



**Glenn Highway
& Hiland Road**
Interchange Improvements



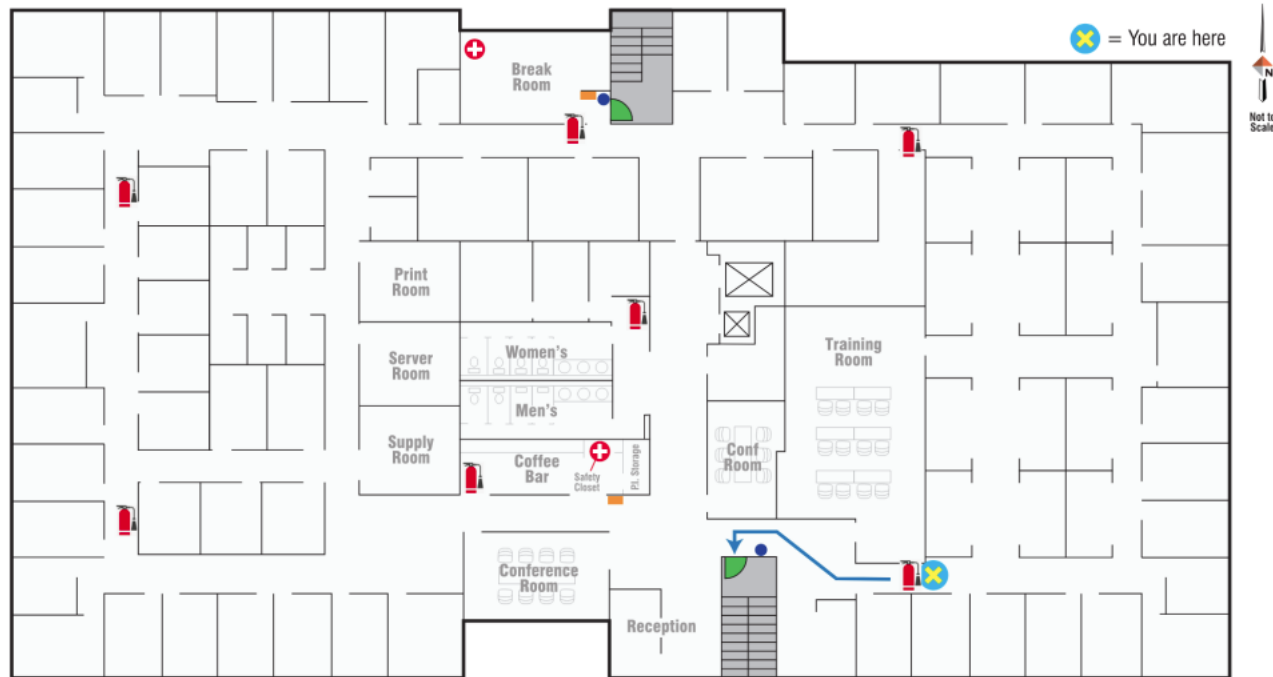
Glenn Highway & Hiland Road

Interchange Planning Workshop

April 30, 2024



Safety Minute



After hours/Emergency: Call 907-865-1500 or 911



5015 Business Park Boulevard, Suite 4000

Evacuation Route Map

Fire Extinguisher
AED
First Aid Kit
Exit Door
Fire Alarm
Exit Route





Project Team - Introductions

DOT&PF

Galen Jones PE, Project Manager

DOWL

Kelly Kilpatrick PE, Project Manager

Sam Tyler PE, Project Engineer

Jovie Garcia, Public Involvement Lead

Morgan McCammon, Public Involvement

Sunrise Transportation Strategies

Brian Ray, Interchange Planning

Kinney Engineering

Jeanne Bowie, Senior Traffic Engineer

Aiza Miguel, Traffic Engineer



Participant - Introductions

- Access Alaska
- Alaska Trucking Association
- Chugiak-Eagle River Chamber of Commerce
- Eagle River Community Council
- Eagle River Valley Community Council
- South Fork Community Council
- Alaska State Representative District 23
- Eagle River High School
- Assembly District 2
- Emergency Management
- Fire Department
- Police Department
- Public Transportation
- Solid Waste Services (SWS)
- Alaska Mental Health Trust Authority
- Joint Base Elmendorf-Richardson (JBER)
- Cook Inlet Region, Inc.
- Chickaloon Village Tribal Council
- Native Village of Eklutna
- Knik 'atnu, Inc.
- Knik Tribe
- Hiland Mountain Correction Center
- Alaska State Senate District L
- MTA Solutions
- Anchorage Water & Wastewater Utility (AWWU)
- Matanuska Electric Authority (MEA)
- ENSTAR Natural Gas
- DOT&PF Measurement Standards & Commercial Vehicle Compliance
- Anchorage Metropolitan Area Transportation Solutions (AMATS)

Project Purpose and Objectives

PURPOSE

- Improve Operations
- Improve Capacity
- Improve Safety for Motorized and Non-Motorized Users

OBJECTIVES

- Enhance Highway Merging
- Mitigate Queue Issues
- Bridge Maintenance Improvements

Funding & Construction

- State Funding (GO Bond) – April 2022
 - Remaining funds obligated from Glenn Highway Capacity Improvements
- FHWA Funding (NHPP) – Feb 2023
 - Obligated under STIP Amendment #4
- Needs funding through Final design and Construction
 - Construction anticipated Summer 2026, pending funding availability

Agenda

- Workshop Goals
- Interchange Background
- Existing Conditions
- Environmental Permitting
- Near-Term Interchange Brainstorming
- Long-Term Interchange Brainstorming
- Next Steps



Workshop Goals

1. Understand project, history, and constraints
2. Evaluate near-term interchange upgrade opportunities and considerations
3. Consider compatibility with potential long-term interchange configurations
4. Understand relative order of magnitude implementation issues
5. Obtain input to support technical evaluations and decision making





**Glenn Highway
& Hiland Road**
Interchange Improvements



Interchange Background

Interchange Background

- 1970s: Hiland Interchange Original Connection
 - Hiland Road connected to the Glenn Highway
 - Limited development and land uses
 - Low volume and demand

The interchange remains close to its original form!

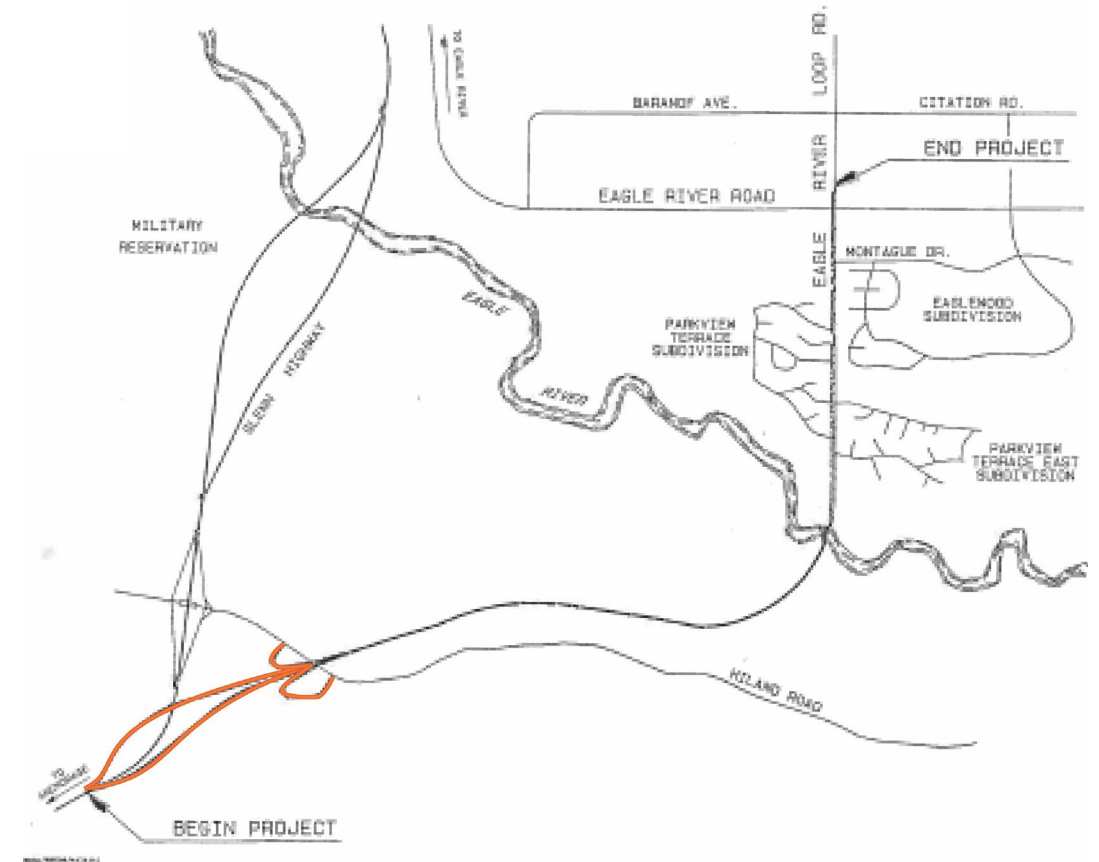
Project Area History – 1970s



Interchange Background

- 1980s: Eagle River Loop (ERLR) to Hiland Road Connection Location Study
 - Established a new connection to Eagle River as an alternative to Artillery Road
 - Plan to connect ERLR to the Glenn Highway with grade separations at:
 - Hiland Road
 - Glenn Highway

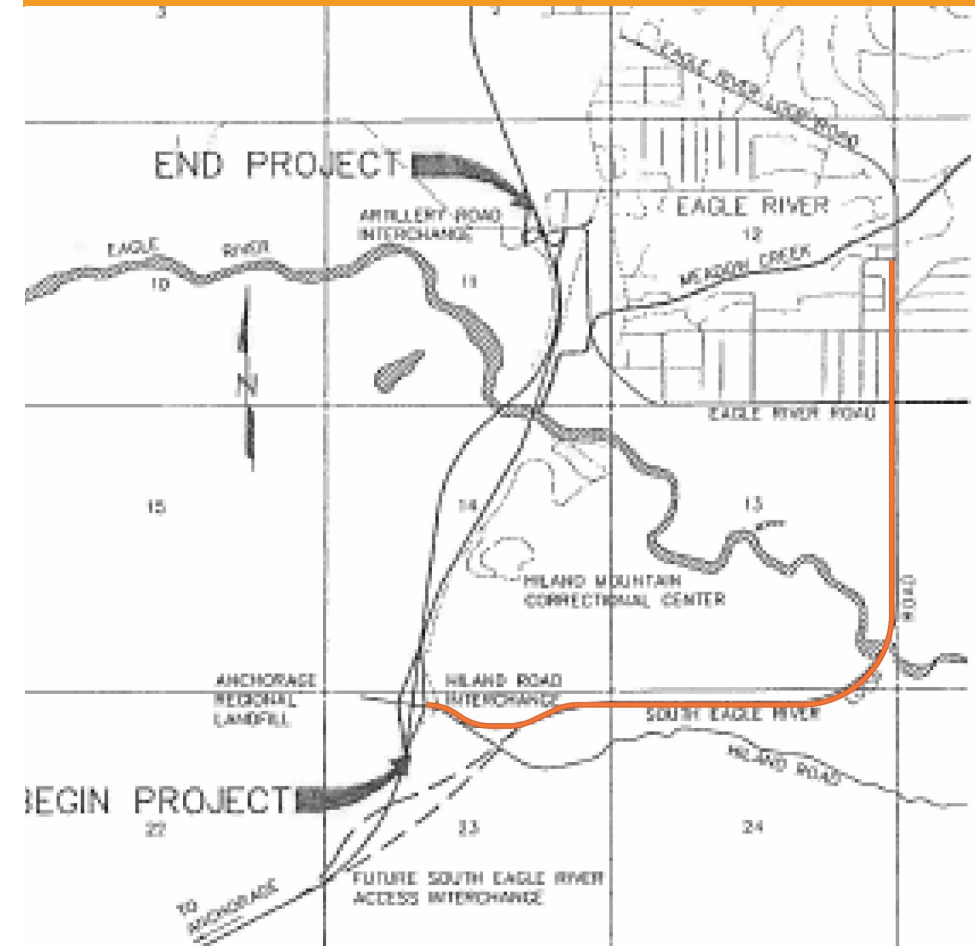
Project Area History – 1980s



Interchange Background

- 1990s: ERLR to Hiland Connection
Location Study Supplement
 - Changed project and funding priorities connected ERLR to Glenn Highway
Glenn Hwy/Hiland Rd Interchange Rehabilitation & Hiland Road Artillery Road Illumination and Southbound Climbing Lane Project.
 - Hiland Road not meant to be a long-term interchange connection
 - Meant to be “temporary”
 - Never intended to serve the volumes it does!

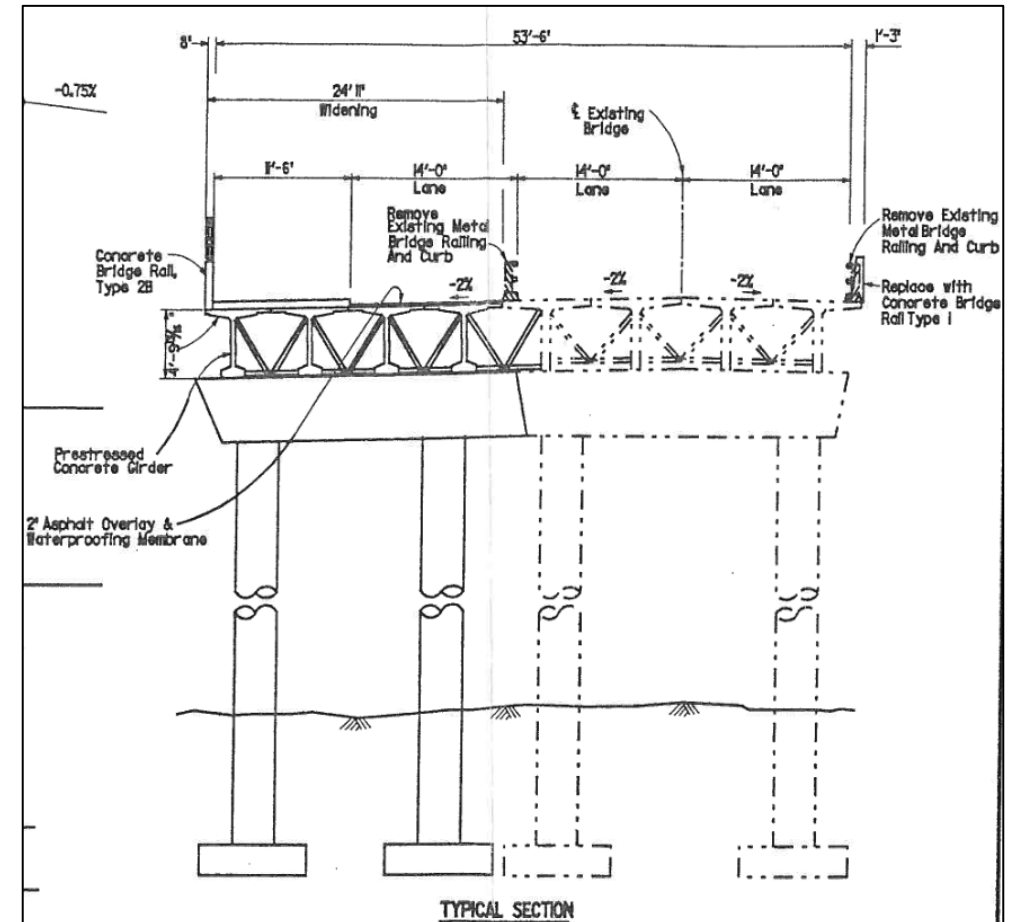
Project Area History – 1990s



Interchange Background - Bridge

- 1990s: ERLR to Hiland Connection Location Study Supplement
 - Widened the bridge to add:
 - Additional lane
 - Pedestrian and bicycle facilities

1990s Glenn/Hiland Bridge Widening





Discussion





Existing Conditions

Traffic Considerations

- The limited roadway network concentrates traffic to the Hiland interchange
- Because Eagle River Loop Road terminates at the Glenn Highway, this interchange has unique needs compared to other interchanges in Anchorage
- Near- or long-term interchange solutions must be adapted to the unique context of this location
- Solutions will be based on fundamental interchange design principles and customized to the traffic volumes, patterns, and composition



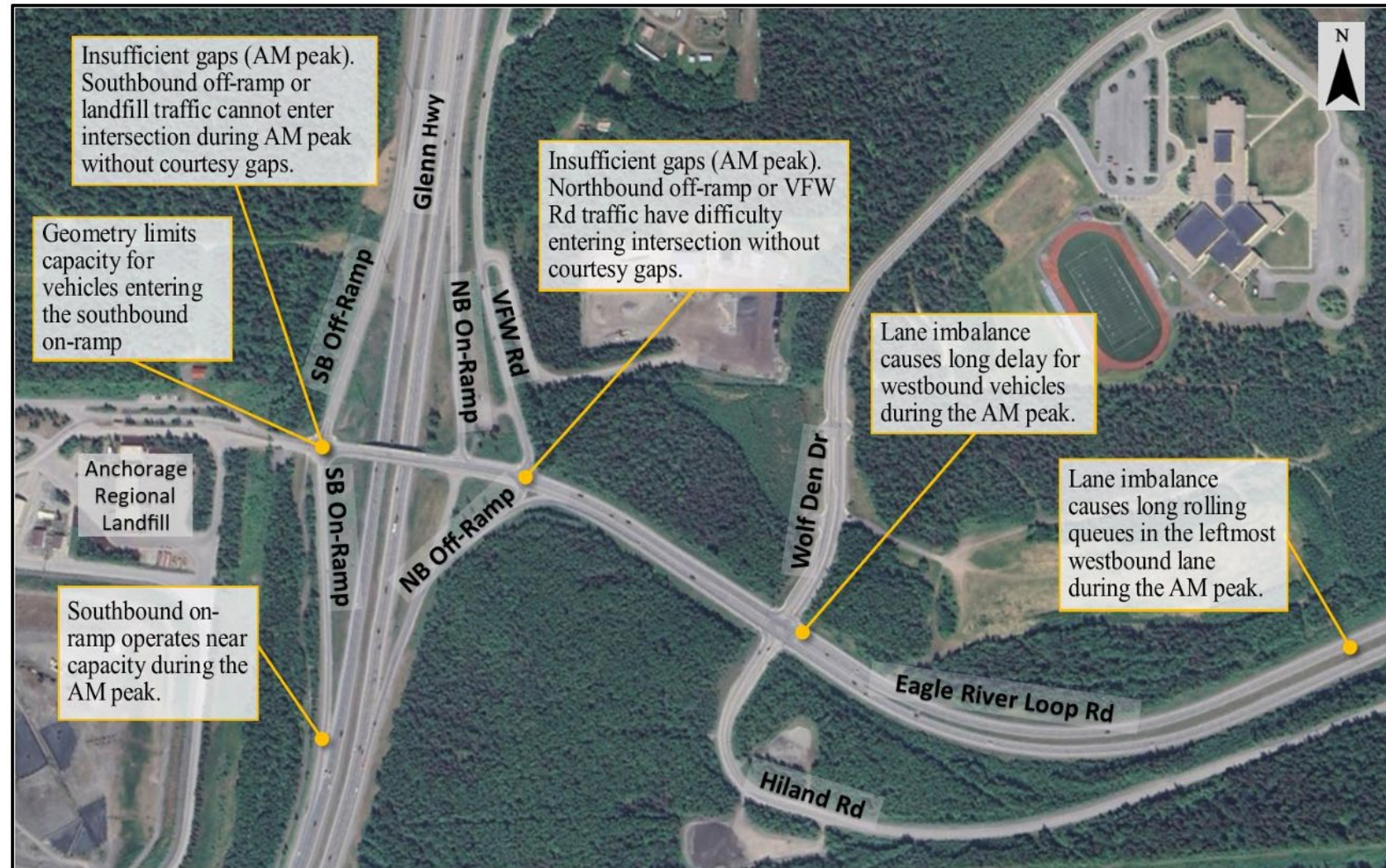
Traffic Considerations

- Existing and forecast volumes
 - Forecast growth is less than 1% annually to 2050
- Peak periods
 - Morning peaks are the focus
- Safety performance
 - There are few reported injury crashes and few total crashes
- Multimodal transportation
 - A key focus for safety and comfort
- Truck Volumes
 - Landfill and oversize/overweight



Traffic Operations Performance

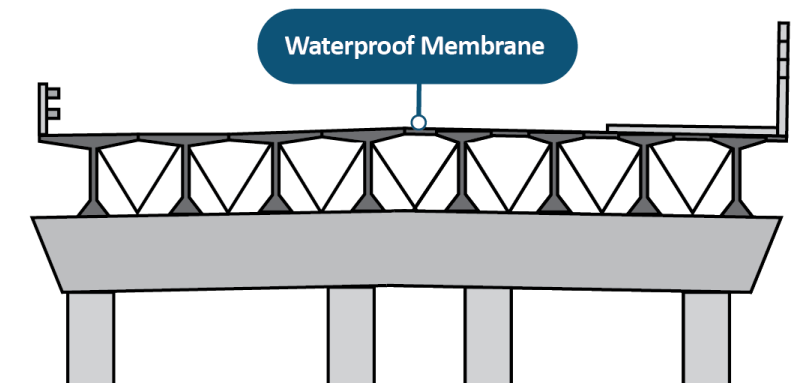
- Each location's operational issue affects the other
- The needs to address each issue is relatively clear
- Features that address near-term issues are compatible with potential long-term solutions



Existing Bridge

- Retain and use the existing bridge!
- 75-year design life with 25 years left
- In good condition but needs preventative maintenance:
 - Pavement has extensive potholing and rutting
 - Bridge railings may need replacing
 - Bridge concrete spalling repair
 - Replace waterproofing membrane
 - Prevents rust of structural elements under pavement

Glenn/Hiland Bridge



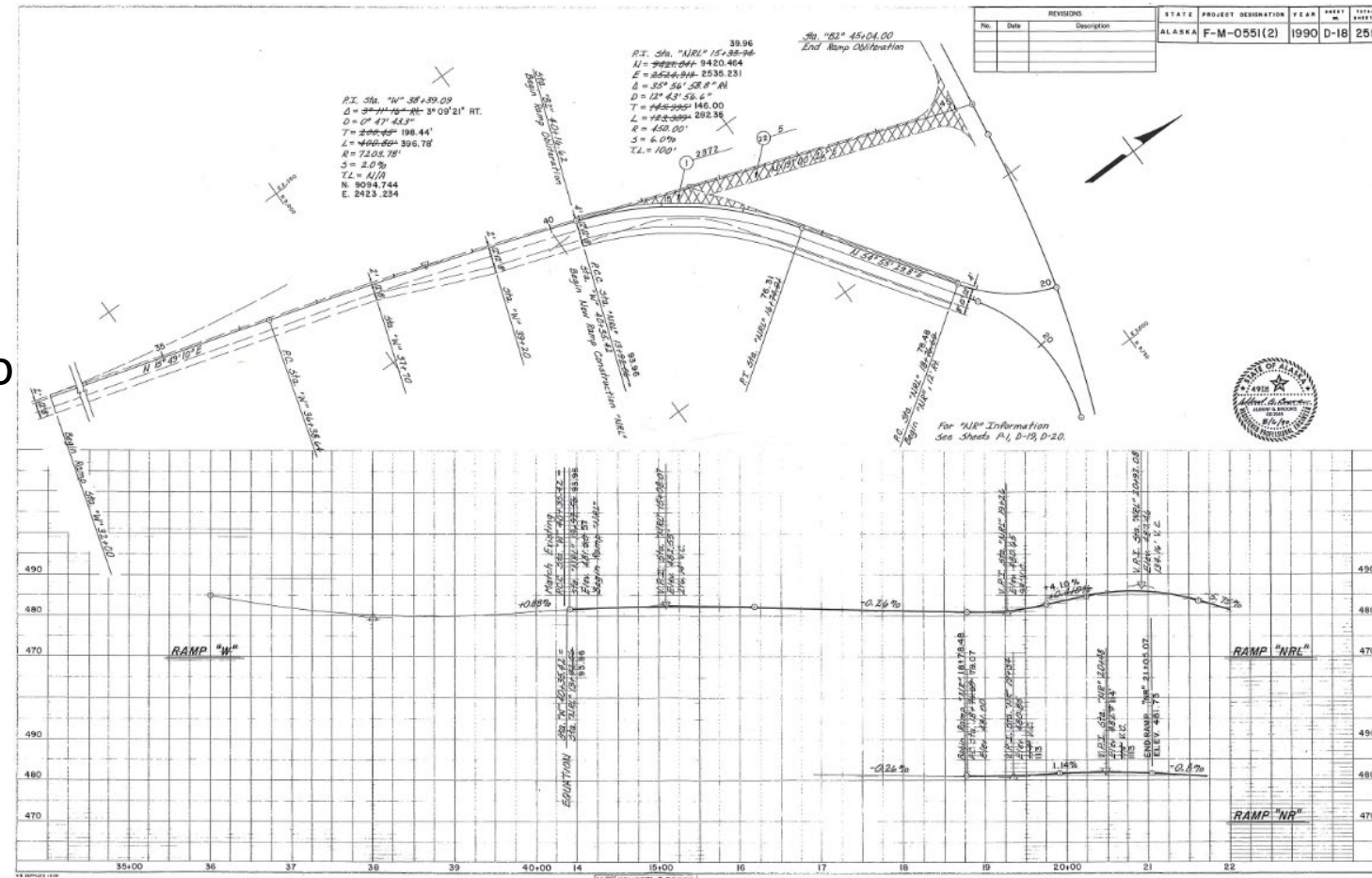
Existing Bridge – Vertical Clearance

- Existing Vertical clearance:
 - 16'-4" Northbound
 - 16'-2" Southbound
 - Yearly, over 800+ vehicles over legal height permitted on the Glenn Highway
- Current Vertical Clearance Guidance
 - Minimum 17"
 - 16'-6" plus 6" for future resurfacing

Over-Height Permits – Glenn Highway	
Year	Count
2019	916
2020	897
2021	873
2022	836
2023	880
Total	4,402

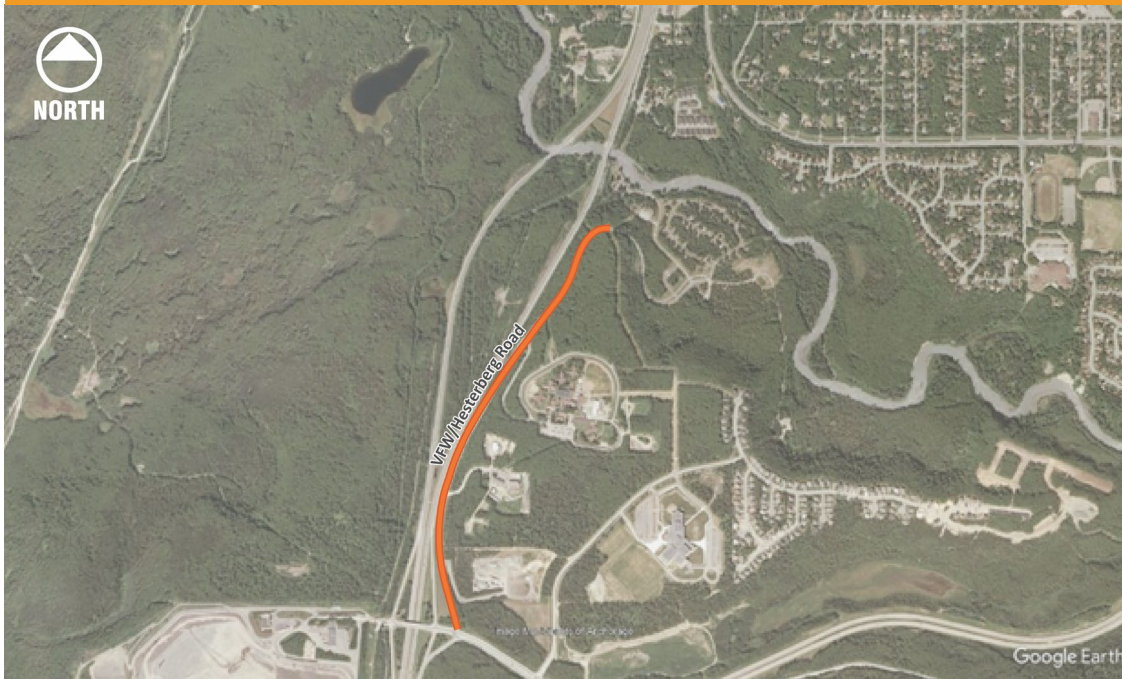
Northbound Ramp Terminal Intersection

- Originally aligned with the northbound entrance ramp
- Shifted in 1990s. **But why?**
 - Oversize/Overweight trucks?
 - To better align VFW/Hesterberg to serve the corrections center?
- Atypical configuration is inconsistent with contemporary interchange design
- Creates risk of wrong way movements to the NB Glenn Highway

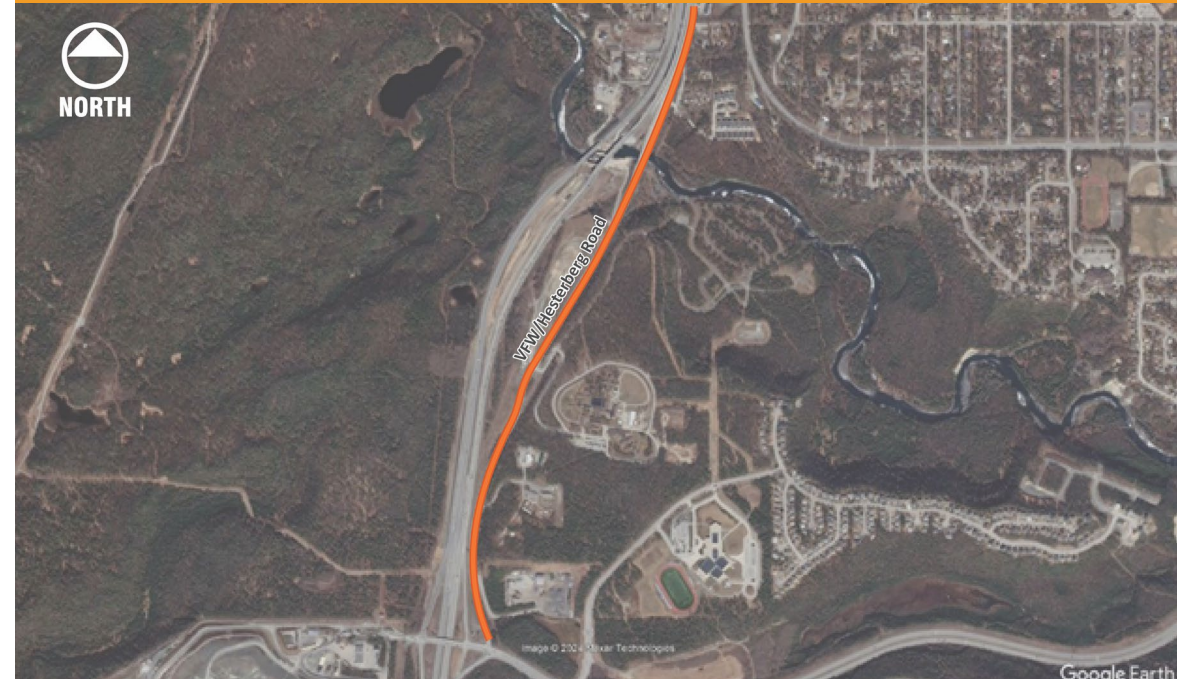


VFW/Hesterberg Road

VFW/Hesterberg, Pre 2020



VFW/Hesterberg, 2020 connected to ERR



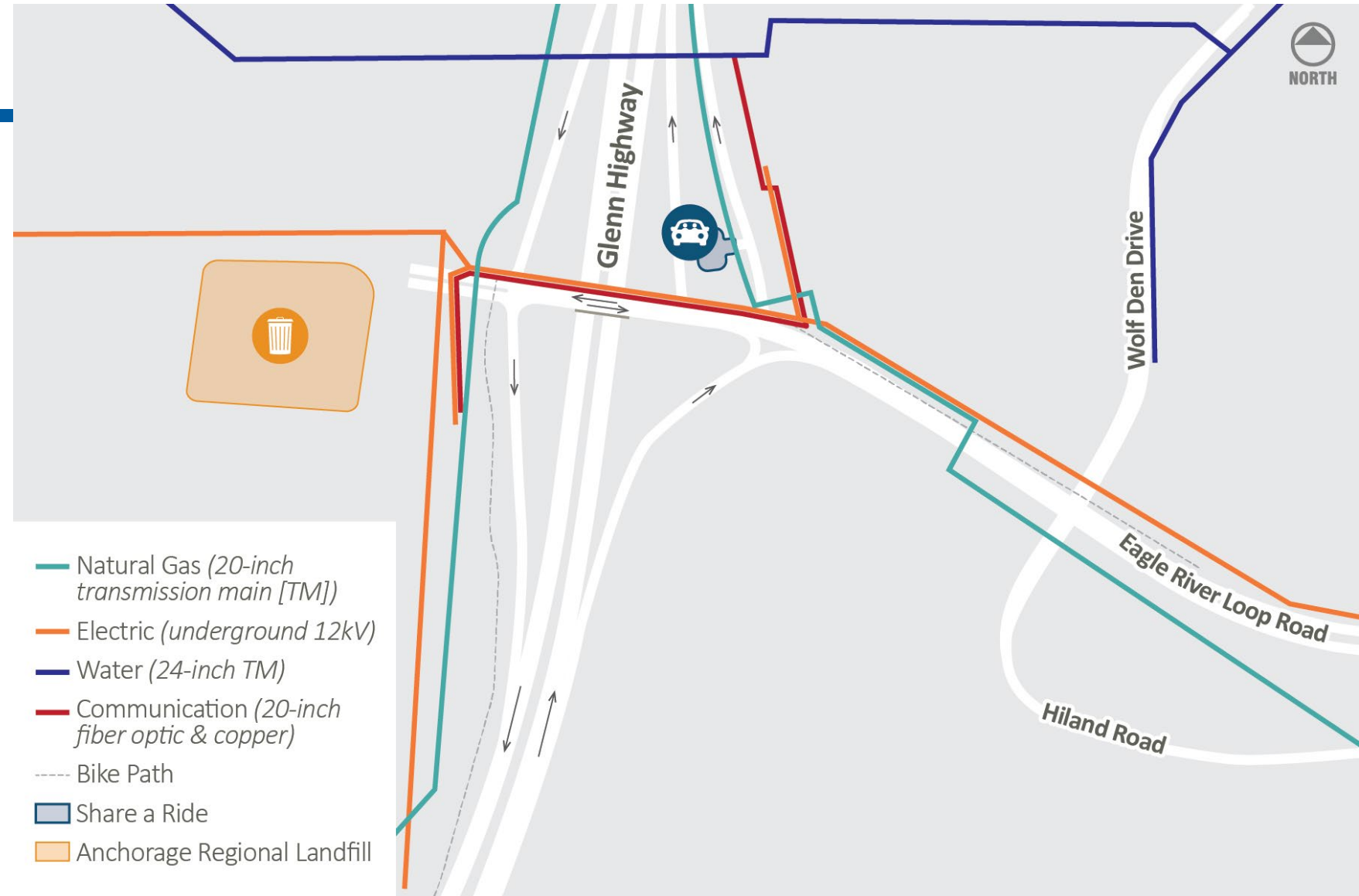


Discussion



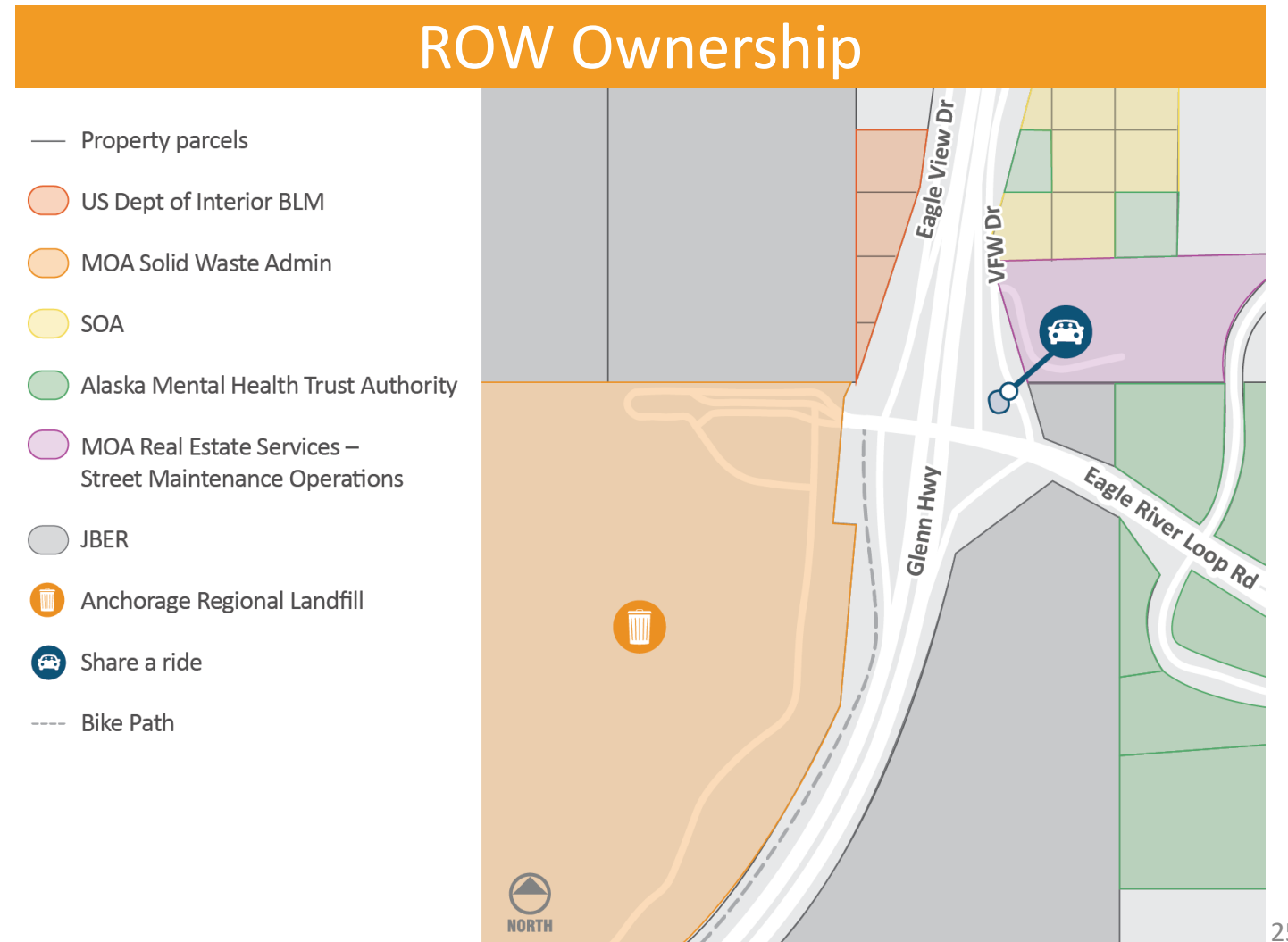
Utilities

- High-cost
 - 20-inch Natural Gas Main
 - NW Quadrant – ACS/MTA division pedestals/vaults
- Low Cost
 - Underground electric
- No Anticipated conflicts
 - Overhead electric
 - Water



Right-of-Way

- ROW Considerations
 - West of interchange: High potential for impacts
 - Bureau of Land Management (BLM)
 - Joint Base Elmendorf-Richardson (JBER)
 - Anchorage Regional Landfill
 - East of Interchange: Low potential for impacts
 - Controlled access modifications likely

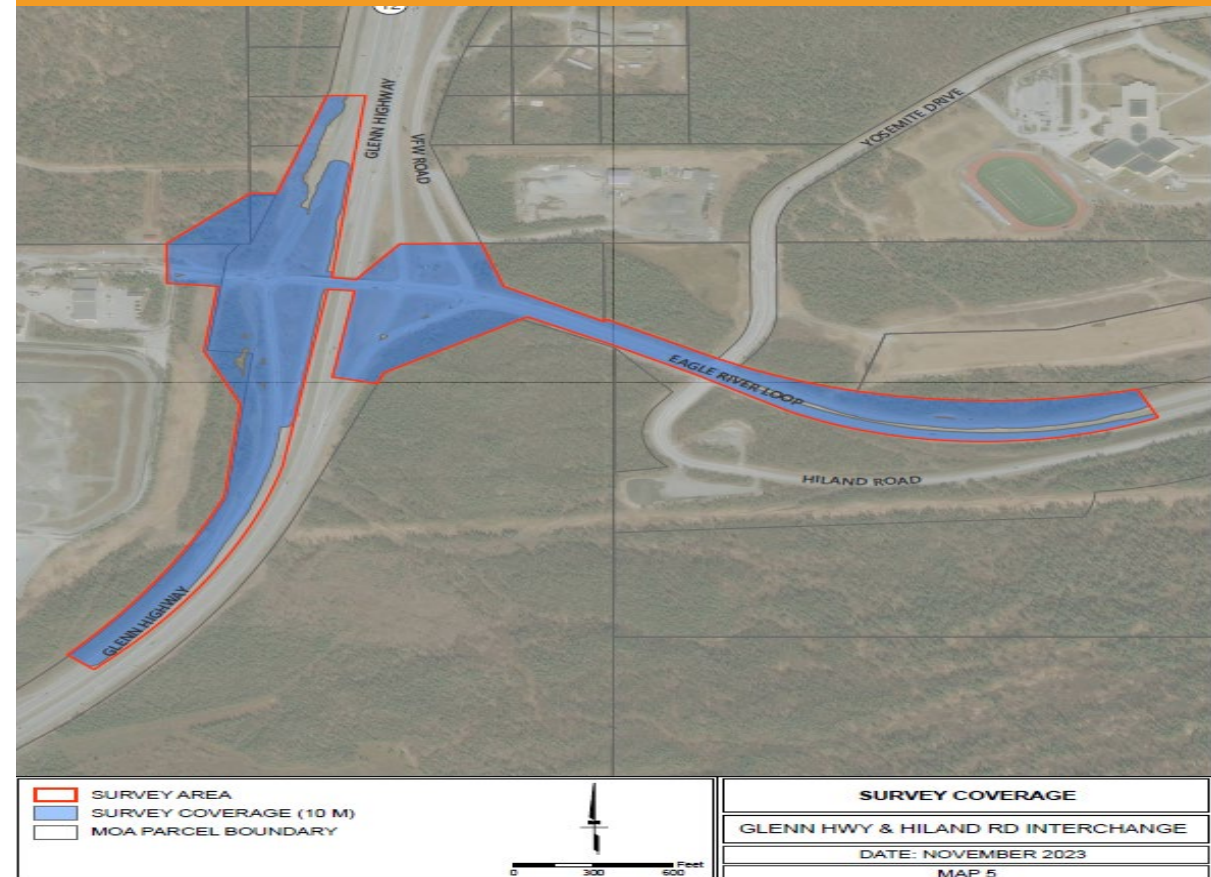


Environmental Compliance

Compliance and Consultation

- Project complies with Alaska Historic Preservation Act (AHPA) of 1971 and Section 106 of the National Historic Preservation Act (NHPA) of 1966
- Section 106 initiation letters drafted for DOT&PF's consultation effort
- Archaeological and historic surveys completed
- Excavated 7 test units revealed no significant findings
- Draft Section 106 findings letter will recommend "No Historic Properties Affected," consistent with 36 CFR 800.4(d)(1)

Archaeological Survey Coverage within APE





Discussion



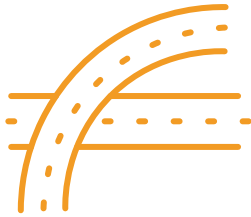


Near-Term Interchange Brainstorming

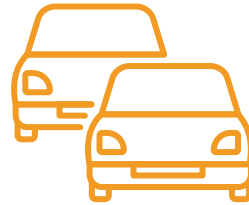
Overview

- The existing bridge must be retained and integrated into near-term solutions
- Pedestrian and bicyclist facilities must be maintained or enhanced
- Solutions must address each of the traffic operational issues
 - Balanced lane volumes on Eagle River Loop Road before Wolf Den Road
 - Increase capacity to serve westbound to southbound vehicles
 - Increase entrance ramp capacity at the southbound entrance ramp
- To the extent possible, near-term project elements should be adaptable to potential long-term solutions

Ala Carte Approach



Some interchange elements come in a combination (“no substitutions”)



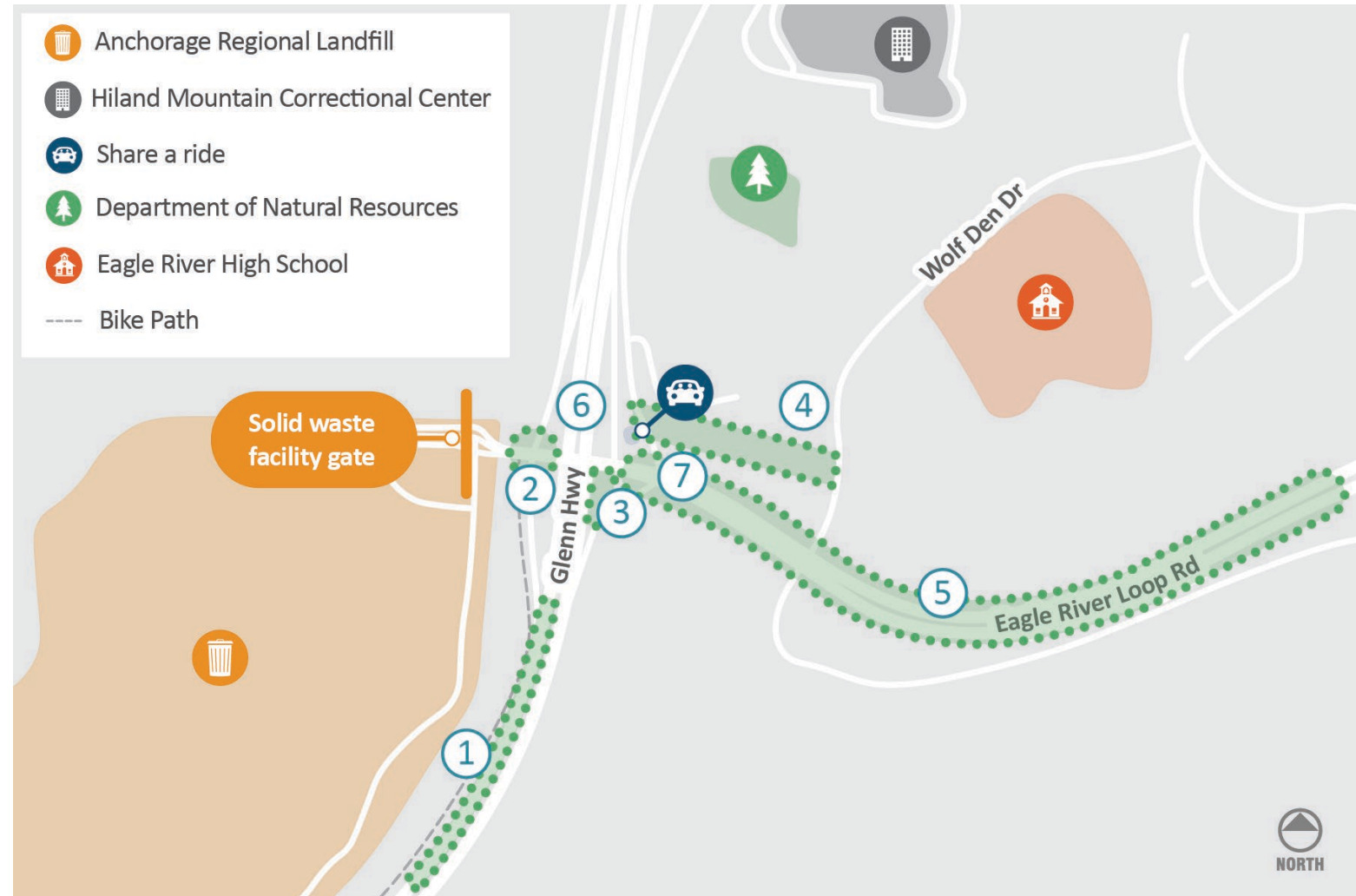
Solutions must address each of the traffic operational issues



Capital investment based on maximum value and benefit for dollars spent

Brainstorming Ideas

1. Add lane versus merge
2. Provide two turning lanes
3. Reconnect northbound entrance intersection
4. Realign to intersect with Wolf Den Drive
5. Add westbound lane
6. New interchange configurations (Loop Ramp, DDI)
7. Traffic operations strategy - Metering

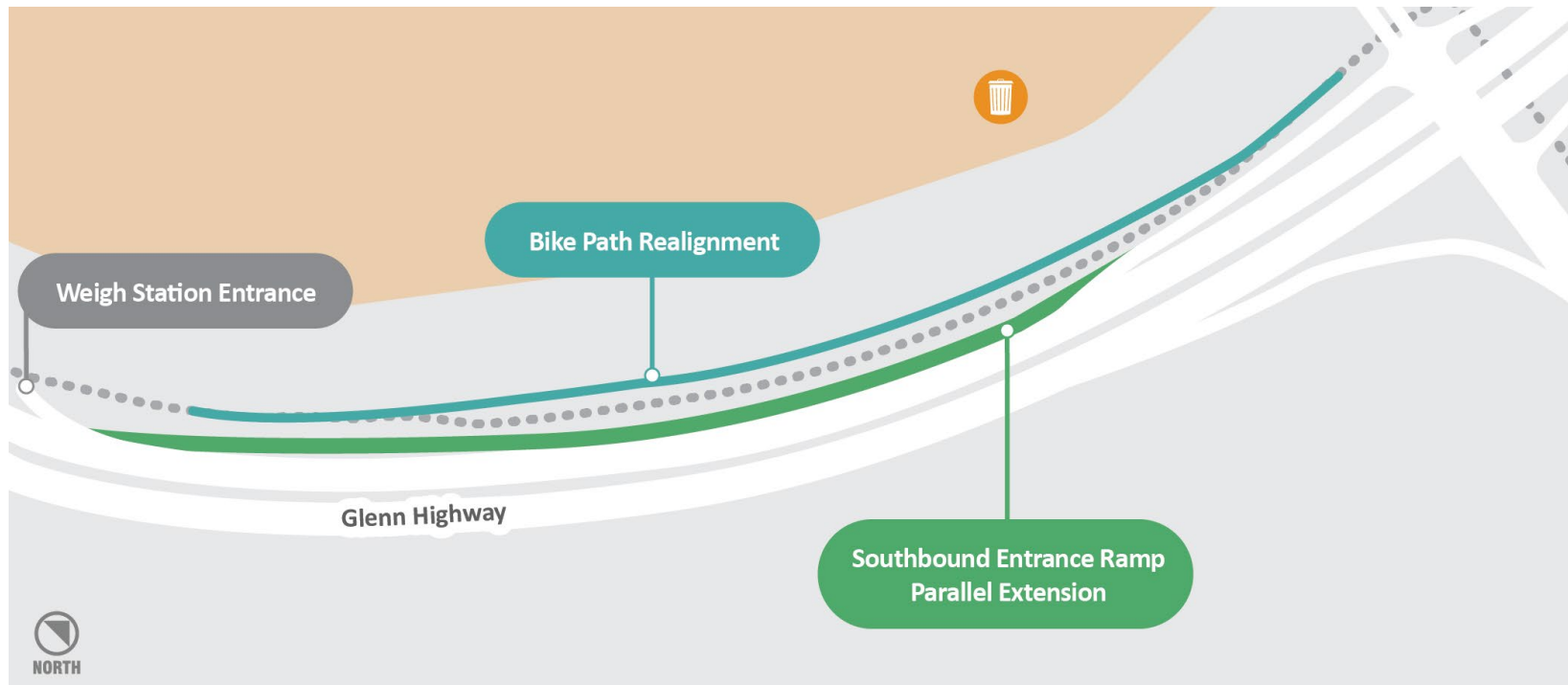


Southbound Entrance Ramp Terminal

- Replace the existing at-capacity tapered merge
- Construct speed change lane
 - 1,500 feet long lane for diamond
 - 2,800 feet long lane for loop ramp

- Will require adjustment to existing pathway

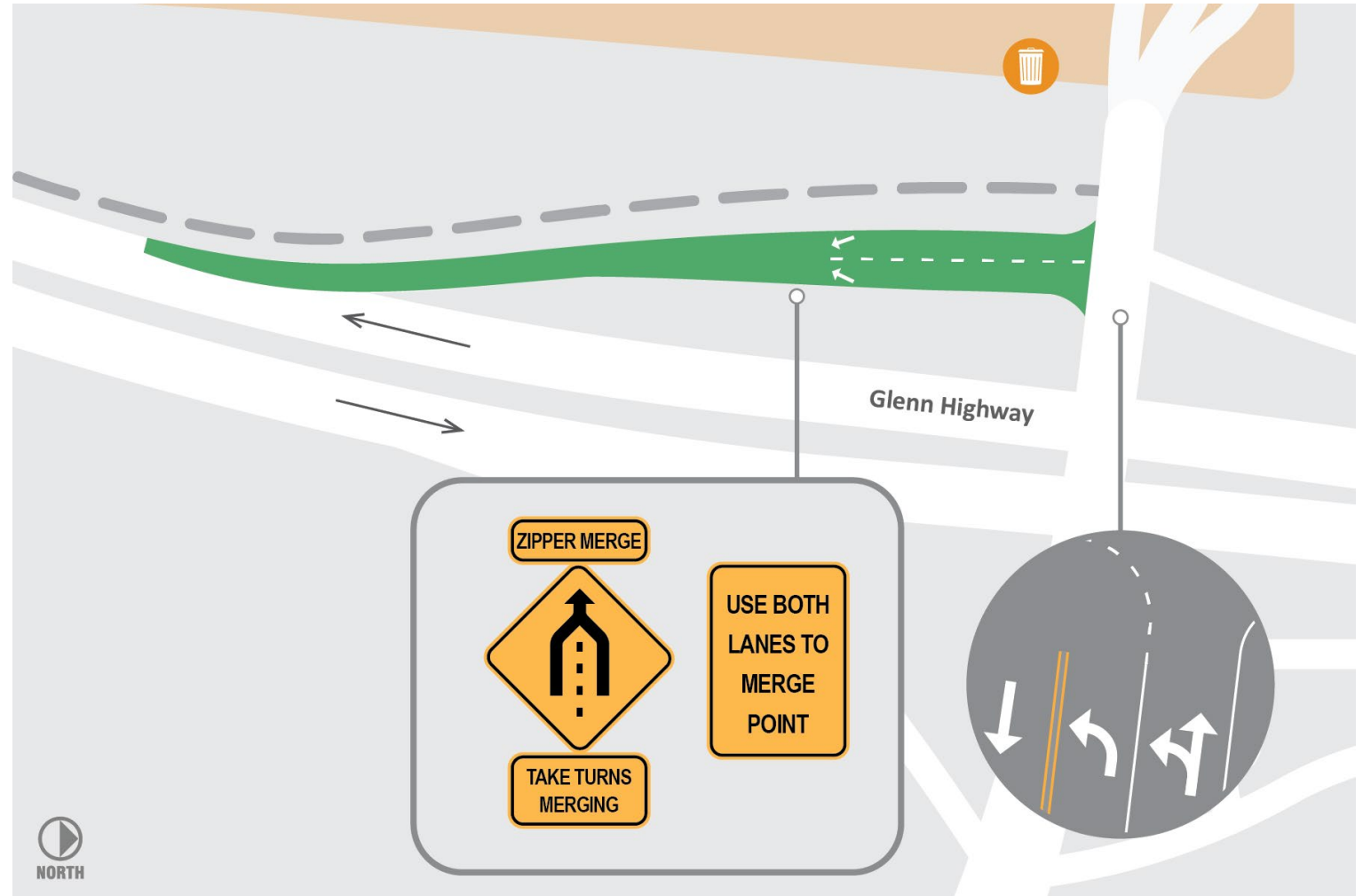
The speed change lane could be integrated into potential long-term solutions!



Southbound Ramp Terminal Intersection

- Provide a double WB to SB left turn lane
- Two lane merge to a single entrance lane added to SB Glenn Highway
- Construction impacts are relatively limited

This only works with the 1,500-foot-long SB speed change lane!



VFW / Hesterberg Road

- Realign the roadway to Wolf Den Drive
- Construct driveway to existing parking lot
- Opportunity to expand the existing parking lot
- Provide emergency and bicycle and pedestrian access from Eagle River Loop Road



Northbound Ramp Terminal Intersection

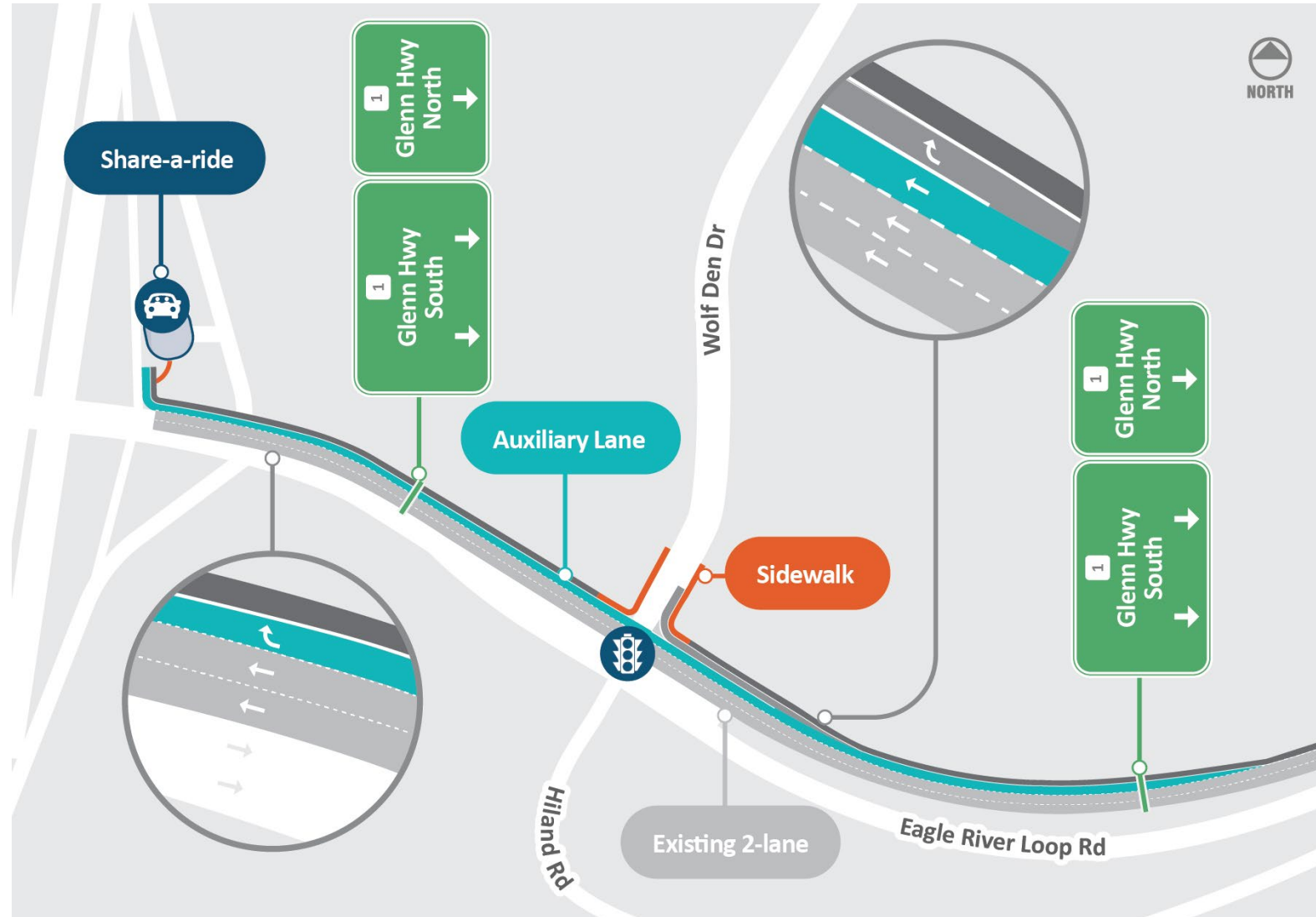
- Realign the NB ramp to its original design configuration
- Remove the existing ramp connection across from VFW/Hesterberg Road

Consistent with contemporary interchange design and reduces risk of wrong way movements!



Wolf Den Drive Intersection

- Add auxiliary lane extending to the NB ramp terminal intersection
- Adjust existing right turn lane
- Add overhead sign bridges



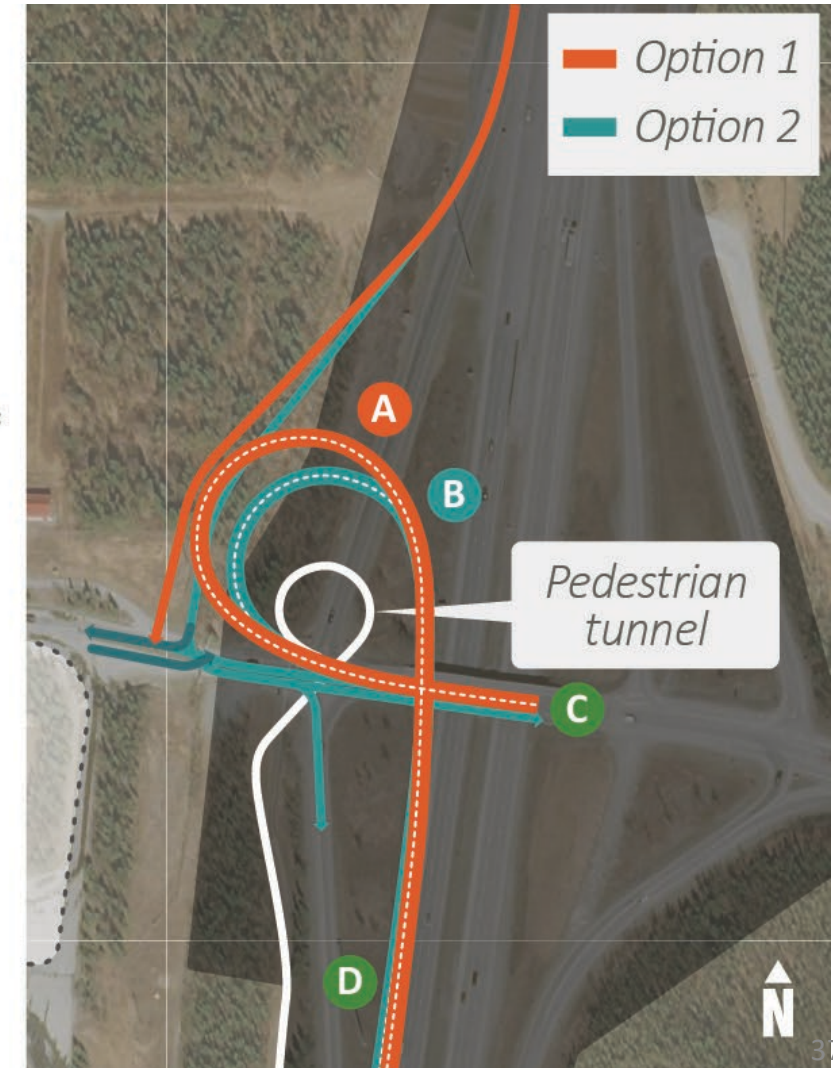
Southbound Ramp Terminal Intersection

- Two lane merge to a single entrance lane onto Glenn Highway
- Pedestrian tunnel
- More construction and impacts than double left turn concept

Only works with a 2,800-foot speed change lane!

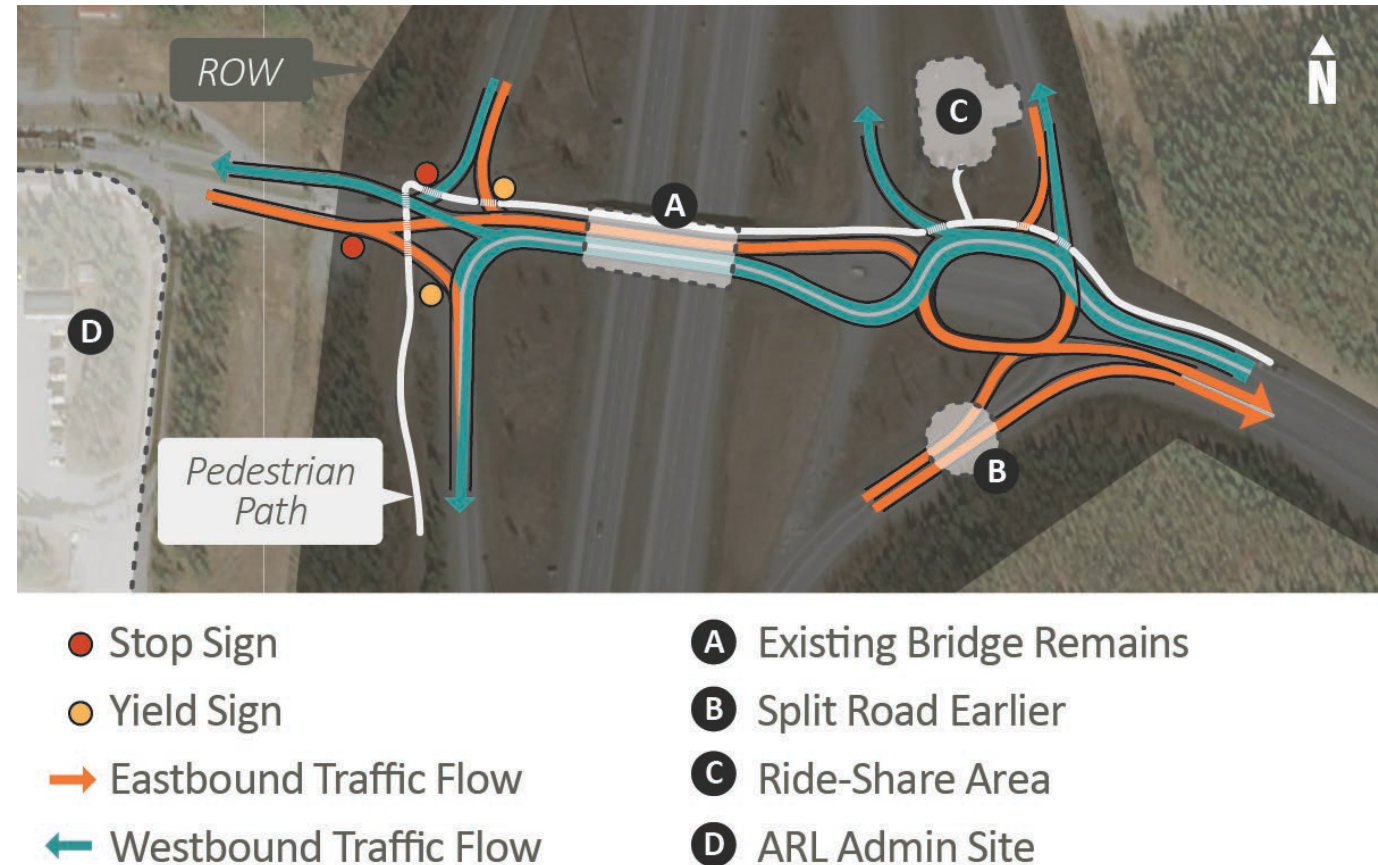
- A** R=160 feet (minimum desired)
- B** R=125 feet (minimum allowed)
- C** Overhead lane-use sign
- D** Single Lane Add to Glenn Hwy*

** Lanes drop off one at a time prior to the weigh station*



Diverging Diamond Interchange

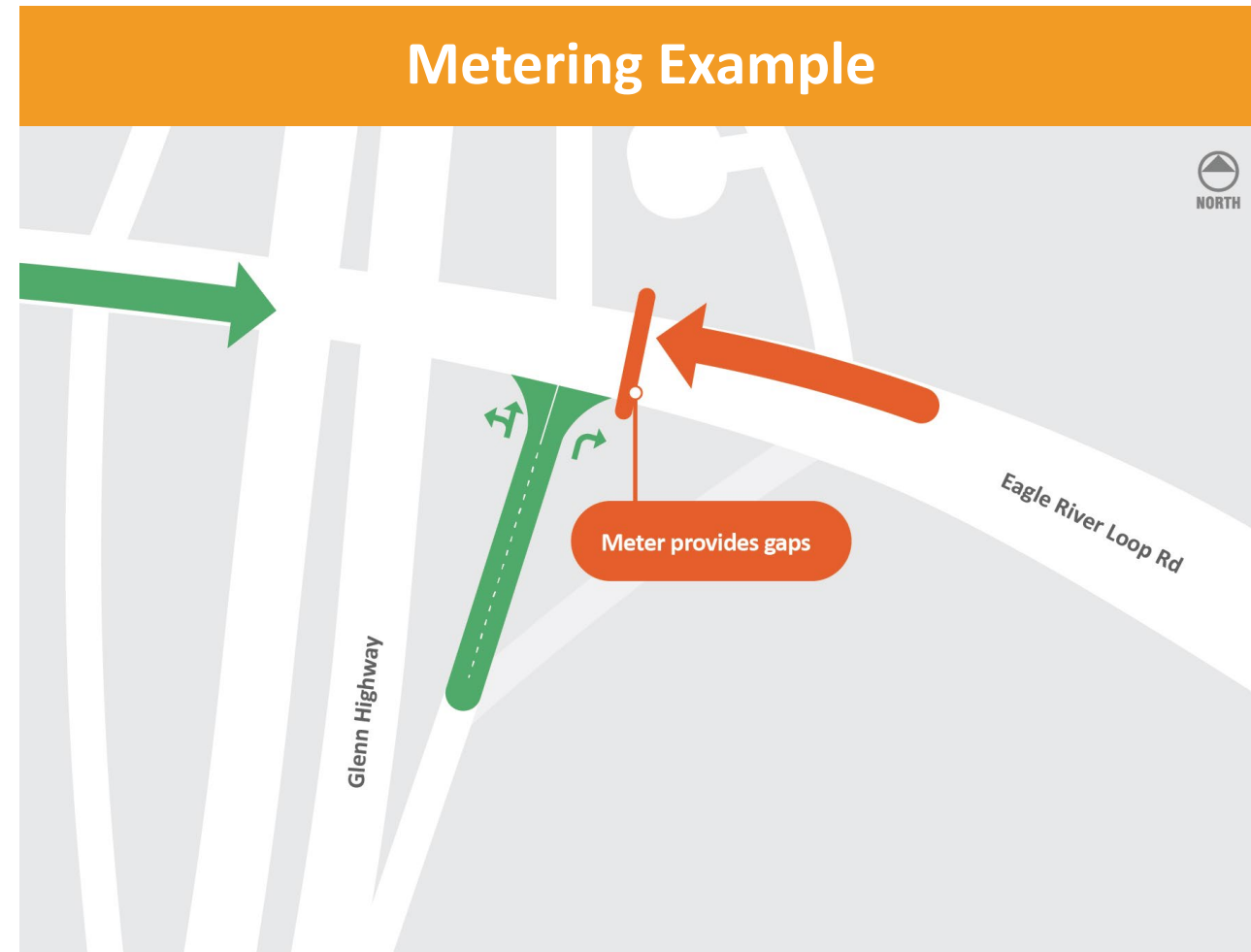
- Traffic volumes do not justify traffic signals at SB ramp terminal intersection
- Reconstruct SB ramp terminal intersection
- WB to SB traffic has no conflicts
- Construct roundabout at NB ramp terminal intersection and VFW/Hesterberg Road
- Complicated and expensive if VFW/Hesterberg Road remains



Traffic Operations Strategy

- Limited gaps during morning peak flows
 - From Regional Landfill
 - NB exit ramp Off peak traffic volume is inefficient for signalization
- Metering signal breaks morning peak to support minor movements














































A possible way to extend the service life of near-term interchange investments!



Improvement Menu

ITEM		NAME	BASE COST	w/ A	w/ B	w/ C	w/ A+ B+ C
1	Double Left Turn		\$7.4M	\$13.1M	\$8.4M	\$7.9M	\$14.6M
	Double Left Turn		\$1.8M				
	Speed Change Lane		\$3.2M				
	Wolf Den Drive (includes Eagle River Loop Road 3 rd lane)		\$2.4M				
2	Loop Ramp		\$19.6M	\$25.3M	\$20.6M	\$20.1M	\$26.8M
	Loop Ramp		\$12.3M				
	Speed Change Lane		\$4.9M				
	Wolf Den Drive (includes Eagle River Loop Road 3 rd lane)		\$2.4M				
3	Diverging Diamond		\$13.9M	\$19.6M	\$14.9M	\$14.4M	\$21.1M
	Diverging Diamond		\$8.2M				
	Speed Change Lane		\$3.2M				
	Wolf Den Drive (includes Eagle River Loop Road 3 rd lane)		\$2.4M				
Complement Tool Box							
A	VFW/Hesterberg Road		\$5.7M				
B	Northbound Ramp Terminal Intersection		\$1.0M				
C	Traffic Operations Strategy (Meter)		\$0.5M				

Comparative Assessment

	No Build	Double Left	Loop Ramp	Diverging Diamond
Operations & Capacity				
Lane Utilization				
SB On/Off-Ramp Operations				
NB Off-Ramp Operations				
Truck Operations				
Safety Performance				
Motorized				
Non-Motorized				
Impacts				
ROW Impacts				
Utility Impacts				
Environmental Impacts				
Schedule Impacts				
Capital Cost				
Compatibility w/ Near Term Interests				



Discussion





Long-Term Interchange Brainstorming

Long-Term Solution Considerations

- Since Eagle River Loop Road terminates at Glenn Highway:
 - Traffic volumes and patterns are highly unbalanced
 - No through movements mean traditional interchange forms generally overbuild the SB ramp terminal intersection
 - Interchange forms can be adapted to meet specific project needs
- Solutions must address each of the traffic operational issues by:
 - Balancing lane volumes on Eagle River Loop Road before Wolf Den Road
 - Increasing capacity to serve WB to SB turning vehicles
 - Increasing capacity at the SB entrance ramp at the Glenn Highway

Interchange Types

- Systems versus Service Interchanges
- Roundabout versus signalized ramp terminal intersections
- High-capacity Diamonds
 - Displaced left turn is a relatively new version of diamond forms
- Partial Cloverleafs/Single Loop Cloverleaf

Service Interchanges

- Service interchanges are used for highways to arterials
- The Hiland interchange functions as an arterial versus its original purpose connecting a local road
- Near term treatments maximize capacity and retain the existing bridge
- Long-Term concepts will increase capacity to meet all users and long-Term needs

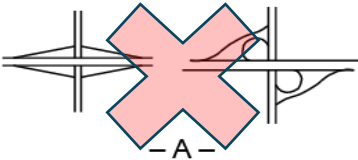
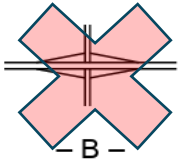
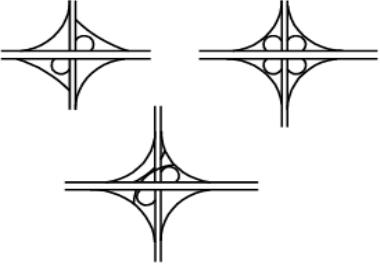
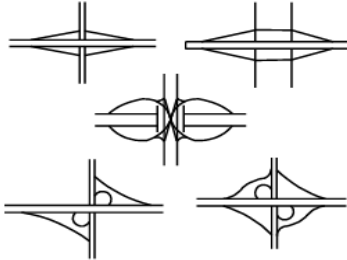
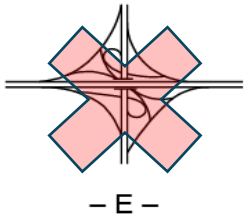
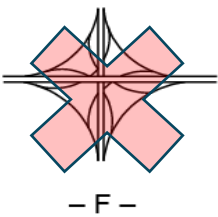
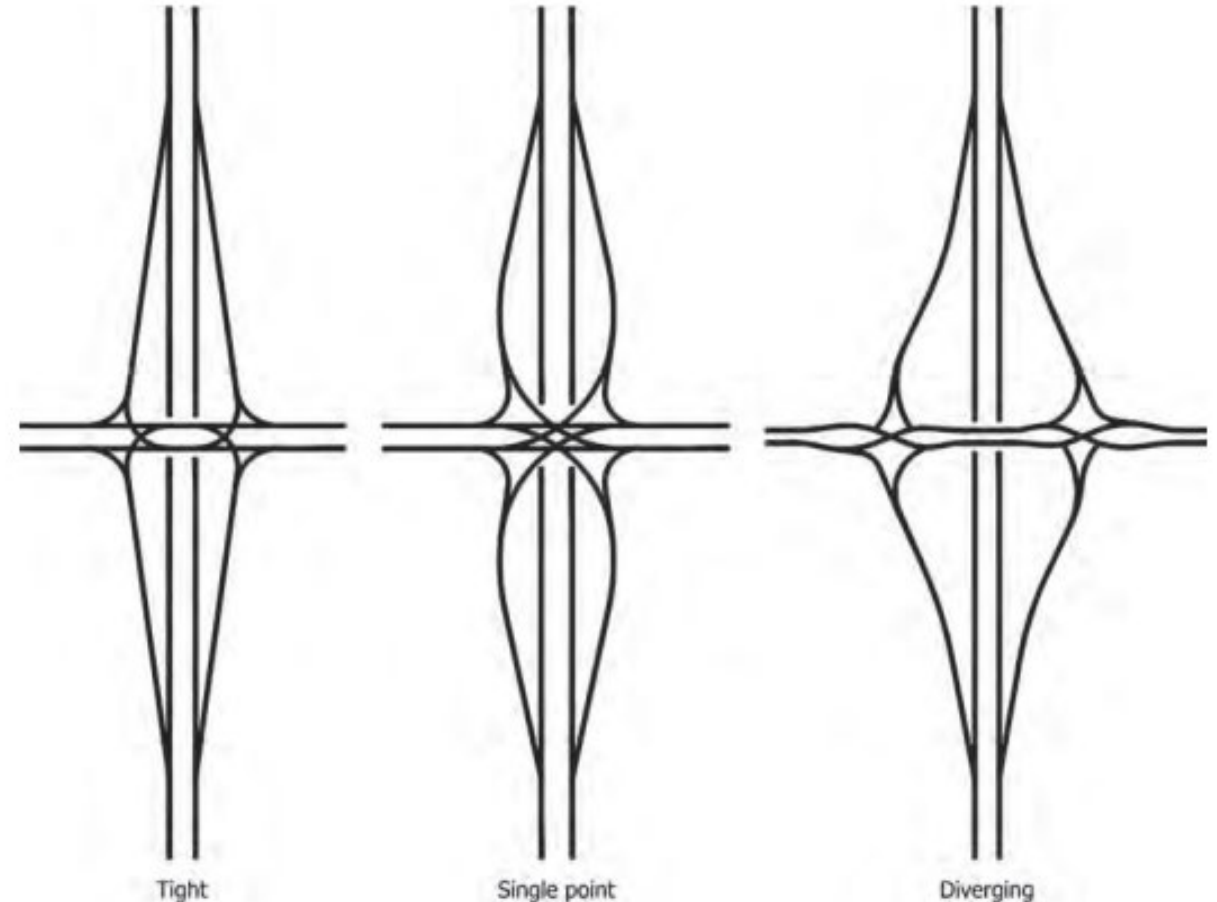
TYPE OF INTERSECTING FACILITY		RURAL	SUBURBAN	URBAN
SERVICE INTERCHANGES	LOCAL ROAD OR STREET			
	COLLECTORS AND ARTERIALS			
	FREEWAYS			

Figure 10-45. Adaptability of Interchanges on Freeways as Related to Types of Intersecting Facilities

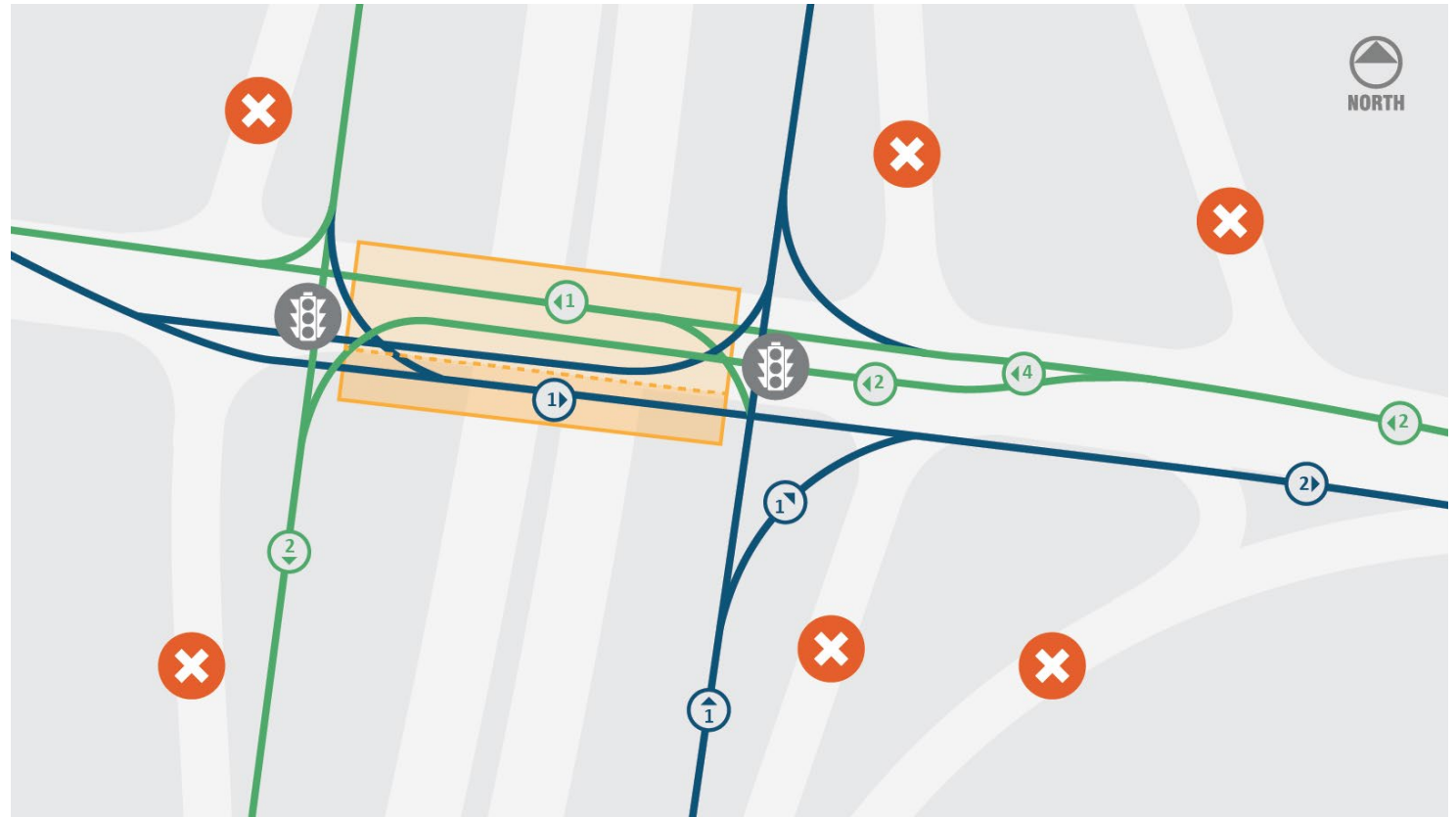
High-Capacity Diamonds

- Diverging Diamond Interchange (DDI)
 - Largest footprint (impact landfill access)
 - Eliminates ramp to ramp movements
- Single Point Diamond
 - Difficult construction
 - More expensive bridge
 - Does not readily allow ramp to ramp movements
- Tight Diamond
 - Roundabout intersections
 - Easy to construct and maintain



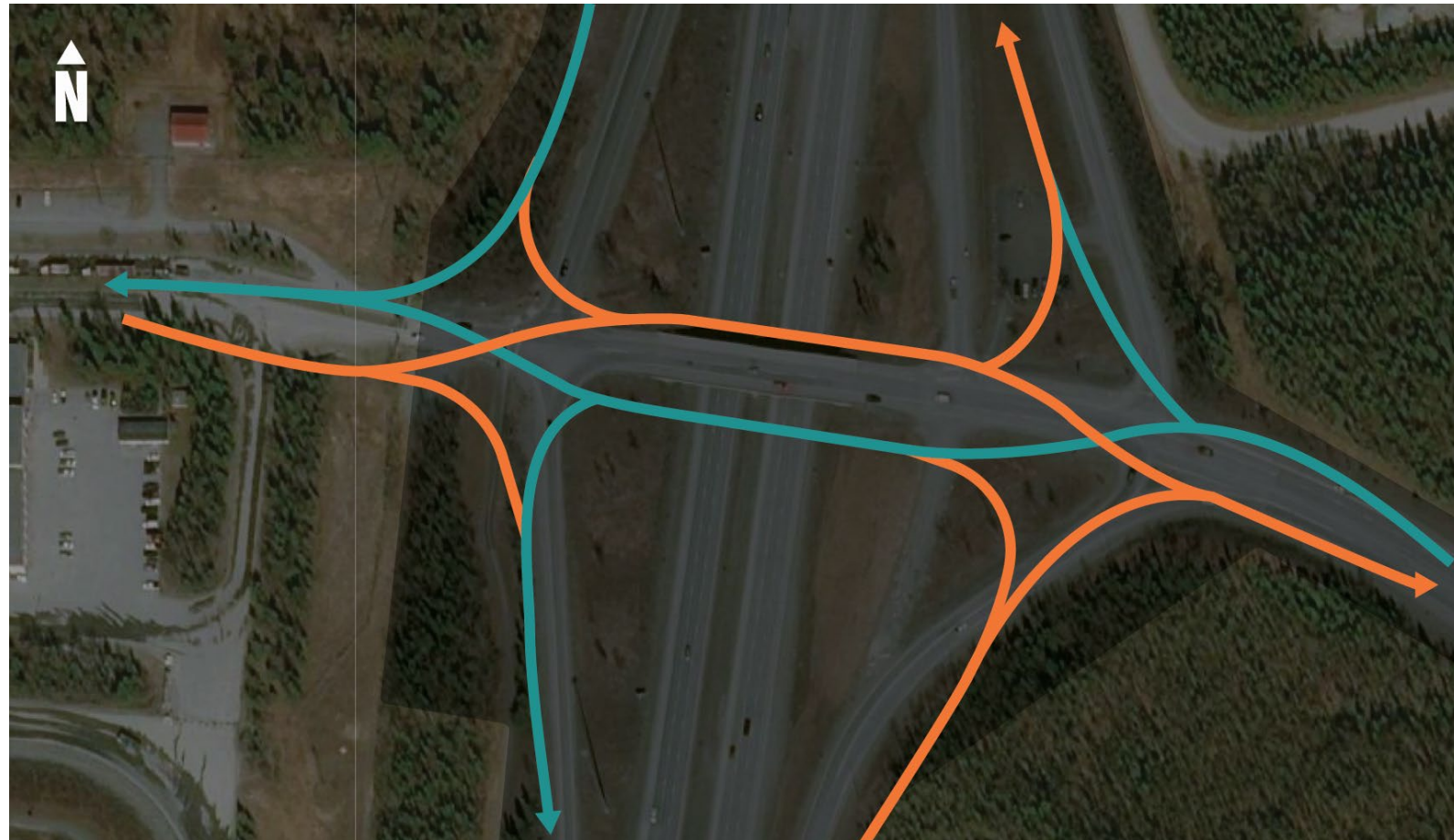
Tight Diamond—Tailored

- Signalize NB and SB Ramp terminal intersections
- Replace Bridge
 - Add barrier between motorized traffic
 - Enhanced pedestrian/bicycle facilities
- Construct two lane SB entrance ramp
- Reconfigure weigh station access for widened Glenn Highway



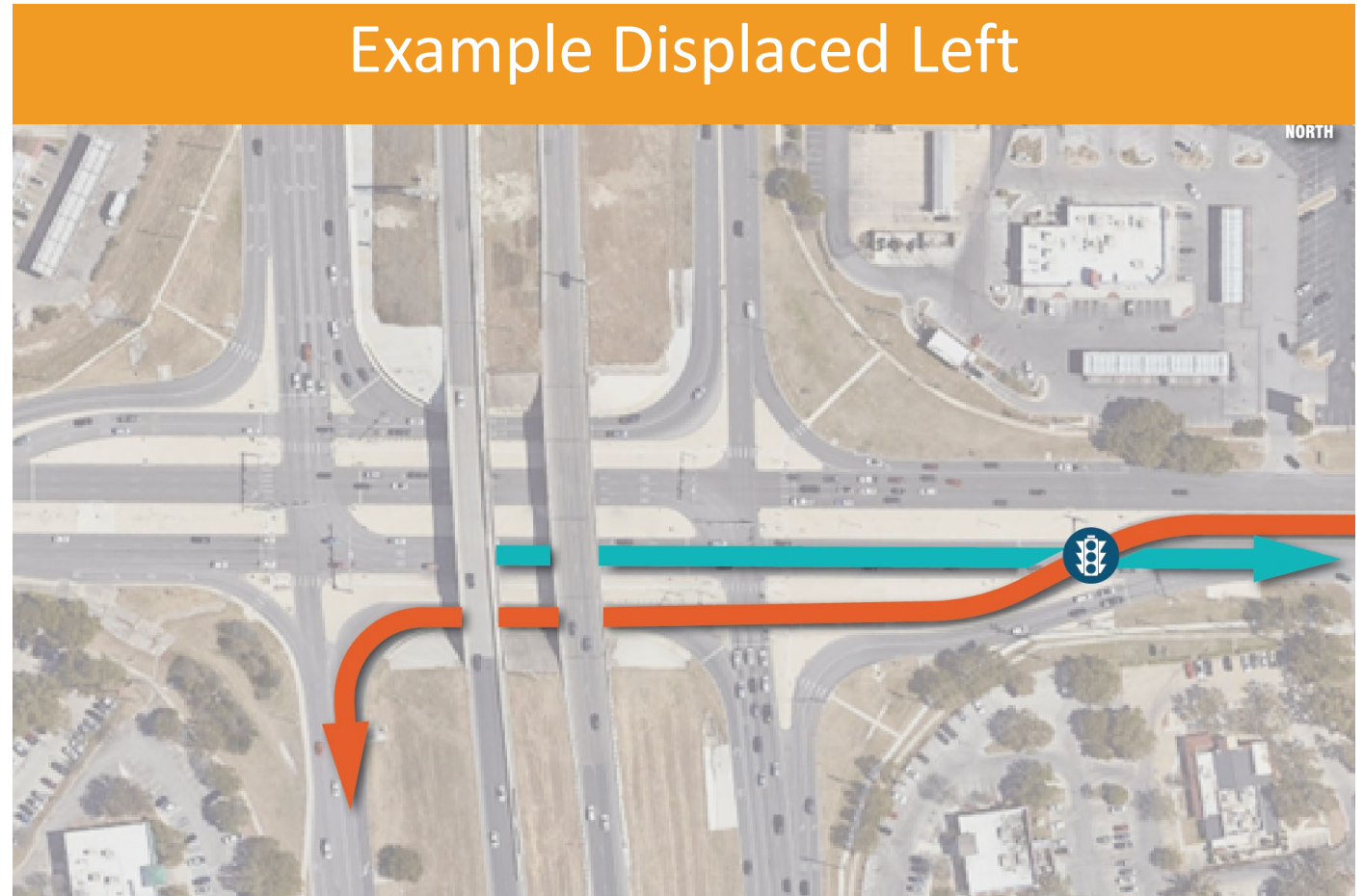
Diverging Diamond

- Signalize NB Ramp terminal intersection
- Replace Bridge
 - Add barrier between contraflow motorized traffic
 - Enhanced pedestrian/bicycle facilities
- Construct two lane SB entrance ramp
- Reconfigure weigh station access for widened Glenn Highway



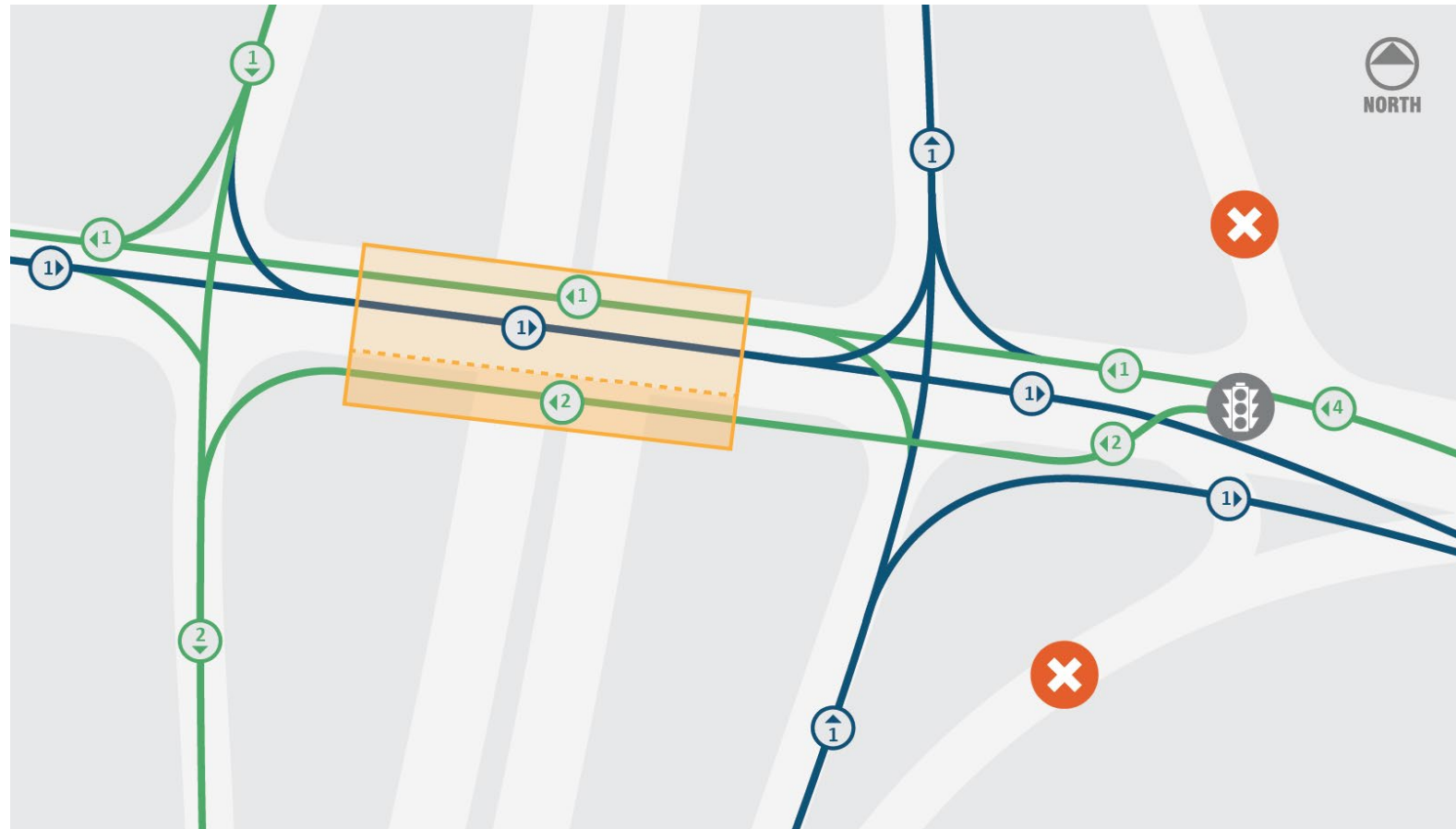
Displaced Left

- Shifts left turns in advance the interchange
- Left turn traffic is separated and contra flow to cross street traffic
- Left turn to entrance ramp is unimpeded.
- Interchange would be tailored to Glenn/Hiland location



Displaced Left—Tailored

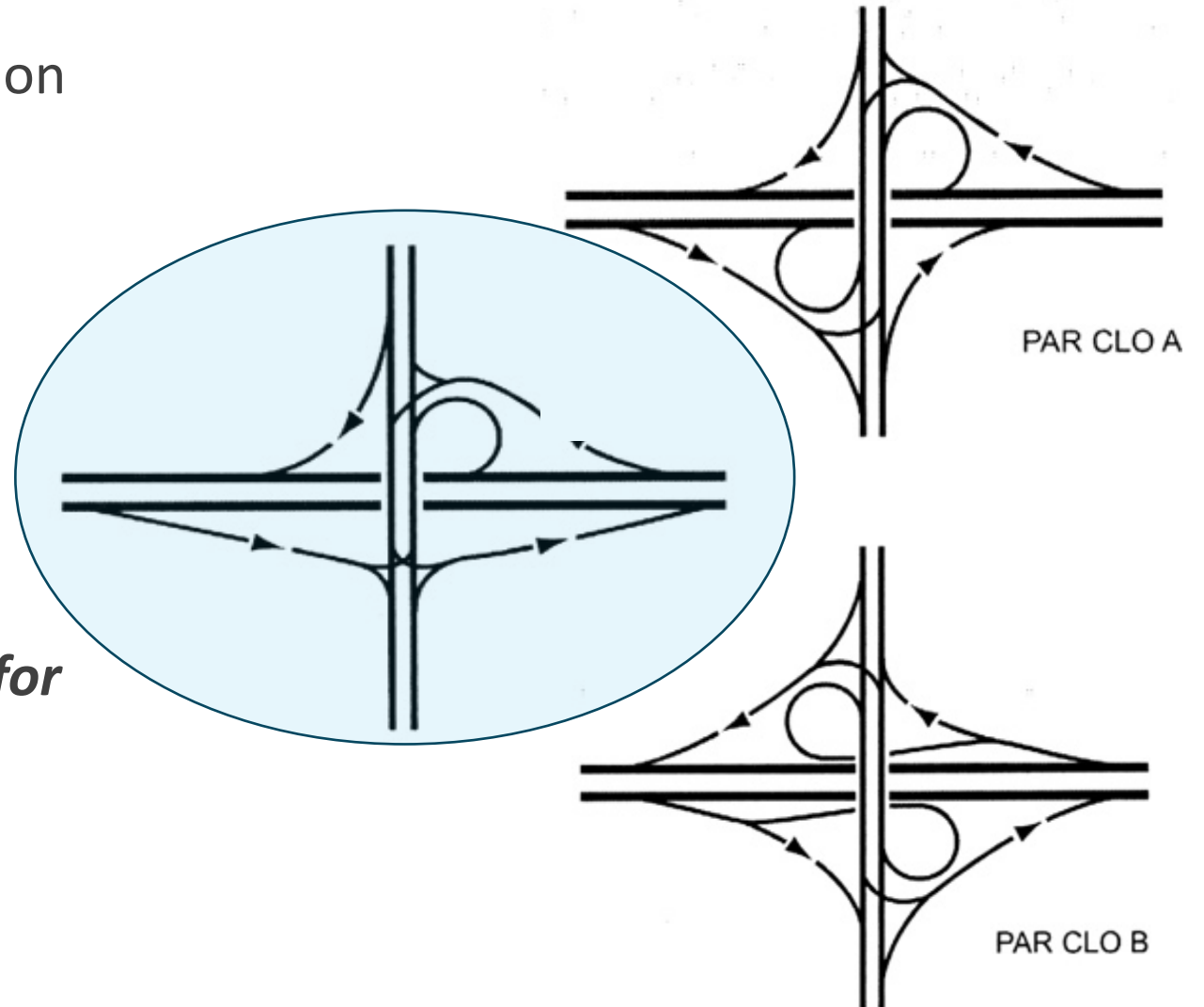
- Signalize NB Ramp terminal intersection
- Replace Bridge
 - Add barrier between contraflow motorized traffic
 - Enhanced pedestrian/bicycle facilities
- Construct two lane SB entrance ramp
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Partial Cloverleaf (Par Clo) Forms

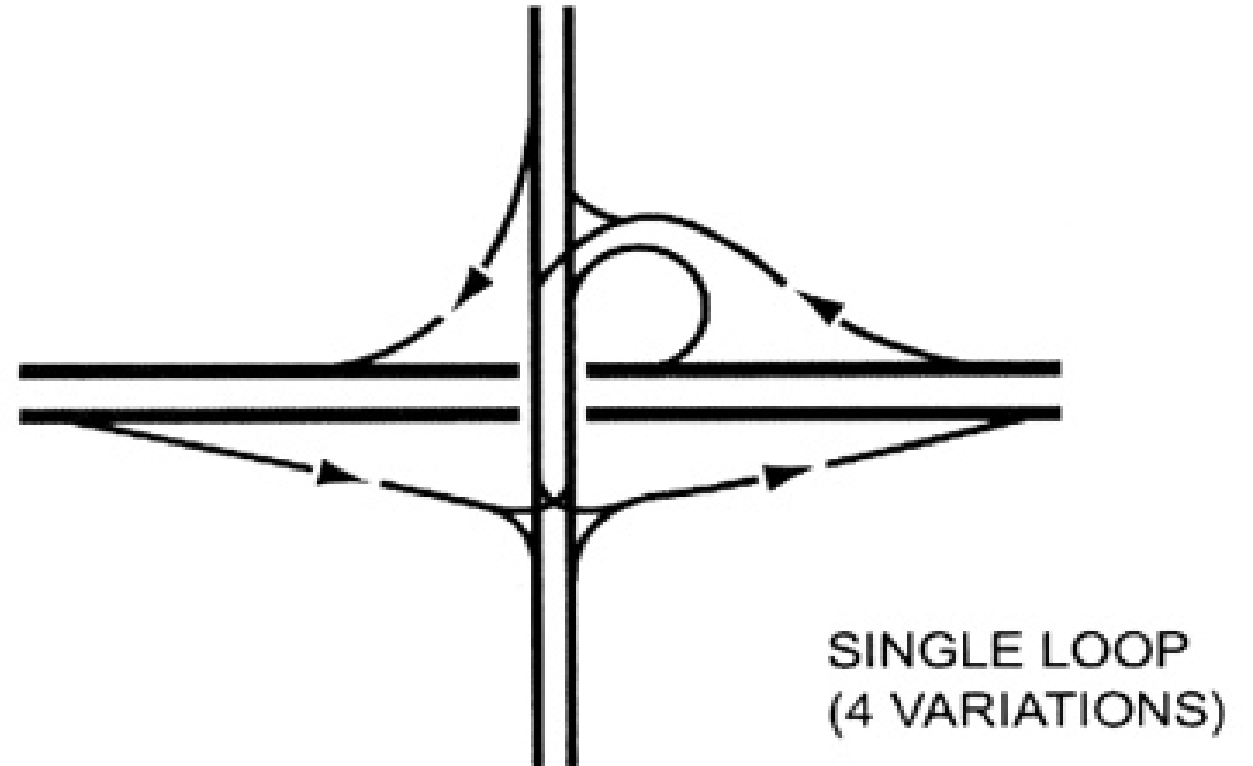
- “A” and “B” is based on the loop location
 - “Advance” of the cross street
 - “Beyond” the cross street
- Single quadrant variation
 - Tailored to traffic volumes
- Bigger footprint than diamonds

Single quadrant Par Clo A is best suited for this location!












Partial Cloverleaf--Tailored

- Replace Bridge
 - Create space for two lane entrance ramp
 - Add barrier between motorized traffic
 - Enhanced pedestrian/bicycle facilities
- Grade separate non-motorized users from loop ramp traffic
- Construct two lane SB entrance ramp
- Reconfigure SB diamond ramp
- Reconfigure weigh station access for widened Glenn Highway



Compatibility Assessment

Long-Term Interchange Form	Short-Term Interchange Form		
	Double Left	Loop Ramp	Diverging Diamond
DIAMOND FORMS			
Tight Diamond			
Displaced Left Turn			
PAR CLO (Single Loop)			



Discussion



Next Steps

What to expect over the next 12 months

- Public Outreach
- Traffic Capacity and Safety Analysis
- Concepts Evaluation
- Context Sensitive Solutions Process (P&Z and UDC)
- Open House #1



Project Contacts

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Kinney Engineering

Jeanne Bowie, Traffic Engineer

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