MATANUSKA-SUSITNA BOROUGH
PLANNING COMMISSION AGENDA

Edna DeVries, Mayor

PLANNING COMMISSION
Doug Glenn, District 1
Richard Allen, District 2
Patricia Chesbro, District 3
Mike Rubeo, District 4
Bill Kendig, District 5
Stafford Glashan, District 6
Curt Scoggin, District 7

Michael Brown, Borough Manager

PLANNING & LAND USE DEPARTMENT
Alex Strawn, Planning & Land Use Director
Kim Sollien, Planning Services Manager
Jason Ortiz, Development Services Manager
Fred Wagner, Platting Officer
Karol Riese, Planning Clerk

Assembly Chambers of the
Dorothy Swanda Jones Building
350 E. Dahlia Avenue, Palmer

June 6, 2022
REGULAR MEETING
6:00 p.m.

Ways to participate in the meeting:

IN PERSON: Should you wish to testify in person, please adhere to a 6-foot distance between yourself and others.

IN WRITING: You can submit written comments to the Planning Commission Clerk at msb.planning.commission@matsugov.us.

TELEPHONIC TESTIMONY:
(We are having intermittent technical difficulties with our software; if you would like to submit comments, please submit comments to the email address above by the Friday before the meeting.)

- Dial 1-855-290-3803; you will hear "joining conference" when you are admitted to the meeting.
- You will be automatically muted and able to listen to the meeting.
- When the Chair announces audience participation or a public hearing you would like to speak to, press *3; you will hear, "Your hand has been raised." (There may be a delay, please be patient with the system.)
- When it is your turn to testify, you will hear, "Your line has been unmuted."
- State your name for the record, spell your last name and provide your testimony.

Ways to observe the meeting:
FACEBOOK LIVE at www.facebook.com/MatSuBorough
- Questions or comments will **not** be answered; please call the number above if you have a comment or concern.

I. CALL TO ORDER, ROLL CALL, AND DETERMINATION OF QUORUM

II. APPROVAL OF AGENDA

III. PLEDGE OF ALLEGIANCE

IV. CONSENT AGENDA

A. MINUTES
Regular Meeting Minutes: 05/16/2022

B. INTRODUCTION FOR PUBLIC HEARING: QUASI-JUDICIAL MATTERS

C. INTRODUCTION FOR PUBLIC HEARING: LEGISLATIVE MATTERS

Resolution 22-20 A resolution of the Matanuska-Susitna Planning Commission recommending the Assembly adopt the Beverly Lake Lake Management Plan and an Ordinance amending MSB 17.59 for lake management plan implementation; Public Hearing: June 20, 2022 (Staff: Kelsey Anderson)

V. COMMITTEE REPORTS

VI. AGENCY/STAFF REPORTS

VII. LAND USE CLASSIFICATIONS

VIII. AUDIENCE PARTICIPATION (*three minutes per person, for items not scheduled for public hearing*)

IX. PUBLIC HEARING: QUASI-JUDICIAL MATTERS ***(Commission members may not receive or engage in ex-parte contact with the applicant, other parties interested in the application, or members of the public concerning the application or issues presented in the application)***.

X. PUBLIC HEARING: LEGISLATIVE MATTERS

Resolution 22-13 A resolution of the Matanuska-Susitna Borough Planning Commission recommending Assembly adoption of the Matanuska-Susitna Borough 2022 Official Streets and Highways Plan Update (Staff: Adam Bradway).

Resolution 22-18 A resolution of the Matanuska-Susitna Borough Planning Commission recommending adoption of an ordinance amending MSB 43.05.015 Purpose and Scope to reference the 2022 Subdivision Construction Manual (Staff: Alex Strawn).

XI. CORRESPONDENCE & INFORMATION

XII. UNFINISHED BUSINESS

XIII. NEW BUSINESS

XIV. COMMISSION BUSINESS:

A. Upcoming Planning Commission Agenda Items

XV. DIRECTOR AND COMMISSIONER COMMENTS

XVI. ADJOURNMENT (*Mandatory Midnight*)

Disabled persons needing reasonable accommodation in order to participate at a Planning Commission Meeting should contact the Borough ADA Coordinator at 861-8432 at least one week in advance of the meeting.

MINUTES

May 16, 2022

The regular meeting of the Matanuska-Susitna Borough Planning Commission was held on May 2, 2022, at the Matanuska-Susitna Borough Assembly Chambers, 350 E. Dahlia Avenue, Palmer, Alaska. The meeting was called to order at 6:00 p.m. by Vice-Chair Patricia Chesbro.

I. CALL TO ORDER, ROLL CALL, AND DETERMINATION OF QUORUM

Planning Commission members present and establishing a quorum:

Mr. Doug Glenn, Assembly District #1
Mr. Richard Allen, Assembly District #2
Ms. Patricia Chesbro, Assembly District #3, Vice-Chair
Mr. Michael Rubeo, Assembly District #4*
Mr. Bill Kendig, Assembly District #5
Mr. Curt Scoggin, Assembly District #7

Planning Commission members absent and excused were:

Mr. Stafford Glashan, Assembly District #6, Chair

Staff in attendance:

Ms. Peggy Horton, Planner II
Mr. Adam Bradway, Planner II
Mr. Emerson Krueger, Natural Resource Manager
Ms. Karol Riese, Planning Depart. Administrative Specialist/Planning Commission Clerk

*Indicates that the individual attended telephonically.

II. APPROVAL OF AGENDA

Vice-Chair Chesbro inquired if there were any changes to the agenda.

GENERAL CONSENT: The agenda was approved without objection.

III. PLEDGE OF ALLEGIANCE

The pledge of allegiance was led by Mr. Adam Bradway.

IV. CONSENT AGENDA

A. Minutes Regular Meeting Minutes: May 2, 2022

B. INTRODUCTION FOR PUBLIC HEARING: QUASI-JUDICIAL MATTERS

C. INTRODUCTION FOR PUBLIC HEARING: LEGISLATIVE MATTERS

Resolution 22-13 2022 Official Streets and Highways Plan Update, Public Hearing: June 6, 2022, (Staff: Adam Bradway).

Resolution 22-18 MSB Subdivision Construction Manual Update, Public Hearing: June 6, 2022, (Staff: Alex Strawn).

GENERAL CONSENT: The consent agenda was approved without objection.

V. COMMITTEE REPORTS

(There were no committee reports.)

VI. AGENCY/STAFF REPORTS

Adam Bradway, Planner II, presented the MSB Planning and Land Uses Viewer.

VII. LAND USE CLASSIFICATIONS

Resolution 22-17 A resolution of the Matanuska-Susitna Borough Planning Commission recommending Assembly approval of the reclassification of a borough-owned parcel, Tax ID #20N04W08A001, (Staff: Emerson Krueger, Natural Resource Manager).

MOTION: Commissioner Kendig moved to approve Planning Commission Resolution 22-17. The motion was seconded.

No discussion.

VOTE: The main motion passed without objection.

VIII. AUDIENCE PARTICIPATION (Three minutes per person.)

(There were no persons to be heard.)

IX. PUBLIC HEARING: QUASI-JUDICIAL MATTERS

Commissioner Kendig recused himself – left room at 6:21pm

Resolution 22-08 A conditional use permit in accordance with MSB 17.60 – Conditional Uses for a marijuana cultivation facility located at 3097 South Sylvan Lane, Tax ID #6315B01L011 & 6315B01L012 (Lot 11A); within Township 17 North, Range 2 West, Section 22, Seward Meridian, (Applicant Ryan McKay and Jana Weltzin for AK Legacy Genetics; Staff: Peggy Horton).

Vice-Chair Chesbro read the resolution title into the record.

Ms. Horton provided a staff report:

- staff recommended approval of the resolution with conditions.

Vice-Chair Chesbro invited the applicant or their representative to provide an overview of their application.

Ms. Weltzin, representative for the applicant, and Ryan McKay, applicant, provided an overview of their application.

Commissioners questioned the applicant regarding:
- Exhaust systems – sealed system: recirculating, recycling are within;
- Growth facility/retail facility

Vice-Chair Chesbro opened the public hearing.

The following persons spoke in opposition of Planning Commission Resolution 22-04:
Lisa Day, Wendy Richardson, Chris Schmidt, Alton Schmidt, Pat Martin, Philip Bledsoe, Jared Carson,

Vice-Chair Chesbro invited the applicant to respond to questions and statements from the audience.

Mr. McKay provided information on how the water process will work and odor process. Extended an invitation to the neighborhood to see how the facility operates. Offer full transparency.

There being no one else to be heard, Vice-Chair Chesbro closed the public hearing and discussion moved to the Planning Commission.

MOTION: Commissioner Allen moved to approve Planning Commission Resolution 22-08. The motion was seconded.

Discussion ensued

VOTE: The main motion passed with one Commissioner Glenn opposed.
Yes: Commissioner Allen, Commissioner Scoggin, Commissioner Rubeo, Commissioner Chesbro
No: Commissioner Glenn

Commissioner Kendig returned to meeting at 7:12pm

Resolution 22-11 A conditional use permit in accordance with MSB 17.70 – Regulation of Alcoholic Beverage Uses for the operation of a convenience market with gas pumps and alcoholic beverage package store called Valley Country Store #4, located at 3068 South Trunk Road, Tax ID #8150000L001B; within Township 17 North, Range 1 East, Section 16, Seward Meridian, (Applicant: Matt Gittlein for KG Enterprises, LLC; Staff: Peggy Horton).

Vice-Chair Chesbro read the resolution title into the record.

Ms. Horton provided a staff report:

- staff recommended approval of the resolution with conditions.

Vice-Chair Chesbro invited the applicant, or their representative to provide an overview of their application.

Mr. Matt Gittlein, applicant, and the applicants Civil Engineer, Tim Alley, provided an overview of their application.

Commissioners questioned the applicant regarding:
(No questions were asked)

Vice-Chair Chesbro opened the public hearing.

There were no persons to be heard.

There being no one else to be heard, Vice-Chair Chesbro closed the public hearing and discussion moved to the Planning Commission.

MOTION: Commissioner Allen moved to approve Planning Commission Resolution 22-11. The motion was seconded.

Discussion ensued

VOTE: The main motion passed without objection.
Yes: Commissioner Rubeo, Commissioner, Kendig, Commissioner Allen, Commissioner Glenn, Commissioner Scoggin, Commissioner Chesbro

Resolution 22-10 A conditional use permit in accordance with MSB 17.61 – Core Area for the operation of a convenience market with gas pumps and alcoholic beverage package store called Valley Country Store #4, located at 3068 South Trunk Road, Tax ID #8150000L001B; within Township 17 North, Range 1 East, Section 16, Seward Meridian, (Applicant: Matt Gittlein for KG Enterprises, LLC; Staff: Peggy Horton).

Vice-Chair Chesbro read the resolution title into the record.

Ms. Horton provided a staff report:

- staff recommended approval of the resolution with conditions. .

Vice-Chair Chesbro invited the applicant or their representative to provide an overview of their application.

Mr. Gettlein, applicant, provided an overview of their application.

Vice-Chair Chesbro opened the public hearing.

The following persons spoke in favor of Planning Commission Resolution 22-10:
Mr. August Manelisk and Ms. Emma Greenwood-Duran

There being no one else to be heard, Vice-Chair Chesbro closed the public hearing and discussion moved to the Planning Commission.

MOTION: Commissioner Kendig moved to approve Planning Commission Resolution 22-10. The motion was seconded.

Discussion ensued

VOTE: The main motion passed without objection.
Yes: Commissioner Allen, Commissioner Scoggin, Commissioner Rubeo, Commissioner Kendig, Commissioner Chesbro, Commissioner Glenn

X. PUBLIC HEARING LEGISLATIVE MATTERS

XI. CORRESPONDENCE AND INFORMATION
(There was no correspondence and information.)

XII. UNFINISHED BUSINESS
(There was no unfinished business.)

XIII. NEW BUSINESS - *(There was no new business.)*

XIV. COMMISSION BUSINESS

A. Upcoming Planning Commission Agenda Items (*Staff: Jason Ortiz*)

(Commission Business was presented, and no comments were noted.)

XV. DIRECTOR AND COMMISSIONER COMMENTS

XVI. ADJOURNMENT

The regular meeting adjourned at 7:41 p.m.

____
STAFFORD GLASHAN, Planning Commission Chair

ATTEST:

____
KAROL RIESE, Planning Commission Clerk

Minutes approved: ______________________

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INTRODUCTION FOR PUBLIC HEARING

LEGISLATIVE

Resolution No. PC 22-20

Beverly Lakes, Lake Management Plan

(Pages 13-18)

INTRODUCTION FOR PUBLIC HEARING

MATANUSKA-SUSITNA BOROUGH
Planning and Land Use Department
Planning Division
350 East Dahlia Avenue • Palmer, AK 99645
Phone (907) 861-7833
www.matsugov.us

PLANNING DIVISION STAFF REPORT

DATE: June 6, 2022

SUBJECT: Beverly Lake, Lake Management Plan

RESOLUTION NO.: Planning Commission Resolution 22-20

REVIEWED BY: Alex Strawn, Planning & Land Use Director
Kim Sollien, Planning Services Division Manager

STAFF: Kelsey Anderson, Planner II

SUMMARY STATEMENT

Lake Management Planning History

The Matanuska-Susitna Borough (MSB) adopted the first Lake Management Plan (LMP) in 1995. Since then, there have been forty-one LMPs adopted by the Borough Assembly. The Beverly Lake LMP was initiated in the summer of 2021 for the same reasons as the 41 lakeside communities before them: as populations grow, there is an increase in conflicting uses of the land and water being developed. When this happens, the residents have an option of initiating an LMP to resolve conflict among current neighbors while setting a standard for incoming residents. The LMP process is a grassroots planning option, meaning that LMPs must be initiated by a lake community. Once initiated, the residents work together to develop the regulations they think are appropriate for the lake. The Borough's Planning Department staff act as researchers, writers, and neutral meeting facilitators throughout the process.

Lake Management Plans provide guidance for how the surface of the lake is used and makes recommendations concerning public access and education of lake users to meet the goals of the plan. Certain aspects of the plan can be implement as enforceable regulations through MSB 17.59. In 1999, the Borough Assembly adopted Ordinance NO. 99-103 which established guidelines for appropriate regulations based on the lake size. Residents also have the power to develop their own regulations to be included in a Lake Management Plant. According to the Alaska Department of Fish & Game, Beverly Lake measures 42 surface acres with an average depth of 9 feet. The adopted guidelines for a lake of this size are as follows: No Wake Zone of 100 feet from shoreline; Quiet Hours 10pm to 8am; Personal Watercraft Restriction; 10 Horsepower Limit.

Beverly Lake, Lake Management Plan Process

Residents of Beverly Lake, located within the Meadow Lakes Community Council, began the petition process for a Lake Management Plan (LMP) in 2018. After 2 years and several attempts, residents submitted a valid petition to the Matanuska-Susitna Borough (MSB) Planning Department. For an LMP petition to be considered valid, it must show that over fifty percent of all property owners within 600 feet of the shoreline agree to initiate a plan. Fifty-three percent of lake residents signed the petition.

The next step in the LMP process as defined in MSB 15.24.031 required planning staff to mail a ballot to every parcel within 600 feet of the shoreline asking residents to indicate whether they support or oppose initiating an LMP. Eighty-four ballots were mailed. Of those, fifty-nine ballots were returned to the MSB. Thirty-seven properties voted in favor of a LMP, which made the final count show sixty-two percent in support.

Planning staff scheduled two public meetings for Beverly Lake residents to discuss their concerns, ideas, and to work towards a consensus for regulations to be included in the Lake Management Plan. The first meeting was held on March 22, 2022 in person at the Wasilla Public Library and had a Microsoft Teams component so residents could join virtually. Planning staff gave an overview of what to expect from the LMP process and then provided an opportunity for residents to voice their concerns regarding usage conflicts on Beverly Lake. Residents were divided into small groups where they developed some ideas for regulation packages including quiet hours, a no-wake zone, and options for motorized watercraft and personal watercraft use. At the end of the meeting, residents voted to have another meeting to further discuss regulations. The second meeting was held on March 24, 2022, and was entirely virtual using Microsoft Teams. The meeting followed the same format as the first, with the exception of the small groups. In the virtual meeting, residents worked through their ideas and concerns together and also agreed to a follow-up meeting.

While it was very clear that the primary issue was jet ski use, there were several notable themes that residents agreed on. These issues are discussed at length in the LMP. Below is a brief summary of the top three issues:

Safety: Community members spoke on what safety for their children and their property looks like on the lake. Several mentioned "close calls" with kids riding jet skis while their children were swimming. There was also videos, photos, and many comments on damaged docks and shorelines from wakes made by jet skis and fast moving boats.

Wildlife & Environmental Protection: Loon nesting habitat, swans, and ducks were mentioned as important species to protect on Beverly Lake. There was an Alaska Department of Fish & Game representative at both meetings to help answer questions that residents had about loon nesting habitat. All residents agreed that habitat protection was of great importance to the overall quality of life on the lake.

Motorized Watercraft/Personal Watercraft Use: Residents spoke both for and against motorized use on Beverly Lake. The residents who would like to see a ban on jet ski use and boats over 15 horsepower brought up points such as the size and depth of the lake being incompatible with high speed use, and how the noise was disturbing the quiet, rural character of the neighborhood. The residents who were in favor of maintaining motorized use on Beverly Lake spoke to the family-oriented nature of lakeside living, and wanting to be able to enjoy their property by jet skiing, water skiing, tubing, and boating.

The third and final public meeting was held on April 26, 2022. The meeting was held at the Wasilla Public Library and on Microsoft Teams. Planning staff provided a draft Lake Management Plan several days before the meeting so residents would have time to review the document and proposed regulations prior to the meeting. The goal of the final meeting was to come to an agreement on the regulations that would be included in an LMP so that residents could cast a final vote that would show if residents supported bringing the Beverly Lake, Lake Management Plan forward to the Planning Commission and Assembly for adoption into MSB Code. However, residents were unable to come to an agreement on the regulations they wanted to be included in the LMP. Because residents were not able to come to a consensus regarding the regulations that would be included in the Plan, Planning staff had to ask residents to vote on which regulation package they wanted to see included in a plan.

The final regulation options for the Beverly Lake LMP were developed by the residents of Beverly Lake, and were presented as "Option A" and "Option B" on the ballot (defined below). There was also an "Option C," which was the option to not have an LMP. Residents agreed to a ranked choice voting option for the final ballot. Planning staff mailed ballot packets to residents within 600 feet of the shoreline on Friday, May 6, 2022 and gave residents until May 20, 2022 to send back their ballot.

Option A: Quiet Hours 10 p.m. to 8 a.m., Sunday through Saturday; 150 feet No-Wake Zone; No personal watercraft; Motorized Watercraft allowed up to 15 horsepower.

- Option A is within the parameters laid out by Ordinance No. 99-103 which established guidelines for lake regulations based on size.

Option B: Quiet Hours 10 p.m. to 7 a.m., Sunday through Thursday, 11 p.m. to 7 a.m., Friday through Saturday; Motorized Watercraft and Personal Watercraft Use allowed on odd days of the month and all federal three-day holidays (Memorial Day, Fourth of July, and Labor Day).

Option C: No Lake Management Plan

The Final Ballot Count:
Ballots mailed: 84

Ballots Returned: 70

Option A as first choice: 38

Option B as first choice: 0

Option C as first choice: 32

Clear majority in first round of counting: <u>Yes, 54 % majority in favor of Option A</u>

Legislation

The attached draft code ordinance, Ordinance No. 22-078, will be submitted to the Assembly as part of the adoption process. This legislation is included for your information. The ordinance adopts the Beverly Lake, Lake Management Plan under MSB 15.24.030(C), and amends MSB 17.59 to implement the regulations that the community voted on as they are defined in the Lake Management Plan.

Staff Recommendations

The Beverly Lake, Lake Management Plan was developed with intensive public feedback through public meetings, written and verbal comment, and ballot process for both the initiation and implementation of the Lake Management Plan. This LMP is the will of the majority of property owners within 600 feet of the shoreline of Beverly Lake.

Staff respectfully recommends the adoption of the Planning Commission Resolution 22-20, recommending the adoption of the Beverly Lake, Lake Management Plan.

PUBLIC HEARING LEGISLATIVE

Resolution No. PC 22-13

Official Streets and Highways Plan Update

(Pages 19-146)

MATANUSKA-SUSITNA BOROUGH
Planning and Land Use Department
Planning Division
350 East Dahlia Avenue • Palmer, AK 99645
Phone (907) 861-7833
www.matsugov.us

PLANNING DIVISION STAFF REPORT

DATE:	May 4, 2022
SUBJECT:	2022 Official Streets and Highways Plan Update
RESOLUTION NO.:	Planning Commission Resolution 22-13
REVIEWED BY:	Alex Strawn, Planning & Land Use Director K.S. acting Kim Sollien, Planning Services Manager K.S.
STAFF:	Adam Bradway, Planner II

SUMMARY STATEMENT

The Matanuska-Susitna Borough (MSB) Official Streets and Highways Plan (OSHP) is a map that identifies future road corridors and road upgrades necessary to safely and efficiently accommodate our growing population and its transportation needs. The OSHP is a map-based component of the MSB Long Range Transportation Plan (LRTP) focused on preserving future road corridors. The OSHP is one of the Borough's most used transportation planning tools and was last updated in 2007.

Since 2007 the population of the Borough has grown dramatically, and it is projected to continue to grow at a similar pace in the future. Many roads have been built to accommodate this growth and many more roads will be needed in the coming years. Population growth also puts pressure on important future road corridors. As land is subdivided and developed, it is key that land is also reserved for road corridors to ensure that we can develop an effective road network going forward. Due to these factors, MSB staff identified the need for a comprehensive update of the OSHP, which will take into account existing conditions and plan for future infrastructure needs.

Funding for the OSHP update was provided through a 2020 Memorandum Of Agreement (MOU) between the MSB and the Alaska Department of Transportation & Public Facilities (AKDOT&PF), which included federal earmark funds dedicated to the project. This funding was used to hire a contractor to assist the Borough with the update. In coordination with staff and a technical steering committee, the contractor analyzed existing and future development and its impacts on our road network, looked at population growth assumptions, and examined how development-constrained lands might limit corridor development. This data was used to draft the

OSHP map with the appropriate infrastructure recommendations. The consultant and staff also developed a final methodology report to highlight the data used to justify the corridor recommendations.

MSB Planning Staff is handling public outreach and education for the project. Staff developed a robust project webpage, an interactive map-based public comment tool, and have offered presentations to numerous MSB advisory boards. All comments submitted by the public, the cities, agency partners, and MSB Departments have been reviewed and addressed by staff. A comments summary will be presented at the public hearings for the Planning Commission and Assembly.

THE PLAN

The OSHP assesses growth in the Borough and identifies key elements of the region's transportation system that will be needed to serve its growing communities. Some of the road corridors identified in the OSHP will be needed sooner, while others might not be needed for a very long time. Population growth will guide the need for infrastructure. The value of having the OSHP is that it allows us to plan for these connections now, limiting traffic congestion, safety issues, and more expensive road projects in the future. Once adopted by the Assembly, the OSHP is placed in MSB code in Title 15. Having the OSHP codified ensures that all future platting actions are reviewed against the OSHP to ensure that the corridors are identified and preserved.

Goals of the OSHP:

- Promote safe & efficient travel
- Reduce traffic congestion
- Lower road project costs
- Improve quality of life

OSHP Deliverables:

The OSHP update produced three main deliverables. The OSHP thoughtfully outlined better connectivity options for our higher class road network, assigned a functional classes to our corridors, and identified primary intersections.These deliverables can be viewed by looking at the attached OSHP maps.

Connectivity Recommendations

- These recommendations (indicated as dotted lines on the OSHP) are the road connections that will be needed, as the Borough builds out, to effectively accommodate population growth and increased traffic. The OSHP looks at all roads in the Borough but focuses on collector level roads, because these are the roads most often built by the Borough, because there is a need for more of these roads, and because they are essential for a complete road network.

Functional Classification Recommendations

- The OSHP assigns functional classifications (indicated by color on the OSHP) to help with road design and engineering. Functional classifications are used to explain the "type" of road and are used for designing and upgrading roads to ensure that they are efficiently meeting the traffic demand and that they function the way they are intended to.

- Functional classifications can be complex, but local examples can be helpful for reference.

Classification	Approximate Speed	Example
Interstate	55-65 MPH	Parks Highway
Major Arterial	55 MPH	Trunk Road
Minor Arterial	35-45 MPH	Seldon Road
Major Collector	35-45 MPH	Hollywood Road
Minor Collector	30-35 MPH	Smith Road
Local Road	15-35 MPH	Most subdivision roads

Primary Intersection Recommendations

- This deliverable is a study that assigned ideal intersection locations for roads classified as arterial or interstate. These roads function at their best when the number of intersections is limited.. Intersection location and spacing is an important part of planning for an efficient road system, and these interesections are often key commercial centers and economic generators.

Note: Some large infrastructure projects (ex. Knik Arm Bridge) were left off of the map; once these projects have more concrete funding sources and alignments, the OSHP will need to be updated to include them.

How is the OSHP used?
The OSHP is a tool used to help guide development so that it does not interfere with future road projects. Currently, this tool is most commonly used during the platting process to reserve space for future road connections. The Borough's Subdivision Construction Manual ensures that new subdivisions do not conflict with the OSHP. The platting process and Borough driveway standards also help to ensure that new roads are built at appropriate intersection locations.

Developing the OSHP is a Planning function of the Borough's larger road development process. Platting ensures the OSHP corridor is preserved and the Public Works Department uses the OSHP to identify new road projects and upgrades. Roads identified in the OSHP are often pulled out and included in prioritized funding lists like the Road Improvement Projects list, or the Long Range Transportation Plan projects list.

Note: The OSHP is designed to be a living document and will need to be updated periodically as the Borough's population grows, subdivisions and commercial developments are created, and when roads are built.

Legislation

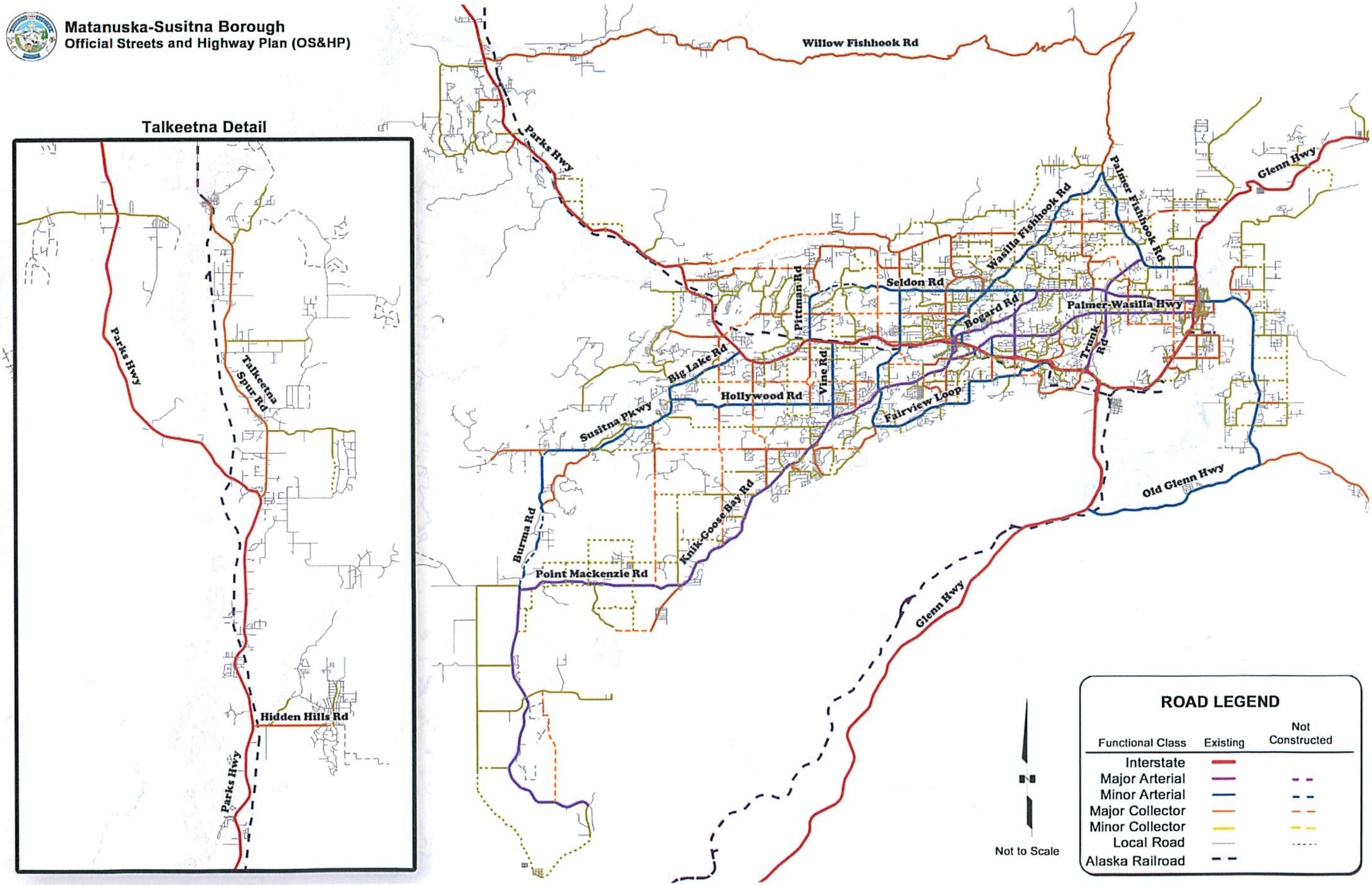
The attached draft code ordinance, MSB 22-063, will be submitted to the Assembly as part of the adoption pocess. This legislation is included for your information. The ordinance repeals an outdated code chapter associated with the OSHP and inserts the OSHP into MSB 15.23.030(B) along with most other Borough Plans. The repealed code required that an official paper map be kept in the Planning Director's office; with modern record keeping technology, this is no longer prudent. This change is meant to clean up outdated code and adopt the OSHP into an appropriate MSB Code location.

Staff Recommendations

The Matanuska-Susitna Borough Official Streets and Highways Plan is a valuable transportation planning tool used to ensure the development of a safe and efficient road network.

Staff respectfully recommends the adoption of Planning Commission Resolution 22-13, recommending the adoption of the Matanuska-Susitna Borough 2022 Official Streets and Highways Plan Update.

Matanuska-Susitna Borough
Official Streets and Highway Plan (OS&HP)



Official Streets and Highways Plan (OSHP) - Update

Frequently Asked Questions

What is the OSHP?

- A map that identifies future road corridors and road upgrades necessary to safely and efficiently accommodate our growing population and its transportation needs. The OSHP was last updated in 2007.

How is the OSHP used?

- Once adopted by the Assembly, the OSHP update is placed in MSB code in Title 15. All future platting actions are reviewed against the OSHP to ensure the corridors identified on the map are preserved.
- The OSHP is also used by Matanuska-Susitna Borough Public Works to identify new road projects and upgrades.

The Official Streets and Highways Plan vs the Long Range Transportation Plan?

- The OSHP is a map-based component of the Borough's Long Range Transportation Plan (LRTP).

OSHP	LRTP
• Focused on roads	• All modes of transportation (roads, rail, transit, bike, pedestrian, etc.)
• Looks at all collector and arterial roads that will be needed when development occurs	• Looks at collector and arterial roads needed until 2035 & that there will likely be funding for
• Does not prioritize roads	• Prioritizes which roads should be built next
• Developed specific road connection needs	• Developed general goals and strategies
• Map-based	• Document based

What are functional (road) classifications?

- Classifications are a way to explain what type of road is being talked about. The three broad categories are Local Road (lower speed, less traffic, e.g subdivision roads), Collector (medium speed, medium traffic, e.g Smith Road), and Arterial (higher speed, more traffic, e.g Trunk Road).
- The OSHP looks at all collector and arterial roads, but focuses on collector level roads, as these are the roads most often built by the Borough.

Why do functional classifications matter?

- Functional classifications are the link between planning and road design. They help turn a line on the map into an engineered road. They communicate how wide a road should be, how fast the speed limit should be, how many access points a road should have, and many other characteristics.

Are all of the roads on this map owned and maintained by the Borough?

- No, many of the roads identified in the OSHP are owned or maintained by Alaska Department of Transportation & Public Facilities (AKDOT&PF), the City of Wasilla, and the City of Palmer. We incorporated plans and comments from those entities in our process.

What data was used to create the OSHP?

- The project team utilized Geographic Information systems (GIS) to review population and employment trends, current land use, current roads and infrastructure, community planning documents, and physical constraints (water, steep hills, etc.).
- The project team also used computer modeling to project where and when population growth will happen, and the number of vehicles that will be driving every day based on those population projections.

Where did the not constructed (NC) roads come from?

- All the data listed above was used to determine where population will grow. From that we determined where new roads will be needed to accommodate that growth.
- The project team also went road by road with our technical steering committee to make sure that all of the proposed roads are realistic.

When are all these roads being built?

- It all depends on population growth, need, and funding. Some of these road connections will happen soon, others might not happen for a very long time, but if we don't plan for them now we will end up with traffic problems, and more expensive roads in the future.
- When an area of the Borough starts growing rapidly, the OSHP roads in that area will take priority over the roads in areas that aren't growing as rapidly.

How will I know when a road is getting built near me?

- The OSHP is just the first step. Typically before one of these roads are built they will end up on a priority list (Capital Projects List, Road Improvement Projects List, Long Range Transportation Plan), and need to be funded; those steps involve public meetings, and possibly ballot questions for bond initiatives.
- Remember that the Borough is not the only one that builds roads. Other government agencies and private developers also build roads.
- Roads take a long time to build, which is good for making sure that the public is notified and involved.

I need a road now! How do I get a road prioritized and built?

- Get involved in the planning and prioritization processes. Speak to your local RSA, Assembly members, and Borough staff to tell us what you need. A great place to start would be submitting a comment on the OSHP, in writing or at the OSHP webpage.
- If you don't see the road you are looking for on the OSHP, let us know that too.

What does it mean if an OSHP road is through my property?

- The Matanuska-Susitna Borough may build this road at some point. If and when depends on population growth, Assembly approval, and funding. The alignments on the OSHP are close but not final, until the road is designed by engineers, the exact alignment is unknown.
- It does mean that if you subdivide your land you will need to make sure that your subdivision does not conflict with the OSHP. And depending on the classification of the OSHP road, you may need to ensure that access to the road is appropriate.
- Get in contact with us to learn more.

How can I submit comments?

- Submit comments on the project page (https://oshp-msb.hub.arcgis.com/) Using the map comment tool you can show us the exact location you want to talk about.
- Submit written comments to:

  The Permit Center

  350 E. Dahlia Ave., Palmer, AK 99645

MATANUSKA-SUSITNA BOROUGH
Planning and Land Use Department
Planning Division
350 East Dahlia Avenue • Palmer, AK 99645
Phone (907) 861-7833
www.matsugov.us

Official Streets and Highways Plan 2022 Update
Public Involvement Summary

Plan Update Timeline

- **January 2020:** Memorandum of Understanding between MSB and AKDOT&PF signed, dedicating federal earmark funds to the OSHP update.
- **August 2020:** Kinney Engineering hired as a consultant, work plan established, and technical steering committee organized.
- **October 2020:** Kick off presentation at joint Planning Commission/Assembly meeting to inform policy makers of OSHP update.
- **November 2020:** Existing Conditions Report completed. Review of existing GIS data, current infrastructure, development, and existing long range community and transportation plans. Reviewed by steering committee.
- **December 2020:** Growth Study analysis completed. This study forecasted how much the population of the MSB will grow in the future and where that growth will happen. The Growth Study analysis was used to understand where traffic will occur in the future, how many trips will be generated from proposed population growth and development and to plan for future infrastructure needs. Reviewed by steering committee.
- **Spring and Summer 2021**: Draft OSHP map highlighting infrastructure recommendations was completed. The steering committee performed a detailed review of the document, at multiple meetings going through recommendations road by road to ensure accuracy, feasibility, and need.
- **June 2021:** AKDOT&PF submitted significant comments. Planning staff and the consultant team reviewed each comment and determined if they would be included.
- **July 2021:** Contract and project timeline extension was necessary to make the modifications to many maps based on ADOT&PF recommendations.
- **Fall and Winter 2021:** Incorporation of comments and drafting of OSHP Technical Report, Implementation Plan, and Summary Document.
- **February 2022:** Final deliverables submitted to technical steering committee.
- **Spring 2022:** The OSHP was released for public review and comment and Planning Staff began Public Outreach and Public Meetings

Public Outreach and Public Meetings

Technical Steering Committee who oversaw the project included staff from the City of Palmer, City of Wasilla, AKDOT&PF, MSB School District, and MSB staff.

Public meetings to date include presentations to Local Road Service Area Advisory Board, Transportation Advisory Board, and MSB Platting Board.

Project Website including educational materials, documents, maps, and interactive public comment tool was developed and social media was used to help the public access the interactive website.

The Public Comment Period ran for six weeks from February 16th 2022- March 31 2022.
-We received 31 individual comments from the public.
-The project website had over 1700 interactions.

- Staff emailed responses to all commenters who included contact information. Letters were mailed to individual if no email was provided.
- All comments are included in this packet with staff response and recommendation. General comment themes are summarized below.
    - The majority of comments received were general opposition to new road connections for fear of increased traffic impact. These comments often assume OSHP roads will be constructed in the near future.
        - Response: The OSHP is a planning document, while some of these connections are not needed at this time, staff suggests that they remain in the document to help ensure that options are available if they are needed in the future as population grows. We can absolutely understand residents wanting to maintain the character of their community. The community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that will likely have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.
    - Some comments suggested new road connections, proposed alternatives, or deletion of unbuildable connections.
        - Response: These suggestions were closely looked at and incorporated if appropriate. AKDOT&PF submitted significant comments of this nature.
    - Some comments asked about needed improvements to specific roads.
        - Response: These comments have been included if they were not already. Comments about current road projects have been directed to city or Borough Public Works.

All Written Comments			
Project	Comment	Response	Change to the OSHP Recommended?
Nelson Rd-Fairview Loop	Suggestion of an alternative Nelson Road connection: The proposed alternative provided by Bill Tucker is an update to a proposal he submitted in 2009. This proposal was provided for consideration for the 2021 OSHP update. The alignment includes an extension of Nelson Road North to the Parks Highway frontage road, with a grade-separated crossing of the railroad. The proposal also includes an upgrade to Fairview Loop, with another grade-separated crossing and a three-leg roundabout to tie into the new Nelson Road extension. DOT also submitted significant comments related to this area. More detailed comments and responses are included separately in this packet.	During the technical review of the draft OSHP Planning asked Public Works to provide a cost estimate of this proposal. The Borough estimated the cost of this proposal at $21 million. This alignment was not selected due to substantial cost and impact and because there are other more cost effective options. Planning staff and the Consultant proposed corridors on the OSHP that when implemented will address the access, connectivity and safety issues in the Nelson Road at a higher return on investment. This area was also studied in depth during a 2009 reconnaissance study. That study returned the two options included in the OSHP as the most beneficial.	No. More detailed comments and responses are included separately in this packet.
General	AKDOT&PF submitted significant comments related to their roads and facilities borough wide. ADOT comments were generally focused on plans for projects that they have identified in the STIP. ADOT also made significant comments along intersections connecting to the Parks Highway corridor.	Planning reviewed each comment and many were incorporated into the OSHP. Comments are included in this packet.	Yes, changes were made administratively
Boyd Rd-Norman Ave	At the November 16, 2021 Assembly meeting, as a response to public notification about the development of the Boyd to Norman connection by the RSA, community members attended the meeting asking for the Assembly to not build this connection. The Community cited an increased traffic, crime, cost as the main reasons to not construct this road. Community members testified that they don't want secondary access. RSA 23 does not support the project. The community prefers Falk-Jensen connection as it avoids heavily populated streets.	It is the opinion of Planning staff that all of the alignments shown in the draft 2021 OSHP for this area should be retained to preserve right of way and maintain the corridors for future road construction. Preserving the corridor now is less impactful and more cost effective than acquiring it in the future. The Boyd-Norman connection is the lowest cost, lowest impact connection in the neighborhood and would improve emergency response. This connection has been planned for over 40 years. Planning recommends Boyd to Norman remain on the OSHP.	Connection was removed at the request of the Borough Manager
Bear St - Heart Lake Loop	Extend Bear St along the section line up to Heart Lake Loop to provide a secondary route for the Wolf Lake community to Bogard. Would be a good candidate	The project team had already included this connection and the intersection has been marked as a primary intersection.	No
W Youngtree Dr	Hello, how do I found out if W.Youngtree Dr. is getting paved? We are on a the Wasilla city boundary line and connects to Day Rd which is paved. It is a really short distance on Youngtree, Greentree and Wintergreen that is not paved.	The road in question is projected to remain a local road. Upgrade would likely be handled by the RSA.	No

Hermann Ave & Soapstone Subdivision	Soapstone Subdivision: Additional access to this neighborhood is not needed. It will NOT improve our quality of life, nor promote safe & efficient travel. Please contact the residents PRIOR to adding this to your final to do list.	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.	No
Fairview Loop	I think you need to relook at FVL as a minor artery. It's a raceway and speeds approach 55-65 MPH on stretches. Soft or non existent shoulders and heavy banks make it dangerous. Straighten and finish your projects on FVL for once. We have been waiting	Fairview Lp is a DOT road and an example of a road that needs policies and upgrades to help it function as it is intended. Classifying the road as an Arterial will encourage some of those changes. The proposed collector roads in the region will also help relieve pressure from the road.	No
Intersection of Fairview Loop & Hayfield Rd	The inter door FVL & Hayfield Rd is dangerous. There should be a 4-way stop, roundabout, or something to slow/stop the traffic there. Especially dangerous is trying to turn left from FVL into Hayfield. Please consider this. Thanks.	We agree with your concerns. The OSHP addresses them by identifying the intersection and road as needing upgrades. This intersection has been labeled as primary, which means it is important and needs to be prioritized.	No
Jensen to Falk to Soapstone	Please do not punch this road through, there many houses along Jensen and 35-45 mph is too fast. Also it will create more traffic for a small area.	This alignment is the lowest impact route in the area, if this road is removed from the OSHP another route may be designed in the future that may have more impact on the community. This road may not be wanted or needed now, but it likely will at some point in the future. Planning early will minimize conflicts and issues should the road be built.	No

Jensen	This road is currently not even cleared. There is no need for this road as the neighborhood is large parcels and while a few lots may be subdivided there will not be a large concentration of homes built here and this will add traffic to a neighborhood	This alignment is the lowest impact route in the area, if this road is removed from the OSHP another route may be designed in the future that may have more impact on the community. We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. Planning early will minimize conflicts and issues should a road be needed in the future.	No
Soapstone extension	Do NOT want ANY extension of Soapstone road. Most people bought on Soapstone BECAUSE OF its limited access. And any extension of Soapstone will take an acre of my land that I am currently raising cows on. Food security?	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future. Also, the connections identified are not final alignments, when/if the road is built we will have a better idea of the exact route.	No

Soapstone	All of the roads you want to build in the soapstone area. I strongly oppose!!! You are ruining the reason people live here. No one wants there. Please take our opposition seriously. We live on Norman.	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.	No
Soapstone rd, Jensen, Buffalo mine rd	I oppose these road extensions. They would bring traffic into a quiet neighborhood changing it for the negative. There are already other ways to access these roads that are sufficient	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.	No
Evergreen between Soapstone and Norman	This is actually a trail that our neighborhood children use on a daily basis. Please do not make this a road. We do not want or need this proposed road in our neighborhood. We do not want to become a thoroughfare for traffic.	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.	No

Soapstone Neighborhood second access point	Due to growth, a second access point in the Soapstone area is essential. Hermann to Buffalo Mine extension is a huge waste of money. I'm open to an option that isn't a main thoroughfare that brings more commuter traffic but is also fiscally responsible.	MSB Planning agrees, a connection between the Soapstone neighborhood and Buffalo Mine is not the most cost effective secondary access location. This connection was added to replace the more cost effective Boyd-Norman connection which was removed due to public opposition. This connection was a suggestion from AKDOT&PF If this connection is removed, the Boy-d Norman connection should be added back.	No
Norman Ave	Please do not connect Norman/Hermann ave with buffalo mine or any other roads. The terrain is rugged, it is a waste of money, nobody needs or wants these roads. I do not support a new road with higher speeds. People already speed with it at 25.	MSB Planning agrees, a connection between the Soapstone neighborhood and Buffalo Mine is not the most cost effective secondary access location. This connection was added to replace the more cost effective Boyd-Norman connection which was removed due to public comment. The community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. If these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should road be needed in the future. This is not a to-do list, it is a long range plan.	No
Soapstone	I listed the main road because it appears there are several plans for this neighborhood. The members of this neighborhood very clearly stated at a recent meeting that we are absolutely against these plans and were told that we were heard loud and clear.	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.	No

E Jensen	Is the plan to connect E Jensen to E Koenen rd. And if so when?	Yes, the timeline will depend on population growth, need, Assembly approval, and funding. A future connection identified on this plan does not mean that it will be funded or built any time soon. Planning early will minimize conflicts and issues should road be needed in the future. This is not a to-do list, it is a long range plan.	No
Soapstone/buffalo mine	This extension has no purpose and will upset more people than it will help. There is very little traffic that leaves the soapstone area to head north on the Glenn. Residents from both soapstone and buffalo mine don't want more traffic. That is why we live here	MSB Planning agrees, a connection between the Soapstone neighborhood and Buffalo Mine is not the most cost effective secondary access location. A secondary access will be needed at some point for emergency preparedness. This connection was added to replace the more cost effective Boyd-Norman connection which was removed due to public opposition. This connection was a suggestion from AKDOT&PF If this connection is removed, the Boy-d Norman connection should be added back.	No
Soapstone rd	I am opposed to any and all development associated with any connector roads linking langes Norman holiday subdivision and sabbatis hills development to any outside or existing roads There is strong opposition across the neighborhood.	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.	No
Norman	Waste of tax payers money Where new Evergreen crosses Norman and up to Hermann has been tried before and was way to steep of a grade Hermann just opens up the backside of land that already backs up to state land makes no sense Taxes already to high	This connection may not be built any time soon, but it is meant to plan for an effective collector road network so that higher speed traffic is kept off of local roads and flows into and out of the neighborhood safely and efficiently. These connections are not final alignments, and may look different when/if they are built.	No

Evergreen to farm loop connection, Jensen road extension, Hermann road extension.	There is no need to connect these two neighborhoods in this manner. These roads do not need extended at this time, the neighborhood will be massively effected in a negative way if these proposed roads are built.	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.	No
Are Fishhook #16 - Tex-Al Dr. and Falk Rd. connection to Jensen	It would be a waste of money to build Jensen Rd when you could connect to Soapstone via a ROW already reserved to make the connection Soapstone. I live at 12400 Soapstone - my home is 6 inches from the Jensen ROW.	At this level, this alignment was determined to be the lowest impact route in the area. These are not final alignments, if this road is prioritized and funded in the future these two routes will likely be looked at in much more detail. Right now, Jensen has ROW platted for a future road and has far fewer driveways.	No
Soapstone Herman	Absolutely not a good plan in many respects. To tie in Herman would be way too steep for a road. They tried that many years back and left me, a property owner nothing but an eyesore. And to what purpose why should we honor the past mistakes ?	This connection may not be built any time soon, but it is meant to plan for an effective collector road network so that higher speed traffic is kept off of local roads and flows into and out of the neighborhood safely and efficiently. These connections are not final alignments, and may look different when/if they are built.	No
Soapstone Road area	It is troubling the Borough doesn't respect this communities wishes for this area. We spoke up loud & clearly against any new road improvements in our area when this was brought up recently. The Hermann one especially is a TOTAL WASTE of tax-payers money.	We can absolutely understand wanting to maintain the character of your community. Our goal with the OSHP is to create a long-range plan that anticipates growth, not necessarily an urgent to-do list. In that sense, the community may not want new connections now, but they will likely be needed in the future. A future connection identified on this plan does not mean that it will be funded or built any time soon. However, if these roads are removed from the OSHP other routes may be designed in the future that may have more impact on the community. Planning early will minimize conflicts and issues should a road be needed in the future.	No

Soapstone Area	It is also sad that you only give people 255 characters to type their message. Why is this done this way, what is the problem with expanding the amount of space available so people have enough room to truly express their points and concerns?	The amount of characters was limited by the mapping software used. You are always welcome to submit longer written comments to the Borough as well.	No
Duchess and Trunk	Original plans for the new Trunk Rd had SB left turn access to Duchess from S. Trunk. Didn't happen. Need left turn access into the neighborhood w/o going all the way down to the roundabout. Use College Rd intersection if necessary.	Left turn access at this intersection is unlikely because Trunk Road is a high speed road. These arterial roads have limited access for safety and to allow traffic to flow. Planning agrees that a frontage road connection to College Dr is neceassary.	Yes, an extension of the frontage road to college drive was added in response to this comment.
W. Misty Lake Rd	The existing road is not built to specifications and is not maintained by the Borough. Can this road be built along the existing section line adjacent to W. Misty Lake Rd? We are planning to build on the portion of the property you are bisecting!	The connections on the OSHP are not final alignments, they are for planning purposes and will likely change some when/if the road moves to design stage. When this road is built will depend on, population growth, need, Assembly approval, and funding. This road will likely not be built anytime soon. The corridor bisects your property because we were attempting to avoid the wetlands present within the section line easement.	Yes, this corridor was moved to the section line in response to this comment. A final alignment will be detrmined when/if the road is built.
Whispering woods Dr.	This road has become a major cut through for people avoiding the parks highway from Seward meridian. They cut through to the sonic plaza, or just cut through. Speeds are high and traffic is non stop. A block at Herman road would be great. Thanks.	The connections and upgrades planned for this area, specifically the Hermon Rd upgrade and extension to the Palmer-Wasilla Hwy, will relieve cut through traffic and improve the intersection. This project is funded and will be managed by AKDOT, it is scheduled for construction around 2023. Once this project is built, traffic will have more efficient options and will not need to cut through Whispering Woods.	No
Herman road and Parks Highway	Oh My Gosh. This intersection needs help. The shops at sun mountain draw more traffic than in the past and the intersection is super congested and unsafe (with the frontage road at the parks). People cut through on Whispering Woods to avoid it. Help!	The connections and upgrades planned for this area, specifically the Hermon Rd upgrade and extension to the Palmer-Wasilla Hwy, will relieve cut through traffic and improve the intersection. This project is funded and will be managed by AKDOT, it is scheduled for construction around 2023. Once this project is built, traffic will have more efficient options and will not need to cut through Whispering Woods.	No
Settlers Bay Costal Park	The proposed connection of S Settlers Bay Dr, and the connection between S Settlers Bay Dr and S Hayfield Road are not constructible due to the Borough's recent conservation easement which restricts development.	These connections were an oversight and will not be able to be built. They will be removed administratively.	Yes, removed administratively.

Proposed Fairview Loop Road Improvements

The Fairview Loop extends from the George Parks Highway to the Knik Goose Bay Road. Once a meandering farm road approximately 10.5 miles in length, spanning seven miles as the crow flies, the Fairview has evolved into the only east-west collector south of the Parks Highway, which it parallels but to which it rarely provides north-south connectivity. The Fairview Loop as farm road often followed the needs of the various individuals in the area, constrained by topography and without the benefit of planning. This has resulted in a number of service and safety shortcomings for the Fairview in its developing role as a rural collector.

The Alaska Department of Transportation (ADOT) first paved the Fairview forty years ago. Since that time, the Department has periodically been tasked with correcting these shortcomings. One area containing serious currently unaddressed safety and service issues is the easterly 1.5 miles of the Fairview, from where it begins at the Parks Highway frontage road through where it intersects Abby Boulevard, Old Matanuska Road, the Alaska Railroad and Linlu Lane.

SERVICE AND SAFETY ISSUES ON THE EAST 1.5 MILES OF THE FAIRVIEW LOOP:

The most obvious problem on this stretch of the Fairview comes at its conjunction with the Old Mat road intersection (mile post 0.9 to 1.0) and the Alaska Railroad crossing (mile post 1.0). The Old Mat intersection is actually three intersections in one, each of which creates grade, visibility angle and traffic control issues for the other two. Further, the westerly, most problematic portion of the intersection, is only approximately sixty feet from the unsafe 45 degree angle on-grade crossing of the Fairview over Alaska Railroad, creating potential for vehicles to be backed up from the Old Mat onto the tracks.

Another problem area, which also includes an on-grade railroad crossing, is Abby Boulevard. Originally designed to provide on-grade access over the railroad tracks to Garden Terrace Estates, a small residential development, this road was marginally adequate to serve the seventy Garden Terrace homes. Subsequently a major development to the south, the Ranch Subdivision, was proposed, with plans to use Abby Boulevard to provide westerly ingress-egress for its anticipated thousand-plus homes. The MSB Platting Board rejected this plan, requiring the developer to find alternative westerly collector road ingress-egress, which he has thus far been unable to do. None the less, MSB administration at the time allowed a work-around through a portion of the original Ranch proposal, renamed and resubmitted as Creekside, which has resulted in funneling westerly Ranch traffic through Garden Terrace Estates, generating the problems anticipated by the Platting Board. To compound these problems, the administration at the time also chose to locate the proposed South Palmer elementary school within the Ranch subdivision, without consideration of the safety issues resultant from sending school busses over on-grade railroad crossings, or the further increased traffic from parents bringing children to school. The Ranch developer has provided an appropriate collector road system, Nelson Road, for his project, the east end of which the ADOT, at MSB request, extended to the Parks Highway and Truck Road by building a bridge over the railroad. Unfortunately, the west end of Nelson Road currently ends in a gravel pit south of the railroad, and is therefore unusable..

We understand from ADOT Traffic Safety that another area of concern should be that area of the Fairview extending south of the railroad past the Linlu Lane intersection. The Fairview at the Linlu intersection makes an abrupt ninety degree turn with a turning radius of approximately 200 feet and a gradient in excess of eight percent, neither of which are appropriate for a rural collector road. To make matters worse, in this area the Fairview follows a steep bank on its east side, leading to downhill rollovers and apparently one or more deaths. Incidentally, Fairview in this area apparently does not have a formal right-of-way, ADOT being able to claim only the area between its ditch lines.

FAIRVIEW PARKS INVESTORS (FPI) INVOLVEMENT IN THE PLANNING PROCESS

In 2007, the MSB administration acknowledged that the elementary school, on which they had already begun construction, did not have the appropriate grade separated access over the railroad for school busses from outside the Ranch Subdivision. The Fairview Parks Investors (FPI), an investment partnership, was then contacted by MSB through its Public Works Department, and requested to evaluate access potential of our real estate. The obvious solution was to extend the west dead end of Nelson Road, the Ranch collector road, north to the railroad right-of-way along an alignment identified by the owner of that property, then over the railroad and Fairview Loop on a bridge, continuing north to the Parks Highway frontage road, a total distance of 1700 feet, thereby mitigating the Fairview/Abby Road problem and eliminating the issue of school access.. This was rejected because it did not also access the Fairview Loop. The Nelson Road extension was then combined with a concept MSB Public Works in 1985 had found desirable, which realigned the Fairview while eliminating the existing Old Mat/Fairview intersection and the 45* railroad crossing.

The concepts FPI provided were subsequently rejected in favor of extending the east end of the Nelson collector road to the Parks Highway and the Trunk Road, including the realignment of two existing frontage roads and construction of two roundabouts as well as a bridge.

In 2018, FPI was again contacted, by MSB Manager John Moosey, requesting FPI again consider the Fairview realignment and west Nelson Road extension plan, to which FPI agreed. Further contact with ADOT planners, at MSB request, indicated that MSB inclusion of these concepts in the MSB Official Streets and Highways Plan would provide appropriate direction to ADOT.

Recent planning documents have emphasized the value of thinking ahead to the future road needs of the community and reserving where possible corridors appropriate to those needs. This appears to be one of those opportunities. While FPI as an investment entity cannot commit to a major development project, it can respond to an expression of community need, though only so long as it remains in title. FPI has asked MSB and ADOT in return only for assistance in realigning its properties to match the potential road corridors, and the return of real estate taken during a previous ADOT project, but no longer needed for the original purpose, a noncash transaction.

Today, public funds do not appear to be available to address the problems noted above. None the less, both affected community councils, Gateway and Knik-Fairview, have passed resolutions in support (see attached), and MSB and ADOT do have the ability, by protecting the routes identified, to protect future public ability to cure the problems afflicting this part of the Fairview Loop, for which no alternative fixes have thus far been identified, at no dollar cost for the dirt.

William Tucker

From:	Vanhove, Todd E (DOT) <todd.vanhove@alaska.gov>
Sent:	Tuesday, September 7, 2021 1:10 PM
To:	'William Tucker'
Subject:	RE: Fairview Loop improvements

Bill,

I have no information to contradict anything in your letter. I believe it to be accurate as far as the information I currently have.

Todd VanHove
Chief of Planning
Anchorage Field Office
907-269-0518

From: William Tucker <wm.tucker@gci.net>
Sent: Wednesday, August 25, 2021 4:27 PM
To: Vanhove, Todd E (DOT) <todd.vanhove@alaska.gov>
Subject: Fairview Loop improvements

Todd,
Attached is a brief summary of our fourteen year journey with MSB regarding our end of the Fairview Loop. Kim Solien at MSB is managing a committee reviewing the MSB OS&HP and has asked that I provide a synopsis of the situation. I would appreciate your advising me if I have incorrectly represented the situation.
Thank you for your time.
Bill Tucker
Fairview Parks Investors

Gateway Community Council
Board Resolution 2018-01

A RESOLUTION IN SUPPORT OF PRIORITIZING EFFORTS TO RESOLVE TRAFFIC CONGESTION ON S. ABBY BOULEVARD AND NELSON ROAD IN THE RANCH SUBDIVISION AREA THAT IS WITHIN THE GATEWAY COMMUNITY COUNCIL BOUNDARIES

Whereas, the Gateway Community Council (GCC) recognizes that congestion on S. Abby Boulevard and Nelson Road is a long-standing problem, dating back several years to the construction of Machetanz Elementary, the development of the Ranch subdivision and other nearby subdivisions; and

Whereas, the GCC recognizes that more than 4,000 cars a day have been recorded traveling S. Abby Boulevard and that the extension of S. Trunk Road extension has alleviated a portion - about one quarter of that traffic - but the road is still congested and unsafe; and

Whereas, S. Abby Boulevard was constructed as a subdivision road with limited right-of-way, narrow travel lanes, no shoulders, minimal ditching and was not designed to carry the traffic volume of a collector road; and

Whereas, the constriction of traffic on S. Abby Boulevard at the intersection of Fairview Loop causes additional congestion further south on Nelson Road; and

Whereas, traffic coming to and from Machetanz school regularly backs up onto Nelson Road; and

Whereas, this issue has been looked at extensively by the Mat-Su Borough in a 2009 Mat-Su Borough Reconnaissance Report that looked at the C2 option of extending Nelson Road to Fairview Loop, and also by William Tucker (Parks Highway Investors) who submitted a more extensive proposal that included realigning Fairview Loop; and

Whereas, the traffic is a safety hazard, causes extensive time delays for residents, school buses and emergency responders , and the issue has not been resolved despite several years of review by borough staff and administration since it was identified; and

Whereas, the Mat-Su Borough has included this issue in both its Long Range Transportation Plan (LRTP) and Capital Improvement Plan (CIP); and

Whereas the 2009 borough reconnaissance report was limited in scope to solving the Abby Boulevard/Nelson congestion problem and did not include area wide traffic problems; and

Whereas, Goal 1 of the Core Area Comprehensive plan is to "foster a pattern of land development that protects the appealing features of the Core Area…"; and,

Whereas, Policy 1-B of the Core Area Comprehensive Plan is to "promote an orderly land use pattern suited to the demand for attractive settings in which to live, work, shop, learn, play and carry on other daily activities, and,

Now therefore be it resolved that the GCC encourages the Mat-Su Borough Assembly at its upcoming July 31 meeting to include funding in the 2018 proposed bond package that will provide a solution to this S. Abby Boulevard and Nelson Road congestion issue; and

Now therefore be it further resolved that the borough examine and determine solutions to traffic safety and congestions issues in the broader Fairview Loop area from Seward Meridian Parkway east to Trunk Road.

Approved by unanimous consent of the GCC Board on this date

____
July 10, 2018

____
Stephanie Nowers, President
Gateway Community Council

KNIK-FAIRVIEW COMMUNITY COUNCIL RESOLUTION

A RESOLUTION TO SUPPORT THE CONSTRUCTION OF THE NELSON ROAD-ALT FOR ACCESS TO THE MACHETANZ ELEMENTARY SCHOOL.

WHEREAS, a western collector/arterial access to the Machetanz Elementary School is necessary for safety and to reduce excess traffic in the currently used route to the west and north through narrow, residential streets; and

WHEREAS, a route has been proposed utilizing Nelson Road in the Northwest corner of The Ranch Subdivision, extending then through Valley Block and Concrete property (via the proposed Sweeping Vista Subdivision), than North over Fairview Loop Road to an intersection with E. Fireweed Road that is most appropriate; and

WHEREAS, the proposed route also eliminates the current dangerous intersection of Old Matanuska Road, the Alaska Rail Road and Fairview Loop Road.

NOW, THEREFORE BE IT RESOLVED that the Knik-Fairview Community Council recommends that the NELSON ROAD-ALT, as shown on the attached Exhibit "A", be included in the Borough Long Range Transportation Plan; and

ADDITONALLY, BE IT RESOLVED that the Matanuska-Susitna Borough, at this time, accept all Easements and Rights-of-Way that Property Owners lying under the proposed route will donate to the Borough at no cost over drafting and surveying; and

ADDITIONALLY, BE IT RESOLVED that the Matanuska-Susitna Borough include the project in the next Road Bonding package or utilize funds granted to the Borough from the State of Alaska, which every occurs first.

APPROVED by the Knik-Fairview Community Council at a General Membership meeting held May 2, 2018.

Bill Kendig

Bill Kendig
Board President

Teri Johnson

Teri Johnson
Board Secretary

MATANUSKA-SUSITNA BOROUGH
Planning and Land Use Department
Planning Division
350 East Dahlia Avenue • Palmer, AK 99645
Phone (907) 861-7833
www.matsugov.us

MEMORANDUM

DATE: October 14, 2021

TO: Mike Brown, Borough Manager

TROUGH: Kim Sollien, Planning Services Manager

FROM: Adam Bradway, Planner

SUBJECT: Official Streets and Highways Plan – Nelson Road Alternatives Summary

Background

The Matanuska-Susitna Borough (MSB) is updating its Official Streets and Highways Plan (OSHP), a map-based component of the MSB Long Range Transportation Plan (LRTP). When the LRTP was last updated in 2017 the MSB Assembly chose to fiscally constrain the plan, and eliminated many megaprojects which were previously included. This change reflected the reality of limited funding, the Borough's intention to limit its planning scope to those projects that fit within a reasonable revenue forecast, and the necessity to prioritize projects that offer the best benefit-to-cost ratio. While the OSHP is not necessarily fiscally constrained as it does not estimate costs for all projects, it seeks to reflect the values of the LRTP by prioritizing realistic projects given limited Borough resources.

The OSHP is meant to geographically represent existing facility improvements and new roadway connections. The OSHP is specifically meant to guide MSB investments, and while it considers the road network as a whole, it focuses on MSB facilities. In most cases, the OSHP does not directly plan for the needs of AKDOT&PF or local subdivision roads.

The OSHP relies heavily on the short and mid-term projects identified in the LRTP, but also uses technical analysis of travel, demographics, and development. The OSHP update process involved evaluating every road in the Borough, with some areas requiring in-depth analysis to determine solutions that would best serve the community.

The area (Attachment A) south of the Parks Highway, west of the Glenn Highway, and east of Fairview Loop has seen and continues to see, significant development. Over the years, the access issues in this area have been well documented, and the MSB has studied the area on multiple occasions. One significant study was the *2009 Trunk Road Extension South Reconnaissance Report (recon report)*, which led to the Nelson Road extension east to meet Trunk Road, and alleviated the largest access issues for the area.

The recon report also considered many alternatives to extend access west to Fairview Loop. While current traffic volumes do not currently necessitate improving the western connectivity in this area, the LRTP and OSHP identified it as a future needed connection.

Because of the complex existing conditions in the area, and the many possible road alignments, the area was studied in-depth.

This memo is intended to summarize the different alignment alternatives for the study area and give justification for the two alignments chosen for inclusion in the 2021 Official Streets and Highways Plan update. This memo also highlights those routes that were not chosen for the update and gives reasoning.

[Note: The 2009 recon report was an essential consideration in this evaluation, as it studied many of the alternatives in detail. Many of the attachments were taken directly from the 2009 report though costs have been updated. The 2009 report contains significantly more detail about the alternatives it considered and should be referenced if such detail is required.]

Alignment Alternatives (2021 OSHP update)

Nelson Road East (Attachment B)

- This alternative extends Nelson Road, builds an improved at-grade crossing at the current Valley Block and Concrete crossing, and closes the existing at-grade crossing at Abby Rd.

Nelson Road Extension (Attachment C)

- This alternative extends Nelson Road west to Fairview-Loop near Linlu Lane; this would cross the future ARRC realignment.

Seward Meridian Section Line (Attachment D)

- This alternative begins at Nelson Road near Wasilla Creek. It follows a section line west, until it reaches another section line, in alignment with Seward Meridian Road, which it follows north to Fairview Loop.

Nelson Road Extension North (Attachment E)

Note: Conceptual level cost estimate included with Attachment E

- This alternative provided by Bill Tucker is an updated to a proposal submitted in 2009. This proposal was provided for consideration for the 2021 OSHP update. The alignment includes an extension of Nelson Road North to the Parks Highway frontage road, with a grade-separated cussing of the railroad. The proposal also includes an upgrade to Fairview Loop, with another grade-separated crossing and a three-leg roundabout to tie into the new Nelson Road extension.

Selected Alternatives (2021 OSHP Update)

Nelson Road East (Attachment B) - Selected

This alternative was selected as it provides the significant benefit at a lower cost, provides an adequate western access solution for Nelson Road, and has been identified multiple times as the preferred alternative for this issue. This alternative has also been moved forward through the Sweeping Vista Master Plan (Attachment F), showing that the subject property owner plans for this alignment to be chosen.

- Lowest Cost alternative
- Improved at-grade crossing is an adequate solution for current traffic volumes
    - ARRC plans to move railroad alignment, eliminating railroad conflict in the future
    - Grade-separated crossing over railroad would be cost prohibitive
- Only alternative identified in the LRTP
- Alternative has propositioned by the local landowner and has been approved by the MSB
- Lowest impact to environment and local property owners

- Platting Board approved. Sweeping Vista Master Plan (Attachment F)

Nelson Road Extension (Attachment C) – Selected
This alternative was selected as a higher cost, but higher function alternative to Nelson Road East. This alternative provides the most direct connection to Fairview Loop and would allow Nelson Road to accommodate larger traffic volumes than the Nelson Road East alternative. This alternative impacts property owners and the area in a significant way than Nelson Road East, and this alternative likely won't be built until traffic volumes are significant enough to warrant it.

- Second lowest cost alternative
- No impact to existing ARRC track, though coordination would be needed related to future railroad alignment
- Provides direct connection to Fairview Loop
- Alignment could accommodate a higher classification roadway and with an extension of Seward Meridian Parkway, would create a high volume route to the Parks Hwy
- AK DOT&PF supported

Seward Meridian Section Line (Attachment D) – Not Selected
This alternative was not selected due to substantial cost and impact. This alternative does provide the potential for a higher classification roadway. It also avoids some established subdivisions. The cost of this project is problematic, and is out of the range of a typical MSB collector road project. Selected alternatives offer similar solutions with lower impact.

- Avoids ARRC
- Follows existing section lines
- Alignment could accommodate a higher classification roadway and, with an extension of Seward Meridian Parkway, would create a high volume route to the Parks Highway

- $25,400,000 cost estimate is outside of typical MSB road project cost. Due to MSB road powers would need to be paid for with area-wide funds. Note: No projects over $8 million on 2021 infrastructure bond proposal
- More road miles than selected alternatives and associated local and environmental impacts would be greater

Nelson Road Extension North (Attachment E) –Not Selected
This alignment was not selected due to substantial cost and impact. This alternative improves east-west connection of Nelson Road and north-south connection in the Fairview Loop area, but the cost of the project is out of the range of a typical MSB collector project. While grade-separated crossings are ideal, they are unwarranted at current traffic levels and come at a significant cost and impact.
There were other projects selected for the OSHP that address the issues raised in this proposal at a higher return on investment. A significant portion of this proposal focuses on improving the North-South connection of Fairview Loop (DOT owned) to improve access to the Parks Highway. The OSHP proposes an extension of Seward-Meridian Parkway to create a similar connection, with a more direct route to the existing Parks Highway interchange. The Seward-Meridian connection makes improvements to the east side of Fairview Loop likely unnecessary.

- Grade-separated crossings avoid direct conflict with ARRC
- Improves access by extending Nelson road to Fairview Loop, and by improving Fairview Loop

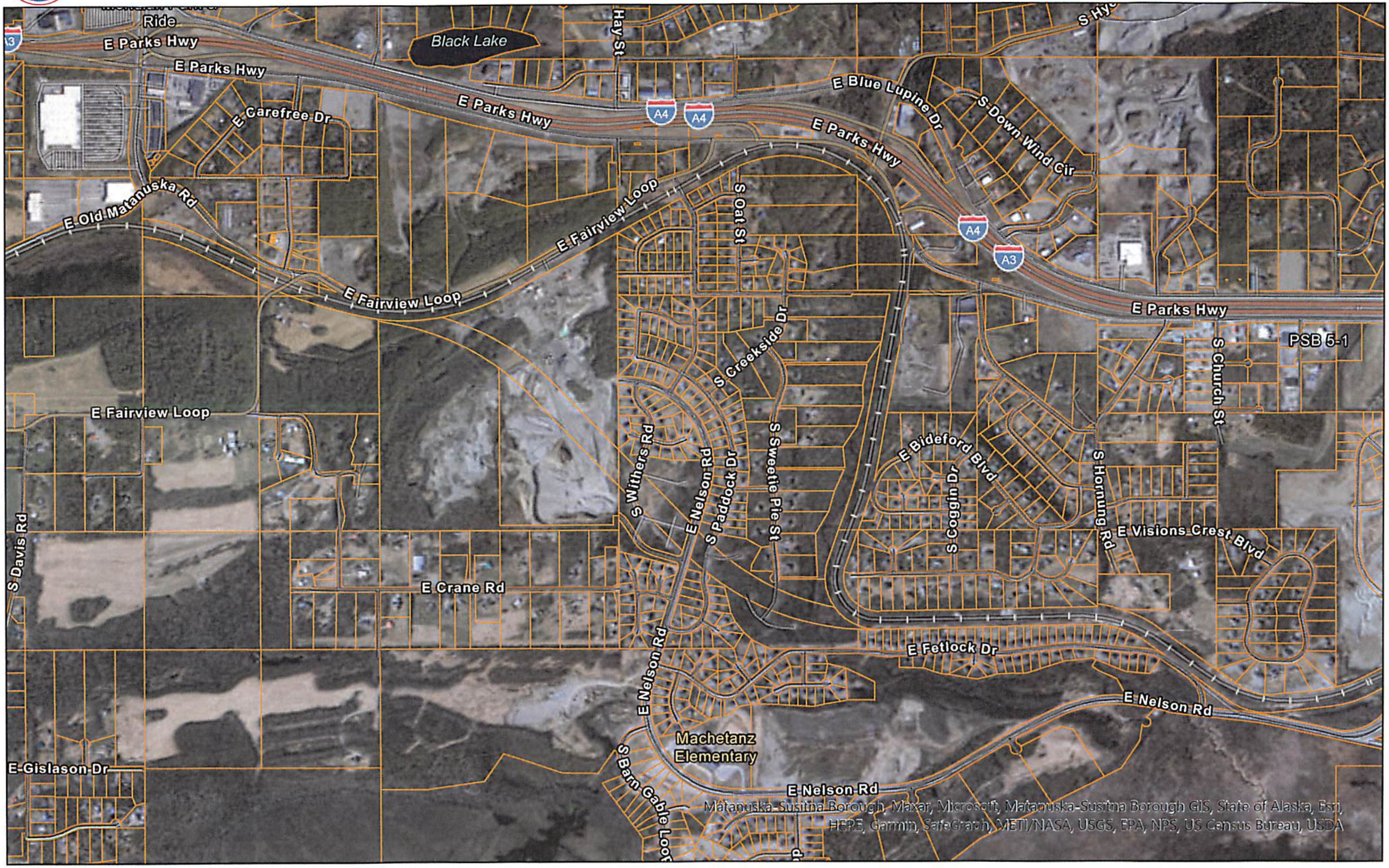
- A grade-separated crossing for Nelson Road is prohibitively expensive. Such expense is unwarranted given the current traffic volume. Also, when ARRC realigns the railroad a grade-separated crossing is unnecessary
- $21,031,000 cost estimate is outside of typical MSB road project cost. Due to MSB road powers would need to be paid for with area-wide funds. Note: No projects over $8 million on 2021 infrastructure bond proposal
- Identified need for improvement to Fairview Loop N-S connection addressed by proposed Seward Meridian Parkway project
- Selected alternatives provide similar benefits at lower costs

Alternatives Summary Table

Factor	Description of measure	Alternatives			
		Nelson Road East	Nelson Road Extension	Seward Meridian Section Line	Fairview Loop Realignment
Total Length	Total length of alternative in miles.	1.0 Mile	1.3 Miles	2.6 Miles	2.5
Estemated Cost to Construct	Total cost of alternative in 2022 dollars (millions)	$3,500,000.00	$7,600,000.00	$25,400,000.00	$21,031,000.00
Avoids Alaska Railroad	Description of impact to Alaska Railroad	Would close Abby Rd at-grade crossing, and upgrade Valley Block and Concrete crossing	No, however crosses RR at planned crossing	Yes	No, adds two new grade-seperated crossings of existing railroad and crosses RR ROW at planned crossing
Wetlands Impacts	Yes, if wetlands corssed. No, if wetlands not crossed.	No	Yes	Yes	Yes
Property Owner Impacts	Acreage of right of way required.	7 acres	23 acres	25 acres	unknown
LRTP	Yes, if included in MSB LRTP. No if not included in MSB LRTP	Yes	No	No	No

Study Area

Attachment A



N
W E
S

— Infrastructure Roads MSB

Cadastral_Parcels

Date: 10/14/2021

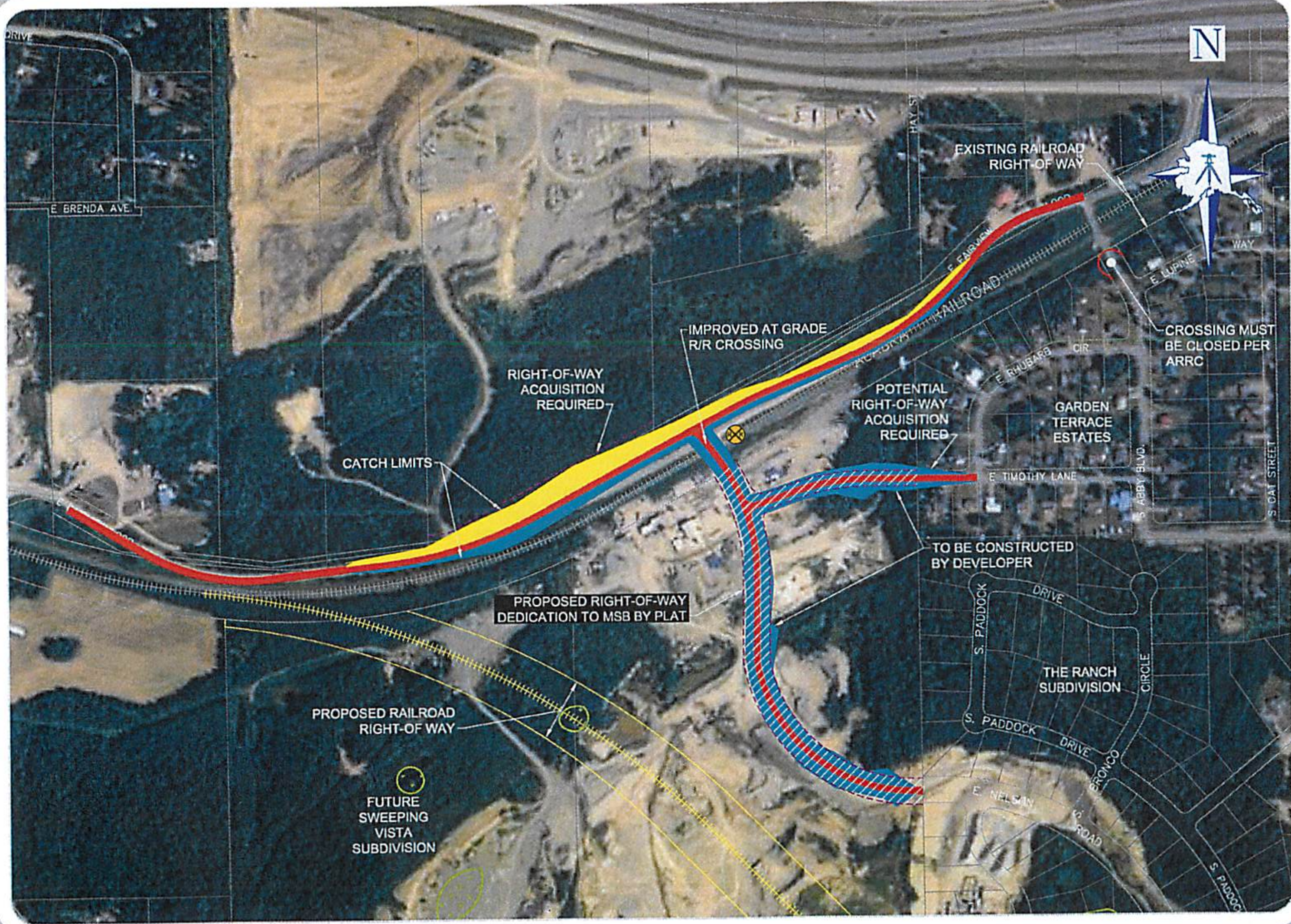
This map is solely for informational purposes only. The Borough makes no express or implied warranties with respect to the character, function, or capabilities of the map or the suitability of the map for any particular purpose beyond those originally intended by the Borough. For information regarding the full disclaimer and policies related to acceptable uses of this map, please contact the Matanuska-Susitna Borough GIS Division at 907-861-7858

0 0.15 0.3 0.6 mi

~~Trunk Road Extension South~~
Reconnaissance Report

Attachment B

Nelson Road East
~~Figure C-2~~



Legend

- PROPOSED ROAD
- PROPOSED CUT
- PROPOSED FILL
- PROPOSED ROW
- TO BE CONSTRUCTED BY DEVELOPER
- POTENTIAL WETLANDS

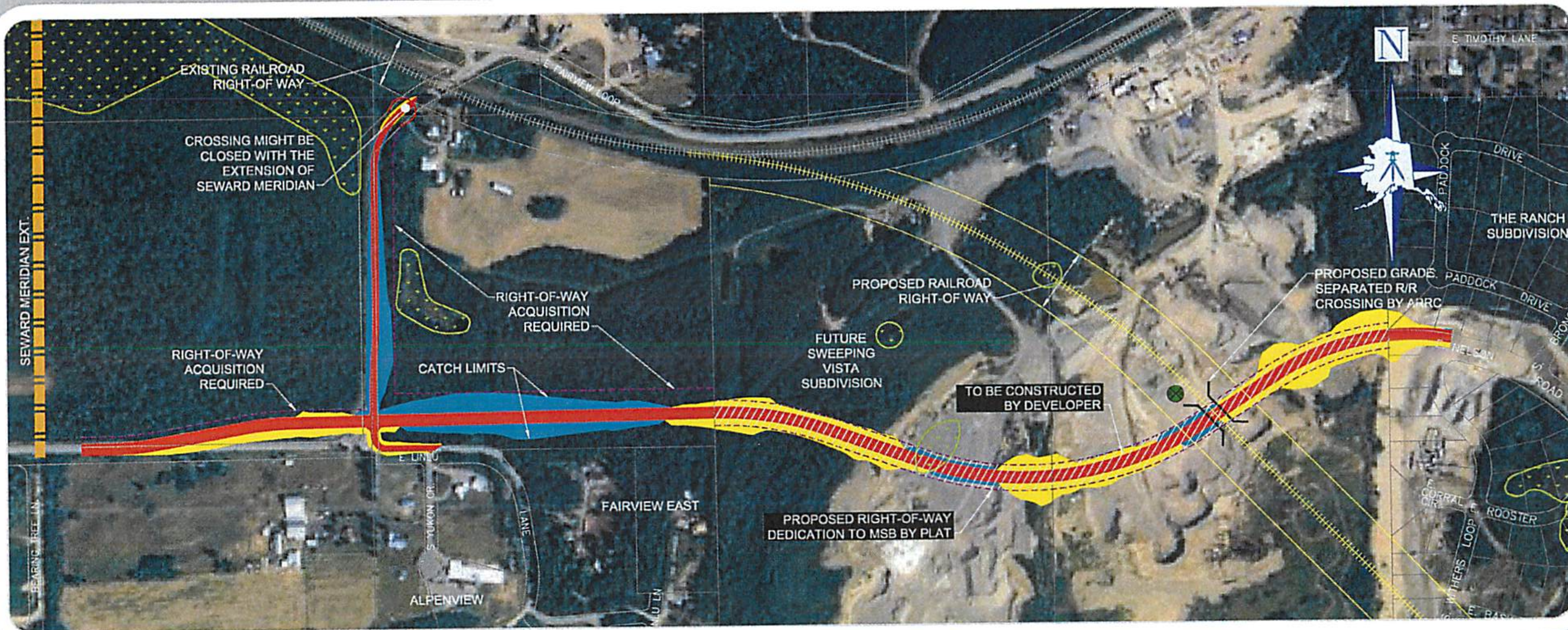
Comparison Table Info

- TOTAL LENGTH: 1.0 MILES
- ESTIMATED COST: ~~$2.7 MILLION~~
  - » ~~$2.0 (MSB)~~
  - » ~~$0.7 (DEVELOPER)~~ $3.5 Million
- AVOIDS ARRC: NO, REQUIRES CLOSURE OF ABBY BOULEVARD CROSSING PER ARRC
- AVOIDS WETLANDS: YES
- RIGHT-OF-WAY ACQUISITION: YES
  - » 7 ACRES

~~Trunk Road Extension South~~
Reconnaissance Report

Attachment C

Nelson Road Extension
Figure C-4



Legend

PROPOSED ROAD	TO BE CONSTRUCTED BY DEVELOPER
PROPOSED CUT	POTENTIAL WETLANDS
PROPOSED FILL	
PROPOSED ROW	

Comparison Table Info

- TOTAL LENGTH: 1.3 MILES
- ESTIMATED COST: ~~$5.9 MILLION~~
  - » ~~$4.5 (MSB)~~
  - » ~~$1.4 (DEVELOPER)~~ $7.6 Million
- AVOIDS ARRC: NO, REQUIRES FUTURE GRADE SEPARATED R/R CROSSING BY ARRC
- AVOIDS WETLANDS: NO
- RIGHT-OF-WAY ACQUISITION: YES
  - » 23 ACRES

Trunk Road Extension South
Reconnaissance Report

Attachment D

Seward Meridian (Section Line)
Figure C-6

Legend

- PROPOSED ROAD
- PROPOSED CUT
- PROPOSED FILL
- PROPOSED ROW
- TO BE CONSTRUCTED BY DEVELOPER
- POTENTIAL WETLANDS

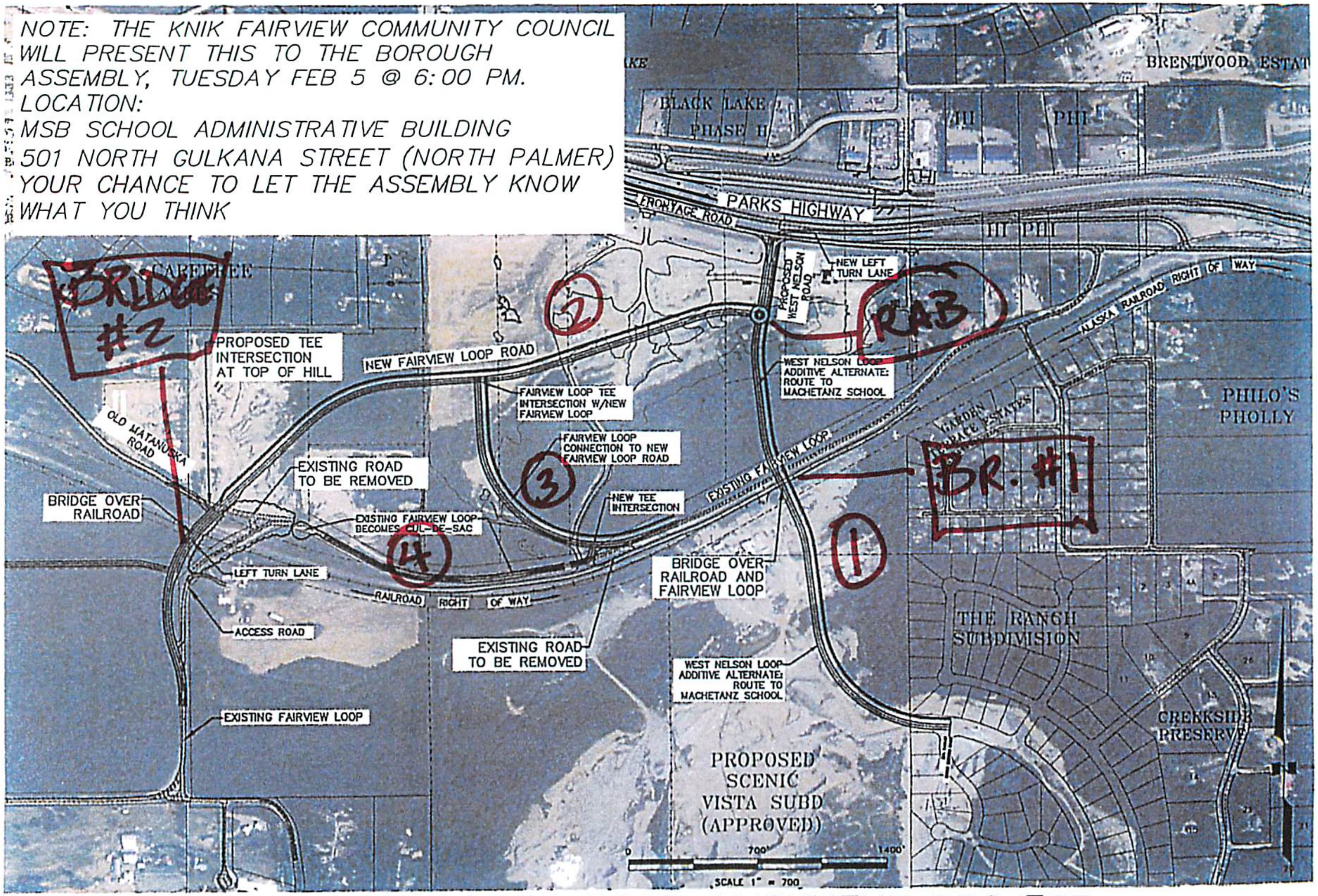
Comparison Table Info

- TOTAL LENGTH: 2.6 MILES
- ESTIMATED COST: ~~$10.6 MILLION~~
  - » ~~$12.0 (MSB)~~
  - » ~~$ 7.6 (DEVELOPER)~~ $25.4 Million
- AVOIDS ARRC: YES
- AVOIDS WETLANDS: NO
- RIGHT-OF-WAY ACQUISITION: YES
  - » 25 ACRES

#- ROADS

NELSON RD. EXT. NORTH

10/11/21



NEW FAIRVIEW LOOP ROAD ALIGNMENT PROJECT
WITH WEST NELSON LOOP OPTION TO MACHETANZ SCHOOL

VERIFY SCALE

Attachment D

$21 Million

NELSON ROAD EXTENSION NORTH

Nelson Road Extension North to Parks Highway Frontage Road and realignment of Fairview Loop and other road connections.

Conceptual Level Cost Estimate

Roadway Class: Various Major/Minor Collectors				Depth Aggregate:	0.333 ft
Date:	10/13/2021	Paved Width:	42 LF	Depth Exca./Fill:	2 ft
By:	Mike Campfield, P.E.	ROW:	100 LF	Depth Asphalt:	0.1667 ft
Assumptions:	2 x 12-foot lanes, 4-foot shoulders, 10-foot seperated pathway. Moderate grades with steep fill slopes and deep fills at bridge approaches. Roadway illumination assumed for roundabout and at roadway intersections.				
	Based on assumptions, the estimated cost of the roadway construction is $1.5M/mile in				1,500,000

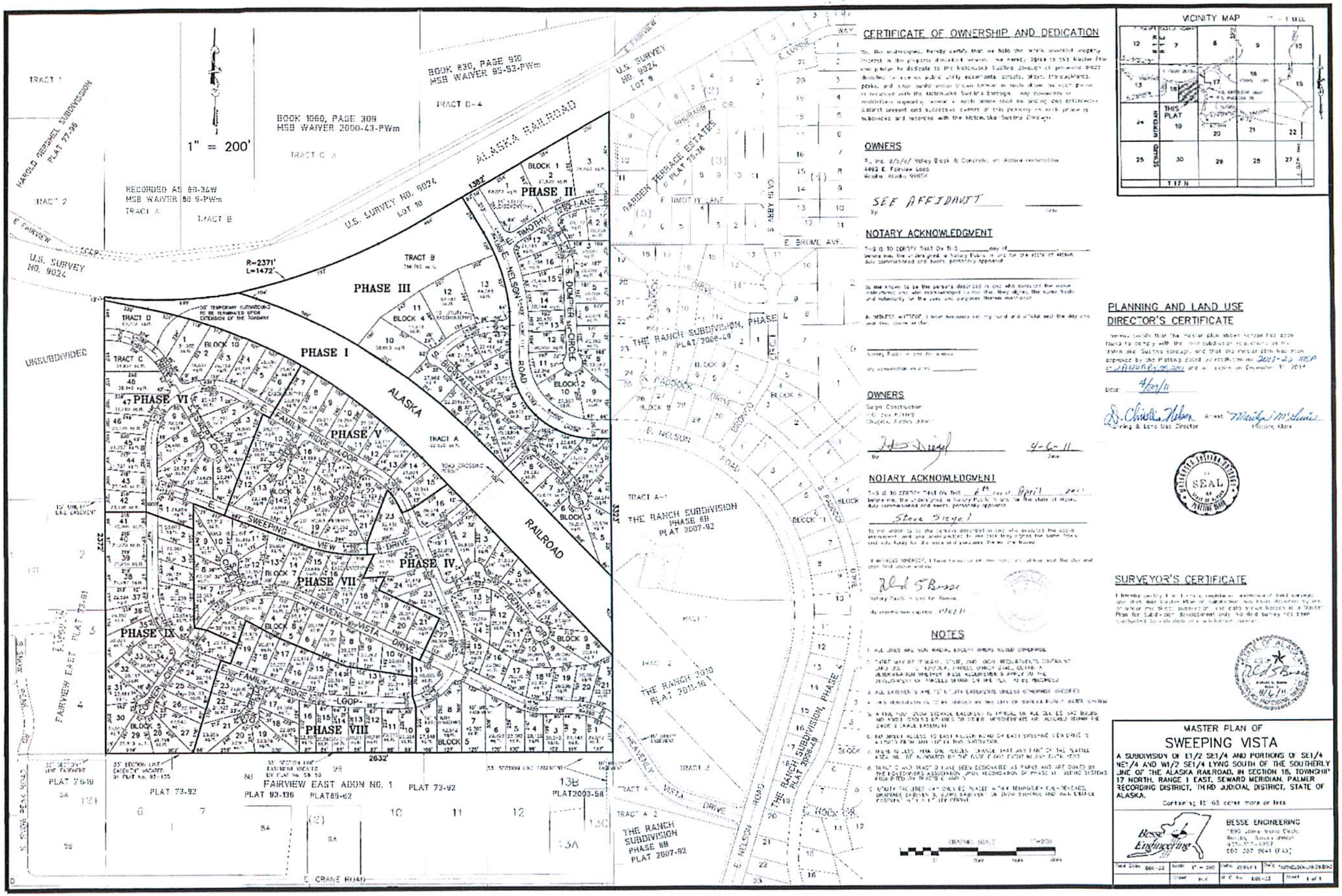
Construction Costs

Segment	**Length (mi)**		**Cost**
Road #1	0.61	$	915,000
Road #2	0.85	$	1,275,000
Road #3	0.55	$	825,000
Road #4 (no path)	0.55	$	650,000
Roundabout	4 -leg single lane	$	1,000,000
Bridge #1	over ARRC and road	$	5,000,000
Bridge #2	over ARRC	$	2,500,000
CONSTRUCTION SUB TOTAL		$	12,165,000

Non-constrution Costs

Right-of-Way	acquisition from 12 parcels	$	3,000,000
Utility Coordination	unknown impacts	$	1,000,000
Engineering Design Services	20%	$	2,433,000
Construction Management	15%	$	1,824,750
Project Administration	5%	$	608,250
GRAND TOTAL		**$**	**21,031,000**

Attachment F



Adam Bradway

From:	Thomas, Scott E (DOT) <scott.thomas@alaska.gov>
Sent:	Wednesday, May 4, 2022 9:51 AM
To:	Adam Bradway
Cc:	Kemplen, Allen (DOT); Post, David E (DOT); 'Kate Dueber'
Subject:	RR Xing Policy and maximizing Interchange access/use at or near Nelson Rd/Fairview Loop road

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Adam,

As I look at the nearly final OSHP, good work linking major routes to Trunk Road Interchange and Seward Meridian Interchange from the South! More on goals this serves below.

With regards to the Nelson Road Extension shown terminating at Fairview Loop Road poses RR Xing problems that make it less feasible. I am ccing ARRC, who with DOTPF jointly follows RR Xing Policy.
I recommend 5 minor adjustments to the OSHP to clear up RR Xing and Interchange access outcomes. These recommendations maximize options for the Abby Blvd neighborhoods caught in the middle of a disconnected area.

1) I recommend the OSHP extend Nelson Rd to Fireweed Rd as an orange dashed line on the map. (per the legend = "not constructed" yet..)
   Like Linlu lane – it does cross private properties. Unlike Linlu Lane – Nelson to Fairview falls under DOTPF/ARRC "Joint Policy" 1988.
   I would prioritize Linlu Lane as the best way to meet regional goals for higher class roads on page 5 as noted below.
   I would rank Nelson options second below Linlu Lane as a way to improve local and collector access, under the same recommendations for Page 5 as noted below.

2) I recommend Abby Blvd and Old Mat Rd be shown as red X's to clearly show they will most likely have to be removed if a Nelson Road connection were to be built in the OSHP.
   This may require adding a new legend symbol for removals.
   The new dash across the railroad cannot appear without one or more removals nearby due to close proximity. (a 2 mile rule in Policy citations below)

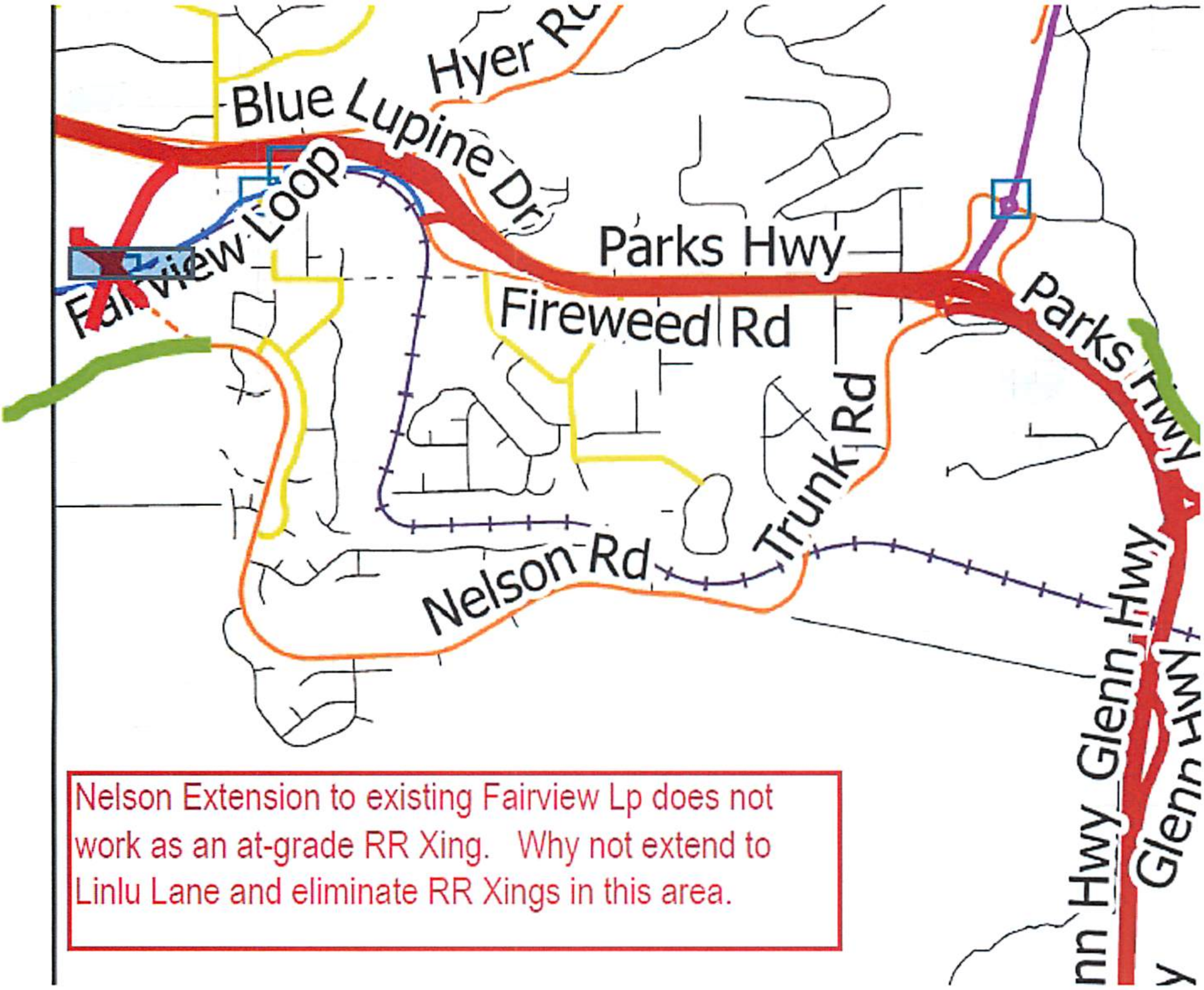
3) I recommend adding railroad crossings as a top intersection safety constraint, really a critical path item,, same as other major intersections, by adding to the bullets on the top of page 5 in the summary report (in red):
   - Safer railroad crossings through proper spacing and grade separation over time with growth (like the 2nd bullet, but RR Xing intersections)

4) And modify bullet 4 (in red):
   - The possible closure of left-turn access on and off arterial roads and interstates for safety (this is DOTPF Policy *when approaching 20,000 vehicles per day*.)

5) And modify the last bullet 6 (in red) that getting to interchanges, etc. is very important and efficient to both our agencies:

Parallel routes to better distribute intraregional trips traveling east and west from one side of the Valley to the other or to get to interchanges on the Parks and Glenn Highways. The purpose is to serve the most residents with access to traffic signals, roundabouts, and interchanges.

Here's the original review comment clipped:



Background for the 5 requested changes:

An extended line is recommended because it give the MSB and DOTPF three options, while a termini at Fairview Loop Road only offers the first to options. Here's the background for recommended edits above:

1) No-build – One option is to not show a new Fairview Loop connection. Abby Blvd and Old Mat Road RR Xings remain open until they are too congested or blocked by staging trains. At that point they are at risk of closure. With Seward Meridian grade separated connection to Fairview Loop. These two RR Xigns are likely to be closed in 20 years. No language required in the report. However, I would show red X's on the crossings to show this is a likely outcome with population and road growth.
PROBLEM: Abby Blvd retains the bulk of the traffic unless it is to be closed as a railroad crossing. Then the No-Build option works with closure of at-grade RR Xings. ARRC train staging as siding will eventually block Fairview Loop connections..

By not showing the line, Collector traffic would be focused to Arterials at Seward Meridian and Trunk, and their two Interchanges at the Parks. Serving the most people by getting them to those primary interchanges is DOTPF's top goal recommended for Page 5 clarifications (above). The other basis for this option is our 1988 Joint Policy with the Alaska Railroad which states in Section 4.2.1 Planning: *"Local jurisdictions, state and federal agencies, and private enterprise should incorporate planning process (a) aimed at minimizing the need for at-grade crossings and traffic at existing crossings; and (b) which will evaluate the effect on a crossing by changes in zoning, approval of new subdivisions, and other elements of the planning process."* In other words, minimize at-grade crossings due to increasing crash risk with each one. It goes further to state *"New at-grade crossings are discouraged and no new crossings will be permitted without concurrence of the appropriate diagnostic team."*

2) At-grade Nelson Road. Showing the line as is. And Closing Abby Bld and Old Mat Road Xings to comply with 1988 Joint Policy.
   PROBLEMS: Existing Fairview Loop Road ROW not expandable. School Bus queuing and clear storage requires shifting Fairview Loop Road north. Potential signalization and signal preemption means 3 lane widening of Fairview Loop Road. ROW and Utilties costs, waterline could double this to a $10-15 Million dollar intersection project. ARRC train staging as siding will eventually block Fairview Loop connections..
   Per Jt Policy - 4.5 New Crossings – *"New at-grade crossings should not be allowed if there is another crossing within two miles of the proposed new location."* Because this is a new crossing in the vicinity of two existing crossings – it is really and existing crossing replacement of Abby Blvd and/or Old Mat Road. Under JT Policy, DOTPF and ARRC requires the increased crash risk for the new crossingl to be offset by eliminating one or more crossings. That is not always possible and depends a lot on out of direction travel (> 2 miles). Abby Blvd and/or Old May Rd would have to close to meet this policy.

3) Grade separation and extension to Fireweed Rd. And closing Abby Blvd and Old Mat Road RR Xings.
   PROBLEMS: Cost of a bridge and ROW to the north. No ROW to preserve.
   Fits the OSHP goals of a road network that guides future land use, increases road connectivity and promotes travel more so than the existing Fairview Loop Road constrained by ARRC ROW. Road costs may be similar to S Trunk Extension. Prevents ARRC blockages of at-grade crossings into roads to the south.

Any one of all these options can be chosen by MSB for the OSHP. I recommend Option 3 as it is possible to phase construct and it allows all 3 options to be possible. All 3 options show it is feasible to close-grade RR Xings with future improvements. This would require at least 1 more grade separations at Seward Meridian Parkway or Nelson Rd indirectly to Hyer Rd. S Trunk Rd is already completed. . Two grade separated routes are shown in the OSHP, so at-grade closures are a likely outcome.

Scott Thomas, P.E., CR Traffic-Safety Engineer
Alaska DOT&PF, Central Region Traffic, Safety, and Utilities Section
4111 Aviation Ave, Anchorage, AK 99519
Phone: 907.269.0639 | email: scott.thomas@alaska.gov

"Keep Alaska Moving through service and infrastructure."
"Toward Zero Deaths: Everyone Counts on Alaska's Roadways"

HOUSTON

5 primary intersections not shown but mapped and approved in the Parks ADP

- 3 are not primary intersections
- Essential MSB parcels off of Hawk Lane may be critical to rail spur and Parks Hwy bypass feasibility in Houston. Recommend putting a shade on those parcels for transportation set asides prior to other uses.
- There are essential SLE's in the NW corner of this map that parallel and cross the Parks Hwy to large tracts.

Big Lake

- MSB lands on Hollywood Road are essential to solving sharp curves and pioneer alignments in two areas. Recommend showing these lands as "essential to transportation planning" and careful planning of ROW widths and setbacks to Hollywood Road.

WASILLA

- Fairview Lp Rd at Linlu lane is a primary intersection to existing lands with greater feasibility to serve Nelson Rd area than other options shown.
- 4 intersections shown are not primary – meaning not likely to serve LT's or signals in the long term.
- A Leota/Endeavor connection appears underway with developer planning at KGB/Endeavor
- DOTPF concurs with SM extension South in past correspondence RE Nelson Rd area and Fariview Loop Road/Abby Blvd concerns. This fits the goal fo maximizing Collector and Arterial access to interchanges for the most residents and businesses possible.

KNIK-GOOSE BAY

- 3 primary intersections have been mapped by DOTPF for signal spacing to match long term growth of large parcels and frontage roads.
- 3 existing intersections are not primary. They are likely to be rerouted to long term primary intersections.
- A Settler's Bay - Hayfield Rd connection is recommended. Much housing is still going in with lower emergency access and limited access to turn bays and signals out on KGB.

FISHHOOK

- The first primary intersection would be ½ mile west of the Glenn Hwy with greater N-S connectivity than the site shown. DOTPF selects future signal locations and major intersections on state routes.
- Is Trunk Rd Extension supported by LRTP modeling - in lieu of Glenn Hwy expansion in Palmer? Does it offer local governments their goals towards a Boulevard in Palmer through AADT reduction? This would qualify as a future goal review as stated in the Implementation Plan, that is not yet ready for the OSHP or LRTP modeling. If the MSB and City of Palmer desire the Interstate route relocated out of Palmer, then now is the time to plan for it - otherwise it will remain due to lack of options in 30 years.

PALMER

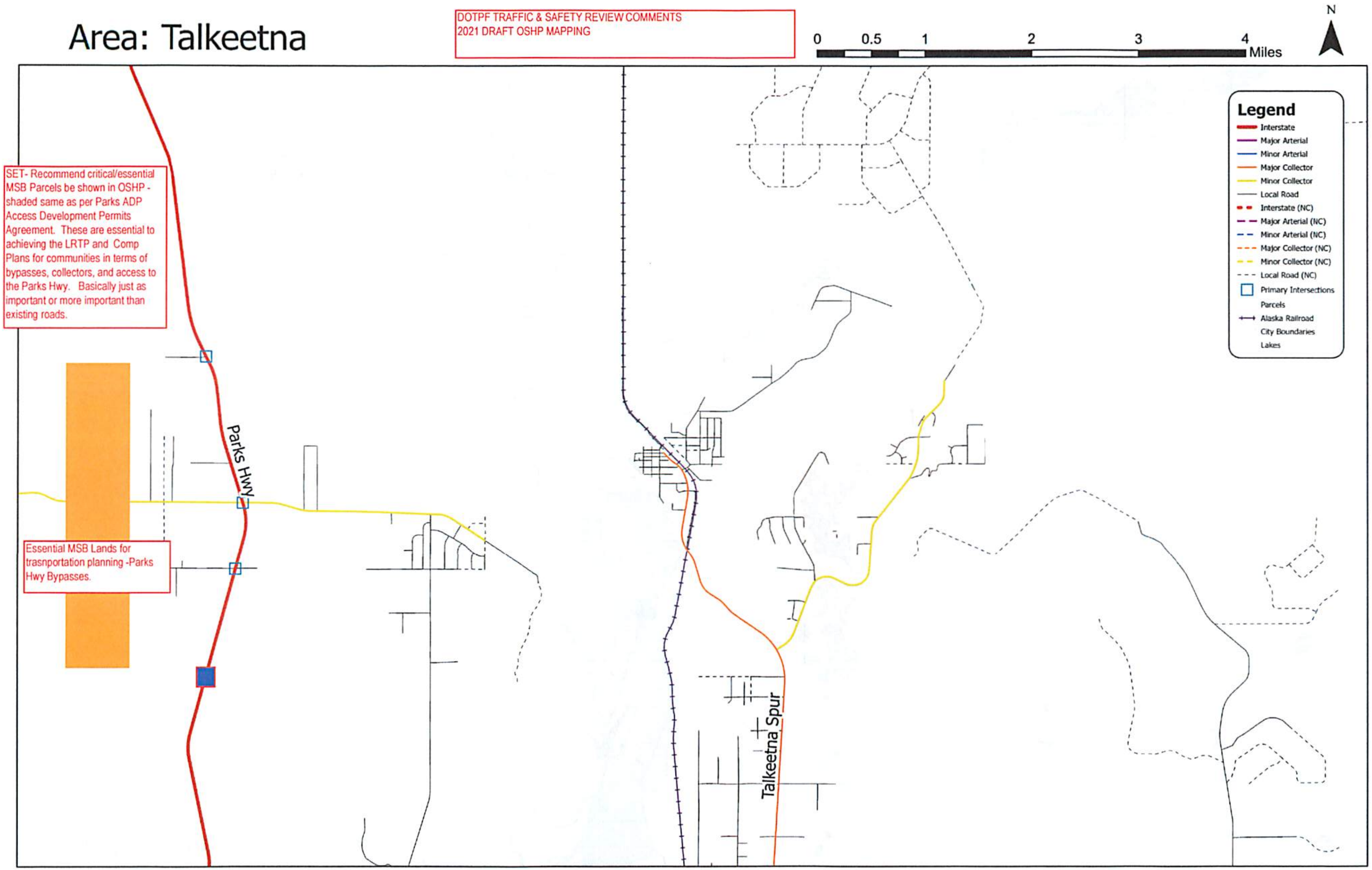
- Fairview Lp Rd at Linlu lane is a primary intersection to existing lands with greater feasibility to serve Nelson Rd area than other options shown. RR Xing as shown is not feasible w/o also realigning Fairview Loop Road away from ARRC for school bus storage and may not be approvable for safety without engineering study. DOTPF/ARRC joint policy requires and engineering study look at reducing RR Xing conflicts – which Linlu Lane connection does.
- Shennum/Shoreline and Hay St to the south are a large neighborhood split dependent on PW Hwy for most access. Long term, eventual Hay St crossover should be considered to maximize connectivity to the Fairview/Nelson area, schools and other services. Would be same as McCarrey St in Anchorage for example.
- MatSu Regional Hospital requires a 2^{nd} point of access for emergency response. Look at the potential to extend Glenn 34-42 frontage at Matanuska Lake to Woodworth Loop.
- "4 Corners" CIRI and 3Bears are at risk of enough congestion to lead to stop and go traffic backing into adjacent signals in the long term. The area is served by poor signal spacing in proximity to new Trunk Road. Examine Ray Lane or a new intersection and internal perimeter route west of these facilities that can remain signalized with less congestion. A gateway to 1 million square feet of retail at the Old Trunk Road intersection will fail the PW Hwy in the long term. A relocated signal is best planned in the OSHP and LRTP as a larger system. This cannot be easily resolved within the limitations of individual TIA's for individual parcels.
- Show Midtown/Golden Hills, Colleen Street as planned.
- Old Glenn access to Burkholder Lake and hundreds of acres is needed via Section Line. There's enough traffic to support a middle connector rather than divert all traffic to the curves at Back Acres Rd or Maud Rd. If traffic is concentrated without new connectors – then signals are more likely to be warranted. With more roads, signals can be avoided for a longer time.
- PW Hwy N/S disconnect needs solutions. An E-W Collector S of the Hwy can serve more access to signals - including schools, sports centers etc. Rather than building more signals and more congestion on the main highway. This also improves emergency circulation and school bus routing - less need for bus stops on the main hwy.
- A Mat R Xing is more of a goal than a known route, just like Interstate bypasses. Crossing the braided river is best at a canyon or unbraided area. The Glenn is too wide and steep for an ideal at-grade intersection at 58 mile Road, but may work as a grade separation in the very long term.

KNIK RIVER

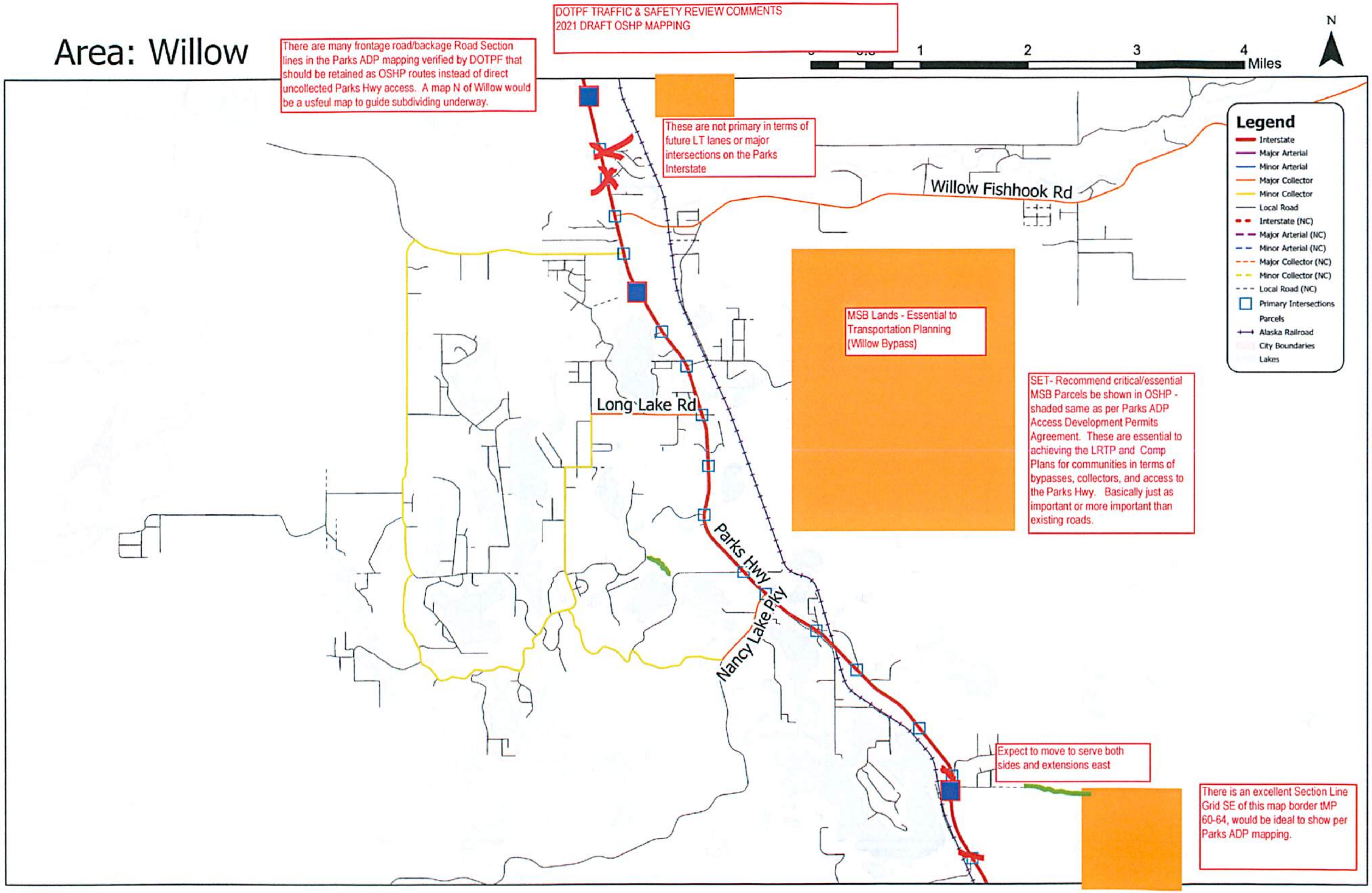
- It appears River Road is better positioned for an intersection and visibility on the N end rather than the south end of the loop.

OTHER

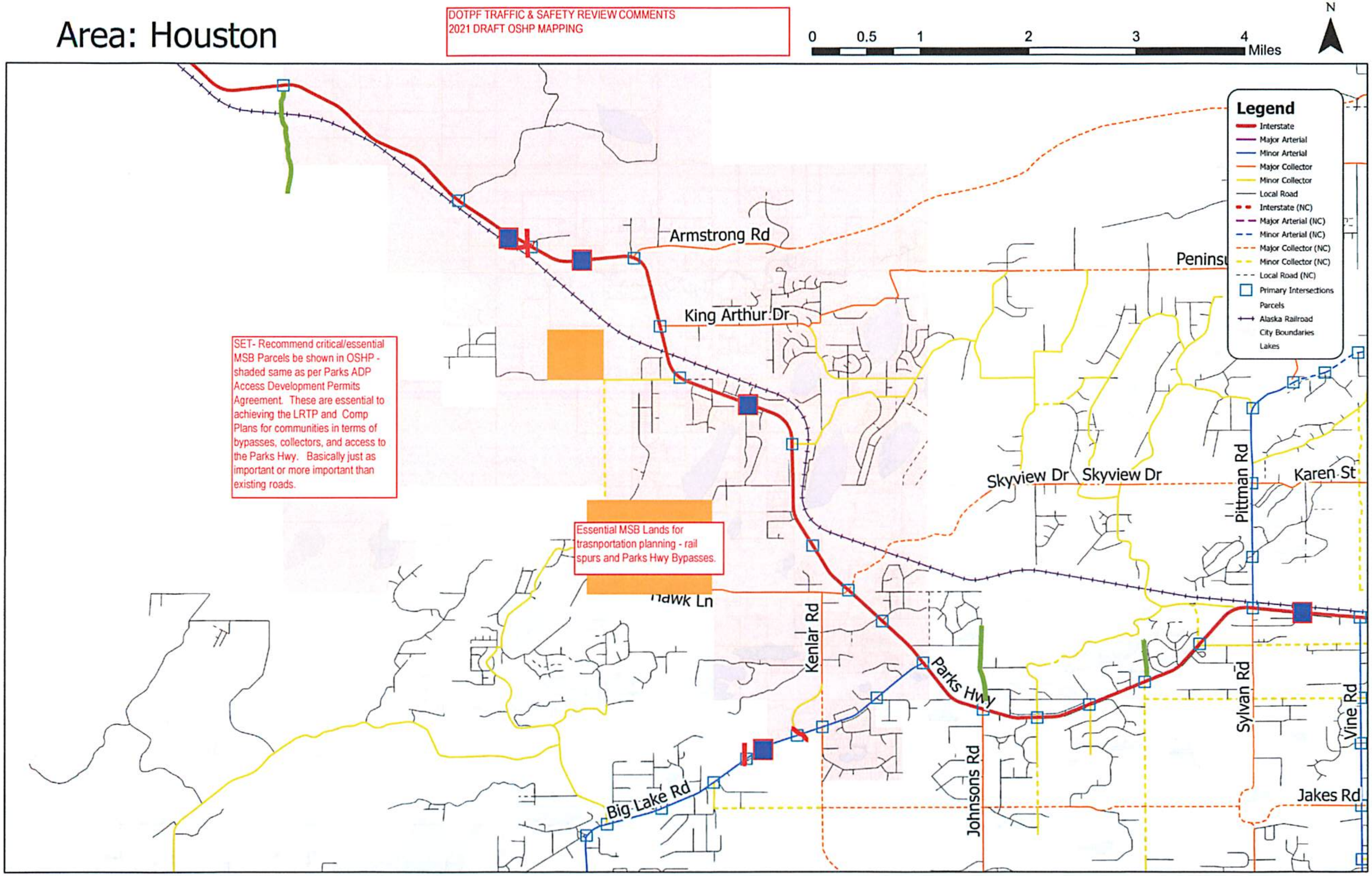
- Other apparent OSHP collectors/connectors were mapped in the DOTPF "Over the Shoulder" review of the OSHP in February 2, 2021 mapping, attached.
    -


Area: Talkeetna
DOTPF TRAFFIC & SAFETY REVIEW COMMENTS
2021 DRAFT OSHP MAPPING
0 0.5 1 2 3 4 Miles
N
SET- Recommend critical/essential MSB Parcels be shown in OSHP - shaded same as per Parks ADP Access Development Permits Agreement. These are essential to achieving the LRTP and Comp Plans for communities in terms of bypasses, collectors, and access to the Parks Hwy. Basically just as important or more important than existing roads.
Essential MSB Lands for trasnportation planning -Parks Hwy Bypasses.
Parks Hwy
Talkeetna Spur
Legend
Interstate
Major Arterial
Minor Arterial
Major Collector
Minor Collector
Local Road
Interstate (NC)
Major Arterial (NC)
Minor Arterial (NC)
Major Collector (NC)
Minor Collector (NC)
Local Road (NC)
Primary Intersections
Parcels
Alaska Railroad
City Boundaries
Lakes

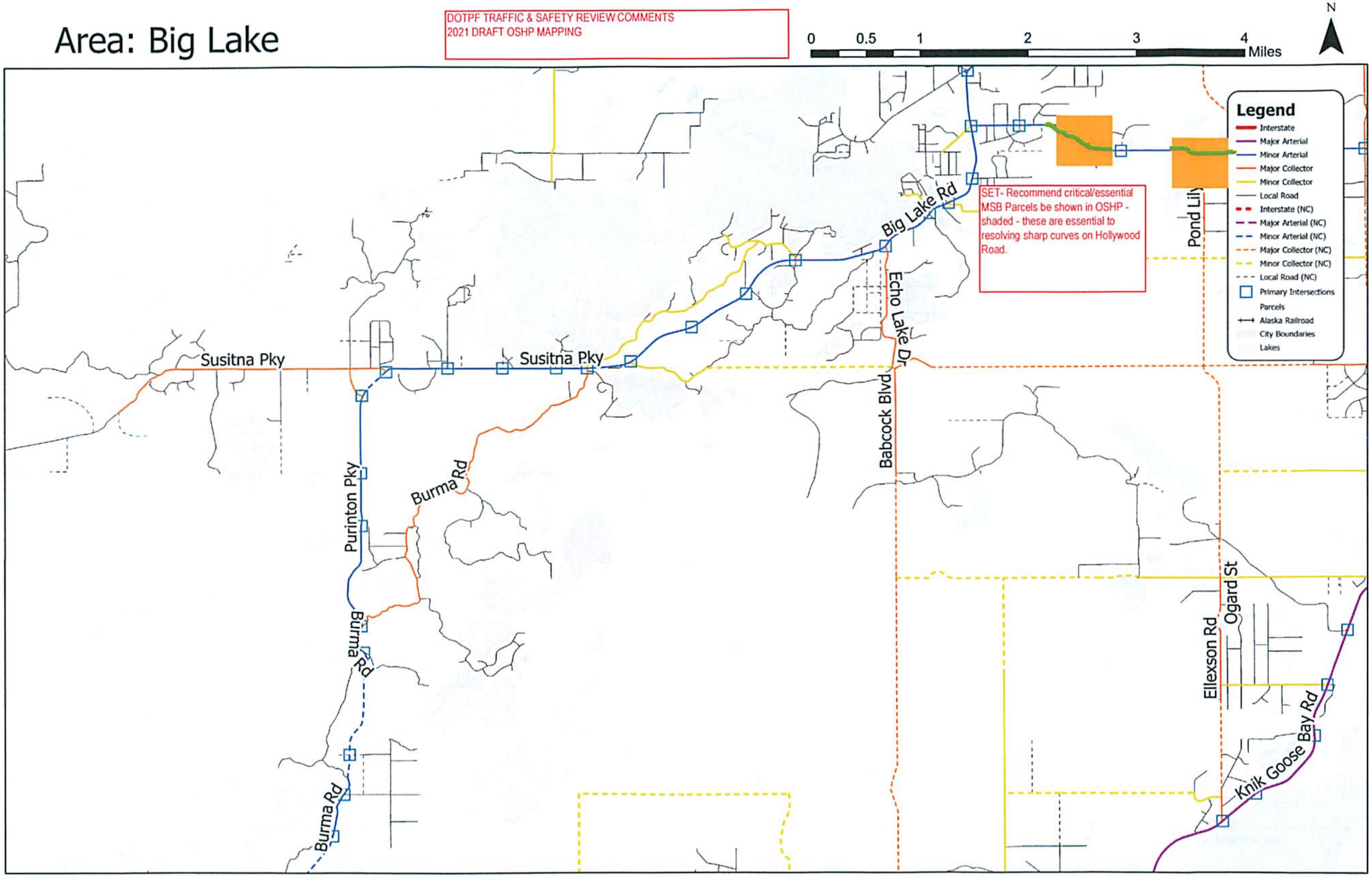
Area: Willow


DOTPF TRAFFIC & SAFETY REVIEW COMMENTS
2021 DRAFT OSHP MAPPING
There are many frontage road/backage Road Section lines in the Parks ADP mapping verified by DOTPF that should be retained as OSHP routes instead of direct uncollected Parks Hwy access. A map N of Willow would be a useful map to guide subdividing underway.
These are not primary in terms of future LT lanes or major intersections on the Parks Interstate
Willow Fishhook Rd
MSB Lands - Essential to Transportation Planning (Willow Bypass)
SET- Recommend critical/essential MSB Parcels be shown in OSHP - shaded same as per Parks ADP Access Development Permits Agreement. These are essential to achieving the LRTP and Comp Plans for communities in terms of bypasses, collectors, and access to the Parks Hwy. Basically just as important or more important than existing roads.
Long Lake Rd
Parks Hwy
Nancy Lake Pky
Expect to move to serve both sides and extensions east
There is an excellent Section Line Grid SE of this map border tMP 60-64, would be ideal to show per Parks ADP mapping.
1
2
3
4
Miles
N
Legend
Interstate
Major Arterial
Minor Arterial
Major Collector
Minor Collector
Local Road
Interstate (NC)
Major Arterial (NC)
Minor Arterial (NC)
Major Collector (NC)
Minor Collector (NC)
Local Road (NC)
Primary Intersections
Parcels
Alaska Railroad
City Boundaries
Lakes

Area: Houston



Area: Big Lake

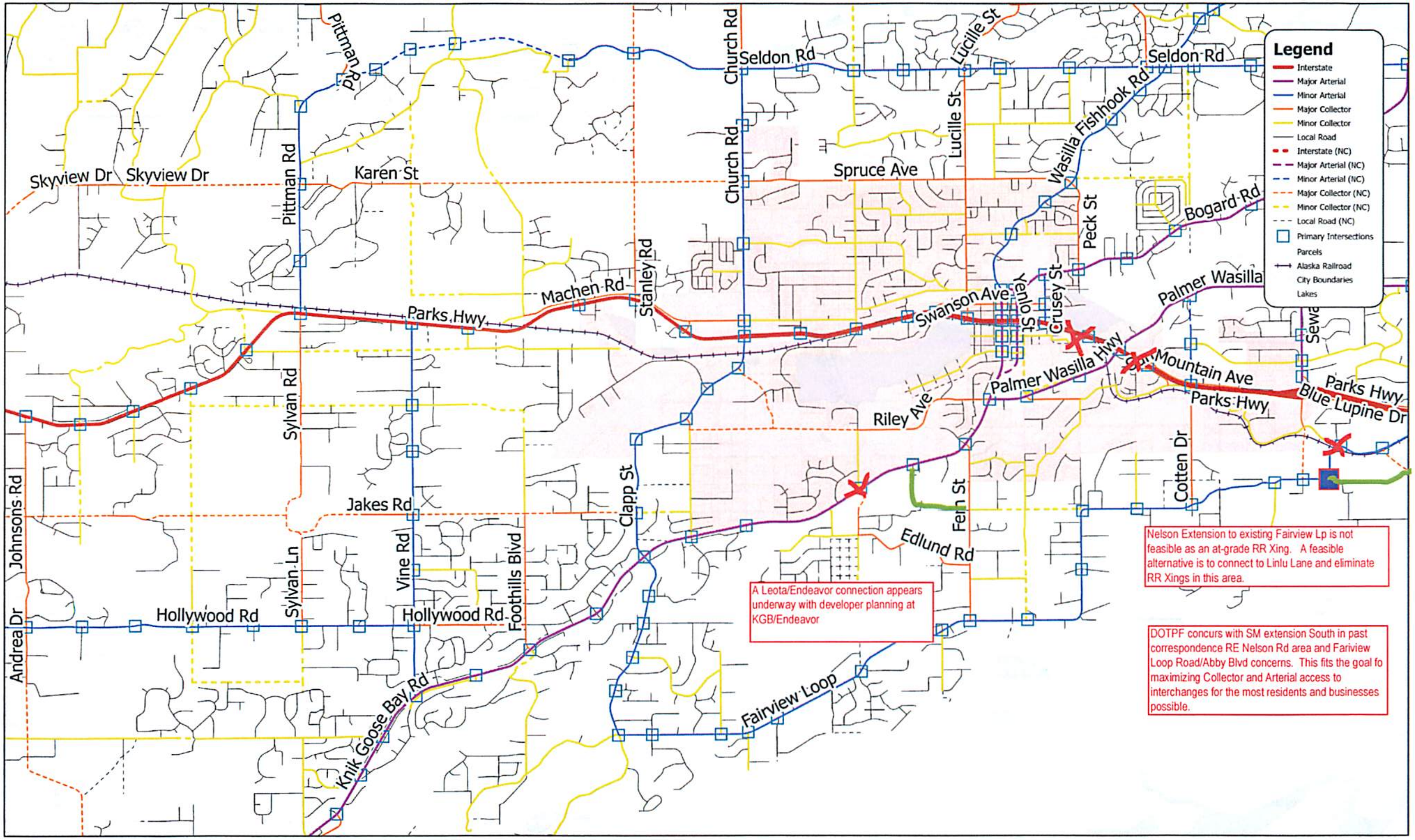


Area: Wasilla

DOTPF TRAFFIC & SAFETY REVIEW COMMENTS
2021 DRAFT OSHP MAPPING

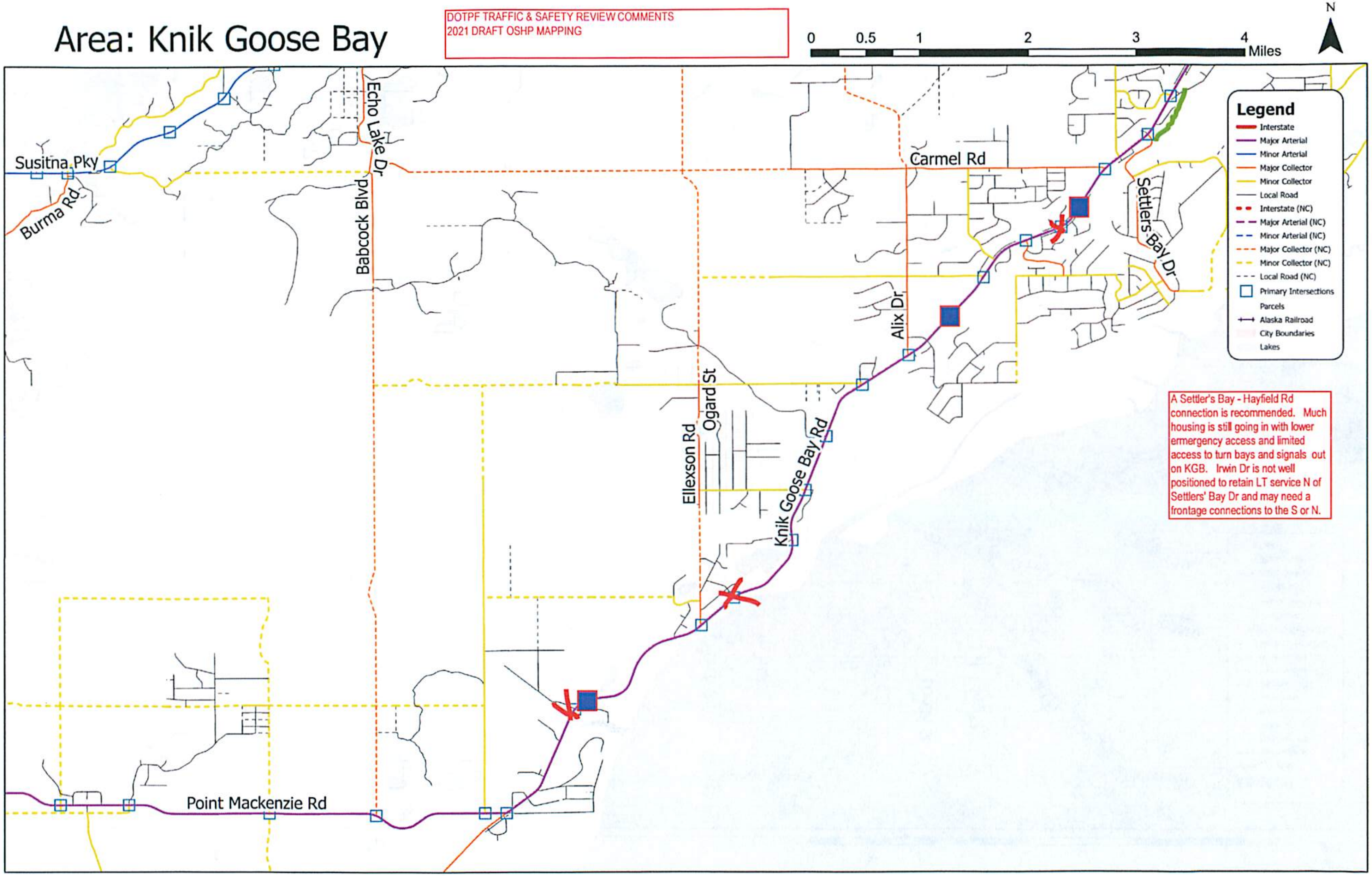
0 0.5 1 2 3 4 Miles

N



Area: Knik Goose Bay

DOTPF TRAFFIC & SAFETY REVIEW COMMENTS
2021 DRAFT OSHP MAPPING



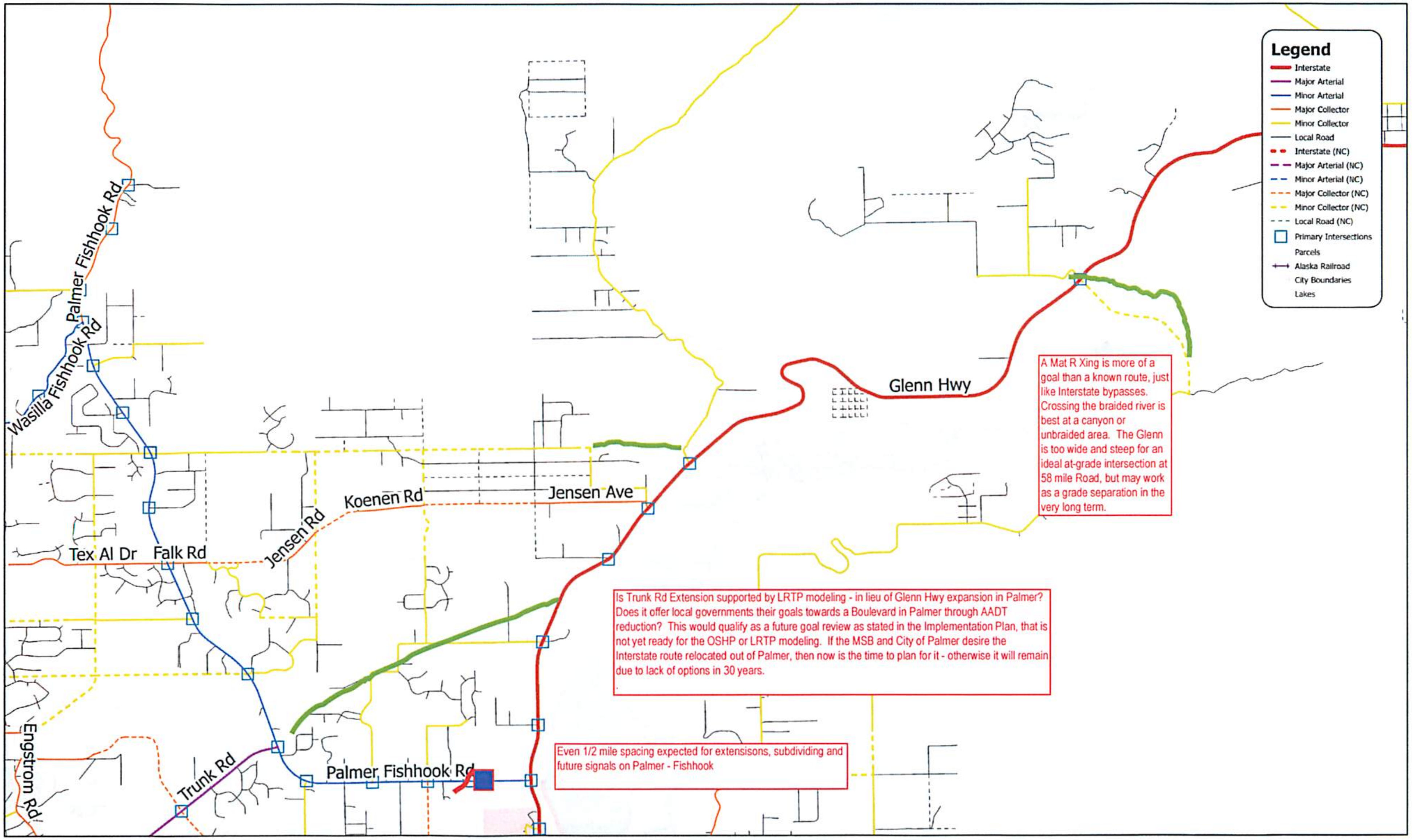
A Settler's Bay - Hayfield Rd connection is recommended. Much housing is still going in with lower emergency access and limited access to turn bays and signals out on KGB. Irwin Dr is not well positioned to retain LT service N of Settlers' Bay Dr and may need a frontage connections to the S or N.

Area: Fishhook

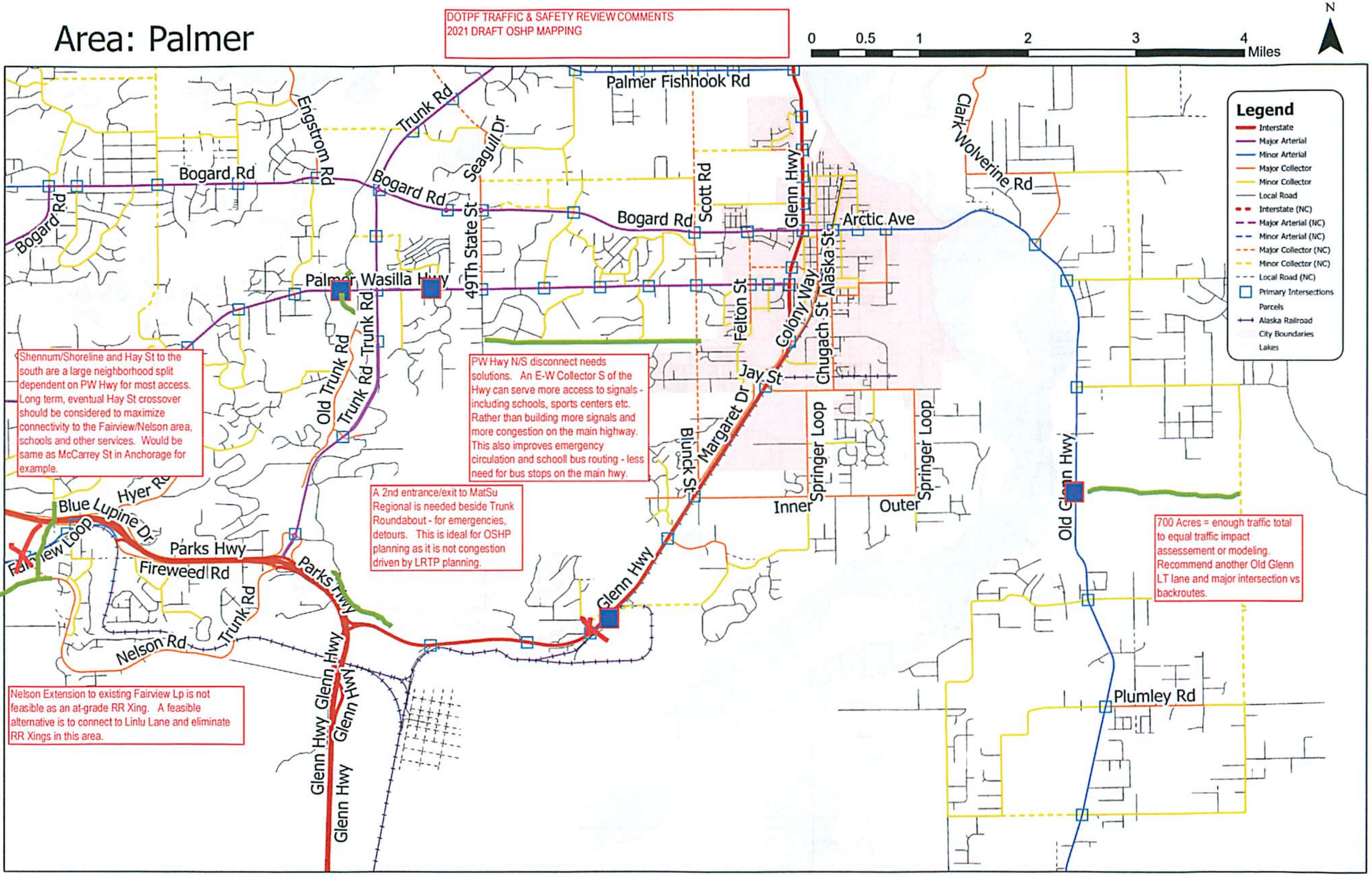
DOTPF TRAFFIC & SAFETY REVIEW COMMENTS
2021 DRAFT OSHP MAPPING

0 0.5 1 2 3 4 Miles

N



Area: Palmer


DOTPF TRAFFIC & SAFETY REVIEW COMMENTS
2021 DRAFT OSHP MAPPING
0 0.5 1 2 3 4 Miles
N
Legend
Interstate
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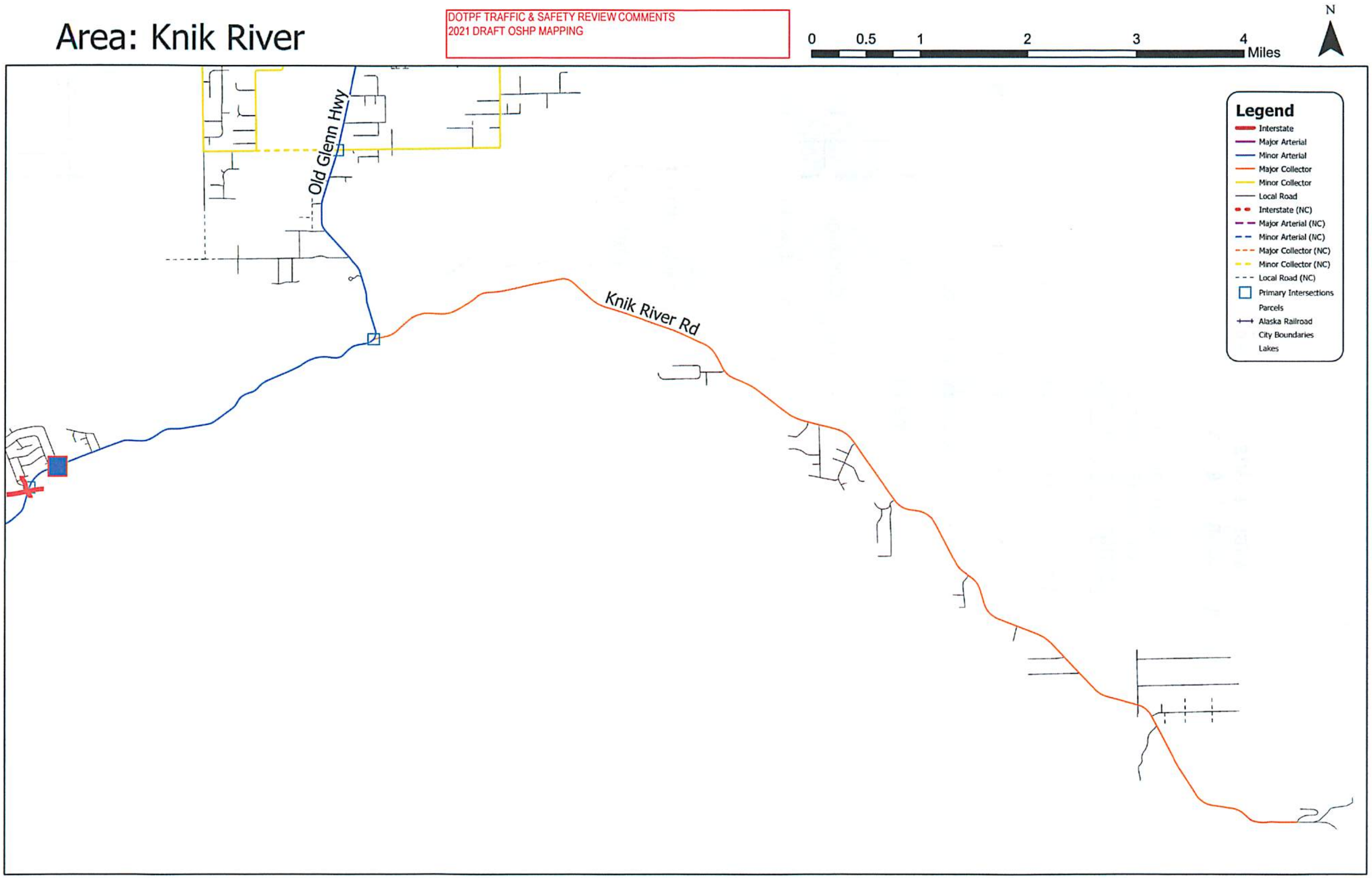
Lakes
Palmer Fishhook Rd
Trunk Rd
Seagull Dr
Engstrom Rd
Bogard Rd
Scott Rd
Glenn Hwy
Arctic Ave
Clark Wolverine Rd
49Th State St
Palmer Wasilla Hwy
Felton St
Colony Way
Alaska St
Chugach St
Jay St
Old Trunk Rd
Margaret Dr
Blunck St
Springer Loop
Inner
Outer
Old Glenn Hwy
Hyer Rd
Blue Lupine Dr
Fairview Loop
Parks Hwy
Fireweed Rd
Nelson Rd
Plumley Rd
Shennum/Shoreline and Hay St to the south are a large neighborhood split dependent on PW Hwy for most access. Long term, eventual Hay St crossover should be considered to maximize connectivity to the Fairview/Nelson area, schools and other services. Would be same as McCarrey St in Anchorage for example.
PW Hwy N/S disconnect needs solutions. An E-W Collector S of the Hwy can serve more access to signals - including schools, sports centers etc. Rather than building more signals and more congestion on the main highway. This also improves emergency circulation and schooll bus routing - less need for bus stops on the main hwy.
A 2nd entrance/exit to MatSu Regional is needed beside Trunk Roundabout - for emergencies, detours. This is ideal for OSHP planning as it is not congestion driven by LRTP planning.
700 Acres = enough traffic total to equal traffic impact assessement or modeling. Recommend another Old Glenn LT lane and major intersection vs backroutes.
Nelson Extension to existing Fairview Lp is not feasible as an at-grade RR Xing. A feasible alternative is to connect to Linlu Lane and eliminate RR Xings in this area.

Area: Knik River

DOTPF TRAFFIC & SAFETY REVIEW COMMENTS
2021 DRAFT OSHP MAPPING



MATANUSKA-SUSITNA BOROUGH
PLATTING BOARD RESOLUTION No. 2022-25

A RESOLUTION OF THE MATANUSKA-SUSITNA BOROUGH PLATTING BOARD RECOMMENDING ADOPTION OF THE Matanuska-Susitna Borough 2022 OFFICIAL STREETS AND HIGHWAYS PLAN UPDATE.

WHEREAS, the Official Streets and Highways Plan (OSHP) is a transportation planning tool that identifies future road corridors and road upgrades necessary to accommodate the Borough's growing population and its transportation needs; and

WHEREAS, the OSHP is a part of the Borough's Long Range Transportation Plan, is map-based, and focuses on road infrastructure needs; and

WHEREAS, the OSHP provides a thoughtful, proactive, and comprehensive basis for planning, platting, and transportation infrastructure investment decisions; and

WHEREAS, the Borough's Subdivision Construction Manual states that, "Subdivisions shall be designed in a manner that does not conflict with the Long Range Transportation Plan or the Official Streets and Highways Plan"; and

WHEREAS, the OSHP will help the Platting Board preserve future road corridors; reducing right-of-way costs by minimizing building conflicts and addressing road network deficiencies before they happen; and

WHEREAS, subdivisions depend on a functioning road network for access; and

WHEREAS, the OSHP will support subdivision and development by planning and preserving space for a robust collector road network; and

WHEREAS, implementation of the OSHP will enhance road safety, reduce congestion, reduce negative impacts on neighborhoods, and lower transportation costs.

NOW, THEREFORE, BE IT RESOLVED, that the Matanuska-Susitna Borough Platting Board does hereby hereby recommends adoption of the 2022 Matanuska-Susitna Borough Official Streets and Highways Plan Update.

ADOPTED by the Matanuska-Ssitna Borough Platting Board this _____ day of ____________, 2022.

____
Wilfred Fernandez,
Platting Board Chair

ATTEST:

____
SLOAN VON GUNTEN,
Platting Board Clerk

(SEAL)

MATANUSKA-SUSITNA BOROUGH
TRANSPORTATION ADVISORY BOARD
RESOLUTION SERIAL NO. TAB 22-01

A RESOLUTION OF THE MATANUSKA-SUSITNA BOROUGH TRANSPORTATION ADVISORY BOARD IN SUPPORT OF THE MATANUSKA-SUSITNA BOROUGH 2022 OFFICIAL STREETS AND HIGHWAYS PLAN UPDATE.

WHEREAS, the Matanuska-Susitna Borough Transportation Advisory Board advises the Assembly on transportation-related issues; and

WHEREAS, the Official Streets and Highways Plan (OSHP) is a transportation planning tool that identifies future road corridors and road upgrades necessary to accommodate the Borough's growing population and its transportation needs; and

WHEREAS, the OSHP is a part of the Borough's Long Range Transportation Plan, is map-based, and focuses on road infrastructure needs; and

WHEREAS, the OSHP provides a thoughtful, proactive, and comprehensive basis for planning, platting, and transportation infrastructure investment decisions; and

WHEREAS, the OSHP will help preserve future road corridors; reducing right-of-way costs by minimizing building conflicts and addressing road network deficiencies before they happen; and

WHEREAS, implementation of the OSHP will enhance road safety, reduce congestion, reduce negative impacts on neighborhoods, and lower transportation costs; and

WHERE AS, future road corridors and upgrades to existing roads should be planned early in order to ensure a safe and efficient road network.

NOW, THEREFORE, BE IT RESOLVED, that the Matanuska-Susitna Borough Transportation Advisory Board hereby recommends adoption of the 2022 Matanuska-Susitna Borough Official Streets and Highways Plan Update.

ADOPTED by the Matanuska-Susitna Borough Transportation Advisory Board this _____ day of ______________, ____.

____
Joshua Cross, Chair

ATTEST:

____
Kim Sollien, Planning Services Manager
Staff Support

LOCAL ROAD SERVICE AREA ADVISORY BOARD

RESOLUTION ___

A RESOLUTION BY THE MATANUSKA-SUSITNA BOROUGH LOCAL ROAD SERVICE AREA ADVISORY BOARD (LRSAAB) IN SUPPORT OF THE MATANUSKA-SUSITNA BOROUGH 2022 OFFICIAL STREETS AND HIGHWAYS PLAN UPDATE

WHEREAS: the Local Road Service Area Advisory Board advises the Assembly on local road policy within the Matanuska-Susitna Borough; and

WHEREAS: the Official Streets and Highways Plan (OSHP) is a transportation planning tool that identifies future road corridors and road upgrades necessary to accommodate the Borough's growing population and its transportation needs; and

WHEREAS: the OSHP is a part of the Borough's Long Range Transportation Plan, is map-based, and focuses on road infrastructure needs; and

WHEREAS: the OSHP provides a thoughtful, proactive, and comprehensive basis for planning, platting, and transportation infrastructure investment decisions; and

WHEREAS: the OSHP will help preserve future road corridors; reducing right-of-way costs by minimizing building conflicts and addressing road network deficiencies before they happen; and

WHEREAS: implementation of the OSHP will enhance road safety, reduce congestion, reduce negative impacts on neighborhoods, and lower transportation costs; and
WHEREAS: future road corridors and upgrades to existing roads should be planned early in order to ensure a safe and efficient road network.

NOW, THEREFORE, BE IT RESOLVED: The Local Road Service Area Advisory Board hereby recommends the adoption of the 2022 Matanuska-Susitna Borough Official Streets and Highways Plan Update.

Adopted by unanimous vote on _______

Stephen Edwards________________________ Board Chair

Mike Shields ___________________________ Board Secretary

Matanuska Susitna Borough
Official Streets and Highway Plan

Technical Report
and
Implementation Plan

May 2022

Table of Contents

Figures

Tables

Abbreviations

AADT	Average Annual Daily Traffic
AMATS	Anchorage Metropolitan Area Transportation Solutions
ATV	All-Terrain Vehicle
CIP	Capital Improvement Project
DOT&PF	Alaska Department of Transportation and Public Facilities
DOWLD	Alaska Department of Labor and Workforce Development
FC	Functional Classification
FHWA	Federal Highway Administration
GIS	Geographic Information System
ISER	Institute of Social and Economic Research
LRTP	Long-Range Transportation Plan
MSB	Matanuska-Susitna Borough
MUTCD	Manual on Uniform Traffic Control Devices
OS&HP	Official Streets and Highway Plan
RIP	Road Improvement Project
ROW	Right-of-Way
SCM	Subdivision Construction Manual (2020)
STIP	Statewide Transportation Improvement Program
TAZ	Traffic Analysis Zone
TDM	Travel Demand Model
TRB	Transportation Research Board

1 Introduction

The Value of an Efficient Road Network

Roads are an important public resource. They are the conduits through which all commerce, recreation, and industry happen, and they are the foundation on which a community thrives. The design of the road network directly defines the limits to which a community can provide services and allow for growth while continuing to provide a community that people want to live in. If housing and commercial development outpace road network development without properly considering future needs, the community will quickly become constrained by the road network and community development will stop. Often, road infrastructure needs will only become apparent after they are affecting the community and solutions will become reactionary with options limited by the surrounding development. The Official Streets and Highway Plan (OS&HP) is a planning tool for the Matanuska-Susitna Borough (MSB) that helps decision makers reserve future road corridors and identify possible road network improvements so that when the need arises, reasonable options are still available.

The Nature of Road Development

Roads take a very long time to develop compared to other community development projects. Therefore, it is common in quickly growing areas for adequate road infrastructure to lag behind in the order of development, with housing and commercial development happening first and the necessary road development to support that growth happening later. This is the case for the Mat-Su Borough, where population growth since the 80s has been upwards of 6% a year. These are growth rates usually seen in dense urban areas[1] with multimodal transportation programs and road powers, etc. Much of this growth in the Mat-Su Borough has been allowed to occur in such a way that road network issues have recently become glaringly apparent, and the road solutions with the lowest impact and cost are no longer available due to adjacent development.

Growth and Roads

Population growth is expected to continue in the Mat-Su Borough through at least 2045 at the same 6% rate, assuming employment opportunities, housing, and services are made available. As population and traffic volumes grow, road congestion and safety issues on the existing road network will become exponentially worse if improvements are not made. It is essential that the MSB seriously consider action steps to prioritize road development that meets community demand. Routes identified in the OS&HP may have impacts

OS&HP Goals

- Link Planning to Engineering Design and Construction
- Provide a Plan for the Development of an Appropriate Road Network
- Guide Future Land Use
- Preserve Safe & Efficient Travel
- Promote Economic Development
- Produce Lower Cost Projects
- Extend Project Design Lives
- Improve Quality of Life

[1] Pew Research Group Report: What Unites and Divides Urban, Suburban and Rural Communities; May 22, 2018

and involve compromises and careful planning, but if they are not reserved, other far less beneficial projects will be needed at a higher cost. The goal of the OS&HP is not to hinder or control housing and commercial development, but to increase the capacity of the MSB to respond to community infrastructure needs due to population growth.

A detailed discussion of the growth analysis used to develop the OS&HP is included in Appendix A on page 38.

An Overview of the OS&HP

The OS&HP is a map-based transportation infrastructure plan developed by the MSB Planning Division, with support from Kinney Engineering and a steering committee consisting of members of MSB Public Works, MSB Platting, MSB GIS (Geographic Information System), the City of Palmer, and the City of Wasilla, as well as the input and coordination of the Alaska Department of Transportation (DOT&PF). The Plan was developed with a robust effort of modeling, analysis, and planning-level engineering with group workshops to select and include the most favorable road alignments and intersection locations in the Plan.

The primary component of the Plan is a map, included in Appendix B on page 45. The map shows the existing road network, possible future road alignments, and primary intersection locations. Each road segment is identified by a functional classification, which is a planning-level method of indicating the design parameters of the road. Functional classifications are tied to design manuals where the classification is translated into such design aspects as ROW width requirements or design speeds.

What is Functional Classification?

Functional Classification is a method of identifying the primary use of a road segment in the overall network. This communicates the context of the road between agencies, designers, and the public, and decides the design parameters of the road.

The road network displayed in the OS&HP represents the various routes and classifications needed to provide safe and efficient travel for existing and anticipated development. Since the timing and location of growth and development are dynamic, the road network presented in the OS&HP is not tied to a set horizon year, but serves as a guide to plan for growth and future travel demand. The purpose of the OS&HP is to highlight where roads are needed and to guide development and the subdivision of lands so the corridors are available for future road projects. The Platting Division implements the OS&HP. During the platting process, every subdivision development is assessed for compatibility with the OS&HP. If there is a conflict with the design, MSB Staff will work with the applicant to find a solution that allows for the proposed development and also preserves the OS&HP corridor.

Importance of the OS&HP

The road network outlined in the OS&HP emphasizes the following components:

- **Connectivity**. The Alaska road network has historically been very reliant on the interstate highway system and this has led many communities, including the MSB, to develop without proper connectivity in their secondary road network. The road network is very reliant on the interstate highway system. A majority of trips, regardless of their distance or purpose, are routed onto the highway at some point in their travel. This leads to major congestion along the interstate through the urban core. The OS&HP is designed to provide tools to recover that missing connectivity, leading to higher mobility and efficiency of travel.
- **Safety.** The role of functional classifications in a road network is to identify drivers' expectations at different places in the network. Mixing drivers with a wide range of expectations can greatly decrease safety. For instance, drivers on neighborhood roads expect a high number of turning vehicles, low speeds, and pedestrians on the road and shoulders. However, a deficient road network may push high mobility traffic onto the neighborhood road, causing "cut-through traffic." The mixing of drivers with different needs on the same road creates an obvious safety issue. Simply installing speed bumps and traffic calming may reduce the safety impacts, but it does not address the greater cause, which is a road network that is failing to provide all users with appropriate roads to serve their needs. The OS&HP shows a road network that, if fully built, would provide optimal routes for all users using the space currently available.
- **Cost-effectiveness**. A primary goal of the OS&HP is to reduce the financial and societal costs of road projects in the future. A study of the future community growth showed locations where issues will exist in the network if reasonable expectations about growth occur. Therefore, solutions to these issues will someday become urgent to the community, and decision-makers will need to have answers available to meet these needs. The most favorable solution in each case is included on the OS&HP map. If the MSB does not preserve these routes, then secondary, less favorable options will need to be explored. This will result in a slower road development process resulting in higher-cost solutions that provide less improvement to the road network.

The OS&HP is a part of the MSB process for designing and constructing road infrastructure. Decision makers will use the OS&HP to choose road projects for further study and design and the construction of infrastructure. The OS&HP works in tandem with the MSB Long-Range Transportation Plan (LRTP), the MSB Subdivision Construction Manual (SCM 2020), and other road-related policies and plans.

2 The Planning Process and the Role of the OS&HP

The OS&HP in the MSB Planning Process

The recommendation of a planned road network in the OS&HP is the first step in road infrastructure development. The connections shown are based on current development data and existing socioeconomic projections for the MSB. The exact corridor alignments and road network layout may change as projects are studied in more detail. The 2022 iteration of the OS&HP is now designed to be a "living document," which will be updated by MSB Planning Division as growth and development forecasts change.

Figure 1, below, presents the general planning and road design process in the MSB. Studies and road plans will generally follow a form of this process on their way to construction.

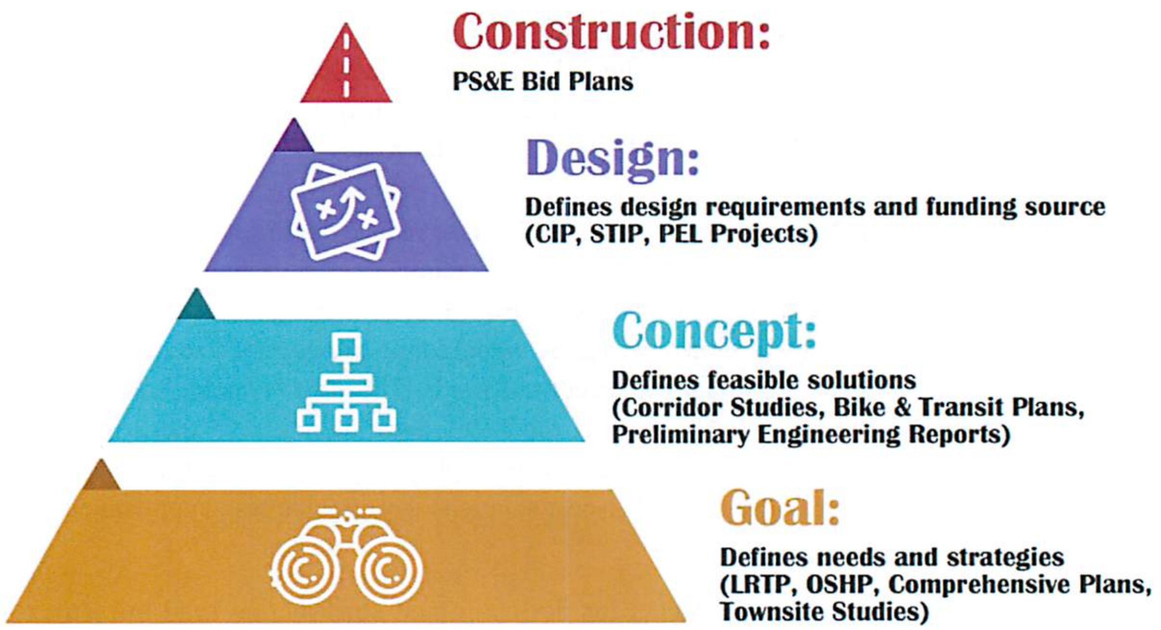


Figure 1. Road Development Pyramid

Goal Planning

At the foundational level of the pyramid are studies that identify infrastructure needs in the community and present solutions in the form of goals and strategies. For example, the community comprehensive plans identify needs in a community for road connections or transit services and explore possible solutions for further study. The LRTP is a key element at this stage of planning as it brings together a broad view of community transportation needs and prioritizes those needs using basic feasibility measurements with a constrained budget and defined horizon year.

Concept Planning

The second level of road planning involves studies that take broad-level goal-based strategies and transition them to more feasible engineering solutions. There are often many possible ways to fulfill a single identified need in the community. Studies at this level typically determine the optimal solution through more detailed traffic engineering analysis, cost-benefit techniques, and public involvement.

Design Planning

On the "Design" level are projects which have an established alignment and design concept that has been vetted by feasibility analysis and environmental processes. They have more involved engineering design requirements, and their scope and layout are well defined. Another key element at this stage is establishing a funding source.

Construction and the Nature of Project Development

The final step of project development is the construction of the road. This step takes the feasible solutions and turns them into shovel-ready projects that may go out to bid for construction.

Depending on the size and scope of the project, a road may not pass through every step of this process before going to final design and construction, and no step of the process, including final design, guarantees the construction of a road project. This is to say, a road shown on the OS&HP maps is not a committed road but rather an indication of a possible future need. The alignment proposed in the OS&HP is likely to be the least impactful and most cost-effective solution for that future need. However, further discussion and study will take place before a road is built.

The Relationship between the OS&HP and the LRTP

The OS&HP is a long-term planning document that is an extension of the LRTP, and a part of the LRTP's implementation strategy. The LRTP is a fiscally constrained study that looks at all modes and transportation needs in the MSB and develops a plan with a set horizon year and limited budget forecast. The most recent MSB LRTP studied a horizon year of 2035 and recommended Short-term, Mid-term, and Long-term projects. The OS&HP includes the recommendations of the LRTP but also looks beyond 2035 to an undefined horizon year to predict, on a planning level, additional projects that may be included in future LRTPs and future Statewide Transportation Improvement Programs (STIP). The OS&HP's role in road planning is to forecast the connectivity and road function needs of the Borough and to reserve these corridors for future projects. The OS&HP helps fulfill Federal Highway Administration (FHWA) requirements for a planning process that leads to a STIP.

The OS&HP bridges the gap between the "Goal" level and the "Concept" level of road development, and it works in tandem with the LRTP as the basis for future road projects. Table 1, on page 9, compares the differences between the scope and purpose of the LRTP and the OS&HP.

Table 1. Key Goals and Purposes of LRTP vs OS&HP

LRTP	OS&HP
• Broad Transportation Focus • Performance-Based through 2035 • Developed Goals and Strategies • Recommended Fiscally Constrained Improvements • Models High-Volume Road Congestion in a Model that Primarily Provides Higher Function Road Solutions	• Road Network Access and Connectivity Focus • Protects Options for Projects Beyond 2035 • Part of the LRTP's Implementation Strategy • Not Fiscally Constrained • Defines Functional Classes and Patterns Network Design with Planning-Level Road Alignments • Designs Secondary Road Network Needed to Support Arterial-Level LRTP Solutions

3 Key Elements of the OS&HP

The OS&HP is a map designed in GIS software and updated by the MSB Planning Department. A current version of the map is included as figures in Appendix B of this report. The OS&HP highlights three main features.

1. Existing and Possible Future Road Alignments
2. Functional Classification of Road Segments
3. Primary Intersections along Arterial Road Corridors

3.1 Existing and Possible Future Road Alignments

Existing road alignments are based on MSB GIS data. The MSB GIS data used includes land features, land ownership, land development, road characteristics, public facilities, parcels, structures, and (Right-of-way) ROW. The main source of data was the MSB GIS Department's online data portal. Data was downloaded in September of 2020.

Important Data Referenced in the Study:

MSB GIS Data
2007 OS&HP (readopted in 2017
2020 DOT&PF Functional Classes
2020 Capital Improvement Project (CIP) list
2017 Long Range Transportation Plan (LRTP)
2020 Subdivision Construction Manual (SCM)
2015 MSB Build-Out Study
Community Council Area Comprehensive Plans
Alaska Moose Crash Location Database

Future road alignments were determined based on SCM and FHWA guidance design criteria regarding road networks. Road connections included in previous plans were considered first, and then additions were made using an iterative process of considerations, agency input, and steering committee workshop discussions.

The study also referenced the following Assembly Adopted plans:

- Area Comprehensive Plans currently available on the MSB website
- Alsop Townsite Plan, 2013
- Southwest MSB 2060 Futures Project, 2014
- Fish Creek Townsite Study
- Current design plans
  - Parks Highway, Lucus to Big Lake expansion project
  - Knik-Goose Bay Road expansion project
  - Seldon Road Extension to Pittman Road.

The Importance of Connectivity

One of the primary goals of the OS&HP was to provide better connectivity within the secondary road network. Connectivity provides intraregional access between different major destinations in the community. Figure 2, below, shows an example of connectivity in a street network, comparing a typical cul-de-sac subdivision design to a street design with more connectivity.

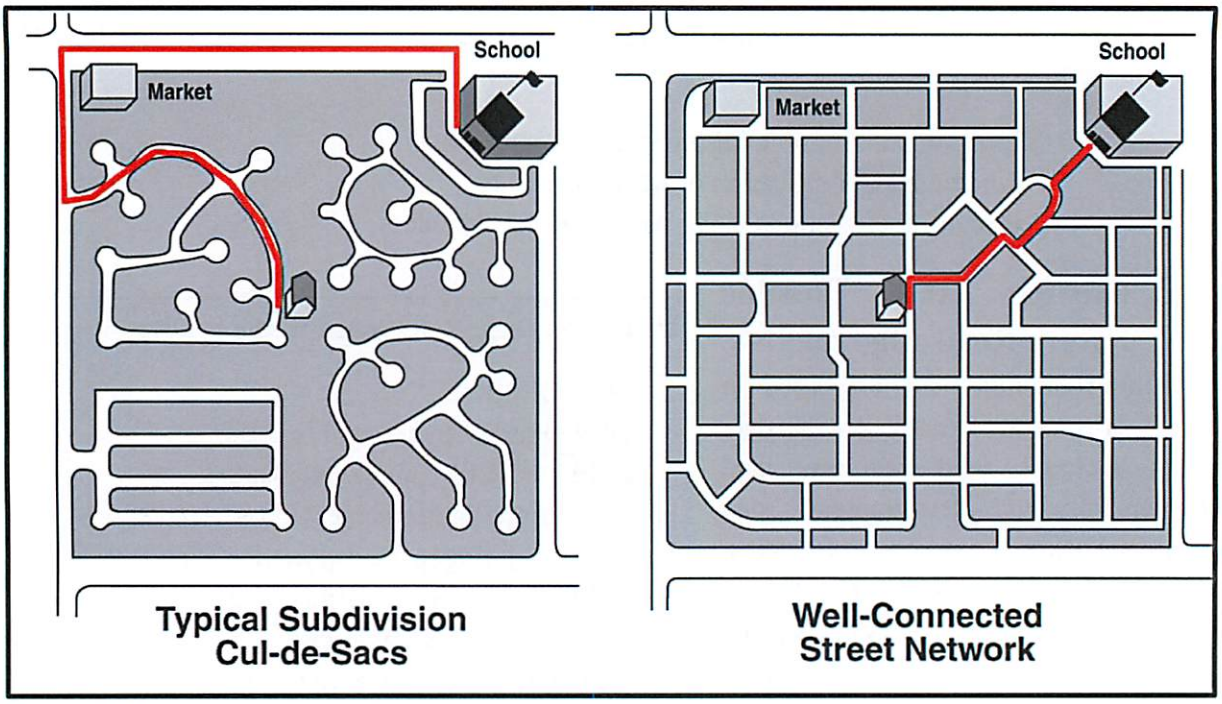


Figure 2. Example of Street Network Connectivity

Notice that trips between the subdivision and the school in the cul-de-sac design are forced onto the major road network. In the more connected street network example, however, the same trip has several possible routes to choose from, some of which can avoid the major road network entirely. Poor connectivity in the road network has a rippling effect throughout the community as it exasperates issues at overloaded intersections, increases safety risks due to more frequent turning on high mobility roads, and increases cumulative travel miles. The lost time to road users in the community can become extremely high. Note that the road network shown in Figure 2 is not entirely ideal and is merely shown as an example. It is unclear from the cartoon what the trip generation rates of the properties are and how these volumes would be distributed in the secondary road network. A well connected network for the MSB will need an appropriate design that better controls the routing of internal traffic since high volume through traffic on a residential street is not favorable.

Because of a disconnect between Platting and Land Use, the MSB has not effectively connected the secondary road network. Numerous subdivisions and commercial generators have been constructed in the past 20 years, resulting in secondary road network that forces all trips generated in the subdivision to take longer routes that must use the arterial road, regardless of their destination. One example of this disconnected development style is the Fishhook Triangle, the region contained within Palmer and Wasilla Fishhook Road, Bogard Road, and the north end of Trunk Road. Figure 3 , below, shows the road network in this region.

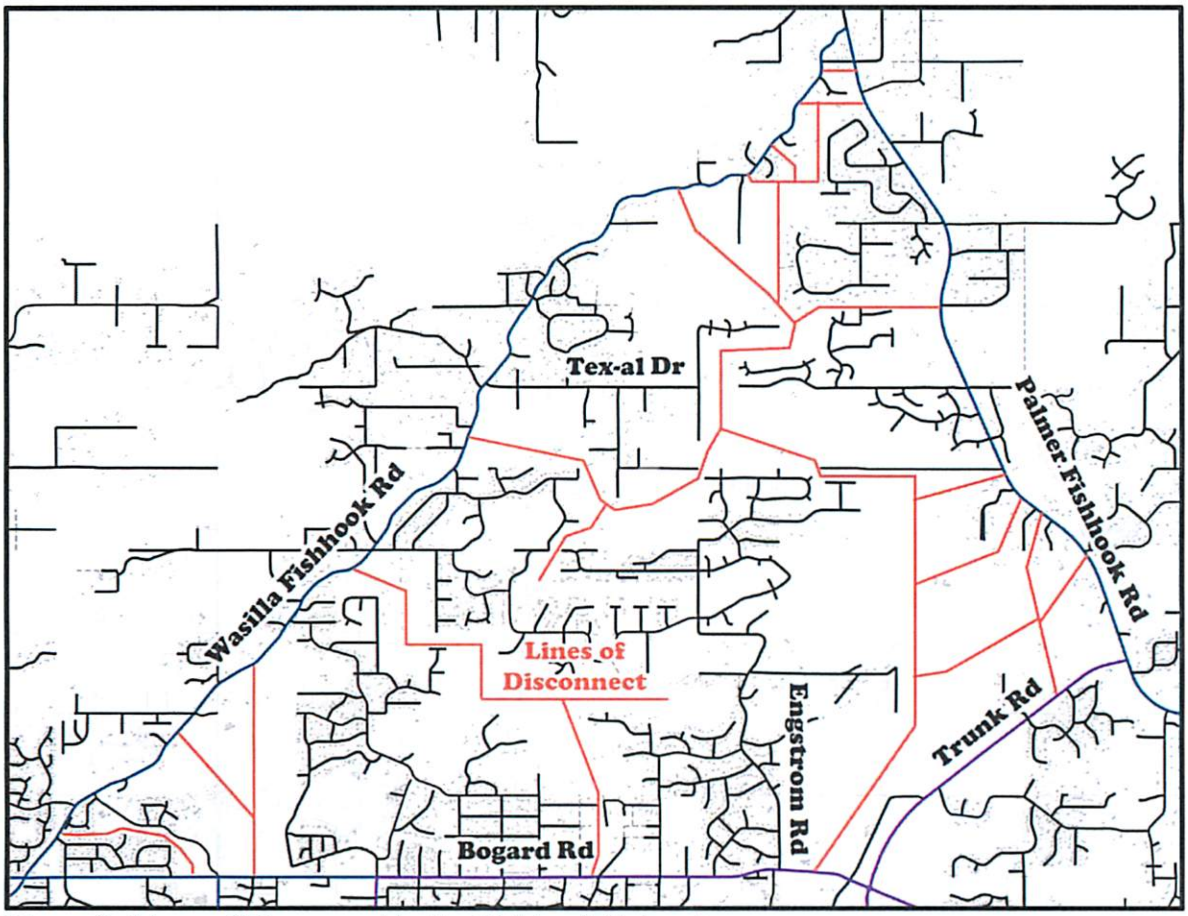


Figure 3. Lines of Disconnect in the Fishhook Triangle

Note the red lines are the lines of disconnect that roads do not cross. Any trip generated within these regions must be routed to the arterial road network, even if they are making a local trip. This prematurely overloads the arterial road network and creates a cascade of issues throughout the area. Notice Engstrom Road. The traffic congestion and safety issues at the intersection of Engstrom Rd and Bogard Rd are a prime example of internal connectivity creating problems in a different part of the road network. Connectivity in the secondary road network within the Fishhook triangle was a concern as far back as the 2007 OS&HP. Solutions for connectivity in this region were included in the 2007 OS&HP; however, they were not built and issues have continued to compound. The current OS&HP is proposing road connections that would solve some of the network issues like those identified in Figure 3. To develop a more efficient road network, it is vital that corridors shown on the OS&HP are protected.

Appropriate connectivity provides mobility, which greatly benefits the community by decreasing travel times, increasing route options, and allowing for more direct travel between regions of the MSB. This, in turn, increases economic viability, opens up new areas for development, increases public safety, creates smaller intersections with less frequent need for traffic signals, diversifies the negative aspects of roads, increases the available pedestrian routes, moves bicyclists off of major roadways, reduces the peak hour congestion on high mobility roads, and provides alternative routes to accommodate road closures or emergency service access.

3.2 Functional Classifications

A second core feature of the OS&HP is the functional classification of the road segments in the network. Functional classes is a road planning tool that helps define the road's design needs by identifying the expectations of the drivers on the road segment. The OS&HP establishes the functional classification of the road, new and existing, which is key to linking design criteria to functional needs. The MSB OS&HP applies a functional classification system recommended by FHWA and is consistent with existing MSB policy and design guidance and that of the DOT&PF.

The FHWA functional classification system used in the MSB OS&HP identifies roads in the following categories:

- Interstate Highway
- Major/Minor Arterial Roads
- Major/Minor Collector Roads
- Local Roads

Each of these classes fulfills a specific role in the road network.

Note that roads are identified for their future use, and not necessarily their current design. Many existing roads will need to be upgraded to adapt to the OS&HP network.

What are Access and Mobility?

Access is the ability for a road to provide access safely and efficiently to and from destinations adjacent to a roadway. High access roads would likely be designed to allow frequent turns through conflicting vehicle paths.

Mobility is the ability for a road to allow travel safely and efficiently through an area at a relatively high rate of speed with limited disturbance due to conflicting traffic or road capacity constraints.

Functional Classifications: Access vs Mobility

The basic principle of functional classification is to identify the expectation of drivers at different points along a trip, so that the road section can be designed in a way that best suits that need. For example, when pulling in or out of a driveway, drivers may expect relatively low traffic volumes traveling at lower speeds so that they can safely and comfortably access the road network; however, later in that trip, the same driver may expect to travel at a much higher more consistent rates of speed, with greater separation between themselves and other high-speed traffic, without the conflict of turning vehicles. Functional classification assists in the design of roads that meet the driver's dominant expectation on the road and provides a well-connected network that will help separate drivers with different expectations onto different road segments, increasing the efficiency and safety of all roads.

In general, there are two functions of a road: Access and Mobility. These road functions are each crucial to the operation of the road network; however, the two functions often are in opposition to one another. Access degrades the mobility function of a roadway as the unpredictable movement of turning traffic and the acceleration/deceleration of cars tend to slow the progress of through traffic. For this reason, roads should be planned into the network in such a way that they can provide the needed function when and where it is required.

Figure 4, below, shows the relationship between access and mobility as it pertains to the functional classifications.

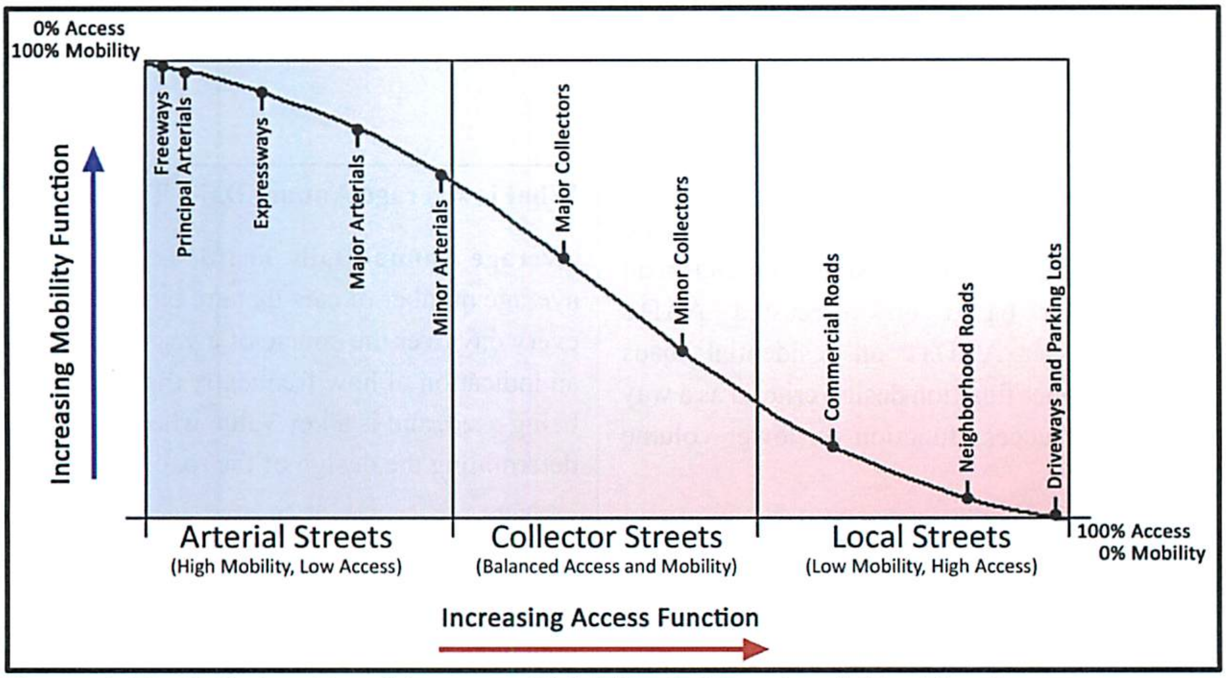


Figure 4. The Relationship of Access and Mobility in Functional Classifications

Of particular interest to the OS&HP are the Collector Streets which serve as transition routes between local roads (as described in the SCM) and arterials. The design and location of these routes are of special importance since they are the routes where the driver expectations will be especially mixed, meaning they will require special study, planning, and design. Also, these are the routes that are more likely to be Borough-owned and maintained.

Functional Classifications: Assignment Goals

Functional classifications definitions are crucial to the road network. Road links that are inadequately designed will not properly serve the necessary role in the community. The collector roads in the MSB OS&HP are assigned based on **three main goals:**

1. **Access** – Design for access to existing and future residential developments
2. **Connectivity** – Produce connectivity in the proposed road network
3. **Diversity** – Create a network with an appropriately balanced assignment of road functions

Goal #1 – Access

The first goal was to provide proper access to existing and planned residential areas following the SCM Average Annual Daily Traffic (AADT) guidance. The SCM recommends road classification based on forecasted AADT levels. Higher AADTs on residential roads result in higher function design criteria as a way to preserve access function on lower volume roads.

Goal #2 - Connectivity

The second goal was to provide connectivity in the network. This goal is independent of projected volumes and provides for such things as secondary access to isolated communities and higher mobility roads between sub communities.

Goal #3 – Functional Class Diversity

The third goal was to ensure that the planned road network provides an appropriate amount of each functional class. This was used as a metric to measure how well the network was being planned and distributed.

What is Average Annual Daily Traffic?

Average Annual Daily Traffic is the average number of cars that are on a road every day over the course of a year. This is an indication of how frequently the road is being used, and is a key value when determining the design of the road.

However, many other factors play a part in the design of a road and AADT is not always the most reliable. For example a road may have an AADT of 1,000 vehicles per day, and a very high percentage of those vehicles may be heavy trucks. A different road may have the same 1,000 AADT, but with very directional commuter trips of single-person vehicles passing one way in the morning and the opposite in the evening. These examples would both have the same AADT, but require very different designs.

Functional Classifications: Access

The goal of providing "Access" in the network reflects the need for people to have adequate roads in front of houses and businesses where access-related maneuvers take place. Some access-related maneuvers are turning, walking, backing up, and often making distracted decisions. These maneuvers are high risk, and therefore, are safest when performed on low-volume, low-speed roads.

The SCM provides guidance for the design of roads that serve residential areas, and part of the SCM is an AADT limit requirement that encourages subdivisions to be designed with low-volume roads. If a subdivision is forecast to produce volumes higher than the specific AADT limit, the SCM requires a higher speed design. The SCM AADT limits were used in the OS&HP study to determine where collector roads should be considered based on future growth projected in the Growth Study (see Appendix A on page 38).

Table 2. Functional Class AADT Limits (per SCM)

SCM Classification	OS&HP Classification	AADT Limit	Approximate Upper Limit of Households
Residential Street	Local Road	< 400	~ 50
Residential Sub-Collector	Local Road	400 – 1,000	~ 150
Residential Collector	Minor Collector	1,000 – 3,000	~ 300
Major Collector	Major Collector	> 3,000	Undefined

Table 2, above, shows the AADT limits for the various classifications specified in the SCM, the equivalent OS&HP functional class, and the approximate upper limit of households in a region that would suggest higher function designs may be required.

As shown in the table, based on trip generation rates in the SCM, a minor collector road would be needed for any development with more than 150 households, and a major collector would be needed for a development serving more than 300 households.

These volume limits were compared to the forecasted population growth to identify areas where the traffic volumes generated in a region would warrant a collector road. Figure 5, below, shows the regions that the study indicated would likely generate traffic volumes higher than the SCM AADT limits. Consideration was given to how drivers get to high mobility roadways since several regions in combination may also generate traffic volumes that are over the volume limits.

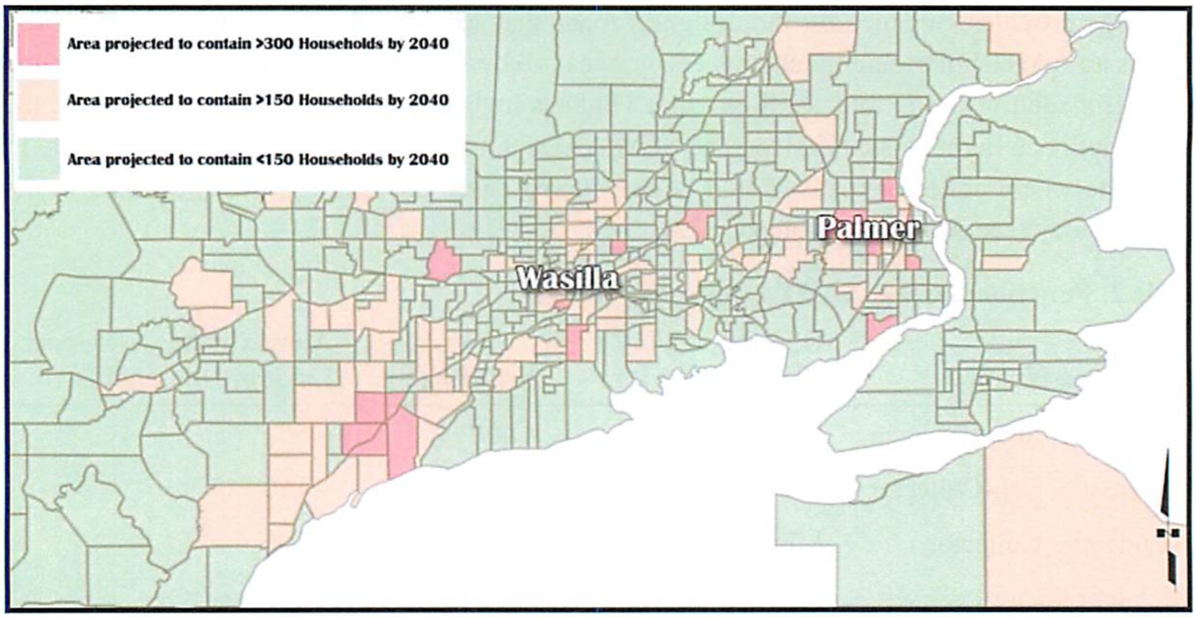


Figure 5. 2040 Household Density Map (Based on SCM AADT Thresholds)

Notice that relatively few regions are projected to warrant a major collector road (red) or even a minor collector road (orange) based on the SCM AADT limits which have been adopted into the MSB code.

The FHWA provides guidance on functional classifications in their 2013 publication "Highway Functional Classification Concepts Criteria and Procedures." This guidance provides suggested AADT limits for collector roads. Table 3, below, presents the AADT limits that are suggested by the FHWA as compared to what is currently required by the Borough's SCM.

Table 3. Functional Class AADT Limit Comparison SCM vs FHWA

Functional Classification	SCM Minimum AADT Limit	FHWA Recommended AADT Range	
		Rural	Urban
Local Road	0 – 1,000	0 – 400	0 – 700
Minor Collector	1,000 – 3,000	150 – 1,100	1,100 – 6,300
Major Collector	> 3,000	300 – 2,600	1,100 – 6,300

Note that the SCM AADT limits are much higher than the FHWA AADT limits on rural roads. <u>This means that subdivisions in the MSB built according to the SCM guidelines are likely being under-designed compared to national standards.</u>

Table 3 includes the FHWA AADT limits for rural and urban roads. MSB SCM AADT limits are more similar to the urban limits. The MSB does not qualify as an urban area, outside the dense commercial confines of the Core Area. An urban area is allowed to have higher volume collector roads because urban density tends to slow traffic and increase their expectation for delays with transit systems and high numbers of pedestrians. Without these natural traffic calming elements, a network of under-designed roads will be less safe, less efficient, and less supportive of growth. This is the trend that is currently being seen in the MSB as vital links in the road network are being built for too low of a functional class. Then, when issues arise because of the inappropriate design, there are no low-cost, low-impact solutions to repair the network.

Figure 6, below, shows what the household growth study would look like using FHWA guidance to determine the AADT values.

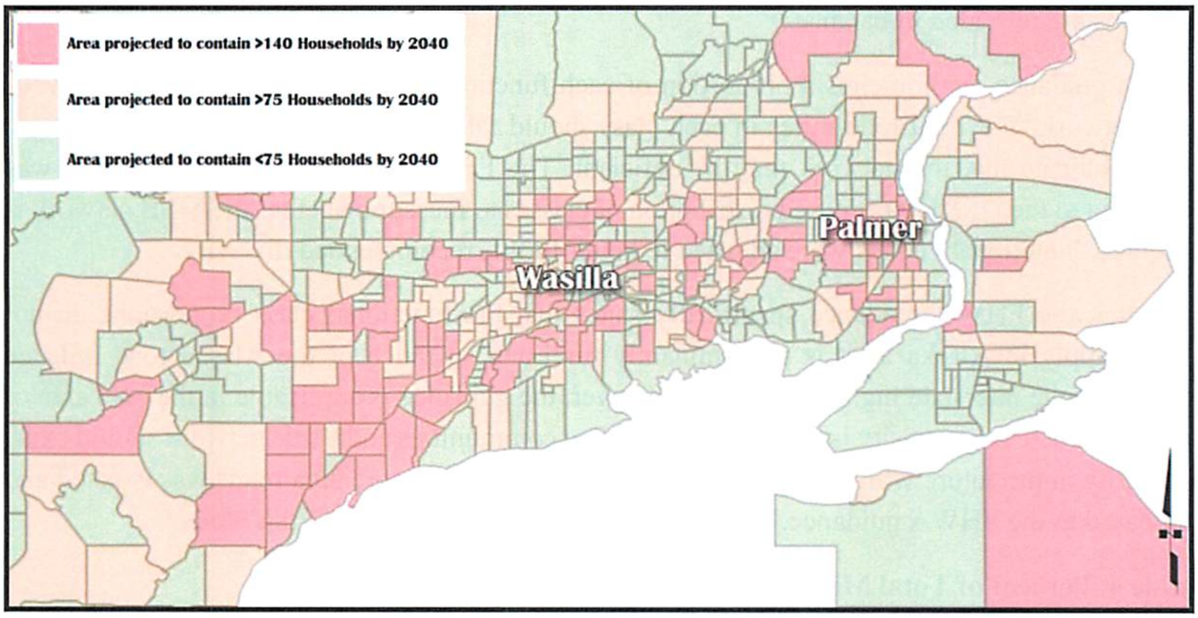


Figure 6. 2040 Household Density Map (Based on FHWA AADT Thresholds)

Application of the FHWA limits would clearly result in more residential collector roads.

The SCM AADT limits were used to identify collector roads in the OS&HP since those are the limits that are currently adopted into MSB code and will be the standards applied when new developments are constructed. But, it is highly recommended that the SCM volume limits be re-evaluated as discussed in the implementation plan in section 4 on page 27.

Functional Classifications: Connectivity

In addition to the "Access" goal, which is purely AADT based, functional classifications were also assigned based on "Connectivity" which does not depend on AADTs. Connectivity was discussed earlier in Section 2 as it pertains to links in the road network. However, connectivity also is important to consider when assigning functional classes. Suppose the network is well connected, but all the roads are designed as local roads. In that case, the network will actually operate worse than a network without connectivity because the local road connectivity will promote cut-through travel. To prevent this, proper connectivity must exist in the collector network to allow drivers to get through an area more efficiently and at a higher rate of speed on a road that is appropriately designed for this behavior. In short, connectivity must exist in the local road network, and if it is designed into the local road network, it absolutely must also exist in the collector road network as well.

The OS&HP, therefore, assigns functional classes to new and existing roads in the proposed network in such a way that properly connects sub-communities with major and minor collector road corridors, which are intended to move high mobility traffic from local roads.

Functional Classifications: Functional Class Diversity
One final goal of the functional classification assignment is to produce a network in which all functions are provided in balance.

FHWA guidance recommends a proportion of each functional class that should exist in a well-built network. The total road miles in each class should fall within a certain range, otherwise, it would indicate that the network may be deficient. The FHWA recommended distribution was compared to the OS&HP proposed distribution of classes to measure whether the MSB network is adequate. Functional classes were adjusted to better fit this recommended diversity.

Note that the FHWA guidance specifically states that the functional class proportions do not always apply in Alaska as it is predominantly rural and so much of the Alaska road mileage consists of the interstate highway system. However, the guidance *is* applicable in the core area of the MSB where road density is typical to other urban communities and a true network should exist, especially in the future with moderate build-out. A region of the core area roads was isolated and compared to the FHWA guidance. Table 4, below, presents the results of this study.

Table 4. Percent of Total Mileage in Functional Class System

Classification	**FHWA Guidance**	**2022 OS&HP**	**2022 OS&HP** (with +30% more Local Roads)
Interstate	1 – 3%	4%	4%
Major Arterial	2 – 6%	4%	4%
Minor Arterial	2 – 6%	4%	4%
Major Collector	8 – 19%	10%	7%
Minor Collector	3 – 15%	20%	13%
Local Road	62 – 74%	58%	68%

The proposed OS&HP road network closely matches the FHWA guidance. The numbers show a high average number of arterial road miles, which is to be expected in such a large region as the core of the MSB. In terms of collector roads, the percentages show an overabundance of minor collectors and a relatively low number of major collector roads. This is a result of the SCM AADT limits making it difficult to justify major collectors based on volumes. The major collector roads included in the Plan are recommended based on the connectivity of sub-communities and not access. The percentage of local roads in the planned network is lower than recommended. This is because unplatted local roads are not included in the OS&HP. Therefore, they are not showing up in the total road miles. The table includes a column showing what the approximate distribution would be with 300 more local road miles (30% increase in local roads than the current network) to approximate the actual distribution after the network has been constructed. Notice that after this adjustment is made the percentage of major collectors in the network is 7% which is below the 8% recommended by FHWA guidelines. It is, therefore, most important for the MSB to preserve and construct the major collector road network.

3.3 Primary Intersections

The third key element of the OS&HP is the Primary Intersection locations. The Primary Intersection Study analyzed all roads classified in the OS&HP as a Minor Arterial or higher mobility functional class. The term "Primary Intersections" is used in the OS&HP to describe locations where future side street connections should be prioritized for consolidation of access and the potential access control options in the future.

As traffic volumes grow in the community, designers often seek to preserve the mobility function of arterial roads by limiting access to side streets and driveways via medians or approach road closures, or by installing traffic control devices such as traffic lights or roundabouts. For example, the recent upgrades of the Parks Highway (from Lucus to Big Lake), and Knik-Goose Bay Road (from Centaur to Vine) designed depressed medians that prevent left turns in and out of side streets. This led to the inclusion of frontage roads and secondary connections to move access to the most desirable locations.

The purpose of the Primary Intersections Study is to apply the access control principles used in the previous arterial road studies to other arterial roads, well in advance of them being possibly upgraded to include access control. This will assist decision-makers to design access to the arterials at intersection locations that are most desirable to the arterial road network. This tool is expected to be used when new connections to arterials are designed either for residential side streets or borough collector roads. Consideration should be given to consolidating roads at these primary intersection locations and aligning access on either side of the arterial to avoid offset intersections.

What are "Primary Intersections"?

The term "Primary Intersections" was coined by the 2022 OS&HP as a way to identify preferred intersections locations along arterial roads where future road connections should be prioritized.

Example: The Engstrom Road and Bogard Road intersection mentioned previously is an example of an intersection location where a primary intersection designation could have saved the community from issues. There are obvious problems at this intersection that could have been avoided if it had been planned as a primary intersection. The offset alignment of Engstrom Road and Green Forest

Drive creates major turning conflicts and makes upgrades costly and difficult. The inconsistent design function of Engstrom as a major collector, and Green Forest as a local road, weakens the road network and promotes cut-through traffic on Green Forest Drive since there is an obvious demand for connectivity that is not being provided. The approach grades and sight distances are not favorable for the amount of uncontrolled activity the intersection experiences during peak hours. This has created a major bottleneck that has degraded the public's trust in the Borough's ability to protect and design the road network as a resource. The primary intersections shown in the OS&HP all have the potential to create similar problems as those at Engstrom Road if their importance in the network is disregarded or if the road network connections are not preserved.

The locations of the primary intersection points were determined based on a planning level analysis of the corridors. The analysis considered existing intersection locations, adjacent topography, current and projected land development, property ownership, planned road corridors, and intersection spacing.

One parameter of the primary intersection study was a desire to keep major intersections properly spaced. The DOT&PF recommendations are for major intersections to be no closer than ¼ mile apart. This guidance is similar to Manual on Uniform Traffic Control Devices (MUTCD), which warrants 6 concerning coordinated signal systems. The goal of this guidance is to provide satisfactory signal progression through a signal network along a controlled-access highway.

Signal spacing of less than ¼-mile is not desirable because of progression considerations. A spacing of ½-mile is preferred because there would be less need for interconnection or offset timing. The Transportation Research Board (TRB) Access Management Manual indicates that signal spacing of less than ¼-mile will result in progression speeds of less than 15 mph, and that signal spacing of ¼-mile can maintain progression speeds up to 30 mph (depending upon cycle length).

Signal spacing of ½-mile will allow for progression speeds of around 40 to 60 mph for typical cycle lengths on an arterial corridor with low volume side street approaches. Half-mile spacing is the DOT&PF's goal for at-grade access and signal spacing on a Major Arterial.

This study was conducted with cooperation from MSB staff and reviewed by the DOT&PF. The locations agree with all DOT&PF access management studies on DOT&PF corridors. However, it should be noted that the primary intersection locations included in this study represent the planning level preference for where major intersections may be desired in the future. A primary intersection in the OS&HP does not guarantee access in future designs.

The primary intersection locations are shown on the OS&HP maps starting on page 45.

3.4 Other Plans and Considerations

Key Question for OS&HP Updates

- Are growth forecasts still applicable?
- Does the plan still provide appropriate access and connectivity?
- Is any part of the plan no longer feasible or are options limited?
- Are there any regulatory changes that need to be updated?

The OS&HP includes all roads and corridors that are required to create a road network that will support a reasonable expectation of future growth in the Borough. This growth has been studied and forecasted using the best possible data currently available, and recommendations have been made with the agreement of a multi-departmental steering committee. However, changes to growth projections or development patterns could, in turn, change the infrastructure needs targeted in this OS&HP. For this reason, the 2022 OS&HP is designed to be a "Living Document". This means that the OS&HP is expected to be updated on a regular basis, ideally on a 3-to-5-year cycle. The GIS files used to create the Functional Class Maps and the Primary Intersection locations are being collected by the MSB to include in the Borough GIS databases. These databases can be adjusted as situations arise, such as arterial and interstate road statuses change, or development that progresses differently from forecasts.

Future Projects

The OS&HP is focused on designing a road network where every piece works in concert with the adjacent roads. Major changes to the arterial network or other major community developments will have a ripple effect throughout the Plan. For this reason, several major projects are not included in the OS&HP because of the uncertainty of their alignment, design, or construction and the impact they would have on the OS&HP in the short term.

Some of these projects are the following:

- Parks Highway Alternative Corridor
- Knik-Arm Bridge
- West Susitna Parkway
- Willow Bypass
- Big Lake Bypass
- Houston Bypass
- Natural Gas Project on Ayrshire

These projects are currently being studied, and alignments and designs are being determined. They would have an extreme impact on the road network. Due to the uncertainty of both their construction schedule and their exact locations, they are not currently included in the OS&HP. As soon as a settled alignment is available, and/or funding and schedule are secured, the OS&HP should be updated to prepare for these projects.

For example, the Parks Highway Alternative Corridor (PHAC), is currently being studied as part of a Planning and Environment Linkage Study (PEL). The nature of a PEL is that it will include a broad array of alignment, design, and intersection options. The beginning and endpoints of the PHAC may change as a result of the PEL as well as the crossing locations and designs. For instance, the location and treatment of the Knik-Goose Bay Road crossing are still undetermined.

Figure 7 shows the area that is most likely to be impacted by the new bypass road.

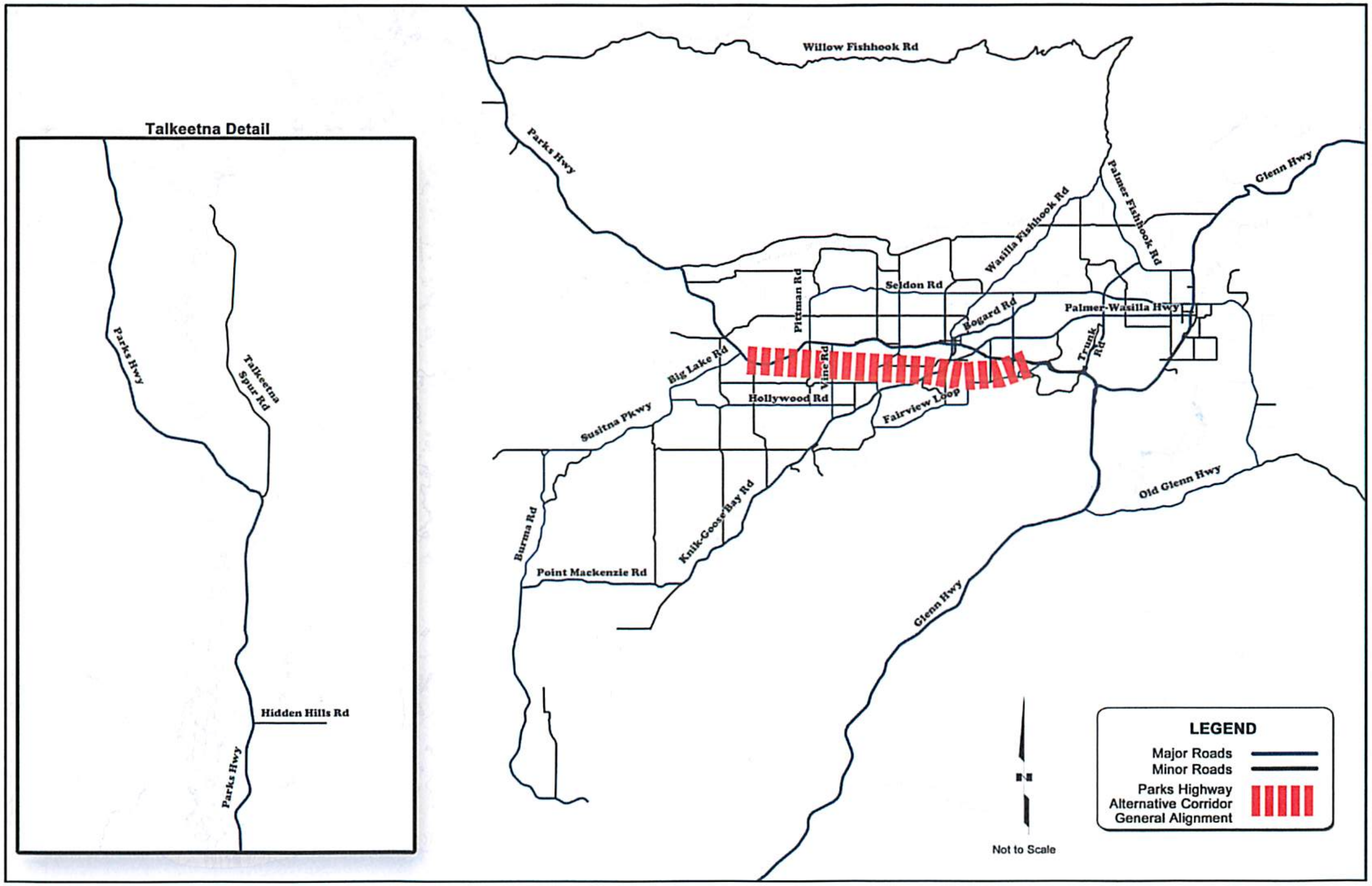


Figure 7. Parks Highway Alternative Corridor, General Alignment

The PHAC would be classified as an interstate highway and would need supporting arterial road connections and secondary collector roads designed in harmony with the high mobility design. Therefore, once the highway alignment is determined, the OS&HP will need to be updated respectively.

Several other DOT&PF bypass and realignment projects would possibly require the use of MSB property adjacent to the Parks Highway. This is a special case where these alignments are still not determined, but the use of these MSB properties should be carefully considered and the DOT&PF should be consulted if the development of this land is pursued by the MSB.

The MSB parcels in question are shown in Figure 8.

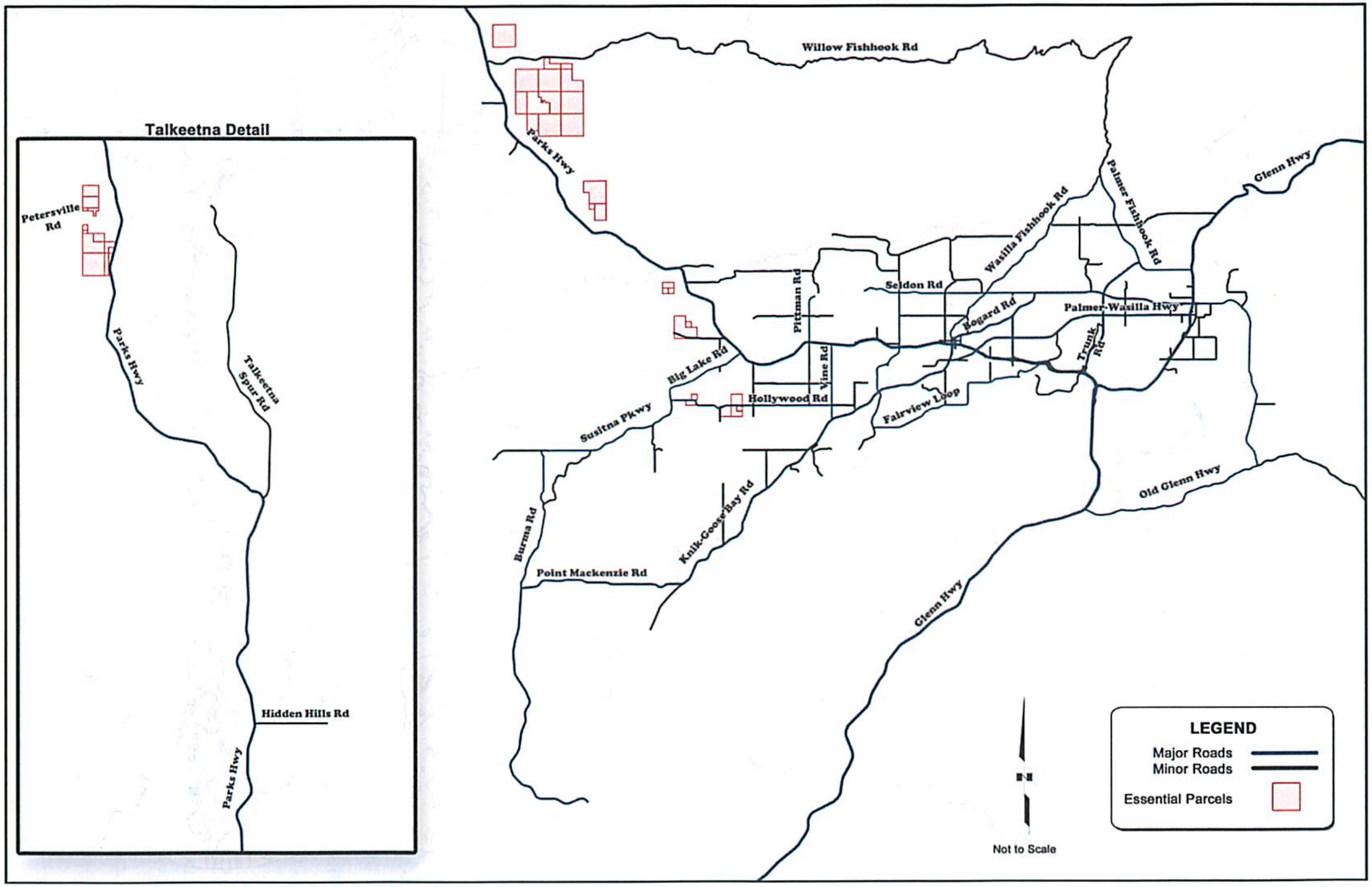


Figure 8. MSB Parcels Essential for DOT&PF Road Planning

4 Implementation Plan

Once the OS&HP is adopted into Borough Code, it guides Platting actions and works to preserve road network connections and corridors and helps prioritizes Public Works improvement projects. If implemented fully, the OS&HP will assist with managing traffic growth and travel demands, help to minimize traffic congestion, reduce safety issues, and limit high-cost maintenance issues in the future. Implementation of the OS&HP map is step one, but there are other actions the MSB can take to further enhance the development of a safe and efficient road network.

4.1 Implementation Plan Overview

The following section outlines some of the additional tools and policies that would further enhance the OS&HP:

Adopt OS&HP

- Pursue acceptance of the OS&HP plan by public and decision making bodies and advisory groups: RSA Board, TAB, Assembly, Planning Commission, DOT&PF, Cities of Palmer and Wasilla, and MSB Departments
- Adopt the OS&HP into Borough Code

Apply Plan using Current Tools

- Educate and train MSB staff on the role and purpose of the OS&HP
- Agree on responsibilities as outlined in Table 5 on page 29
- Include projects in Road Improvement Program (RIP) list
- Include new OS&HP roads in the LRTP update
- Incorporate OS&HP functional classifications into MSB GIS layering
- Publish OS&HP GIS Maps of roads, functional classes, and primary intersections

Adapt Policy to Provide New Tools

- Develop policy stating that OS&HP routes and recommendations be incorporated into all aspects of planning, design, project development, and construction within the MSB
- Revise the SCM to better align with the OS&HP and FHWA AADT thresholds
- Adopt ROW standards for each functional classification for use in plat reviews, setback requirements, and road network development
- Draft or revise MSB code to require all streets to conform to the OS&HP
- Require Developers to identify the intended use of the property to better plan for trip generation
- Require developments to document how traffic will impact the surrounding road network
- Require developments with impacts that result in a change of functional class to the immediately adjacent road network as outlined in the OS&HP, change of intersection location, and/or change in OS&HP present a plan for bringing impacted road to the applicable functional classification

- Develop policy and plans for access management
- Develop a timeline or triggers for implementing zoning and/or adopting road powers

Update Planning Documents to Conform to OS&HP

- Review and update supporting plans on a regular schedule:
    - LRTP
    - Area Comprehensive Plans
    - Bike and Pedestrian Plans
    - Transit Plans
    - Hub Community Plans

Develop Design Criteria to Define Functional Classifications

- Develop and adopt a Design Criteria Manual (DCM), which includes standard criteria for the design and construction of each functional class of roads in the OS&HP
- Survey existing road designs and compare them with standards in DCM
- Determine locations where road upgrades are needed to conform to standards
- Prioritize projects to upgrade existing roads to meet the OS&HP recommendations

Conduct Further Studies and Projects to Reinforce the OS&HP

- Updated population build-out study
- Employment growth study
- Corridor management studies
- Commercial and industrial hub studies
- Potential funding source identification

Update OS&HP to Keep Current with New Trends and Policies

- Review and update the OSHP every 3 to 5 years
- Develop policies and processes to guide how revisions and updates are incorporated into the OS&HP
- Keep OS&HP GIS maps up to date and published online

4.2 Adoption Process

The first step of implementation is the adoption of the OS&HP into the Borough code.

The Plan was developed by a steering committee of MSB department heads and decision-makers, as well as members of DOT&PF Planning, and the City of Palmer and Wasilla Planning. The Plan was then presented to the Road Service Area (RSA) Board, Transportation Advisory Board (TAB), MSB Platting Board, Planning Commission, and the MSB Assembly, along with a public hearing and comment period. Documents and maps were online and available for comment throughout this period.

4.3 Decision-maker Responsibilities

Through the planning process, key responsibilities for MSB departments, agency partners and the public were outlined to better clarify how the OS&H is intended to be used. Table 5, below, summarizes the responsibilities.

Table 5. User and Agency Responsibilities

User or Agency	Responsibility
MSB Planning	• Own and maintain the OS&HP • Maintain the connection between LRTP and OS&HP by regularly revisiting OS&HP and updating with the newest developments and road changes • Assist in preserving ROW and maintaining access control • Coordinate among various plans • Advance and prioritize OS&HP projects for inclusion in the RIP and Capital Projects lists • Identify potential funding sources • Follow and manage the implementation process • Execute conceptual level planning studies • Coordinate agency and department cooperation • Recommend code changes that allow the OS&HP to function effectively • Develop access management plans for key areas • Preserve land highlighted by DOT&PF as "Essential for DOT&PF Road Planning" (see Figure 8 on page 26)
MSB Platting	• Preserve ROW and/or the future corridors during Platting actions • Encourage subdivision roads to connect at Primary Intersections locations • Ensure subdivision roads are built to appropriate standards • Notify MSB Planning if any changes make features of the OS&HP less favorable • Educate the public about the OS&HP purpose and function
MSB Public Works	• Manage and maintain Borough ROWs • Ensure design conformance to functional classifications • Manage, upgrade, and build process for MSB projects • Create a Memorandum of Understanding (MOU) with DOT&PF to adhere to plans
MSB GIS	• Maintain current OS&HP database • Assist planning in OS&HP map updates

MSB Assembly	• Help secure funding for road studies, designs, and construction projects shown in OS&HP • Approve updates to the OS&HP with consideration of OS&HP's goal-oriented scope • Fund road projects • Approve code changes to assist with implementation
DOT&PF	• Coordinate new road planning studies and projects with MSB to maintain functional classifications and primary intersections in MSB OS&HP • Nominate projects to the STIP that are consistent with the OS&HP
Developers	• Produce designs that fulfill both development and OS&HP community goals
Designers	• Design road sections to the assigned functional classes in the OS&HP or design in a way that does not preclude future upgrades
Advisory Boards	• Advise Borough on issues related to OS&HP
Cities	• Create or Update City OS&HPs to incorporate Borough plan • Notify MSB planning when the City plan conflicts with MSB OS&HP

4.4 Preservation of Right-of-Way

One of the main purposes of the OS&HP is the preservation of ROW for future road corridors. To preserve ROW, decision-makers in the MSB are expected to use the OS&HP maps as a reference when directing road projects. Road projects pursued for construction, including DOT&PF arterial roads, secondary MSB roads, and private roads platted through the MSB, should agree with the OS&HP plan, or trigger an update of the OS&HP if no feasible agreement can be made.

Roads designed as part of residential developments are required to apply standards specified by the *MSB Subdivision Construction Manual 2020*. The SCM says the following regarding its connection to the OS&HP:

> "Subdivisions shall be designed in a manner that does not conflict with the Long-Range Transportation Plan or the Official Streets and Highways Plan. Subdivisions containing future road corridors identified in the LRTP or OS&HP are encouraged to include the future road corridor as part of the road layout of the subdivision."

To not conflict with the OS&HP, a subdivision must be built such that roads and connections shown in the OS&HP are either built along with the subdivision or built in the future with allowable ROW width for the future alignment. This ROW width would be clear of all features that would prevent the construction of a road that fulfills the desired function of the road in the OS&HP. The SCM provides minimum ROW widths per road functional class which can be expected to be reserved for this purpose as shown in Table 6, below.

Table 6. Minimum ROW Width per Functional Class (From SCM)

	Local Road	**Minor Collector**	**Major Collector**	**Minor Arterial**	**Major Arterial**	**Interstate**
Minimum Right-of-Way Width	60'	60'	80'	100'	100'	200'

Note that the ROW widths shown in the SCM are defined as the "minimum" requirements. In many cases, the design needs of the road will greatly increase the amount of ROW needed. Requiring developers to identify land use would help Platting ensure enough ROW is being reserved.

Care should be taken in preserving ROW in areas with:

- Significant vertical topography since the design may require wide cut and fill slope limits that will need to be within the limits of the ROW.
- Roads that are part of a future pathway may need additional ROW to accommodate the path with proper separation.
- Roads adjacent to commercial properties or roads that have many side streets will require additional ROW for turn lanes or median treatments, especially at intersections with major collectors or arterial roads where roundabouts or traffic signals may be required.

For reference, Table 7 on page 322 includes a list of the design features that might change the ROW requirements for each functional classification.

Note that the OS&HP is not a design manual. The actual features included in a road's design should be selected based on the context of the roadway, engineering judgment, and the applicable design standards if available. The features shown below are simply a general idea of what roads of various classifications typically include.

Table 7. Expected Design Features per Functional Class

Classification	Local Road	Minor Collector	Major Collector	Minor Arterial	Major Arterial	Interstate
ROW	60 feet	60 feet	**80 feet**	**100 feet**	100 feet	**200 feet**
Design Speed	25 – 30 mph	**35 mph**	**35-45 mph**	**35-45 mph**	**55 mph**	**55-70 mph (As defined by DOT&PF)**
Road Surface	Possibly unpaved, 2-lanes, 10-foot lanes	Possibly unpaved, 2-lanes, 10-foot lanes	**Paved,** 2 lanes, **12-foot lanes**	2-4 lanes, 12-foot lanes	2-4 lanes, 12-foot lanes	4-6 lanes, 12-foot lanes
Access	Encouraged (Residential and Commercial)	Encouraged (Residential and Commercial)	**Restricted,** **Commercial access with possible traffic lights**	Restricted, Commercial access with traffic lights, **Frontage and backage roads**	Restricted, Commercial access with traffic lights, Frontage and backage roads	**Driveway access strongly discouraged,** **Access directed to specific intersections or ramps**
Intersection Treatments	Stop control, No traffic signals expected	Stop control, No traffic signals expected	Stop Control, **Traffic signals or roundabouts at arterial or major collector crossings**	Traffic lights and roundabouts	**Traffic signals with dual left-turn lanes,** **Double-lane roundabouts,** **Separated grade interchanges**	**Signalized intersections very probable,** **Separated grade interchanges,** **Roundabouts very unlikely**
Median Treatments	No turn lanes, No medians except for traffic calming	**Turn lanes at intersections with higher function roads,** No medians except for traffic calming	Turn lanes, No medians, **No traffic calming,** **Center-two-way-left-turn lanes**	**Turn lanes for left turns off Arterial,** No medians, Center-two-way-left-turn lanes	**Divided medians**	Divided medians, **Disconnected alignments per direction of travel**
Shoulder Treatments	2' gravel shoulder	2' gravel shoulder	4' paved shoulders Sidewalks, **Pedestrians discouraged from using the roadway but possible bikes and bike lanes**	**4-8 foot paved shoulders,** Bike Lanes No pedestrians in roadway	4-8 foot shoulders, Bike lanes No pedestrians in roadway	**12-foot paved,** **Bikes on the shoulder** No pedestrians in roadway
Pedestrian Treatments	Urban sidewalks, Expectation for pedestrians in the roadway	Possible urban sidewalks expectation for pedestrians in the roadway	**Separated pathways likely** **Possible Crosswalks at planned locations**	Separated pathways likely, crosswalks likely	Separated pathways likely, crosswalks	Separated pathways likely, **possible separated grade pedestrian crossings**
Other Expectations	Possible Speed bumps, Transit stops, Mailbox pullouts, Cul-de-sacs, Mini-roundabouts	**No Cul-de-sacs** Possible speed bumps, Transit stops, Mailbox pullouts, Mini-roundabouts	**On-street features such as mailbox pullouts are discouraged**	**Mobility design, but without passing lanes or interchange features**	**Possible freeway design,** **Possible passing lanes or slow vehicle turnouts,** **Designed for heavy vehicle use**	Possible freeway design with passing lanes and slow vehicle turnouts, Designed for heavy vehicle use

NOTE: **Bold** text indicates features that are different from lower mobility function roads (Moving from left to right).

4.5 Design Criteria Manual

The MSB does not currently have a Design Criteria Manual for roads. The absence of a DCM means there are no standards for road design based on functional classes other than the minimal requirements of the SCM. Having a DCM would define the design goals for the functional classes assigned in the OS&HP and the DCM would define ROW standards.

Design manuals used for roads within the MSB

- MSB SCM, for Residential Streets
- DOT&PF Highway Preconstruction Manual
- Municipality of Anchorage Design Criteria Manual, as guidance, particularly for urban streets
- City of Palmer Development Standards, 1985
- Geometric Design of Highways and Streets (Also known as "The Green Book"), published by the American Association of State Highway and Transportation Officials
- Highway Capacity Manual, published by the TRB

Once an MSB DCM is available, a survey should be conducted to compare the existing design of roads to determine what functional class they are actually built to. This study should then reference back to the OS&HP to identify routes that need to be upgraded. Evaluation of available ROW can be made to determine the cost and impacts of upgrades. This data should be used to prioritize road upgrade projects.

4.6 Miles of Unconstructed Road

If ROW is being preserved for road projects, then funding for the design and construction of those roads must be prioritized.

Table 8, below, shows the total number of unconstructed road miles in the 2022 OS&HP road network. A total of 164 miles of road are required to fully construct the OS&HP. The OS&HP does not have a horizon year and the planned road segments are therefore assumed to be built as they are needed and as funding is available. The number of planned road miles suggests an approximate rate of one mile of collector road constructed for every two miles of local road constructed in the Borough.

Table 8. Total Mileage of Unconstructed Roadway in Secondary Road Network

Functional Classification	Unconstructed Road Miles in 2022 OS&HP
Major Collector	59
Minor Collector	105
Total	164

Figure 9, on page 34, shows the location of the unconstructed road miles within the Core Area of the MSB.

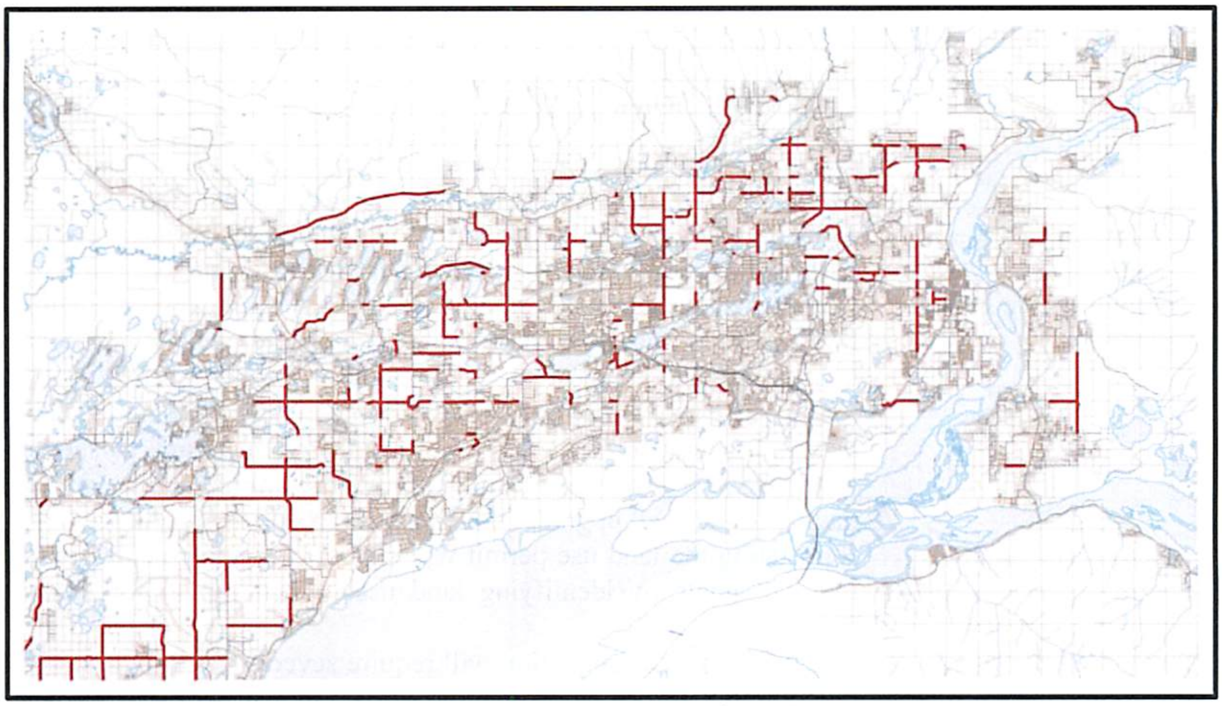


Figure 9. Unconstructed Secondary Road Network in Core Area

Note that future studies, such as a possible update of the LRTP, or arterial road corridor plans, would be needed to prioritize projects for promotion to design.

Once these projects have final alignments, and funding sources and are moving into detailed design, the OS&HP will be updated to include them and make the needed changes to the surrounding secondary road network to fully integrate them into the system.

Note this section does not include existing roads that will require upgrades to higher mobility function design standards.

4.7 Additional Studies

Throughout the process of the OS&HP development, numerous studies or projects were discussed which would either be informed by the OS&HP or would be triggered by its publication. Table 9, on page 35, includes a summary of some of the projects and studies that would require some level of integration with the OS&HP once adopted or would be recommended as follow up studies:

Table 9. Studies Impacted by the OS&HP

Study	*Description of Possible Impacts*
Agency Interaction	The OS&HP for the MSB designs a secondary road network that is meant to support the residential road network and the arterial road network. To bridge this gap properly, communication between agencies will be crucial to make sure that the OS&HP plan keeps up with any changes in the networks it is designed to bridge.
Comprehensive Plan Updates	Comprehensive plans for smaller communities, as well as for the MSB as a whole, will need to be updated to include the road connections and intersection locations shown in the OS&HP.
Corridor Studies	A DOT&PF study of arterial road corridors in the MSB should study how improvements to the MSB secondary road network, as shown in the OS&HP, will enhance or improve the arterial roads without having to focus all upgrades on the arterial roads themselves.
Reinstate the Land Use Permit	Reinstating the land use permit will support the implementation of OS&HP goals by identifying land use to better plan for traffic generated.
Future Metropolitan Planning Organization (MPO) policy	The future MPO designation will require several federally required planning policies to be used in the MSB. Once the MPO is formed the MSB will work with the MPO to ensure the OS&HP is a tool that both organizations can use.
LRTP Update	The existing LRTP has a horizon year of 2035 and was created in 2017. The LRTP considered arterial level congestion and suggested arterial level solutions. As a result of the DOT&PF corridor studies and the OS&HP, an update to the LRTP could extend the horizon year and include MSB projects that may support the arterial road network with less impact and cost.
MSB GIS Cartegraph Databases	The MSB uses an asset management system known as Cartegraph, a GIS-based system that includes data about each road segment. Currently, this data includes functional classification data that will need to be updated to reflect the OS&HP assigned designations.
Bike and Pedestrian Plan	A Bike and Pedestrian Plan for the MSB should consider the functional class designation of roads and the location of future road connections so that pathways can best utilize the relationship between roads and pathways.
Potential Funding Source Identification	The OS&HP should be referenced when seeking funding for future projects. Having an OS&HP may open up new opportunities for grants or bond packages. The designation of roads is often linked to federal funding sources.
Project Prioritization	Studies will need to be made to identify which roads in the OS&HP need to be upgraded based on OS&HP functional class designations, and what the estimated cost would be to design and build new road connections. The benefits of the road connections should be measured and estimated so that projects can be prioritized on a basis of a comparison of benefit vs cost to optimize road funds in the MSB.

Transit Plan	A transit plan in the MSB should consider how the OS&HP plans for traffic to circulate within the MSB based on the road connections and functional class designations.
Moose Crossing Study	Moose-related crashes are a significant issue in the MSB and the interaction between moose and cars will likely increase as the MSB population continues to grow, traffic volumes rise, and intraregional travel speeds are increased. A study of high moose crash areas may be needed to address moose hotspots in the MSB with possible road design features, such as fencing or animal crossings.
Revisit of SCM Chapter B	The Subdivision Construction Manual was revised in 2020 and adopted in January of 2021. Chapter B of the SCM discusses general design standards for major road corridors, including the minimum ROW width requirements for each functional class and the frontage road conditions and setback requirements. This section of the SCM would need to be updated as the MSB becomes an MPO and adopts more detailed design policies and manuals.
Rail Crossing Study	The OS&HP includes several planned roads that would require crossings of the Alaska Railroad. Additionally, there are several crossings of the rail extension south of Houston that are currently not being used by the borough road network. A study of these existing and future rail crossings should be conducted to properly preserve and utilize rail crossings as a resource and determine the feasibility of new connections early on in the road planning process.
Road Use Study (Residential, Commercial, Industrial)	In support of the OS&HP and a future MSB Design Criteria Manual, a study should be conducted which identifies the road use of the various segments in the OS&HP. Currently, the OS&HP classifies roads by their functional class which is focused on the relationship between access and mobility; however, the use of the road as, for example, a residential, commercial, or industrial street may change the design criteria that would be applied for roads.

4.8 OS&HP Update Process

The 2022 OS&HP is designed to exist within the MSB as a "Living Document," which will need to be updated periodically based on a planned schedule and updated methodology defined by MSB planning.

It is recommended that the OS&HP be updated every 3 to 5 years, or as major developments or changes trigger changes in the network. The OS&HP alignments, functional classes, and primary intersection locations are all subject to adjustments.

However, it is highly recommended that policies be codified, which establish thresholds for when changes can be made. It is also recommended to determine who, at a minimum, should be involved; establish timelines for comments; and determine when changes are appropriate (for example, sufficient community comment/support, alternative planning, changes to comprehensive plans, major road corridor changes, scheduled updates, etc.). These recommendations are to prevent cases where changes are made unilaterally without proper cause.

Appendix A Growth Study

A major part of the OS&HP study was a growth forecast for the MSB. The growth study created GIS maps of the MSB showing areas where population and employment development has recently happened, where it is predicted to occur in the next 20 years, and where it is projected to occur by full build-out. The goal of the study was to create a vision of growth, with approximate traffic volume projections so that the infrastructure can be planned in advance of land development.

Demographic Projections

Population projections from the Alaska Department of Labor and Workforce Development (DOLWD) and projections from the Institute of Social and Economic Research (ISER) agree on an approximate growth rate of around 5.8% annually within the MSB through 2045.

In this study, the population growth for the region was distributed to various sub-regions in a GIS mapping environment. These GIS regions are known as Traffic Analysis Zones (TAZs) and are used by the AMATS Travel Demand Model (TDM) to predict traffic volumes. The TAZs for the AMATS TDM were used as a basis for this study. The AMATS TDM TAZs were subdivided into smaller regions to better isolate the traffic volumes on neighborhood streets where small differences in volumes can determine the difference between various functional classifications.

What is a Traffic Analysis Zone (TAZ)?

A Traffic Analysis Zone is a region used in travel demand modeling. The regions are defined by GIS polygons. The Mat-Su Borough is divided into TAZs of various shapes and sizes. Within the GIS databases for the TAZs is information about the region, such as population rates, average income levels, and employment numbers in different industries.

Figure 10, on page 39, shows an example of the TAZ region divisions.

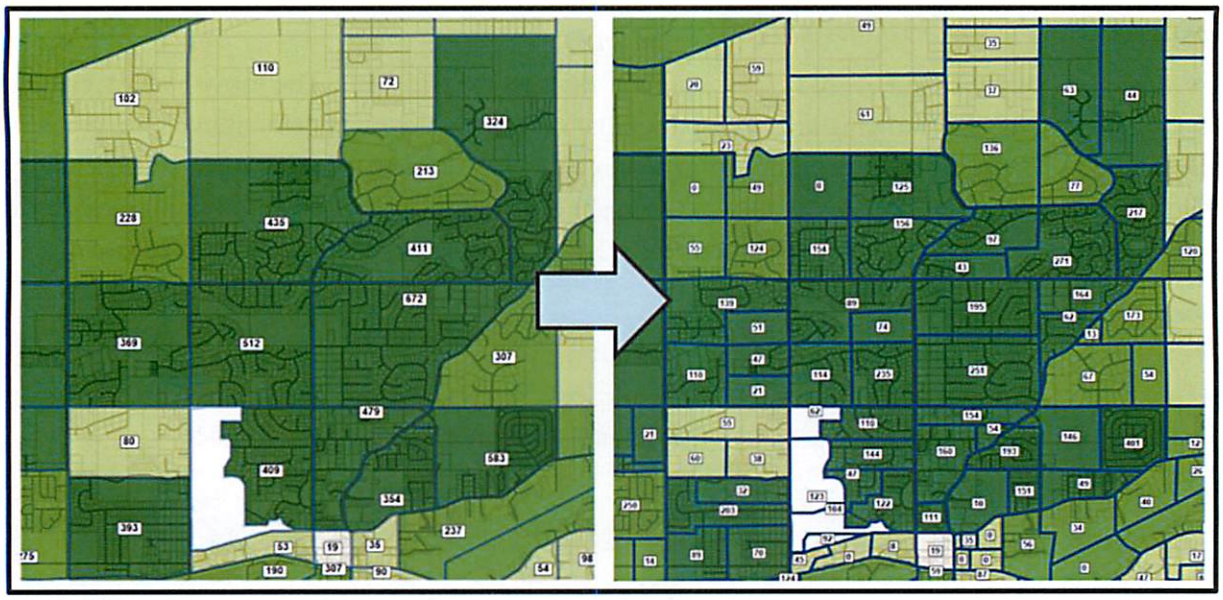


Figure 10. Example Conversion of TAZ Region Refinement

The growth study uses the new TAZ regions as containers for estimating the location of existing and future population and employment. Future growth is located based on projections from the AMATS Travel Demand Model (TDM) and the MSB Build-out Study. Both of these studies distributed data into larger TAZ regions. This growth study further divided the data among the smaller regions based on the availability of developable land. "Developable land" is land with favorable topography, wetlands designations, water and septic suitability, access availability, land ownership, lake setbacks, and many other considerations determined from available GIS mapping data.

AMATS Travel Demand Model (TDM)

The AMATS TDM is a traffic forecasting model produced by AMATS, with the cooperation of DOT&PF. The model covers an area from Talkeetna to Girdwood. The basis for the model is a 2013 household and employment GIS layer that divides the model area into zones known as Traffic Analysis Zones (TAZs). Each TAZ contains values identifying how many households and employees live and work in the region in 2013 and 2040. The model generates vehicle trips using these values and distributes them onto the roadway to forecasts traffic volumes and capacity problems.

MSB Build-out Study

The MSB Build-out Study was produced between 2011 and 2015. The goal of the study was to forecast the maximum possible density in the MSB at an undetermined future year beyond 100 years from now (based on moderate growth trend calculations). The Build-out Study assumes extreme redevelopment and heavy densification. It also imagines new urban areas in the vicinity of Settler's Bay, Meadow Lakes, Point MacKenzie, and Willow.

Note that, given the very long-term horizon of the Build-out Study data, the OS&HP never uses the outcomes of the Build-out Study as the sole justification for a road functional class upgrade or a new road connection. The build-out data was used as a reference to support decisions made based on other collected data.

Also note, that the MSB Build-out Study does not include employment projections, therefore, the OS&HP growth study only predicted employment development through 2040 using the AMATS TDM forecasts.

Growth Study Conclusions

The results of the population analysis for the Growth Study are shown in Figure 11 through Figure 13, starting on page 41, and the employment analysis results are shown in Figure 14 and Figure 15, starting on page 43. These figures are intensity maps, where the regions with the brightest color intensity indicate regions with the highest relative growth between the years.

The population study showed that available land for development is quickly disappearing, especially in the core area of the MSB. **To keep up with the projected population demand, growth will continue to move west, into Meadow Lakes, Houston, Settlers Bay, Point MacKenzie, and also up into Willow and Talkeetna.** Growth in these areas will be further encouraged by the road expansion projects along the Parks Highway and Knik-Goose Bay Road, which makes land in these directions closer to the borough core area, by travel time.

Additionally, to achieve the growth rates projected by the DOLWD and ISER, the core area will need to start increasing the density of both residential and commercial developments, which implies an increase in utilities and services, such as municipal water and sewer. This makes preparing for future road upgrades even more critical. Additionally, the increasing density within the core area will likely bring a culture change, with a population that is more urban-minded and open to transit and walking paths. Around 2040, when developable land becomes more limited, growth in the core area can be expected to slow.

Figure 11. Population Growth 2013 to 2020 (Based on Observation of Existing Data)

Figure 12. Population Growth 2020 to 2040 (Based on AMATS TDM Forecasts)

Figure 13. Population Growth 2040 to Full Build-out (Based on MSB Build-out Study)

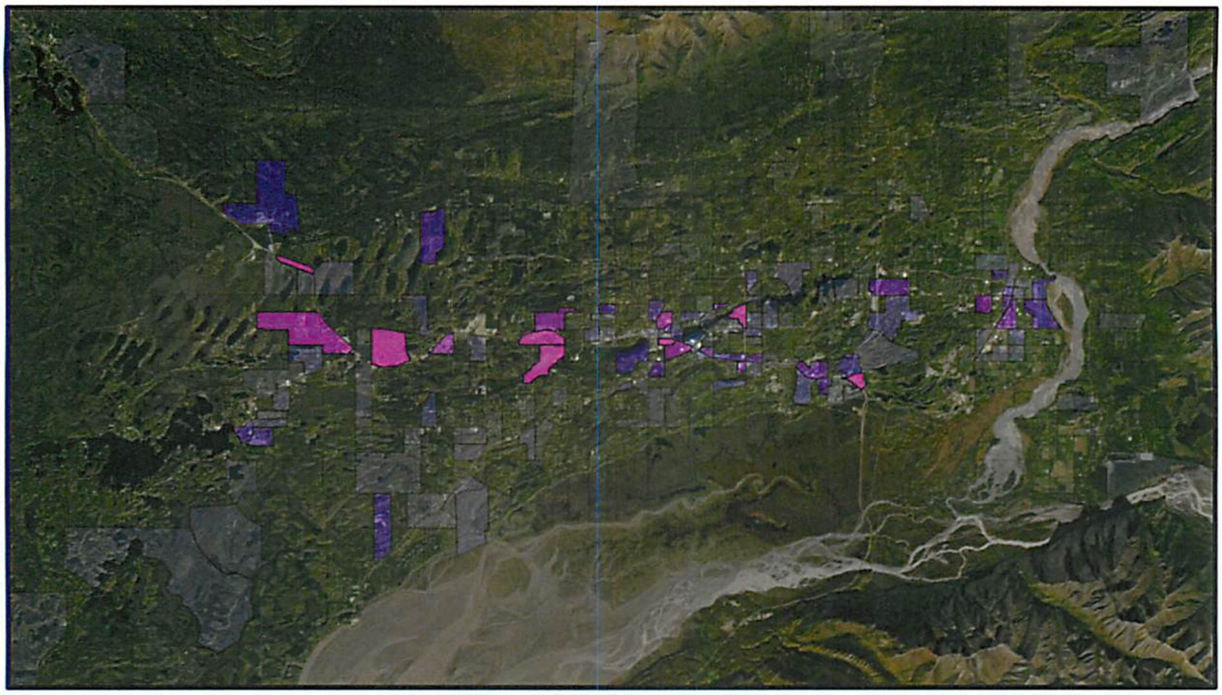


Figure 14. Employment Growth 2013 to 2020 (Based on Observation of Existing Data)

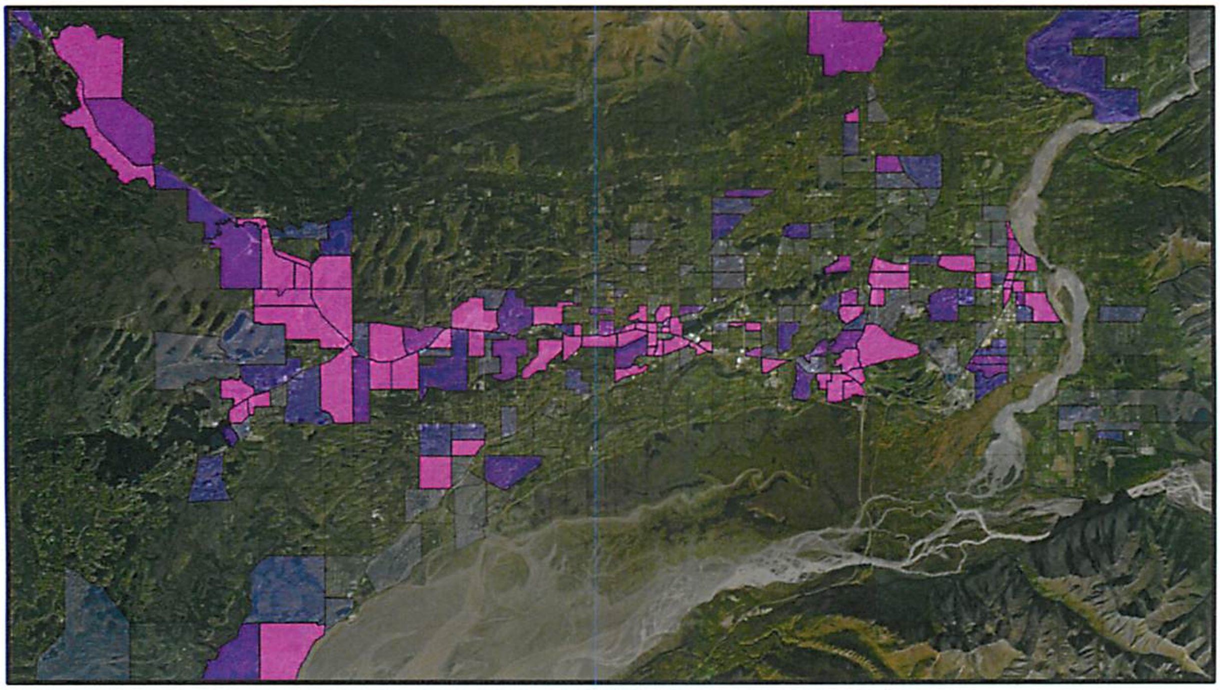


Figure 15. Employment Growth 2020 to 2040 (Based on AMATS TDM Forecasts)

Notice in the previous figures that population growth from 2013 to 2020 was able to stay primarily in the urban core. The study from 2020 to 2040 shows higher population growth to the southwest towards Point MacKenzie and in the area of Big Lake. This is due in part to the urban core reaching capacity, with all of the easily developed land having already been used. Also, major road projects like the Parks Hwy upgrade from Lucus to Big Lake, and the Knik-Goose Bay Road upgrade to Settlers Bay, will effectively make regions serviced by these roads closer to the urban core, based on shorter travel times and reduced traffic congestion. This will increase the desirability of these areas for housing development. Note that this also points out the key relationship between suitable road networks and economic development.

Appendix B OS&HP Maps

The following maps present the 2022 Official Streets and Highway Plan for the Matanuska-Susitna Borough including planned roads, road functional classifications, and primary intersection points.

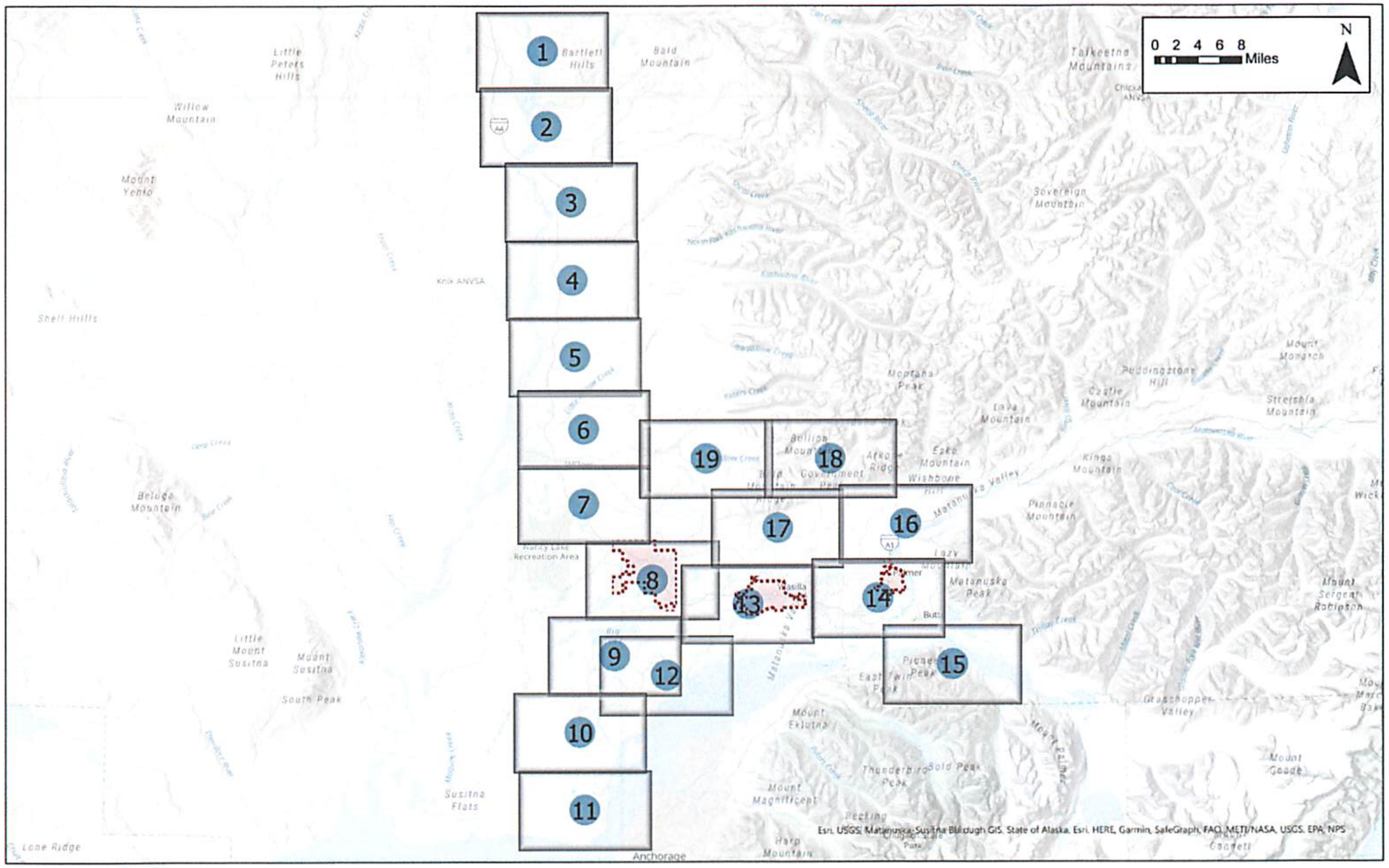


Figure 16. OS&HP Vicinity Map

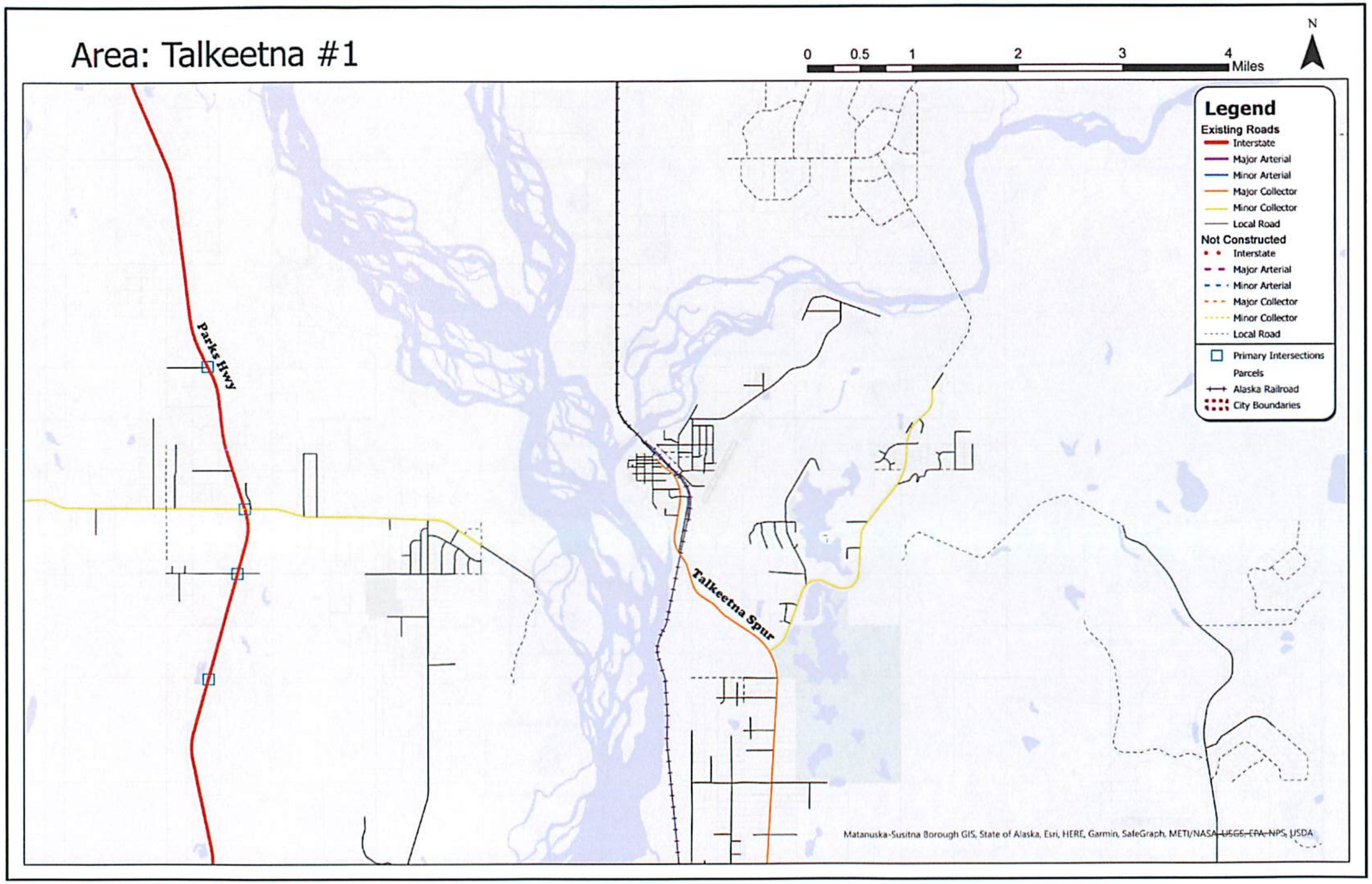


Figure 17. OS&HP Map 1 – Talkeetna North

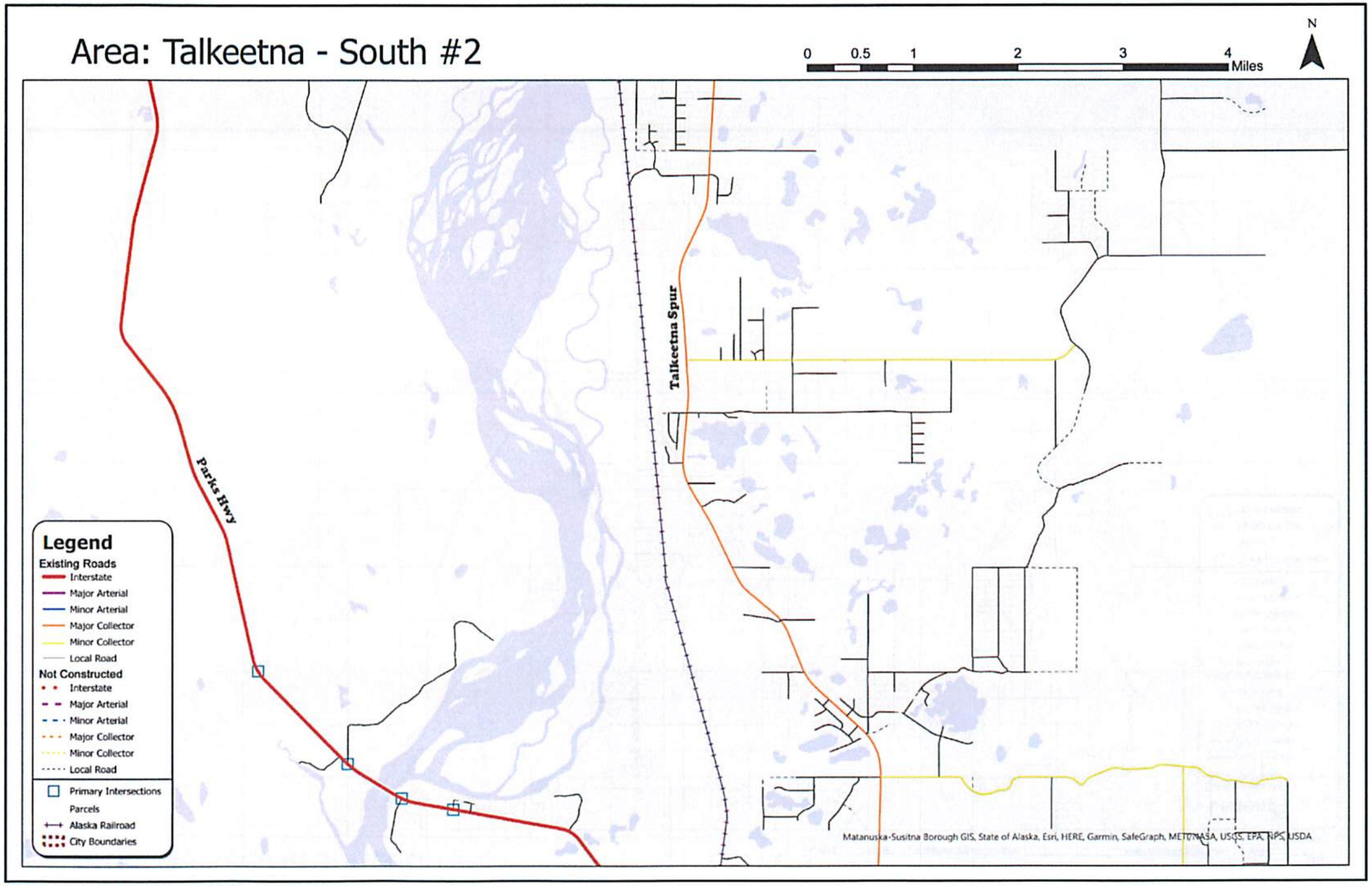


Figure 18. OS&HP Map 2 – Talkeetna South

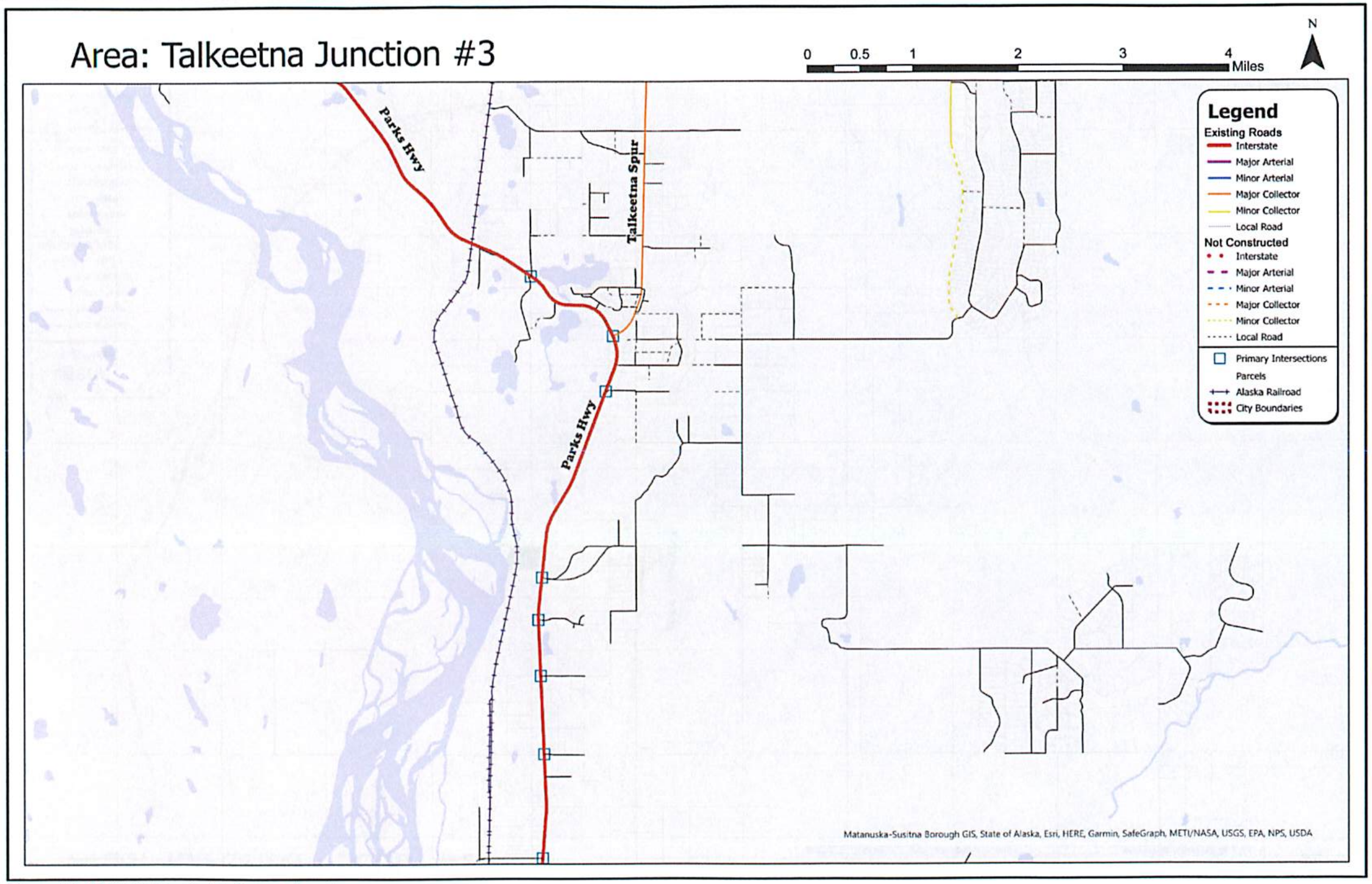


Figure 19. OS&HP Map 3 – Talkeetna Junction

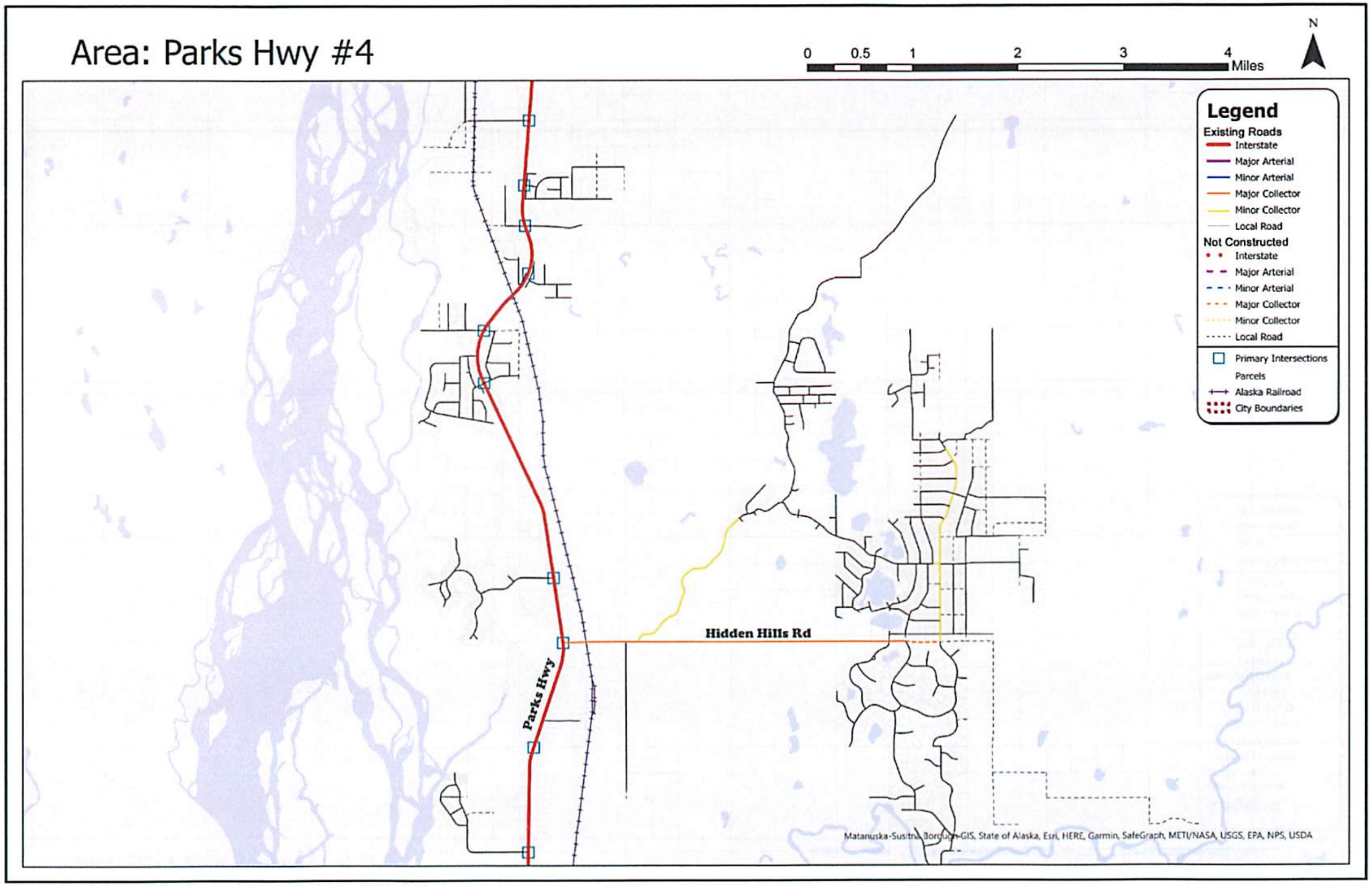


Figure 20. OS&HP Map 4 – Parks Hwy (Hidden Hills Rd)

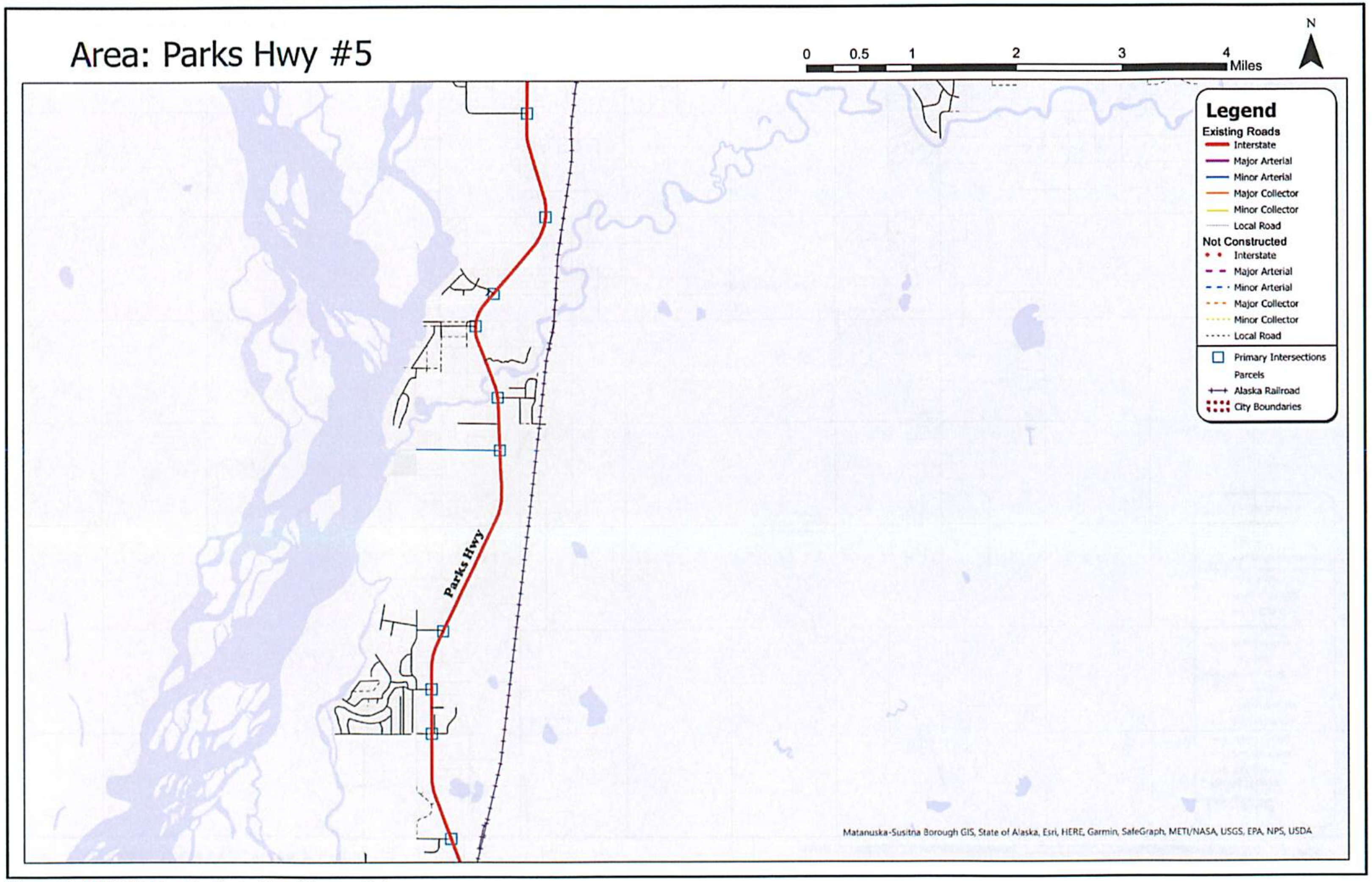


Figure 21. OS&HP Map 5 – Parks Hwy (Yancey Dr)

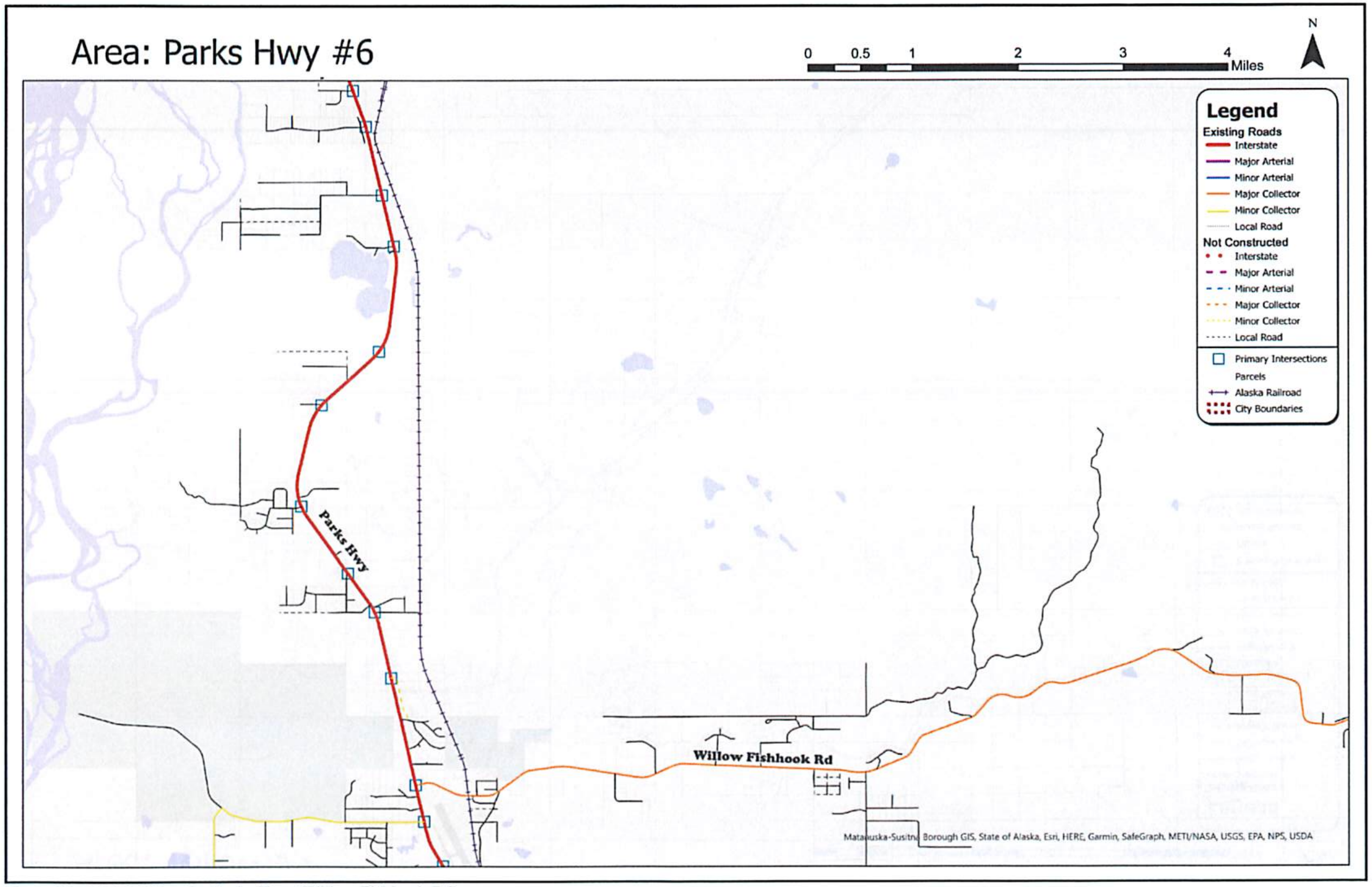


Figure 22. OS&HP Map 6 – Parks Hwy (Willow Fishhook Rd)

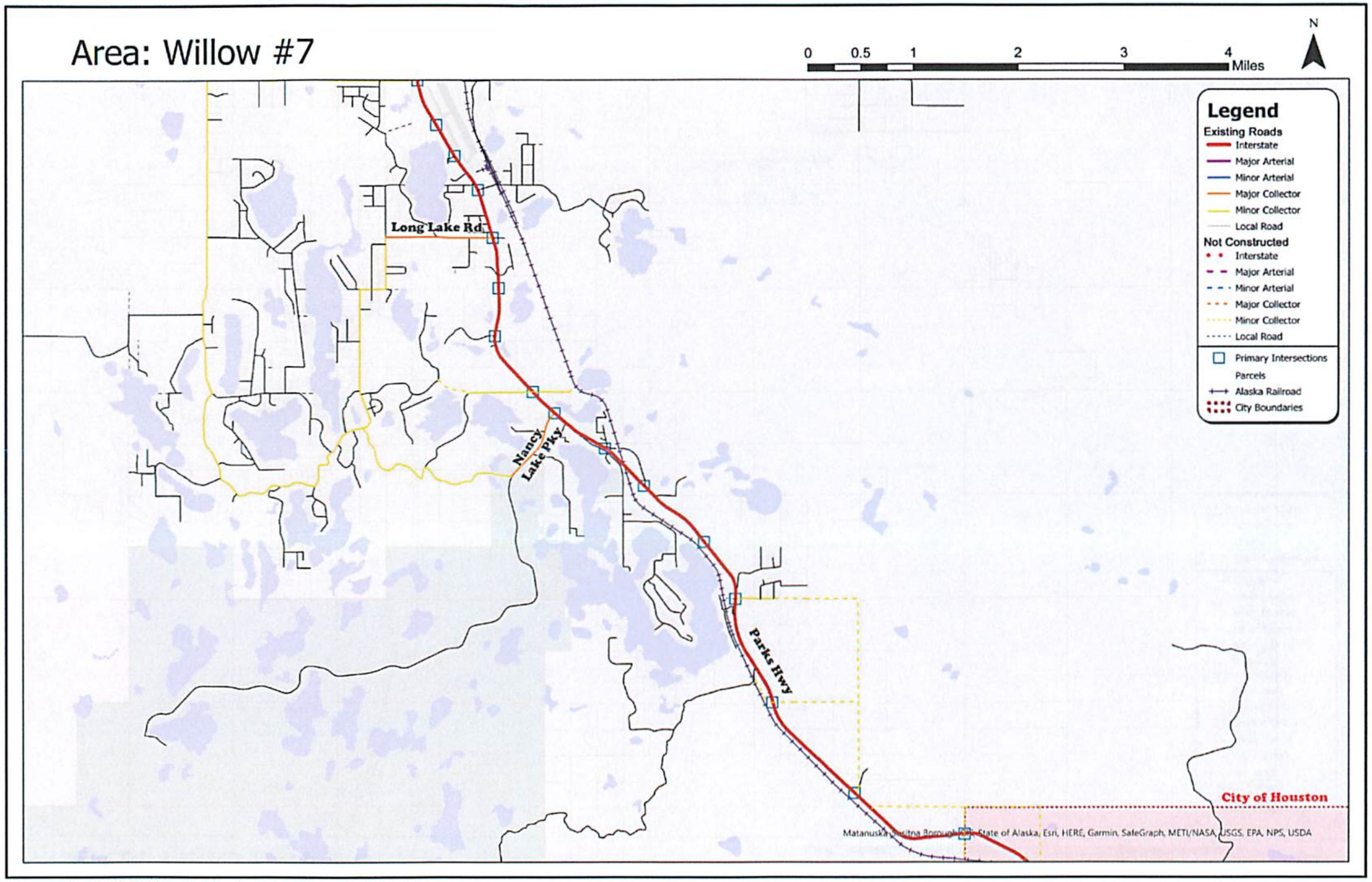


Figure 23. OS&HP Map 7 – Parks Hwy (Long Lake Rd)

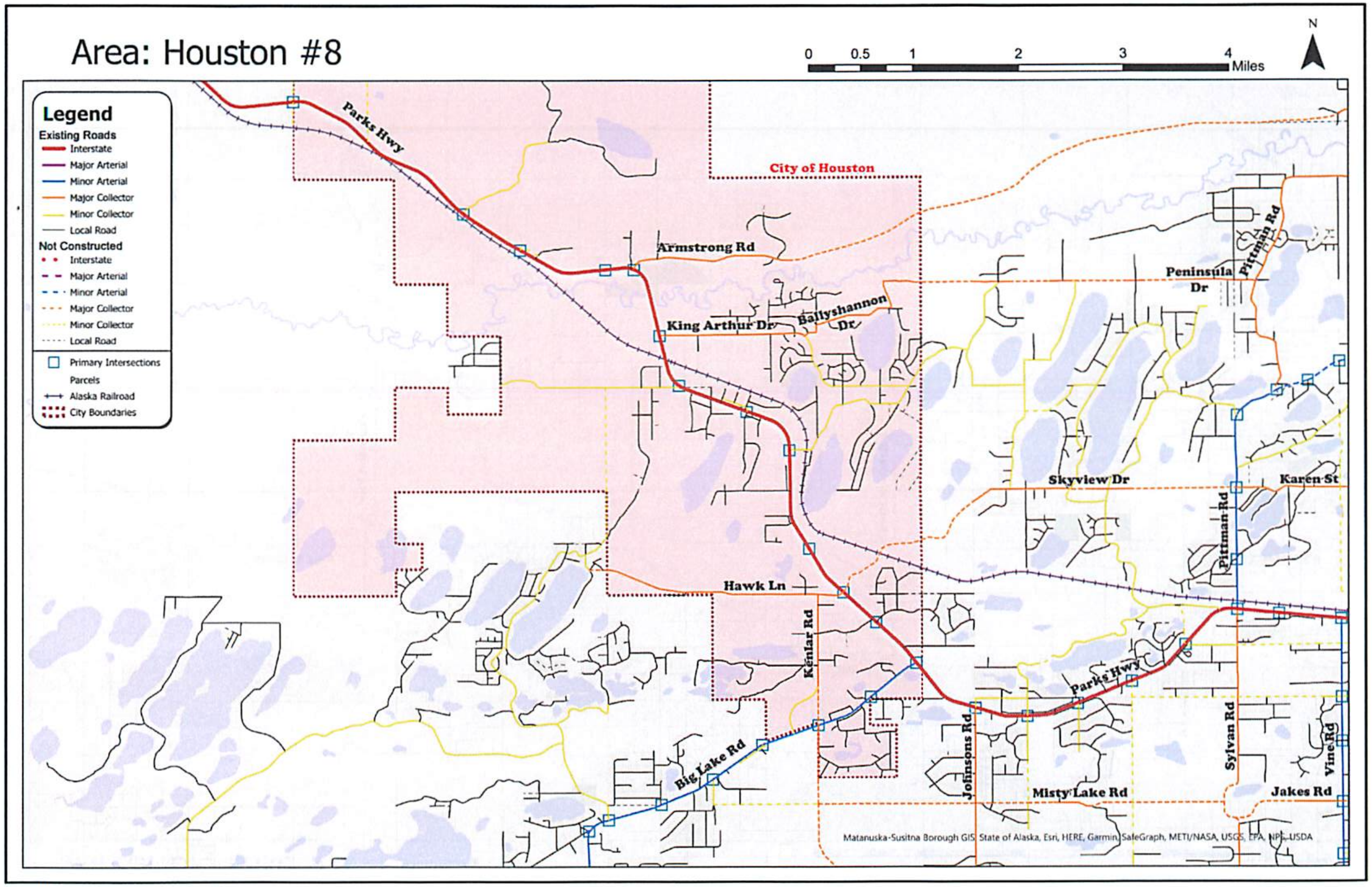


Figure 24. OS&HP Map 8 – Houston

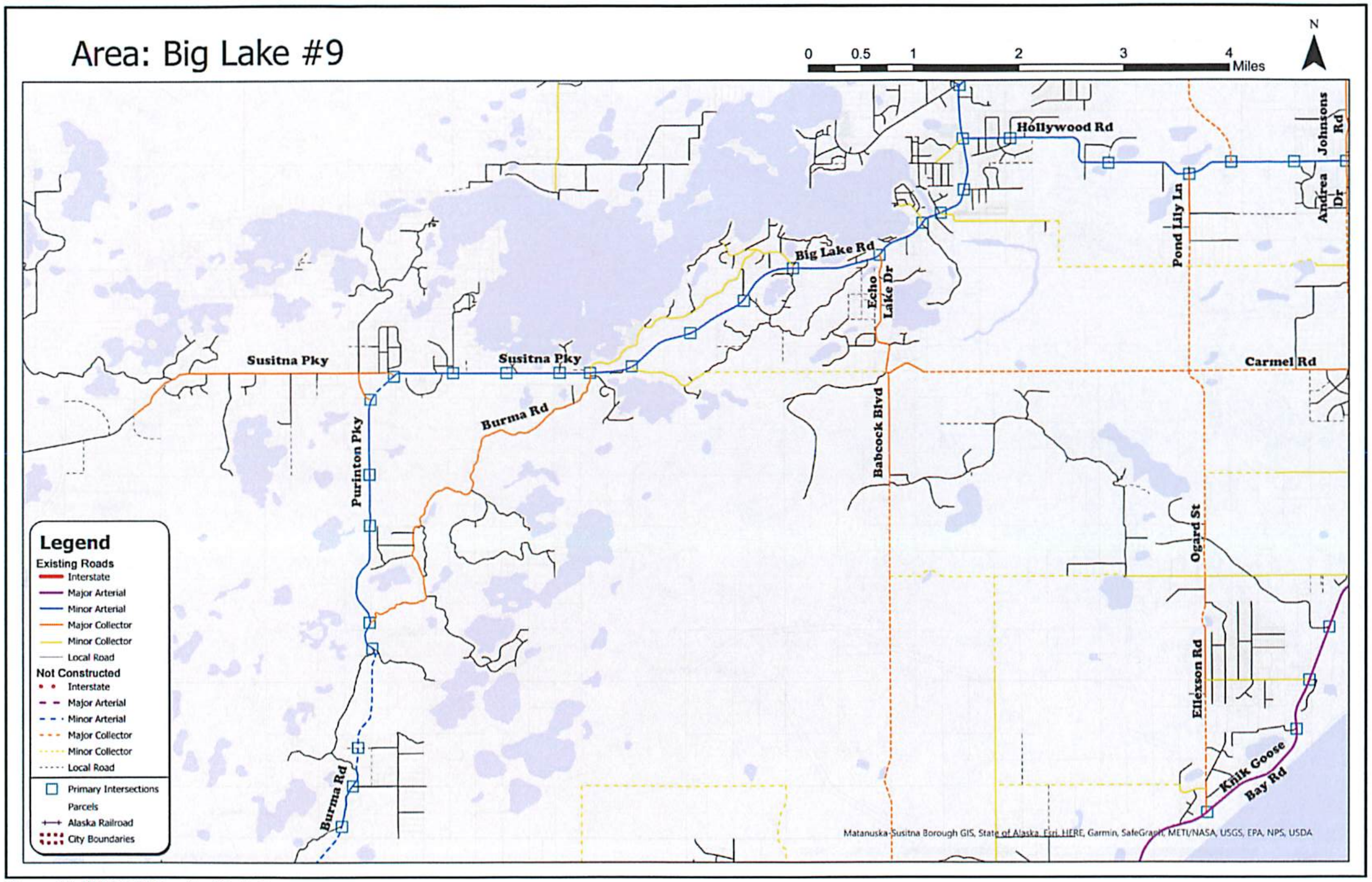


Figure 25. OS&HP Map 9 – Big Lake

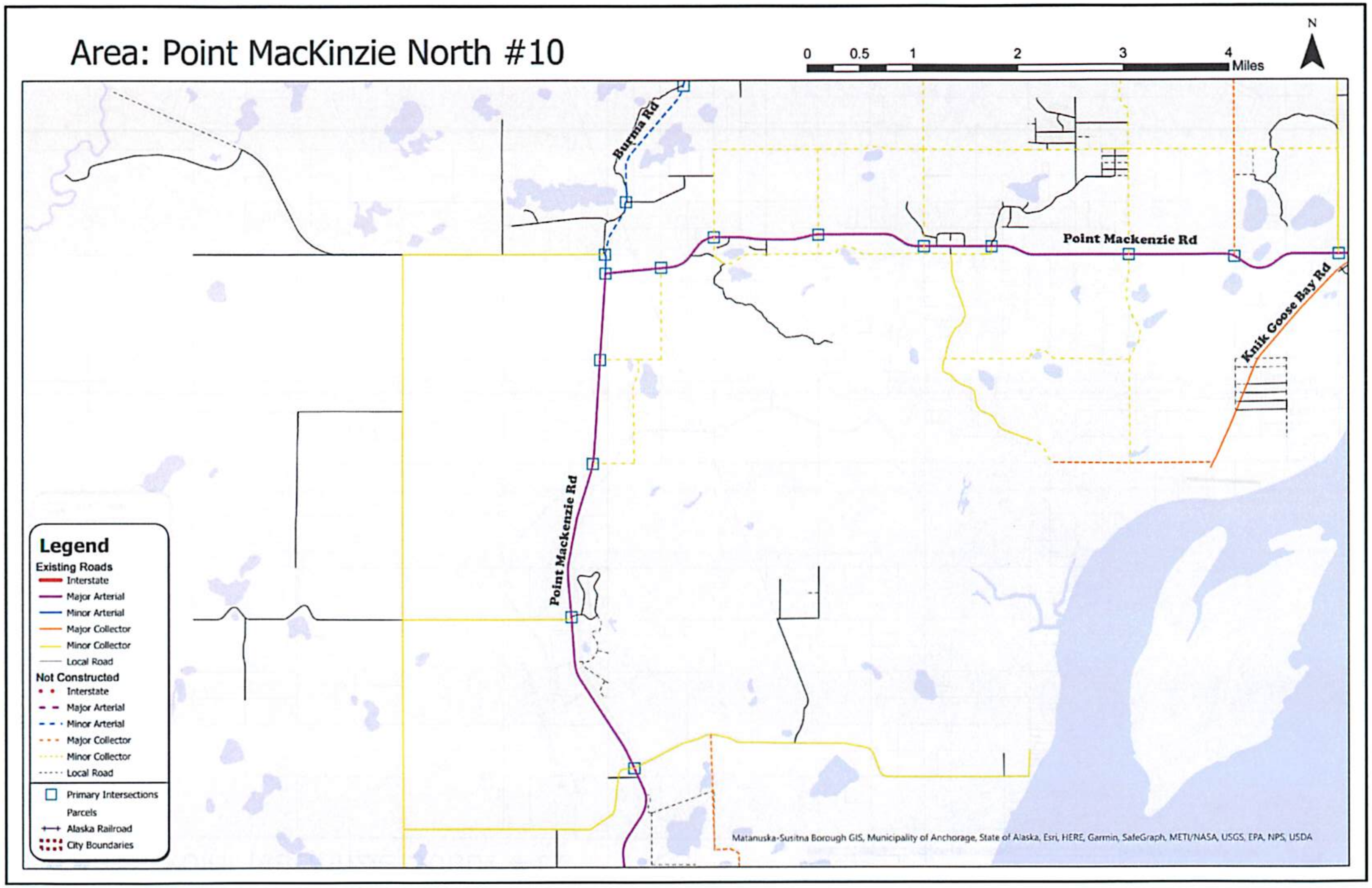


Figure 26. OS&HP Map 10 – Point MacKenzie North

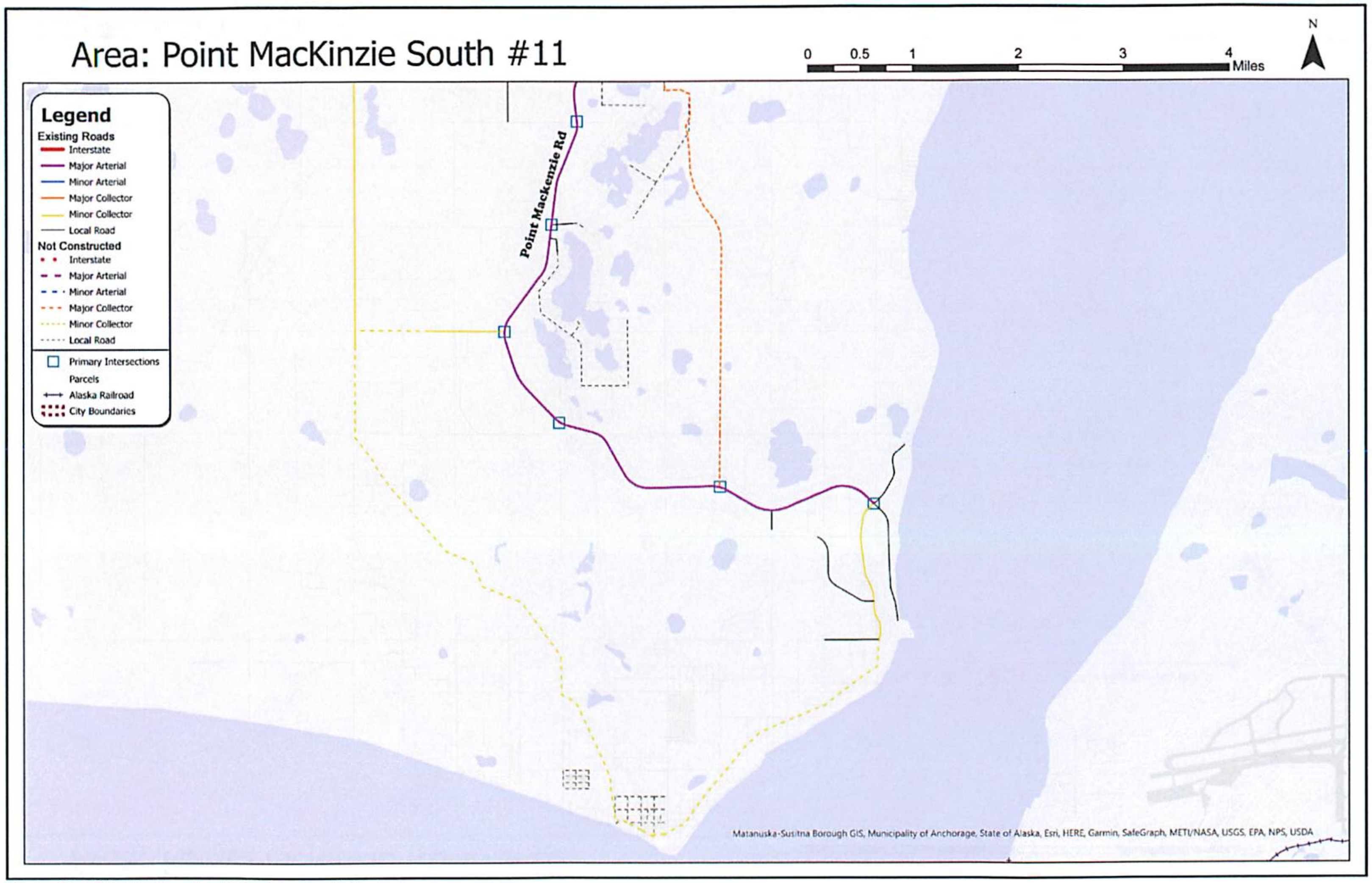


Figure 27. OS&HP Map 11 – Point MacKenzie South

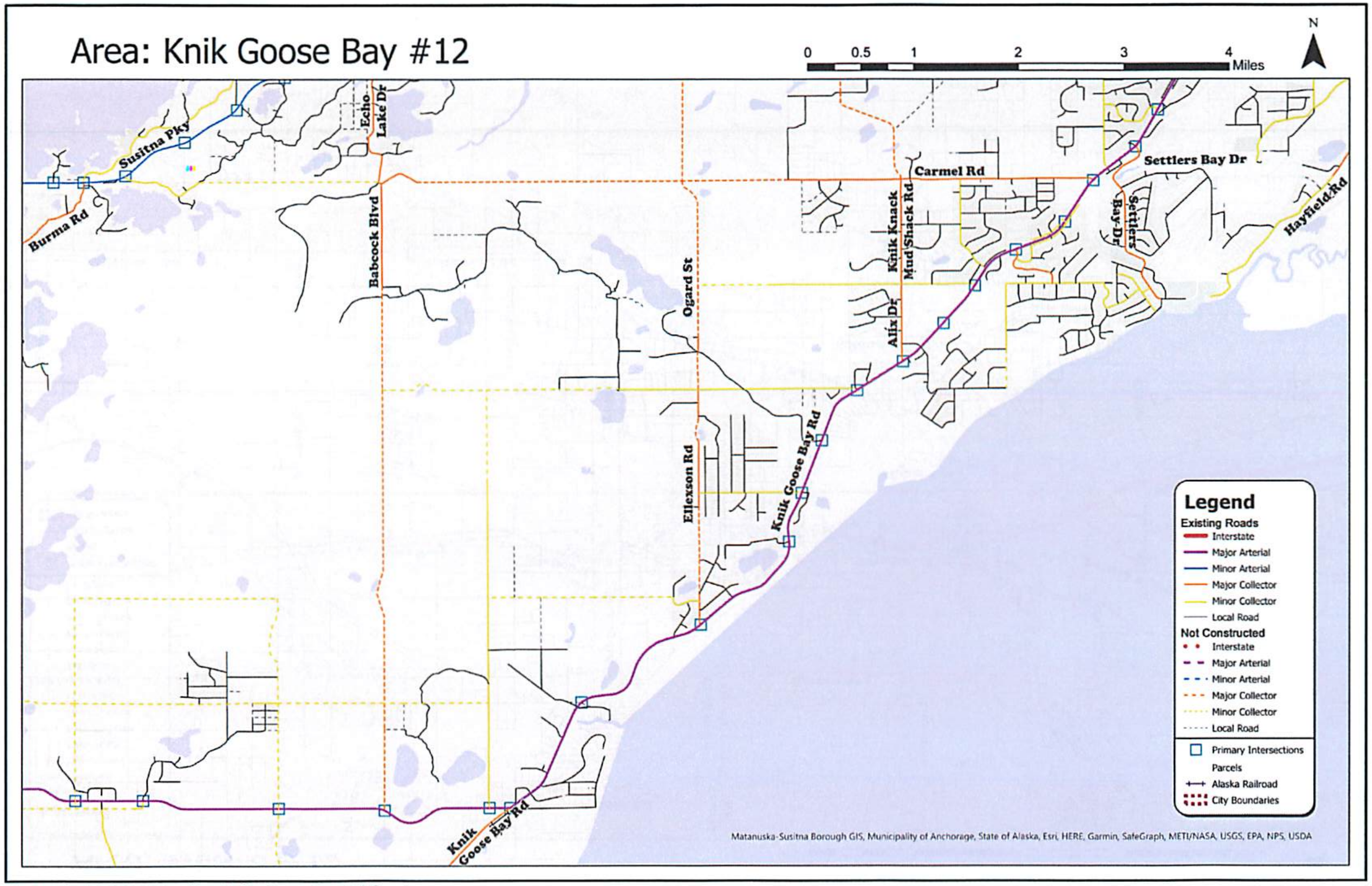


Figure 28. OS&HP Map 12 – Knik-Goose Bay Rd South

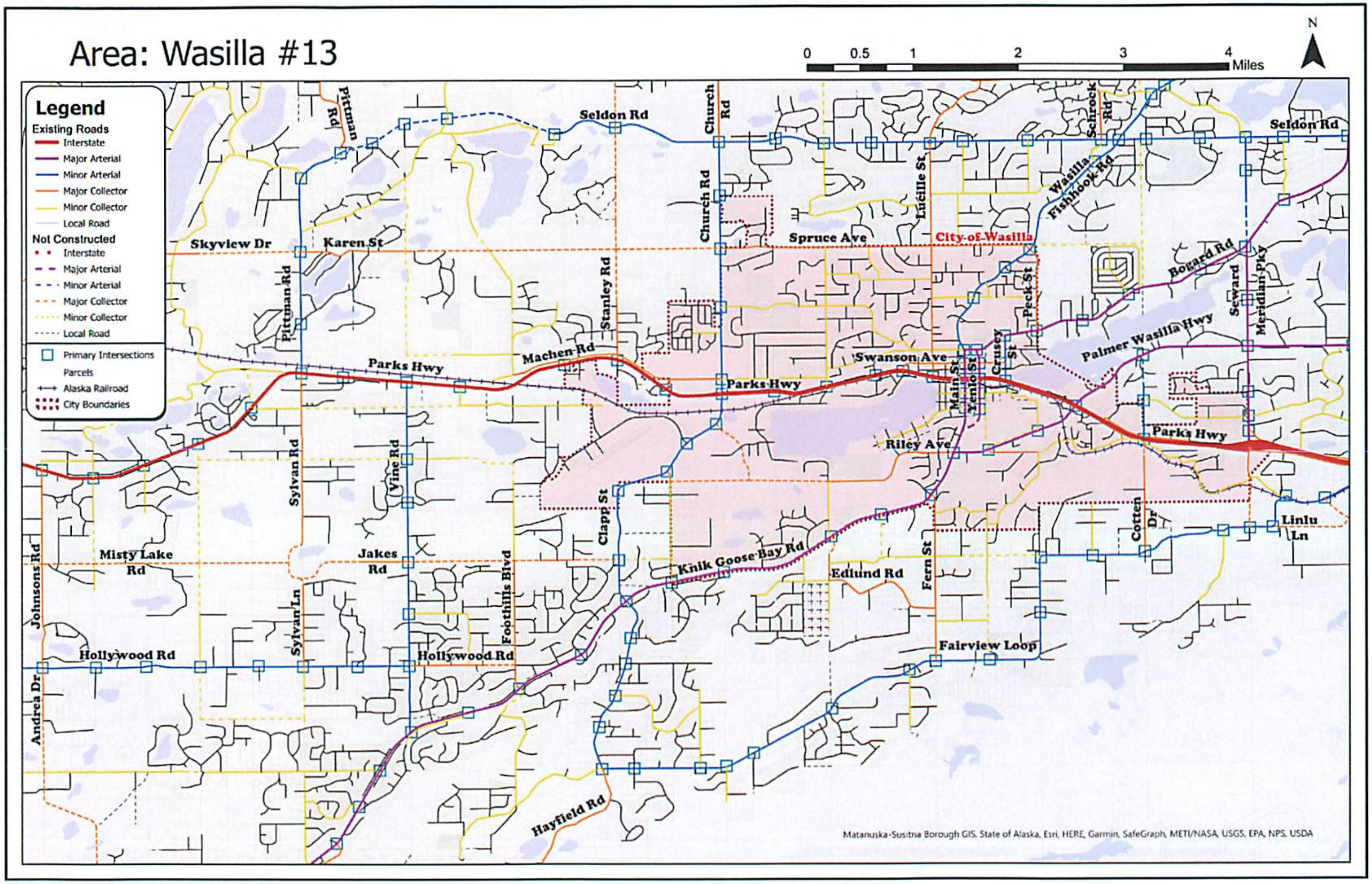


Figure 29. OS&HP Map 13 – Wasilla

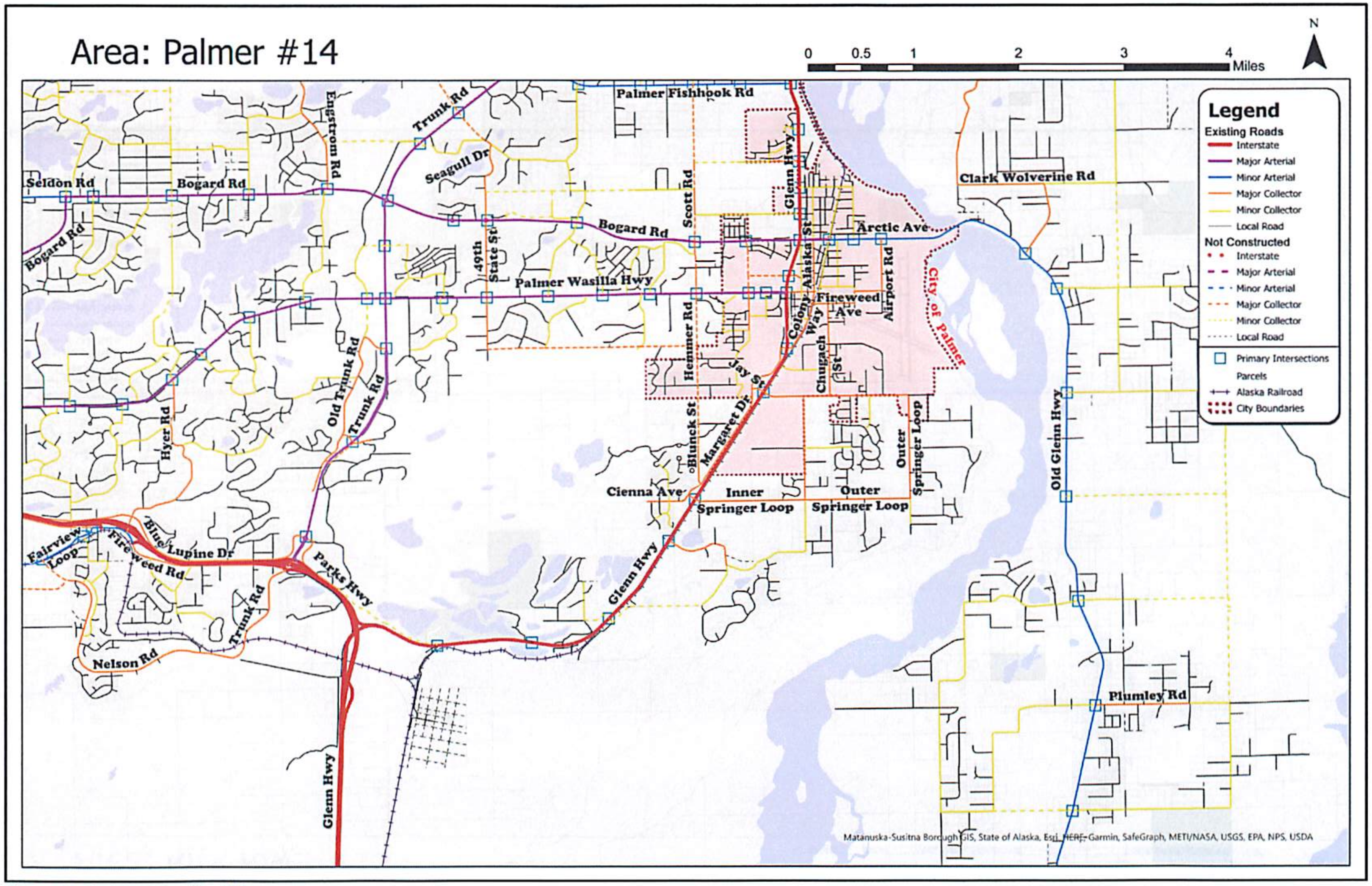


Figure 30. OS&HP Map 14 – Palmer

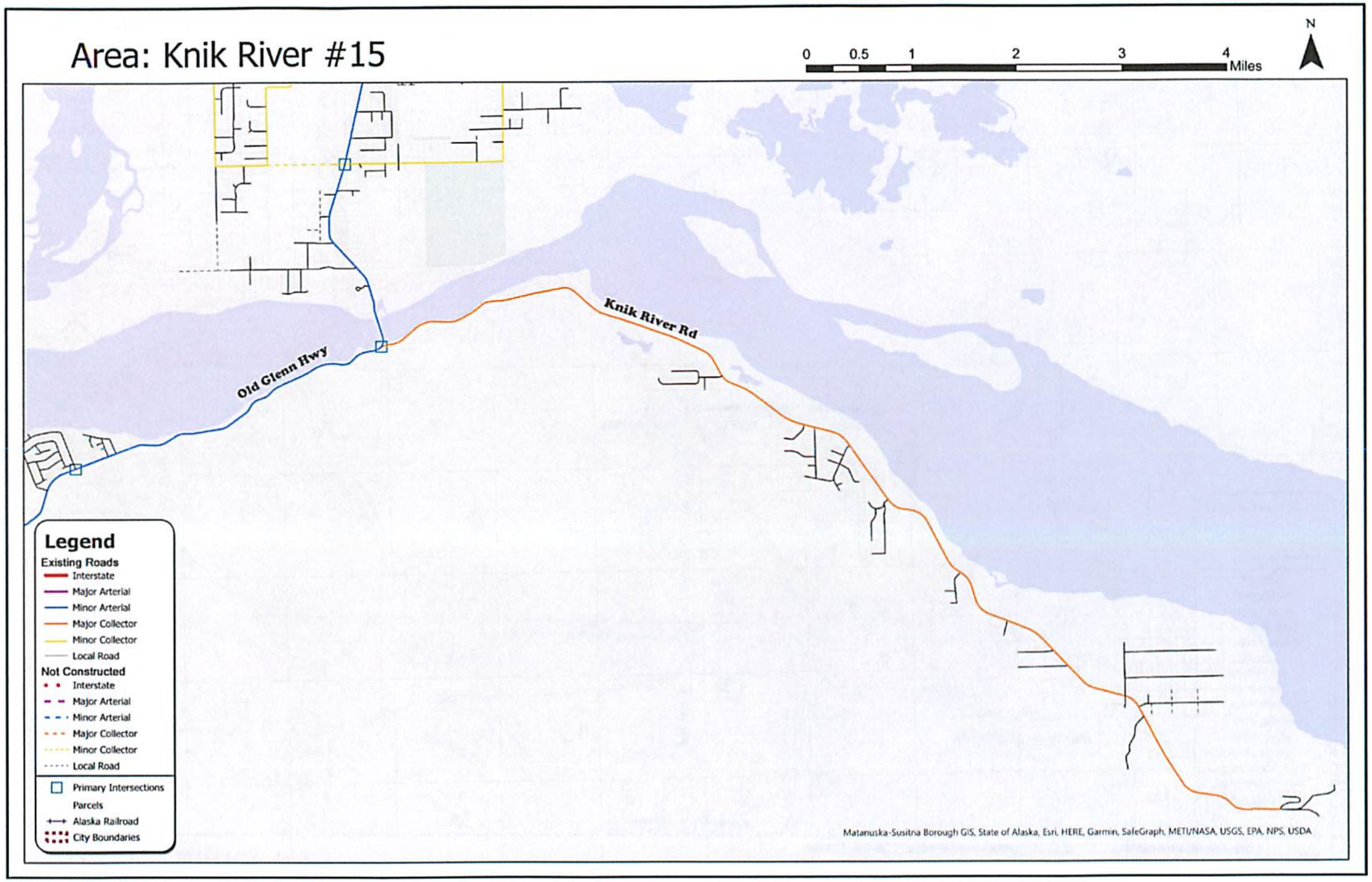


Figure 31. OS&HP Map 15 – Knik River Rd

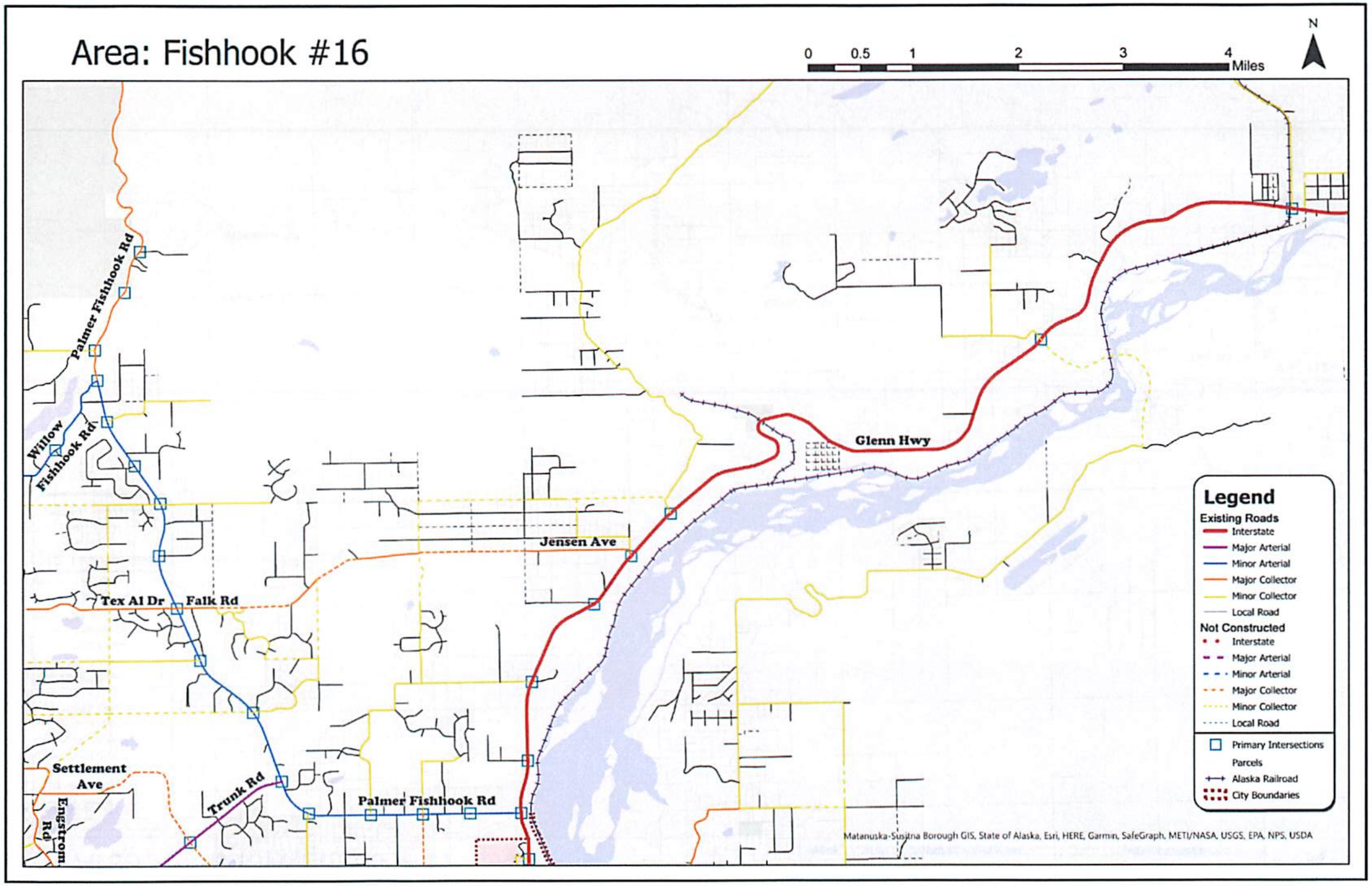


Figure 32. OS&HP Map 16 – Palmer Fishhook Rd

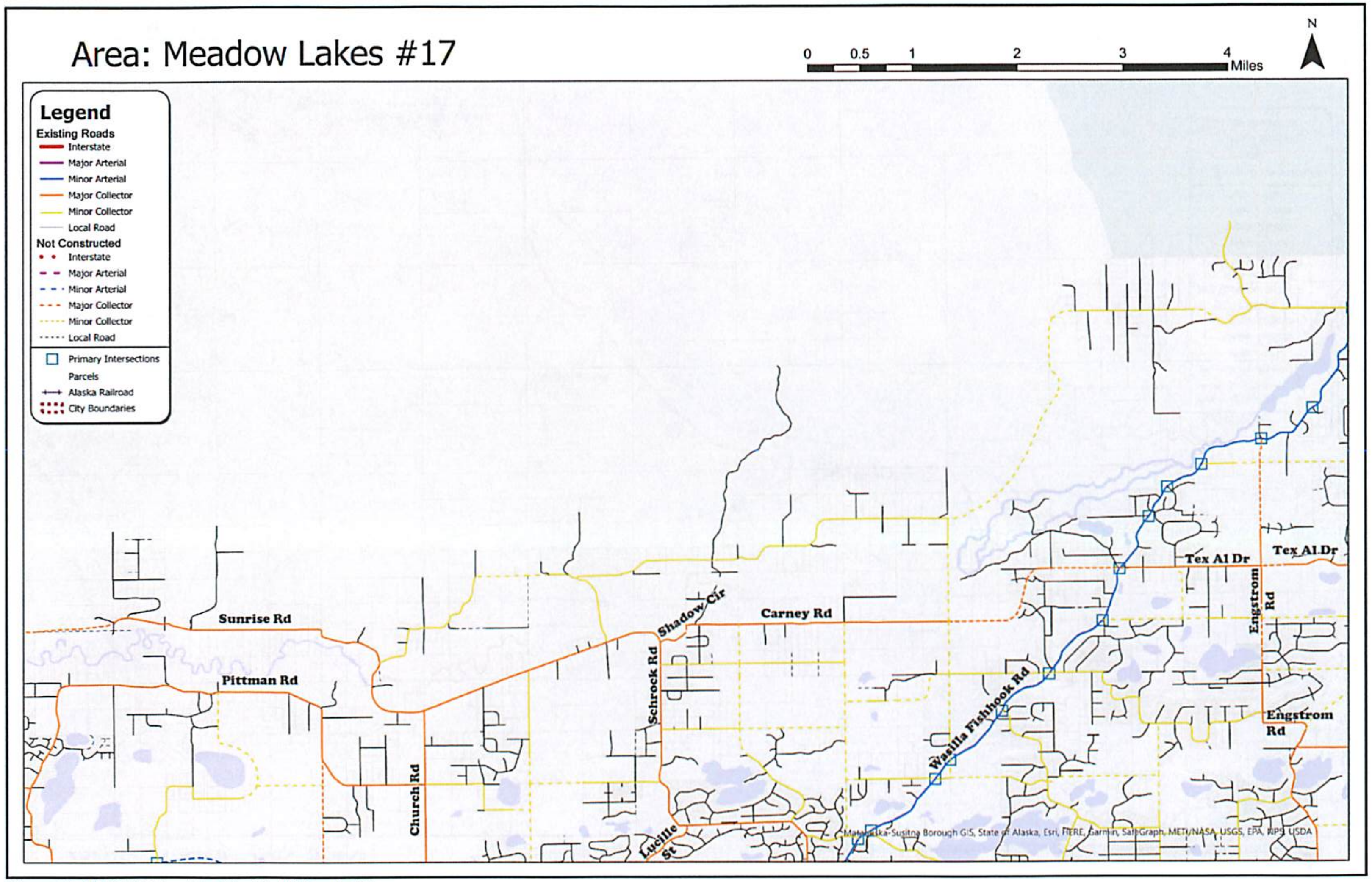


Figure 33. OS&HP Map 17 – Wasilla Fishhook Rd

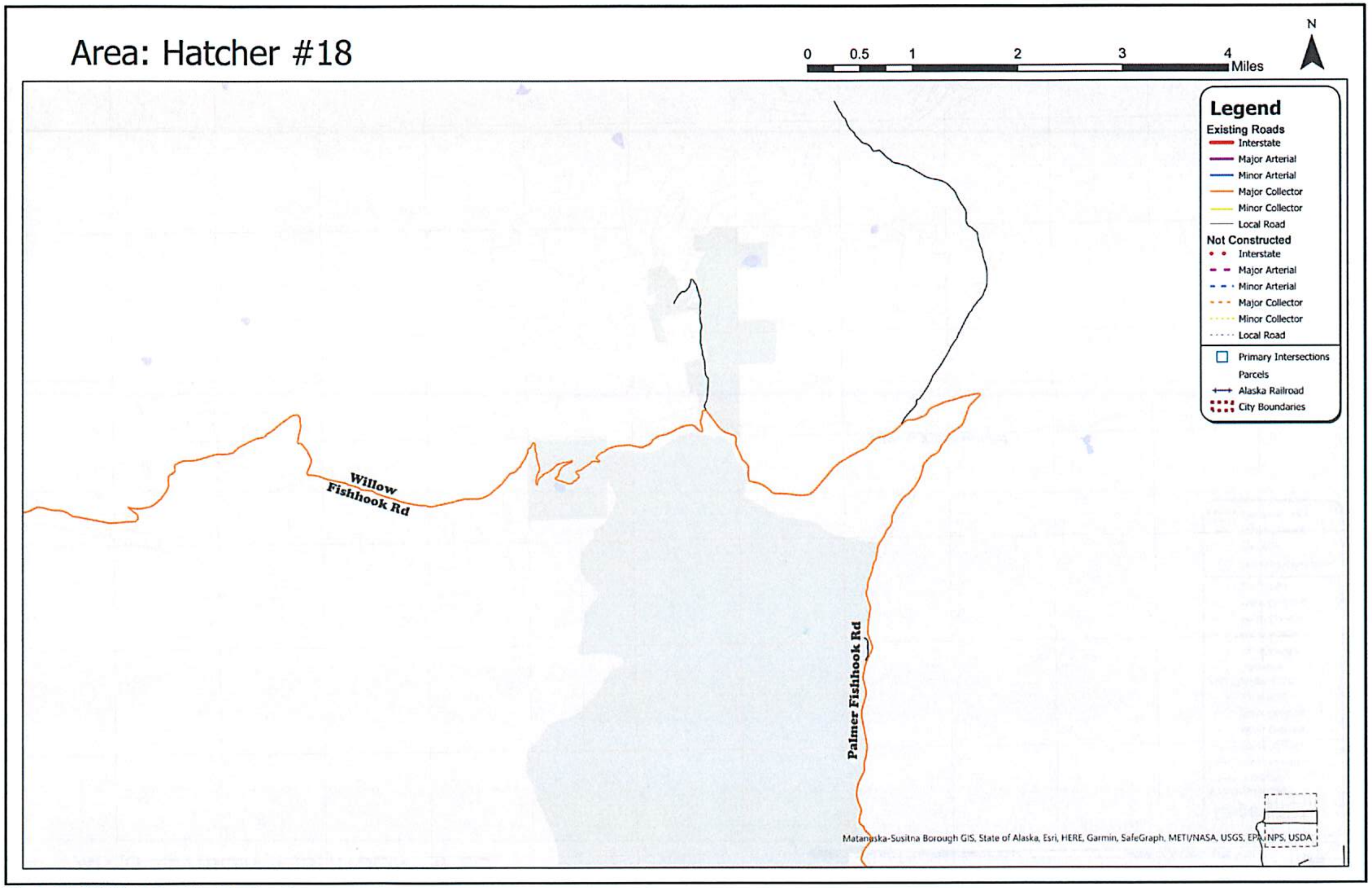


Figure 34. OS&HP Map 18 – Hatcher Pass

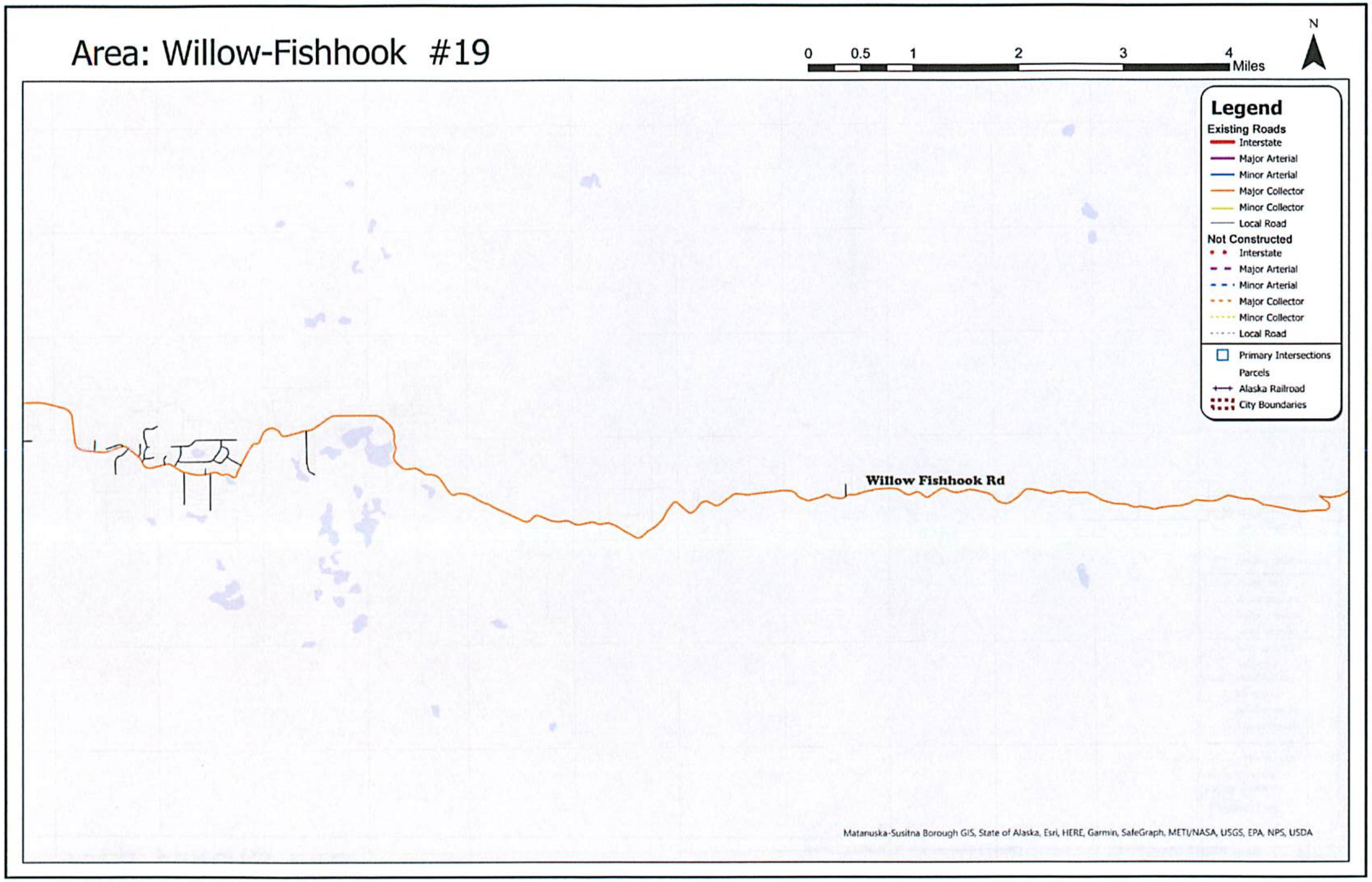


Figure 35. OS&HP Map 19 – Willow Fishhook Rd

CODE ORDINANCE

Sponsored by:
Introduced:
Public Hearing:
Action:

MATANUSKA-SUSITNA BOROUGH
ORDINANCE SERIAL NO. 22-063

AN ORDINANCE OF THE MATANUSKA-SUSITNA BOROUGH ASSEMBLY REPEALING MSB 15.30 OFFICIAL STREETS AND HIGHWAYS PLAN MAP, ELIMINATING AN UNUSED DEFINITION WITHIN MSB 17.55, ADDING THE OFFICIAL STREETS AND HIGHWAYS PLAN TO MSB 15.24 ASSEMBLY; ZONING FUNCTIONS, AND ADOPTING THE 2022 OFFICIAL STREETS AND HIGHWAYS PLAN UPDATE.

BE IT ENACTED:

Section 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the Borough Code.

Section 2. Repeal of chapter. MSB 15.30 OFFICIAL STREETS AND HIGHWAYS PLAN MAP is hereby repealed in its entirety.

Section 3. Amendment of Subsection. MSB 17.55.004(A) is hereby amended as follows:

[• "OFFICIAL STREETS AND HIGHWAY PLAN" MEANS A MAP AND ATTENDANT DOCUMENT DEPICTING THE PROPOSED SYSTEM OF FREEWAY, ARTERIAL, AND COLLECTOR STREETS IN THE BOROUGH, AS ADOPTED BY THE PLANNING COMMISSION AND BY THE ASSEMBLY, AND WHICH IS ON FILE IN THE PLANNING DEPARTMENT OFFICE, TOGETHER WITH ALL AMENDMENTS THERETO SUBSEQUENTLY ADOPTED.]

Section 4. Amendment of Subsection. MSB 15.24.030(B) is hereby amended as follows:

(46) Official Streets and Highways Plan, adopted 2022.

Section 5. Effective date. This ordinance shall take effect upon adoption.

ADOPTED by the Matanuska-Susitna Borough Assembly this - day of -, 2022.

EDNA DeVRIES, Borough Mayor

ATTEST:

LONNIE R. McKECHNIE, CMC, Borough Clerk

(SEAL)

By: Adam Bradway
Introduced: April 4, 2022
Public Hearing: April, 18 2022
Action:

MATANUSKA-SUSITNA BOROUGH
PLANNING COMMISSION RESOLUTION NO. PC 22-13

A RESOLUTION OF THE MATANUSKA-SUSITNA BOROUGH PLANNING COMMISSION RECOMMENDING ADOPTION OF THE MATANUSKA-SUSITNA BOROUGH 2022 OFFICIAL STREETS AND HIGHWAYS PLAN UPDATE.

WHEREAS, the Official Streets and Highways Plan (OSHP) is a transportation planning tool that identifies future road corridors and road upgrades necessary to accommodate the Borough's growing population and its transportation needs; and

WHEREAS, the OSHP is a part of the Borough's Long Range Transportation Plan, is map-based, and focuses on road infrastructure needs; and

WHEREAS, the OSHP will provide a thoughtful, proactive, and comprehensive basis for planning, platting, and transportation decisions; and

WHEREAS, the OSHP will help the Borough preserve future road corridors, reducing right-of-way costs and addressing road network deficiencies before they happen; and

WHEREAS, the OSHP will enhance safety, reduce congestion, reduce negative impacts on neighborhoods, and lower transportation costs;

WHERE AS, future road corridors and upgrades to existing roads should be planned early in order to ensure a safe and efficient road network.

NOW, THEREFORE, BE IT RESOLVED, that the Matanuska-Susitna Borough Planning Commission hereby recommends adoption of the 2022 Matanuska-Susitna Borough Official Streets and Highways Plan Update.

ADOPTED by the Matanuska-Susitna Borough Planning Commission this -- day of --, 2022.

Stafford Glashan, Chair

ATTEST

KAROL RIESE, Planning Clerk

(SEAL)

YES:

NO:

PUBLIC HEARING LEGISLATIVE

Resolution No. PC 22-18

2022 Subdivision Construction Manual

(Pages 147-300)

MATANUSKA-SUSITNA BOROUGH
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STAFF REPORT

DATE: May 23, 2022

SUBJECT: 2022 Subdivision Construction Manual Update

RESOLUTION NO.: Planning Commission Resolution 22-039

STAFF: Alex Strawn, Planning & Land Use Director

SUMMARY STATEMENT

In August 2020 the Matanuska-Susitna Borough Assembly adopted a major revision to the Subdivision Construction Manual. After working with the new manual for a construction season, both staff and the development community identified modifications that will clarify requirements of the manual. The modifications consist of general cleanup, modification of standards, and clarification of acceptable engineering techniques. Specifically, the changes can be summarized as follows:

1. General cleanup and clarification
2. Removed the number of lot and length restriction on residential streets before it becomes a residential Subcollector
3. Modified standards for turnarounds and paved aprons
4. Clarified compaction standards and added requirements for testing methods
5. Require the use of NOAA rainfall data for all locations and added standards how to use the data
6. Allow developers to put drainage facilities within utility easements while providing protections for future and existing utility facilities
7. Modified standards for water quality associated with treatment of runoff
8. Modified downstream evaluation and mitigation criteria for flood hazards
9. Added requirements to the flood bypass design requirements

10. Added standards for ditch stabilization
11. Added minimum freeboard for all ditches
12. Added culvert gauge standards
13. Added energy dissipation requirements at culvert outlets
14. Added soil infiltration facility standards
15. Added pre-approved runoff calculation methods
16. Modified warranty timeframes to work better for both DPW and developers
17. Added inspection deadline for Subdivision Agreements
18. Removed appendices for example construction plan and paving special provision

Staff Recommendations

Staff respectfully recommends considering adoption of this legislation.

2022 Subdivision Construction Manual - Clean Copy

Matanuska-Susitna Borough
Public Works Department

2022
Subdivision Construction Manual

(Roads, Drainage, and Utilities)

Adopted June 21, 2022

Effective June 21, 2022

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Acronyms & Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ADFG	Alaska Department of Fish and Game
ADT	Average Daily Traffic
ADOT&PF	Alaska Department of Transportation and Public Facilities
ATM	Alaska Test Method
cfs	cubic feet per second
CMP	Corrugated metal pipe
DPW	Department of Public Works of the Matanuska-Susitna Borough
FHWA	Federal Highway Administration
ft	feet
h:v	horizontal to vertical
IDF	Intensity-Duration-Frequency
IFC	International Fire Code
in	inches
ITE	Institute of Transportation Engineers
LEW	Low Erosivity Waiver
LRTP	Long Range Transportation Plan
mph	miles per hour
MSB	Matanuska-Susitna Borough
N/A	not applicable
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NTP	notice to proceed
OHWM	ordinary high water mark
OSHP	Official Streets and Highways Plan
PUE	public use easement
ROW	right-of-way
SCS	Soil Conservation Service
VPD	vehicles per day

Definitions

Access Point The location along a road at which a driveway or road intersects.

Arterial A road that provides a high level of mobility within the transportation network. Arterials have managed access with a minimal number of intersections or interchanges.

Average Daily Traffic The total number of vehicle trips during a given time period (in whole days greater than one day and less than one year) divided by the number of days in that time period.

Backslope On a roadway section in a cut, the portion of the roadside that slopes up from the roadside ditch and away from the roadway to the top of the cut, see Figure A-3.

Catchment Area The total area contributing stormwater runoff to a particular point, site, or structure.

Collector A road that links local roads with arterials and performs some duties of each. Collectors have managed access with a moderate number of intersections and driveways.

Curve Return The curve located at the corner of an intersection, connecting the roadway edge of one road to the roadway edge of an intersecting road or driveway.

Detention The temporary storage of runoff, for later controlled release.

Drainage Pattern The configuration of a drainage system including manmade and natural features within a catchment area.

Driveway A vehicular access way between a road and a parking area within a lot or property.

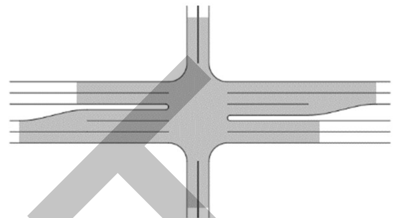
Embankment Earthen material that is placed and compacted for the purpose of raising the grade of a roadway.

Engineer An individual who is registered as a Professional Civil Engineer in the State of Alaska.

Feasible Reasonable and capable of being done or carried out.

Foreslope On a roadway section, the portion of the roadside that slopes down and away from the roadway, see Figure A-3.

Functional Area The physical area of an intersection and the area extending both upstream and downstream which includes perception reaction distance, maneuver distance, and storage length.



Intersection The general area where two or more roads join or cross.

Local Road A road that provides access to abutting property, rather than to serve through traffic. Local roads are not access controlled and can have frequent intersections and driveways.

Lot Frontage A property line that abuts the right-of-way that provides access to the lot.

Ordinary High Water Mark The elevation marking the highest water level which has been maintained for a sufficient time to leave evidence upon the landscape. Generally, it is the point where the natural vegetation changes from predominately aquatic to upland species.

Positive Drainage Clear, unobstructed flow of water away from structures and roadways without localized ponding.

Public Use Easement Provides the rights for ingress, egress, roadways, right-of-way, public utilities, and slopes for cuts and fills. The rights are to the public in general, and public utilities governed by permits required under federal, state, and local laws and regulations. May also be known as a public access easement or right-of-way.

Regulated Stream Any watercourse along which the flood hazard areas have been mapped and approved by the Federal Emergency Management Agency; any stream which harbors fish, as determined by the Alaska Department of Fish and Game; or any stream designated as regulated by MSB.

Retention The prevention of runoff. Stormwater, which is retained, remains indefinitely, with the exception of the volume lost to evaporation, plant uptake, or infiltration.

Right-of-way A strip of land reserved, used, or to be used for a street, alley, walkway, airport, railroad, or other public or private purpose.

Road A general term denoting a public thoroughfare used, or intended to be used, for passage or travel.

Road Prism The foundation that supports the roadway; see Figure A-3.

Roadway The portion of a road that includes driving lanes and shoulders, see Figure A-3.

Segment A portion of road between two significant intersections or an intersection and its terminus.

Shoulder The portion of a roadway contiguous to any traveled way for lateral support of surface courses, see Figure A-3.

Street A general term usually denoting an urban or suburban road.

Stub A right-of-way or road segment that is planned to be extended, typically short in length, which terminates at the boundary of a subdivision or masterplan phase.

T-intersection A three leg intersection in the form of a "T".

Through Street A road given preferential right of way; roads which intersect a through street are controlled, such as with a stop sign or yield sign.

Water Body A permanent or temporary area of standing or flowing water. Water depth is such that water, and not air, is the principal medium in which organisms live. Water bodies include, but are not limited to: lakes, ponds, streams, rivers, sloughs, and all salt water bodies.

Introduction

This manual is intended to accomplish the following goals:

(1) To establish standards for the design and construction of transportation networks throughout the Matanuska-Susitna Borough.
(2) To provide information and guidelines for the design, construction, and upgrade of roads, drainage facilities, and utilities within rights-of-way.
(3) To develop and maintain a safer and more efficient transportation system.
(4) To minimize operation & maintenance efforts.

Section A. Street Design

A01 General

These provisions establish appropriate standards for the design of roads. The purpose of these provisions is to:

(1) promote the safety and convenience of motorized and non-motorized traffic;
(2) promote the safety of neighborhood residents;
(3) minimize the long term costs for maintenance and repair;
(4) protect the residential qualities of neighborhoods by limiting traffic volume, speed, noise, and air pollution;
(5) encourage the efficient use of land; and
(6) minimize the cost of road construction and thereby restrain the rise in housing costs.

A02 Applicability

These standards apply to the design and construction of all subdivision improvements within the Matanuska-Susitna Borough (MSB), with the exception of those streets within cities that exercise road powers by ordinance.

A03 Street Classifications

Roads within the MSB fall within one of the following functional classifications, in accordance with the Long Range Transportation Plan (LRTP): Interstate, Principal Arterial, Minor Arterial, Major Collector, Minor Collector, and Local Road. Functional classification of a road is based on its function, design, and current potential use. The applicant may request review of the functional classification of existing roads abutting or affecting the design of a subdivision or land development during the preapplication process.

This section provides design guidance for roads falling under local road and minor collector functional classifications.

A03.1 Residential Street

Residential streets are local roads intended to carry the least amount of traffic at the lowest speed. The Residential street will provide the safest and most desirable environment for a residential neighborhood. Developments should be designed so that all, or the maximum number possible, of the homes will front on this class of street.

A03.2 Residential Subcollector Street

Residential Subcollector streets are local roads that carry more traffic than Residential streets.

A03.3 Residential Collector Street

Residential Collector streets are the highest order of residential streets and are a type of minor collector. In large residential developments, this class of street may be necessary to carry traffic from one neighborhood to another or from the neighborhood to other areas in the community. Residential Collector streets should provide the fewest direct accesses as possible.

A03.4 Mountain Access Road

Mountain Access Roads may be used in areas where the average cross slope exceeds 15 percent or to traverse terrain features in excess of 25 percent. Maintenance of Mountain Access Roads will be at the discretion of Department of Public Works (DPW). School bus access should be considered as school bus routes require all grades less than 10 percent. Mountain Access Road standards allow for steeper grades and switchbacks, but should otherwise be designed to Residential, Residential Subcollector, or Residential Collector standard as required by this section.

A03.5 Pioneer Road

Pioneer Roads may only be used where allowed by MSB or other applicable code. This classification establishes minimum requirements for roads providing physical access, but should otherwise be designed to Residential, Residential Subcollector, or Residential Collector standard as required by this section. No MSB maintenance will be provided for Pioneer Roads. Pioneer roads may be constructed offset from the centerline of the right-of-way (ROW) to facilitate future expansion of the road.

A03.6 Alleys

Alleys are permitted provided legal and physical access conforms to MSB or other applicable code. No MSB maintenance will be provided for Alleys.

A03.7 Other Street Types

The above classifications may be further typed as one of the following streets. These other street types should be designed to Residential, Residential Subcollector, or Residential Collector standard as required by this section.

(a) Frontage Street – streets parallel and adjacent to a major road corridor which provides access to abutting properties and separation from through traffic. See Section B for additional design standards.
(b) Backage Street – streets that provide access to lots located between the Backage Street and a major road corridor. See Section B for additional design standards.
(c) Connector Street – the portion of a street that connects a frontage or backage street to a major road corridor. See Section B for additional design standards.
(d) Divided Street – streets may be divided for the purpose of accommodating environmental features or avoiding excessive grading. In such a case, the design standards shall be applied to the appropriate street classification and a single lane width with a shoulder on each side.

A04 Access Criteria

A04.1 Residential Street

(a) A Residential street provides access to abutting properties.

(b) The anticipated average daily traffic (ADT) volume on Residential streets shall not exceed 400. A loop street shall be designed such that the anticipated ADT at each terminus of the loop street does not exceed 400, see Figure A-1.

(c) Residential streets may intersect or take access from an equal or higher classification street. Both ends of a loop Residential street are encouraged to intersect the same collecting street and be designed to discourage through traffic.

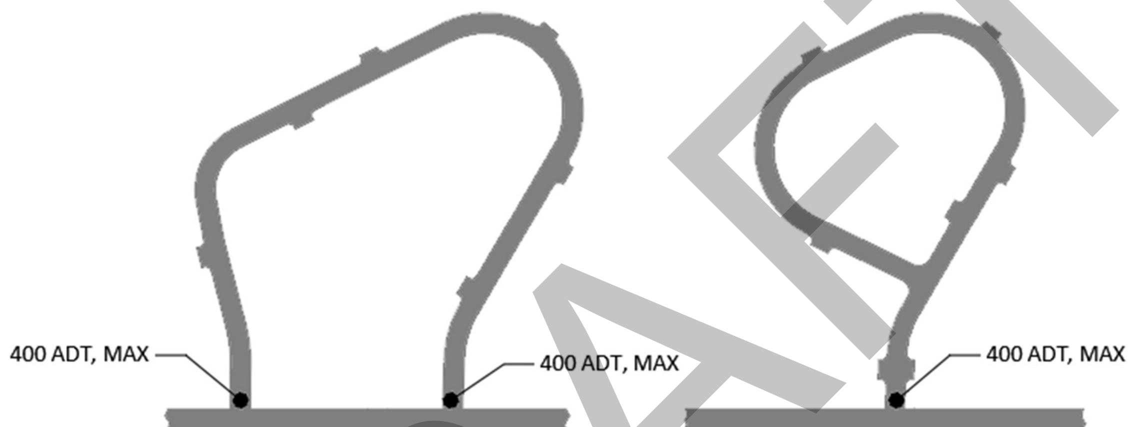


Figure A-1: Loop Residential Streets

A04.2 Residential Subcollector Street

(a) A Residential Subcollector street provides access to abutting properties and may also move traffic from Residential streets that intersect it. Residential Subcollector streets are required when the ADT anticipated on the street will exceed the limits for Residential.

(b) The anticipated ADT on Residential Subcollector streets shall not exceed 1000. A loop street shall be designed such that the anticipated ADT at each terminus of the loop street does not exceed 1000, see Figure A-2.

(c) Residential Subcollector streets shall be designed to exclude all external through traffic that has neither origin nor destination on the Residential Subcollector or its tributary Residential streets. Adjacent parcels may acquire access if proven landlocked by legal or terrain features or if such Residential Subcollector access can be demonstrated to be beneficial to the public.

(d) Residential Subcollector streets shall take access from a street of equal or higher classification.

(e) Traffic calming elements should be considered for the design of Residential Subcollectors, such as avoiding long, straight segments and reducing the length of roadway from farthest lot to a collector.

(f) Residential Subcollector streets shall be provided with two continuous moving lanes within which no parking is permitted.

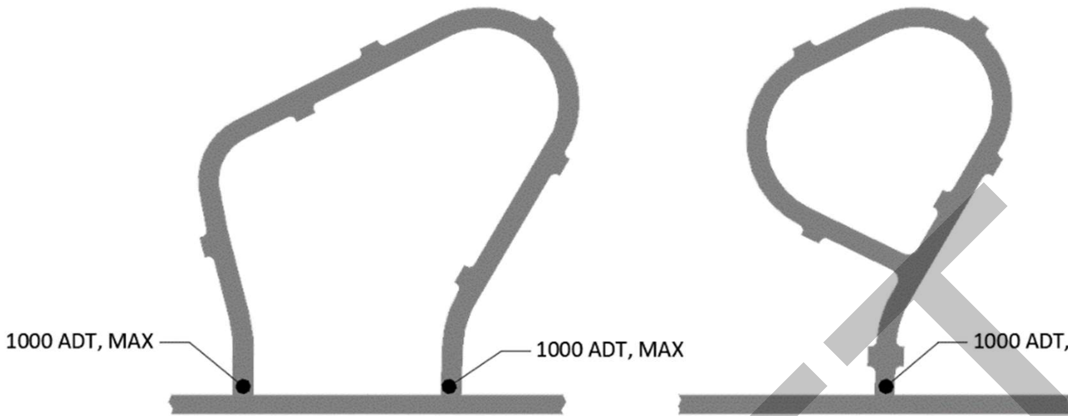


Figure A-2: Loop Residential Subcollector Streets

A04.3 Residential Collector Street

(a) A Residential Collector street carries residential neighborhood traffic, but restricts or limits direct residential access. Residential Collector streets are required when the ADT anticipated on the street will exceed the limits for Residential Subcollectors.

(b) Residential Collector streets should be designed to have as few residential lots directly fronting them as possible. When efficient subdivision design or physical constraints make this not possible, the average access point spacing shall be a minimum of 250 feet. Average access point spacing is calculated per segment and is equal to the segment length divided by the number of potential access points on both sides of the street. Undeveloped lots with only access to Residential Collector streets are counted as having at least one access point. When the average access point spacing on a segment of an existing Residential Collector street is less than 250 feet, the average access point spacing shall not decrease due to the subdivision.

(c) Space shall be provided on these lots for turnaround so that vehicles will not have to back out onto Residential Collector streets.

(d) Proposed access points on Residential Collector streets shall be shown on the preliminary plat.

(e) Residential Collector streets shall be laid out to encourage connectivity within the transportation network.

(f) If the anticipated ADT will exceed 3000, the street shall be classified at a higher level than Residential Collector by DPW.

(g) Every Residential Collector shall be provided with no fewer than two access intersections to streets of equal or higher classification. If it is shown by the applicant that two accesses are not feasible, Residential Collector streets shall be provided with access to one street of equal or higher classification and be designed to accommodate a future second connection to a street of equal or higher classification, or otherwise be approved by DPW.

(h) All Residential Collector streets shall be provided with two continuous moving lanes within which no parking shall be permitted.

A04.4 Access through Existing Streets

The anticipated ADT on existing Residential streets used to access a proposed subdivision may exceed 400, but shall not exceed 800, if:

(a) alternate road corridors are not available or feasible;
(b) horizontal geometry or access density prohibits upgrade to a higher standard road; and
(c) the traffic impacts are mitigated.

A04.5 Traffic Impact Mitigation for Access through Existing Streets

Traffic impact mitigation on existing residential streets can include but is not limited to:

(a) Traffic control devices (signage, striping) on segments where potential ADT exceeds 440;
(b) LED street lighting, speed feedback signs, widened shoulders, inside corner widening for offtracking, or all-way stop intersections on segments where potential ADT exceeds 600.

A04.6 Commercial Uses on Residential and Residential Subcollector Streets

Exceptions to the ADT limits on Residential and Residential Subcollector streets, as set forth in A04.1 and A04.2, respectively, may be allowed for commercial uses that access the first 600 feet of such streets that intersect a Collector standard road or higher classification, as measured from the intersection point. The affected portion of the street and intersection shall be constructed to a higher standard as needed to accommodate the anticipated commercial traffic.

A05 Design Criteria

The design criteria for Residential, Residential Subcollector, and Residential Collector streets and Mountain Access and Pioneer roads are set forth in Table A-1. Any unspecified design criteria shall meet or exceed the design criteria for the roadway design speed in the latest edition of *A Policy on Geometric Design of Highways and Streets* (AASHTO).

Table A-1: Design Criteria

	Unit	Residential	Residential Subcollector	Residential Collector	Mountain Access[1]	Pioneer[1]
Average Daily Traffic	VPD	≤400	401 – 1000	1001 – 3000	–	–
Typical Section						
ROW Width[2]	ft	60	60	60	60	60
Lane Width	ft	10	10	11	10	10
Standard Gravel Shoulder Width	ft	2	2	2	0[3]	0[3]
Shared Paved Shoulder Width[4]	ft	4	4	6	–	–
Roadway Width	ft	24	24	26	20[3]	20
Foreslope[5]	h:v	3:1	3:1	4:1	2:1	3:1
Backslope[6]	h:v	2:1	2:1	2:1	2:1[7]	2:1
Crown, gravel	%	3	3	3	3	3
Crown, pavement	%	2	2	2	2	–
Engineering Criteria						
Design Speed	mph	25	30	35	–	–
Posted Speed	mph	20	25	30	–	–
Stopping Sight Distance	ft	155	200	250	–	–
Horizontal Alignment						
Minimum Centerline Radius	ft	225	350	550	–[8]	–
with DPW Approval	ft	190	275	400	–	–
Minimum Tangent Between Curves	ft	100	100	100	100	100
Maximum superelevation	%	N/A	N/A	4	N/A	N/A

[1] Where a value is not given, Mountain Access and Pioneer Roads shall meet the criteria of the anticipated street classification.
[2] Minimum ROW required for new dedications; width of existing ROW may vary.
[3] Where grades exceed 7 percent, the shoulder width shall be 2 feet for a total roadway width of 24 feet.
[4] An optional paved shoulder may be provided on one or both sides of paved streets for non-motorized shared use.
[5] Slope for the first 7.5 feet from the shoulder; may be steepened to 2:1 thereafter. Install guardrail when required by the latest edition of the *Roadside Design Guide* (AASHTO).
[6] 2:1 Back slopes may be steepened to 1.5:1 if cuts exceed 5 feet and appropriate slope stabilization, as determined by the design engineer, is used. Retaining walls may be used to replace or augment backslopes.
[7] Or backslope recommended by the design engineer based on actual conditions.
[8] Switch backs are allowed provided cul-de-sac criteria is met or turning radius is 40 feet with a 2% grade.

	Unit	Residential	Residential Subcollector	Residential Collector	Mountain Access[1]	Pioneer[1]
Vertical Alignment						
Maximum Centerline Grade	%	10	10	10	15[9]	10
Minimum Rate of Vertical Curvature[10]; Crest		12	19	29	–	–
Minimum Rate of Vertical Curvature [10]; Sag		26	37	49	–	–
Minimum Flow Line Grades	%	0.5	0.5	0.5	1.0	0.5
Intersections						
Minimum ROW Corner Radius	ft	30	30	30	30	30
Minimum Curve Return Radius[11]	ft	20	25	30	–	–
Maximum Grade on through street within 50 feet of intersection	%	7	7	4	9	7

A06 Typical Section

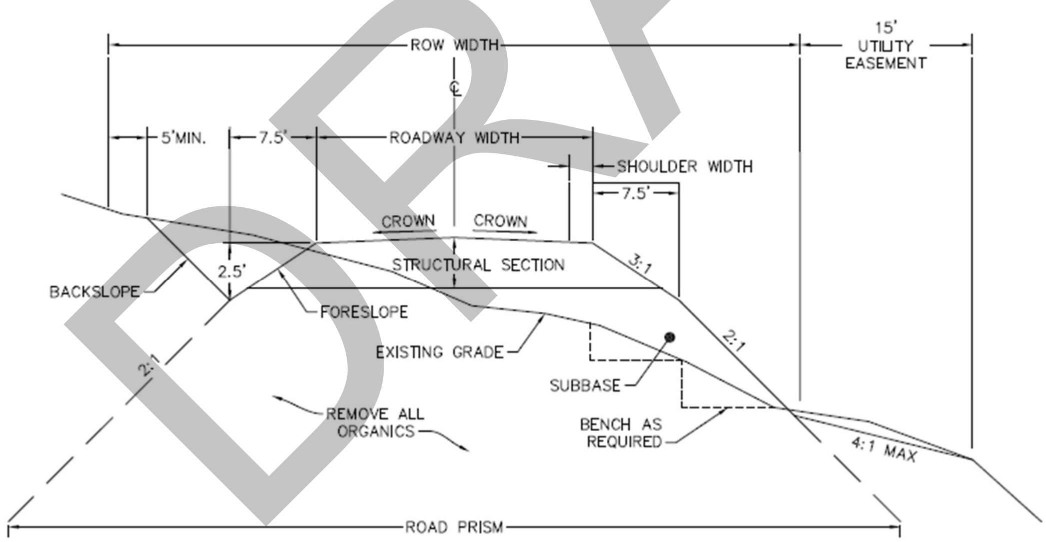


Figure A-3: Typical Section

[9] Up to 15% grade with no more than 200 linear feet of over 10% grade with a minimum of 100 linear feet of less than 10% grade for runout between steeper sections. Maximum grade in a horizontal curve is 10%.
[10] Rate of vertical curvature (K) is the length of curve (L) in feet per percent algebraic difference in intersecting grades (A); K = L / A
[11] 40-foot minimum curve return radius at intersections with higher order streets.

A07 Turnarounds

Streets with only one inlet shall terminate with a constructed turnaround, unless otherwise provided by A08.2.

A07.1 Cul-de-sac Turnarounds

(a) A cul-de-sac turnaround with a drivable surface diameter (shoulder to shoulder) of 85 feet centered in a ROW diameter of 120 feet shall be provided at the terminus of Residential and Residential Subcollector streets.
(b) Cul-de-sac turnarounds shall meet the configuration and dimensions shown in Figure A-4.
(c) The grade throughout the surface of a cul-de-sac, as depicted in the shaded portion of Figure A-4, shall not exceed 4 percent.

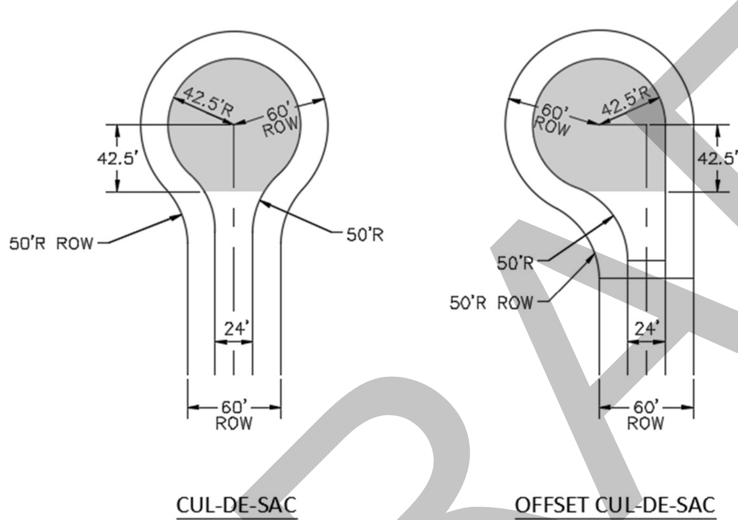


Figure A-4: Cul-de-sac Options

A07.2 Alternate Turnarounds

(a) DPW may permit a street to terminate with an alternative turnaround that meets fire code when such a design is required by extreme environmental or topographical conditions, unusual or irregularly shaped tract boundaries, or when the location of the turnaround is intended to become an intersection.
(b) Alternate turnarounds shall meet the configuration and dimensions shown in Figure A-5.
(c) The grade throughout the turnaround surface, as depicted in the shaded portion of Figure A-5, shall not exceed 4 percent.

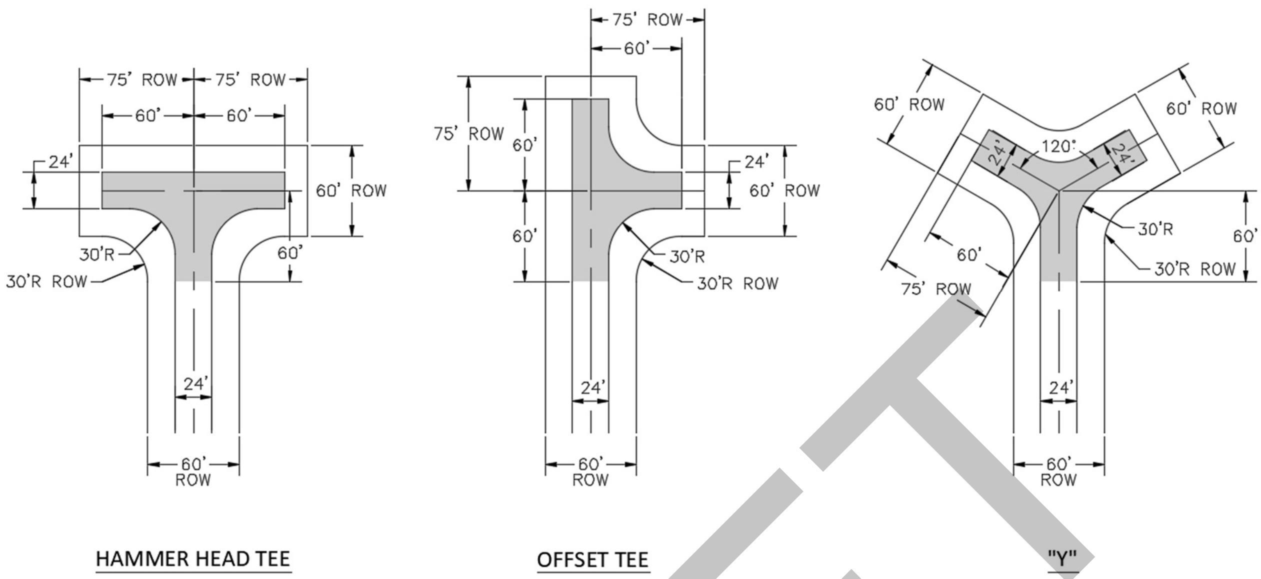


Figure A-5: Alternate Turnarounds

A08 Stub Streets

A08.1 Stub Street Construction

No construction is required if physical access is provided to all lots by adjoining streets as required by MSB or other applicable code.

A08.2 Temporary Turnarounds

Stub streets requiring construction that exceed 200 feet in length (measured from the intersection point to the end of required construction) will meet the requirements ofA07.1 or A07.2. A temporary easement will be provided for the turnaround, which will automatically terminate upon extension of the street and physical removal of the turnaround. The centerline grade on stub streets without turnarounds shall not exceed 4%.

A09 Intersections

A09.1 Intersection Sight Distance

(a) Whenever a proposed street intersects an existing or proposed street of higher order, the street of lower order shall be made a stop controlled street, unless alternate intersection control is used as allowed by this subsection.

(b) Stop controlled streets shall be designed to provide intersection sight distance as specified in this subsection, Table A-2, and Figure A-6.

(c) The entire area of the intersection sight triangles shown in Figure A-6 shall be designed to provide a clear view from point A at 3.5 feet above the roadway to all points 3.5 feet above the roadway along the lane centerlines from point B to point C and point D to point E.

(d) Sight distances less than the recommended shall only be used when there are topographical or other physical constraints outside of the applicant's control.

(e) The minimum sight distances listed in Table A-2 are for a passenger car to turn onto a two-lane undivided street and minor road approach grades of 3 percent or less. For other conditions, the minimum sight distance should be calculated by the applicant's engineer according to *A Policy on Geometric Design of Highways and Streets* (AASHTO).

(f) Sight distances less than the minimum, where no other options exist, will require alternate intersection control or warning signs as determined by the applicant's engineer and approved by DPW.

(g) Intersection sight triangles shall be located in their entirety within ROW or a sight distance maintenance easement.

(h) Yield controlled intersections shall conform to sight distance requirements according to *A Policy on Geometric Design of Highways and Streets* (AASHTO).

(i) Intersections with state or other municipal ROW are subject to their respective requirements and review.

Table A-2: Recommended and Minimum Intersection Sight Distance

Design Speed or Posted Speed Limit (whichever is greater)	S_d Recommended	S_d Minimum
MPH	ft	ft
25	370	280
30	450	335
35	580	390
40	750	445
45	950	500
50	1180	555
55	1450	610
60	1750	665
65	2100	720

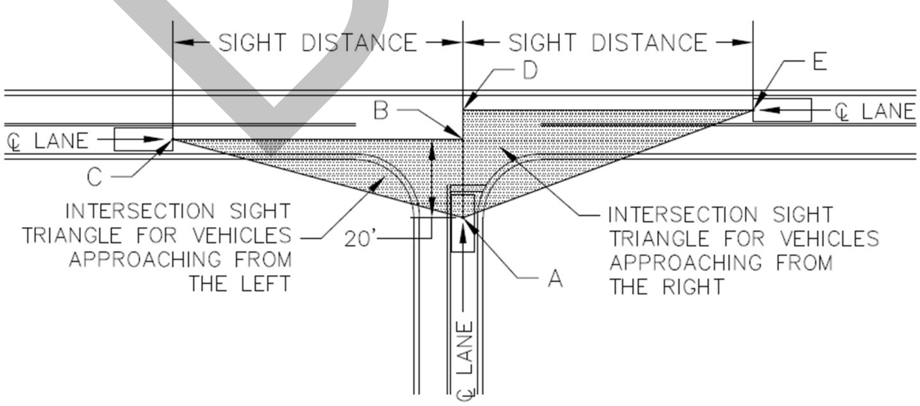


Figure A-6: Intersection Sight Distance

A09.2 Intersection Spacing

(a) Minimum centerline to centerline distance between intersections on the same side or opposing sides of the through street shall be:
   (1) 155 feet on Residential streets;
   (2) 200 feet on Residential Subcollector streets;
   (3) 300 feet on Residential Collectors and Minor Collectors; or
   (4) 650 feet on higher order streets where other access standards do not exist.

(b) If the above spacing along the through street cannot be met, intersections shall be aligned directly across from each other. Intersections on opposing sides of the through street may be offset up to 30 feet, with a preference for a left-right offset, as shown in Figure A-7.

(c) Where pre-existing conditions do not allow for the above spacing and no other legal access exists, alternate spacing or offset most closely meeting (a) or (b) above may be allowed.

(d) Additional intersections should be avoided within the functional area of major intersections with turning bays and approach tapers. Exceptions require DPW approval based upon constraints and no other feasible alternatives.

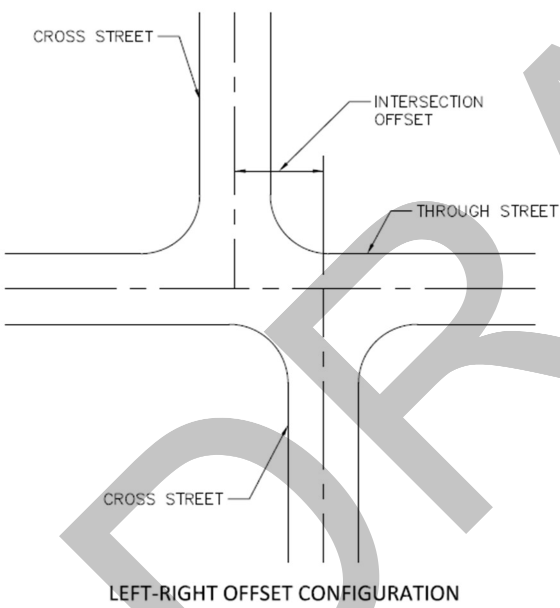


Figure A-7: Intersection Offset

A09.3 Minimum Intersection Angle

Streets should intersect with a straight segment at an angle as close to 90° as possible, but no less than 70°, for a minimum of 75 feet from the intersection point, as shown in Figure A-8.

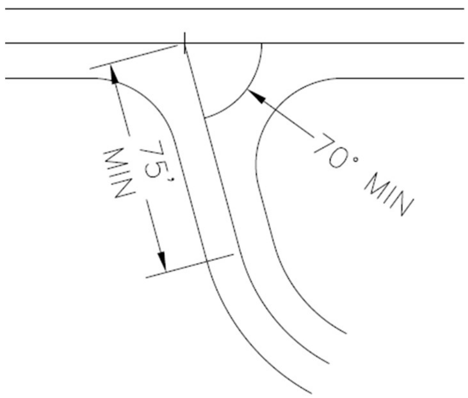


Figure A-8: Intersection Angle

A09.4 Landing

Controlled streets shall be provided with a typical 30-foot landing, conforming to Figure A-9, at its approach to a through street. The landing shall be sloped to match the crown of the through street. Vertical curves shall not be located in the landing to the extent feasible. Where a negative slope away from the through street is not feasible due to topographical constraints, the road shall be constructed in a manner that prevents water from flowing onto the through street.

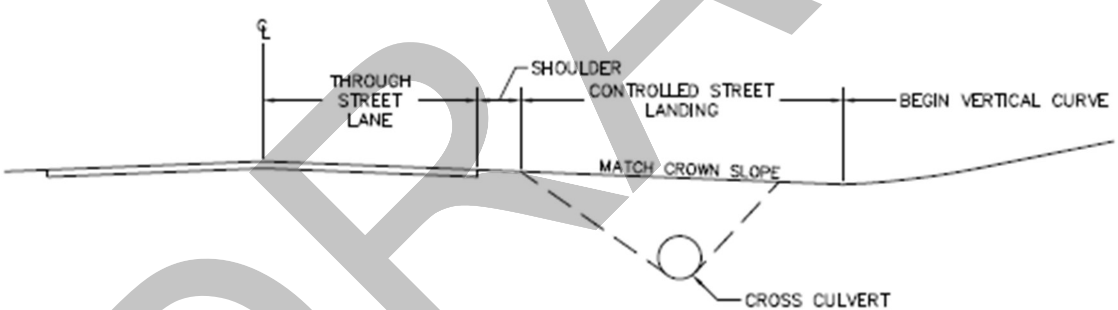


Figure A-9: Controlled Street Landing Profile

A09.5 Paved Apron

A proposed street which intersects an existing paved street shall be provided with a paved apron 40 feet from the edge of the existing pavement.

A10 Driveways

Driveways are not usually required to be constructed within the ROW at time of road construction. However, if an applicant chooses to construct driveways, driveway permits are required. The applicant may permit all driveways with one application. A driveway permit application can be obtained from the MSB Permit Center. Driveways onto state or other municipal ROW are subject to their respective requirements and review.

A11 Trailhead

Trailhead parking lot layout shall conform to applicable local, state, and federal requirements.

A12 Bicycle and Pedestrian Paths

Bicycle and pedestrian paths constructed within public ROW shall conform to the current edition of *Guide for the Development of Bicycle Facilities* (AASHTO), and any other applicable local, state, and federal requirements.

A13 Signage

Signs shall be provided and installed by the applicant in conformance with the latest edition of the *Alaska Traffic Manual* (ADOT&PF) and the *Alaska Sign Design Specifications* (ADOT&PF) prior to plat recordation.

(a) Each street within a subdivision shall be identified and signed at its point of egress and ingress. Cul-de-sac streets will be signed and identified at their point of ingress
(b) Intersection control signs shall be provided at designated intersections within the confines of the subdivision and at the intersection with the access road, if applicable.
(c) Intersection control signs shall be located such that they are visible to approaching traffic and near corresponding stop or yield bars.
(d) Speed limit signs shall be provided at entrances to the subdivision, where the speed limit changes, and at a minimum of one-mile intervals throughout the subdivision.
(e) If a constructed stub street provides access to two or fewer lots and has no turnarounds a sign indicating a dead-end street shall be posted.
(f) If a dedicated stub street is not constructed, no signs are required.
(g) Install signs according to the criteria in Figure A-10, Figure A-11, and Figure A-12.
(h) Signs within state or other municipal ROW are subject to their respective requirements and review.

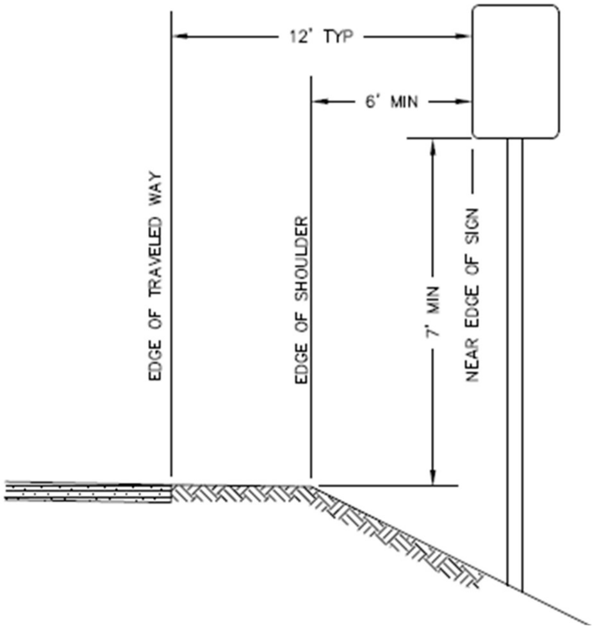


Figure A-10: Sign Placement

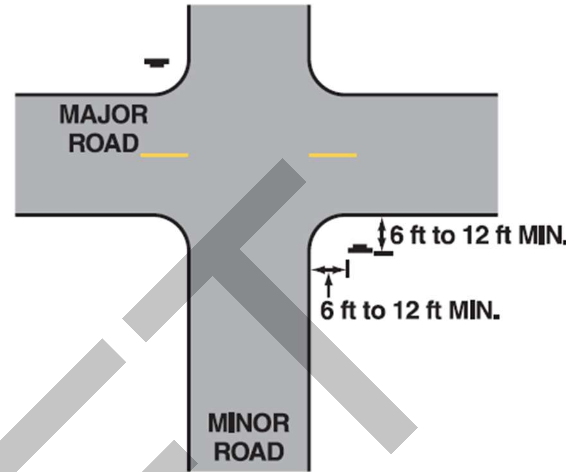
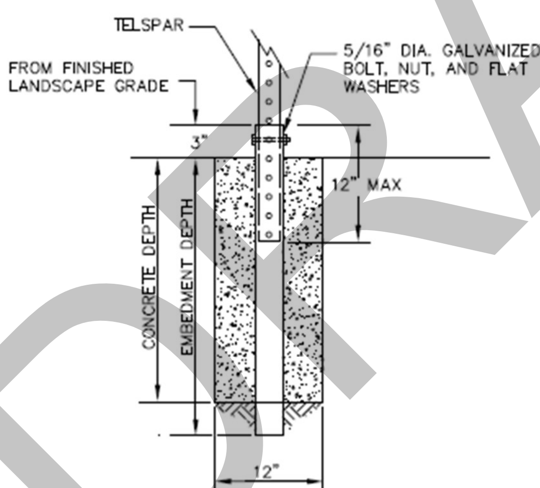


Figure A-11: Stop Sign Location



PERFORATED STEEL TUBES (P.S.T.) (12ga. – .105" Wall Thickness)			
SIGN SURFACE AREA SQ. FT.	POST SIZE	EMBEDMENT DEPTH	CONCRETE DEPTH
7' OR LESS	2" X 2"	27"	24"
GREATER THAN 7'	2 ½" X 2 ½"	33"	30"

Figure A-12: Concrete Foundation for Sign Post

A14 Railroad Crossings

All access requiring a crossing of the Alaska Railroad shall be subject to the *Alaska Policy on Railroad/Highway Crossings* (Alaska Railroad).

A15 Average Daily Traffic

(a) The following formula shall be used to determine the required classification of streets: ADT = Number of lots x 10 for single-family residential use.
(b) See Section G for other land uses.
(c) For subdivisions of five or more lots, submit potential ADT calculations for the following locations with the preliminary plat:
  (1) at each intersection within the subdivision,
  (2) at each intersection en route to an existing Residential Collector street or higher classification, and
  (3) at an existing Residential Collector street or higher classification.

A16 Design Deviations

Design deviations will be considered to address extenuating circumstances including but not limited to: existing substandard ROW, environmental conditions, or existing utilities or other structures. Design deviation requests shall be in writing and contain supporting information, justification, and suggested solutions. Design deviations may be allowed by DPW only for matters that do not fall under the jurisdiction of a Board or Commission. In no circumstances will a roadway width less than 20 feet or foreslopes steeper than 2:1 be allowed. Residential Collector streets shall be no less than 24 feet wide.

Section B. Major Road Corridors

B01 General

Major road corridors include major collectors, arterials, and interstates. This section provides references to and guidelines for the design and construction of major road corridors within the MSB.

B02 Right-of-way and Surface Widths

Table B-1: ROW and Surface Widths

Classification	Minimum ROW Width (ft)	Standard Lane Width (ft)	Number of Lanes	Shoulder Width (ft)
Major Collector	80	12	2 – 3	4
Arterial	100	12	3 – 4	4 – 8
Interstate	200	12	4 – 6	12

B03 Frontage, Backage, and Connector Street Standards

Subdivisions adjacent to planned or existing major road corridors shall plan for future frontage or backage streets when any of the following conditions apply, unless it is shown by the applicant to be not necessary or feasible for future development and public safety with no written objection from the road authority.

(a) Subdivisions accessing roads that are classified by ADOT&PF as Interstates.
(b) Subdivisions accessing roads that are or are projected to grow above 20,000 vehicles per day (VPD).
(c) Subdivisions accessing roads that are or are projected to have four or more lanes or median control per the LRTP or Official Streets and Highways Plan (OSHP).
(d) Subdivisions that require a second access route.
(e) To gain access to an existing or planned signal.
(f) Where access to a minor arterial or collector as a connector road is feasible.
(g) When there are existing or platted frontage or backage routes adjacent to the property.

B03.1 Separation Distances

Minimum ROW to ROW separation distance between major corridors and frontage or backage streets shall be:

(a) 0 feet for locations with no connector street to the major road corridor;
(b) 100 feet for locations with a connector street to the major road corridor that lie between section lines and planned or existing intersections with other major road corridors;
(c) 300 feet for locations where the connector street to the major road corridor is on a section line or planned or existing major road corridor.

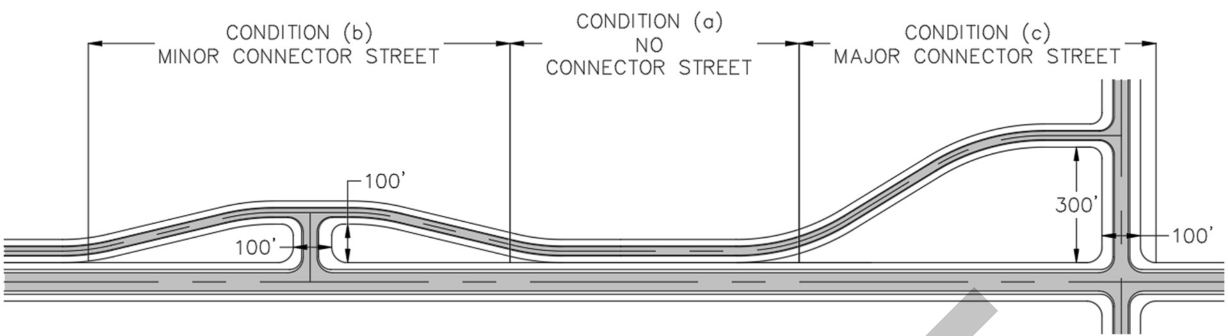


Figure B-1: Frontage Street Configurations

B03.2 Design Standards

(a) Frontage streets

(1) Minimum centerline radii may be reduced near intersections with through connector streets.

(b) Connector streets

(1) 100-foot ROW width desirable.

(2) Minimum 40-foot radius curve returns at the major road corridor.

(3) Minimum 4-foot wide shoulders for 100 feet from the edge of roadway of the major road corridor.

(4) Minimal direct access.

B03.3 Dedication and Setbacks

Dedicate ROW or additional building setbacks to allow for the frontage, backage, and connector street standards in this manual. The applicant shall submit design information sufficient to demonstrate that frontage, backage, and connector street dedications or building setbacks are in a practical location where road construction is feasible in accordance with this manual. The applicant shall be required to submit plan, profile, and cross-sections for the sections of road where existing grades along the proposed route exceed 10 percent, existing cross slopes exceed 15 percent, or if existing utilities or other physical features appear to create impediments to a road design meeting standards of this manual. Road plan and profile shall extend at least 300 linear feet on either side of the subject sections or to intersecting or adjacent ROW within 500 linear feet.

B04 Access Standards

(a) The average access point spacing on major road corridors, where other access standards do not exist, shall not exceed the minimums listed in Table B-2, based on the posted speed limit. Average access point spacing is calculated per segment and is equal to the segment length divided by the number of access points on both sides of the street. Undeveloped lots with only access to the major road corridor are counted as having at least one access point.

(b) When the average access point spacing on a segment of an existing major road corridor is less than the minimum listed in Table B-2, the average access point spacing shall not decrease due to the subdivision.

Table B-2: Average Access Point Spacing

Posted Speed Limit (mph)	Minimum Average Access Point Spacing (feet)
30	250
35	300
40	360
45	425
50	495
55	570

B05 Future Corridors

Subdivisions shall be designed in a manner that does not conflict with the LRTP or the OSHP. Subdivisions containing future road corridors identified in the LRTP or OSHP are encouraged to include the future road corridor as part of the road layout of the subdivision.

Building setbacks prohibiting the location of any permanent structure within the future corridor may be voluntarily designated on the final plat. The area within the future road corridor shall be excluded from usable septic area calculations. The area within the future road corridor and building setbacks shall be excluded from usable building calculations.

B06 References

The following publications shall be used for design and construction standards of these classes of streets that are not otherwise established herein:

(a) *A Policy on Geometric Design of Highways and Streets*, AASHTO (current edition).
(b) *Standard Specifications for Highway Construction*, ADOT&PF (current edition);
(c) *Standard Modifications to the ADOT&PF Standard Specifications for Highway Construction*, MSB (latest revision)
(d) *Alaska Highway Preconstruction Manual*, ADOT&PF (latest revision)

Section C. Construction Requirements

C01 General

This section establishes minimum construction requirements. Prior to any ground disturbing activities, call the Alaska Dig Line for utility locates in accordance with AS 42.30.400.

C02 Road Construction

C02.1 Clearing

Cut and dispose of all trees, down timber, stumps, brush, bushes, and debris. Cut trees and brush to a height of not more than 6 inches above the surrounding ground. Clear the ROW, slope easements, and sight distance triangles. Where ROW exceeds 60 feet, clear a minimum of 60 feet. Clear utility easements, if used, for utilities constructed with the development.

C02.2 Grubbing

Remove and dispose of all stumps, roots, moss, grass, turf, debris, or other deleterious material within the fill and cut catch limits of the road plus 5 feet on each side, within the ROW, and cleared utility easements for underground utilities.

C02.3 Disposal

Dispose of clearing and grubbing debris in an area designated by the applicant outside of all ROW, platted utility easements, and platted private road corridors. Organic debris 3 inches in diameter by 8 inches long, or smaller, may be left in place, outside of the road prism.

C02.4 Slit Trenches

Slit trenches are not allowed in the ROW. Utility easements may be used as a borrow source above a 2:1 extension of the road prism, as shown in Figure A-3. Topsoil or other organic non-deleterious material may be disposed within the utility easement. Compact the disposal area with heavy equipment and grade the surface with positive drainage no steeper than 4:1 and no lower than the ditch line. Submit an as-built drawing showing the horizontal locations of borrow extraction along the road corridor with the Final Report.

C02.5 Embankment Construction

(a) Construct the road with the required structural section, see Figure C-1, and dimensions, see Table A-1 and Figure A-3, as determined by its classification.

(b) Prepare the subgrade. Remove all organics from the area below the road prism and dispose in locations where embankment is not proposed. Bench existing slopes that are steeper than 4:1, measured at a right angle to the roadway, where roadway embankment is to be placed.

(c) Place material meeting, or verify in-situ material meets, the requirements for Subbase specified in subsection C07 to a minimum depth of 20 inches with the upper 6 inches having no material with a diameter larger than 6 inches. Place embankment in horizontal layers, as directed by the engineer, for the full width of the embankment and compact as specified before the next lift is placed.

(d) Place 4 inches of Surface Course meeting the requirements specified in subsection C07. Finish with a 3 percent crown, and compact as specified.

(e) For Residential and Residential Subcollector standard roads, compact all embankment to not less than 90 percent of the maximum dry density at the optimum moisture content and the top 24 inches to not less than 95 percent of the maximum dry density at the optimum moisture content. For Residential Collector standard roads, compact all embankment to not less than 95 percent of the maximum dry density at the optimum moisture content.

(f) Optimum moisture and maximum dry density will be determined by Alaska Test Method (ATM) 207 and ATM 212 or alternative methods approved by DPW.

(g) In-place density shall be determined by ATM 213 or alternative method approved by DPW. Compaction tests on the Subbase layer shall be taken at representative locations along the roadways as follows:
   (1) a minimum of three;
   (2) at least one per segment;
   (3) one additional test per 1000 linear feet, or portion thereof, when the combined length of roadway exceeds 1000 linear feet;
   (4) at least one out of every three within three feet of the shoulder, and the remainder in the center of a driving lane.

(h) For paved roadways, substitute Surface Course with a minimum of 2 inches of Base Course and 2 inches of HMA Type II, Class B, for Residential and Residential Subcollector streets, and a minimum of 3 inches of Base Course and 3 inches of HMA Type II, Class B, for Residential Collector Streets. Pavement shall meet MSB Special Provision Section 401 Hot Mix Asphalt Pavement. The width of the pavement shall be equal to two lane widths plus the shared paved shoulder width, if used, and finished with a 2 percent crown. Pavement edges shall be backed with additional Base Course graded and compacted flush with the pavement surface and tapered to the edge of the roadway. The pavement shall be washed or swept immediately following shouldering work.

(i) Remove all loose material exceeding 6 inches in diameter from the ditches and foreslopes. Where slopes are 3:1 or steeper and longer than 10 feet measured along the slope face, trackwalk perpendicular to the slope, or the equivalent, to form 1-inch wide grooves parallel to the road no more than 12 inches apart.

(j) Permanently stabilize backslopes 3:1 or steeper. Stabilization can be part of a subdivision agreement. Stabilization may be allowed to establish during the warranty period.

C02.6 Unsuitable Subgrades

When structurally unsuitable material such as peat, saturated material, or permafrost are present within the ROW, provide an appropriate structural design for approval by DPW, according to Section F, prior to construction. Place embankment to a depth that will produce a stable road surface with a final grade 18 inches above the surrounding ground.

C03 Roads Outside of a Road Service Area

Roads outside of a Road Service Area are not subject to the requirement for Surface Course.

C04 Pioneer Road Construction Requirements

Pioneer roads, whether proposed or existing, shall meet the requirements of Figure C-1, Table A-1, and Figure A-3. Place material meeting, or verify in-situ material meets, the requirements for Subbase specified in subsection C07 to a minimum depth of 12 inches. Additional road embankment may be required to provide a stable road surface. Surface Course is not required. Pioneer roads may be constructed offset from the centerline of the ROW to facilitate future expansion of the road. Cross drainage culverts, minimum 18 inch diameter, will be installed where determined necessary and 24 inch ditches will be provided for drainage.

C05 Winter Construction

Winter construction may be allowed. DPW will not accept any roads until all ground has thawed and any settlement areas corrected.

C06 Alternate Methods and Materials

Use of alternate materials and road construction methods that will more appropriately fit the conditions of the specific road locations, following general engineering practices, may be proposed by the applicant or their engineer in writing. Final acceptance of such plans must be approved by DPW.

C07 Materials

C07.1 Subbase

(a) Is aggregate containing no muck, frozen material, roots, sod, or other deleterious matter;
(b) has a plasticity index not greater than 6 as tested by ATM 204 and ATM 205; and
(c) meets the requirements of Table C-2, as determined by ATM 304.

C07.2 Base Course

(a) Crushed stone or crushed gravel, consisting of sound, rough, durable pebbles or rock fragments of uniform quality;
(b) free from clay balls, vegetable matter, or other deleterious matters;
(c) meets the requirements of Table C-1; and
(d) meets the requirements of Table C-2, as determined by ATM 304.

C07.3 Surface Course

(a) Is a screened or crushed gravel, consisting of sound, rough, durable pebbles or rock fragments of uniform quality;
(b) free from clay balls, vegetable matter, or other deleterious matters; and
(c) meets the requirements of Table C-2, as determined by ATM 304.

Table C-1: Aggregate Quality Properties for Base Course

Property	Test Method	Base Course
L.A. Wear, %	AASHTO T 96	50, max
Degradation Value	ATM 313	45, min
Fracture, %	ATM 305	70, min
Plastic Index	ATM 205	6, max
Sodium Sulfate Loss, %	AASHTO T 104	9, max (5 cycles)

Table C-2: Aggregate Gradations

Sieve Designation	Subbase	Base Course	Surface Course
1 1/2 inch			100
1 inch		100	
3/4 inch		70 to 100	70 to 100
3/8 inch		50 to 80	50 to 85
No. 4	20 to 60	35 to 65	35 to 75
No. 8		20 to 50	20 to 60
No. 50		6 to 30	15 to 30
No. 200	0 to 10	0 to 6	7 to 13

(Percent Passing By Weight)

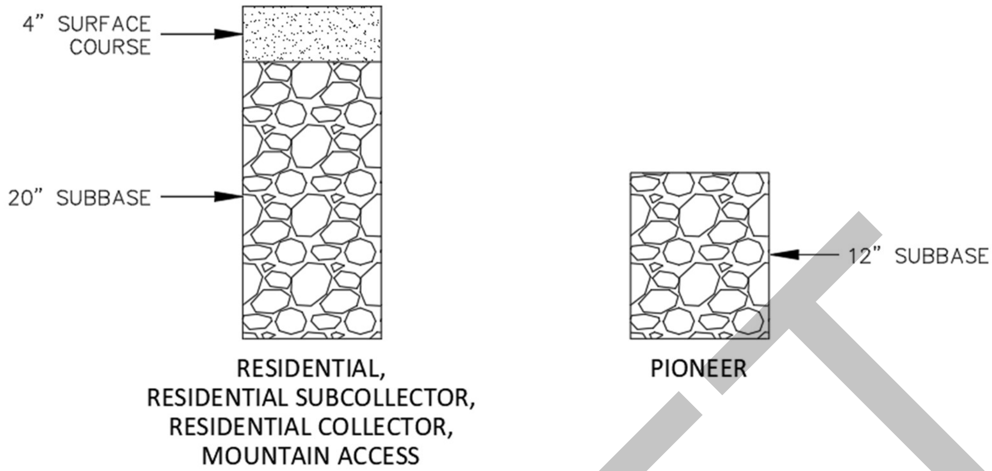


Figure C-1: Structural Sections for Gravel Roads

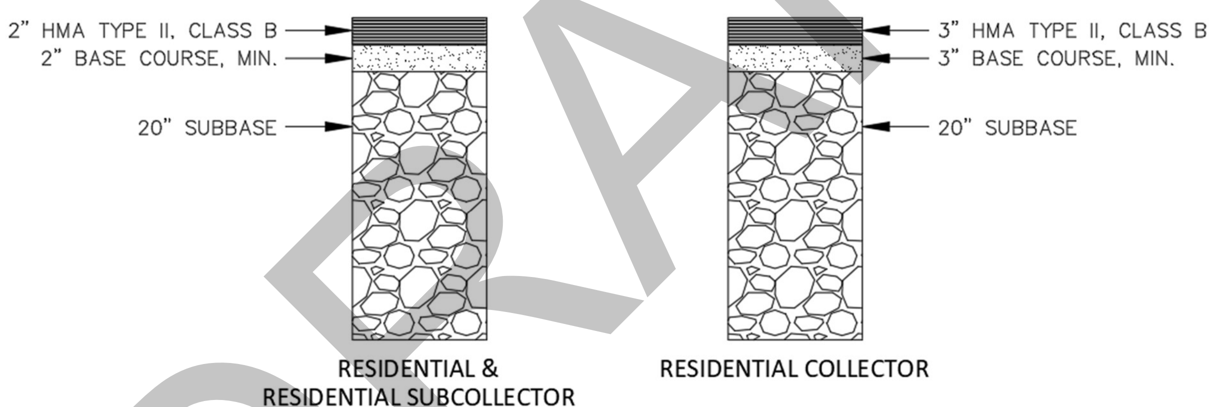


Figure C-2: Structural Sections for Paved Roads

Section D. Drainage

D01 General

The purpose of this section is to ensure that stormwater management is provided with land development activities. Responsible stormwater management is the treatment, retention, detention, infiltration, and conveyance of stormwater and other surface waters without adversely impacting adjoining, nearby, or downstream properties and receiving waters.

D02 Requirements

A preliminary drainage plan is required when road construction or disturbing land to create useable area for a subdivision is proposed. A drainage report is required for projects that include road construction, disturb 10,000 square feet of land or more, fill in wetlands, disturb land within 100 feet of the ordinary high water mark (OHWM) of a water body, disturb land within a mapped flood hazard area, or change the location, direction, quantity, or type of runoff leaving a site. See subsection D06 for specific requirements regarding fish passage culverts. It is the applicant's responsibility to comply with all other applicable federal, state, and local codes and regulations.

D02.1 Preliminary Drainage Plan

Submit a preliminary drainage plan, prepared by an engineer or other qualified professional registered in the State of Alaska, with the preliminary plat or ROW construction permit application. The preliminary drainage plan shall show the project site at a legible scale plottable on 11" by 17" paper or larger and depict the following:

(a) Existing and proposed property lines, plottable easements disclosed in the title report, the OHWM of water bodies with 100-foot upland offset, and existing mapped flood hazard areas.
(b) Existing topography with horizontal and vertical accuracy meeting US National Map Accuracy standards, with 5-foot contour intervals if the ground slope is less than 10 percent and 10-foot contour intervals if the ground slope is greater than 10 percent.
(c) Existing features that convey or retain drainage, including but not limited to: water bodies, wetlands, natural valleys, swales, ditches, check dams, culverts, and pipe systems.
(d) Proposed drainage pattern and features, both constructed and natural, on site. Identify conveyance types, flow directions, and any drainage changes that may affect adjacent property.
(e) Proposed stream crossings and anticipated culvert sizes. Identify fish-bearing streams.

D02.2 Drainage Report

Submit a drainage report, prepared by an engineer or other qualified professional registered in the State of Alaska, as part of the construction plan submittal in subsection F01.2. The drainage report shall include the following:

(a) The drainage plan as specified in D02.1 (may be shown on two plans for clarity), updated to include:

(1) Pre-development and post-development catchment area boundaries determined using 2-foot contour intervals; and
(2) Locations of peak flow, peak velocity, and where runoff leaves the project site.

(b) Description of methods, assumptions, and data sources used or made, including but not limited to:
(1) Rainfall data from the NOAA-14 Precipitation Frequency Data Server.
(2) Assumed post-development land cover conditions.
(3) Method used to determine runoff quantities, time of concentration, peak flows, etc.

(c) Catchment area maps used or created to evaluate down-gradient conditions.

(d) Identify design elements, with supporting runoff calculations, necessary to show compliance with the drainage design criteria set forth in D03.

(e) Fish passage culvert plans, if applicable.

D03 Drainage Design Criteria

(a) Design a drainage system for the project site to meet the criteria listed in Table D-1.

(b) Retain natural drainage patterns to the extent possible.

(c) Changes to drainage patterns must not adversely affect adjacent property or ROW.

(d) Base the size and capacity of the drainage system on runoff volumes and flow rates assuming full development of the subdivision and a 10 percent increase to runoff from the catchment area.

(e) Drainage easements are required where the ROW is not sufficient to accommodate drainage needs. See subsection E01.2.

(f) Where drainage easements overlap utility easements:
(1) Above ground drainage facilities, such as retention and detention basins, may be located in new utility easements only in a manner that will not interfere with utilities. See subsection H02.
(2) Above ground drainage facilities located within existing utility easements require a letter of non-objection from affected utilities.
(3) Culverts crossing utility easements require a letter of non-objection from affected utilities.
(4) Underground drainage facilities such as infiltration trenches and vertical inlets shall not be located in utility easements.

(g) Drainage to state or other municipal ROW are subject to their respective requirements and review.

Table D-1: Drainage Sizing and Analysis Criteria

Design Requirement	Purpose	Criteria
Conveyance	Size conveyances to pass design peak flows.	Drainage ditches: 10-year, 24-hour Non-regulated streams: 10-year, 24-hour Regulated streams: 100-year, 24-hour
Wetlands	Retain function of original wetlands	Preserve the pre-development function of wetlands. For jurisdictional wetland areas, comply with United States Army Corps of Engineers wetlands development retention requirements.
Water Quality	Treat first flush pollutant loading	Treat runoff generated by 0.50 inch of rainfall in a 24-hour period.
Erosion and Sedimentation Control	Ensure channel stability for all project conveyances	Control flows in conveyance channels so that transport of particles sized D50 and greater will not occur for the post-development peak flow.
Extended Detention	Protect streams and channels from damage from smaller, more frequent storm flows	Provide 12 to 24 hours of detention for the post-development project runoff in excess of pre-development runoff volume for the 1-year, 24-hour storm.
Flood Hazard	Control peak flow to minimize downstream impacts	Option 1 Maintain the post-development project runoff peak flows from the 10-year, 24-hour storm to less than or equal to pre-development runoff peak flow at all project discharge points. Option 2 Maintain the post-development project runoff peak flows to less than 1.10 times pre-development runoff peak flow at all project discharge points. Evaluate downstream until the project site area is less than 10% of the total upstream basin area and mitigate adverse impacts.
Flood Bypass	Prevent an increased risk of flood damage from large storm events.	Compute post-development peak flow and delineate an unobstructed, overland flow path for runoff to overtop or bypass project conveyance routes for the post-development 100-year, 24-hour storm.

D04 Drainage Ditches

Stabilize ditches with gravel, turf, or rock riprap. See Table D-2 and Table D-3 for most common conditions and acceptable ditch lining materials. Evaluate channel stability for compliance with the Erosion and Sedimentation Control design requirement in Table D-1 for other conditions.

Normal ditch depth shall be 30 inches and according to the typical section shown in subsection A06. The design peak flow required by Conveyance Design in Table D-1 shall be conveyed within ditches with a minimum freeboard of 12 inches.

The ditch depth may be reduced at local high points of the ditch, provided the flow line offset is maintained and with DPW concurrence. Alternate ditch design along Residential and Residential Subcollector streets may be considered, if evidence is provided that the following conditions exist:

(a) Ditches are a minimum of 18" deep;
(b) The design peak flow required by Table D-1 is demonstrated to be conveyed within ditches with a minimum freeboard of 12 inches;
(c) Adequate drainage routes are provided and constructed within the ROW or designated drainage easements;
(d) Flow lines are established at least 8 feet from the edge of roadway.
(e) Ditches are deepened to provide cross drainage through 24" corrugated metal culverts (18" with DPW approval).
(f) Cross sectional area of ditch is at least 15 square feet.

Table D-2: Ditch Stabilization

Flow	Ditch Slope (ft/ft)										
(cfs)	0.005	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
2.0	A	A	A	A	A	A	A	A	A	A	A
4.0	A	A	A	A	A	A	A	A	B	B	B
6.0	A	A	A	A	A	A	B	B	B	B	B
8.0	A	A	A	A	A	B	B	B	B	B	B
10.0	A	A	A	A	B	B	B	B	B	B	C
20.0	A	A	A	B	B	B	C	C	C	C	C
30.0	A	A	A	B	B	C	C	C	D	D	D
40.0	A	A	B	B	C	C	C	D	D	D	E
50.0	A	A	B	B	C	C	D	D	D	E	E
60.0	A	A	B	C	C	D	D	D	E	E	E
70.0	A	A	B	C	C	D	D	E	E	E	E
80.0	A	B	C	C	C	D	E	E	E	E	E
90.0	A	B	C	C	D	D	E	E	E	E	F
100.0	A	B	C	C	D	D	E	E	E	F	F

Table D-3: Ditch Lining Materials

Type	Material	D50 (in)	Dmax (in)	Dmin (in)	Thickness (in)
A	Native Grass, Turf, or Gravel with < 6% fines				
B	Riprap or Bone Rock	3.0	4.5	1.5	6.0
C	Riprap or Bone Rock	6.0	9.0	3.0	12.0
D	Riprap or Bone Rock	9.0	13.5	4.5	18.0
E	Riprap or Bone Rock	12.0	18.0	6.0	24.0

D05 Culverts

D05.1 General Culvert Design Criteria

The following criteria apply to all cross road culverts for runoff or seasonal drainage:

(a) The minimum culvert slope is 0.5 percent.
(b) Culverts longer than 100 feet require appropriate maintenance access and DPW approval
(c) Cross road culverts shall have a minimum diameter of 18 inches.
(d) Culverts shall be sized to convey the design peak flow required by Table D-1, based on the larger of the two computed sizes using inlet control and outlet control.
(e) Culverts shall be corrugated metal pipe (CMP) and minimum:
  (1) 16 gauge galvanized steel on Residential and Residential Subcollector streets;
  (2) 12 gauge galvanized steel on Residential Collector and Minor Collector streets; or
  (3) 16 gauge aluminum or aluminized if needed due to soil or water conditions.
(f) Design and install energy dissipation rock aprons at culvert outlets in accordance with Hydraulic Engineering Circular No. 14 (FHWA).
(g) Install culverts in accordance with the manufacturer's recommendations for the anticipated traffic loads.

D05.2 Stream Crossing Culvert Criteria

The following criteria apply to all stream crossing culverts:

(a) Prior to preliminary plat submittal, contact the Alaska Department of Fish and Game (ADFG), Division of Habitat to determine if a stream reach harbors fish. If so, stream crossing culverts shall be designed, constructed, and maintained according to D06.
(b) Stream crossing culverts shall be placed as close to the pre-existing channel alignment as possible. Avoid placing culverts at pools and stream bends.
(c) Road alignment shall be as close to perpendicular to the stream channel as possible.
(d) Culvert slope shall be within 25 percent of the natural stream slope. For example, if the natural stream slope is 1.0 percent, the minimum design slope of the culvert would be 0.75 percent and the maximum design slope would be 1.25 percent.
(e) Culvert outlet and inlet protection shall be used as necessary to reduce the risk of scour and perching.

(f) Stream crossings shall be composed of a single pipe or arch for the main stream channel.
(g) Overflow culverts may be used but should be placed at a higher elevation so that flows up to the OHWM pass through the primary culvert.
(h) Stream crossings shall maintain the connectivity of wetlands adjacent to stream channels and shall accommodate sheet flow within such wetlands.
(i) Stream crossing culverts shall not interfere with the functioning of floodplains and shall be designed to convey the design peak flow required by Table D-1. If the stream crossing culvert is not designed to accommodate the 100-year flow, a route must be established to safely convey flows exceeding the design peak flow without causing damage to property, endangering human life or public health, or causing significant environmental damage.
(j) In cases of crossings within high entrenchment ratio environments, the ratio of the flood prone width to the OHWM width is greater than 2.2, floodplain overflow culverts may be beneficial to floodplain connectivity and can be used to pass the design flow. Minimum width requirements for the primary culvert still apply.
(k) Stream crossing culverts shall have a minimum diameter of three feet.
(l) Stream crossing culvert pipes and arches shall be metal.
(m) Culverts longer than 100 feet require appropriate maintenance access and DPW approval
(n) Install culverts in accordance with the manufacturer's recommendations for the anticipated traffic loads.

D06 Fish Passage Culverts

These criteria provide general design guidance for road crossings of fish-bearing streams to maintain the full hydrologic functioning of the water body they are crossing. Site-specific conditions, such as multi-thread channels, may require alternate design approaches.

D06.1 Pre-design Conference

Schedule a fish passage pre-design conference with DPW prior to permit submittals. The pre-design conference is to:
(a) determine required permits;
(b) coordinate interagency requirements;
(c) determine any site-specific design requirements; and
(d) establish a plan review process.

D06.2 Stream Simulation Method

Stream simulation methodologies shall be used for the design of all fish-bearing stream crossings. The stream simulation method uses reference data from a representative section, or reference reach, of the specific water body crossed. This method attempts to replicate the natural stream channel conditions found upstream and downstream of the crossing. Sediment transport, flood and debris conveyance, and fish passage are designed to function as they do in the natural channel.

Reference Reach

(a) Select a reference reach on the water body being crossed that is outside any anthropogenic influence, such as an existing culvert. In most cases of new crossings, the reference reach can be at the crossing location.

(b) The length of the reference reach should be a minimum of 20 times the reference bankfull width and no less than 200 feet.

(c) If there is not a suitable reference reach on the water body being crossed, a reference reach may be chosen from another water body with similar geomorphic and hydrologic characteristics. The reference reach characteristics should meet the following criteria in comparison to the water body being crossed:

  (1) The reference reach bankfull width should be at least one half and no more than two times that of the water body being crossed;

  (2) The reference reach bankfull discharge should be at least one half and no more than one and one half times the bankfull discharge of the water body being crossed; and

  (3) The stream order of the reference reach should be within one stream order of the water body being crossed.

(d) For a reference reach from another water body, the geomorphic characteristics of the crossing shall be scaled using ratios of the bankfull conditions.

(e) The reference reach bankfull dimensions should be determined in the field by surveying a detailed cross section at the upper 1/3 of a representative riffle.

(f) Reference data shall include, at a minimum:

  (1) channel width at the OHWM,

  (2) bankfull width,

  (3) bankfull cross-sectional area,

  (4) bankfull slope based on the longitudinal profile,

  (5) substrate, and

  (6) potential for floating debris.

Culvert Size, Slope, and Substrate

In addition to D05.2, the following criteria apply to fish passage culverts:

(a) Under normal flow conditions, the channel within or under the fish passage culvert shall not differ from the reference reach condition in regards to the channel width at the OHWM, cross-sectional area, slope, substrate, and ability to pass floating debris.

(b) The width of fish passage culverts shall not be less than the greater of 1.2 times the channel width at the OHWM and 1.0 times the bankfull width.

(c) Fish passage culverts shall have a minimum diameter of five feet.

(d) The use of smooth wall culverts is prohibited.

(e) The use of trash racks or debris interceptors is prohibited

(f) Round culvert pipes shall have a minimum invert burial depth of 40 percent of the culvert diameter into the substrate. Arch or box culverts shall have a minimum invert burial depth of 20 percent of the culvert's rise into the substrate, unless scour analysis shows less fill is acceptable. The minimum invert burial depth is 1 foot.

(g) The gradation of the substrate material within a fish passage culvert shall be designed to be a dense, well-graded mixture with adequate fines to ensure that the majority of the stream flows on the surface and the minimum water depth is maintained.

(h) Substrate material within or under the fish passage culvert shall remain dynamically stable at all flood discharges up to and including a 50-year flood. Dynamic stability means that substrate material mobilized at higher flows will be replaced by bed material from the natural channel upstream of the crossing. For crossings without an adequate upstream sediment supply, the substrate material within the crossing shall be designed to resist the predicted critical shear forces up to the 100-year flood. For culverts with a slope of 6 percent or greater, substrate retention sills may be required to allow the bed load to continuously recruit within the culvert.

(i) Substrate material within or under the fish passage culvert shall incorporate a low flow channel. The low flow channel should mimic the reference reach where possible. If the low flow channel dimensions are not discernable from the reference reach, the low flow channel should have a cross sectional area of 15 to 30 percent of the bankfull cross sectional area and a minimum depth of 4 inches for juvenile fish and 12 inches for adult fish. The low flow channel should be defined by rock features that will resist critical shear forces up to the 100-year flood.

(j) Constructed streambanks are recommended inside fish passage culverts to protect the culvert from abrasion, provide resting areas for fish, and provide for small mammal crossing. If streambanks are constructed through a crossing, the streambanks shall be constructed of rock substrate designed to be stable at the 100-year flood. The streambank width should be a minimum of 1.5 times the maximum sieve size of the streambed material (D100). The crossing width shall be increased to allow for the channel width plus the streambanks.

(k) If substrate retention sills are used, they shall have a maximum weir height of one half of the culvert invert burial depth. Substrate retention sills shall be spaced so that the maximum drop between weirs is 4 inches. The use of sills without substrate is not allowed.

(l) Other state and federal requirements may apply.

D06.3 Hydraulic Method

Hydraulically designed culverts are discouraged for fish-bearing stream crossings, though may be approved by DPW and ADFG in circumstances where stream simulation is not practical. In addition to D05.2, the following criteria apply to hydraulically designed culverts:

(a) The hydraulic method uses the swimming capability and migration timing of target design species and sizes of fish to create favorable hydraulic conditions throughout the culvert crossing. Information and design software for this methodology is available from ADFG, Division of Sport Fisheries (Fishpass) and the US Forest Service (FishXing).

(b) The design fish shall be a 55-milimeter (2.16-inch) juvenile coho salmon for anadromous streams and a 55-milimeter (2.16-inch) Dolly Varden char for non-anadromous streams. These criteria may change based on ongoing research by federal and state agencies.

(c) Fish passage high flow design discharge will not exceed the 5 percent annual exceedance flow or 0.4 times the 2-year peak flow, whichever is lower and has the most supporting hydrologic data.
(d) Fish passage low-flow design discharge shall ensure a minimum 6-inch water depth or natural low flow and depth within the reach the crossing occurs. In cases where local conditions preclude natural low flow characteristics, backwatering or in-culvert structures should be considered.
(e) In cases where flared end sections with aprons are necessary and fish passage is required, water depths and velocities that satisfy fish passage criteria must be demonstrated across the apron in addition to within the culvert.
(f) Fish passage criteria for culverts crossing tidally-influenced streams must be satisfied 90 percent of the time. Tidally-influenced streams may sometimes be impassable due to insufficient depth at low flow and low tide. If the tidal area immediately downstream of a culvert is impassable for fish at low tide, the exceedance criterion shall apply only to the time during which fish can swim to the culvert.
(g) Other state and federal requirements may apply.

D07 Soil Infiltration Facilities

Soil infiltration may be used to reduce stormwater flow and volume with the following criteria:

(a) Soil infiltration facilities within Borough ROW or drainage easements should be designed such that they are not considered Class V injection wells. See Appendix A for the EPA's memorandum addressing the subject in June 2008.
    (1) Private drainage facilities that are considered Class V injection wells require conformance with EPA regulations.

D08 Rainfall Data

D08.1 Rainfall Distribution

Intensity-Duration-Frequency (IDF) and 24-hour rainfall data are furnished by NOAA Atlas 14 Point Precipitation Frequency Estimates. Use SCS Type-I Rainfall Distribution and 24-hour rainfall depth to compute runoff.

D08.2 Runoff Transformation

Use the Rational Method for estimating peak flows in drainage basins less than 200 acres and with times of concentration less than 20 minutes for design of conveyances. Use NRCS (SCS) Unit Hydrograph Method for estimating runoff volumes and peak flows for other conditions and applications. Other methods more appropriate for site conditions may be utilized upon DPW approval.

Section E. Easements

E01 General

E01.1 Common Access Easements

When a shared driveway is required for two or more lots, a common access easement shall be granted for the exclusive use of the subject lots, unless otherwise accommodated. The common access easement shall be sized to reasonably accommodate separation of the shared driveway to the individual lots.

E01.2 Drainage Easements

Drainage easements are required where the ROW is not sufficient to accommodate drainage needs. Drainage easements can overlap with other platted easements and shall begin or terminate at the ROW. Drainage easements shall be a minimum width of 20 feet, and a minimum average length of 20 feet outside of any overlapping easements or of sufficient size and area shown to facilitate construction and maintenance.

E01.3 Slope Easements

Slope easements are required to contain all cut and fill slopes steeper than 2.5:1 that extend outside of the ROW, plus at least 5 feet outside the cut or fill catches.

E01.4 Sight Distance Maintenance Easements

Sight distance maintenance easements are required where intersection sight triangles extend outside of the ROW.

E01.5 Snow Storage Easements

Snow storage easements are required where the ROW is not sufficient to accommodate anticipated snow removal needs. Snow storage easements shall be located where the storage of snow would not impede sight distance.

E01.6 Utility Easements

Unless lots are otherwise served by alternate utility easements or agreements, at least one 15-foot utility easement adjacent to the ROW is required to allow for utility installation and maintenance. Additional utility easements may be required as deemed reasonably necessary by utility companies to serve the subdivision or protect existing facilities. The applicant is responsible for satisfying any conflicts that may occur in the request for easements from any utility company during the platting process.

Platted utility easements are to be clear of wells, septic systems, structures, or encroachments, as defined by MSB or other applicable code; unless the applicant has obtained an encroachment permit from the MSB and a "Non-Objection to Easement Encroachment" from each utility.

Utility easements are to be fully useable for utility installation where installation equipment can safely work. Whenever possible, utility easements should not be placed in swamps, steep slopes, or other unusable areas.

Section F. Development Implementation

F01 General

This section describes the procedure that is to be followed before constructing any improvements required for recording a subdivision plat. The applicant's engineer shall be the primary point of contact throughout this process.

It is the applicant's responsibility to determine, acquire, and follow permits required by other agencies. Approval from MSB does not supersede other agencies' permit requirements.

F01.1 Preliminary Plat Submittal

The preliminary plat submittal is to be accompanied by:

(a) ADT calculations per A15;
(b) Preliminary drainage plan per D02.1;
(c) Road plan and profile for sections of road where proposed grades exceed 6 percent where cuts and fills exceed 5 feet in height measured from the centerline, or where slope easements will be required, and cross sections at the maximum cut and fill sections. Road plan and profile shall include the vertical curves or grade breaks on either side of the subject sections;
(d) Road plan, profile, and cross-sections if required by B03.3; and
(e) Intersection sight distance evaluation, if requested, according to A09.1.

F01.2 Construction Plans

Submit construction plans to DPW at least seven calendar days before the preconstruction conference. All plan drawing submittals shall be at a scale of 1 inch = 50 feet or more detailed, plottable on 11" by 17" paper. Construction plans shall include the following:

(a) Drainage Report, according to D02.2;
(b) Plan & Profile of proposed roads (if required by F01.1);
    (1) Existing topography with horizontal and vertical accuracy meeting US National Map Accuracy standards, two-foot contour intervals within the proposed road corridors.
(c) Asbuilt survey of visible improvements and above ground utilities within and adjacent to the subdivision;
(d) Copy of agency accepted permit applications required for the improvements prior to construction, including but not limited to ADOT&PF Approach Road Permit, DNR Section Line Easement authorization, MSB Flood Hazard Development permit, and USACE wetland fill permit; and
(e) Plans for any proposed improvements within the ROW that are outside of the scope of this manual (e.g. retaining walls or guard rail) or do not conform to the standards set forth herein, conforming to ADOT&PF design criteria and standards.

F01.3 Preconstruction Conference

The preconstruction conference is for the purpose of reviewing and approving the Subdivision Construction Plan for the required improvements. The engineer may request scheduling of a preconstruction conference with DPW after the preliminary plat has been approved by the Platting Board, the Platting Board Action Letter has been received, and the construction plans have been submitted. Scheduling of preconstruction conference requests may be delayed during the month of October. The applicant, or designated representative, and the engineer must attend the preconstruction conference. In addition to the construction plans, the following items will be provided at or prior to the preconstruction conference:

(a) Cost estimate of required improvements for the determination of the inspection fee according to the most recently adopted Schedule of Rates and Fees;
(b) Proof of compliance with the Alaska Pollutant Discharge Elimination System Program;
  (1) Acceptable proof includes a Notice of Intent (NOI), a Low Erosivity Waiver (LEW), or a determination by a qualified person that neither is needed.
(c) Rough plan and time line for construction;
(d) Copy of any issued permits required for the improvements prior to construction;
(e) Off-site material source and quantities; and
(f) On-site clearing, grubbing, and topsoil disposal plan, location map.

The Subdivision Construction Plan must be signed by the applicant, or designated representative, and the engineer. Upon acceptance of the Subdivision Construction Plan by DPW and payment of the inspection fee, the Platting Division will issue a Notice to Proceed (NTP).

Some construction plans or permit approvals may take longer to develop or obtain, such as fish passage culvert plans and associated permits. Those finalized plans and issued permits may be submitted later but must be received and reviewed by DPW before construction begins within the respective areas.

F01.4 Interim Inspections

The applicant's engineer shall supervise all phases of construction. Notify DPW of changes to the Subdivision Construction Plan, such as adding or deleting a cross culvert, changes in culvert size, adding or deleting a drainage facility, grade changes of more than 1 percent or that would result in grades of over 6 percent or cuts or fills of over 5 feet in height measured from the centerline, or changes to foreslopes or backslopes. The changes should be approved by DPW prior to completion of construction. Periodic interim inspections may be conducted by DPW. Interim inspections may be requested by the engineer.

F01.5 Subdivision Agreements

If a developer wishes to enter into a Subdivision Agreement and the requirements of MSB 43.55.010(A) are met, the engineer shall submit a request to DPW no later than October 15th for an Interim Inspection. The Interim Inspection shall be attended by the engineer and DPW, and a list of remaining improvements and work items will be developed. The engineer shall then submit a request for a

Subdivision Agreement containing the scope of work, quantity estimates, and cost estimate in accordance with MSB 43.55 to Platting and for approval by DPW. DPW will only approve the request for a Subdivision Agreement if all of the minimum required improvements have been inspected by October 31st or before winter conditions prohibit inspection, whichever comes first.

F01.6 Pre-Final Inspection

When the engineer has determined that construction of the improvements will be substantially complete according to the Subdivision Construction Plan, the engineer will request a Pre-Final Inspection. The Pre-Final Inspection request must be received by September 30th and shall include a description of work yet to be completed. The Pre-Final Inspection will be scheduled to occur within 14 calendar days of the request and shall be attended by the engineer and DPW. A punch list will be developed, if any work items remain, at the Pre-Final Inspection.

F01.7 Final Inspection

When construction of the improvements and punch list items are complete according to the Subdivision Construction Plan, the engineer will request a Final Inspection of the improvements. The Final Inspection request must be received by October 15th. Final Inspections will cease October 31st, or when winter conditions prohibit inspection, whichever comes first. The Final Inspection will be scheduled to occur within 14 calendar days of the request and shall be attended by the engineer and DPW.

F01.8 Final Report

Upon DPW approval of the Final Inspection, the engineer shall submit a written Final Report to the Platting Division. The Final Report shall include:

(a) Stamped and signed narrative describing at a minimum:
   (1) road construction process and equipment used,
   (2) material source and disposal areas,
   (3) road embankment and subbase used,
   (4) road topping or pavement used,
   (5) compactive effort,
   (6) road dimensions and shaping (length, roadway width, material thicknesses, pavement width, crown, cul-de-sac or t-turnaround dimensions and slope, foreslope, backslope, maximum centerline grade, etc.) for each road constructed,
   (7) drainage, ditch depth, location of drainage easements, and
   (8) road standard certification (Pioneer Road, Residential Street, etc.) for each road constructed;

(b) Stamped and signed final drainage plan, (minimum 11”x17”);
(c) As-built drawing showing the horizontal locations of borrow extraction along the road corridor;
(d) Documentation verifying Surface Course thickness such as photos and descriptions of test pits, scale tickets, asbuilt surveys, or alternative methods approved by DPW;
(e) Compaction test reports;
(f) Gradation tests, if required; and

(g) Photos of each stage of construction.

DPW will review the report and provide comments, if necessary, within 14 calendar days.

F01.9 Construction Acceptance

Upon approval of the Final Report, DPW will issue a Certificate of Construction Acceptance.

F01.10 Warranty

All improvements are to be guaranteed until October 31st of the calendar year following DPW approval of the Final Inspection. Roads within a Road Service Area may be accepted for maintenance at the end of the warranty. Pioneer Roads are not eligible for maintenance. Maintenance of Mountain Access Roads is at the discretion of DPW.

During the warranty period, the applicant is responsible for any road maintenance including, but not limited to: snow removal, maintaining a smooth road surface and crown, maintaining stabilized foreslopes and backslopes, and maintaining positive drainage. If any deficiencies arise during the warranty, DPW will issue a punch list to the applicant by September 1st to allow time for completion of repairs. The applicant must notify DPW of completion of repairs by October 15th for the roads to be eligible for maintenance on November 1st.

The warranty period for improvements following completion of a subdivision agreement may be lessened to one calendar year. The applicant shall request a punch list from DPW no more than one month before the end of the one-year warranty.

If the subdivision plat has not recorded by April 30th or if warranty repairs are not completed by October 15th, the warranty will be extended an additional year and the warranty process will be repeated.

Maintenance may be denied and the Certificate of Construction Acceptance revoked if deficiencies are not corrected to the satisfaction of DPW. A notice may be recorded indicating to the public that the MSB is not responsible for road upkeep and maintenance until such a time that the deficiencies are corrected.

Section G. Commercial and Industrial Subdivisions

G01 General

Commercial and Industrial subdivisions shall be designed using trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual, and to meet the standards of AASHTO, International Fire Code (IFC), and any other applicable standards or code.

Section H. Utilities

H01 General

These standards apply to the design and construction of utility facilities within the MSB. All utility installation within existing or proposed ROW or utility easements must comply with the provisions of MSB or other applicable code, or as otherwise approved by the permitting authority.

H02 Utility Location Guidelines

H02.1 Underground Utility Facilities:

(a) The location of utility facilities placed within the ROW shall be coordinated with the permitting authority.

(b) Backslopes or foreslopes which extend into a utility easement should not exceed 4:1. These limits are necessary for construction equipment for utility installation.

(c) Utility facilities paralleling the road shall not be located within 10 feet of the roadway, unless otherwise approved by the permitting authority.

(d) Underground road crossings shall be buried a minimum of 48 inches below finished grade. Backfill shall be compacted according to the requirements of Section C, or as otherwise approved by the permitting authority.

(e) Conduit road crossings, if used, shall be installed in accordance with each utility company's standards and applicable code.

(f) Standard burial depth of longitudinal utilities is 36 inches below grade. The applicant should delineate areas, such as where driveways and drainage easements are planned, where deeper burial may be needed.

H02.2 Above Ground Utility Facilities:

(a) Above ground pedestals, poles, and utility facilities shall not be located within 10 feet of the roadway, unless an alternate design meets clear zone requirements.

(b) Above ground pedestals, poles, and utility facilities shall not be located such that they substantially block intersection or driveway sight triangles.

(c) Unless otherwise authorized by the permitting authority, above ground pedestals, poles, and utility facilities shall not be located within the ROW nearer than 40 feet from the point of intersection of the extension of the property lines at any existing or proposed intersection on Residential Collector streets or higher classification.

(d) Above ground pedestals, poles, and utility facilities shall not be located within a common access easement or drainage easement, within 20 feet of a common access point, or within 10 feet of a roadway cross culvert.

(e) Permanent 5-foot high snow marker poles, grey with white retroreflective sheeting or yellow, shall be installed on all pedestals and vaults.

(f) All guy wires installed within the ROW or utility easements adjacent to, or near to a roadway shall have a minimum 8-foot long yellow delineator installed above the anchor.

(g) Pedestals located within the ROW shall be located within the outer 1 foot of the ROW.

H02.3 Separation of Utilities:

(a) Recommend 5-foot horizontal separation between power poles and buried utilities.
(b) Recommend minimum 1-foot physical separation between all underground utilities.
(c) Separation of storm, sewer, and water utilities shall meet the requirements of the Alaska Department of Environmental Conservation.

References

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Appendix A

Environmental Protection Agency Memorandum - Class V Injection Wells

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 13 2008

OFFICE OF WATER

MEMORANDUM

SUBJECT: Clarification on which stormwater infiltration practices/technologies have the potential to be regulated as "Class V" wells by the Underground Injection Control Program

TO: Water Division Directors, Regions 1-10

FROM: Linda Boornazian, Director
Water Permits Division (MC 4203M)

Steve Heare, Director
Drinking Water Protection Division (MC 4606M)

Over the past several years stormwater infiltration has become an increasingly effective tool in the management of stormwater runoff. Although primary stormwater management responsibilities within EPA fall under the Clean Water Act (CWA), the infiltration of stormwater is, in some cases, regulated under the Safe Drinking Water Act (SDWA) with the goal of protecting underground sources of drinking water (USDWs). Surface and ground water protection requires effective integration between the overlapping programs. This memorandum is a step forward in that effort and is meant to provide clarification on stormwater implementation and green infrastructure, in particular under the CWA, which is consistent with the requirements of the SDWA's Underground Injection Control (UIC) Program.

In April 2007, EPA entered into a collaborative partnership with four national groups (the Association of State and Interstate Water Pollution Control Administrators, the Low Impact Development Center, the National Association of Clean Water Agencies, and the Natural Resources Defense Council) to promote green infrastructure as a cost-effective, sustainable, and environmentally friendly approach to stormwater management. The primary goals of this collaborative effort are to reduce runoff volumes and sewer overflow events through the use of green infrastructure wet weather management practices.

Within the context of this collaborative partnership, green infrastructure includes a suite of management practices that use soils and vegetation for infiltration, treatment, and evapotranspiration of stormwater. Rain gardens, vegetated swales, riparian buffers and porous pavements are all common examples of green infrastructure techniques that capture and treat stormwater runoff close to its source. Green infrastructure management practices typically do not include commercially manufactured or proprietary infiltration devices or other infiltration practices such as simple drywells, which do not provide for pre-treatment prior to infiltration.

The partnership is promoting green infrastructure as an effective approach to stormwater management because these practices are associated with a number of environmental benefits. In addition to reducing and delaying runoff volumes, green infrastructure approaches can also reduce pollutant levels in stormwater, enhance ground water recharge, protect surface water from stormwater runoff, increase carbon sequestration, mitigate urban heat islands, and increase wildlife habitat.

Given the multiple benefits that green infrastructure can provide, EPA and its partners have increased efforts to incorporate green infrastructure techniques into stormwater management strategies nationwide. In recent years, public support for these practices has gradually increased. For more information on green infrastructure, please visit www.epa.gov/npdes/greeninfrastructure.

There are cases where stormwater infiltration practices are regulated as Class V wells under the UIC program, and State and local stormwater managers report that some developers are hesitant to incorporate green infrastructure practices because they fear regulatory approvals will slow the process and increase costs. EPA believes those fears are unfounded and notes that most green infrastructure practices do not meet the Class V well definition and can be installed without regulatory oversight by the UIC Program. However, EPA remains committed to the protection of USDWs and emphasizes the need for UIC program compliance (per 40 CFR 144).

To provide clarification on which stormwater infiltration techniques meet EPA's UIC Class V well definition, EPA's Office of Water has developed the attached "Class V Well Identification Guide." State or Regional stormwater and nonpoint source control programs, developers, and other interested parties are requested to contact the State or Regional UIC Program Director with primary authority for the UIC Class V program when considering the use of practices that have been identified, or potentially identified, as Class V wells. UIC program managers should consider the proximity to sensitive ground water areas when looking at the suitability of stormwater infiltration practices. Depending on local conditions, infiltration without pretreatment may not be appropriate in areas where ground waters are a source of drinking water or other areas identified by federal, state, or local governments as sensitive ground water areas, such as aquifers overlain with thin, porous soils.

Please share this memo and the attached guide with your State and Regional stormwater, nonpoint source control, UIC and other ground water managers, as well as with appropriate green infrastructure contacts. These programs are encouraged to coordinate on stormwater management efforts when sensitive ground water issues arise.

Attachment

Underground Injection Control (UIC) Program Class V Well Identification Guide

This reference guide can be used to determine which stormwater infiltration practices/technologies have the potential to be regulated as “Class V” wells. Class V wells are wells that are not included in Classes I through IV. Typically, Class V wells are shallow wells used to place a variety of fluids directly below the land surface. By definition, a well is “any bored, drilled, driven shaft, or dug hole that is deeper than its widest surface dimension, or an improved sinkhole, or a subsurface fluid distribution system” and an “injection well” is a “well” into which “fluids” are being injected (40 CFR §144.3). Federal regulations (40 CFR §144.83) require all owners/operators of Class V wells to submit information to the appropriate regulatory authorities including the following:

1. Facility name and location
2. Name and address of legal contact
3. Ownership of property
4. Nature and type of injection well(s)
5. Operating status of injection well(s)

For more information on Class V well requirements, please visit http://www.epa.gov/safewater/uic/class5/comply_minrequirements.html. For more information on green infrastructure, please visit http://www.epa.gov/npdes/greeninfrastructure.

The stormwater infiltration practices/technologies in rows A through I below are generally not considered to be wells as defined in 40 CFR §144.3 because typically they are not subsurface fluid distribution systems or holes deeper than their widest surface dimensions. If these practices/technologies are designed in an atypical manner to include subsurface fluid distribution systems and/or holes deeper than their widest surface dimensions, then they may be subject to the Class V UIC regulations. The stormwater infiltration practices/technologies in rows J through K however, depending upon their design and construction probably would be subject to UIC regulations.

	Infiltration Practice/Technology	Description	Is this Practice/Technology Generally Considered a Class V Well?
A	Rain Gardens & Bioretention Areas	Rain gardens and bioretention areas are landscaping features adapted to provide on-site infiltration and treatment of stormwater runoff using soils and vegetation. They are commonly located within small pockets of residential land where surface runoff is directed into shallow, landscaped depressions; or in landscaped areas around buildings; or, in more urbanized settings, to parking lot islands and green street applications.	No.
B	Vegetated Swales	Swales (e.g., grassed channels, dry swales, wet swales, or bioswales) are vegetated, open-channel management practices designed specifically to treat and attenuate stormwater runoff. As stormwater runoff flows along these channels, vegetation slows the water to allow sedimentation, filtering through a subsoil matrix, and/or infiltration into the underlying soils.	No.
C	Pocket Wetlands & Stormwater Wetlands	Pocket/Stormwater wetlands are structural practices similar to wet ponds that incorporate wetland plants into the design. As stormwater runoff flows through the wetland, pollutant removal is achieved through settling and biological uptake. Several design variations of the stormwater wetland exist, each design differing in the relative amounts of shallow and deep water, and dry storage above the wetland.	No.
D	Vegetated Landscaping	Self-Explanatory.	No.
E	Vegetated Buffers	Vegetated buffers are areas of natural or established vegetation maintained to protect the water quality of neighboring areas. Buffer zones slow stormwater runoff, provide an area where runoff can infiltrate the soil, contribute to ground water recharge, and filter sediment. Slowing runoff also helps to prevent soil and stream bank erosion.	No

	Infiltration Practice/Technology	Description	Is this Practice/Technology Generally Considered a Class V Well?
F	Tree Boxes & Planter Boxes	Tree boxes and planter boxes are generally found in the right-of-ways alongside city streets. These areas provide permeable areas where stormwater can infiltrate. The sizes of these boxes can vary considerably.	No.
G	Permeable Pavement	Permeable pavement is a porous or pervious pavement surface, often built with an underlying stone reservoir that temporarily stores surface runoff before it infiltrates into the subsoil. Permeable pavement is an environmentally preferable alternative to traditional pavement that allows stormwater to infiltrate into the subsoil. There are various types of permeable surfaces, including permeable asphalt, permeable concrete and even grass or permeable pavers.	No.
H	Reforestation	Reforestation can be used throughout a community to reestablish forested cover on a cleared site, establish a forested buffer to filter pollutants and reduce flood hazards along stream corridors, provide shade and improve aesthetics in neighborhoods or parks, and improve the appearance and pedestrian comfort along roadsides and in parking lots.	No.
I	Downspout Disconnection	A practice where downspouts are redirected from sewer inlets to permeable surfaces where runoff can infiltrate.	In certain circumstances, for example, when downspout runoff is directed towards vegetated/pervious areas or is captured in cisterns or rain-barrels for reuse, these practices generally would not be considered Class V wells.
J	Infiltration Trenches	An infiltration trench is a rock-filled trench designed to receive and infiltrate stormwater runoff. Runoff may or may not pass through one or more pretreatment measures, such as a swale, prior to entering the trench. Within the trench, runoff is stored in the void space between the stones and gradually infiltrates into the soil matrix. There are a number of different design variations.	In certain circumstances, for example, if an infiltration trench is "deeper than its widest surface dimension," or includes an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground, it would probably be considered a Class V injection well.

	Infiltration Practice/Technology	Description	Is this Practice/Technology Generally Considered a Class V Well?
K	Commercially Manufactured Stormwater Infiltration Devices	Includes a variety of pre-cast or pre-built proprietary subsurface detention vaults, chambers or other devices designed to capture and infiltrate stormwater runoff.	These devices are generally considered Class V wells since their designs often meet the Class V definition of subsurface fluid distribution system.
L	Drywells, Seepage Pits, Improved Sinkholes.	Includes any bored, drilled, driven, or dug shaft or naturally occurring hole where stormwater is infiltrated.	These devices are generally considered Class V wells if stormwater is directed to any bored, drilled, driven shaft, or dug hole that is deeper than its widest surface dimension, or has a subsurface fluid distribution system.

2022 Subdivision Construction Manual - Track Change Copy

Matanuska-Susitna Borough
Public Works Department

2022
Subdivision Construction Manual

(Roads, Drainage, and Utilities)

Adopted ~~August 18, 2020~~June 21, 2022

Effective ~~Date January 1, 2021~~June 21, 2022

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Acronyms & Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ADFG	Alaska Department of Fish and Game
ADT	Average Daily Traffic
ADOT&PF	Alaska Department of Transportation and Public Facilities
ATM	Alaska Test Method
cfs	cubic feet per second
CMP	Corrugated metal pipe
DPW	Department of Public Works of the Matanuska-Susitna Borough
FHWA	Federal Highway Administration
ft	feet
h:v	horizontal to vertical
IDF	Intensity-Duration-Frequency
IFC	International Fire Code
in	inches
ITE	Institute of Transportation Engineers
LEW	Low Erosivity Waiver
LRTP	Long Range Transportation Plan
mph	miles per hour
MSB	Matanuska-Susitna Borough
N/A	not applicable
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NTP	notice to proceed
OHWM	ordinary high water mark
OSHP	Official Streets and Highways Plan
PUE	public use easement
ROW	right-of-way
SCS	Soil Conservation Service
VPD	vehicles per day

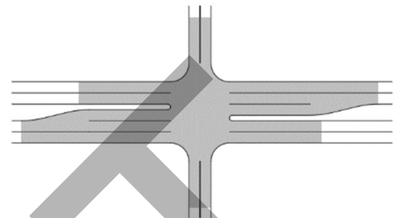
Definitions

Access Point	The location along a road at which a driveway or road intersects.
Arterial	A road that provides a high level of mobility within the transportation network. Arterials have managed access with a minimal number of intersections or interchanges.
Average Daily Traffic	The total number of vehicle trips during a given time period (in whole days greater than one day and less than one year) divided by the number of days in that time period.
Backslope	On a roadway section in a cut, the portion of the roadside that slopes up from the roadside ditch and away from the roadway to the top of the cut, see Figure A-3.
Catchment Area	The total area contributing stormwater runoff to a particular point, site, or structure.
Collector	A road that links local roads with arterials and performs some duties of each. Collectors have managed access with a moderate number of intersections and driveways.
Curve Return	The curve located at the corner of an intersection, connecting the roadway edge of one road to the roadway edge of an intersecting road or driveway.
Detention	The temporary storage of runoff, for later controlled release.
Drainage Pattern	The configuration of a drainage system including manmade and natural features within a catchment area.
Driveway	A vehicular access way between a road and a parking area within a lot or property.
Embankment	Earthen material that is placed and compacted for the purpose of raising the grade of a roadway.
Engineer	An individual who is registered as a Professional Civil Engineer in the State of Alaska.

Feasible Reasonable and capable of being done or carried out.

Foreslope On a roadway section, the portion of the roadside that slopes down and away from the roadway, see Figure A-3.

Functional Area The physical area of an intersection and the area extending both upstream and downstream which includes perception reaction distance, maneuver distance, and storage length.



Intersection The general area where two or more roads join or cross.

Local Road A road that provides access to abutting property, rather than to serve through traffic. Local roads are not access controlled and can have frequent intersections and driveways.

Lot Frontage A property line that abuts the right-of-way that provides access to the lot.

Ordinary High Water Mark The elevation marking the highest water level which has been maintained for a sufficient time to leave evidence upon the landscape. Generally, it is the point where the natural vegetation changes from predominately aquatic to upland species.

Positive Drainage Clear, unobstructed flow of water away from structures and roadways without localized ponding.

Public Use Easement Provides the rights for ingress, egress, roadways, right-of-way, public utilities, and slopes for cuts and fills. The rights are to the public in general, and public utilities governed by permits required under federal, state, and local laws and regulations. May also be known as a public access easement or right-of-way.

Regulated Stream Any watercourse along which the flood hazard areas have been mapped and approved by the Federal Emergency Management Agency; any stream which harbors fish, as determined by the Alaska Department of Fish and Game; or any stream designated as regulated by MSB.

Retention The prevention of runoff. Stormwater, which is retained, remains indefinitely, with the exception of the volume lost to evaporation, plant uptake, or infiltration.

Right-of-way	A strip of land reserved, used, or to be used for a street, alley, walkway, airport, railroad, or other public or private purpose.
Road	A general term denoting a public thoroughfare used, or intended to be used, for passage or travel.
Road Prism	The foundation that supports the roadway; see Figure A-3.
Roadway	The portion of a road that includes driving lanes and shoulders, see Figure A-3.
Segment	A portion of road between two significant intersections or an intersection and its terminus.
Shoulder	The portion of a roadway contiguous to any traveled way for lateral support of surface courses, see Figure A-3.
Street	A general term usually denoting an urban or suburban road.
Stub ~~Road~~	A right-of-way or road segment~~,~~ that is planned to be extended, typically short in length, which terminates at the boundary of a subdivision or masterplan phase.~~or site plan, the purpose of which is to ultimately connect to abutting property when it is developed.~~
T-intersection	A three leg intersection in the form of a "T".
Through Street	A road given preferential right of way; roads which intersect a through street are controlled, such as with a stop sign or yield sign.
Water Body	A permanent or temporary area of standing or flowing water. Water depth is such that water, and not air, is the principal medium in which organisms live. Water bodies include, but are not limited to: lakes, ponds, streams, rivers, sloughs, and all salt water bodies.

Introduction

This manual is intended to accomplish the following goals:

(1) To establish standards for the design and construction of transportation networks throughout the Matanuska-Susitna Borough.
(2) To provide information and guidelines for the design, construction, and upgrade of roads, drainage facilities, and utilities within rights-of-way.
(3) To develop and maintain a safer and more efficient transportation system.
(4) To minimize operation & maintenance efforts.

Section A. Street Design

A01 General

These provisions establish appropriate standards for the design of roads. The purpose of these provisions is to:

(1) promote the safety and convenience of motorized and non-motorized traffic;
(2) promote the safety of neighborhood residents;
(3) minimize the long term costs for maintenance and repair;
(4) protect the residential qualities of neighborhoods by limiting traffic volume, speed, noise, and air pollution;
(5) encourage the efficient use of land; and
(6) minimize the cost of road construction and thereby restrain the rise in housing costs.

A02 Applicability

These standards apply to the design and construction of all subdivision improvements within the Matanuska-Susitna Borough (MSB), with the exception of those streets within cities that exercise road powers by ordinance.

A03 Street Classifications

Roads within the MSB fall within one of the following functional classifications, in accordance with the Long Range Transportation Plan (LRTP): Interstate, Principal Arterial, Minor Arterial, Major Collector, Minor Collector, and Local Road. Functional classification of a road is based on its function, design, and current potential use. The applicant may request review of the functional classification of existing roads abutting or affecting the design of a subdivision or land development during the preapplication process.

This section provides design guidance for roads falling under local road and minor collector functional classifications.

A03.1 Residential Street

Residential streets are local roads intended to carry the least amount of traffic at the lowest speed. The Residential street will provide the safest and most desirable environment for a residential neighborhood. Developments should be designed so that all, or the maximum number possible, of the homes will front on this class of street.

A03.2 Residential Subcollector Street

Residential Subcollector streets are local roads that carry more traffic than Residential streets.

A03.3 Residential Collector Street

Residential Collector streets are the highest order of residential streets and are a type of minor collector. In large residential developments, this class of street may be necessary to carry traffic from one neighborhood to another or from the neighborhood to other areas in the community. Residential Collector streets should provide the fewest direct accesses as possible.

A03.4 Mountain Access Road

Mountain Access Roads may be used in areas where the average cross slope exceeds 15 percent or to traverse terrain features in excess of 25 percent. Maintenance of Mountain Access Roads will be at the discretion of Department of Public Works (DPW). School bus access should be considered as school bus routes require all grades less than 10 percent. Mountain Access Road standards allow for steeper grades and switchbacks, but should otherwise be designed to Residential, Residential Subcollector, or Residential Collector standard as required by this section.

A03.5 Pioneer Road

Pioneer Roads may only be used where allowed by MSB or other applicable code. This classification establishes minimum requirements for roads providing physical access, but should otherwise be designed to Residential, Residential Subcollector, or Residential Collector standard as required by this section. No MSB maintenance will be provided for Pioneer Roads. Pioneer roads may be constructed offset from the centerline of the right-of-way (ROW) to facilitate future expansion of the road.

A03.6 Alleys

Alleys are permitted provided legal and physical access conforms to MSB or other applicable code. No MSB maintenance will be provided for Alleys.

A03.7 Other Street Types

The above classifications may be further typed as one of the following streets. These other street types should be designed to Residential, Residential Subcollector, or Residential Collector standard as required by this section.

(a) Frontage Street – streets parallel and adjacent to a major road corridor which provides access to abutting properties and separation from through traffic. See Section B for additional design standards.
(b) Backage Street – streets that provide access to lots located between the Backage Street and a major road corridor. See Section B for additional design standards.
(c) Connector Street – the portion of a street that connects a frontage or backage street to a major road corridor. See Section B for additional design standards.
(d) Divided Street – streets may be divided for the purpose of accommodating environmental features or avoiding excessive grading. In such a case, the design standards shall be applied to the appropriate street classification and a single lane width with a shoulder on each side.

A04 Access Criteria

A04.1 Residential Street

(a) A Residential street provides access to abutting properties.

(b) The anticipated average daily traffic (ADT) volume on Residential streets shall not exceed 400. A loop street shall be designed such that the anticipated ADT at each terminus of the loop street does not exceed 400, see Figure A-1~~Figure A-1~~.

(c) Residential streets may intersect or take access from an equal or higher classification street. Both ends of a loop Residential street are encouraged to intersect the same collecting street and be designed to discourage through traffic.

~~(d) Residential streets with only one inlet/outlet shall provide access to no more than 20 lots and not exceed 1000 feet in length (measured from the intersection point to the center point of the turnaround).~~

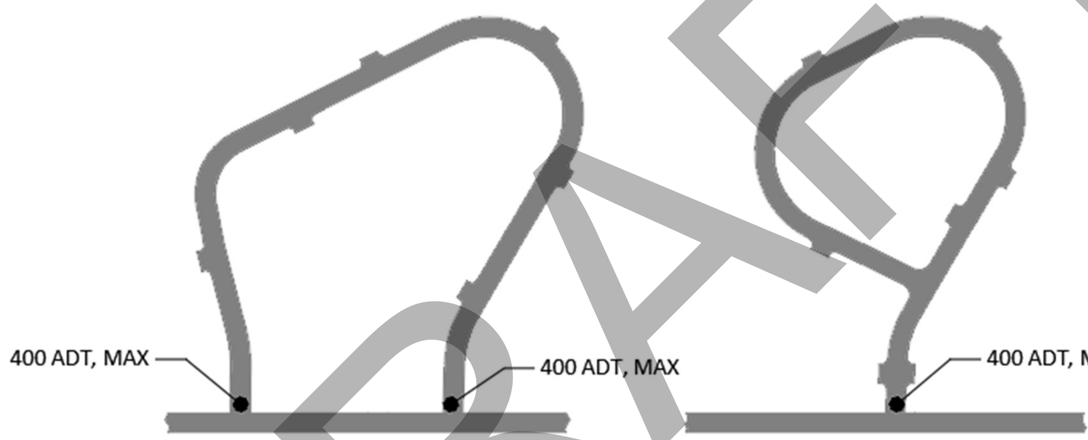


Figure A-1: Loop Residential Streets

A04.2 Residential Subcollector Street

(a) A Residential Subcollector street provides access to abutting properties and may also move traffic from Residential streets that intersect it. Residential Subcollector streets are required when the ADT anticipated on the street will exceed the limits for Residential~~ or when a street with only one inlet/outlet provides access to more than 20 lots or exceeds 1000 feet in length~~.

(b) The anticipated ADT on Residential Subcollector streets shall not exceed 1000. A loop street shall be designed such that the anticipated ADT at each terminus of the loop street does not exceed 1000, see Figure A-2.

(c) Residential Subcollector streets shall be designed to exclude all external through traffic that has neither origin nor destination on the Residential Subcollector or its tributary Residential streets. Adjacent parcels may acquire access if proven landlocked by legal or terrain features or if such Residential Subcollector access can be demonstrated to be beneficial to the public.

(d) Residential Subcollector streets shall take access from a street of equal or higher classification.

(e) Traffic calming elements should be considered for the design of Residential Subcollectors, such as avoiding long, straight segments and reducing the length of roadway from farthest lot to a collector.

(f) Residential Subcollector streets shall be provided with two continuous moving lanes within which no parking is permitted.

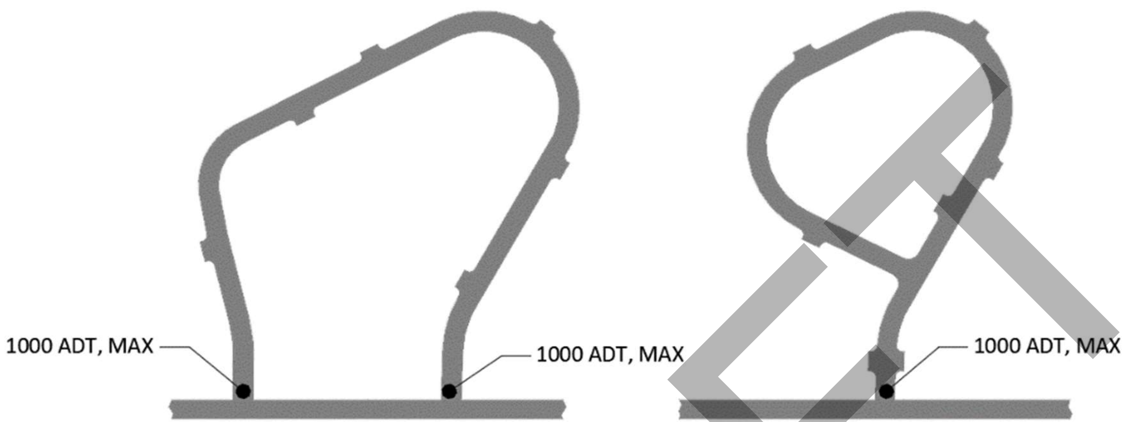


Figure A-2: Loop Residential Subcollector Streets

A04.3 Residential Collector Street

(a) A Residential Collector street carries residential neighborhood traffic, but restricts or limits direct residential access. Residential Collector streets are required when the ADT anticipated on the street will exceed the limits for Residential Subcollectors.

(b) Residential Collector streets should be designed to have as few residential lots directly fronting them as possible. When efficient subdivision design or physical constraints make this not possible, the average access point spacing shall be a minimum of 250 feet. Average access point spacing is calculated per segment and is equal to the segment length divided by the number of potential access points on both sides of the street. Undeveloped lots with only access to Residential Collector streets are counted as having at least one access point. When the average access point spacing on a segment of an existing Residential Collector street is less than 250 feet, the average access point spacing shall not decrease due to the subdivision.

(c) Space shall be provided on these lots for turnaround so that vehicles will not have to back out onto Residential Collector streets.

(d) Proposed access points on Residential Collector streets shall be shown on the preliminary plat.

(e) Residential Collector streets shall be laid out to encourage connectivity within the transportation network.

(f) If the anticipated ADT will exceed 3000, the street shall be classified at a higher level than Residential Collector by DPW.

(g) Every Residential Collector shall be provided with no fewer than two access intersections to streets of equal or higher classification. If it is shown by the applicant that two accesses are not feasible, Residential Collector streets shall be provided with access to one street of equal or higher classification and be designed to accommodate a future second connection to a street of equal or higher classification, or otherwise be approved by DPW.

(h) All Residential Collector streets shall be provided with two continuous moving lanes within which no parking shall be permitted.

A04.4 Access through Existing Streets

The anticipated ADT on existing Residential streets used to access a proposed subdivision may exceed 400, but shall not exceed 800, if:

(a) alternate road corridors are not available or feasible;
(b) horizontal geometry or access density prohibits upgrade to a higher standard road; and
(c) the traffic impacts are mitigated.

A04.5 Traffic Impact Mitigation for Access through Existing Streets

Traffic impact mitigation on existing residential streets can include but is not limited to:

(a) Traffic control devices (signage, striping) on segments where potential ADT exceeds 440;
(b) LED street lighting, speed feedback signs, widened shoulders, inside corner widening for offtracking, or all-way stop intersections on segments where potential ADT exceeds 600.

A04.6 Commercial Uses on Residential and Residential Subcollector Streets

Exceptions to the ADT limits on Residential and Residential Subcollector streets, as set forth in A04.1 and A04.2, respectively, may be allowed for commercial uses that access the first 600 feet of such streets that intersect a Collector standard road or higher classification, as measured from the intersection point. The affected portion of the street and intersection shall be constructed to a higher standard as needed to accommodate the anticipated commercial traffic.

A05 Design Criteria

The design criteria for Residential, Residential Subcollector, and Residential Collector streets and Mountain Access and Pioneer roads are set forth in Table A-1~~Table A-1~~. Any unspecified design criteria shall meet or exceed the design criteria for the roadway design speed in the latest edition of *A Policy on Geometric Design of Highways and Streets* (AASHTO).

Table A-1: Design Criteria

	Unit	Residential	Residential Subcollector	Residential Collector	Mountain Access[1]	Pioneer[1]
Average Daily Traffic	VPD	≤400	401 – 1000	1001 – 3000	–	–
Typical Section						
ROW Width[2]	ft	60	60	60	60	60
Lane Width	ft	10	10	11	10	10
Standard Gravel Shoulder Width	ft	2	2	2	0[3]	0[3]
Shared Paved Shoulder Width[4]	ft	4	4	6	–	–
Roadway Width	ft	24	24	26	20[3]	20
Foreslope[5]	h:v	3:1	3:1	4:1	2:1	3:1
Backslope[6]	h:v	2:1	2:1	2:1	2:1[7]	2:1
Crown, gravel	%	3	3	3	3	3
Crown, pavement	%	2	2	2	2	–
Engineering Criteria						
Design Speed	mph	25	30	35	–	–
Posted Speed	mph	20	25	30	–	–
Stopping Sight Distance	ft	155	200	250	–	–
Horizontal Alignment						
Minimum Centerline Radius	ft	225	350	550	–[8]	–
with DPW Approval	ft	190	275	400	–	–
Minimum Tangent Between Curves	ft	100	100	100	100	100
Maximum superelevation	%	N/A	N/A	4	N/A	N/A

[1] Where a value is not given, Mountain Access and Pioneer Roads shall meet the criteria of the anticipated street classification.
[2] Minimum ROW required for new dedications; width of existing ROW may vary.
[3] Where grades exceed 7 percent, the shoulder width shall be 2 feet for a total roadway width of 24 feet.
[4] An optional paved shoulder may be provided on one or both sides of paved streets for non-motorized shared use.
[5] Slope for the first 7.5 feet from the shoulder; may be steepened to 2:1 thereafter. Install guardrail when required by the latest edition of the *Roadside Design Guide* (AASHTO).
[6] 2:1 Back slopes may be steepened to 1.5:1 if cuts exceed 5 feet and appropriate slope stabilization, as determined by the design engineer, is used. Retaining walls may be used to replace or augment backslopes.
[7] Or backslope recommended by the design engineer based on actual conditions.
[8] Switch backs are allowed provided cul-de-sac criteria is met or turning radius is 40 feet with a 2% grade.

	Unit	Residential	Residential Subcollector	Residential Collector	Mountain Access[1]	Pioneer[1]
Vertical Alignment						
Maximum Centerline Grade	%	10	10	10	15[9]	10
Minimum Rate of Vertical Curvature[10]; Crest		12	19	29	–	–
Minimum Rate of Vertical Curvature [10]; Sag		26	37	49	–	–
Minimum Flow Line Grades	%	0.5	0.5	0.5	1.0	0.5
Intersections						
Minimum ROW Corner Radius	ft	30	30	30	30	30
Minimum Curve Return Radius[11]	ft	20	25	30	–	–
Maximum Grade on through street within 50 feet of intersection	%	7	7	4	9	7

A06 Typical Section

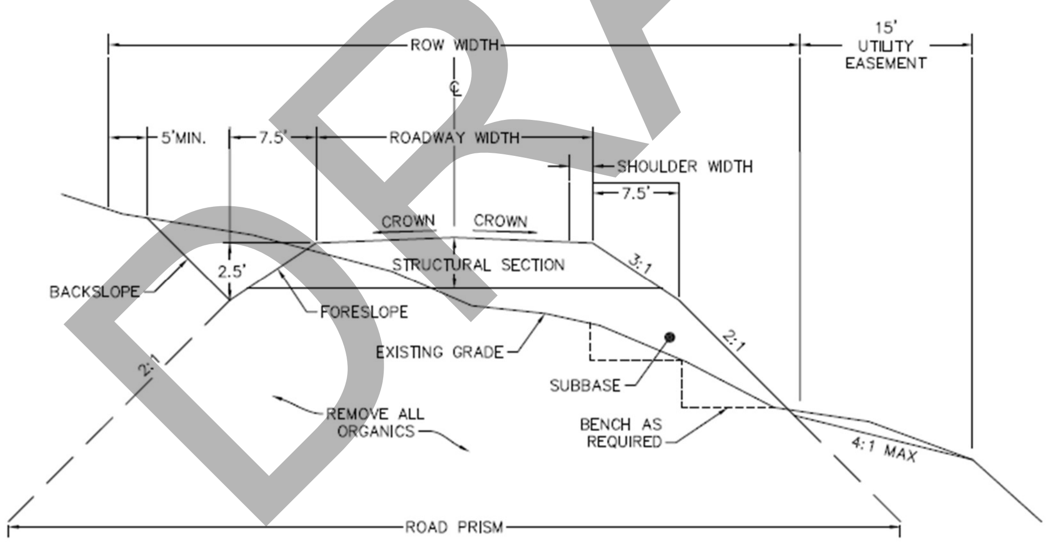


Figure A-3: Typical Section

[9] Up to 15% grade with no more than 200 linear feet of over 10% grade with a minimum of 100 linear feet of less than 10% grade for runout between steeper sections. Maximum grade in a horizontal curve is 10%.
[10] Rate of vertical curvature (K) is the length of curve (L) in feet per percent algebraic difference in intersecting grades (A); K = L / A
[11] 40-foot minimum curve return radius at intersections with higher order streets.

A07 Turnarounds

Streets with only one inlet ~~that exceed 200 feet in length (measured from the intersection point to the end of required construction)~~ shall terminate with a constructed turnaround, unless otherwise provided by A08.2.

A07.1 Cul-de-sac Turnarounds

(a) A cul-de-sac turnaround with a drivable surface diameter (shoulder to shoulder) of 85 feet centered in a ROW diameter of 120 feet shall be provided at the terminus of Residential and Residential Subcollector streets.

(b) Cul-de-sac turnarounds shall meet the configuration and dimensions shown in Figure A-4.

(c) The grade throughout the surface of a cul-de-sac, as depicted in the shaded portion of Figure A-4, shall not exceed 4 percent.

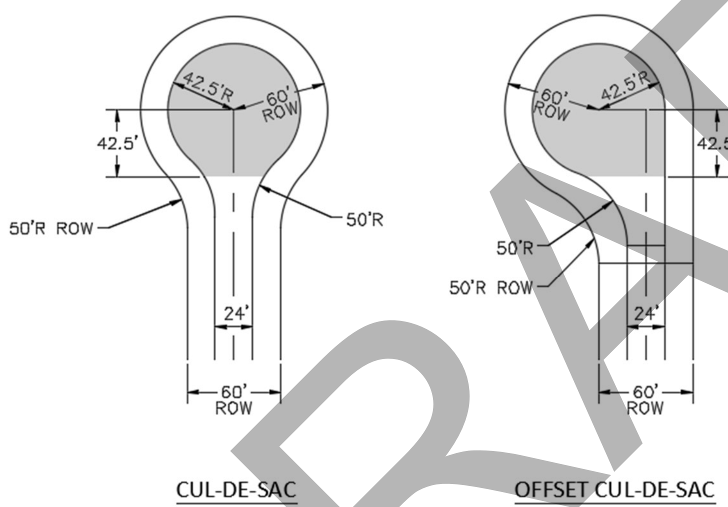


Figure A-4: Cul-de-sac Options

A07.2 Alternate Turnarounds

(a) DPW may permit a street to terminate with an alternative turnaround that meets fire code when such a design is required by extreme environmental or topographical conditions, unusual or irregularly shaped tract boundaries, or when the location of the turnaround is intended to become an intersection.

(b) Alternate turnarounds shall meet the configuration and dimensions shown in Figure A-5.

(c) The grade throughout the turnaround surface, as depicted in the shaded portion of Figure A-5, shall not exceed 4 percent.

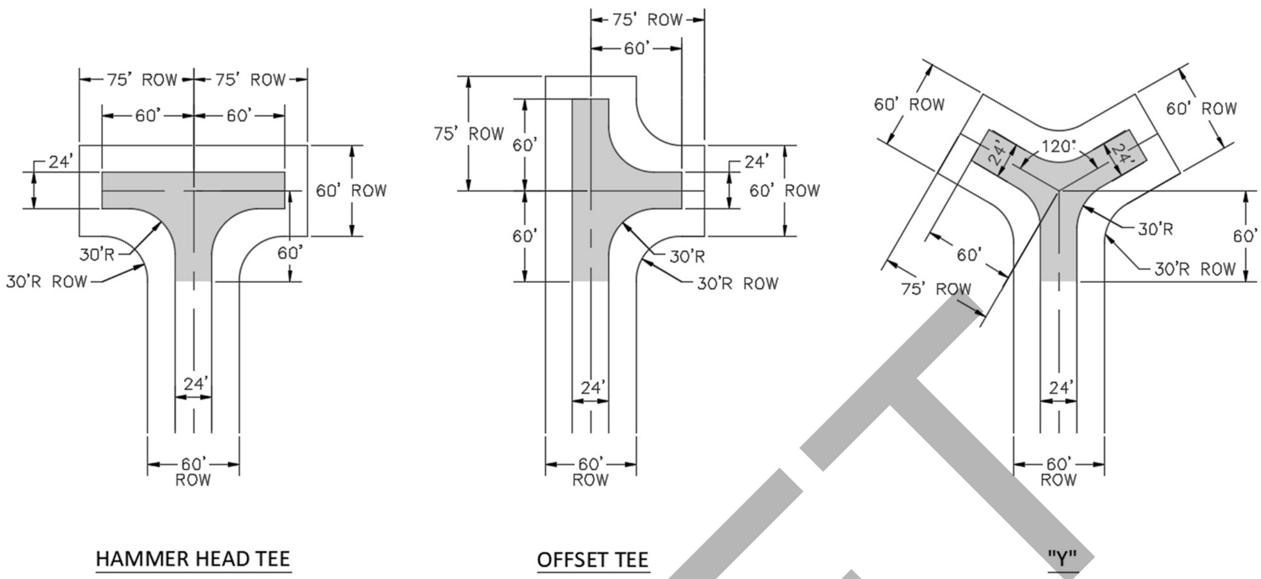


Figure A-5: Alternate Turnarounds

A08 Stub Streets

A08.1 Stub Street Construction

No construction is required if physical access is provided to all lots by adjoining streets as required by MSB or other applicable code.

A08.2 Temporary Turnarounds

~~All s~~Stub streets requiring construction that exceed 200 feet in length (measured from the intersection point to the end of required construction) will meet the requirements of ~~A07~~A07.1 or A07.2. A temporary easement will be provided for the turnaround, which will automatically terminate upon extension of the street and physical removal of the turnaround. The centerline grade on stub streets without turnarounds shall not exceed 4%.

A09 Intersections

A09.1 Intersection Sight Distance

(a) Whenever a proposed street intersects an existing or proposed street of higher order, the street of lower order shall be made a stop controlled street, unless alternate intersection control is used as allowed by this subsection.

(b) Stop controlled streets shall be designed to provide intersection sight distance as specified in this subsection, Table A-2~~Table A-2~~, and Figure A-6~~Figure A-6~~.

(c) The entire area of the intersection sight triangles shown in Figure A-6~~Figure A-6~~ shall be designed to provide a clear view from point A at 3.5 feet above the roadway to all points 3.5 feet above the roadway along the lane centerlines from point B to point C and point D to point E.

(d) Sight distances less than the recommended shall only be used when there are topographical or other physical constraints outside of the applicant's control.

(e) The minimum sight distances listed in Table A-2~~Table A-2~~ are for a passenger car to turn onto a two-lane undivided street and minor road approach grades of 3 percent or less. For other conditions, the minimum sight distance should be calculated by the applicant's engineer according to *A Policy on Geometric Design of Highways and Streets* (AASHTO).

(f) Sight distances less than the minimum, where no other options exist, will require alternate intersection control or warning signs as determined by the applicant's engineer and approved by DPW.

(g) Intersection sight triangles shall be located in their entirety within ROW or a sight distance maintenance easement.

(h) Yield controlled intersections shall conform to sight distance requirements according to *A Policy on Geometric Design of Highways and Streets* (AASHTO).

(i) Intersections with state or other municipal ROW are subject to their respective requirements and review.

Table A-2: Recommended and Minimum Intersection Sight Distance

Design Speed or Posted Speed Limit (whichever is greater)	S_d Recommended	S_d Minimum
MPH	ft	ft
25	370	280
30	450	335
35	580	390
40	750	445
45	950	500
50	1180	555
55	1450	610
60	1750	665
65	2100	720

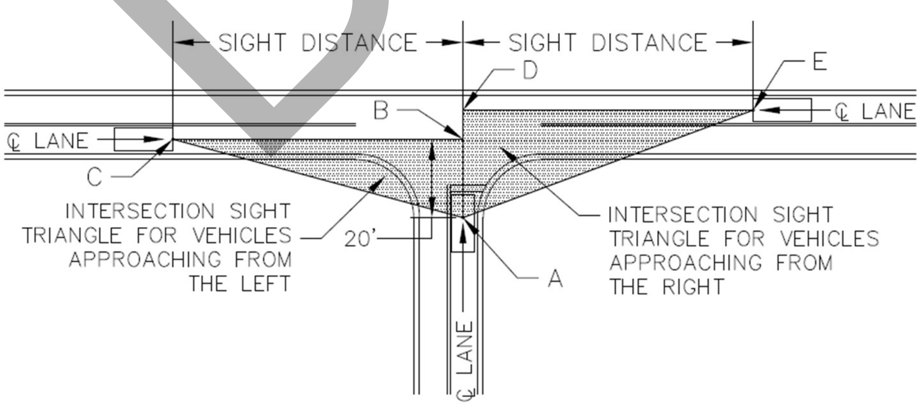


Figure A-6: Intersection Sight Distance

A09.2 Intersection Spacing

(a) Minimum centerline to centerline distance between intersections on the same side or opposing sides of the through street shall be:
    (1) 155 feet on Residential streets;
    (2) 200 feet on Residential Subcollector streets;
    (3) 300 feet on Residential Collectors and Minor Collectors; or
    (4) 650 feet on higher order streets where other access standards do not exist.

(b) If the above spacing along the through street cannot be met, intersections shall be aligned directly across from each other. Intersections on opposing sides of the through street may be offset up to 30 feet, with a preference for a left-right offset, as shown in Figure A-7.

(c) Where pre-existing conditions do not allow for the above spacing and no other legal access exists, alternate spacing or offset most closely meeting (a) or (b) above may be allowed.

(d) Additional intersections should be avoided within the functional area of major intersections with turning bays and approach tapers. Exceptions require DPW approval based upon constraints and no other feasible alternatives.

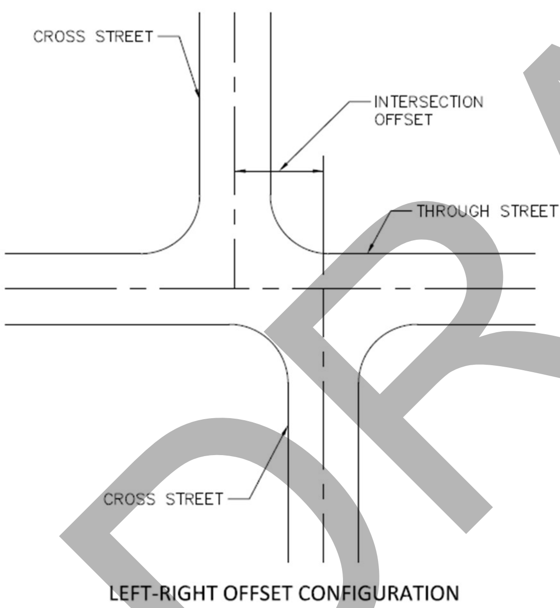


Figure A-7: Intersection Offset

A09.3 Minimum Intersection Angle

Streets should intersect with a straight segment at an angle as close to 90° as possible, but no less than 70°, for a minimum of 75 feet from the intersection point, as shown in Figure A-8.

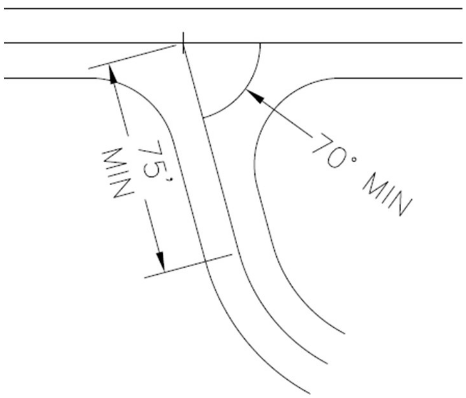


Figure A-8: Intersection Angle

A09.4 Landing

Controlled streets shall be provided with a typical 30-foot landing, conforming to Figure A-9, at its approach to a through street. The landing shall be sloped to match the crown of the through street. Vertical curves shall not be located in the landing to the extent feasible. Where a negative slope away from the through street is not feasible due to topographical constraints, the road shall be constructed in a manner that prevents water from flowing onto the through street.

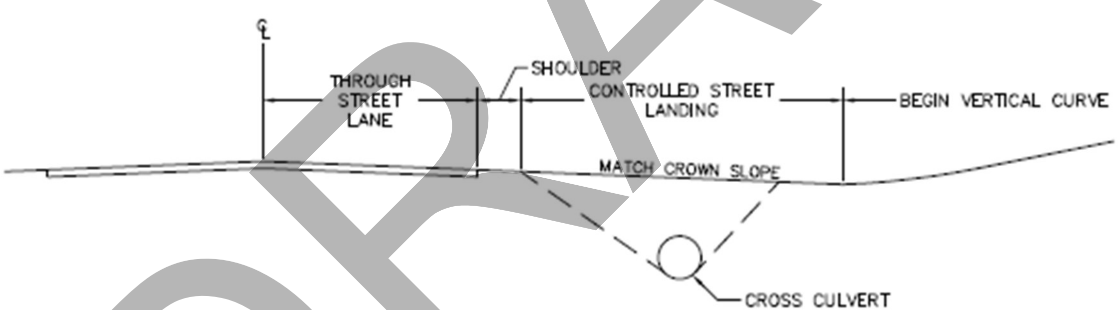


Figure A-9: Controlled Street Landing Profile

A09.5 Paved Apron

A proposed street which intersects an existing paved street shall be provided with a paved apron 40 feet from the edge of the existing pavement.

~~A proposed street which intersects an existing paved street shall be provided with a paved apron from the edge of the existing pavement to the end of the curve return plus 10 feet.~~

A10 Driveways

Driveways are not usually required to be constructed within the ROW at time of road construction. However, if an applicant chooses to construct driveways, driveway permits are required. The applicant may permit all driveways with one application. A driveway permit application can be obtained from the

MSB Permit Center. Driveways onto state or other municipal ROW are subject to their respective requirements and review.

A11 Trailhead

Trailhead parking lot layout shall conform to applicable local, state, and federal requirements.

A12 Bicycle and Pedestrian Paths

Bicycle and pedestrian paths constructed within public ROW shall conform to the current edition of *Guide for the Development of Bicycle Facilities* (AASHTO), and any other applicable local, state, and federal requirements.

A13 Signage

Signs shall be provided and installed by the applicant in conformance with the latest edition of the *Alaska Traffic Manual* (ADOT&PF) and the *Alaska Sign Design Specifications* (ADOT&PF) prior to plat recordation.

(a) Each street within a subdivision shall be identified and signed at its point of egress and ingress. Cul-de-sac streets will be signed and identified at their point of ingress
(b) Intersection control signs shall be provided at designated intersections within the confines of the subdivision and at the intersection with the access road, if applicable.
(c) Intersection control signs shall be located such that they are visible to approaching traffic and near corresponding stop or yield bars.
(d) Speed limit signs shall be provided at entrances to the subdivision, where the speed limit changes, and at a minimum of one-mile intervals throughout the subdivision.
(e) If a constructed stub street provides access to two or fewer lots and has no turnarounds a sign indicating a dead-end street shall be posted.
(f) If a dedicated stub street is not constructed, no signs are required.
(g) Install signs according to the criteria in Figure A-10, Figure A-11, and Figure A-12.
(h) Signs within state or other municipal ROW are subject to their respective requirements and review.

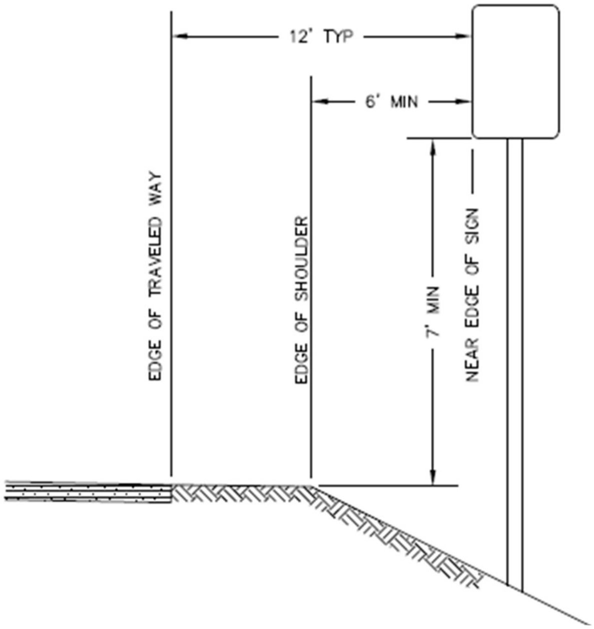


Figure A-10: Sign Placement

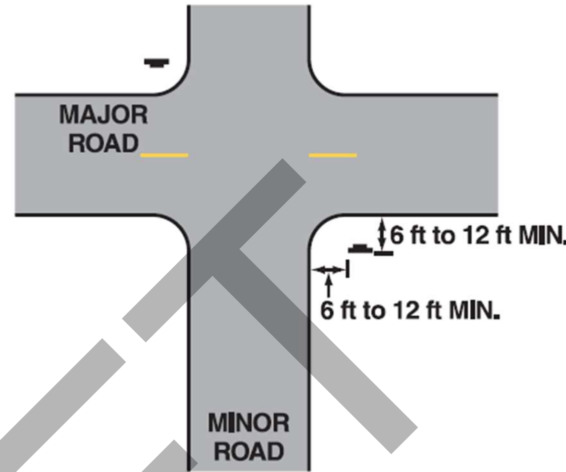
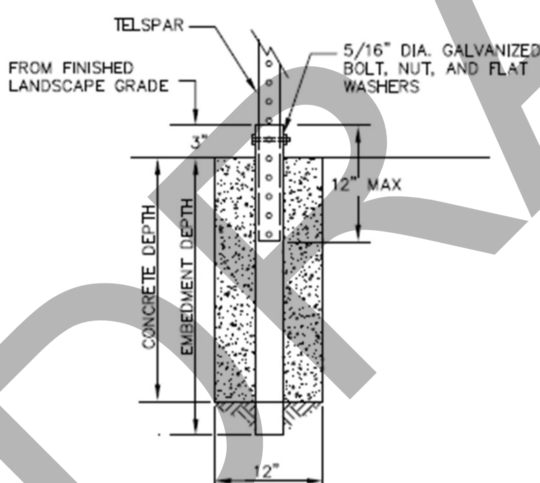


Figure A-11: Stop Sign Location



PERFORATED STEEL TUBES (P.S.T.) (12ga. – .105" Wall Thickness)			
SIGN SURFACE AREA SQ. FT.	POST SIZE	EMBEDMENT DEPTH	CONCRETE DEPTH
7' OR LESS	2" X 2"	27"	24"
GREATER THAN 7'	2 ½" X 2 ½ "	33"	30"

Figure A-12: Concrete Foundation for Sign Post

A14 Railroad Crossings

All access requiring a crossing of the Alaska Railroad shall be subject to the *Alaska Policy on Railroad/Highway Crossings* (Alaska Railroad).

A15 Average Daily Traffic

(a) The following formula shall be used to determine the required classification of streets: ADT = Number of lots x 10 for single-family residential use.
(b) See Section G for other land uses.
(c) For subdivisions of five or more lots, submit potential ADT calculations for the following locations with the preliminary plat:
  (1) at each intersection within the subdivision,
  (2) at each intersection en route to an existing Residential Collector street or higher classification, and
  (3) at an existing Residential Collector street or higher classification.

A16 Design Deviations

Design deviations will be considered to address extenuating circumstances including but not limited to: existing substandard ROW, environmental conditions, or existing utilities or other structures. Design deviation requests shall be in writing and contain supporting information, justification, and suggested solutions. Design deviations may be allowed by DPW only for matters that do not fall under the jurisdiction of a Board or Commission. In no circumstances will a roadway width less than 20 feet or foreslopes steeper than 2:1 be allowed. Residential Collector streets shall be no less than 24 feet wide.

Section B. Major Road Corridors

B01 General

Major road corridors include major collectors, arterials, and interstates. This section provides references to and guidelines for the design and construction of major road corridors within the MSB.

B02 Right-of-way and Surface Widths

Table B-1: ROW and Surface Widths

Classification	Minimum ROW Width (ft)	Standard Lane Width (ft)	Number of Lanes	Shoulder Width (ft)
Major Collector	80	12	2 – 3	4
Arterial	100	12	3 – 4	4 – 8
Interstate	200	12	4 – 6	12

B03 Frontage, Backage, and Connector Street Standards

Subdivisions adjacent to planned or existing major road corridors shall plan for future frontage or backage streets when any of the following conditions apply, unless it is shown by the applicant to be not necessary or feasible for future development and public safety with ~~non-objection~~ no written objection from the road authority.

(a) Subdivisions accessing roads that are classified by ADOT&PF as Interstates.
(b) Subdivisions accessing roads that are or are projected to grow above 20,000 vehicles per day (VPD).
(c) Subdivisions accessing roads that are or are projected to have four or more lanes or median control per the LRTP or Official Streets and Highways Plan (OSHP).
(d) Subdivisions that require a second access route.
(e) To gain access to an existing or planned signal.
(f) Where access to a minor arterial or collector as a connector road is feasible.
(g) When there are existing or platted frontage or backage routes adjacent to the property.

B03.1 Separation Distances

Minimum ROW to ROW separation distance between major corridors and frontage or backage streets shall be:

(a) 0 feet for locations with no connector street to the major road corridor;
(b) 100 feet for locations with a connector street to the major road corridor that lie between section lines and planned or existing intersections with other major road corridors;
(c) 300 feet for locations where the connector street to the major road corridor is on a section line or planned or existing major road corridor.

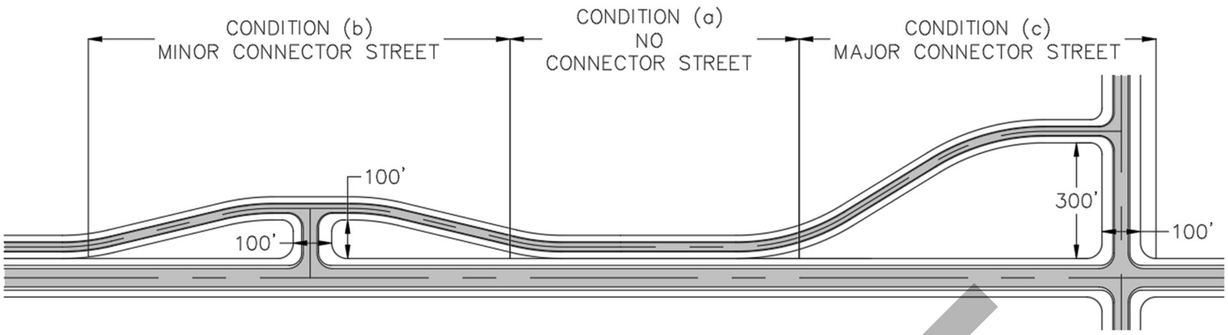


Figure B-1: Frontage Street Configurations

B03.2 Design Standards

(a) Frontage streets

(1) Minimum centerline radii may be reduced near intersections with through connector streets.

(b) Connector streets

(1) 100-foot ROW width desirable.

(2) Minimum 40-foot radius curve returns at the major road corridor.

(3) Minimum 4-foot wide shoulders for 100 feet from the edge of roadway of the major road corridor.

(4) Minimal direct access.

B03.3 Dedication and Setbacks

Dedicate ROW or additional building setbacks to allow for the frontage, backage, and connector street standards in this manual. The applicant shall submit design information sufficient to demonstrate ~~prove~~ that frontage, backage, and connector street dedications or building setbacks are in a practical location where road construction is feasible in accordance with this manual. The applicant shall be required to submit plan, profile, and cross-sections for the sections of road where~~if~~ existing grades along the proposed route exceed 10 percent, existing cross slopes exceed 15 percent, or if existing utilities or other physical features appear to create impediments to a road design meeting standards of this manual. Road plan and profile shall extend at least 300 linear feet on either side of the subject sections or to intersecting or adjacent ROW within 500 linear feet.

B04 Access Standards

(a) The average access point spacing on major road corridors, where other access standards do not exist, shall not exceed the minimums listed in Table B-2~~Table B-1~~, based on the posted speed limit. Average access point spacing is calculated per segment and is equal to the segment length divided by the number of access points on both sides of the street. Undeveloped lots with only access to the major road corridor are counted as having at least one access point.

(b) When the average access point spacing on a segment of an existing major road corridor is less than the minimum listed in Table B-2~~Table B-1~~, the average access point spacing shall not decrease due to the subdivision.

Table B-2~~B-1~~: Average Access Point Spacing

Posted Speed Limit (mph)	Minimum Average Access Point Spacing (feet)
30	250
35	300
40	360
45	425
50	495
55	570

B05 Future Corridors

Subdivisions shall be designed in a manner that does not conflict with the ~~Long Range Transportation Plan~~LRTP or the ~~Official Streets and Highways Plan~~OSHP. Subdivisions containing future road corridors identified in the LRTP or OSHP are encouraged to include the future road corridor as part of the road layout of the subdivision.

Building setbacks prohibiting the location of any permanent structure within the future corridor may be voluntarily designated on the final plat. The area within the future road corridor shall be excluded from usable septic area calculations. The area within the future road corridor and building setbacks shall be excluded from usable building calculations.

B06 References

The following publications shall be used for design and construction standards of these classes of streets that are not otherwise established herein:

(a) *A Policy on Geometric Design of Highways and Streets*, AASHTO (current edition).
(b) *Standard Specifications for Highway Construction*, ADOT&PF (current edition);
(c) *Standard Modifications to the ADOT&PF Standard Specifications for Highway Construction*, MSB (latest revision)
(d) *Alaska Highway Preconstruction Manual*, ADOT&PF (latest revision)

Section C. Construction Requirements

C01 General

This section establishes minimum construction requirements. Prior to any ground disturbing activities, call the Alaska Dig Line for utility locates in accordance with AS 42.30.400.

C02 Road Construction

C02.1 Clearing

Cut and dispose of all trees, down timber, stumps, brush, bushes, and debris. Cut trees and brush to a height of not more than 6 inches above the surrounding ground. Clear the ROW, slope easements, and sight distance triangles. Where ROW exceeds 60 feet, clear a minimum of 60 feet. Clear utility easements, if used, for utilities constructed with the development.

C02.2 Grubbing

Remove and dispose of all stumps, roots, moss, grass, turf, debris, or other deleterious material within the fill and cut catch limits of the road plus 5 feet on each side, within the ROW, and cleared utility easements for underground utilities.

C02.3 Disposal

Dispose of clearing and grubbing debris in an area designated by the applicant outside of all ROW, platted utility easements, and platted private road corridors. Organic debris 3 inches in diameter by 8 inches long, or smaller, may be left in place, outside of the road prism.

C02.4 Slit Trenches

Slit trenches are not allowed in the ROW. Utility easements may be used as a borrow source above a 2:1 extension of the road prism, as shown in Figure A-3. Topsoil or other organic non-deleterious material may be disposed within the utility easement. Compact the disposal area with heavy equipment and grade the surface with positive drainage no steeper than 4:1 and no lower than the ditch line. Submit an as-built drawing showing the horizontal locations of borrow extraction along the road corridor with the Final Report.

C02.5 Embankment Construction

(a) Construct the road with the required structural section, see Figure C-1, and dimensions, see Table A-1~~Table A-1~~ and Figure A-3, as determined by its classification.

(b) Prepare the subgrade. Remove all organics from the area below the road prism and dispose in locations where embankment is not proposed. Bench existing slopes that are steeper than 4:1, measured at a right angle to the roadway, where roadway embankment is to be placed.

(c) Place material meeting, or verify in-situ material meets, the requirements for Subbase specified in subsection C07 to a minimum depth of 20 inches with the upper 6 inches having no material with a diameter larger than 6 inches. Place embankment in horizontal layers, as directed by the engineer, for the full width of the embankment and compact as specified before the next lift is placed.

(d) Place 4 inches of Surface Course meeting the requirements specified in subsection C07. Finish with a 3 percent crown, and compact as specified.

(e) For Residential and Residential Subcollector standard roads, compact all embankment to not less than 90 percent of the maximum dry density at the optimum moisture content and the top 24 inches to not less than 95 percent of the maximum dry density at the optimum moisture content. For Residential Collector standard roads, compact all embankment to not less than 95 percent of the maximum dry density at the optimum moisture content.

(f) Optimum moisture and maximum dry density will be determined by Alaska Test Method (ATM) 207 and ATM 212 or alternative methods approved by DPW.

~~(e)~~(g) In-place density shall be determined by ATM 213 or alternative method approved by DPW. Compaction tests on the ~~subbase~~ Subbase layer shall be taken at representative locations along the roadways as follows:

(1) a minimum of three;

(2) at least one per segment;

(3) one additional test per 1000 linear feet, or portion thereof, when the combined length of roadway exceeds 1000 linear feet;

(4) at least one out of every three within three feet of the shoulder, and the remainder in the center of a driving lane.

~~(f)~~(h) For paved roadways, substitute Surface Course with a minimum of 2 inches of Base Course and 2 inches of HMA Type II, Class B, for Residential and Residential Subcollector streets, and a minimum of 3 inches of Base Course and 3 inches of HMA Type II, Class B, for Residential Collector Streets~~, in accordance with Appendix A~~. Pavement shall meet MSB Special Provision Section 401 Hot Mix Asphalt Pavement. The width of the pavement shall be equal to two lane widths plus the shared paved shoulder width, if used, and finished with a 2 percent crown. Pavement edges shall be backed with additional Base Course graded and compacted flush with the pavement surface and tapered to the edge of the roadway. The pavement shall be washed or swept immediately following shouldering work.

~~(g)~~(i) Remove all loose material exceeding 6 inches in diameter from the ditches and foreslopes. Where slopes are 3:1 or steeper and longer than 10 feet measured along the slope face, trackwalk perpendicular to the slope, or the equivalent, to form 1-inch wide grooves parallel to the road no more than 12 inches apart.

~~(h)~~(j) Permanently stabilize backslopes 3:1 or steeper. Stabilization can be part of a subdivision agreement. Stabilization may be allowed to establish during the warranty period.

C02.6 Unsuitable Subgrades

When structurally unsuitable material such as peat, saturated material, or permafrost are present within the ROW, provide an appropriate structural design for approval by DPW, according to Section F, prior to construction. Place embankment to a depth that will produce a stable road surface with a final grade 18 inches above the surrounding ground.

C03 Roads Outside of a Road Service Area

Roads outside of a Road Service Area are not subject to the requirement for Surface Course.

C04 Pioneer Road Construction Requirements

Pioneer roads, whether proposed or existing, shall meet the requirements of Figure C-1, Table A-1~~Table A-1~~, and Figure A-3. Place material meeting, or verify in-situ material meets, the requirements for Subbase specified in subsection C07 to a minimum depth of 12 inches. Additional road embankment may be required to provide a stable road surface. Surface Course is not required. Pioneer roads may be constructed offset from the centerline of the ROW to facilitate future expansion of the road. Cross drainage culverts, minimum 18 inch diameter, will be installed where determined necessary and 24 inch ditches will be provided for drainage.

C05 Winter Construction

Winter construction may be allowed. DPW will not accept any roads until all ground has thawed and any settlement areas corrected.

C06 Alternate Methods and Materials

Use of alternate materials and road construction methods that will more appropriately fit the conditions of the specific road locations, following general engineering practices, may be proposed by the applicant or their engineer in writing. Final acceptance of such plans must be approved by DPW.

C07 Materials

C07.1 Subbase

(a) Is aggregate containing no muck, frozen material, roots, sod, or other deleterious matter;
(b) has a plasticity index not greater than 6 as tested by ~~Alaska Test Method (~~ATM~~)~~ 204 and ATM 205; and
(c) meets the requirements of Table C-2, as determined by ATM 304.

C07.2 Base Course

(a) Crushed stone or crushed gravel, consisting of sound, rough, durable pebbles or rock fragments of uniform quality;
(b) free from clay balls, vegetable matter, or other deleterious matters;
(c) meets the requirements of Table C-1; and
(d) meets the requirements of Table C-2, as determined by ATM 304.

C07.3 Surface Course

(a) Is a screened or crushed gravel, consisting of sound, rough, durable pebbles or rock fragments of uniform quality;

(b) free from clay balls, vegetable matter, or other deleterious matters; and

(c) meets the requirements of Table C-2, as determined by ATM 304.

Table C-1: Aggregate Quality Properties for Base Course

Property	Test Method	Base Course
L.A. Wear, %	AASHTO T 96	50, max
Degradation Value	ATM 313	45, min
Fracture, %	ATM 305	70, min
Plastic Index	ATM 205	6, max
Sodium Sulfate Loss, %	AASHTO T 104	9, max (5 cycles)

Table C-2: Aggregate Gradations

Sieve Designation	Subbase	Base Course	Surface Course
1 1/2 inch			100
1 inch		100	
3/4 inch		70 to 100	70 to 100
3/8 inch		50 to 80	50 to 85
No. 4	20 to 60	35 to 65	35 to 75
No. 8		20 to 50	20 to 60
No. 50		6 to 30	15 to 30
No. 200	0 to 10	0 to 6	7 to 13

(Percent Passing By Weight)

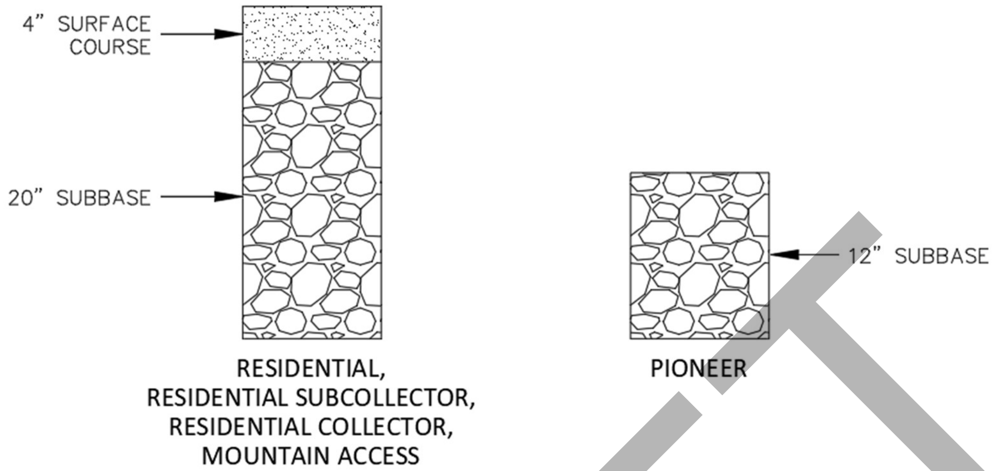


Figure C-1: Structural Sections for Gravel Roads

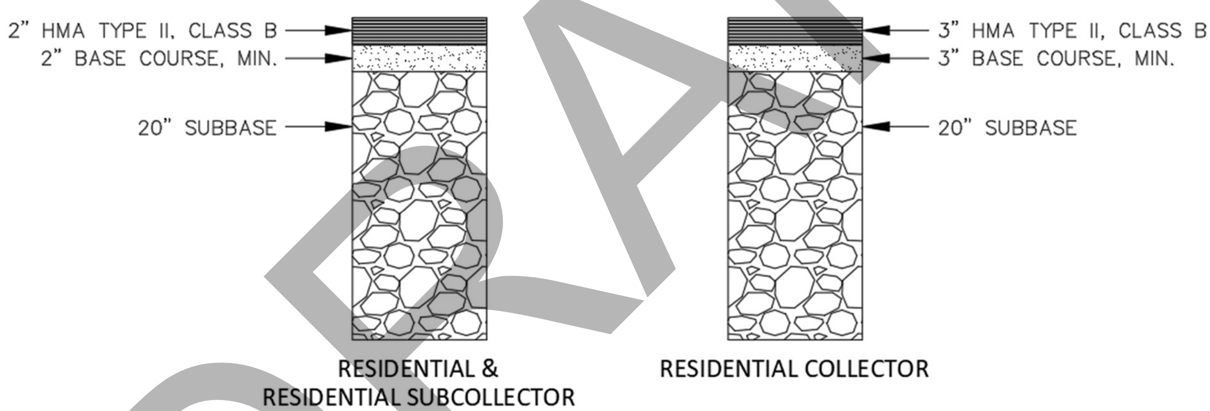


Figure C-2: Structural Sections for Paved Roads

Section D. Drainage

D01 General

The purpose of this section is to ensure that stormwater management is provided with land development activities. Responsible stormwater management is the treatment, retention, detention, infiltration, and conveyance of stormwater and other surface waters without adversely impacting adjoining, nearby, or downstream properties and receiving waters.

D02 Requirements

A preliminary drainage plan is required when road construction or disturbing land to create useable area for a subdivision is proposed. A drainage report is required for projects that include road construction, disturb 10,000 square feet of land or more, fill in wetlands, disturb land within 100 feet of the ordinary high water mark (OHWM) of a water body, disturb land within a mapped flood hazard area, or change the location, direction, quantity, or type of runoff leaving a site. See subsection D06 for specific requirements regarding fish passage culverts. It is the applicant's responsibility to comply with all other applicable federal, state, and local codes and regulations.

D02.1 Preliminary Drainage Plan

Submit a preliminary drainage plan, prepared by an engineer or other qualified professional registered in the State of Alaska, with the preliminary plat or ROW construction permit application. The preliminary drainage plan shall show the project site at a legible scale plottable on 11" by 17" paper or larger and depict the following:

(a) Existing and proposed property lines, plottable easements disclosed in the title report, the OHWM of water bodies with 100-foot upland offset, and existing mapped flood hazard areas.
(b) Existing topography with horizontal and vertical accuracy meeting US National Map Accuracy standards, with 5-foot contour intervals if the ground slope is less than 10 percent and 10-foot contour intervals if the ground slope is greater than 10 percent.
(c) Existing features that convey or retain drainage, including but not limited to: water bodies, wetlands, natural valleys, swales, ditches, check dams, culverts, and pipe systems.
(d) Proposed drainage pattern and features, both constructed and natural, on site. Identify conveyance types, flow directions, and any drainage changes that may affect adjacent property.
(e) Proposed stream crossings and anticipated culvert sizes. Identify fish-bearing streams.

D02.2 Drainage Report

Submit a drainage report, prepared by an engineer or other qualified professional registered in the State of Alaska, as part of the construction plan submittal in subsection F01.2. The drainage report shall include the following:

(a) The drainage plan as specified in D02.1 (may be shown on two plans for clarity), updated to include:

(1) Pre-development and post-development catchment area boundaries determined using 2-foot contour intervals; and

(2) Locations of peak flow, peak velocity, and where runoff leaves the project site.

(b) Description of methods, assumptions, and data sources used or made, including but not limited to:

(1) Rainfall data ~~used (~~from the NOAA-14~~'s~~ Precipitation Frequency Data Server~~ or the Palmer Airport IDF curves in Figure D-1, whichever is more appropriate for the local conditions)~~.

(2) Assumed post-development land cover conditions.

(3) Method used to determine runoff quantities, time of concentration, peak flows, etc.

(c) Catchment area maps used or created to evaluate down-gradient conditions.

(d) Identify design elements, with supporting runoff calculations, necessary to show compliance with the drainage design criteria set forth in D03.

(e) Fish passage culvert plans, if applicable.

D03 Drainage Design Criteria

(a) Design a drainage system for the project site to meet the criteria listed in Table D-1.

(b) Retain natural drainage patterns to the extent possible.

(c) Changes to drainage patterns must not adversely affect adjacent property or ROW.

(d) Base the size and capacity of the drainage system on runoff volumes and flow rates assuming full development of the subdivision and a 10 percent increase to runoff from the catchment area.

(e) ~~Utility easements may be crossed by drainage features, but cannot be used to retain or detain water.~~ Drainage easements are required where the ROW is not sufficient to accommodate drainage needs. See subsection E01.2.

(f) Where drainage easements overlap utility easements:

(1) Above ground drainage facilities, such as retention and detention basins, may be located in new utility easements only in a manner that will not interfere with utilities. See subsection H02.

(2) Above ground drainage facilities located within existing utility easements require a letter of non-objection from affected utilities.

(3) Culverts crossing utility easements require a letter of non-objection from affected utilities.

(4) Underground drainage facilities such as infiltration trenches and vertical inlets shall not be located in utility easements.

~~(e)~~(g) Drainage to state or other municipal ROW are subject to their respective requirements and review.

Table D-1: Drainage Sizing and Analysis Criteria

Design Requirement	Purpose	Criteria
Conveyance ~~Design~~	Size conveyances to pass design peak flows.	Drainage ditches: 10-year, 24-hour Non-regulated streams: 10-year, 24-hour Regulated streams: 100-year, 24-hour
Wetlands ~~Retention~~	Retain function of original wetlands	~~In areas where wetlands are disturbed, drainage must be designed to p~~Preserve the pre-development function of ~~the remaining~~ wetlands. For jurisdictional wetland areas, comply with United States Army Corps of Engineers wetlands development retention requirements.
Water Quality ~~Protection~~	Treat first flush pollutant loading ~~Ensure channel stability for all project conveyances~~	Treat runoff generated by 0.50 inch of rainfall in a 24-hour period.~~Treat the initial 0.25 inch of post-developed runoff for each storm event.~~ ~~Control flows in conveyance channels so that transport of particles sized D50 and greater will not occur for the post-development 10-year, 24-hour storm.~~
Erosion and Sedimentation Control	Ensure channel stability for all project conveyances	Control flows in conveyance channels so that transport of particles sized D50 and greater will not occur for the post-development peak flow.
Extended Detention	Protect streams and channels from damage from smaller, more frequent storm flows	Provide 12 to 24 hours of detention for the post-development project runoff in excess of pre-development runoff volume for the 1-year, 24-hour storm.
Flood Hazard ~~Protection~~	Control ~~project~~ peak flow to minimize downstream impacts	Option 1 Maintain the post-development project runoff peak flows from the 10-year, 24-hour storm to less than ~~1.10 times~~ or equal to pre-development runoff peak flow at all project discharge points. Option 2 Maintain the post-development project runoff peak flows to less than 1.10 times pre-development runoff peak flow at all project discharge points. Evaluate downstream until the project site area is less than 10% of the total upstream basin area and mitigate adverse impacts. ~~If post-development discharge is greater than pre-development discharge, evaluate down-gradient conditions for and mitigate adverse impacts for a~~

		~~distance of 1 mile downstream from the project as measured along the flow path or to the receiving water body, whichever is less,~~
~~Project~~ Flood Bypass	Prevent an increased risk of flood damage from large storm events.	Compute post-development peak flow and delineate~~Design or identify~~ an unobstructed, overland flow path for runoff to overtop or bypass project conveyance routes for the post-development 100-year, 24-hour storm.

D04 Drainage Ditches

Stabilize ditches with gravel, turf, or rock riprap. See Table D-2 and Table D-3 for most common conditions and acceptable ditch lining materials. Evaluate channel stability for compliance with the Erosion and Sedimentation Control design requirement in Table D-1 for other conditions.

Normal ditch depth shall be 30 inches and according to the typical section shown in subsection A06. The design peak flow required by Conveyance Design in Table D-1 shall be conveyed within ditches with a minimum freeboard of 12 inches.

The ditch depth may be reduced at local high points of the ditch, provided the flow line offset is maintained and with DPW concurrence. Alternate ditch design along Residential and Residential Subcollector streets may be considered, if evidence is provided that the following conditions exist:

(a) Ditches are a minimum of 18" deep;
(b) The design peak flow required by Table D-1 is demonstrated to be conveyed within ditches with a minimum freeboard of 12 inches;
(c) Adequate drainage routes are provided and constructed within the ROW or designated drainage easements;
(d) Flow lines are established at least 8 feet from the edge of roadway.
(e) Ditches are deepened to provide cross drainage through 24" corrugated metal culverts (18" with DPW approval).
(f) Cross sectional area of ditch is at least 15 square feet.

Table D-2: Ditch Stabilization

Flow	Ditch Slope (ft/ft)										
(cfs)	0.005	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09	0.10
2.0	A	A	A	A	A	A	A	A	A	A	A
4.0	A	A	A	A	A	A	A	A	B	B	B
6.0	A	A	A	A	A	A	B	B	B	B	B
8.0	A	A	A	A	A	B	B	B	B	B	B
10.0	A	A	A	A	B	B	B	B	B	B	C
20.0	A	A	A	B	B	B	C	C	C	C	C
30.0	A	A	A	B	B	C	C	C	D	D	D
40.0	A	A	B	B	C	C	C	D	D	D	E
50.0	A	A	B	B	C	C	D	D	D	E	E
60.0	A	A	B	C	C	D	D	D	E	E	E
70.0	A	A	B	C	C	D	D	E	E	E	E
80.0	A	B	C	C	C	D	E	E	E	E	E
90.0	A	B	C	C	D	D	E	E	E	E	F
100.0	A	B	C	C	D	D	E	E	E	F	F

Table D-3: Ditch Lining Materials

Type	Material	D50 (in)	Dmax (in)	Dmin (in)	Thickness (in)
A	Native Grass, Turf, or Gravel with < 6% fines				
B	Riprap or Bone Rock	3.0	4.5	1.5	6.0
C	Riprap or Bone Rock	6.0	9.0	3.0	12.0
D	Riprap or Bone Rock	9.0	13.5	4.5	18.0
E	Riprap or Bone Rock	12.0	18.0	6.0	24.0

D05 Culverts

D05.1 General Culvert Design Criteria

The following criteria apply to all cross road culverts for runoff or seasonal drainage:

(a) The minimum culvert slope is 0.5 percent.
(b) Culverts longer than 100 feet require appropriate maintenance access and DPW approval
(c) Cross road culverts shall have a minimum diameter of 18 inches.
(d) Culverts shall be sized to convey the design peak flow required by Table D-1, based on the larger of the two computed sizes using inlet control and outlet control.
(e) Culverts shall be corrugated metal pipe (CMP) and minimum:
  (1) 16 gauge galvanized steel on Residential and Residential Subcollector streets;
  (2) 12 gauge galvanized steel on Residential Collector and Minor Collector streets; or
  (3) 16 gauge aluminum or aluminized if needed due to soil or water conditions.
(f) Design and install energy dissipation rock aprons at culvert outlets in accordance with Hydraulic Engineering Circular No. 14 (FHWA).
~~(e)~~(g) Install culverts in accordance with the manufacturer's recommendations for the anticipated traffic loads.

D05.2 Stream Crossing Culvert Criteria

The following criteria apply to all stream crossing culverts:

(a) Prior to preliminary plat submittal, contact the Alaska Department of Fish and Game (ADFG), Division of Habitat to determine if a stream reach harbors fish. If so, stream crossing culverts shall be designed, constructed, and maintained according to D06.
(b) Stream crossing culverts shall be placed as close to the pre-existing channel alignment as possible. Avoid placing culverts at pools and stream bends.
(c) Road alignment shall be as close to perpendicular to the stream channel as possible.
(d) Culvert slope shall be within 25 percent of the natural stream slope. For example, if the natural stream slope is 1.0 percent, the minimum design slope of the culvert would be 0.75 percent and the maximum design slope would be 1.25 percent.
(e) Culvert outlet and inlet protection shall be used as necessary to reduce the risk of scour and perching.

(f) Stream crossings shall be composed of a single pipe or arch for the main stream channel.
(g) Overflow culverts may be used but should be placed at a higher elevation so that flows up to the OHWM pass through the primary culvert.
(h) Stream crossings shall maintain the connectivity of wetlands adjacent to stream channels and shall accommodate sheet flow within such wetlands.
(i) Stream crossing culverts shall not interfere with the functioning of floodplains and shall be designed to convey the design peak flow required by Table D-1. If the stream crossing culvert is not designed to accommodate the 100-year flow, a route must be established to safely convey flows exceeding the design peak flow without causing damage to property, endangering human life or public health, or causing significant environmental damage.
(j) In cases of crossings within high entrenchment ratio environments, the ratio of the flood prone width to the OHWM width is greater than 2.2, floodplain overflow culverts may be beneficial to floodplain connectivity and can be used to pass the design flow. Minimum width requirements for the primary culvert still apply.
(k) Stream crossing culverts shall have a minimum diameter of three feet.
(l) Stream crossing culvert pipes and arches shall be metal.
(m) Culverts longer than 100 feet require appropriate maintenance access and DPW approval
(n) Install culverts in accordance with the manufacturer's recommendations for the anticipated traffic loads.

D06 Fish Passage Culverts

These criteria provide general design guidance for road crossings of fish-bearing streams to maintain the full hydrologic functioning of the water body they are crossing. Site-specific conditions, such as multi-thread channels, may require alternate design approaches.

D06.1 Pre-design Conference

Schedule a fish passage pre-design conference with DPW prior to permit submittals. The pre-design conference is to:
(a) determine required permits;
(b) coordinate interagency requirements;
(c) determine any site-specific design requirements; and
(d) establish a plan review process.

D06.2 Stream Simulation Method

Stream simulation methodologies shall be used for the design of all fish-bearing stream crossings. The stream simulation method uses reference data from a representative section, or reference reach, of the specific water body crossed. This method attempts to replicate the natural stream channel conditions found upstream and downstream of the crossing. Sediment transport, flood and debris conveyance, and fish passage are designed to function as they do in the natural channel.

Reference Reach

(a) Select a reference reach on the water body being crossed that is outside any anthropogenic influence, such as an existing culvert. In most cases of new crossings, the reference reach can be at the crossing location.
(b) The length of the reference reach should be a minimum of 20 times the reference bankfull width and no less than 200 feet.
(c) If there is not a suitable reference reach on the water body being crossed, a reference reach may be chosen from another water body with similar geomorphic and hydrologic characteristics. The reference reach characteristics should meet the following criteria in comparison to the water body being crossed:
  (1) The reference reach bankfull width should be at least one half and no more than two times that of the water body being crossed;
  (2) The reference reach bankfull discharge should be at least one half and no more than one and one half times the bankfull discharge of the water body being crossed; and
  (3) The stream order of the reference reach should be within one stream order of the water body being crossed.
(d) For a reference reach from another water body, the geomorphic characteristics of the crossing shall be scaled using ratios of the bankfull conditions.
(e) The reference reach bankfull dimensions should be determined in the field by surveying a detailed cross section at the upper 1/3 of a representative riffle.
(f) Reference data shall include, at a minimum:
  (1) channel width at the OHWM,
  (2) bankfull width,
  (3) bankfull cross-sectional area,
  (4) bankfull slope based on the longitudinal profile,
  (5) substrate, and
  (6) potential for floating debris.

Culvert Size, Slope, and Substrate

In addition to D05.2, the following criteria apply to fish passage culverts:

(a) Under normal flow conditions, the channel within or under the fish passage culvert shall not differ from the reference reach condition in regards to the channel width at the OHWM, cross-sectional area, slope, substrate, and ability to pass floating debris.
(b) The width of fish passage culverts shall not be less than the greater of 1.2 times the channel width at the OHWM and 1.0 times the bankfull width.
(c) Fish passage culverts shall have a minimum diameter of five feet.
(d) The use of smooth wall culverts is prohibited.
(e) The use of trash racks or debris interceptors is prohibited
(f) Round culvert pipes shall have a minimum invert burial depth of 40 percent of the culvert diameter into the substrate. Arch or box culverts shall have a minimum invert burial depth of 20

percent of the culvert's rise into the substrate, unless scour analysis shows less fill is acceptable. The minimum invert burial depth is 1 foot.

(g) The gradation of the substrate material within a fish passage culvert shall be designed to be a dense, well-graded mixture with adequate fines to ensure that the majority of the stream flows on the surface and the minimum water depth is maintained.

(h) Substrate material within or under the fish passage culvert shall remain dynamically stable at all flood discharges up to and including a 50-year flood. Dynamic stability means that substrate material mobilized at higher flows will be replaced by bed material from the natural channel upstream of the crossing. For crossings without an adequate upstream sediment supply, the substrate material within the crossing shall be designed to resist the predicted critical shear forces up to the 100-year flood. For culverts with a slope of 6 percent or greater, substrate retention sills may be required to allow the bed load to continuously recruit within the culvert.

(i) Substrate material within or under the fish passage culvert shall incorporate a low flow channel. The low flow channel should mimic the reference reach where possible. If the low flow channel dimensions are not discernable from the reference reach, the low flow channel should have a cross sectional area of 15 to 30 percent of the bankfull cross sectional area and a minimum depth of 4 inches for juvenile fish and 12 inches for adult fish. The low flow channel should be defined by rock features that will resist critical shear forces up to the 100-year flood.

(j) Constructed streambanks are recommended inside fish passage culverts to protect the culvert from abrasion, provide resting areas for fish, and provide for small mammal crossing. If streambanks are constructed through a crossing, the streambanks shall be constructed of rock substrate designed to be stable at the 100-year flood. The streambank width should be a minimum of 1.5 times the maximum sieve size of the streambed material (D100). The crossing width shall be increased to allow for the channel width plus the streambanks.

(k) If substrate retention sills are used, they shall have a maximum weir height of one half of the culvert invert burial depth. Substrate retention sills shall be spaced so that the maximum drop between weirs is 4 inches. The use of sills without substrate is not allowed.

(l) Other state and federal requirements may apply.

D06.3 Hydraulic Method

Hydraulically designed culverts are discouraged for fish-bearing stream crossings, though may be approved by DPW and ADFG in circumstances where stream simulation is not practical. In addition to D05.2, the following criteria apply to hydraulically designed culverts:

(a) The hydraulic method uses the swimming capability and migration timing of target design species and sizes of fish to create favorable hydraulic conditions throughout the culvert crossing. Information and design software for this methodology is available from ADFG, Division of Sport Fisheries (Fishpass) and the US Forest Service (FishXing).

(b) The design fish shall be a 55-milimeter (2.16-inch) juvenile coho salmon for anadromous streams and a 55-milimeter (2.16-inch) Dolly Varden char for non-anadromous streams. These criteria may change based on ongoing research by federal and state agencies.

(c) Fish passage high flow design discharge will not exceed the 5 percent annual exceedance flow or 0.4 times the 2-year peak flow, whichever is lower and has the most supporting hydrologic data.

(d) Fish passage low-flow design discharge shall ensure a minimum 6-inch water depth or natural low flow and depth within the reach the crossing occurs. In cases where local conditions preclude natural low flow characteristics, backwatering or in-culvert structures should be considered.

(e) In cases where flared end sections with aprons are necessary and fish passage is required, water depths and velocities that satisfy fish passage criteria must be demonstrated across the apron in addition to within the culvert.

(f) Fish passage criteria for culverts crossing tidally-influenced streams must be satisfied 90 percent of the time. Tidally-influenced streams may sometimes be impassable due to insufficient depth at low flow and low tide. If the tidal area immediately downstream of a culvert is impassable for fish at low tide, the exceedance criterion shall apply only to the time during which fish can swim to the culvert.

(g) Other state and federal requirements may apply.

D07 Soil Infiltration Facilities

Soil infiltration may be used to reduce stormwater flow and volume with the following criteria:

(a) Soil infiltration facilities within Borough ROW or drainage easements should be designed such that they are not considered Class V injection wells. See Appendix A for the EPA's memorandum addressing the subject in June 2008.

  (1) Private drainage facilities that are considered Class V injection wells require conformance with EPA regulations.

~~D07~~D08 Rainfall Data

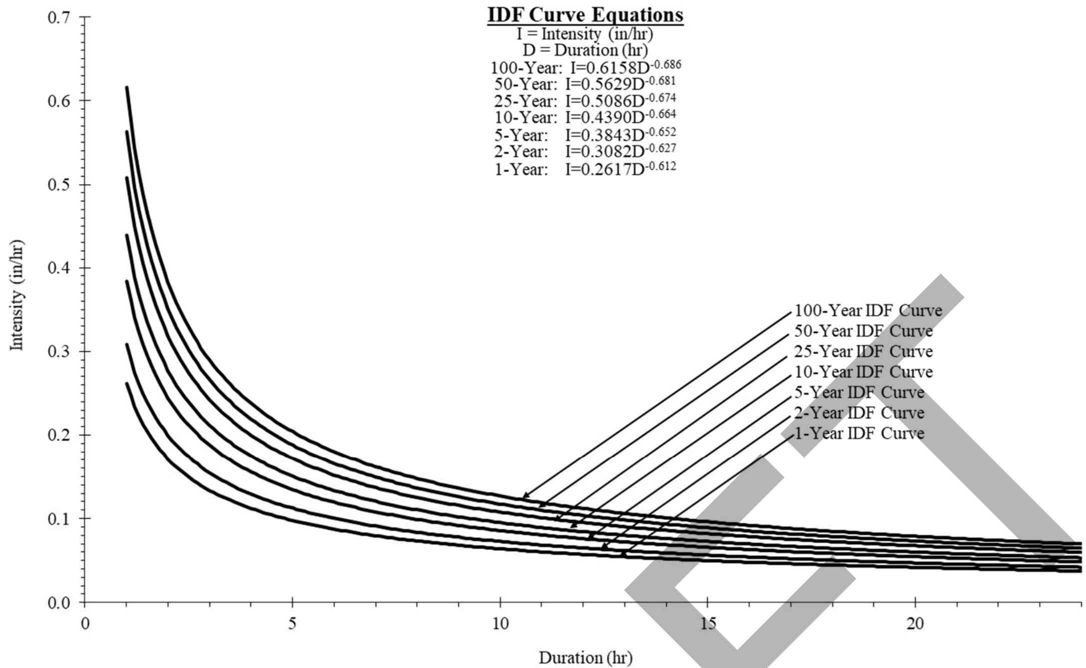
~~D07.1~~D08.1 Rainfall Distribution

Intensity-Duration-Frequency (IDF) and 24-hour rainfall data are furnished by NOAA Atlas 14 Point Precipitation Frequency Estimates. Use SCS Type-I Rainfall Distribution and 24-hour rainfall depth to compute runoff.

D08.2 Runoff Transformation

Use the Rational Method for estimating peak flows in drainage basins less than 200 acres and with times of concentration less than 20 minutes for design of conveyances. Use NRCS (SCS) Unit Hydrograph Method for estimating runoff volumes and peak flows for other conditions and applications. Other methods more appropriate for site conditions may be utilized upon DPW approval.

~~The following IDF curves and hyetograph, derived from data measured at the Palmer airport, may be used for runoff calculations.~~



~~**Figure D-1: Intensity-Duration-Frequency Relationships for the Matanuska-Susitna Borough**~~
~~*Source: Palmer Municipal Airport, 1999 to 2008, Stantec – 2009*~~

~~Table D-2: Recurrence Interval Hyetographs (in/hr) for the Matanuska-Susitna Borough~~

~~Time (hr)~~	~~1 Year~~	~~2 Year~~	~~5 Year~~	~~10 Year~~	~~25 Year~~	~~50 Year~~	~~100 Year~~
~~1~~	~~0.01~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~
~~2~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~
~~3~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.03~~
~~4~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.03~~	~~0.03~~
~~5~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.03~~	~~0.03~~	~~0.03~~
~~6~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.03~~
~~7~~	~~0.02~~	~~0.02~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.04~~
~~8~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.04~~	~~0.04~~	~~0.04~~
~~9~~	~~0.03~~	~~0.03~~	~~0.04~~	~~0.04~~	~~0.04~~	~~0.05~~	~~0.05~~
~~10~~	~~0.04~~	~~0.04~~	~~0.04~~	~~0.05~~	~~0.05~~	~~0.06~~	~~0.06~~
~~11~~	~~0.05~~	~~0.05~~	~~0.06~~	~~0.06~~	~~0.07~~	~~0.08~~	~~0.08~~
~~12~~	~~0.06~~	~~0.07~~	~~0.07~~	~~0.08~~	~~0.09~~	~~0.10~~	~~0.10~~
~~13~~	~~0.26~~	~~0.31~~	~~0.38~~	~~0.44~~	~~0.51~~	~~0.56~~	~~0.62~~
~~14~~	~~0.08~~	~~0.09~~	~~0.10~~	~~0.12~~	~~0.13~~	~~0.14~~	~~0.15~~
~~15~~	~~0.04~~	~~0.04~~	~~0.05~~	~~0.05~~	~~0.06~~	~~0.06~~	~~0.07~~
~~16~~	~~0.03~~	~~0.04~~	~~0.04~~	~~0.04~~	~~0.05~~	~~0.05~~	~~0.05~~
~~17~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.04~~	~~0.04~~	~~0.04~~	~~0.04~~
~~18~~	~~0.02~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.04~~	~~0.04~~
~~19~~	~~0.02~~	~~0.02~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.03~~	~~0.03~~
~~20~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.03~~	~~0.03~~	~~0.03~~
~~21~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.03~~	~~0.03~~	~~0.03~~
~~22~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.03~~
~~23~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~
~~24~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~	~~0.02~~
~~Total~~	~~0.90~~	~~1.01~~	~~1.16~~	~~1.28~~	~~1.43~~	~~1.55~~	~~1.67~~

~~Note: Total values of rainfall calculated by adding un-rounded average rainfall intensities for each time step.~~
~~Source: Palmer Municipal Airport, 1999 to 2008, Stantec – 2009~~

Section E. Easements

E01 General

E01.1 Common Access Easements

When a shared driveway is required for two or more lots, a common access easement shall be ~~dedicated~~ granted for the exclusive use of the subject lots, unless otherwise accommodated. ~~The MSB is the permitting authority within common access easements.~~ The common access easement shall be sized to reasonably accommodate separation of the shared driveway to the individual lots.

E01.2 Drainage Easements

Drainage easements are required where the ROW is not sufficient to accommodate drainage needs. Drainage easements can overlap with other platted easements and shall begin or terminate at the ROW. Drainage easements shall be a minimum width of 20 feet, and a minimum average length of 20 feet outside of any overlapping easements or of sufficient size and area shown to facilitate construction and maintenance.

E01.3 Slope Easements

Slope easements are required to contain all cut and fill slopes steeper than 2.5:1 that extend outside of the ROW, plus at least 5 feet outside the cut or fill catches.

E01.4 Sight Distance Maintenance Easements

Sight distance maintenance easements are required where intersection sight triangles extend outside of the ROW.

E01.5 Snow Storage Easements

Snow storage easements are required where the ROW is not sufficient to accommodate anticipated snow removal needs. Snow storage easements shall be located where the storage of snow would not impede sight distance.

E01.6 Utility Easements

Unless lots are otherwise served by alternate utility easements or agreements, at least one 15-foot utility easement adjacent to the ROW is required to allow for utility installation and maintenance. Additional utility easements may be required as deemed reasonably necessary by utility companies to serve the subdivision or protect existing facilities. The applicant is responsible for satisfying any conflicts that may occur in the request for easements from any utility company during the platting process.

Platted utility easements are to be clear of wells, septic systems, structures, or encroachments, as defined by MSB or other applicable code; unless the applicant has obtained an encroachment permit from the MSB and a "Non-Objection to Easement Encroachment" from each utility.

Utility easements are to be fully useable for utility installation where installation equipment can safely work. Whenever possible, utility easements should not be placed in swamps, steep slopes, or other unusable areas.

Section F. Development Implementation

F01 General

This section describes the procedure that is to be followed before constructing any improvements required for recording a subdivision plat. The applicant's engineer shall be the primary point of contact throughout this process.

It is the applicant's responsibility to determine, acquire, and follow permits required by other agencies. Approval from MSB does not supersede other agencies' permit requirements.

F01.1 Preliminary Plat Submittal

The preliminary plat submittal is to be accompanied by:

(a) ADT calculations per A15;
(b) Preliminary drainage plan per D02.1;
(c) Road plan and profile for sections of road where proposed grades exceed 6 percent where cuts and fills exceed 5 feet in height measured from the centerline, or where slope easements will be required, and cross sections at the maximum cut and fill sections. Road plan and profile shall include the vertical curves or grade breaks on either side of the subject sections;
(d) Road plan, profile, and cross-sections if required by B03.3; and
(e) Intersection sight distance evaluation, if requested, according to A09.1.

F01.2 Construction Plans

Submit construction plans to DPW at least seven calendar days before the preconstruction conference. All plan drawing submittals shall be at a scale of 1 inch = 50 feet or more detailed, plottable on 11" by 17" paper. Construction plans shall include the following:

(a) Drainage Report, according to D02.2;
(b) Plan & Profile of proposed roads (if required by F01.1);
    (1) Existing topography with horizontal and vertical accuracy meeting US National Map Accuracy standards, two-foot contour intervals within the proposed road corridors.
(c) Asbuilt survey of visible improvements and above ground utilities within and adjacent to the subdivision;
(d) Copy of agency accepted permit applications required for the improvements prior to construction, including but not limited to ADOT&PF Approach Road Permit, DNR Section Line Easement authorization, MSB Flood Hazard Development permit, and USACE wetland fill permit; and
(e) Plans for any proposed improvements within the ROW that are outside of the scope of this manual (e.g. retaining walls or guard rail) or do not conform to the standards set forth herein, conforming to ADOT&PF design criteria and standards.

F01.3 Preconstruction Conference

The preconstruction conference is for the purpose of reviewing and approving the Subdivision Construction Plan for the required improvements. The engineer may request scheduling of a preconstruction conference with DPW after the preliminary plat has been approved by the Platting Board, the ~~Notification of Action (NOA)~~Platting Board Action Letter has been received, and the construction plans have been submitted. Scheduling of preconstruction conference requests may be delayed during the month of October. The applicant, or designated representative, and the engineer must attend the preconstruction conference. In addition to the construction plans, the following items will be provided at or prior to the preconstruction conference:

(a) Cost estimate of required improvements for the determination of the inspection fee according to the most recently adopted Schedule of Rates and Fees;
(b) Proof of compliance with the Alaska Pollutant Discharge Elimination System Program;
    (1) Acceptable proof includes a Notice of Intent (NOI), a Low Erosivity Waiver (LEW), or a determination by a qualified person that neither is needed.
(c) Rough plan and time line for construction;
(d) Copy of any issued permits required for the improvements prior to construction;
(e) Off-site material source and quantities; and
(f) On-site clearing, grubbing, and topsoil disposal plan, location map.

The Subdivision Construction Plan must be signed by the applicant, or designated representative, and the engineer. Upon acceptance of the Subdivision Construction Plan by DPW and payment of the inspection fee, the Platting Division will issue a Notice to Proceed (NTP). ~~See Appendix B for an example of the Subdivision Construction Plan.~~

Some construction plans or permit approvals may take longer to develop or obtain, such as fish passage culvert plans and associated permits. Those finalized plans and issued permits may be submitted later but must be received and reviewed by DPW before construction begins within the respective areas.

F01.4 Interim Inspections

The applicant's engineer shall supervise all phases of construction. Notify DPW of changes to the Subdivision Construction Plan, such as adding or deleting a cross culvert, changes in culvert size, adding or deleting a drainage facility, grade changes of more than 1 percent or that would result in grades of over 6 percent or cuts or fills of over 5 feet in height measured from the centerline, or changes to foreslopes or backslopes. The changes should be approved by DPW prior to completion of construction. Periodic interim inspections may be conducted by DPW. Interim inspections may be requested by the engineer.

F01.5 Subdivision Agreements

If a developer wishes to enter into a Subdivision Agreement and the requirements of MSB 43.55.010(A) are met, the engineer shall submit a request to DPW no later than October 15th for an Interim Inspection. The Interim Inspection shall be attended by the engineer and DPW, and a list of remaining improvements and work items will be developed. The engineer shall then submit a request for a Subdivision Agreement containing the scope of work, quantity estimates, and cost estimate in accordance with MSB 43.55 to Platting and for approval by DPW. DPW will only approve the request for a Subdivision Agreement if all of the minimum required improvements have been inspected by October 31st or before winter conditions prohibit inspection, whichever comes first.

~~F01.5~~F01.6 Pre-Final Inspection

When the engineer has determined that construction of the improvements will be substantially complete according to the Subdivision Construction Plan, the engineer will request a Pre-Final Inspection. The Pre-Final Inspection request must be received by September 30th and shall include a description of work yet to be completed. The Pre-Final Inspection will be scheduled to occur within 14 calendar days of the request and shall be attended by the engineer and DPW. A punch list will be developed, if any work items remain, at the Pre-Final Inspection.

~~F01.6~~F01.7 Final Inspection

When construction of the improvements and punch list items are complete according to the Subdivision Construction Plan, the engineer will request a Final Inspection of the improvements. The Final Inspection request must be received by October 15th. Final Inspections will cease October 31st, or when winter conditions prohibit inspection, whichever comes first. The Final Inspection will be scheduled to occur within 14 calendar days of the request and shall be attended by the engineer and DPW.

~~F01.7~~F01.8 Final Report

Upon DPW approval of the Final Inspection, the engineer shall submit a written Final Report to the Platting Division. The Final Report shall include:

(a) Stamped and signed narrative describing at a minimum:
  (1) road construction process and equipment used,
  (2) material source and disposal areas,
  (3) road embankment and subbase used,
  (4) road topping or pavement used,
  (5) compactive effort,
  (6) road dimensions and shaping (length, roadway width, material thicknesses, pavement width, crown, cul-de-sac or t-turnaround dimensions and slope, foreslope, backslope, maximum centerline grade, etc.) for each road constructed,
  (7) drainage, ditch depth, location of drainage easements, and
  (8) road standard certification (Pioneer Road, Residential Street, etc.) for each road constructed;

(b) Stamped and signed final drainage plan, (minimum 11"x17");

(c) As-built drawing showing the horizontal locations of borrow extraction along the road corridor;

~~(c)~~(d) Documentation verifying Surface Course thickness such as photos and descriptions of test pits, scale tickets, asbuilt surveys, or alternative methods approved by DPW;

~~(d)~~(e) Compaction test reports;

~~(e)~~(f) Gradation tests, if required; and
~~(f)~~(g) Photos of each stage of construction.

DPW will review the report and provide comments, if necessary, within 14 calendar days.

~~F01.8~~F01.9 Construction Acceptance

Upon approval of the Final Report, DPW will issue a Certificate of Construction Acceptance.

~~F01.9~~F01.10 Warranty

All improvements are to be guaranteed until October 31st of the calendar year following ~~issuance of the Certificate of Construction Acceptance~~DPW approval of the Final Inspection. Roads within a Road Service Area may be accepted for maintenance at the end of the warranty. Pioneer Roads are not eligible for maintenance. Maintenance of Mountain Access Roads is at the discretion of DPW.

During the warranty period, the applicant is responsible for any road maintenance including, but not limited to: snow removal, maintaining a smooth road surface and crown, maintaining stabilized foreslopes and backslopes, and maintaining positive drainage. If any deficiencies arise during the warranty, DPW will issue a punch list to the applicant by September 1st to allow time for completion of repairs. The applicant must notify DPW of completion of repairs by October 15th for the roads to be eligible for maintenance on November 1st.

The warranty period for improvements following completion of a subdivision agreement may be lessened to one calendar year. The applicant shall request a punch list from DPW no more than one month before the end of the one-year warranty.

If the subdivision plat has not recorded ~~within 6 months of the date of the Certificate of Construction Acceptance~~by April 30th or if warranty repairs are not completed by October 15th, the warranty will be extended an additional year and the warranty process will be repeated.

Maintenance may be denied and the Certificate of Construction Acceptance revoked if deficiencies are not corrected to the satisfaction of DPW. A notice may be recorded indicating to the public that the MSB is not responsible for road upkeep and maintenance until such a time that the deficiencies are corrected.

Section G. Commercial and Industrial Subdivisions

G01 General

Commercial and Industrial subdivisions shall be designed using trip generation rates from the Institute of Transportation Engineers (ITE) Trip Generation Manual, and to meet the standards of AASHTO, International Fire Code (IFC), and any other applicable standards or code.

Section H. Utilities

H01 General

These standards apply to the design and construction of utility facilities within the MSB. All utility installation within existing or proposed ROW or utility easements must comply with the provisions of MSB or other applicable code, or as otherwise approved by the permitting authority.

H02 Utility Location Guidelines

H02.1 Underground Utility Facilities:

(a) The location of utility facilities placed within the ROW shall be coordinated with the permitting authority.
(b) Backslopes or foreslopes which extend into a utility easement should not exceed 4:1. These limits are necessary for construction equipment for utility installation.
(c) Utility facilities paralleling the road shall not be located within 10 feet of the roadway, unless otherwise approved by the permitting authority.
(d) Underground road crossings shall be buried a minimum of 48 inches below finished grade. Backfill shall be compacted according to the requirements of Section C, or as otherwise approved by the permitting authority.
(e) Conduit road crossings, if used, shall be installed in accordance with each utility company's standards and applicable code.
(f) Standard burial depth of longitudinal utilities is 36 inches below grade. The applicant should delineate areas, such as where driveways and drainage easements are planned, where deeper burial may be needed.

H02.2 Above Ground Utility Facilities:

(a) Above ground pedestals, poles, and utility facilities shall not be located within 10 feet of the roadway, unless an alternate design meets clear zone requirements.
(b) Above ground pedestals, poles, and utility facilities shall not be located such that they substantially block intersection or driveway sight triangles.
(c) Unless otherwise authorized by the permitting authority, above ground pedestals, poles, and utility facilities shall not be located within the ROW nearer than 40 feet from the point of intersection of the extension of the property lines at any existing or proposed intersection on Residential Collector streets or higher classification.
(d) Above ground pedestals, poles, and utility facilities shall not be located within a common access easement or drainage easement, within 20 feet of a common access point, or within 10 feet of a roadway cross culvert.
(e) Permanent 5-foot high snow marker poles, grey with white retroreflective sheeting or yellow, shall be installed on all pedestals and vaults.
(f) All guy wires installed within the ROW or utility easements adjacent to, or near to a roadway shall have a minimum 8-foot long yellow delineator installed above the anchor.

(g) Pedestals located within the ROW shall be located within the outer 1 foot of the ROW.

H02.3 Separation of Utilities:

(a) Recommend 5-foot horizontal separation between power poles and buried utilities.

(b) Recommend minimum 1-foot physical separation between all underground utilities.

(c) Separation of storm, sewer, and water utilities shall meet the requirements of the Alaska Department of Environmental Conservation.

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Appendix A

Environmental Protection Agency Memorandum - Class V Injection Wells

~~MSB Special Provision to the ADOT&PF Standard Specifications for Highway Construction~~

~~Appendix B~~

~~Subdivision Construction Plan~~

MATANUSKA-SUSITNA BOROUGH
Public Works Department
350 East Dahlia Avenue • Palmer, AK 99645 (mailing address)
Phone (907) 861-7751 • Fax (907) 861-7735
e-mail: Terry.Dolan@matsugov.us

MEMORANDUM

DATE: May 11, 2022

TO: Alex Strawn, Planning & Land Use Director

FROM: Terry Dolan, Public Works Director Terry Dolan Digitally signed by Terry Dolan Date: 2022.05.11 16:01:57 -08'00'

SUBJECT: Department of Public Works' Position on the Subdivision Construction Manual 2022 Update

I have reviewed the updates to the Subdivision Construction Manual and I support the implementation with the attached notes.

Attachment: as noted

DPW's Position on the Subdivision Construction Manual 2022 Update

Construction: **We recommend the addition of language regarding the use of stormwater best management practices (BMPs) during construction.**

BMPs should always be used, whether required for Alaska Pollutant Discharge Elimination System permit coverage or not, to maintain compliance with the Clean Water Act, Clean Air Act, Alaska Water Quality Standards (18 AAC 70), etc.

Water Quality: **We recommend no change to the "first flush" design requirement.**

The proposed change to this design requirement appears to be more stringent than the current standard, however in many cases the runoff calculations will show that the entirety of a 0.50" rain event will be absorbed in the ground and no treatment of runoff will need to be provided. This change overlooks the need for runoff treatment during frozen ground conditions, such as during a winter rain event or spring breakup. The current design requirement to treat the initial 0.25 inch of post-developed runoff intentionally ignores the differing permeability of site soils to account for when the ground or snow surface is sealed by ice.

> Industry Standards
>
> Section 12.3, page 12-8, of Highway Drainage Guidelines, 4th edition (AASHTO, 2007) says [emphasis mine] "Water quality facilities are most often designed to treat the "first flush" from a storm event, because the initial flush of runoff contains the highest percentage of pollutants. The **first 15 mm (0.6 in) of storm runoff** is generally considered to contain this surcharge of pollutants." Subdivision roads see considerably less traffic than the highways considered in this AASHTO manual, however winter sand and salt, oil leaks from parked vehicles, etc still contribute a significant amount of pollutants that should be considered.
>
> The Municipality of Anchorage requires treatment of runoff from the 90th percentile storm (0.52") which is comparable to the proposed change to the Water Quality design requirement. However, the Muni requires treatment of runoff from **all impermeable areas** with Green Infrastructure (i.e. rain garden or sedimentation basin).

Soil Infiltration Facilities: **We recommend the addition of standards for soil infiltration facilities.** MSB currently has no standards for the size or location of these facilities which has resulted in large discrepancies between designers. Many of these soil infiltration facilities are being constructed within the roadside ditch which can cause damage to the road prism during freeze thaw cycles and are more likely to become clogged with sediment. See excerpt below from Section 12.3.3.2, page 12-17, of Highway Drainage Guidelines, 4th edition (AASHTO, 2007) supporting many of our recommended standards.

12.3.3.2 *Infiltration Facilities*

Properly functioning infiltration practices are effective water quality controls. To ensure that the longest possible life is realized from an installation, the engineer should consider the following points:

- The facility depth should be set to allow complete draining of the structure within 24 to 72 hours. This will ensure that the design volume is available to treat the next storm event.
- The minimum practical soil permeability is 25 mm/h (1 in./h). Advance soil tests should be conducted at all proposed infiltration sites to verify this rate.
- When water quality is a concern, the bottom of the facility should be set above the seasonal high groundwater table or bedrock to provide for filtering. An additional factor of safety should be considered if limited information on the groundwater table is available or if large fluctuations in water table elevations are typical of the area.
- A filter strip or vegetated swale should be provided upstream to buffer the facility from sources of high sediment loadings. Additionally, infiltration facilities should be kept a sufficient distance from the edge of pavement to prevent saturation of the roadway subbase.
- To avoid problems of slope saturation and excessive settlement, infiltration facilities should not be placed in fill areas.
- Construction of trenches (Figure 12-10), dry wells, and basins should be the last item completed on a project. Allowing stabilization of all contributing areas prior to constructing infiltration facilities will limit premature clogging through sediment deposition.
- To maximize storage volumes, infiltration facilities should be constructed with a flat bottom. In areas of steep slopes, use of several small facilities in series will reduce the depth of excavation over that required for a single large facility.
- Porous pavement (Figure 12-11) should be limited to application in low-volume traffic areas. A typical application would be a commuter parking lot. The passenger vehicle parking area would use porous pavement while the access lanes and the bus loading areas would have conventional pavement. Regular vacuuming will be necessary to maintain porosity.

C01 General

This section establishes minimum construction requirements. Prior to any ground disturbing activities, call the Alaska Dig Line for utility locates in accordance with AS 42.30.400 and initiate construction stormwater Best Management Practices (BMPs). If required by Alaska Department of Environmental Conservation (ADEC) obtain coverage under the Construction General Permit (CGP) or individual APDES permit.

D03 Drainage Design Criteria

Table D-1: Drainage Sizing and Analysis Criteria

Design Requirement	Purpose	Criteria
Water Quality	Treat first flush pollutant loading	Treat the initial 0.25 inch of post-developed runoff for each storm event.

D07 Soil Infiltration Facilities

Soil infiltration may be used to reduce stormwater flow and volume with the following criteria:

a) Perform field testing to determine soil infiltration rates using ASTM D3385 (Standard Test Method for Infiltration Rate of Soils in Field Using Double-Ring Infiltrometer) or the Falling Head Percolation Test Procedure (EPA) at or below the proposed bottom of the infiltration facility.

b) The design infiltration rate shall be no more than 50% of field-measured rate.

c) Where the field measured infiltration rate exceeds eight inches per hour, evaluate potential for groundwater contamination and provide appropriate measures to reduce rate of infiltration or provide pre-treatment.

d) Soil infiltration facilities are not recommended in locations where the field measured infiltration rate is less than one inch per hour.

e) In compliance with 18 AAC 80, facilities must be located a minimum distance of 200 feet from Public Water System wells. Water lines cannot be located in or under soil infiltration facilities.

f) Consider ground water hydraulics and the proximity of soil infiltration facilities to private drinking water wells.

g) Underground soil infiltration facilities shall not be located in utility easements.

h) Minimum separation distance between the seasonal high groundwater table elevation and the bottom of soil infiltration facilities is two feet.

i) Soil infiltration facilities shall be located such that water is not held against the structural section and are generally not allowed in the roadside ditches.

j) Construction of soil infiltration facilities should occur after all contributing areas have been stabilized to limit premature clogging through sediment deposition.

k) Soil infiltration facilities within Borough rights-of-way or drainage easements should be designed such that they are not considered Class V injection wells. See Appendix A for the EPA's June 2008 memorandum addressing the subject.

(1) **Private drainage facilities that are considered Class V injection wells require conformance with EPA regulations.**

Karol Riese

From: Alex Strawn
Sent: Wednesday, May 18, 2022 9:18 AM
To: Karol Riese
Subject: FW: Subdivision Construction Manual Update

From: bruce@civilresourcesllc.com <bruce@civilresourcesllc.com>
Sent: Tuesday, May 17, 2022 10:38 AM
To: Alex Strawn <Alex.Strawn@matsugov.us>; Jamie Taylor <Jamie.Taylor@matsugov.us>; Fred Wagner <Frederic.Wagner@matsugov.us>; 'Gary LoRusso' <garyl@mtaonline.net>; 'Jess Hall' <jhall@hallhomes.com>; 'Dave Miller' <dmiller@nortakbuilders.com>; 'Curt Holler' <holler@mtaonline.net>
Subject: RE: Subdivision Construction Manual Update

[EXTERNAL EMAIL - CAUTION: Do not open unexpected attachments or links.]

Comments:

1. Not needed. Best Management Practices are required by SWPPP. Requirement for SWPPP/NOI are already required. Always using BMP'S even when not required is a personal preference, might be a good idea, but does not necessarily benefit Waters of the United States or Alaska.
2. Using runoff from 0.5" rainfall will treat 90% of all rainfall including snow melt during spring break up. Anchorage data plus snow melt estimates shows that snow melts at about 0.5" to 0.6" per day during spring break up. Snow melt will infiltrate into frozen ground in the winter just like any other time of the year unless "ice sealing" occurs. "Ice Sealing" is a rare event and did not occur this year. When it does occur, it reduces infiltration and lasts for one or two days. It would be considered an extreme event (less than 10% of all events). Other agencies base their requirement on the 90th percentile rainfall event and I recommend MSB do the same until more data and analyses justifies a higher value. It may be more appropriate to add requirements for snow storage facilities.
3. Road side ditches are green infrastructure. Runoff from impervious paved road flows into gravel and vegetated road side ditches where water is filtered by vegetation and infiltrates into the ground. Filtering and infiltration is green infrastructure. Adding infiltration trenches improves performance.
4. I agree with adding standards for infiltration facilities following more study and analyses. A distinction between high and low capacity facilities is important. Standards often referenced are usually for high capacity facilities and not the small low capacity ditch infiltration trenches that are commonly used in the Borough. Clogging of small ditch infiltration ditches could be an issue downstream from a steep slope where there is sedimentation from upstream erosion or winter sanding. But this should not be an issue if steep ditches are stabilized to prevent movement of D_{50} particle size and sand is reclaimed. Ditch trenches should be protected from clogging during and after construction until ditch has been stabilized. This is a standard SWPPP requirement. I have been placing rock/wattle check dams upstream of ditch trenches for this purpose. It would also be a good idea to cover the trench with filter fabric similar to septic absorption trenches. If this was done, you would need a small drop inlet to direct water into the rock under the fabric.
5. Is there a history of road damage from ditch infiltration facilities? There shouldn't be. The large porous material in the trenches is not susceptible to freeze thaw and is outside the road prism.

<u>I do not recommend any more changes to the SCM</u> without more study and analyses. For example, are there wetlands, streams, or lakes that show degradation caused by upstream subdivisions? If not, why make any changes? Standards developed for high density impervious urban areas are not applicable to the low density pervious rural residential areas covered by the DCM. Maybe the SCM standards should differentiate between commercial, industrial, and residential storm water requirements.

Bruce J. Friedhoff, PE
3001 W. Stonebridge Drive
Wasilla, AK 99654
Email: Bruce@CivilResourcesLLC.com
Phone: 907-354-3021

From: Alex Strawn <Alex.Strawn@matsugov.us>
Sent: Monday, May 16, 2022 4:59 PM
To: Jamie Taylor <Jamie.Taylor@matsugov.us>; Fred Wagner <Frederic.Wagner@matsugov.us>; 'Gary LoRusso' <garyl@mtaonline.net>; 'Jess Hall' <jhall@hallhomes.com>; bruce@civilresourcesllc.com; 'Dave Miller' <dmiller@nortakbuilders.com>; 'Curt Holler' <holler@mtaonline.net>
Subject: Subdivision Construction Manual Update

Good evening,

Attached is a memo from Public Works regarding the changes to the manual. Please let me know if you have any questions.

Thanks,
Alex Strawn
Planning & Land Use Director

Matanuska-Susitna Borough
350 E. Dahlia
Palmer, AK 99645
(907) 861-7850

By: A. Strawn
Introduced: June 2, 2022
Public Hearing: June 16, 2022
Action:

MATANUSKA-SUSITNA BOROUGH
PLATTING BOARD RESOLUTION NO. 22-039

A RESOLUTION OF THE MATANUSKA-SUSITNA BOROUGH PLATTING BOARD RECOMMENDING ADOPTION OF AN ORDINANCE AMENDING MSB 43.05.015 PURPOSE AND SCOPE, TO REFERENCE THE 2022 SUBDIVISION CONSTRUCTION MANUAL.

WHEREAS, in August 2020, the Matanuska-Susitna Borough Assembly adopted a major revision to the Subdivision Construction Manual; and

WHEREAS, after working with the new manual for a construction season, both staff and the development community identified modifications that will clarify requirements of the manual; and

WHEREAS, the modifications consist of general cleanup, modification of standards, and clarification of acceptable engineering techniques.

NOW, THEREFORE, BE IT RESOLVED, that the Matanuska-Susitna Borough Platting Board hereby recommends Assembly amending MSB 43.05.015 Purpose and Scope, to reference the 2022 Subdivision Construction Manual.

ADOPTED by the Matanuska-Susitna Borough Platting Board this -- day of --, 2022.

WILFRED FERNANDEZ, Chair

ATTEST

SLOAN VANGUNTEN
Platting Board Clerk

(SEAL)

YES:

NO:

MATANUSKA-SUSITNA BOROUGH
TRANSPORTATION ADVISORY BOARD
RESOLUTION SERIAL NO. TAB 22-03

A RESOLUTION OF THE MATANUSKA-SUSITNA BOROUGH TRANSPORTATION ADVISORY BOARD IN SUPPORT OF INCREASED TRANSPARENCY IN THE DELIBERATIONS OF REVISIONS TO THE 2020 SUBDIVISION CONSTRUCTION MANUAL THROUGH ADVERTISEMENT AND PUBLIC PARTICIPATION.

WHEREAS, the Matanuska-Susitna Borough Transportation Advisory Board advises the Assembly on transportation-related issues; and

WHEREAS, the Subdivision Construction Manual (SCM) is intended to:

1) Establish standards for the design and construction of transportation networks throughout the Matanuska-Susitna Borough;
2) Provide information and guidelines for the design, construction, and upgrade of roads, drainage facilities, and utilities within rights-of-way;
3) Develop and maintain a safer and more efficient transportation system; and
4) Minimize operation and maintenance efforts; and

WHEREAS, in April 2016, the Mat-Su Borough Assembly signed Resolution 17-003 supporting the rewrite of the 1991 SCM; and

WHEREAS, beginning in June 2018, a group of subject matter experts was formed to review the document. The group consisted of local Land Surveyors, Civil Engineers, Developers, Homebuilders, Board Members, and Borough staff; and

WHEREAS, on Tuesday, August 18th, 2021, the Matanuska-Susitna Borough Assembly adopted the 2020 SCM, which went into effect on January 1st, 2021; and

WHEREAS, the SCM the Borough Assembly adopted is currently undergoing additional revisions; and

WHEREAS, the current revision process has not been advertised or conducted as a part of a public process, and the deliberations have not included the same diversity of subject matter experts as was involved in the initial rewrite; and

WHEREAS, public participation directly engages the public in decision-making and gives full consideration to public input in making that decision; and

WHEREAS, public participation builds trust, ensures transparency, and creates results that are beneficial to the entire Borough community, instead of individual stakeholders.

NOW, THEREFORE, BE IT RESOLVED, the Transportation Advisory Board requests increased transparency in the deliberations of revisions to the 2020 Subdivision Construction Manual through advertisement and public participation.

ADOPTED by the Matanuska-Susitna Borough Transportation Advisory Board this _____ day of ______________, ____.

____
Joshua Cross, Chair

ATTEST:

____
Kim Sollien, Planning Services Manager
Staff Support

CODE ORDINANCE

Sponsored by:
Introduced:
Public Hearing:
Action:

MATANUSKA-SUSITNA BOROUGH
ORDINANCE SERIAL NO. 22-___

AN ORDINANCE OF THE MATANUSKA-SUSITNA BOROUGH ASSEMBLY AMENDING MSB 43.05.015 PURPOSE AND SCOPE, TO REFERENCE THE 2022 SUBDIVISION CONSTRUCTION MANUAL UPDATE.

BE IT ENACTED:

Section 1. Classification. This ordinance is of a general and permanent nature and shall become a part of the Borough Code.

Section 2. Amendment of section. MSB 43.05.015(B)(3) is hereby amended to read as follows:

(3) [2020] **2022** Subdivision Construction Manual.

Section 3. Effective date. This ordinance shall take effect upon adoption.

ADOPTED by the Matanuska-Susitna Borough Assembly this - day of -, 2022.

____
EDNA DeVRIES, Borough Mayor

ATTEST:

____
LONNIE R. McKECHNIE, CMC, Borough Clerk

(SEAL)

By:	A. Strawn
Introduced:	June 2, 2022
Public Hearing:	June 16, 2022
Action:	

MATANUSKA-SUSITNA BOROUGH
PLANNING COMMISSION RESOLUTION NO. 22-18

A RESOLUTION OF THE MATANUSKA-SUSITNA BOROUGH PLANNING COMMISSION RECOMMENDING ADOPTION OF AN ORDINANCE AMENDING MSB 43.05.015 PURPOSE AND SCOPE, TO REFERENCE THE 2022 SUBDIVISION CONSTRUCTION MANUAL.

WHEREAS, in August 2020, the Matanuska-Susitna Borough Assembly adopted a major revision to the Subdivision Construction Manual; and

WHEREAS, after working with the new manual for a construction season, both staff and the development community identified modifications that will clarify requirements of the manual; and

WHEREAS, the modifications consist of general cleanup, modification of standards, and clarification of acceptable engineering techniques.

NOW, THEREFORE, BE IT RESOLVED, that the Matanuska-Susitna Borough Planning Commission hereby recommends Assembly amending MSB 43.05.015 Purpose and Scope, to reference the 2022 Subdivision Construction Manual.

ADOPTED by the Matanuska-Susitna Borough Planning Commission this -- day of --, 2022.

Stafford Glashan, Chair

ATTEST

KAROL RIESE, Planning Clerk

(SEAL)

YES:

NO:

COMMISSION BUSINESS

MATANUSKA-SUSITNA BOROUGH
Planning and Land Use Department
350 East Dahlia Avenue • Palmer, AK 99645
Phone (907) 861-7822
www.matsugov.us

MEMORANDUM

DATE: May 20, 2022

TO: Planning Commissioners

FROM: Alex Strawn, Planning and Land Use Director

SUBJECT: Tentative Future PC Items

Upcoming PC Actions

Quasi-Judicial

- Frontier Plaza Subdivision – Earth Material Extraction, 18N10E31A004 (Staff: Mark Whisenhunt)
- Talkeetna Connection – Marijuana Retail Facility, 24N04W29D002 (Staff: Peggy Horton)
- Dime Bag – Marijuana Retail Facility, 6298B01L002 (Staff: Peggy Horton)
- Premier Homes – Earth Material Extraction, 17N02W34D003 (Staff: Peggy Horton)
- Green Jar – Hatcher Pass – Marijuana Retail Facility, 4316B01L0064 (Staff: Jason Ortiz)
- Green Go, LLC – Marijuana Cultivation Facility, 17N01W11A020 (Staff: Mark Whisenhunt)
- Floaters – Alcoholic Beverage Dispensary Expansion, 1783B02L003 (Staff: Mark Whisenhunt)
- QAP – Church-Seldon, Earth Material Extraction, 18N01W31A015 (Staff: Peggy Horton)
- Denali Farms – Marijuana Cultivation Facility, 4136B03L004 (Staff: Peggy Horton)
- MSB East Kashwitna – Earth Materials Extraction, 20N04W07A001 (Staff: Mark Whisenhunt)
- Purely Alaskan – Residential Special Land Use District CUP, 19N04W29A012 (Staff: Mark Whisenhunt)
- Checkmate Harvest Company – Marijuana Cultivation Facility, 18N01W15D005 (Staff: Mark Whisenhunt)

Legislative

- Historic Preservation Plan (HPP) (Staff: Adam Bradway)
- Municipal Separate Storm Sewer System (MS4) (Staff: Rick Antonio)
- Bike and Pedestrian Plan (Staff: Kelsey Anderson)
- MSB Borough-Wide Comprehensive Plan (Staff: Kim Sollien)
- Marijuana Code Update (Staff: Alex Strawn)
- Glacier View Comprehensive Plan Update (Staff: Leda Borys)
- Coordinated Human Services Transportation Plan (Staff: Leda Borys)
- Aviation Overlay District Repeal (Staff: Kelsey Anderson)
- Beverly Lake Lake Management Plan (Staff: Kelsey Anderson)
- MPO Formation (Staff: Kim Sollien)
- Corridor Studies (Staff: Kim Sollien/Adam Bradway)