the applicant with the full authority to do so. I further acknowledge and accept that the above-named applicant shall comply will all the conditions that the Department of Transportation and Public Facilities includes as part of the permit.

Signature Stefanie Armstrong Date 2-26-2015

STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES **APPLICATION FOR LANE CLOSURE PERMIT**	**RECEIVED BY DOT&PF**

A list of requirements for the application is attached. Also attached are the applicable regulations and a list of mandatory (already checked) and event-specific conditions (some of which could be checked when the permit is issued) that will apply to the permit as DOT&PF determines appropriate to protect the public. A nonrefundable $100 application fee must accompany this application.

The State of Alaska, Department of Transportation and Public Facilities (DOT&PF) is pleased to announce the availability of online permitting for lane closure permits.

You may apply online at www.dot.state.ak.us/permits.

Computer access is available at all public libraries
and at the main offices of DOT&PF's regional offices.

If you choose to complete this paper application, please mail it to the appropriate address below and DOT&PF personnel will input the information for you.

Southeast Region	Central Region	Northern Region
Mailing Address: AKDOT/PF ROW 6860 Glacier Hwy Mail Stop 2506 Juneau AK 99801-7909	**Mailing Address:** AKDOT/PF ROW P.O. Box 196900 Anchorage AK 99519-6900	**Mailing Address:** AKDOT/PF ROW 2301 Peger Road Mail Stop 2553 Fairbanks AK 99709-5316
Voice: (907) 465-4540 or 1-800-575-4540 Fax: (907) 465-3506 TDD: (907) 465-4410	Voice: (907) 269-0700 or 1-800-770-5263 Fax: (907) 248-9456 TDD: (907) 269-0473	Voice: (907) 451-5400 or 1-800-475-2464 Fax: (907) 451-5411 TDD: (907) 451-2363
Physical Address: AKDOT/PF ROW 6860 Glacier Hwy Juneau AK 99801-7909	**Physical Address:** AKDOT/PF ROW 4111 Aviation Drive Anchorage AK 99502-1058	**Physical Address:** AKDOT/PF ROW 2175 South University Ave., #2 Fairbanks AK 99709-4910

Please Print or Type

Applicant's Name and Complete Mailing Address Applicant's Email Address:	Phone: Fax:
Contact Person's Name and Complete Mailing Address Contact Person's Email Address:	Phone: Fax:
Business License # (*for businesses only*)	
Permit Activity Location (Include all routes that will be affected)	
Reason for Permit (Also describe the proposed use of the highway right-of-way including the location of the right-of-way, described by its centerline stationing on the particular highway)	
Start Date for Lane Closure: End Date for Lane Closure: Schedule details (start times, end times, days of the week, exceptions, continuous or daily operation):	
Traffic Control will be provided by: 24-hour Traffic Control contact person: Phone: Fax:	

Applicant's Certification

I acknowledge that I am acting on behalf of the applicant with the full authority to do so. I further acknowledge and accept that the above-named applicant shall comply will all the conditions that the Department of Transportation and Public Facilities includes as part of the permit.

Signature ____ Date _____________________________

Appendix O

Public Information Plan

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

Preconstruction Planning Forms

Raspberry Road
Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

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1.0 Project Scope

The State of Alaska Department of Transportation and Public Facilities (DOT&PF) is preparing for the increase traffic flow that will approach Raspberry Road from Southbound drivers on Dowling Road. This project will be a 65% DSR submittal and a 35% plan set. This project will provide improved connectivity, and accessibility between Raspberry Road to C Street for residential, commercial, industrial and emergency service traffic.

Reconstruction of this important arterial link will reduce traffic congestion on the surrounding arterials and improvements anticipated for this corridor will enable more direct traffic movements between southeast and southwest Anchorage. The improvements to this area will also create a convenience for bikers due to the bike paths and boxes.

1.1 Disclaimer

Seawolf Engineering is not familiar with the how public information plans are developed or what role they play within an engineering project, several public information plans were used as references to generate this one. Lists of references to the plan are located in the References, Section 9.0.

2.0 Introduction

2.1 Purpose

This public information plan objective is to notify, listen, and update the public of the Raspberry Road, Jewel Lake to Minnesota project. This public information plan will detail on how the Seawolf Engineering 2015 team will execute the plan to release information to the general public.

2.2 Public Participation Goals

Seawolf Engineering 2015 public participation goal is to keep the public informed throughout the process of the project. Seawolf Engineering will use the different outlets, refer to Section 6.0 to ensure that the public is receiving the information the company is releasing. Releasing the information is not our only goal, the public is extremely important because they will be using this means of transportation, so the company would like to hear what the public has to say. The input of the public will play a vital role in the geometric design of the project to suit the user as best as possible.

3.0 Potentially Affected Interests

The public information plan of this project with address the general public, Federal Government, State of Alaska, and Municipality of Anchorage (MOA), as well as various businesses and their clients. Outlined below are lists of other potentially affected organizations, as they are subgroups to the groups mentioned above.

3.1 General Public

The general public is defined as property owners, business owners, their clients, and the residents within the project study area. The project study area is the way a project mailing list would be composed to receive information. If any personnel outside of the project study area finds interest in the project that lives outside of the project, which may be added to the mailing list.

3.2 Federal Government

These sub-categories have to be contact so Seawolf Engineering 2015 will understand and be able to comply with the laws and regulations that in place by the Government.

3.2.1 Environmental Protection Agency (EPA)

The purpose of the EPA is to protect human health and the environment by writing and enforcing regulations that are passed by the Congress. Seawolf Engineering 2015 will have to be in contact to understand which regulations pertain to them and how to comply with the regulations.

3.2.2 Federal Highway Administration (FHWA)

Seawolf Engineering will have to be in contact with FHWA in order to comply with the federal requirements for project eligibility, contract administration, and construction standards.

3.3 State of Alaska

This project is taking place in Anchorage, Alaska therefore the departments in Alaska need to be contacted in order to ensure compliances with Alaska's laws and regulations.

3.3.1 State of Alaska Department of Environmental Conservation

The State of Alaska Department has to be contacted in order to follow conservation, improvement and protection of natural resources.

3.3.2 State of Alaska Department of Natural Resources

Seawolf Engineering will have to contact The State of Alaska Department of Natural Resources to ensure that the project is developing Alaska's resources and benefits the public interest.

3.3.3 Alaska Department of Fish and Game

Seawolf Engineering will have to contact the Alaska Department of Fish and Game to ensure there is no fishing and hunting in the project area.

3.3.4 State Historical Preservation Office

Seawolf Engineering 2015 will have to contact the State Historical Preservation Office to ensure the lands are not to be historically preserved.

3.4 Municipality of Anchorage

Seawolf Engineering 2015 will have to be in contact with the sub-categories below in order to inform them of the traffic control plan when the project is ongoing.

- Anchorage Fire Department
- Anchorage Police Department
- Anchorage Public Transportation (People Mover)
- Anchorage Traffic Department
- Anchorage Parks and Recreation Commission
- Planning & Zoning Commission (P&ZC)

- Urban Design Commission (UDC)
- Anchorage Assembly

3.5 Other Interested Parties

Other impacted parties are those not listed above. They are categorized as those that may not be directly impacted by the design and construction, but indirectly impacted through traffic delays, decreased access routes to their business, or through their special interests. The list below outlines the known impacted parties for this project.

- Crystal Childcare Development Center
- Filipino Bible Church
- Holiday Gas Station
- Change Point Church
- Gladys Wood Elementary
- Sand Lake Elementary
- Dimond High School
- Condominiums Associations
- Homeowners Associations
- Anchorage Trails Coalition
- Anchorage Waterways Council
- Anchorage Roads Coalition
- Anchorage Metropolitan Area Transportation Solutions (AMATS)

3.6 Utility

Listed below are the utility companies with their contact information that will be used for this project. These companies have utilities inside of the project area so Seawolf Engineering will have to be in contact with these companies to ensure moving of equipment is done correctly.

3.6.1 Anchorage Water & Wastewater Utility (AWWU)

3000 Arctic Boulevard
Anchorage, Alaska 99503
(907) 564-2700

3.6.2 Alaska Communications

600 Telephone Ave.
Anchorage, AK 99503
(907)563-8000

3.6.3 Chugach Electric Association, Inc.

5601 Electron Drive
P.O. Box 196300
Anchorage, AK 99519
(907) 563-7494

3.6.4 ENSTAR Natural Gas Company

P.O. Box 190288
Anchorage, AK 99519
(907) 277-5551

3.6.5 GCI

2550 Denali Street
Suite 1000 Anchorage, AK 99503
(907) 265-5600

4.0 Compiled Mailing List

A compiled mailing list was not made up for this project. If Seawolf Engineering 2015 were to create a mailing list for the project it would compile the addresses for the potentially affected interests (PAI) by the project. Then with that complied mailing list, Seawolf Engineering 2015 would be able to send information to the residents. Personnel outside of the project study area may be added to the mailing list, if there is interest shown in the project. In the figure below shows the project study area where the potentially affect interests would occur.

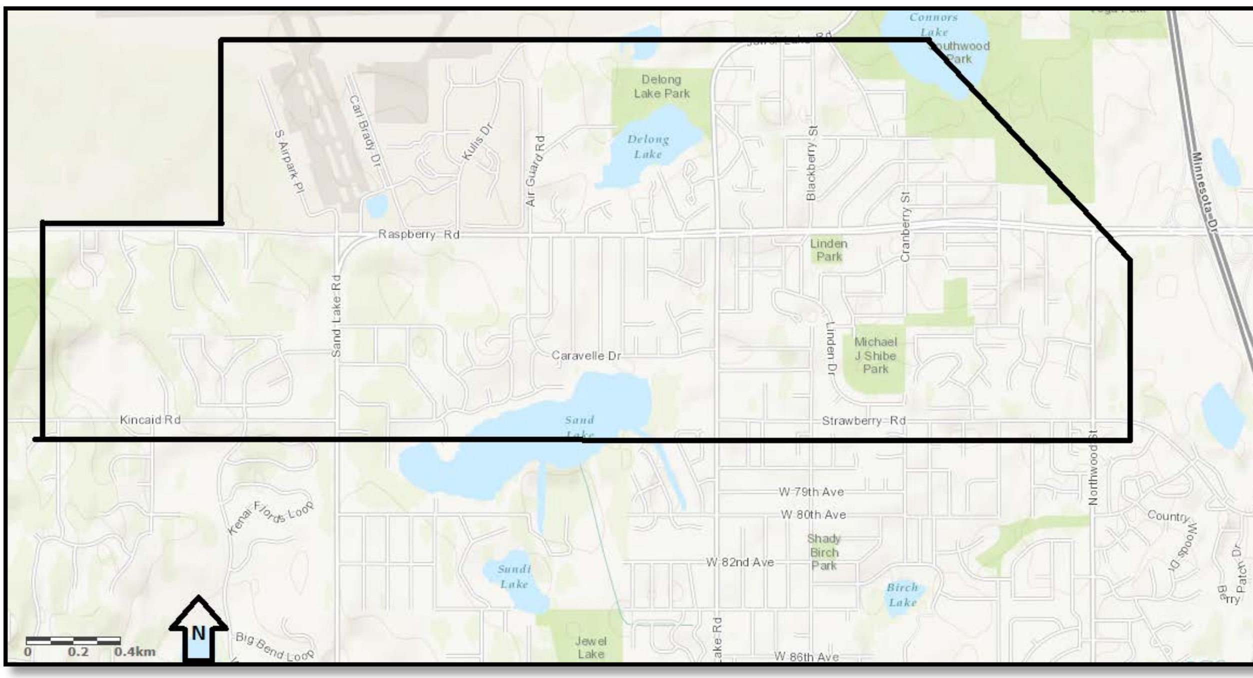

Figure 1: Project Study Area

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5.0 Project Personnel

This project is a fictitious project that does not have actual project personnel other than the project team, the AK DOT&PF Consulting advisor, Associate Professor Dr. Osama Abaza and other leading consulting advisors that have teamed up with Dr. Abaza to provide academic advice and real world experience on this project. Listed below are the project team members, and the people involved in this project.

Name	Role
Dr. Osama Abaza	Instructor, Ph.D
James Amundsen	Co-instructor, P.E
Stephen Nuss	Co-instructor, P.E
Robert DeVassie	AK DOT Project Engineer, P.E – Project Advisor
Stefanie Armstrong	Seawolf Engineering 2015 - Project Manager
Corey Prewitt	Seawolf Engineering 2015 – Project Engineer
Amanda Del Frate	Seawolf Engineering 2015 – Project Engineer
Andrew Gray	Seawolf Engineering 2015 – Technical Team Lead
Brendan Hafele	Seawolf Engineering 2015 – Technical Team Lead
Christi Meyn	Seawolf Engineering 2015 – Technical Team Lead
George Randy Lenig	Seawolf Engineering 2015 – Technical Team Lead
Ryan Kim	Seawolf Engineering 2015 – Technical Team Lead
Travis Thompson	Seawolf Engineering 2015 – Technical Team Lead

Table 1: Project Personnel

6.0 Public Information Method

There will be different methods used for this project in order to reach as many of information outlets as possibly. Real life public involvement activities were not actually fulfilled but several attempts to contact with Bike Commuters of Alaska and also attended a community council meeting in the area. Christi Meyn spoke with Brian of Bike Commuters of Anchorage, but was not able to meet but did obtain good resources to use.

6.1 Public Meetings

From the start to the final design of this project, a minimum of three public meetings will be held. The first meeting will be held during start of the design process. This is to guarantee that Seawolf Engineering can hear public comments when design the project. The second meeting would occur preceding to the 65 percent submittal. A third public meeting would occur following the 95 percent submittal. Additional meetings may be held if public has further concerns. The public meetings are held not only to inform the public of what is occurring during the project but also obtain information from the public and apply it to the design of the project.

6.1.1 Advertising the Public Meetings

Public meetings will be advertised in the Anchorage Dispatch News, local news stations, and through presentations to the local Community Council, as well as through newsletters to the compiled mailing list. The project web site will also be kept up to date with upcoming meetings and a blog of events that have happened in the project.

6.2 Agency Meetings

Seawolf Engineering will hold Technical Advisory Group meetings with the EPA and FHWA in order to follow the laws and regulations that are in place by the State of Alaska. The meetings will give the Seawolf Engineering 2015 team an opportunity to communicate with the agencies about the project in order to be in compliance and receive guidance in ensure all aspect of the project are covered. The main concern for this project is to discuss filling in Class A wetland for the project.

6.3 Contact E-Mail Address

To contact the project about any question or concern, there will be a contact section in the website where one can contact the project.

6.4 Project Website

A project-specific website has be developed and maintained for the duration of the project. The website, http://thompsontravis.wix.com/seawolfengineering will provide a source for current project information and be able to comment on insight that the public may have.

6.5 Community Council Meetings and Other Interest Groups

Seawolf Engineering will attend community council meetings that are in the area during the duration of the project. The purpose of attending these meetings are to show interest in the community, inform and update the public, and receive feedback on the project. Seawolf Engineering will also maintain contact with any other groups that show interest in the project during the design process.

6.6 Project Flyers

Project Flyers will be used as another source of releasing information to the public. This information can be used as a notice for a public meeting or an update of a major event that could impact the general public.

6.7 Press Releases

Projects this size and in such a used area will need to have a press release in order to make information even more accessible. Press Releases will be used in order to inform the general public if a major construction even will occur, public meetings, and great achievements during the construction process.

6.8 Advertisements

Advertisements will be located in the Anchorage Dispatch News. The newspaper gives another outlet of information that can be used. These advertisements will announce upcoming public meetings, meeting time, place, and details in another outlet to make sure the all of the general public know about project events that will be going on.

6.9 Project Involvement Schedule

In order to execute the Public Information Plan created, a schedule of what Seawolf Engineering 2015 would do was essential in creating. Seawolf Engineering did not actually create the project flyer, attend meeting and hold meetings, but if the project were to be real, Table 2 is the kind of scheduling that would be used.

Date	**Public Involvement Method**	**Project Phase/Purpose**	**Time & Location**
Start to the end of project	Compile and update project study area mailing list	Project mailing list	N/A
Website	Create and update project website	Information on the project	N/A
2-Feb-15	Mailing Project Flyer #1	Announce project and upcoming public meeting	N/A
2-Feb-15	Community Council Meeting	Announce project and upcoming meeting	Sand Lake
9-Feb-15	Distribute Project Flyer #1	Announce project and upcoming meeting	N/A
10-Feb-15 & 12-Feb-15	Anchorage Dispatch News, and Press Release	To advertise public about meeting	N/A
13-Feb-15	Public Meeting #1	Introduce project and seek any information	ChangePoint
2-Mar-15	Mailing and distribute Project Flyer #2	Update of project design	N/A
30-Mar-15	Mailing Project Flyer #3	Announce project and upcoming meeting	N/A
6-Apr-15	Distribute Project Flyer #3	Announce project and upcoming meeting	N/A
7-Apr-15 & 9-Apr-15	Anchorage Dispatch News, and Press Release	Announce project and upcoming meeting	N/A
10-Apr-15	Public Meeting #2	Inform public of project after 65% DSR submittal	ChangePoint

Table 2: Schedule of Public Involvement

7.0 Known Project Impacts

7.1 General

The Alaska Department of Transportation and Public Facilities is preparing for increased traffic due to the opening of West Dowling Road on Raspberry Road. The geometric design that Seawolf Engineering has been created will have to acquire right-of-way (ROW) which is being sought for wetland use, and because the design selected has a roundabout and a new out-of-the box bicycle design, special planning and education should be considered for a project of this size and type.

7.2 Roundabout Education and Safety

Current roundabout driver education does not include two-lane roundabout education information. Driver education is required for the roundabouts not only for this area but Alaska has developed the “Roundabout first,” policy which is involve more roundabout in the state of Alaska. This section of the Project Information Plan includes information on driver education resources available online. If additional funding or a Project Deviation scope is provided, and additional funding is provided the scope of the project could include more information on driver navigation about a roundabout.

General tips are provided below were collected from Tom McDonald from Center for Transportation Research and Education

7.2.1 Approaching a Roundabout

The drive needs to slow down to the posted speed limit and enter the lane that suits they destination. Yield to the pedestrians that are in the crosswalk because they have the right-of-way.

7.2.2 Entering a Roundabout

The driver entering the roundabout has to yield to vehicles that are already in the roundabout. Proceed into the roundabout with caution, knowing that the traffic in the roundabout is going in a counterclockwise direction.

7.2.3 Within a Roundabout

When in the roundabout continue until you reach the intended street and do not stop while in the roundabout.

7.2.4 Exiting a Roundabout

When exiting a roundabout the driver should signal he/she is doing so and be prepared to yield to pedestrians.

7.2.5 Turning at Roundabouts

When a driver is turning at a roundabout, they should use their turn signal so the other drivers can understand that, that motor vehicle is turning.

7.2.6 Motorcyclists
Motorcyclists are treated just like motor vehicles and shall abide by the same rules but should do so with more caution. To prevent being passed or cut off, a motorcyclist should ride in the middle of the lane.

7.2.7 Pedestrians
Pedestrians always have the right-of-way when they are in the crosswalks at located pedestrian crossings. Bicyclists have a legal right to ride on the street with the traffic just like other intersections, but it is safer to follow the bike paths or cross walks. It should be known that bikers do have a higher accident rate than on-street bikers at other types of intersections.

7.2.8 Bicyclists
If bicyclists are not confident enough to bike in the roundabout, they should walk their bicycles across the pedestrian crosswalks that are designated. Those experiences and confident bicyclists that use the roundabout should treat themselves as a motor vehicle. A tip for bicyclists is they should ride in the middle lanes to prevent other motor vehicles passing them.

7.2.9 Roundabout Safety
Roundabouts are being installed because they are safer than a signalized traffic intersection. The vehicle to vehicle conflicts are reduced from 32 in a signalized traffic intersection to 8 in a roundabout. The Insurance Institute for Highway Safety conducted a study that presented that roundabouts reduce injury accidents by 75%, and server injury or fatal accidents by as much as 90% when compared to signalized traffic intersections or even stop signs. Due to the reduction in accidents the Alaska Department of Transportation and Public Facilities will adopt a “Roundabout First,” policy. This policy is to deter from signalized traffic and stops sign intersections being built as the first option, so the roundabouts will be the first selection and if it is not feasible then a signalized traffic and stop sign intersection can be put in place as an alternative.

7.3 ROW

The existing roadway is state right of way in order to obtain more ROW the State of Alaska will have to purchase the land from the Municipality of Anchorage Heritage Land Bank. The surrounding lands of the roadway are currently owned by the Municipality of Anchorage Heritage Land Bank and are Class A wetlands under the Anchorage Wetlands Management Plan. Seawolf Engineering 2015 will need a Section 404 permit from the U.S. Army Corps of Engineers in order to fill in the Class A wetlands North of Raspberry for the exit ramp off of the Minnesota Highway.

7.4 Environmental Permitting / Categorical Exclusion

This project does not involve unusual circumstances or significant environmental impacts. The project area meets the criteria for classification as a Categorical Exclusion per 23 Code of Federal Regulations 771.117. The sites are not designated as critical habitat or historic property.

8.0 Existing Public Comments Summary

The public had made it clear that they see the need for a bicycle plan to be put into the Design Study Report for this project. On a website named Zoning and Platting Cases On-line, the public has written comments that vary from personnel that live in the area to people that want to see biking path in Anchorage. These comments can be seen at the URL provided, in the References under Public Comments.

9.0 References

McDonald, T. (n.d.). Roundabouts. Retrieved March 29, 2015, from http://www.gocolumbiamo.com/PublicWorks/Traffic/documents/roundabouttwolanetips.pdf

DOWL HKM. (2008, November 1). Public Involvement Plan. Retrieved February 20, 2015, from http://www.dowlhkm.com/projects/wdowlingroad/images/D60047E.WDRrevsiedforwebpostingPIP081009.pdf

Alaska Roundabouts. (2004, July 1). Retrieved February 24, 2015, from http://www.alaskaroundabouts.com/

Roundabouts. (2011, January 1). Retrieved March 10, 2015, from http://www.dot.alaska.gov/stwddes/dcstraffic/roundabouts.shtml

Public Comments. (2013, June 28). Retrieved February 5, 2015, from http://munimaps.muni.org/planning/allcomments.cfm?casenum=2013-084

Dowl Engineers (2008, May). Public Involvement Plan. Retrieved March 31, 2015, from http://www.alaskaasp.com/admin/Docs/06%20-%20Appendix%20E%20-%20Public%20Involvement%20Plan.pdf

Appendix P

Safety Considerations

The information in this report is compiled for highway safety planning purposes. Federal law prohibits its discovery or admissibility in litigation against state, tribal or local government that involves a location or locations mentioned in the collision data. 23 U.S.C. § 409; 23 U.S.C. § 148(g); Walden v. DOT, 27 P.3d 297, 304-305 (Alaska 2001). This compilation is derived from reports maintained by DMV, and DOT can make no representation about their accuracy.

ALASKA
Department of Transportation
And Public Facilities

Safety Considerations

Raspberry Road

Jewel Lake Road to Minnesota Drive

Spring 2015

Prepared by:
Seawolf Engineering 2015
3211 Providence Drive
Anchorage, Alaska 99508

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1.0 INTRODUCTION

The proposed alternative to the Raspberry Road reconstruction provides solutions to many safety issues that are present on the current roadway. A majority of the safety concerns come from the existing Minnesota southbound off-ramp and at the intersection of Raspberry and Northwood. Previous crash analysis from these locations reveal a total of 97 crashes, although this number is relatively low it is predicted that the value would increase due to the increase in traffic on the roadway. To improve safety a roundabout has been added to the intersection of Raspberry and Northwood, and the Minnesota southbound off-ramp has been realigned to intersect with the new roundabout.

2.0 PREVIOUS CRASH ANALYSIS

Crash data for the intersections of Raspberry with Northwood and the Minnesota southbound off-ramp with Raspberry were provided by the Kinney Engineering. Table 1 highlights the number of crashes at each location and compares them to similar intersection in the State of Alaska. The table shows that neither intersection has a crash rate above the state average.

	Crashes	Entering AADT	Crashes / MEV	Control	State Populations Average	Above Average?	Upper Conltrol Limit (UCL) Rate @ 95.00% Confidence	Above UCL?
Raspberry at Northwood	71	25,679	0.758	Signal	1.0116	No	1.188	No
Raspberry at Minnesota SB off-ramp	26	22,454	0.317	Stop	0.381	No	0.499	No

Table 1 – Crash Rates for 2000 to 2009

2.1 CRASHES AT MINNESOTA SOUTHBOUND OFF-RAMP & NORTHWOOD ST.

Table 2 and Table 3 highlight the crash types and frequencies for crashes at each intersection along Raspberry Road. The most frequent types of crashes are single vehicle run off the road crashes and rear end crashes. Surprisingly there were no crashes related to southbound left turning vehicles from the Minnesota off-ramp.

Crash Type	Frequency	Percentage
Rear End	4	15%
Sideswipe	4	15%
Right Angle	2	8%
Moose	1	4%
Run Off Road	12	46%
Ditch	2	
Guardrail	2	
Other Fixed Object	2	
Overturn	3	
Sign Post	1	
Snowberm	2	
Other	3	12%
TOTAL	**26**	

Table 2 – Crash Type and Frequency at Minnesota Southbound Off-Ramp from 2000 to 2009

Rear End	25	35%
Sideswipe	9	12%
Left Turn	14	20%
Right Angle	2	3%
Moose	5	7%
Run Off Road	14	20%
Curb/Wall	2	
Ditch	1	
Divider	2	
Embankment	1	
Fence	1	
Head on	2	
Light Support	2	
Sign Post	1	
Traffic Light	1	
Utility Post	1	
Other	2	3%
TOTAL	**71**	

Table 3 – Crash Type and Frequency at Northwood Street from 2000 to 2009

3.0 PREDICTED CRASH RATE

The National Cooperative Highway Research Program has a method for determining the predicted number of crashes that will occur at a roundabout. Using the equations provided the predicted number of crashes could be determined. Figure 1 shows the different equations for predicting the frequency of crashes in a roundabout.

Example: Calculation of Expected Frequency of Entering–Circulating Crashes Using AMFs

Consider the following roundabout leg for which the expected frequency of entering–circulating accidents is desired. The actual measurements for each relevant base condition variable and the corresponding AMFs for the site are as follows:

Input parameters

Entry radius = 30 ft

Entry width = 12 ft

Central island diameter = 80 ft

Angle to next leg = 90°

Entering AADT = 3,870 veh/day

Circulating AADT = 1,200 veh/day

Step 1: Apply the base prediction model form

Using Model 1 (with AADT as the only variable), use Equation 5-4 and Exhibit 5-24 as follows:

$$Crashes/year = a_0(EnteringAADT)^{a_1}(CircAADT)^{a_2}e^{[b_1(Var1)+\cdots+b_5(Var5)]}$$

$$= 0.00000176(3870)^{1.0585}(1200)^{0.3672} = 0.15$$

Step 2: Calculate AMFs

Entry radius: $AMF = 1.01^{(30-76)} = 0.63$

Entry width: $AMF = 1.052^{(12-20)} = 0.67$

Central island diameter: $AMF = 0.992^{(80-69)} = 0.92$

Angle to next leg: $AMF = 0.973^{(90-93)} = 1.09$

Step 3: Apply the AMFs to the base model estimate

*Final prediction of crashes per year = 0.15*0.63*0.67*0.92*1.09 = 0.06*

Figure 1: Equations and Examples for Determining Crashes per Year

Listed below in Figure 2 are the predicted crash frequencies for the roundabout at Raspberry and Northwood.

Approach	AADT (2012)	AADT (2035)	Crashes per Year (2012)	Crashes per Year (2035)
Eastbound	17295	26200	1.56	2.73
Northbound	25731	25813	0.57	0.86
Southbound	7467	10037	2.34	2.48
Westbound	11092	16115	0.59	0.84

Figure 2: Predicted Crashes per Year and KAB Injury Frequency per year by direction

As highlighted by the calculations the number of crashes per year would greatly decrease due to the addition of a roundabout at Raspberry and Northwood. Due to the geometry of a roundabout it naturally decreases the number of rear end crashes because of the decreased number of conflict points. The roundabout also allows for southbound left turning vehicles to easily maneuver the turn.

4.0 CONFLICT POINTS

A conflict point is a point within an intersection where a vehicles path will come in to contact with another vehicle path that is traveling the same intersection. With a 4-way single lane intersection there are 32 different conflict points compared to a 4 leg single lane roundabout which only has 8 conflict points, and none of those conflict points are crossing. By reducing conflict points the safety of the intersection is increased, and by removing crossing conflict points the chance of T-bone accidents is reduced.

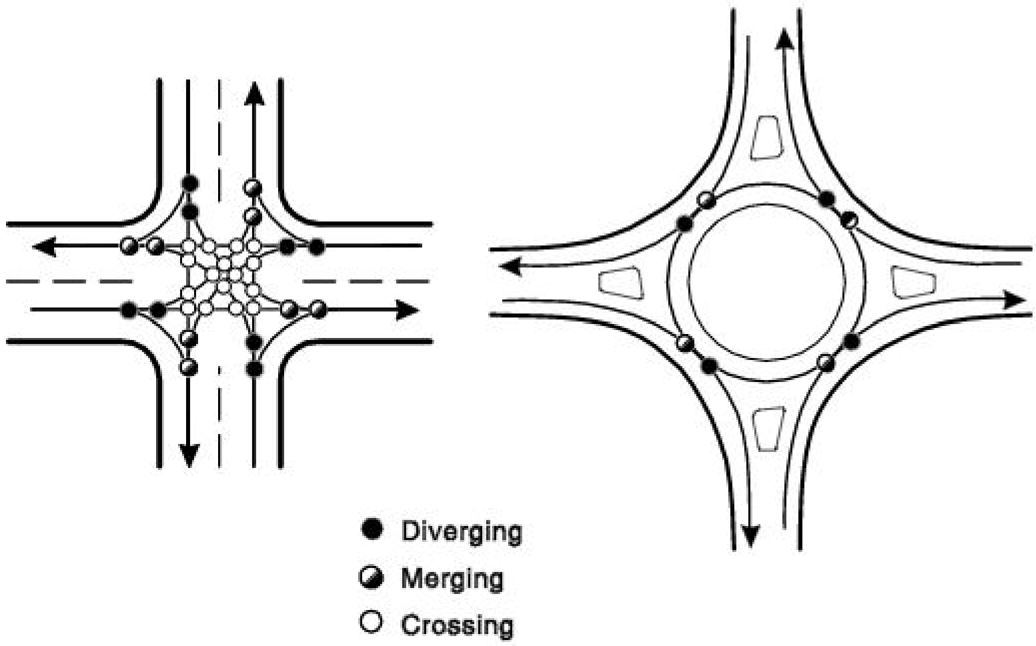

Figure 3: Conflict Points on a 4-way Intersection vs a 4 leg Roundabout

5.0 REFERENCES

Kinney Engineering

Roundabouts an Informational Guide. Washington, D.C.: U.S. Dept. of Transportation, Federal Highway Administration, 2000. Print.

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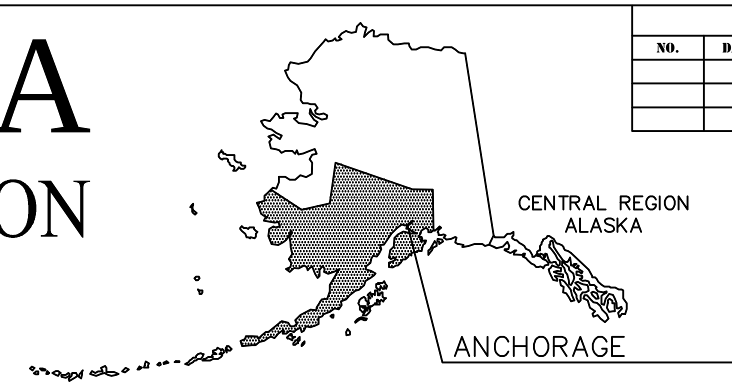

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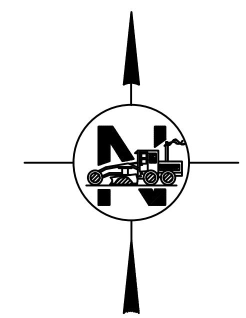
ROUTE: MILEPOINT:

PROPOSED ROADWAY PROJECT

RASPBERRY ROAD UPGRADES
JEWEL LAKE RD TO MINNESOTA DR
PROJECT NO. STP-0526(004)/56727

4R PROJECT



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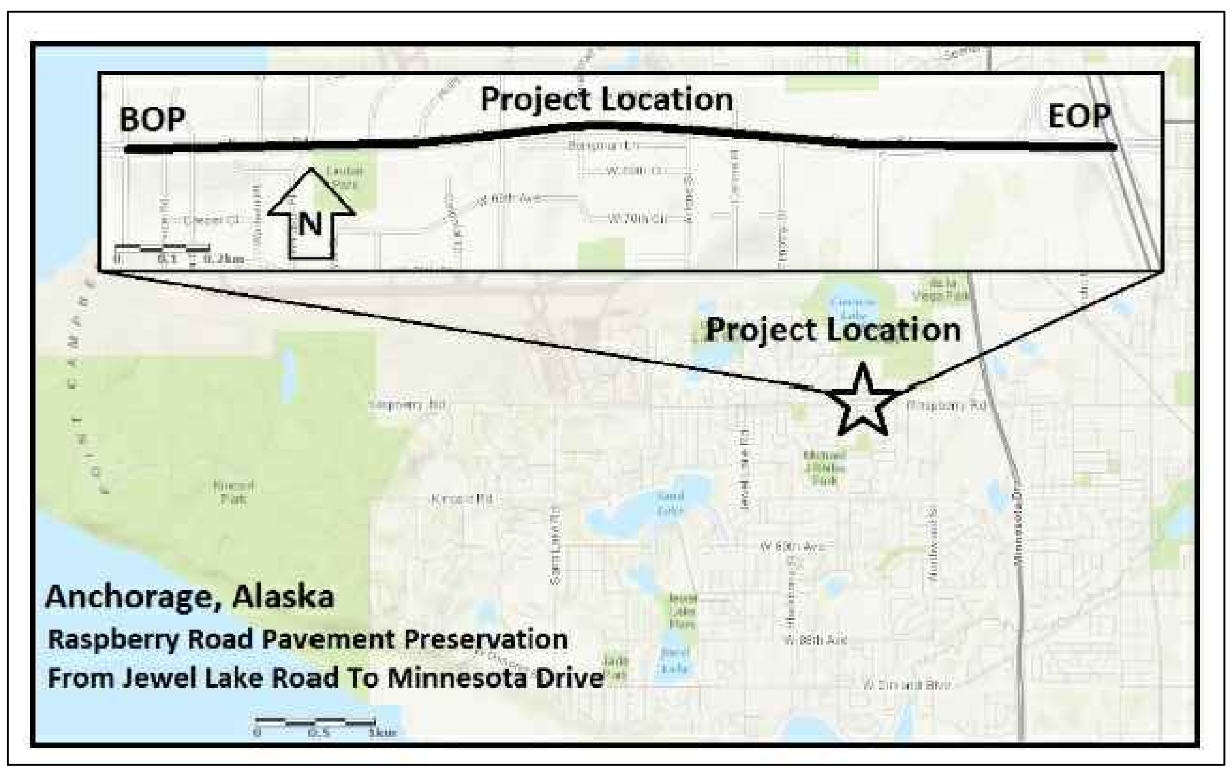

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PROJECT SUMMARY		
ROADWAY SECTION	WIDTH	LENGTH
RASPBERRY ROAD	±110 FT	1.4 MILES

DESIGN DESIGNATIONS		
ROADWAY SECTION	A.A.D.T. 2009	DESIGN SPEED
RASPBERRY ROAD		45 MPH

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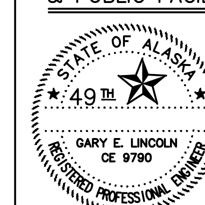

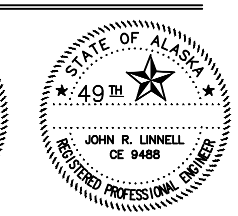

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REGIONAL PRE-CONSTRUCTION ENGINEER DATE

CONCUR:

DIRECTOR, DESIGN & CONSTRUCTION DATE

CERTIFIED TRUE & CORRECT AS-BUILT OF ACTUAL FIELD CONDITION:

CONSTRUCTION PROJECT MANAGER DATE

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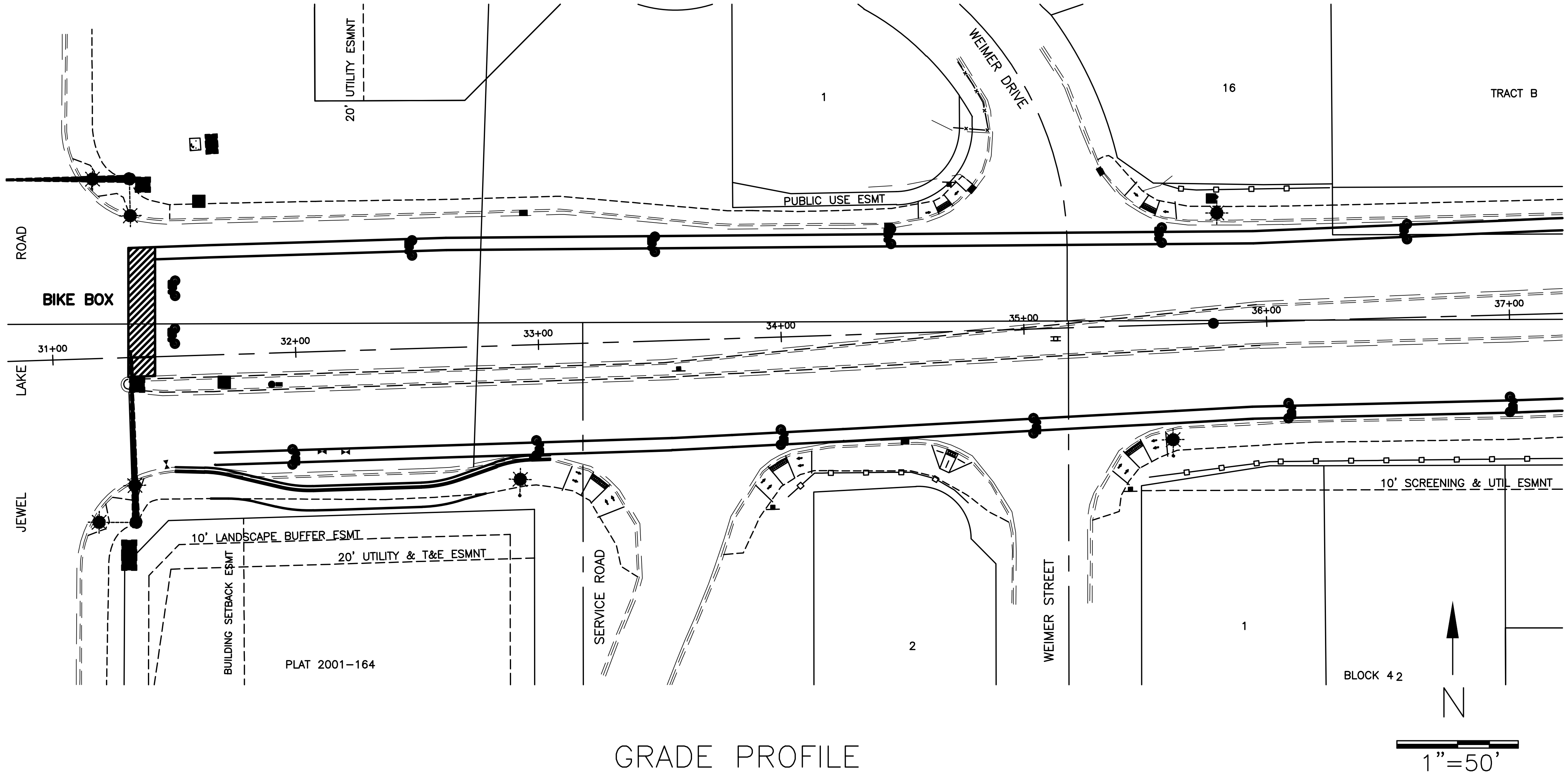

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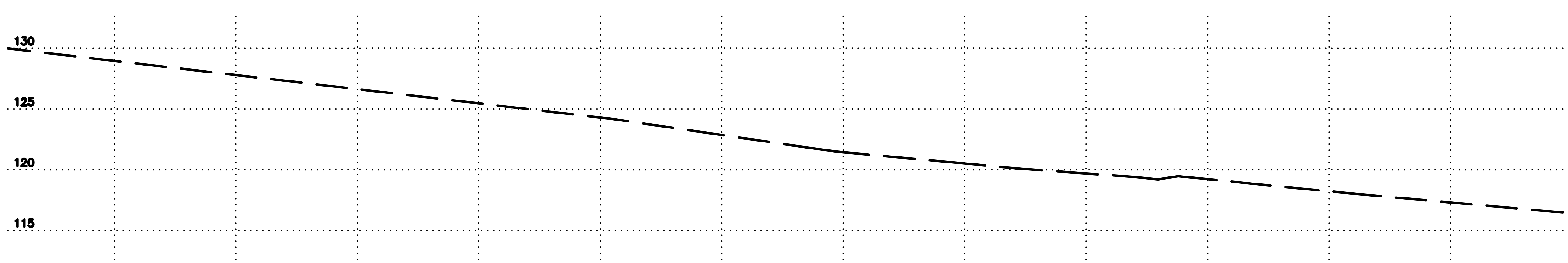

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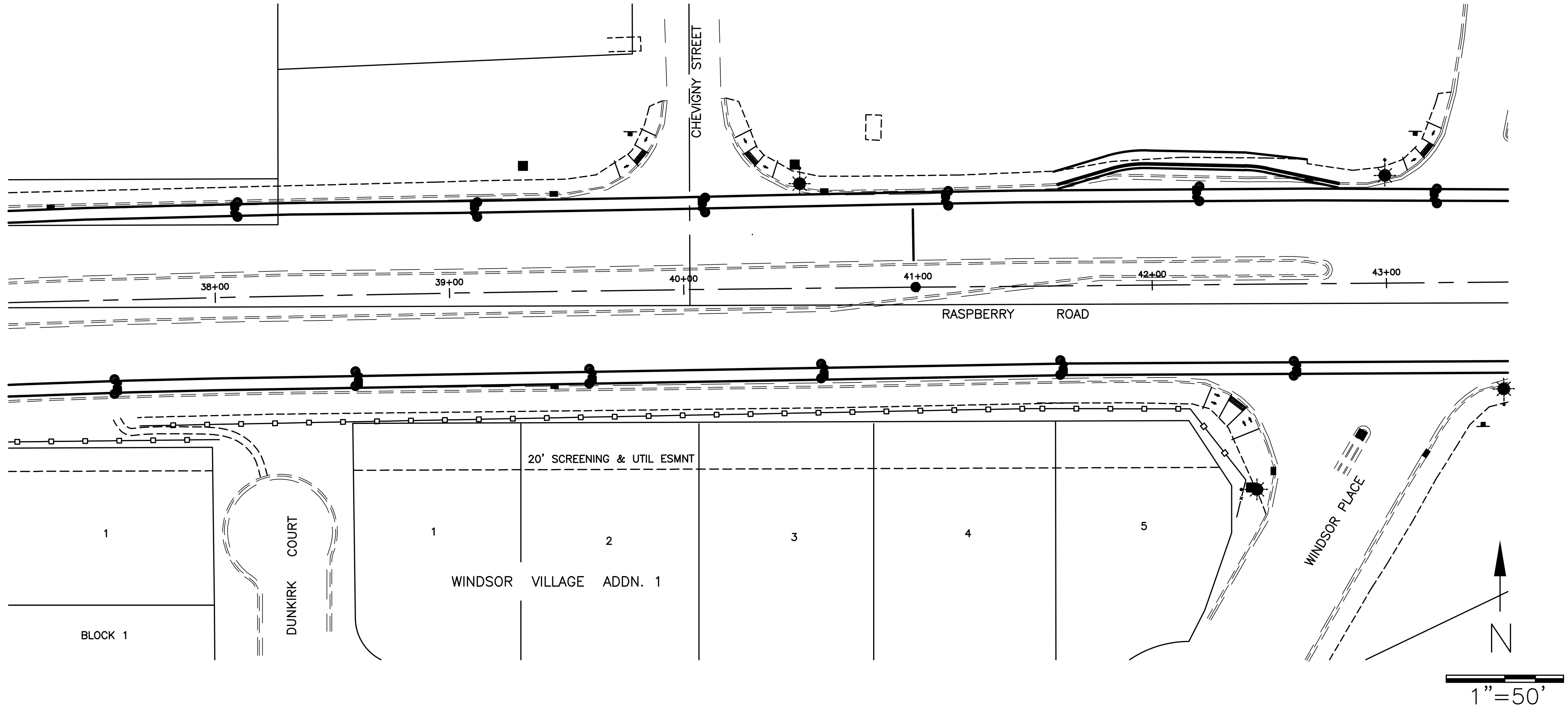

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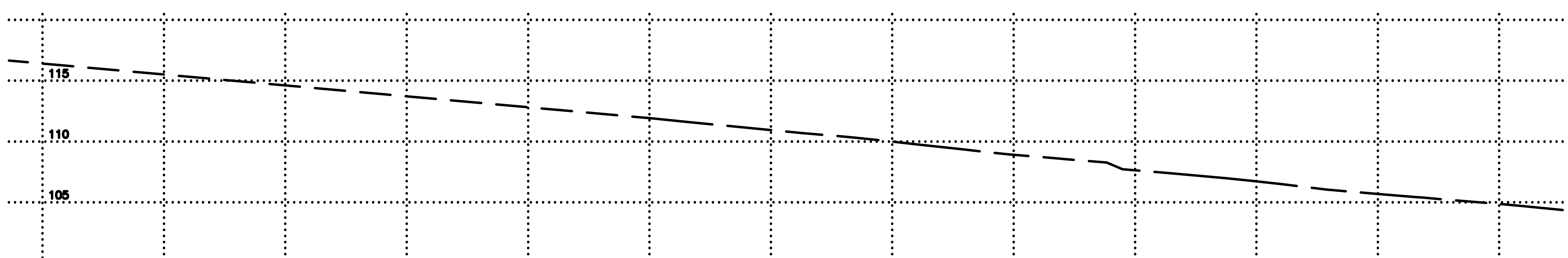

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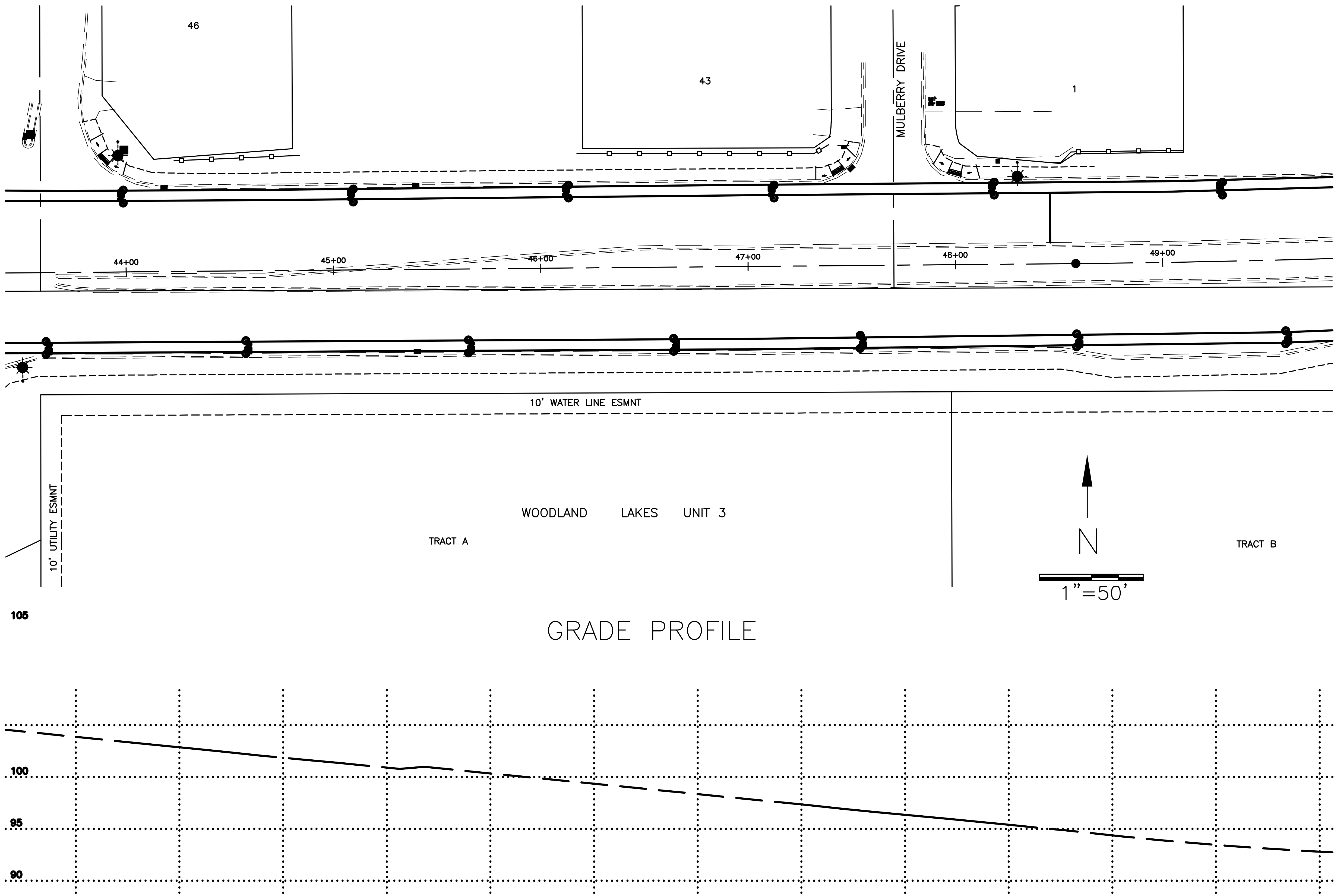

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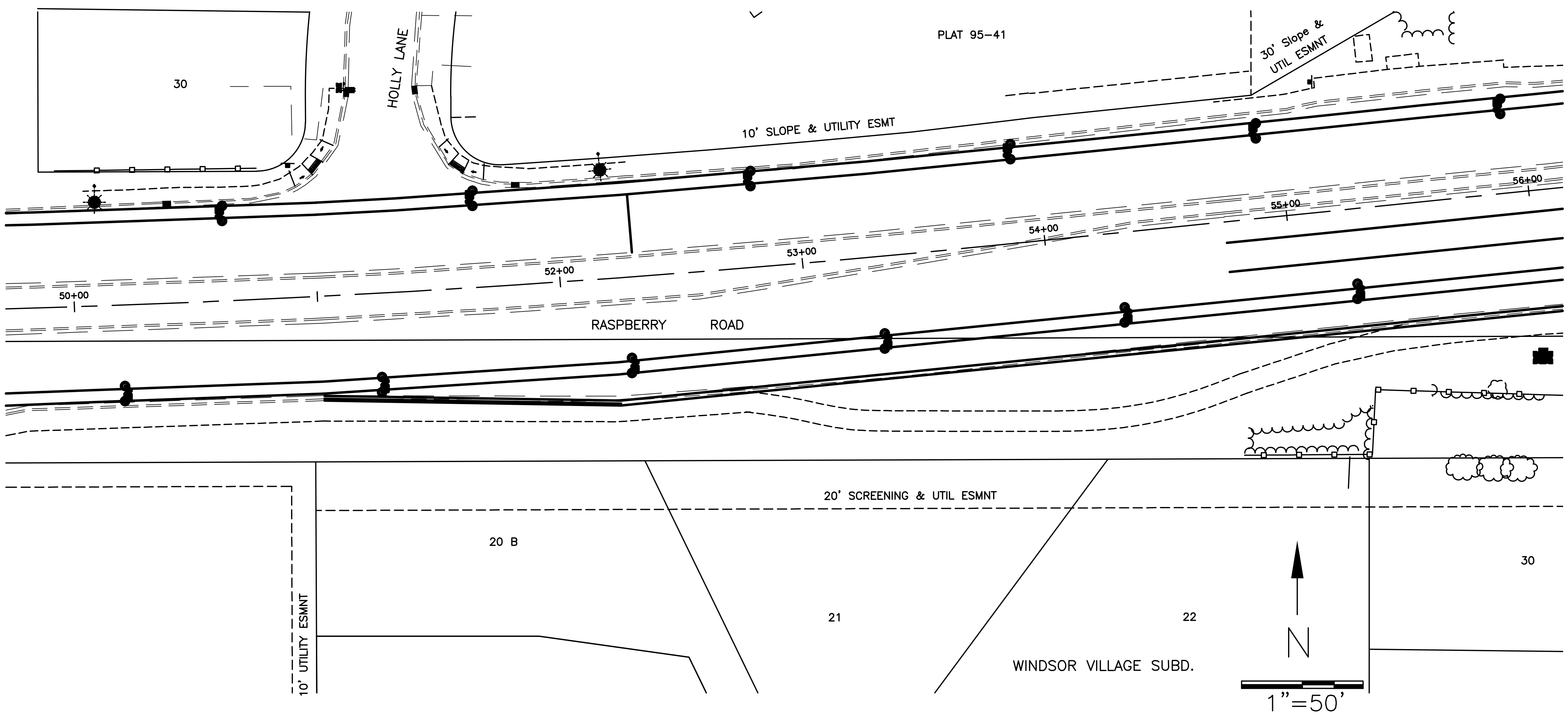

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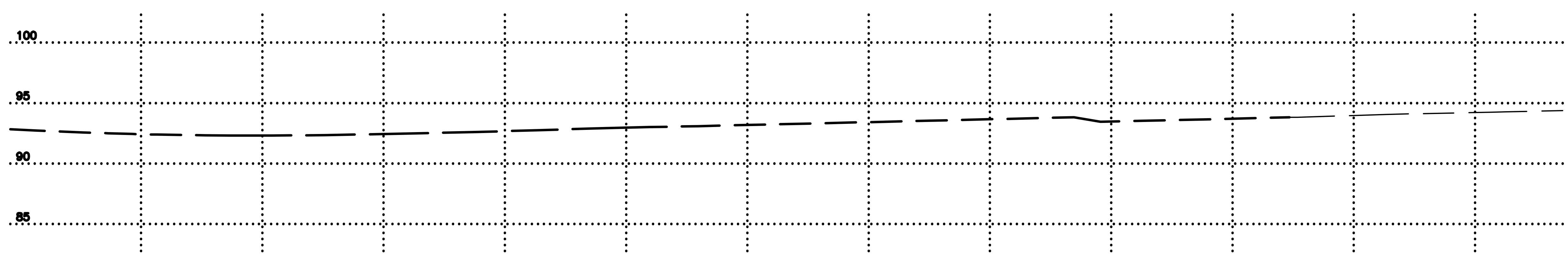

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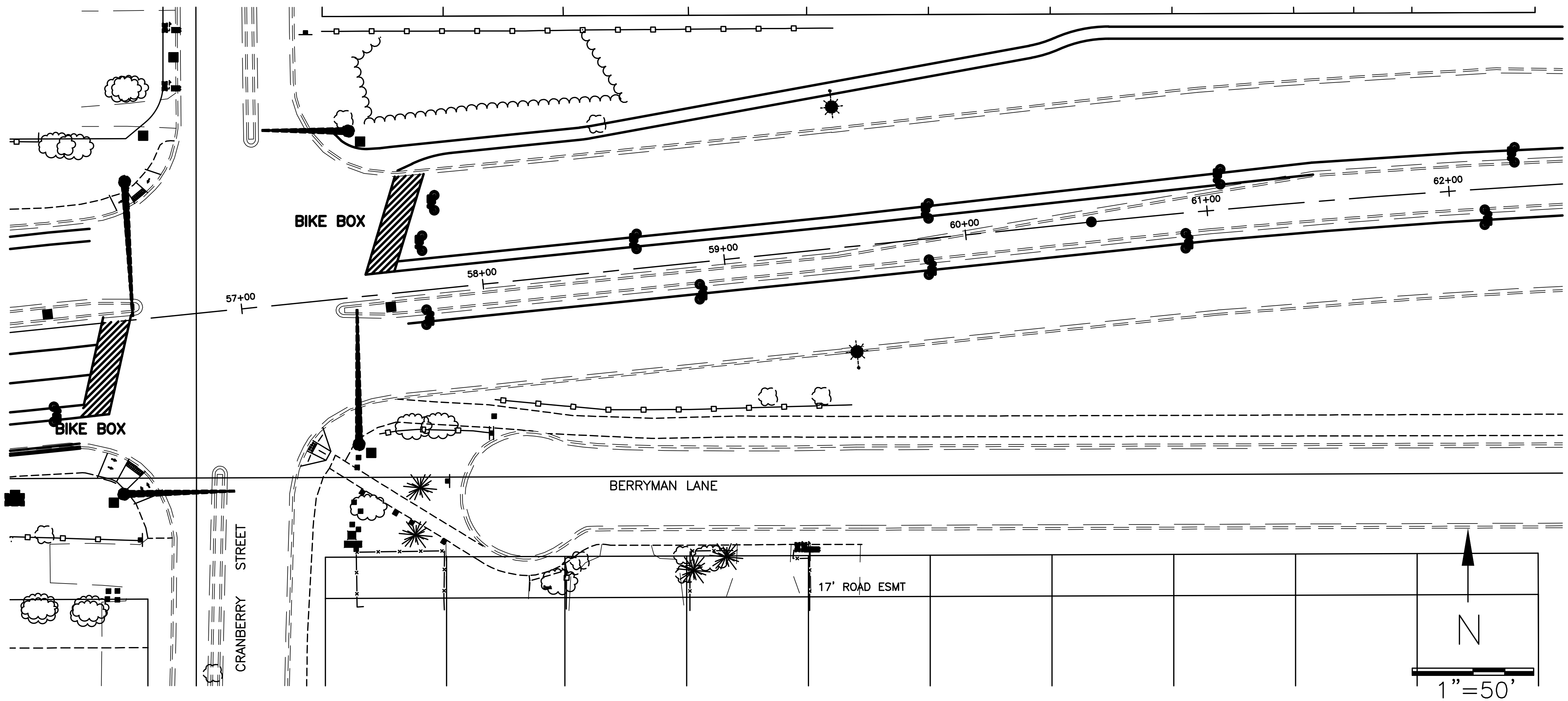

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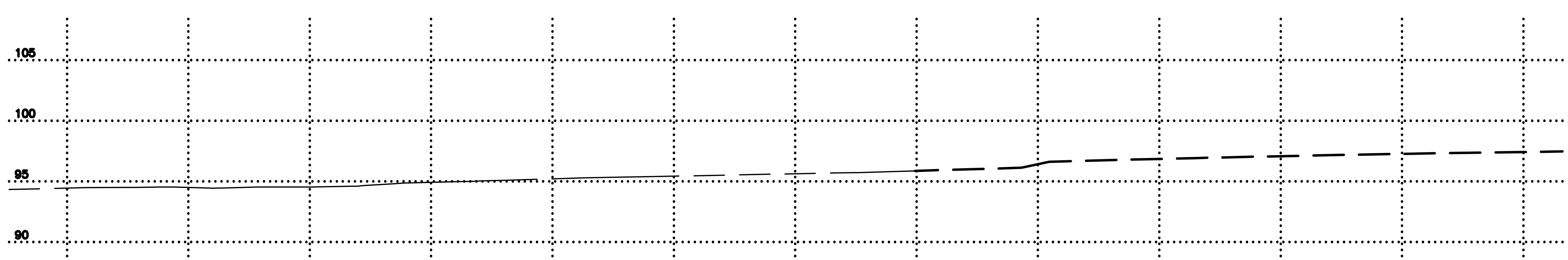

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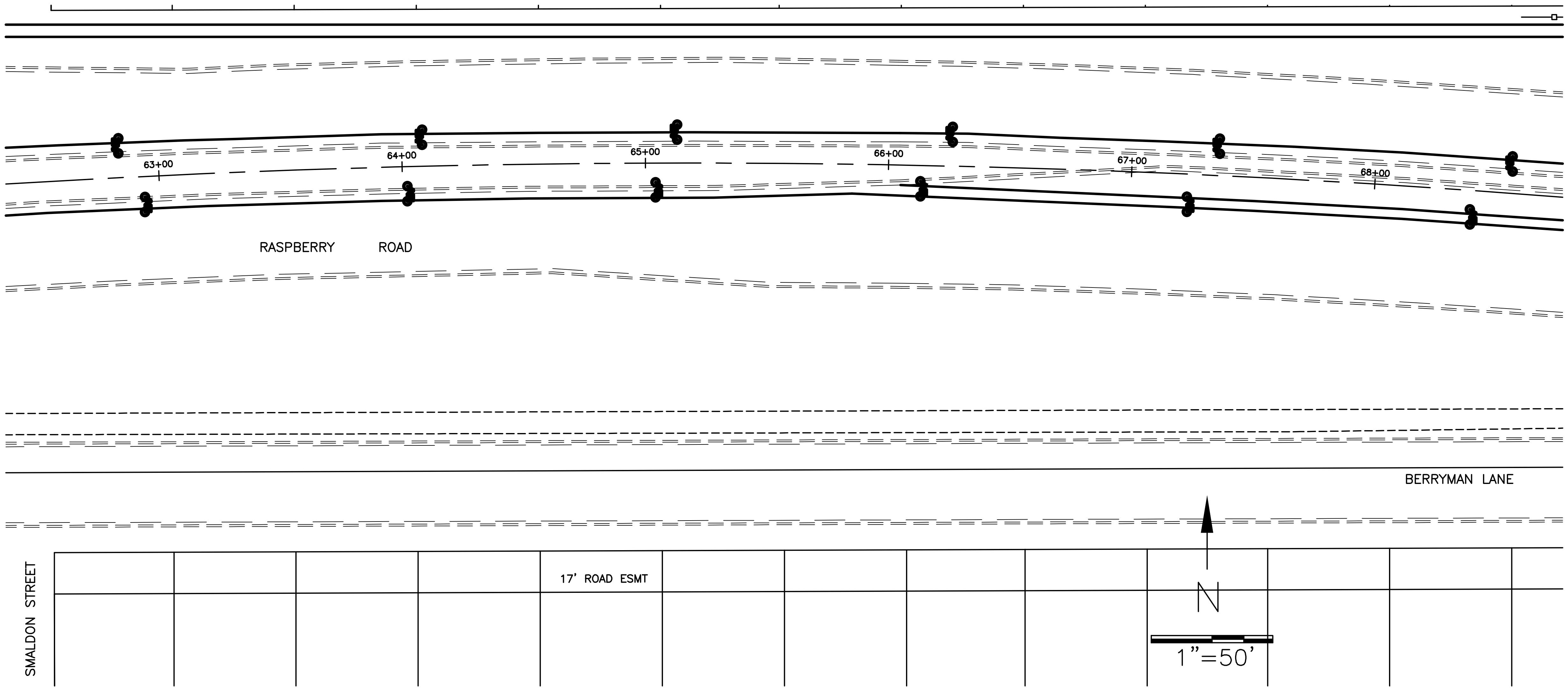

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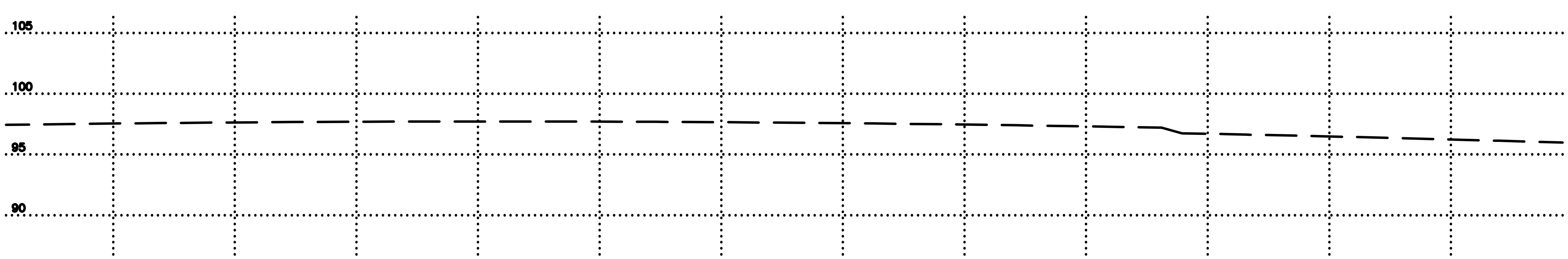

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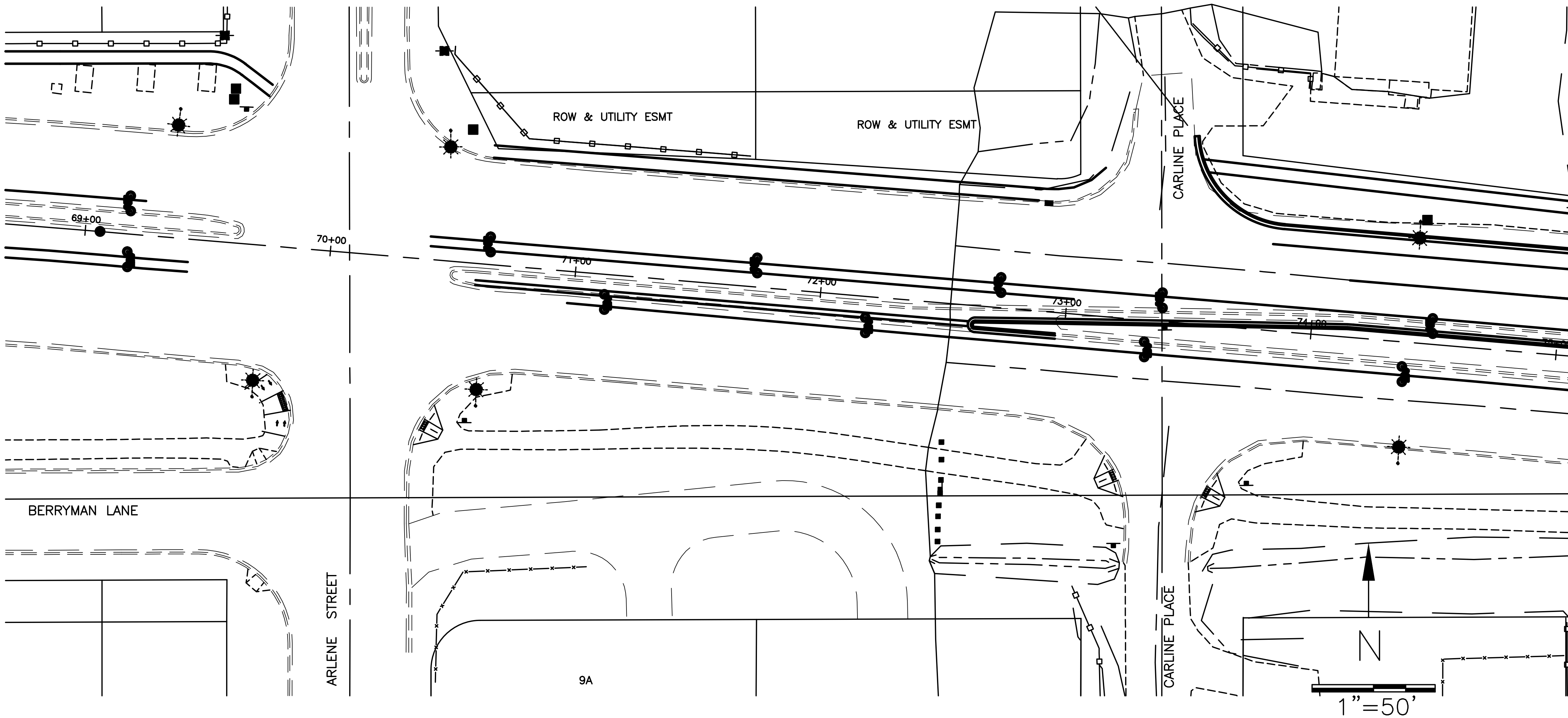

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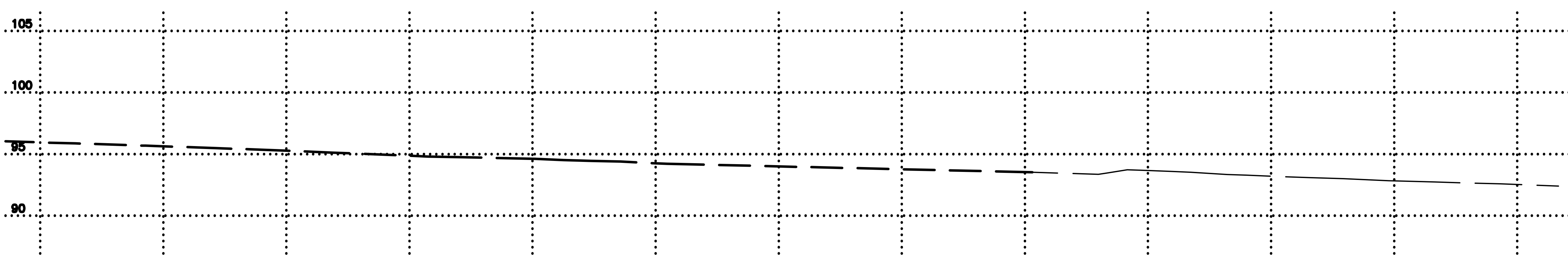

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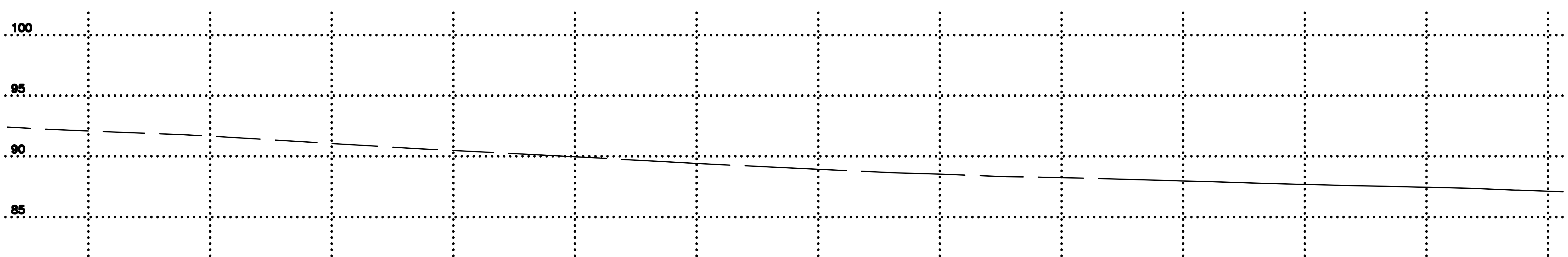

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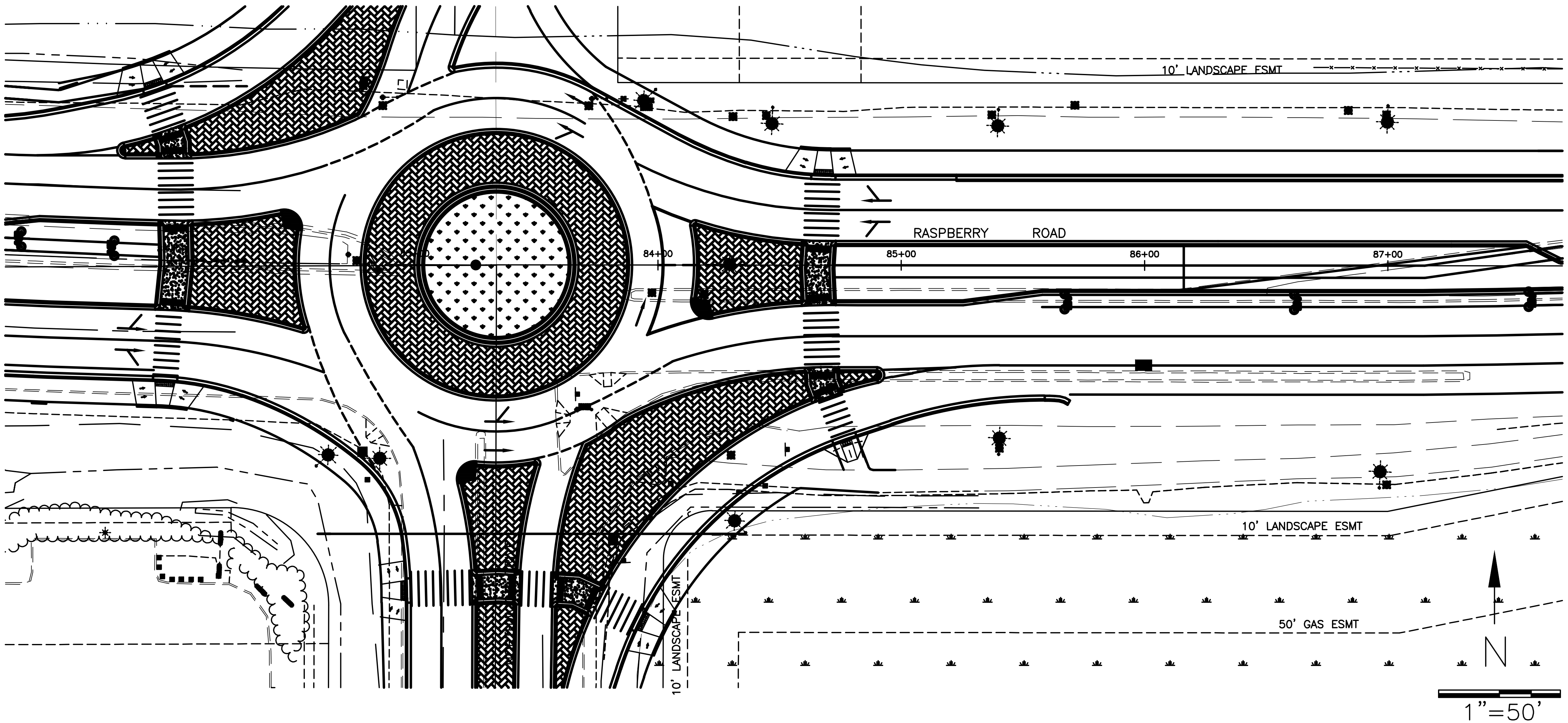

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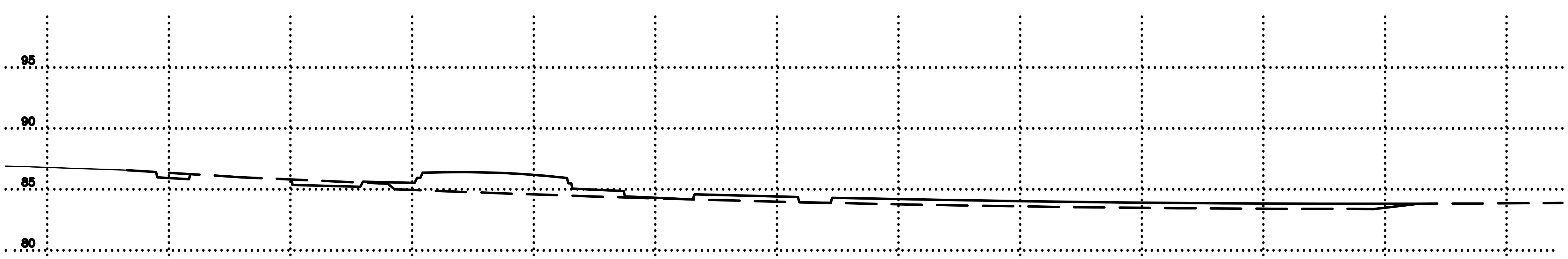

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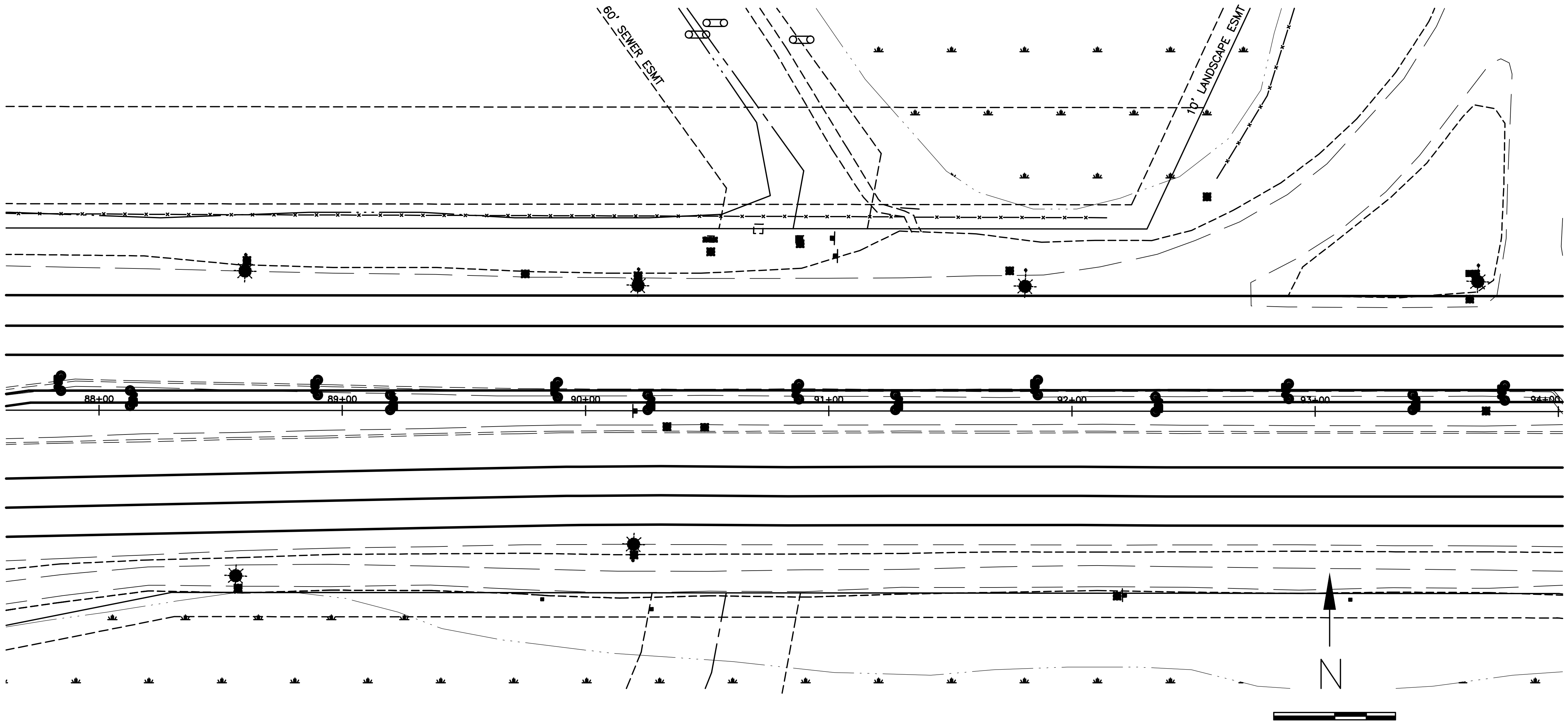

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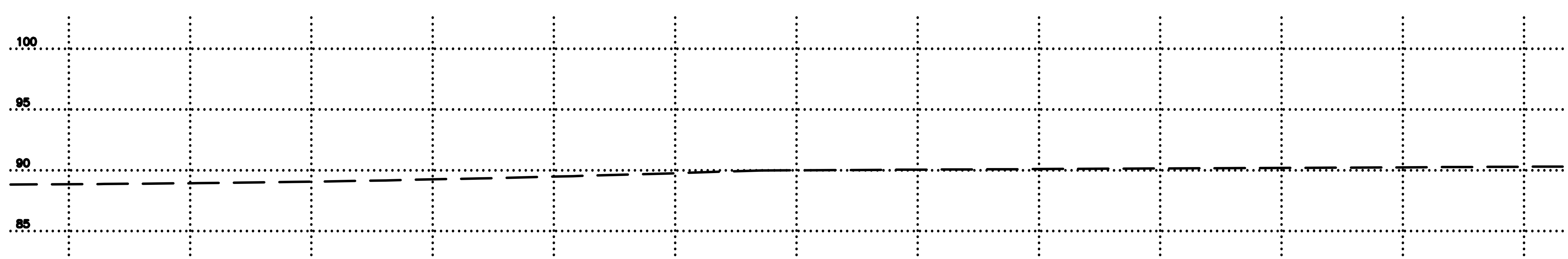

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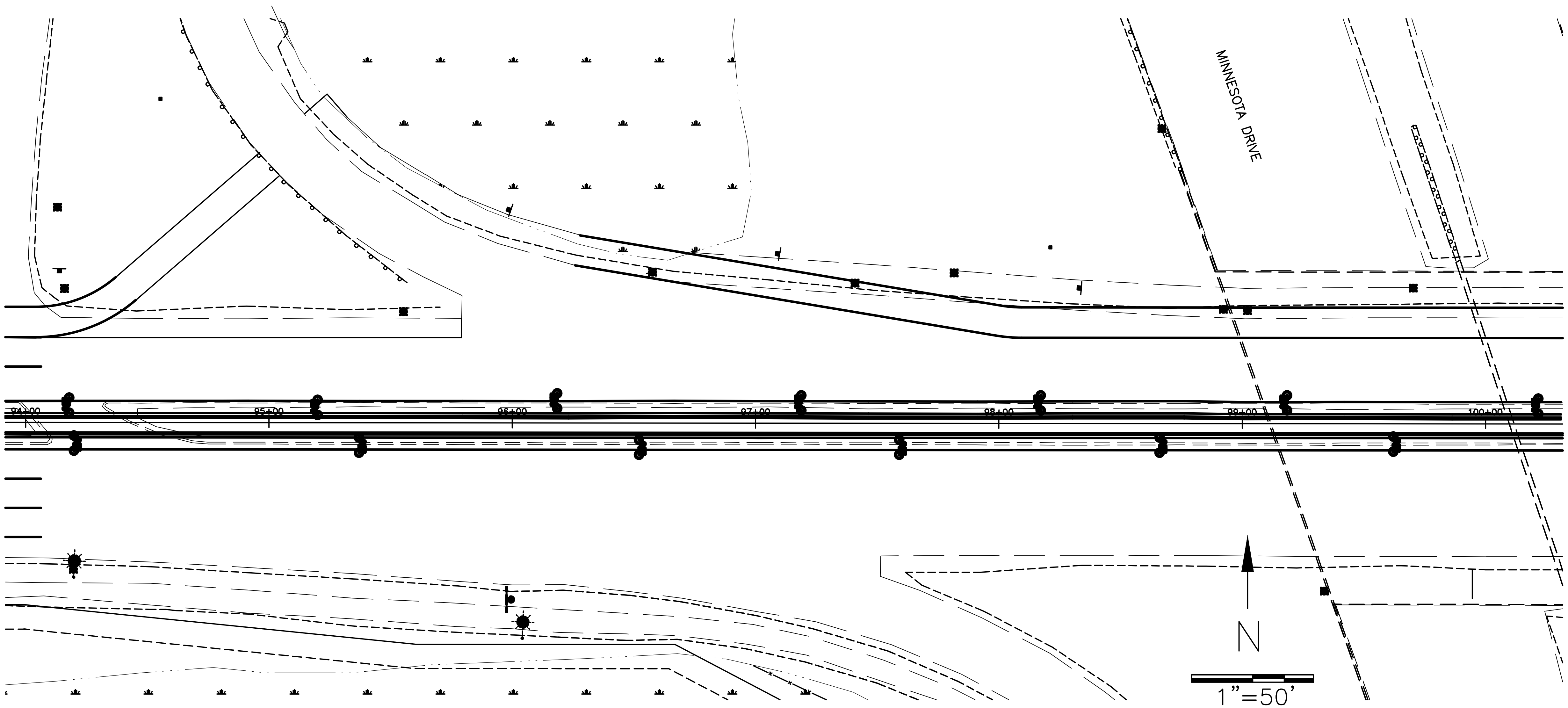

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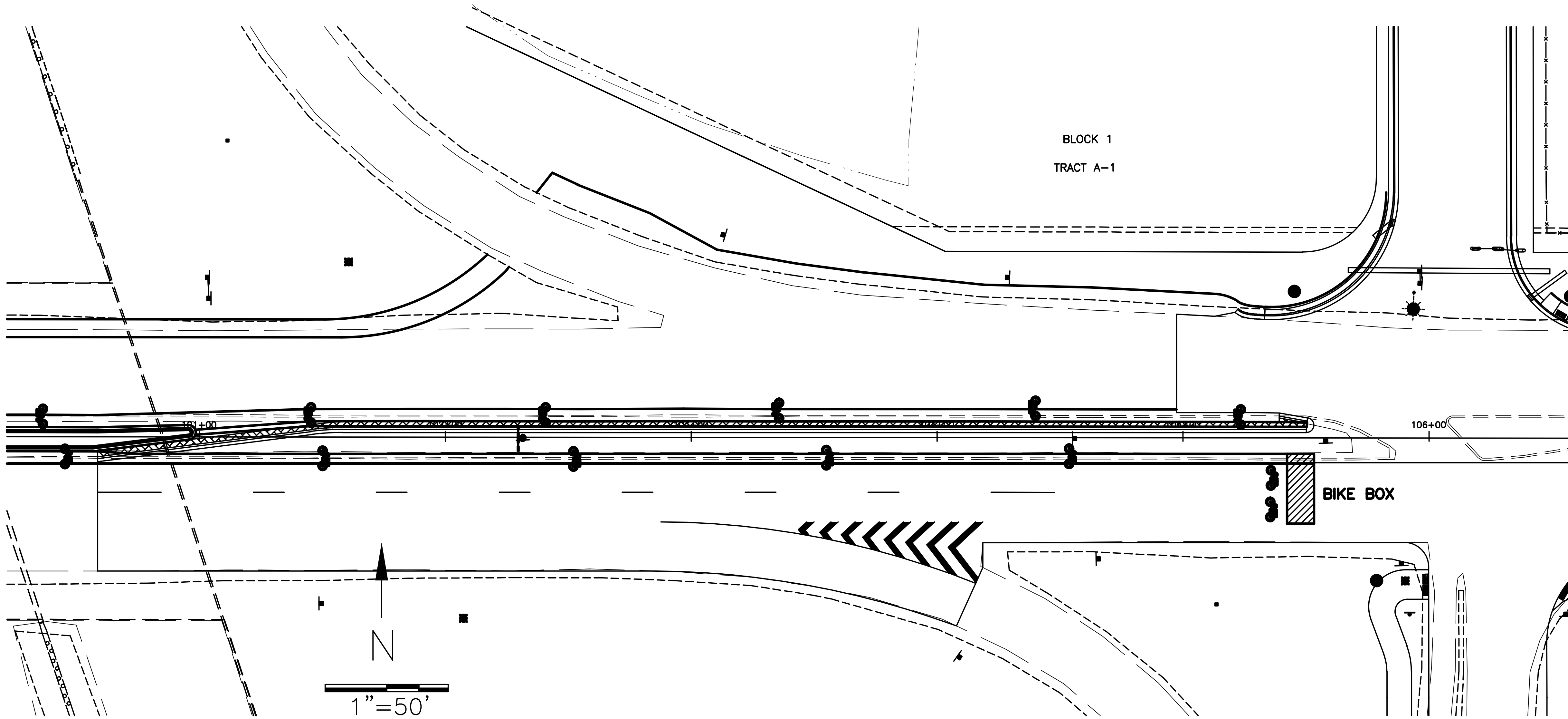

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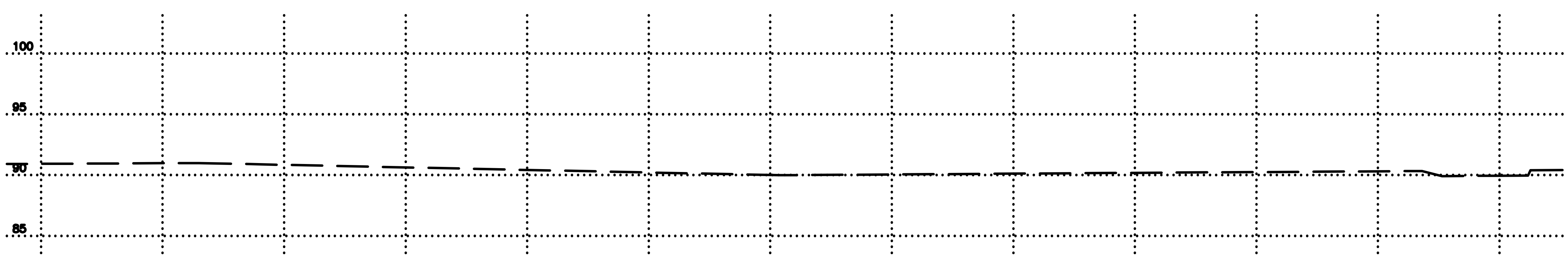

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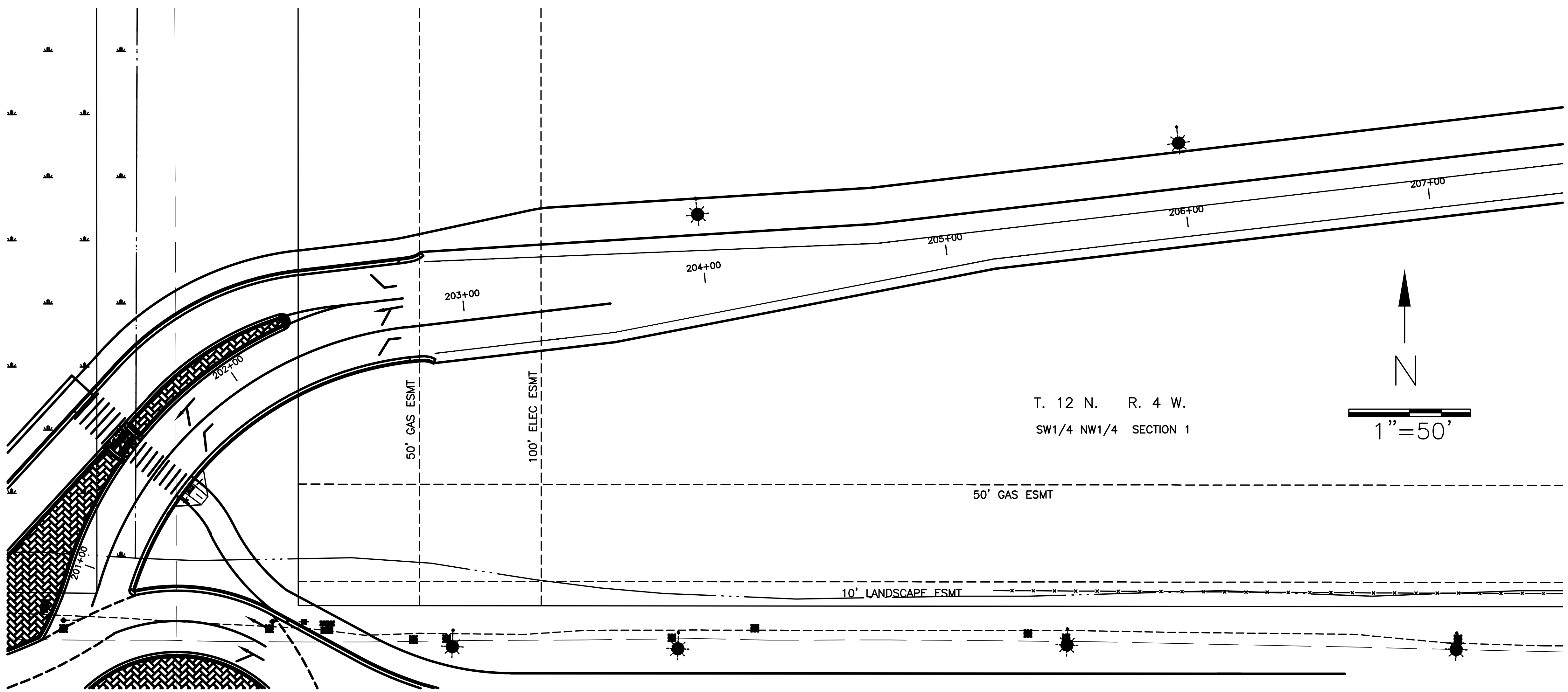

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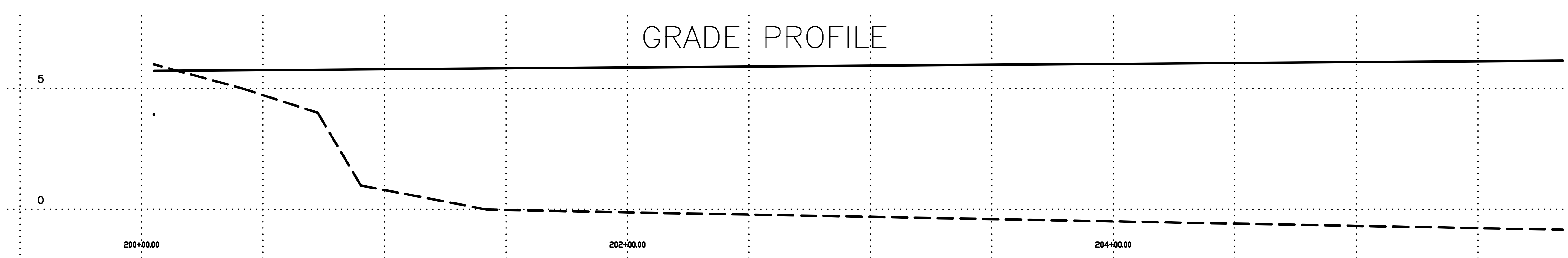

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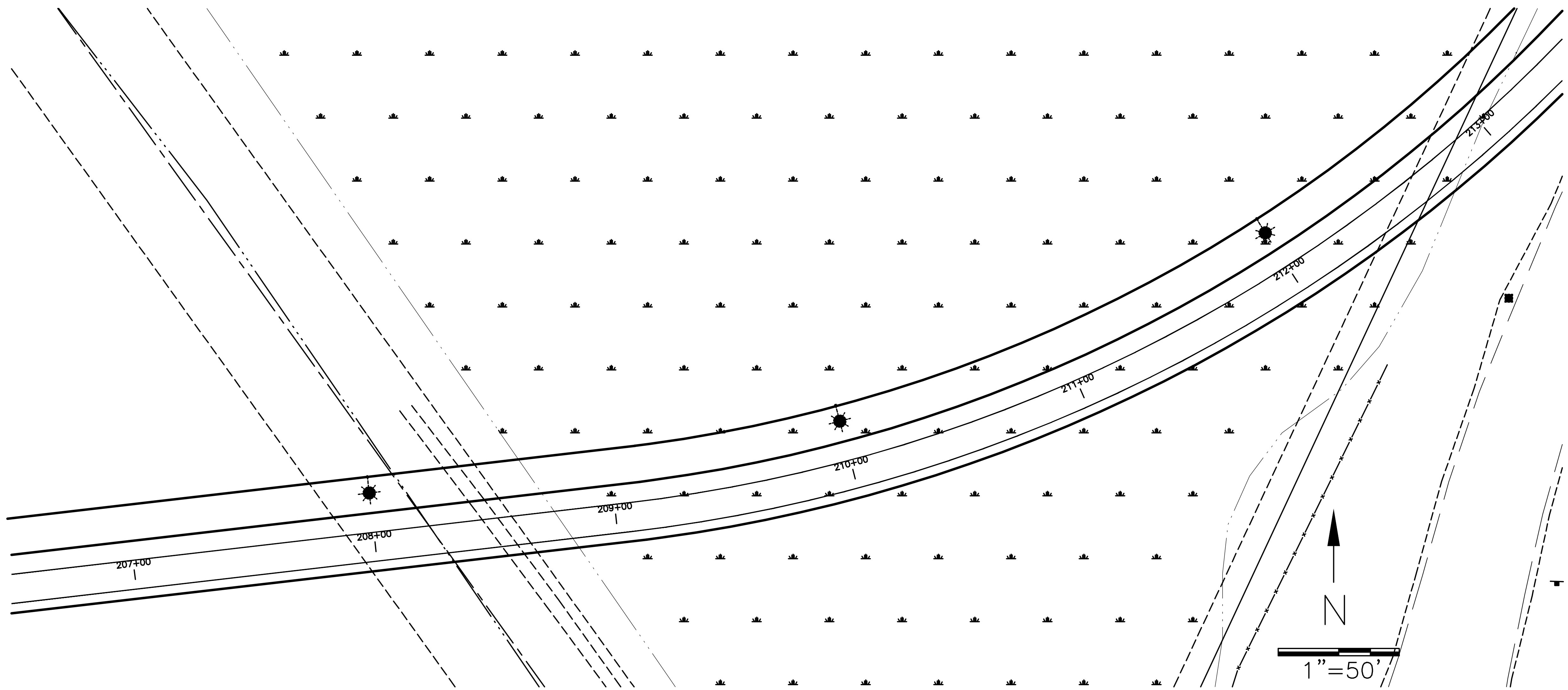

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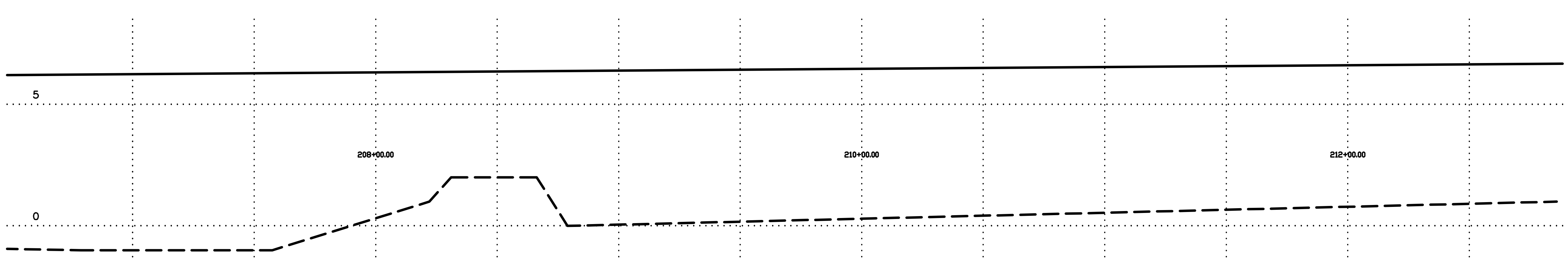

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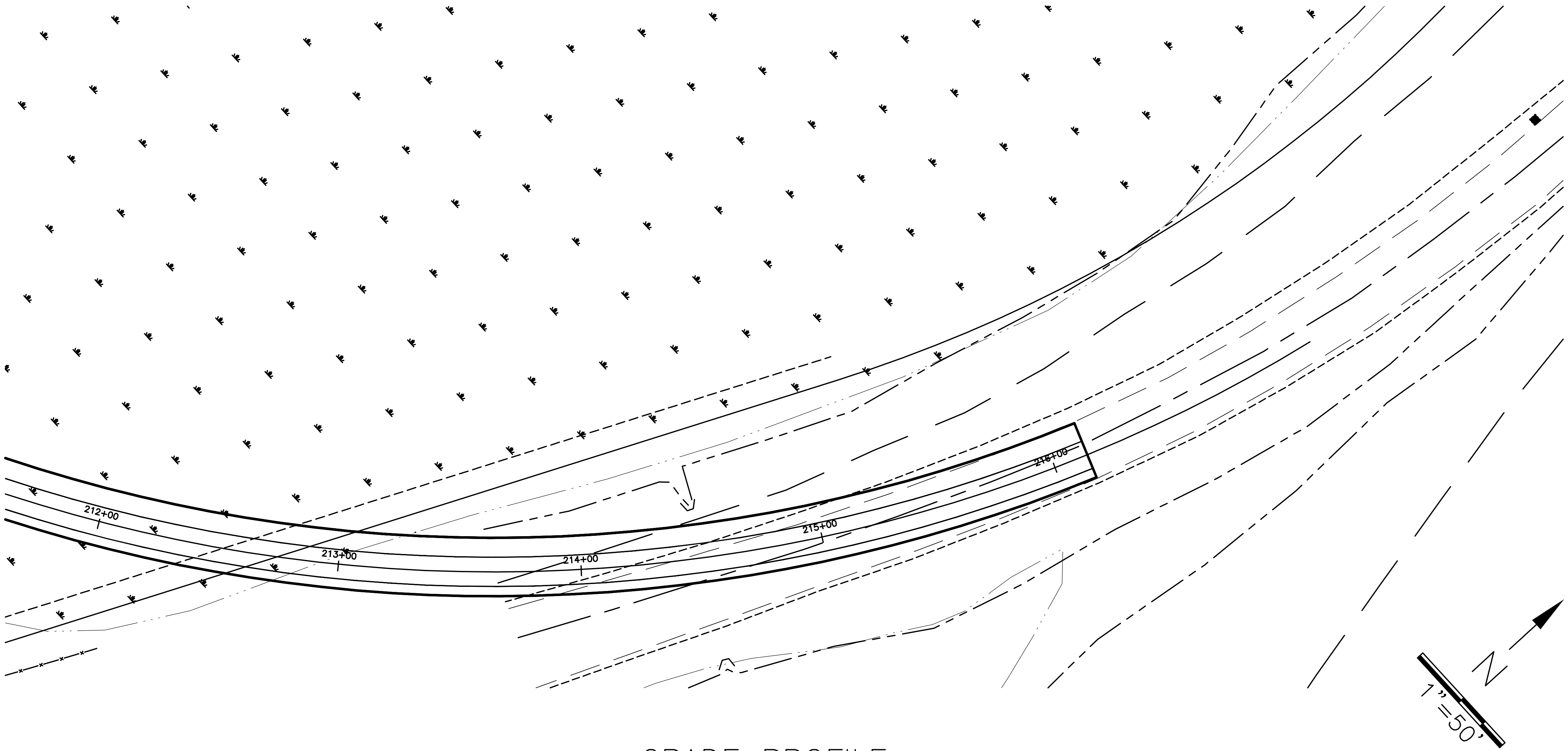

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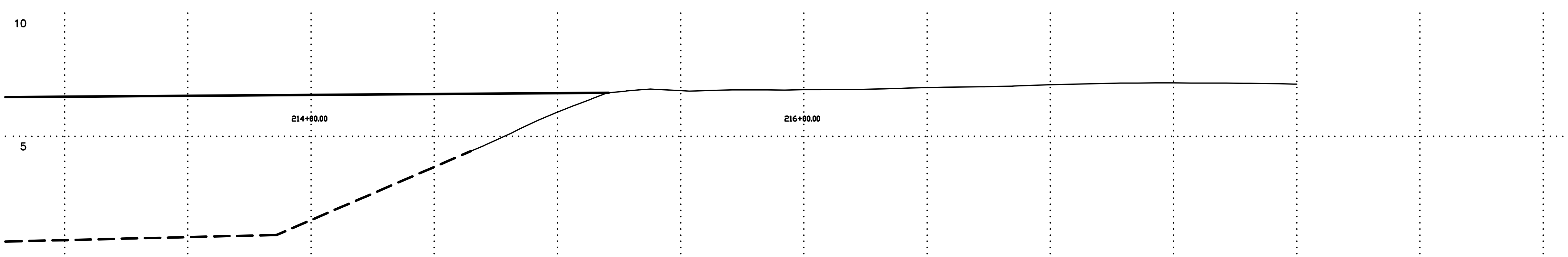

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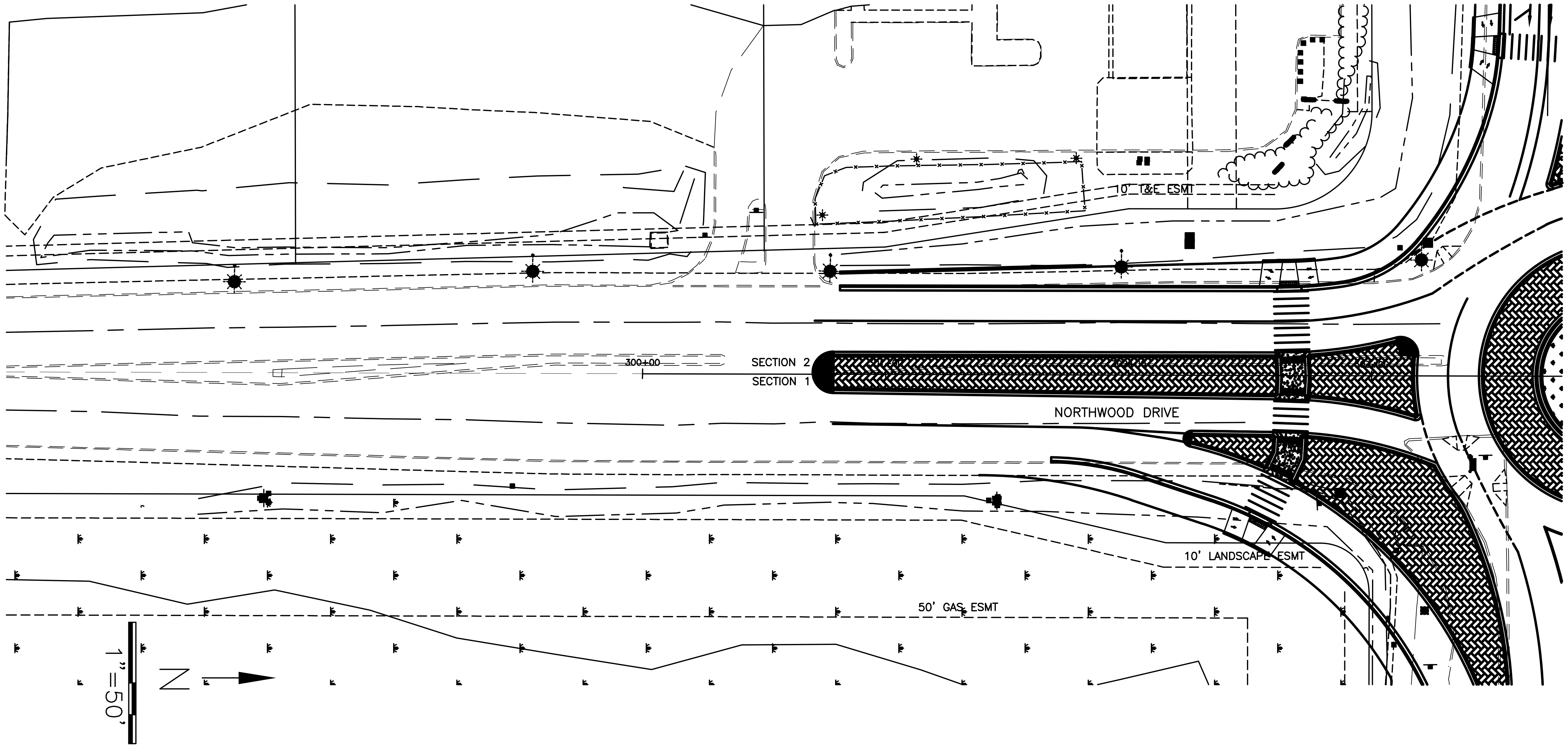

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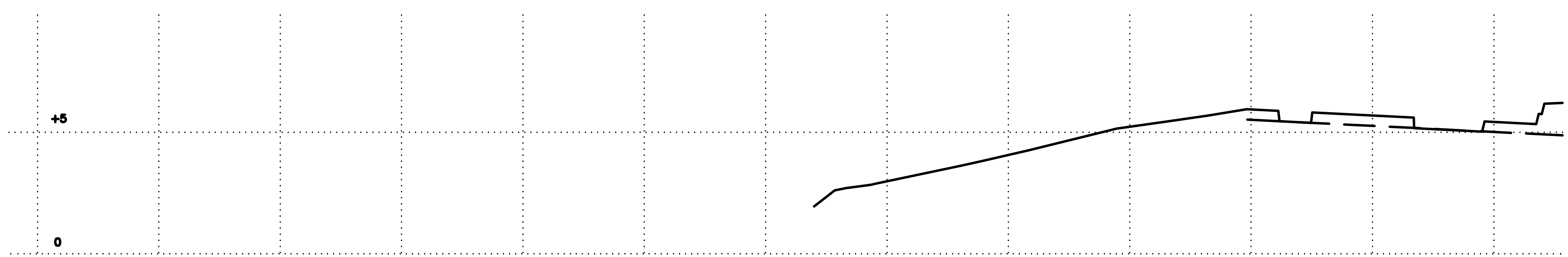

SHEET NO.	TOTAL SHEETS
STATE	**YEAR**
ALASKA	2015

PROJECT DESIGNATION

PROJECT NO. 56727

ADDENDUM NO.

ATTACHMENT NO.

REVISIONS

NO.	DATE	DESCRIPTION

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RASPBERRY ROAD,
JEWEL LAKE TO
MINNESOTA

DESIGNED BY
CHECKED BY
DRAFTED BY

XREFS

SCALE
1"=50'

LAYOUT
MODEL

DATE TIME
4/15/2015 11:47 AM

DRAWING LOCATION
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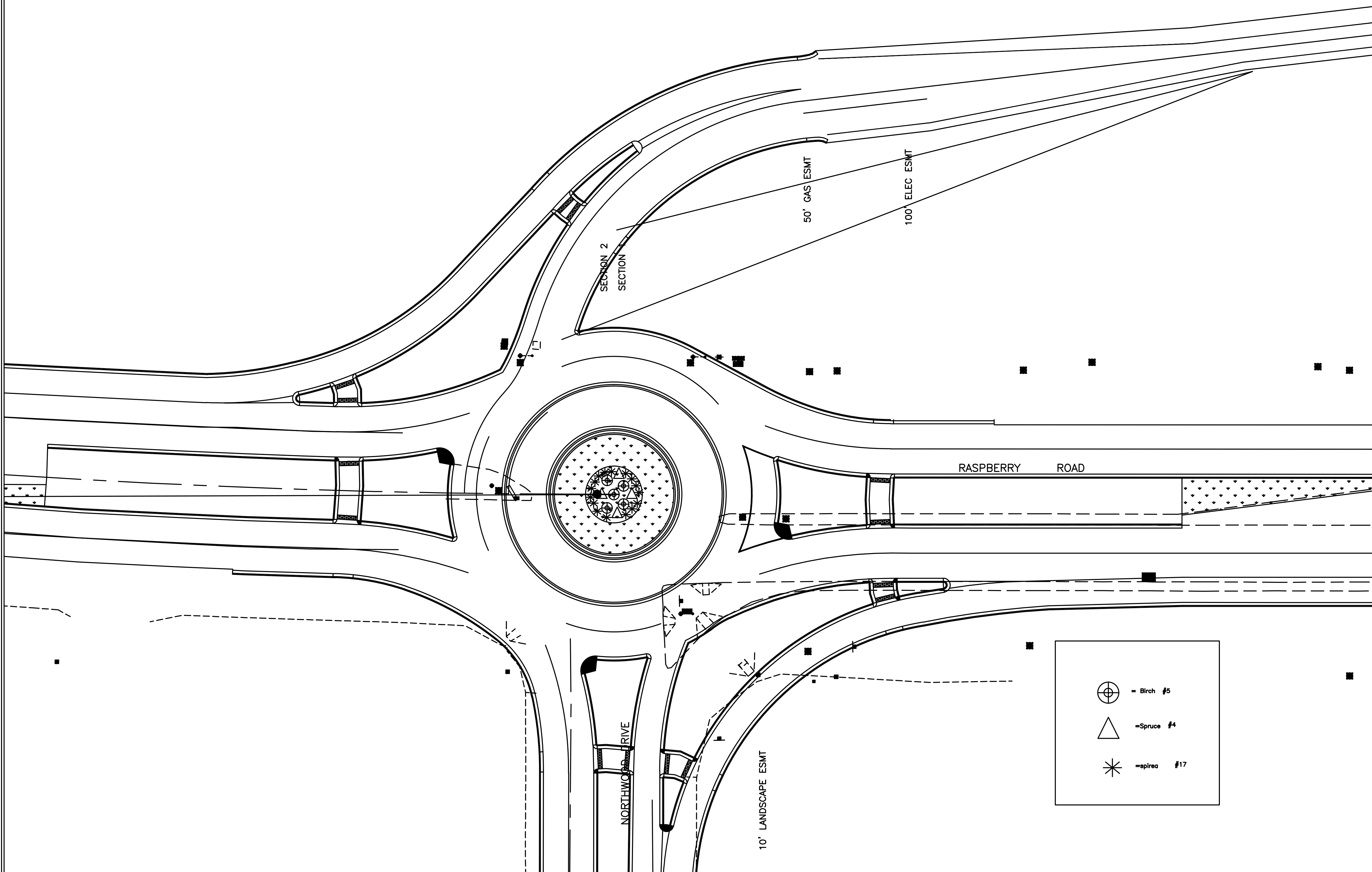
LANDSCAPING DETAIL



SHEET NO.	TOTAL SHEETS
STATE	YEAR
ALASKA	2015

PROJECT DESIGNATION

PROJECT NO. 56727

ADDENDUM NO.

ATTACHMENT NO.

REVISIONS

NO.	DATE	DESCRIPTION

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RASPBERRY ROAD,
JEWEL LAKE TO
MINNESOTA

DESIGNED BY
CHECKED BY
DRAFTED BY

XREFS

SCALE
1"=50'

LAYOUT
MODEL

DATE TIME
4/13/2015 7:29 PM

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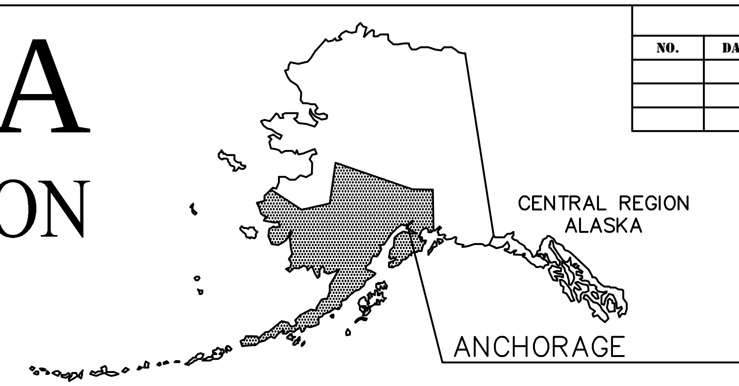
STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES



REVISIONS		
NO.	DATE	DESCRIPTION

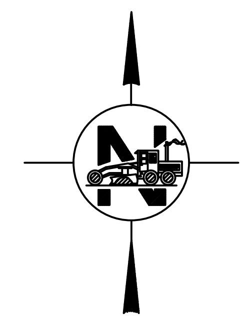
STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL 'A' SHEETS
ALASKA	0526(004)/56727	2014	A1	1
			PLAN SET TOTAL	16

ROUTE: MILEPOINT:

PROPOSED ROADWAY PROJECT

RASPBERRY ROAD UPGRADES
JEWEL LAKE RD TO MINNESOTA DR
PROJECT NO. STP-0526(004)/56727

4R PROJECT



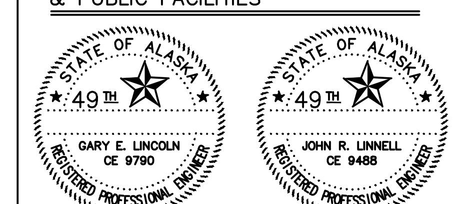
BEGIN PROJECT DESCRIPTION STA: 31+00

END PROJECT DESCRIPTION STA: 106+00

PROJECT SUMMARY		
ROADWAY SECTION	WIDTH	LENGTH
RASPBERRY ROAD	±110 FT	1.4 MILES

DESIGN DESIGNATIONS		
ROADWAY SECTION	A.A.D.T. 2009	DESIGN SPEED
RASPBERRY ROAD		45 MPH

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES



APPROVED:

REGIONAL PRE-CONSTRUCTION ENGINEER DATE

CONCUR:

DIRECTOR, DESIGN & CONSTRUCTION DATE

CERTIFIED TRUE & CORRECT AS-BUILT OF ACTUAL FIELD CONDITION:

CONSTRUCTION PROJECT MANAGER DATE

DESIGNED BY DESIGNEDBY
CHECKED BY CHECKEDBY
DRAFTED BY DRAFTEDBY
XREFS XREF1 XREF2
SCALE SCALE
LAYOUT MODEL
DATE TIME 4/13/2015 8:12 PM
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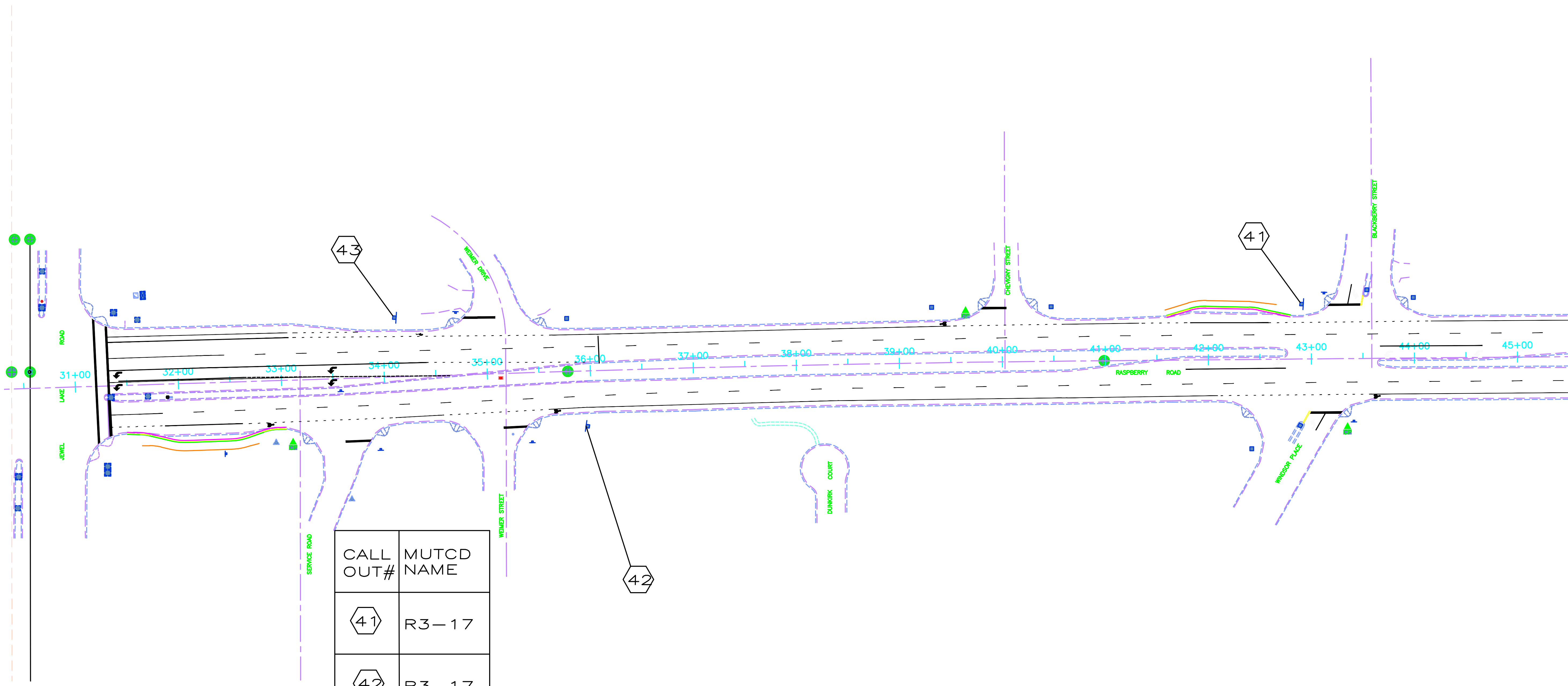
REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	xxxx	2015		



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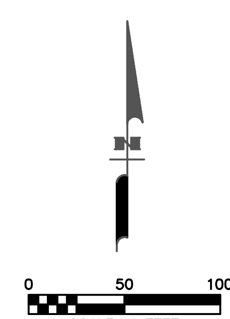
42	R3—17
43	R4—4



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
SIGNING AND STRIPING PLAN

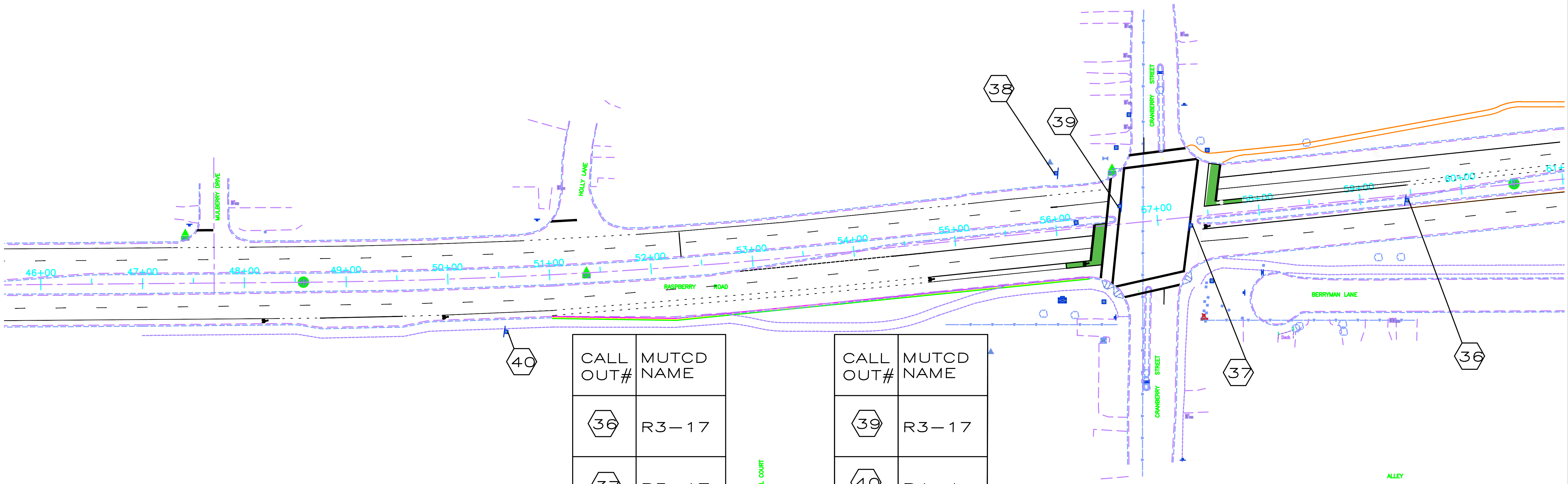
DATE: 04/18/2015

SHEET: 1/5

DESIGNED BY JSB/GND
CHECKED BY JSR
DRAFTED BY
XREFS
SCALE 1" = 50'
LAYOUT PLOT 2
DATE TIME 4/19/2015 12:02 PM
DRAWING LOCATION F:\Senior Design\Travis Striping and Signs.dwg

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	xxxx	2015		



CALL OUT#	MUTCD NAME
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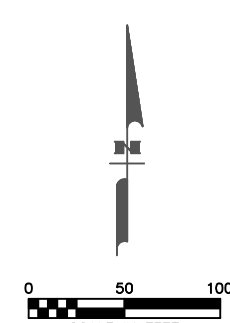
37	R3–17
38	R3–17

CALL OUT#	MUTCD NAME
39	R3–17
40	R4–4



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
SIGNING AND STRIPING PLAN

DATE: 04/18/2015

SHEET: 2/5

DESIGNED BY JSB/GND
CHECKED BY JSR
DRAFTED BY

XREFS

SCALE 1" = 50'

LAYOUT PLOT 3

DATE TIME 4/19/2015 12:02 PM

DRAWING LOCATION F:\Senior Design\Travis Striping and Signs.dwg

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	xxxx	2015		

DESIGNED BY JSR/GND
CHECKED BY JSR
DRAFTED BY

XREFS

SCALE 1" = 50'

LAYOUT PLOT 4

DATE TIME 4/19/2015 12:02 PM

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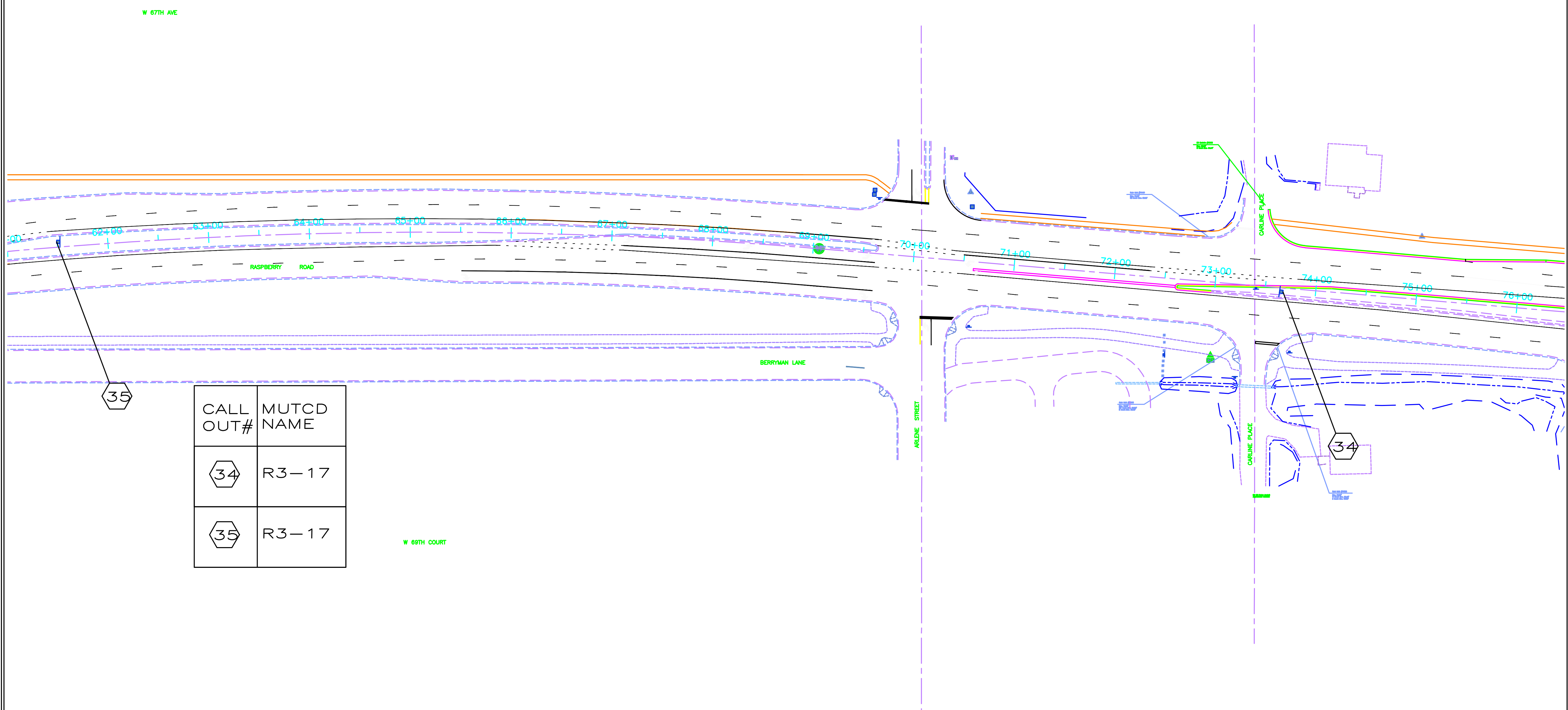
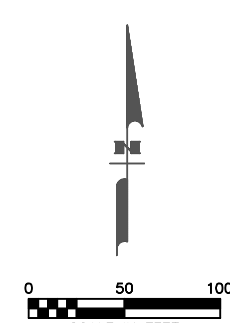


CALL OUT#	MUTCD NAME
34	R3-17
35	R3-17



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
SIGNING AND STRIPING PLAN

DATE: 04/18/2015

SHEET: 3/5

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	xxxx	2015		

DESIGNED BY JSR/GND
CHECKED BY JSR
DRAFTED BY

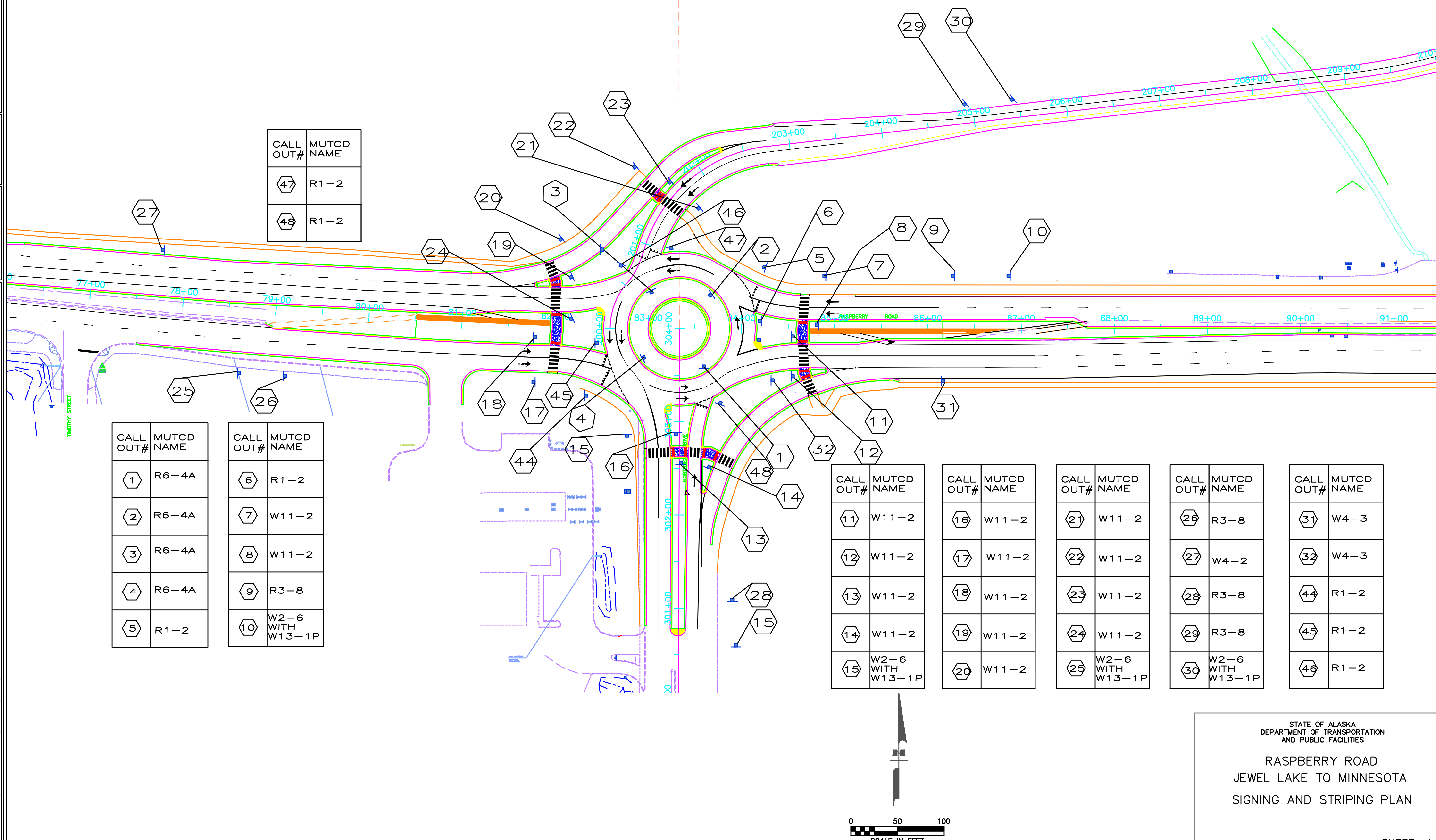
XREFS

SCALE 1" = 50'

LAYOUT PLOT 5

DATE TIME 4/19/2015 12:02 PM

DRAWING LOCATION F:\Senior Design\Travis Striping and Signs.dwg



CALL OUT#	MUTCD NAME
1	R6-4A
2	R6-4A
3	R6-4A
4	R6-4A
5	R1-2
6	R1-2
7	W11-2
8	W11-2
9	R3-8
10	W2-6 WITH W13-1P
11	W11-2
12	W11-2
13	W11-2
14	W11-2
15	W2-6 WITH W13-1P
16	W11-2
17	W11-2
18	W11-2
19	W11-2
20	W11-2
21	W11-2
22	W11-2
23	W11-2
24	W11-2
25	W2-6 WITH W13-1P
26	R3-8
27	W4-2
28	R3-8
29	R3-8
30	W2-6 WITH W13-1P
31	W4-3
32	W4-3
44	R1-2
45	R1-2
46	R1-2
47	R1-2
48	R1-2

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

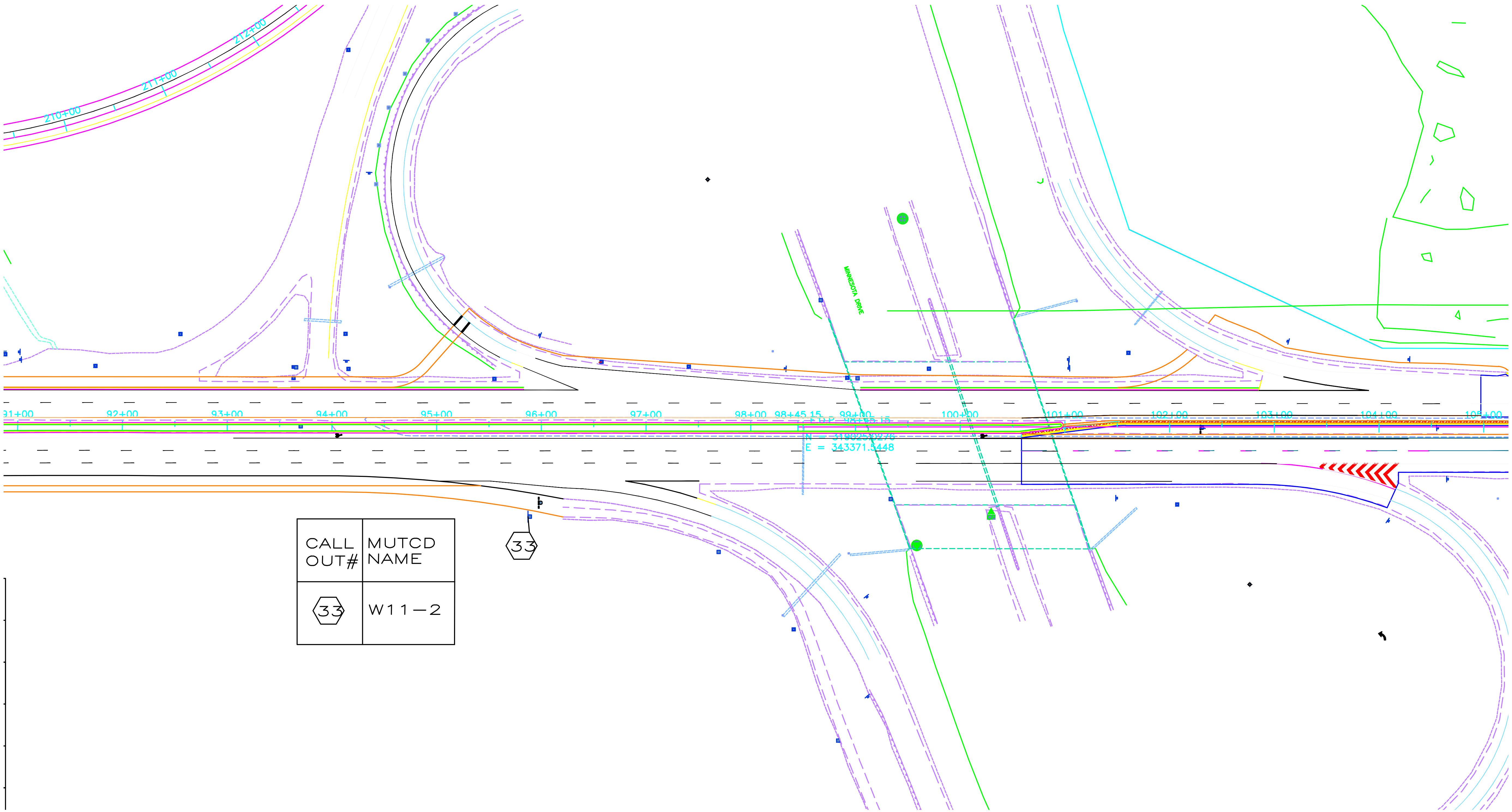
RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
SIGNING AND STRIPING PLAN

DATE: 04/18/2015

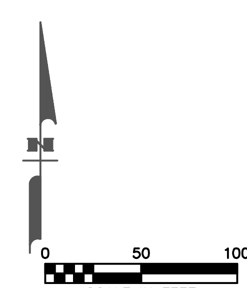
SHEET: 4/5

REVISIONS		
NO.	DATE	DESCRIPTION

STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
ALASKA	xxxx	2015		



CALL OUT#	MUTCD NAME
33	W11—2



STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

RASPBERRY ROAD
JEWEL LAKE TO MINNESOTA
SIGNING AND STRIPING PLAN

DATE: 04/18/2015

SHEET: 5/5

DESIGNED BY JSB/GND
CHECKED BY JSR
DRAFTED BY

XREFS

SCALE 1" = 50'

LAYOUT PLOT 6

DATE TIME 4/19/2015 12:02 PM

DRAWING LOCATION F:\Senior Design\Travis Striping and Signs.dwg