



**Alaska
Department of
Transportation
and
Public Facilities**

**Alaska Highway
Preconstruction
Manual**

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Alaska Highway Preconstruction Manual



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1. Glossary

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100. Abbreviations, Acronyms, and Glossary

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100.1. Abbreviations and Acronyms

3R: Resurfacing, Restoration, and Rehabilitation

AAA: Authority to Appraise and Acquire

AAC: Alaska Administrative Code

AADT: Average Annual Daily Traffic

AASHTO: American Association of State Highway and Transportation Officials

ABSM: Alaska Bridges and Structures Manual

ADA: Americans with Disabilities Act

ADF&G: Alaska Department of Fish and Game

ADT: Average Daily Traffic

AHDM: Alaska Highway Drainage Manual

AKFPDM: Alaska Flexible Pavement Design Manual

ALBDS: AASHTO LRFD Bridge Design Specifications

AO: Administrative Order

APDES: Alaska Pollution and Discharge Elimination System

ARRC: Alaska Railroad Corporation

AS: Alaska Statute

ATA: Authority to Advertise

ATM: Alaska Traffic Manual (MUTCD with Alaska Supplement)

ATP: Authority to Proceed

B/C: Benefit/Cost

BMP: Best Management Practices

CA: Certification Acceptance

CCO: Chief Contracts Officer

CEA: Cost-Effective Analysis

CE: Categorical Exclusion

CFR: Code of Federal Regulations

CGP: Construction General Permit

CIP: Capital Improvement Program

CL: Centerline

COA: Class of Action

CR: Constructability Review

CRO: Civil Rights Office

CSS: Context Sensitive Solutions

CWA: Clean Water Act

CZ: Clear Zone

DBE: Disadvantaged Business Enterprise

DD: Decisional Document

DEC: Department of Environmental Conservation

DEIS: Draft Environmental Impact Statement

DHV: Design Hourly Volume

DNR: Department of Natural Resources

DOL: Department of Labor

DOT&PF: Alaska Department of Transportation and Public Facilities

DPDR: Department Procedures and Regulations

DPOL: Department Policy

DSR: Design Study Report

EA: Environmental Assessment

EEO: Equal Employment Opportunity

EFH: Essential Fish Habitat

EIS: Environmental Impact Statement

EO: Executive Order

EPA: Environmental Protection Agency

EPM:	NEPA Assignment Program Environmental Procedures Manual	MASH:	Manual for Assessing Safety Hardware
ESA:	Endangered Species Act	MCL:	Materials Certification List
ESC:	Erosion and Sediment Control	MMCL:	Master Materials Certification List
ESCP:	Erosion and Sediment Control Plan	MMPA:	Marine Mammal Protection Act
FAA:	Federal Aviation Administration	MOA:	Memorandum of Agreement
FAHP:	Federal-Aid Highway Program	MOU:	Memorandum of Understanding
FAST Act:	Fixing America's Surface Transportation Act	mph:	Miles Per Hour
FEIS:	Final Environmental Impact Statement	MPO:	Metropolitan Planning Organization
FHPM:	Federal Highway Program Manual	MRS:	Management Reporting System
FHWA:	Federal Highway Administration	MUTCD:	Manual on Uniform Traffic Control Devices
FONSI:	Finding of No Significant Impact	MVM:	Million Vehicle Miles
FTA:	Federal Transit Administration	NCHRP:	National Cooperative Highway Research Program
GB:	Green Book. More specifically, the <i>AASHTO A Policy on Geometric Design of Highways and Streets</i>	NEPA:	National Environmental Policy Act
GDVLVLR:	<i>Guidelines for Geometric Design of Very Low-Volume Local Roads (AASHTO)</i>	NHS:	National Highway System
GPS:	Global Positioning System	NMFS:	National Marine Fisheries Service
HCM:	Highway Capacity Manual	NOC:	Notice of Cancellation
HEC-22:	<i>Urban Drainage Design Manual,</i> Hydraulic Engineering Circular, No. 22	NOI:	Notice of Intent
HOV:	High Occupancy Vehicle	NTP:	Notice to Proceed
HPCM:	Alaska Highway Preconstruction Manual	P&P:	Policy and Procedure
HSIP:	Highway Safety Improvement Program	PDA:	Project Development Authorization
ITE:	Institute of Transportation Engineers	PE:	Preliminary Engineering
ITS:	Intelligent Transportation System	PID:	Project Information Document
LA:	Legislative Authority	PIF:	Public Interest Finding
LON:	Length of Need	PIH:	Plans in Hand
LOS:	Level of Service	PIP:	Public Involvement Plan
LPA:	Local Public Agency	PL:	Public Law
MAP-21:	Moving Ahead for Progress in the 21 st Century Act	PM:	Preventive Maintenance
		PMP:	Project Management Plan
		PoDI:	Projects of Division Interest
		PS&E:	Plans, Specifications, and Estimate
		PSA:	Professional Services Agreement

RDG:	Roadside Design Guide
REM:	Regional Environmental Manager
RIP:	Roadway Information Portal
RLDG:	Roadside Lighting Design Guide
ROD:	Record of Decision
ROW:	Right-of-Way
RPRL:	Recommended Practice for Roadway Lighting (RP-8-14)
RSAP:	Roadside Safety Analysis Program
RTSE:	Regional Traffic and Safety Engineer
R/W:	Right-of-Way
SAFETEA-LU:	Safe, Accountable, Flexible, Efficient Transportation Equality Act: A Legacy for Users
SD:	Sight Distance
SE:	Systems Engineering
SEA:	Systems Engineering Analysis
SEO:	Statewide Environmental Office
SHPO:	Statewide Historic Preservation Office
SNTB:	Special Notice to Bidders
SOA:	Stewardship and Oversight Agreement
SSD:	Stopping Sight Distance
SSHC:	Alaska Standard Specifications for Highway Construction
STIP:	Statewide Transportation Improvement Program
SWPPP:	Storm Water Pollution Prevention Plan
T&M:	Time and Materials
TAP:	Transportation Alternatives Program
TCP:	Traffic Control Plan
TL-3:	Test Level 3
TMDL:	Total Maximum Daily Load
TOP:	Traffic Operation Plan
TRB:	Transportation Research Board

T/W:	Traveled Way
US:	United States
USACE:	United States Army Corps of Engineers
USC:	United States Code
USCG:	United States Coast Guard
USFWS:	US Fish and Wildlife Service
V:	Design Speed (expressed in miles per hour, unless otherwise noted)
VE:	Value Engineering
VLVLR:	Very Low-Volume Local Road
vpd:	Vehicles per Day
VSL:	Value of Statistical Life

100.2. Glossary

6004: Section 6004(a) of SAFETEA-LU, which allows DOT&PF to assume responsibility for determining whether certain designated activities are included within classes of action that are categorically excluded from requirements for Environmental Assessments or Environmental Impact Statements.

85th Percentile Speed: The 85th percentile of the distribution of observed speeds.

AASHTO Bike Guide: The American Association of State Highway and Transportation Officials *Guide for the Development of Bicycle Facilities*.

Adjacent Path: A path alignment that closely parallels the main roadway corridor.

Administrative Order (AO): An order issued by The Governor to take certain corrective action, or to refrain from an activity. A list of AOs is found here:

<https://gov.alaska.gov/admin-orders/index.php>

Alaska Administrative Code (AAC): The regulations implementing state law, referred to by title, chapter, and section e.g., 17 AAC 15.011.

<http://www.legis.state.ak.us/basis/aac.asp>

Alaska Statutes (AS): Usually referred to by title, chapter, and section, e.g., AS 36.30.100.

Americans with Disabilities Act (ADA): Section 504 of the Rehabilitation Act of 1973 (Public Law 93-112, amended by PL 516 and PL95-602) requires federally funded facilities and programs to be accessible to people with disabilities. A federal law (#103-366) enacted on July 26, 1990 that prohibits discrimination against people with disabilities regarding access to programs, activities, or facilities provided by state and local governments. Also includes companion regulations in 28 CFR parts 35, 36, 37, and 36 CFR part 1191.

Annual Average Daily Traffic (AADT): The total volume of traffic passing a point or segment of a highway facility in both directions for one year divided by the number of days in the year.

Arterial Highway: That portion of the road system which provides a high-volume, higher speed network for travel between major points in both rural and urban areas.

At-grade Intersection: An intersection where all roadways join or cross at the same level.

Authority to Advertise (ATA): DOT&PF approval to advertise a project for bids, requested in a standardized memo format. ATA is granted when all signatures are obtained and any limiting conditions or exceptions are satisfied.

Authority to Proceed (ATP): FHWA or DOT&PF approval to proceed with the initial, or next stage of project development.

Auxiliary Lane: The portion of the roadway adjoining the through-traveled way for speed change, turning, storage for turning, weaving, truck climbing, or other purposes supplementary to through-traffic movement.

Average Daily Traffic (ADT): The total volume 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.

Average Running Speed: The sum of the distances traveled by vehicles on a highway section during a specified time period divided by the sum of their running times.

Average Travel Speed: the length of the highway segment divided by the average travel time of all

vehicles traversing the segment, including all stopped delay times.

Backfill: Material used to replace or the act of replacing material removed during construction. Also may denote material placed or the act of placing material adjacent to structures.

Bicycle Facility: A general term denoting improvements and provisions to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways not specifically defined for bicycle use.

Bicycle Lane: A portion of roadway that has been designated for preferential or exclusive use by bicyclists by pavement markings and, if used, signs. It is intended for one-way travel, usually in the same direction as the adjacent traffic lanes, unless designated as a contra-flow lane.

Borrow: An approved material required for embankments or for other portions of the work, and obtained from sources outside the right-of-way limits for the project.

Bus: A self-propelled, rubber-tired road vehicle designed to carry a substantial number of passengers (at least 16) and commonly operated on streets and highways.

Capacity: The maximum sustainable hourly flow rate at which persons or vehicles reasonably can be expected to traverse a point or a uniform segment of a lane or roadway during a given time period under prevailing roadway, environmental, traffic, and control conditions.

Capital Improvement Plan (CIP): The Department's plan for project activities spanning the next six federal fiscal years.

Categorical Exclusion (CE): A type of environmental classification used on federal-aid highway projects when there are no significant environmental impacts, as described in Section 430.4.2.

Certification Acceptance (CA): Certification Acceptance. A program agreement with the FHWA contained in the Stewardship and Oversight Agreement (SOA) that grants the Department authority to administer certain federally funded roadway projects.

Clear Runout Area: The additional clear zone space that is needed because a portion of the suggested clear zone falls on a non-recoverable slope. The width of the clear runout area is equal to portion of the clear zone distance that is located on the non-recoverable slope.

Clear Zone (CZ): The unobstructed, traversable area provided beyond the edge of the through traveled way for the recovery of errant vehicles. The clear zone includes shoulders, bike lanes, and auxiliary lanes, except those auxiliary lanes that function like through lanes.

Code of Federal Regulations (CFR): Regulations that implement federal law, referred to by title, part, and section, e.g., 23 CFR 630.114. Title 23 covers Highways.

<https://www.ecfr.gov/cgi-bin/text-idx?tpl=%2Findex.tpl>

Collector Road: A road collecting traffic from local roads and channeling it to the arterial system.

Collector-Distributor Road: A continuous roadway without local access provided parallel to a freeway mainline through one or more interchanges for the purpose of removing weaving movements or closely spaced merges and diverges from the mainline.

Collector Street: A public highway, usually serving moderate traffic volumes. Collector streets serve a dual function: collecting traffic for movement between arterial streets and local roads, and providing access to abutting properties. Collector streets link neighborhoods or areas of homogenous land use with the arterial street systems. These streets not only serve traffic movements between arterials and local streets, but also serve through traffic within local areas.

Commissioner: The Commissioner of the Alaska Department of Transportation and Public Facilities.

Construction: Defined in AS 19.59.001(2) as construction, reconstruction, alteration, improvement, or major repair.

Construction is also defined in 23 USC 101(a)(4) as it applies to most FHWA funded projects. This definition is particularly important in the context of a project's eligibility for FHWA funding.

<https://www.gpo.gov/fdsys/pkg/USCODE-2016-title23/pdf/USCODE-2016-title23-chap1-sec101.pdf>

Context Sensitive Solutions (CSS): A collaborative interdisciplinary approach that involves interested stakeholders in developing a transportation facility that, to the extent practical, maintains or enhances mobility, provides a high level of safety, fits its physical setting and preserves scenic, aesthetic, historic, cultural and environmental values and resources. CSS is an approach that considers the total context within which a transportation improvement project exists.

Controlling Design Criteria: Design criteria identified by FHWA as having substantial importance to the operational and safety performance of any highway such that special attention should be paid to them in design decisions. See Section 1100.3.2. for a listing.

Cross-slope: The slope across the traveled way, auxiliary lane, or shoulder of a roadway. Usually expressed in percentage of fall in feet of the roadway per foot of width.

Cul-de-sac Street: A local street open at one end only. A cul-de-sac should have a special turning area at the closed end.

Department: The Alaska Department of Transportation and Public Facilities (DOT&PF).

Design Criteria: Minimum dimensional values or ranges of values for various elements of the three-dimensional design features of a highway.

Design Exception: A documented approval to design a highway element or segment(s) of a highway project using a criterion that does not meet standards when that criterion is one of the controlling criteria adopted by FHWA. See Section 1100.3.2.

Design Hourly Volume (DHV): The DHV used in design is generally the 30th highest hourly volume of the year, abbreviated as 30 HV, which is typically about 15 percent of the ADT on rural roads.

Design Speed (V): A selected speed used to determine the various geometric design features of the roadway. The assumed design speed should be a logical one with respect to the topography, anticipated operating speed, the adjacent land use, and the functional classification of highway.

Design Standards: Design criteria, typically from published policies or guidelines, that are adopted by regulation or included in Table 1100-1. Design standards establish a uniform set of values to use as the basis for project design.

Design Study Report (DSR): A formal report that documents the preferred design solution. Approval of the DSR constitutes Design Approval. See Section 450.5.1.

Design Vehicle: A selected motor vehicle, the weight, dimensions, and operating characteristics of which are used in highway design.

Design Waiver: A documented approval to design a highway element or a segment(s) of a highway project using a design criterion that does not meet standards, when that criterion is not one of the FHWA controlling criteria. See Section 1100.3.2.

Disadvantaged Business Enterprise (DBE): A for-profit business concern that: (1) is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals; and (2) Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it.

Ditch: A channel cut in the surface of the ground for drainage purposes. Usually parallel and adjacent to the roadway.

Divided Highway: A highway with separated roadways for traffic in opposite directions.

DOT&PF: The Alaska Department of Transportation and Public Facilities. Also referred to in this manual as the Department.

DPDR: Department Procedures and Regulations. See also P&P.

DPOL: Department Policy. See also P&P.

Embankment: A structure of soil, soil-aggregate, or broken rock between the embankment foundation and the subgrade.

Environmental Document: A report required on all federal-aid capital projects because of the National Environmental Policy Act (NEPA). It summarizes the alternative courses of action,

evaluates their potential environmental effects, commits to measures necessary to mitigate adverse impacts, and includes agency coordination and public involvement. The type of document (classification), as defined in 23 CFR 771.115, depends on the project's environmental impact. It may be an EIS, CE, or EA, as described in Section 430.4.2. An environmental document may also be necessary on a state-funded project that requires action by a federal agency, such as federal permits or clearances.

Environmental Assessment (EA): A type of environmental classification used on federal-aid highway projects when the extent of environmental impacts is uncertain. The EA results in either a Finding of No Significant Impact (FONSI) or a decision to develop an Environmental Impact Statement (EIS), as described in Section 430.4.2.

Environmental Impact Statement (EIS): A type of environmental classification used on highway projects when a significant environmental impact is anticipated, as described in Section 430.4.2. The concluding action on an EIS results in a Record of Decision (ROD) through the federal agency with jurisdiction.

Executive Order (EO): Legally binding orders given by the President of the United States to federal agencies.

Expressway: A high-speed divided arterial highway for through traffic with access partially or fully controlled and grade-separations at major intersections

FAST Act: Fixing America's Surface Transportation Act of Dec. 4, 2015.

Federal-Aid Highway Program Policy and Guidance Center (PGC): A web-based searchable source of official FAHP policy and guidance documents.

<https://www.fhwa.dot.gov/pgc/>

Federal-Aid Policy Guide (FAPG): The collection of policies, procedures, and directives from the FHWA for administering the federal-aid program. The FAPG has been terminated and guidance is now found at the Federal-Aid Highway and Program Policy and Guidance Center.

Federal Aviation Administration (FAA): Usually refers to the Alaska Region offices in Anchorage.

Federal Highway Administration (FHWA): Usually refers to the Alaska Division offices in Juneau.

Federal Transit Administration (FTA): Sister agency to the FHWA and FAA, administering the federal transit program. The regional office is located in Seattle, Washington.

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

Finding of no Significant Impact (FONSI): An environmental assessment conclusion, as described in Section 430.4.2, signed by the federal agency with jurisdiction.

Freeway: An expressway with fully controlled access.

Frontage Road: A local road auxiliary to and located adjacent to the side of an arterial highway for service to abutting property and adjacent areas and for control of access.

Functional Group: Same as Support Group.

Gore: The area immediately beyond the divergence of two roadways bounded by the edges of those roadways.

Grade: The level or elevation of something, or the longitudinal slope of an alignment.

Grade-Separation: A crossing of two highways, or a highway and a railroad, at different levels.

Gravel to Pavement Project: A road construction project with the primary purpose of reducing maintenance costs and improving roadway driving characteristics by hard surfacing gravel roads in accordance with the guidance provided in Section 1160.4 of this manual.

Green Book (GB): *AASHTO A Policy on Geometric Design of Highways and Streets.*

Highway: A highway (whether included in primary or secondary systems), road, street, trail, walk, bridge, tunnel, drainage structure and other similar or related structure or facility, and right-of-way thereof, and further includes a ferry system, whether operated solely inside the state or to connect with a

Canadian highway, and any such related facility. Defined in AS 19.59.001(8).

Highway Safety Improvement Program (HSIP): A federally-mandated program to identify, evaluate, prioritize, and fund highway safety improvements. The HSIP focuses on reducing or eliminating fatal and serious injury crashes on all public roads.

Highway, Street, or Road: Recommended usage: In urban areas – highway or street. In rural areas – highway or road.

- **Highway:** A general term denoting a public way for vehicular travel, including the entire area within the right-of-way.
- **Road:** A general term usually denoting a rural public way for vehicular travel, including the entire area within the right-of-way.
- **Street:** A general term for an urban or suburban public way for vehicles, including the entire area within the right-of-way.

See Section 1.3 of the Green Book for definitions of urban and rural areas.

Horizontal Clearance: The horizontal distance from the edge of traveled way to a roadside object or feature.

Interchange: A system of interconnecting roadways in conjunction with one or more grade-separations, providing for the movement of traffic between two or more roadways on different levels.

Intersection: The general area where two or more highways join or cross, which includes the roadway and roadside facilities for traffic in that area. Where separate right-turn roadways are provided through use of curbed or unpaved islands, the intersections of the turning roadway with the other highways are considered separate intersections.

Interstate: Interstate is the highest level of principal arterial, primarily rural. Interstates connect large population centers.

Island: A defined area between traffic lanes for control of vehicle movements or for pedestrian refuge. Within an intersection, a median or an outer separation is considered an island. A right-turn lane created with a painted island is not considered a separate turning roadway.

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

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

Legislative Authority (LA): Approval given by the Alaska Legislature to the Executive Branch to spend state or federal funds towards a specific project. A legislative authority citation is given as ww.xx.yy.zz, where ww is the chapter, xx is the year, yy is the page, and zz is the line.

Length of Need (LON): Total length of a longitudinal barrier needed to shield an area of concern. The length of need point for a given system is usually confirmed by successfully passing a redirection crash test with impact at the length of need point.

Level of Service (LOS): A quantitative stratification of a performance measure or measures that represent a quality of service, measured on an A - F scale, with LOS A representing the best operating conditions from the traveler's perspective and LOS F the worst.

Local Road: A road primarily for access to homes, businesses, or other abutting property.

Local Street: A street primarily for access to homes, businesses, or other abutting property.

Maintenance: The preservation of each type of highway, roadside structure, and facility as nearly as possible to its original condition as constructed, or as subsequently improved, and the operation of highway facilities and services to provide satisfactory and safe highways. Defined in AS 19.59.001(9). See also Preventive Maintenance and Routine Maintenance.

Major Highway: An arterial highway, with intersections at-grade and direct access to abutting property, on which geometric design and traffic control measures are used to improve the safety of the movement of through traffic.

MAP-21: The Moving Ahead for Progress in the 21st Century Act (P.L. 112-141) enacted on July 6, 2012 that funds surface transportation programs.

Markings: All lines, patterns, words, colors, or other devices, except signs, set into the surface of, applied on, or attached to the pavement or curbing or to objects within or adjacent to the roadway, officially placed for regulating, warning, or guiding traffic.

Median: The portion of a divided highway separating the traveled ways of opposing traffic.

Median Opening: A gap in a median provided for crossing and/or turning traffic

Metropolitan Planning Organization (MPO): An MPO carries out transportation planning for urban areas with a population greater than 50,000 people. Defined in Federal Regulation 23 USC Sec. 134 (b) through (d). This includes Anchorage and Fairbanks.

Mid-block Crossing: Intersections formed when paths or sidewalks cross other transportation facilities at locations other than roadway-to-roadway intersections.

Mid-Design Period ADT: The projected ADT that occurs at a point in time equal to one-half the project design life.

National Highway System (NHS): The NHS includes the Interstate System; Congressional High Priority Routes; National Defense Roads (i.e. the Strategic Highway Network); and principal arterial routes or other routes that connect intermodal facilities.

National Environmental Policy Act (NEPA) Assignment Program: The surface transportation project delivery program established in 23 U.S.C. 327 allows DOT&PF to assume FHWA's responsibilities under NEPA.

New Construction: A major highway improvement that constructs a roadway, on new alignment, to the design requirements of the Green Book, and the *Alaska Highway Preconstruction Manual*.

New Construction - Reconstruction: A major highway improvement that completely rebuilds an existing roadway or constructs a roadway on new alignment, to the contemporary design requirements

of the Green Book, and the *Alaska Highway Preconstruction Manual*.

Non-Motorized Transportation: Transportation by human power, including bicycling, walking, in-line skating, skiing, and other methods.

Non-NHS: A term used to designate roads other than those on the NHS. Non-NHS roads are to be designed, constructed, operated, and maintained in accordance with state laws, regulations, directives, safety standards, design standards, and construction standards.

Non-recoverable Slope: A slope that is considered traversable but on which the errant vehicle will continue on to the bottom. Embankment slopes between 3:1 and 4:1 may be considered traversable but non-recoverable if they are smooth and free of fixed objects.

Notice of Intent (NOI): The official notification that a federal agency is beginning the process to prepare an Environmental Impact Statement (EIS).

Operating Speed: The speed at which drivers are observed operating their vehicles during free-flow conditions. The 85th percentile of the distribution of observed speeds is the most frequently used measure of the operating speed associated with a particular location or geometric feature. This speed may be higher or lower than posted or legislated speed limits or nominal design speeds where alignment, surface, roadside development, or other features affect vehicle operations.

Overpass: A grade-separation where the subject roadway, railroad, or pedestrian facility passes over the subject highway.

Parked Vehicle: A vehicle stopped for temporary storage.

Passenger Car: A motor vehicle, except motorcycles, designed for carrying a limited number of passengers and used for the transportation of people.

Path: An improved facility, greater than or equal to 8 feet in width, physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Bicyclists, pedestrians, skaters, wheelchair (both self- and electric-powered)

users, joggers, skiers, and other non-motorized users may use paths.

Pavement Replacement: The replacement of the entire existing pavement structure by the placement of new pavement structure.

Pavement replacement may utilize either new or recycled materials incorporated into the materials used for the replacement of the existing pavement section. Pavement replacement is required when a pavement has either failed or has become functionally obsolete.

Pavement Rehabilitation: Structural enhancements that extend the service life of an existing pavement and/or improve its load carrying capacity. Rehabilitation techniques include restoration treatments and structural overlays.

Pavement Structure: The combination of select material, subbase, base, and surface course placed on a subgrade to support the traffic load and distribute it to the roadbed (42 inches below the asphalt concrete layer).

Phase: Refers to project programming phase as it appears in the STIP.

- Phase 1 – Unprogrammed Legislative Authority
- Phase 2 – Preliminary Engineering
- Phase 3 – ROW
- Phase 4 – Construction
- Phase 7 – Utility Relocation
- Phase 8 – Planning & Research
- Phase 9 – Other

Policy & Procedures (P&P): Synonymous with DPOL (Department Policy) and DPDR (Department Procedures and Department Regulations). Policies and Procedures are found at:

http://www.dot.state.ak.us/admsvc/pnp/policy_and_procedures.shtml

Posted Speed: The regulatory speed conveyed on a traffic sign.

Preliminary Engineering (PE): Preliminary engineering includes preliminary and final design, both defined in 23 CFR 636.103, and other project-related work leading to physical construction. This includes costs to perform studies needed to address requirements of the National Environmental Policy Act (NEPA) and other environmental laws. It may include advertising and other pre-award work such

as bid analysis, although it is also acceptable to include this work as construction engineering cost.

Preservation: Preservation consists of work that is planned and performed to improve or sustain the condition of the transportation facility in a state of good repair. Preservation activities generally do not add capacity or structural value, but do restore the overall condition of the transportation facility.

Preventive Maintenance (PM): A cost-effective means of extending the useful life of highways. PM slows or delays future deterioration and maintains or improves the functional condition of highway facilities without increasing structural capacity.

Preventive Maintenance (PM) Project: A project that is a cost-effective means of extending the useful life of Alaska's highways. A PM project slows or delays future deterioration and maintains or improves the functional condition of highway facilities without increasing structural capacity. A PM project is a proactive approach to maintaining highway facilities while they are still in relatively good condition and is performed before the onset of serious damage, delays or eliminates the need for major rehabilitation or reconstruction. See Section 1140 for further information on this type of project.

Professional Services Agreement (PSA): A contract between the professional service provider (consultant) and the Department. The PSA Manual is found here:

http://www.dot.alaska.gov/procurement/prosvcs/assets/Prosvcs_PSAManualComplete.pdf

Program Year: Refers to the federal fiscal year running from October 1 to September 30. Generally used in the context of STIP funding of project phases.

Project Certification: A document required at the completion of project design and before a project is advertised for construction bids. It attests that the Department has performed environmental, design, right-of-way, and utility work in accordance with the terms of the certification. See Subsections 470.3 and 490.4 for further information on project certifications.

Project Design Criteria: The project specific design criteria as designated on the Project Design Criteria form. The project design criteria values may not meet design standards due to project

specific considerations. See Section 1100 (ref: Figure 1100-2).

Project Development Authorization (PDA): A Department programming document requesting funding and showing funding sources and levels in each phase of a project.

Project Information Document (PID): A standardized form prepared by the engineering manager or project control and signed by the engineering manager and the regional environmental manager. It provides project and environmental status information.

Project Management Plan (PMP): A plan outlining and establishing scope, activities, support group involvement, schedule, and budget for a project.

Project of Division Interest (PoDI): Project of interest to the Alaska Division of FHWA. These projects are identified and updated on an annual basis. See Section 497 for further information.

Public Interest Finding (PIF): Documentation used to satisfy a "findings-of-fact" and "State's best interest" requirement on certain types of construction related work. See P&P 10.02.013.

Public Involvement Plan (PIP): A plan to inform and gather input from agencies and the public.

Railroad Grade Crossing: The area where a highway and a railroad cross at the same level, which includes the railroad, roadway, and roadside facilities for traffic.

Reconstruction: A major highway improvement that completely rebuilds an existing roadway, on a new alignment over a significant portion of the project length, to the design requirements of the Green Book, and the *Alaska Highway Preconstruction Manual*.

Record of Decision (ROD): The concluding action on an Environmental Impact Statement, as described in Section 430.4.8.

Recoverable Slope: A slope on which a motorist may, to a greater or lesser extent, retain or regain control of a vehicle. Slopes flatter than 4:1 are generally considered recoverable.

Region: Typically refers to one of the three organizational units of the Department (Central,

Northern, and Southcoast) having authority for highway program development.

Resurfacing, Restoration, and Rehabilitation

(3R): Restoring the structural integrity of the existing roadway. Additionally, enhancing safety and capacity, if required. See Section 1160.

Road: A general term usually denoting a rural or village public way for vehicular travel, including the entire area within the right-of-way.

Roadside: A general term for the area adjoining the outer edge of the roadway. Extensive areas between the roadways of a divided highway may also be considered roadside.

Roadway: The portion of a highway, including shoulders, for vehicular use. A divided highway has two or more roadways.

Roadway Information Portal (RIP): A web application for accessing information on roadway characteristics for Alaska roads.

Rock Excavation: Excavation of igneous, metamorphic, and sedimentary rock that cannot be excavated without blasting or the use of rippers.

Roundabout: A confluence of three or more intersection legs at which traffic merges into and emerges from a one-way roadway counterclockwise around a central area.

Routine Maintenance: Work performed in reaction to an event, season, or over all deterioration of the transportation asset. This work requires regular reoccurring attention. Routine maintenance is not eligible for federal-aid funding.

Rules of the Road: Regulations in the State of Alaska Administrative Code that govern the operation of motorized and non-motorized use of transportation facilities.

Safe, Accountable, Efficient Transportation Act: A Legacy for Users (SAFETEA-LU): A surface transportation funding and authorization bill signed into law on August 10, 2005 and expiring September 30, 2009. It was replaced with MAP-21 in 2012.

Shared Use Path: See “Path”.

Shoulder: The portion of a highway contiguous to any traveled way for accommodation of bicycles, pedestrians, and vehicles stopped for emergencies, and for lateral support of base and surface courses.

Shy Distance: The distance from the edge of the traveled way beyond which a roadside object will not be perceived as an obstacle by the typical driver to the extent that the driver will change the vehicle’s placement or speed.

Sidewalk: The portion of a road, street, or highway between the curb lines of a roadway and the adjacent property lines, typically elevated and hard-surfaced, intended for pedestrian use.

Slope: The inclination of a surface with respect to the horizontal, expressed as a number of horizontal units to one vertical unit (e.g., 2:1, 4:1, 6:1).

Backslope: On a roadway section in a cut (where the original ground has been excavated), the portion of the plane cross-section from the bottom of the roadside ditch to the top of cut. Also known as a cut slope.

Foreslope: On a roadway section, the portion of the roadside that slopes down and away from the roadway. Also referred to as a fill slope.

Sideslope: Aggregate term encompassing backslopes and foreslopes along a roadway.

Small Community: Topographically concentrated, unincorporated population areas large enough to support a nearby post office or local school.

Special Provisions: An addition or revision that amends or supersedes the Standard Specifications or Standard Modification, and is applicable to an individual project.

Specifications: A general term applied to all contract terms, conditions, directions, provisions, and requirements.

Speed: The rate of vehicular movement, generally expressed in miles per hour.

Speed Change Lane: An auxiliary lane, including tapered areas, primarily for the acceleration or deceleration of vehicles entering or leaving the through-traffic lanes.

Stage: A subdivision of a phase with respect to level or degree of development.

Standard Modification: An addition or revision that amends or supersedes the Standard Specification, and is approved by the Department for general application and repetitive use.

Standard Specifications: The Alaska Department of Transportation and Public Facilities Standard Specifications for Highway Construction.

State Highway: Any highway owned by the State of Alaska.

Statewide Transportation Improvement Program (STIP): The Department's plan for initiating federal-aid highway projects, by phase, for a given fiscal year of the Capital Improvement Program. Projects must be included in the STIP and approved by the FHWA (and, in the case of urban area [MPO] projects, the Federal Transit Authority), before a PDA is issued.

Stewardship and Oversight Agreement (SOA): The Joint Stewardship and Oversight Agreement between the FHWA Alaska Division and DOT&PF. It formalizes the roles and responsibilities of the two parties in administering the Federal-Aid Highway Program, outlines authorities, and assures accountability.

Street: A general term for an urban or suburban public way for vehicles, including the entire area within the right-of-way.

Superelevation: The cross-slope at right angles to the centerline, across the roadway from the inside to the outside edge of a curve. Usually denoted as a percentage or by foot of rise of the roadway per foot of width.

Support Group: Groups other than engineering that play a role in project development. These include:

1. Bridge Design
2. Civil Rights
3. Construction
4. Contracts
5. Drafting
6. Environmental
7. Foundations
8. Geotechnical
9. Hydraulics/Hydrology
10. Planning
11. Project Control
12. Right-of-Way
13. Surveying
14. Traffic and Safety
15. Utilities

Traffic Control Device: A sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, private road, open to public travel, pedestrian facility, or shared-use path by authority of a public agency or official having jurisdiction, or, in the case of a private road open to public travel, by authority of the private owner or private official having jurisdiction.

Traffic Control Plan (TCP): A drawing of one or more specific plans that detail the routing of pedestrians and/or vehicles through or around a construction area, including the location of all traffic control devices.

Traffic Control Signal: Any device—operated manually, electrically, or mechanically—that alternately directs traffic to stop and permits it to proceed.

Traffic Lane: The portion of a traveled way for the movement of a single line of vehicles.

Traffic Operation Plan (TOP): A program designed to improve the use of a highway, street, or highway and street network, through the principles of traffic engineering.

Traffic Sign: A device mounted on a fixed or portable support that conveys a message with words or symbols, officially erected for regulating, warning, or guiding traffic.

Traffic Signal: A power-operated traffic control device that regulates or warns traffic, or alternately directs traffic to take actions.

Trail: An unpaved or unimproved route, which may serve non-motorized or motorized off-road uses.

Trailer: A vehicle designed for carrying people or property and drawn by a motor vehicle, which carries no part of the weight or load of the trailer.

Transportation Alternatives Program (TAP): A program that provides for a variety of transportation alternative projects. The TAP program replaces the funding from pre-MAP-21 programs including Transportation Enhancements, Recreational Trails, and Safe Routes to School, wrapping them into a single funding source.

Traveled Way (T/W): The portion of a roadway for the movement of vehicles, exclusive of shoulders.

Traversable Slope: A slope from which a motorist will be unlikely to steer back to the roadway but may be able to slow and stop safely. Slopes between 3:1 and 4:1 generally fall into this category.

Truck: A heavy vehicle engaged primarily in the transport of goods and materials or services other than public transportation.

Turning Movement: The traffic making a designated turn at an intersection.

Turning Path: The path of a designated point on a vehicle making a specified turn.

Turning Roadway: A connecting roadway for traffic turning between two intersection legs.

Underpass: A grade-separation where the subject roadway, railroad, or pedestrian facility passes under the subject highway.

United States Code (USC): Federal laws, usually referred to by title and section, e.g., 23 USC 109.

<https://www.gpo.gov/fdsys/browse/collectionUSCode.action?selectedYearFrom=-1&go=Go>

Value Engineering (VE): The systematic application of recognized analytical techniques by a multi-disciplined team, which identifies the function of a product or service, establishes a monetary value, generates alternatives, and reliably provides the function at the lowest life-cycle cost consistent with performance, maintainability, safety, and aesthetics.

Van: A vehicle designed to carry passengers (less than 16) or cargo, or both.

Vertical Clearance: The distance from the top of the roadway surface to the lowest part of an overhead facility or obstruction.

Very Low-Volume Local Road (VLVLR): A road that is functionally classified as a local road and has a design average daily traffic volume of 400 vehicles per day or less.

Volume: The total number of vehicles or other roadway users that pass over a given point or section of a lane or roadway during a given time interval, often 1 hour.

Warrants: The criteria by which the need for a safety treatment or improvement can be determined.

Weaving: The crossing of two or more traffic streams traveling in the same direction along a significant length of highway, without the aid of traffic control devices (except for sign guides).

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2. Organization

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200. Design and Engineering Services Organization

- 200.1. Introduction
- 200.2. Statutory Authority

200.1. Introduction

The primary concern of this manual is with the design and engineering of highway facilities. The Commissioner establishes the organization of the Department that performs design. The three regions and Statewide Design and Engineering Services (D&ES) staff share responsibility for these functions. The three regions are Southcoast, Central, and Northern (see Figure 2-1). The regions perform the direct design functions while the Statewide staff provides support in policy and statewide standards. The Chief Engineer at Statewide provides overall design management.

200.2. Statutory Authority

Sec. 44.42.010. Commissioner of transportation and public facilities: This section establishes the commissioner as the principal executive officer of DOT&PF. (E.O. No. 39, § 2 (1977))

Sec. 44.42.020. Powers and duties: The Department shall:

1. Plan, design, construct, and maintain all state modes of transportation and transportation facilities and all docks, floats, breakwaters, buildings, and similar facilities;
2. Study existing transportation modes and facilities in the state to determine how they might be improved or whether they should continue to be maintained;
3. Study alternative means of improving transportation in the state with regard to the economic costs of each alternative and its environmental and social effects;
4. Develop a comprehensive, long range intermodal transportation plan for the state;
5. Study alternatives to existing modes of transportation in urban areas and develop plans to improve urban transportation;
6. Cooperate and coordinate with and enter into agreements with federal, state, and local

government agencies and private entities in exercising its powers and duties;

7. Manage, operate, and maintain state transportation facilities and all docks, floats, breakwaters and buildings, including all state highways, vessels, railroads, pipelines, airports, and aviation facilities;
8. Study alternative means of transportation in the state, considering the economic, social, and environmental effects of each alternative;
9. Coordinate and develop state and regional transportation systems, considering deletions, additions, and the absence of alterations;
10. Develop facility program plans for transportation and state buildings, docks, and breakwaters required to implement the duties in this section, including but not limited to functional performance criteria and schedules for completion;
11. Supervise and maintain all state automotive and mechanical equipment, aircraft, and vessels, except vessels and aircraft used by the Department of Fish and Game or the Department of Public Safety; for state vehicles maintained by the department, the department shall, every five years, evaluate the cost, efficiency, and commercial availability of alternative fuels for automotive purposes, and the purpose for which the vehicles are intended to be used, and convert vehicles to use alternative fuels or purchase energy efficient vehicles whenever practicable, the department may participate in joint ventures with public or private partners that will foster the availability of alternative fuels for all automotive fuel consumers;
12. Supervise aeronautics inside the state, under AS 02.10;
13. Implement the safety and financial responsibility requirements for air carriers under AS 02.40;
14. Inspect weights and measures;

15. At least every four years, study alternatives available to finance transportation systems in order to provide an adequate level of funding to sustain and improve the state's transportation system;

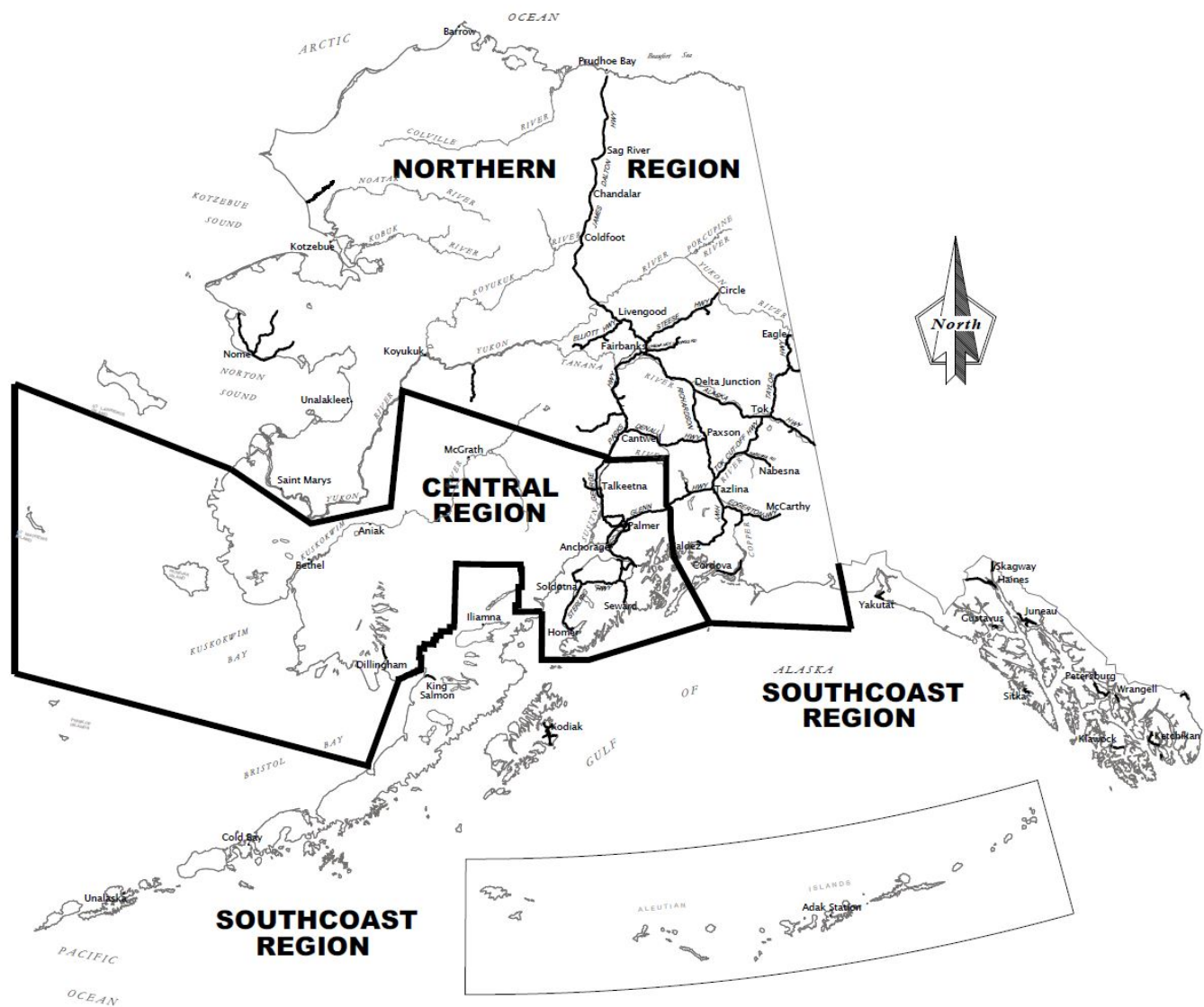
commissioner, directs each regional office. (E.O. No. 39, § 2 [1977]).

The Department may:

1. Engage in experimental projects relating to available or future modes of transportation and any means of improving existing transportation facilities and service;
2. Exercise the power of eminent domain, including the declaration of taking as provided in AS 09.55;
3. Publish plans, schedules, directories, guides, and manuals for distribution, with or without charge, to private or public entities or people;
4. Operate state housing in support of the department's statutory responsibilities and charge rent that is consistent with applicable collective bargaining agreements, or, if no collective bargaining agreement is applicable, competitive with market conditions;
5. Charge reasonable fees to cover the costs of issuing easements, licenses, and permits and to cover the costs of reproduction, printing, mailing, and distribution of contract and bid documents and design and construction standards manuals;
6. Charge and collect fees for training services and technical assistance provided by department personnel;

Citations: E.O. No. 39 § 2 (1977); am § 13 ch 168 SLA 1978; am § 12 ch 83 SLA 1980; am E.O. No. 50, § 10 (1981); am § 77 ch 138 SLA 1986; am § 62 ch 36 SLA 1990; am § 2 ch 122 SLA 1994; E.O. No. 98 § 8 (1997); am § 2 ch 39 SLA 2005; am § 16 ch 83 SLA 2010.

Sec. 44.42.040. Departmental organization: The commissioner establishes regions within the state. The functions of the Department within each region shall be performed, to the maximum extent feasible, through a regional office. A regional transportation and public facilities director, appointed by the



**Figure 2-1
Regional Map**

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400. Introduction

- 400.1. Purpose
- 400.2. Responsibility
- 400.3. Project Work/Improvement Types
- 400.4. Process Flow Charts

400.1. Purpose

This chapter establishes procedures and guidance for use in developing federal-aid and state-funded highway capital improvement projects from initiating project development authorization (PDA) to construction contract award. It stipulates minimum requirements and provides references to the sources of those requirements. Additional steps may be appropriate to address project specific requirements. Section 490 of this manual covers state-funded projects and notes differences in project development procedures.

400.2. Responsibility

The regions are responsible for project development. Planning field offices are responsible for transferring project nomination, Statewide Transportation Improvement Program (STIP) information, planning studies and other information to support project initiation and funding.

Preservation projects come from Asset Management project nominations developed between the regions and Statewide Materials.

Highway Safety Improvement Program (HSIP) project nomination packages come from the regional Traffic & Safety Engineers in consultation with the Statewide Traffic Engineer.

Project managers are responsible for developing projects in accordance with applicable federal, state, and local laws and regulations, and departmental policies and procedures.

In this chapter, the use of position titles refers to levels of authority rather than specific position names.

400.3. Project Work/Improvement Types

There are six major-project types:

- New Construction
- Reconstruction
- Resurfacing, Restoration & Rehabilitation (3R)
- Preservation
- Bridge
- HSIP

This is not inclusive of all the work/improvement types available for federal project budget development.

http://www.dot.state.ak.us/stwddes/dcsprecon/assets/pdf/preconhwy/fhwa_improvement_type_code.pdf

400.4. Process Flow Charts

Project development process flow charts for federal funding approval actions are shown in Figures 400-1 and 400-2.

Some variation from these charts may be granted by Federal Highway Administration (FHWA) Order 6640.1a – *FHWA Policy on Permissible Project Related Activities During the NEPA Process* – which allows advancement of certain project-related activities prior to the conclusion of the National Environmental Policy Act (NEPA) process.

This FHWA order is found here:

<http://www.fhwa.dot.gov/legregs/directives/orders/66401a.htm>

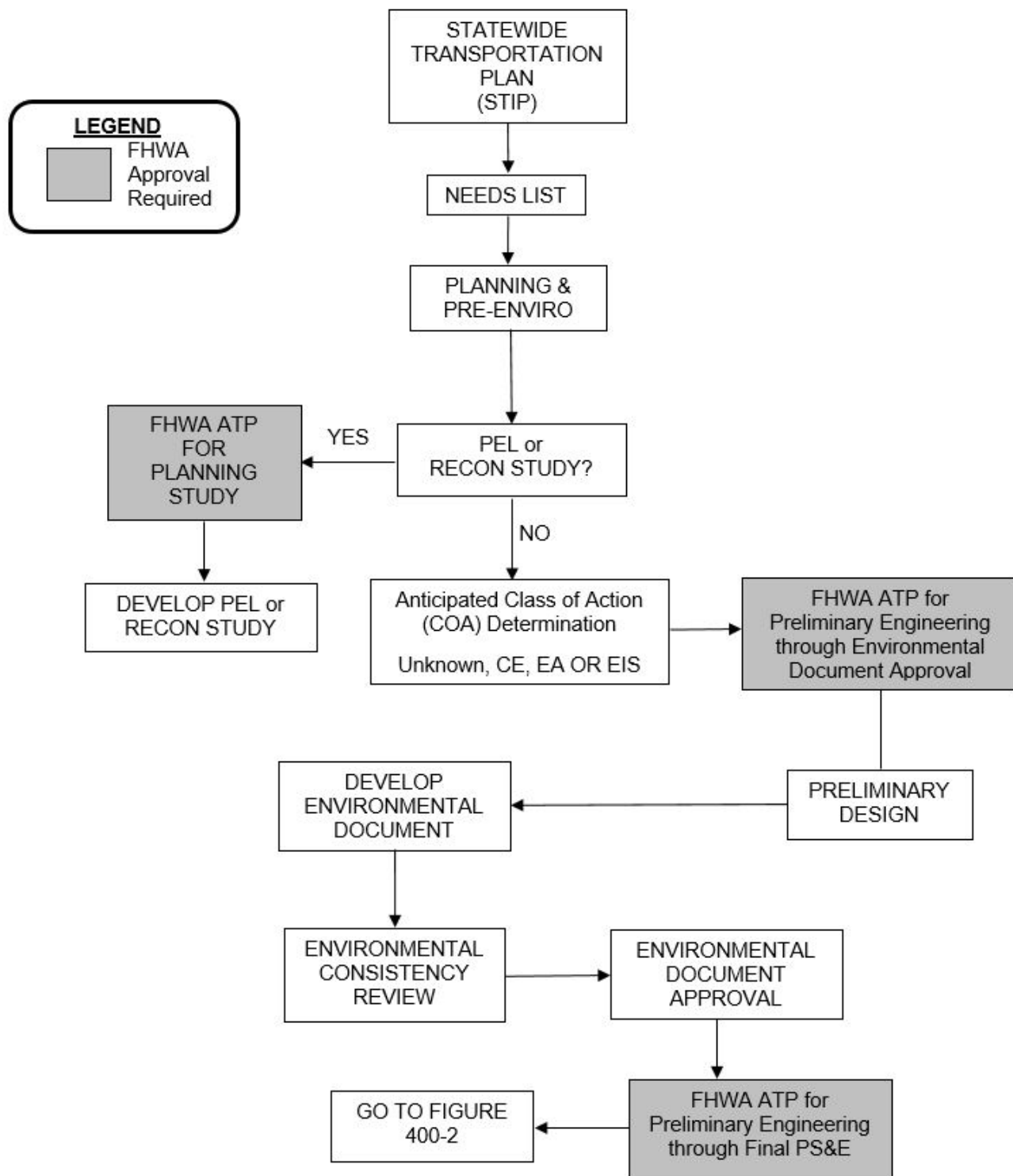


Figure 400-1
Flow Chart For Processing Federal-Aid Projects
FHWA ATP for Preliminary Engineering through Environmental Document
 (Typical Process - Some Minor Variations May Occur)

LEGEND

FHWA
Approval
Required

* Environmental
Document
Re-evaluation
Required

** Activities allowed under
ATP for Preliminary Engineering
through Environmental Document

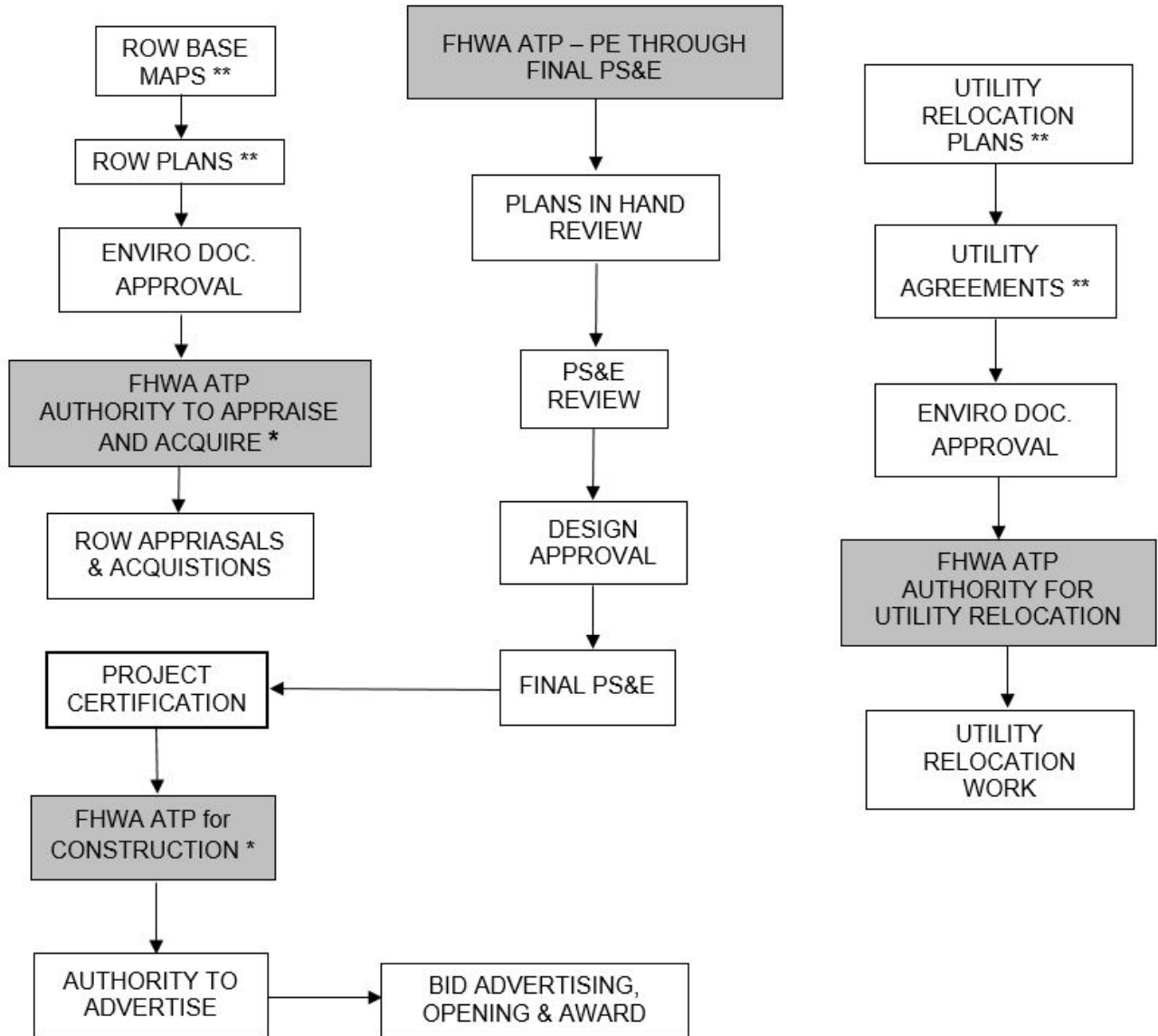


Figure 400-2
Flow Chart for Processing Federal-Aid Projects
FHWA ATP for Preliminary Engineering through Final PS&E
(Typical Process - Some Variations May Occur)

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410. Project Oversight

410.1. General

410.2 Projects of Division Interest

410.1. General

Section 106 of Title 23 United States Code (USC) requires that FHWA and the Alaska Department of Transportation and Public Facilities (DOT&PF) form an agreement documenting those responsibilities that the Department will assume from FHWA. This agreement is referred to as the Stewardship and Oversight (S&O) Agreement, and is found here:

<http://www.dot.state.ak.us/stwddes/dcsaboutus/resources.shtml>

For all federal aid-eligible projects, including National Highway System (NHS) and non-NHS projects, DOT&PF assumes FHWA responsibility under Title 23 for the following:

- Design
- Plans, Specifications, and Estimate (PS&E)
- Right of Way (ROW) Certification
- Contract Awards
- Inspection and final acceptance of projects

This responsibility does not extend to other federal actions required outside of Title 23, for example, the Civil Rights Program. Environmental approvals under NEPA have been assumed under other agreements pursuant to 23 USC 327.

The general requirements of Title 23, such as metropolitan and statewide planning, procurement of services or contracts, disadvantaged business enterprises, wage rates, etc., continue to apply to projects where DOT&PF has assumed the noted responsibilities.

410.2. Projects of Division Interest (PoDIs)

The S&O Agreement between the FHWA and DOT&PF provides that FHWA may retain project-level approval authorities otherwise delegated to the state at the program level. These projects are known as PoDIs. Each PoDI has a project-specific S&O Plan that outlines the specific approval authorities retained by FHWA. DOT&PF is responsible for

requesting FHWA approval prior to advancing the project beyond an approval that is outlined in the project-specific SOP.

See Section 497 of this manual for more on PoDIs.

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415. Planning and Pre-Environmental

- 415.1. Introduction
- 415.2. Planning Level Estimates and Contingency
- 415.3. Local Match Agreements
- 415.4. Maintenance Agreements
- 415.5. Confirming SSEs
- 415.6. Inflation-Proofing Estimates

415.1. Introduction

Prior to preparing the initial Project Development Authorization (PDA) request for a new project start (see Section 420.1), the project manager should coordinate with the planning field office for:

- Planning level project development information
- Applicable Planning and Environmental Linkages (PEL) and Reconnaissance Studies
- Planned parent - child(ren) project relationships, if any
- Project name, location, and scope [e.g. what will go in the initial electronic Project Information Sheet (ePID) and populate the federal-aid agreement] See Section 430.2.

Work with the planning field office and support groups, as necessary, to develop a Project Startup Package, which includes:

- Development of the Project Startup Package:
 - Draft cover letter to Project Control
 - Scope Schedule and Estimate (SSE) Confirmation Form (See Figure 415-1)
 - Project location map, including termini. Route Mile points (termini) are needed to three decimal places. Incidental roadwork less than 500 feet in rural locations or 100 feet in urban locations does not need to be included.
 - Detailed design budget. Budget detail must assign cost to roads and structures (bridges) separately and specifically.
 - Include route or structure information with detailed cost assignment

- Multi-route may be assigned by percentage share of length of entire project as an automatic distribution, or
- Multi-route/bridge may be individually assigned costs, or
- Multi-route/bridge may be assigned costs as a percentage of a group adding up to a total of 100%
- Once a method is selected, the entire project should maintain the budget method through the life of the project
 - Milestone form, with Authority to Proceed (ATP) end date
 - Statewide Transportation Improvement Program (STIP) page

415.2. Planning Level Estimates and Contingency

Planning level estimates vary in detail and accuracy. Application of contingency accounts for the unknown costs and elements of the construction budget in the early stages of project development.

Use the following construction contingency factors:

Estimate Based on	Contingency
System Averages	30%
Itemized Approximation	20%
Detailed Estimate	10%

415.3. Local Match Agreements

For projects requiring a local match, execute a local match agreement in accordance with P&P 09.01.040 before the initial PDA request.

415.4. Maintenance Agreements

The Department has maintenance responsibility for all projects constructed with federal-aid funding (23 CFR 633.208).

For projects owned by a municipality or other local agency, or owned by the Department but maintained by a municipality or other local agency, execute a

written agreement with the municipal or local agency administrator stating their assumed maintenance responsibility. For Department owned facilities currently maintained by a municipality or other local agency, review the existing maintenance agreement and determine if any changes are necessary.

In the event of a request to take over maintenance or operations on a portion, or all, of a roadway, ensure compliance with P&P 07.05.095, which is found here:

http://www.dot.state.ak.us/edocs_code/edocs_document_relay_nativefile_bydocname.cfm?inline=1&ddocname=DOT-JNU_123356

The Department will not assume any additional maintenance and operations responsibilities without written approval by the Regional Director and with necessary funding appropriated.

Ensure maintenance agreements are executed before submitting the initial Phase 2 PDA.

415.5. Confirming SSEs

A project that is in the STIP should have a confirming Scope, Schedule and Estimate (SSE) review by preconstruction personnel prior to formal project initiation (e.g. initial PDA / ATP). Reduce construction cost estimate contingencies commensurate to the level of estimate detail.

An example SSE form is shown in Figure 415-1.

415.6. Inflation-Proofing Estimates

When the base year for a planning level estimate changes by more than two years, adjust using an annual inflation factor of 3.0%.

STIP

SCOPE, SCHEDULE & ESTIMATE

CONFIRMATION

Date: _____

Project Name: _____

Project Need ID: _____

Project Scope: _____

Project estimate: _____

	Year-1	Year-2	Year-3	Year-4	TOTAL
Preliminary Engineering					
Utilities					
Right-of-Way					
Construction					
TOTAL					

Confirmed Scope: _____

Confirmed Project Costs: _____

	Year-1	Year-2	Year-3	Year-4	TOTAL
Preliminary Engineering					
Utilities					
Right-of-Way					
Construction					
TOTAL					

Estimate based on: _____ System averages _____ Itemized approximation _____ Detailed estimate _____

Includes Field Review: → YES → NO

Environmental Considerations: _____

_____ Type document anticipated: → PCE → CE → EA → EIS _____ Re-eval

_____ 4(f) involvement: → YES → NO

Right of Way Considerations: _____

Utility Considerations: _____

Confirmed Scope, Schedule & Estimate prepared by: _____

Confirmed Scope, Schedule & Estimate APPROVED by: _____

Figure 415-1
Scope, Schedule, and Estimate Confirmation Form

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420. Administration

- 420.1. Project Authorization
- 420.2. Project Funding Phases
- 420.3. Professional Services
- 420.4. Local Public Agency Agreements and Oversight
- 420.5. Records
- 420.6. Maintenance Agreements
- 420.7. Project Status Meetings
- 420.8. Project Status Reports

420.1. Project Authorization

The Department must obtain an Authority to Proceed (ATP) through the Federal-aid section from FHWA before beginning any preliminary design work on a federal-aid project (23 CFR 630.106 - 108). In addition, a project must be in the federally approved STIP and have legislative authorization prior to initiating project development.

420.1.1. Project Development Authorization

An approved Project Development Authorization (PDA) and ATP are required before commencing project development activities.

Develop the initial project PDA request based on input from Planning, Design, and Environmental sections. Planning provides an explanation of the nature and extent of the project, project purpose, vicinity map, and the funding source and amount authorized by the Legislature. Prepare the initial project funding request with the requested ATP level (see Section 420.2.1) funding requirements by phase and year, and the following items:

1. Project startup package (See Section 415)
2. An electronic Project Information Document (ePID) prepared by the project manager and signed by both the Regional Environmental Manager (REM) and the project manager. The electronic system for preparing and processing ePIDs is called eWorX and is accessed here:

<https://portal.eworx.com/>

Regional Project Control establishes user access to this system

3. Local Match Agreement (if applicable). Funding requests must include a receipt of payment or copy of the check, identifying the

entity providing the match for the project. Transfer of Responsibility Agreements (TORAs) require similar support. If non-monetary match will be provided, include the type and source of the match on the PDA.

The PDA establishes the authorized funding levels by project phase. The project manager initiates subsequent PDAs either within the existing ATP or in conjunction with a funding request and ATP to the next project development level. A PDA requesting additional funding within an existing ATP is used when more money is needed or the scope of the project changes materially beyond that in the approved Federal-aid Agreement or the STIP. An updated ePID is required for scope changes. Project managers should charge their time in preparing the initial PDA and ePID as directed by the regional preconstruction engineer.

At-Risk Preliminary Engineering

The FAST Act Section 1440 – At-Risk Project Preagreement Authority – allows the Department to incur Preliminary Engineering (PE) costs for an eligible project under Title 23 USC prior to receiving project authorization from FHWA. If At-Risk PE is anticipated, IRIS codes must be established so the expenditures can be tracked and allow them to eventually become federal-aid eligible once the project is authorized.

These costs must be identified as a single line of funding on the initial PDA and the Department must identify the At-Risk PE costs which are being requested for reimbursement at that time. FHWA is not required to approve these costs; hence the “at-risk” designation. These costs must be identified on the initial PDA, the ePID, the Federal Aid Agreement, and throughout the life of the project.

The design phase code will be marked as “suspended for reimbursement” in IRIS until the Federal-Aid Agreement is approved and includes a statement about PE At-Risk costs being eligible for reimbursement.

420.2. Project Funding Phases

Phase 1 – Unprogrammed Legislative Authority

Phase 2 – Preliminary Engineering (PE): This includes pre-environmental document work (preliminary design) and post-environmental document work (final design).

There are two ATP levels in Phase 2:

1. PE through Environmental Document Approval
2. PE through Final PS&E

The project manager determines how much of the total Phase 2 funding is needed to complete the environmental document and how much is needed to complete the final PS&E.

Phase 3 – ROW: This phase includes appraisal and acquisition of ROW, and residential, farm, and business relocations.

Phase 4 – Construction

Phase 7 – Utility Relocation

Phase 8 – Planning & Research: For Statewide Planning and Research only.

Phase 9 - Other: This may include Planning and Environmental Linkage (PEL) studies, Reconnaissance Studies, inspection, training, or other non-construction projects.

420.2.1. Authority to Proceed (ATP)

The Department must obtain ATP from FHWA before beginning work on any federal-aid project (per 23 CFR 630.106) and before beginning work on specific phases of a project except for At Risk PE project starts. All requests for FHWA ATP and subsequent agreement modification requests must comply with 23 CFR108-112 requirements.

The different ATP authorizations are listed in the following paragraphs.

Reconnaissance Study or PEL Study: This ATP level authorizes a reconnaissance engineering study or PEL study.

Preliminary Engineering through Environmental Document Approval: This ATP level authorizes preliminary design work through the environmental document (Phase 2). Preliminary design is defined in 23 CFR 636.103.

The following ROW activities are allowable under this Phase 2 ATP:

- ROW base mapping
- Estimates of the probable number of parcels and their acquisition and relocation costs for alternatives under consideration

- Assessment of the socio-economic effects of residential and commercial relocations
- Title searches *
- Other ROW work necessary to support the environmental document
- Appraisals *
- Appraisal reviews *
- Waiver value preparation *
- Property map preparation *
- Preliminary relocation planning activities *

Note: those activities denoted with an asterisk (*) are considered preliminary acquisition activities under 23 CFR 710.203(a)(3) and may be undertaken prior to completion of the environmental document. These preliminary acquisition activities require approval from the preconstruction engineer. Keep documentation of this approval in the project files.

These utility relocation activities are permitted under this Phase 2 ATP:

- Reviewing and determining probable utility conflicts and developing cost estimates for alternatives under consideration in the environmental document phase
- Developing draft utility relocation agreements

Preliminary Engineering through Final PS&E: This ATP authorizes work necessary for final design and completion of the final PS&E.

This ATP is used for a project after the environmental document is approved.

Right-of-Way through Appraisals and Acquisitions: This ATP level authorizes appraisals and acquisition of ROW necessary to construct a project (Phase 3).

Right-of-Way through Utility Relocation: This ATP level authorizes relocating utilities in accordance with the executed utility relocation agreement(s) (Phase 7).

Construction: This ATP level authorizes advertisement, award, and construction of a project (Phase 4).

Highway Planning and Research: This ATP level is only for Statewide Planning and Research funded projects (Phase 8).

Other: This ATP level is for non-construction, non-design, other management, or non-Statewide Planning and Research funded projects that do not lead directly to a physical construction project (Phase 9).

420.3. Professional Services

420.3.1. General

Use professional service providers (consultants) to balance Department workloads or when the Department lacks expertise. The *Professional Services Agreement (PSA) Manuals* provide guidance for solicitation, selection, award, and administration of construction-related PSAs. The PSA manuals are online at:

<http://www.dot.state.ak.us/procurement/prosvcs/index.shtml>

420.4. Local Public Agency Agreements and Oversight

The Department may permit Local Public Agencies (LPAs) to carry out the Department's assumed responsibilities on locally administered projects. The Department is responsible and accountable for compliance with all applicable Federal laws and requirements, and those additional LPA oversight requirements are spelled out in the Stewardship and Oversight Agreement.

420.5. Reserved

420.6. Project Status Meetings

Regularly scheduled project status meetings are held according to regional policy to review the status or technical aspects of projects. These meetings may encompass all projects under development or be limited, for example, to projects that have encountered problems.

These meetings keep management and support groups informed, and allow management to be involved in identifying and resolving problems in scheduling or funding commitments. The meetings are not necessarily limited to discussions of project status and may include policy, procedures, problem areas, public involvement, and special topics.

420.7. Project Status Reports

The project manager and support groups enter project status information into DOT&PF Management Reporting System (MRS).-MRS is accessed by various department employees to view

the current status and information pertaining to projects currently under development.

The MRS is a web-based program accessed on the DOT&PF intranet site at:

http://web.dot.state.ak.us/status.d/project_status.html?

A username and password are required for data input. A user guide is available from the link posted above.

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425. Reconnaissance Engineering Studies and Planning & Environmental Linkage Studies

- 425.1 Introduction
- 425.2 Reconnaissance Engineering Studies
- 425.3 Planning & Environmental Linkage Studies

425.1. Introduction

Both Reconnaissance Studies and Planning & Environmental Linkage (PEL) Studies are developed under Phase 9 (Other) ATP authorization.

425.2. Reconnaissance Engineering Studies

Project development for a Reconnaissance Engineering Study is similar to projects developed under PE through Environmental Document Approval, except that there is no formal environmental process, and public involvement may be limited. A limited environmental analysis is usually completed to determine the environmental impacts and issues that would need to be addressed if the project advances beyond the reconnaissance stage.

A Reconnaissance Engineering Study is typically performed as follows:

- Identify and review the problem or deficiency to be resolved, and formulate a purpose and need statement
- Obtain support group input on the problem and their data needs
- Research and acquire existing data
- Conduct a site visit, if possible
- Identify and evaluate preliminary alternatives.
- Conduct public involvement activities as outlined in the PIP
- Complete field investigations, including survey and environmental resource mapping as applicable
- Complete traffic analyses as applicable
- Sufficiently develop those alternatives that appear feasible so that they can be compared according to alignment, grade, width, length, cost, level of

service, access control, soils conditions, erosion and sediment control, drainage, availability of construction materials, maintenance, snow and icing problems, right-of-way and utilities considerations, services to existing communities, development and potential development areas within communities, location of hazardous waste sites, wetlands, cultural and historical sites, and other environmental issues.

- Prepare schematic plans as necessary to convey information to support groups, agencies, and the public

The discussion of alternatives should consider the "no build" action, Transportation Management Systems (TMS), alternative transportation options (such as transit) where appropriate, and all reasonable "build" alternatives.

The result of the Reconnaissance Engineering Study is a written report. It contains a description of the project's purpose and need, and a discussion of all technically feasible alternative solutions with comparisons of their engineering characteristics, environmental impacts, and costs.

This report should target a general audience, so it is easily incorporated later into the project's environmental document.

The Reconnaissance Engineering Study may conclude with a recommendation to proceed, not proceed, or proceed later with further project development. The Reconnaissance Engineering Study does not select a preferred alternative, but may recommend which alternative(s) to advance for new project initiation.

The report is signed by the preparer and the project manager and approved by the regional preconstruction engineer.

425.3. Planning and Environmental Linkage Studies (PELs)

PELs are developed following the Alaska DOT&PF PEL Guidebook. A copy of this guidebook is found here:

<https://dot.alaska.gov/stwddes/desenviron/assets/pdf/p>

[rocedures/pel_guidebook.pdf](#)

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430. Preliminary Engineering through Environmental Document Approval

- 430.1. Introduction
- 430.2. Project Purpose, Need, and Scope
- 430.3. Project Management Plan (PMP)
- 430.4. Reserved
- 430.5. Environmental Process
- 430.6. Preliminary Design to Develop and Support the Environmental Document Process

430.1. Introduction

The Preliminary Engineering through Environmental Document Approval stage includes all activities from initiating project development authorization to environmental document approval.

430.2. Project Purpose, Need, and Scope

Purpose and Need

The purpose and need statement identifies the objective of and necessity for a project.

A project purpose and need statement is normally found in the planning documentation. If not, it should be in the project startup package.

Project purpose and need is fundamental in developing, analyzing, and evaluating alternatives and may require refinement during project development.

Project Scope

The project scope is derived from the project purpose and need. The project scope has legal significance and should reflect the context and intent of the legislative authorization. Any change in project scope must conform with the purpose and need and be reflected in the project's NEPA documentation.

Project scope should be consistent across a number of different project documents, for example:

- PDA
- ePID
- PMP
- Environmental document
- Federal-aid agreements
- Status reports

The initial project scope for the PDA for design (Phase 2) should come from information in the project startup package. The scope must specifically mention

any included bridge work, non-motorized facilities, Americans with Disabilities Act (ADA) improvements, and high cost construction features. The electronic Project Information Document (ePID) instructions in eWorX provides guidance on the level of scope detail needed. These instructions are found in the eWorX system. The PID provides scope information that populates the Federal-Aid Agreement, which is approved by FHWA.

On Highway Safety Improvement Program (HSIP) projects, the project scope is limited to that work specifically approved by the Chief Engineer in the HSIP funding program.

Project scope may change during the course of project development. Coordinate project scope changes with the Planning, Project Control and Environmental Sections. FHWA, the Director of Program Development, and the preconstruction engineer must approve changes to the project scope. The PDA and ePID are mechanisms used to change project scope and modify Federal-Aid Agreements.

The final project design scope (Phase 2) must match the PDA scope for construction (Phase 4), inclusive of location information.

Schedule

In this context, "schedule" refers to placement by phase (Preliminary Engineering, ROW, Utility Relocation, and Construction) and anticipated funding year within the STIP. This information is found in the project startup package prepared by the planning field office or in the published STIP. Immediately inform the regional preconstruction engineer of any necessary schedule changes because they can affect fiscal year spending plans. The regional preconstruction engineer must inform the planning field office of these changes.

Authorized Funding

Authorized funding levels are shown by project phase on the PDA. As with scope and schedule, the project manager is responsible for monitoring the project budget and expenditures.

When a project's construction estimate increases by 15%, or more, or a budget adjustment of \$250,000 or more (23 CFR 630.106(4)), from the STIP estimate, refer to Section 440 – Scope and Budget Control.

430.2.1. Reserved

430.3. Project Management Plan

The Project Management Plan (PMP) establishes the activities, budget, resources, and schedule for project development. Prepare the initial PMP after project funding is authorized. The PMP is subsequently reviewed and approved in accordance with regional policy.

The PMP is updated throughout project development as needed or at least before the Authority to Proceed through Final PS&E.

The project manager develops the PMP through coordination with support groups. Include the following in the PMP:

1. Project purpose and need, scope, schedule (program year), and funding
2. Support Group activities, durations, work force, and budget necessary to complete the project
3. Studies, reports, permits, and clearances anticipated during the design development cycle;
4. Public Involvement Plan (PIP) outlining the level of public involvement and schedule for such activities
5. Determination of whether the project will be developed as design-bid-build, CM/GC, design-build, lump sum, or utilize alternative contracting
 - a) Design-build procedures are available at:
www.dot.alaska.gov/designbuild
 - b) Lump sum procedures are available at:
<http://www.dot.state.ak.us/stwddes/dcsmisc/asets/pdf/lumpsum/lumpsum0103.pdf>
 - c) CM/GC Manual:

[under development]

Consider FHWA Order 6640.1A and PE At-Risk (see Section 420.1.1) in developing the PMP in the context of expediting project delivery. FHWA Order 6640.1A defines permissible project related activities that may be advanced prior to the conclusion of the National Environmental Policy Act (NEPA) process. Until the project is authorized, and federal funds obligated, there is no guarantee that the project will be eligible for federal funding. If the Preconstruction Engineer approves the use of this order it must be documented

in the PMP and included in the funding approval. See Section 420.1.1 for further information on at-risk preliminary engineering.

A copy of FHWA Order 6640.1A can be found here:

<https://dot.alaska.gov/stwddes/dcsprecon/>

An example PMP format is available under the Preconstruction Forms heading at:

<http://www.dot.state.ak.us/stwddes/dcsprecon/preconmanual.shtml>

430.3.1. Public Involvement Plan (PIP)

Prepare the PIP in accordance with Chapter 5 of this manual, Chapter 7 of the *Alaska DOT&PF Environmental Procedures Manual* (EPM), and 23 CFR 771.111.

430.4. Reserved

430.5. Environmental Process

All projects require an evaluation of their environmental and socio-economic impacts. This section focuses on federally-funded projects. The process for state-funded projects is covered in Section 490.7.

On federally funded-projects, the environmental process follows:

- National Environmental Policy Act (NEPA)
- 23 CFR Part 771 – Environmental Impact and Related Procedures
- NEPA Assignment Program Memorandum of Understanding (MOU)
- The *Alaska DOT&PF Environmental Procedures Manual (DOT&PF EPM)* projects that are assignable under the NEPA Assignment Program MOU

The goal of the environmental process is to complete an approved environmental document in a timely and efficient manner. Completion of the environmental document is on the critical path of nearly all projects.

All projects generally require the following:

1. Purpose and need statement
2. Project scope
3. Identification and development of alternatives
4. Evaluation of environmental impacts

5. Coordination with local governments and other agencies, including federally recognized tribes
6. Public involvement (except as noted in 430.5.4)
7. Selection of a preferred alternative and proposed action
8. A complete and approved environmental document
9. Acquisition or completion of required environmental approvals, authorizations, clearances, consultations, permits, and reviews as necessary

Work closely with environmental staff throughout project development to ensure that the environmental impacts of all project alternatives are considered.

For more information on the Department's environmental policies and procedures, refer to the appropriate environmental procedures manual and the Statewide Environmental Office's website:

<http://dot.alaska.gov/stwddes/desenviron>

430.5.1. Environmental Classification

Under the NEPA regulations, there are three environmental classes of action, each having different documentation and compliance requirements. The classes of action are:

- Class I – Environmental Impact Statement (EIS)
- Class II – Categorical Exclusion (CE)
- Class III – Environmental Assessment (EA)

For federally-funded projects, the class of action is a major factor in determining the level of preliminary design development required and the project schedule.

Class of Action (COA) Determination

The COA is determined based on the scope of the project and assessment of the probable impacts of the project's action. The initial COA determination is based on information provided to the regional environmental manager (REM), which may include scope provided in planning documents and the ePID.

The REM forwards the initial COA recommendation to the NEPA Program Manager for approval (see Chapter 2 of the EPM). The REM documents the appropriate COA on the ePID. If the initial COA is unknown, the REM will indicate this on the environmental page of the initial ePID.

The completed ePID is included in the initial PDA request.

Class I: Environmental Impact Statement (EIS)

If a project is expected to have a significant impact on the environment, it requires an EIS.

The EIS process is described in detail in Chapter 5 of the EPM.

Class II: Categorical Exclusion (CE)

A CE project has no significant individual or cumulative impact on the environment.

Examples of CE project types are listed in 23 CFR 771.117. The CE process is described in detail in Chapter 3 of the EPM.

Class III: Environmental Assessment (EA)

An EA is appropriate if the effects of a project on the environment are not apparent.

The EA process is described in detail in the EPM.

Other Considerations

For any document type, complex resource investigations such as hazardous materials investigations, indirect and cumulative impacts, air quality issues, cultural resource studies, etc., can significantly extend the time required to develop an approved environmental document.

Consult with the REM before releasing draft or final environmental documents.

430.5.2. Identification of Environmental Issues

All projects should strive to avoid important or sensitive cultural, social, and environmental resources to the extent feasible. Initial environmental work for projects typically consists of identifying areas or issues within the project limits, such as but not limited to:

- Wetlands and other water resources
- Essential fish habitat
- Threatened and endangered species habitat
- Contaminated soils
- Water bodies, including floodplains
- Cultural and historical resources
- Wildlife resources
- Anadromous fish streams, including fish passage issues
- Section 4(f) land

- o Parks
- o Recreation areas
- o Wildlife and Waterfowl refuges
- o Historic sites
- Section 6(f)
- Existing land use or municipal transportation plans
- ROW acquisition and residential, farm, and business relocations.
- Air quality
- Noise
- Materials sites
- Disposal sites
- Environmental justice
- Invasive species

Work with environmental staff to identify boundaries of sensitive environmental features as early as possible to determine whether an alternative affects them and whether impacts can be avoided or minimized, or if mitigation will be required. Identification can consist of researching and reviewing existing data and field reconnaissance.

Evaluating existing physical and environmental features requires qualitative and quantitative analysis. For features that do not present unusual or substantive constraints, a general discussion of their presence is adequate in an EA or EIS. More significant features may require greater effort.

Certain investigations, such as noise studies, archaeological surveys, or soil/water contamination, may require technical expertise beyond that of the Department's environmental staff, requiring the assistance of consultants.

CEs still require some environmental reconnaissance work even though they are, by definition, not likely to have any significant or cumulative environmental effect.

430.5.3. Agency Coordination, Tribal Consultation and Public Involvement

Early coordination with local, state, and federal agencies and federally recognized tribes helps determine the type and scope of the environmental document required. Work with the REM to initiate this (see Chapter 5 of this manual and Chapter 7 of the EPM). Agency and tribal consultation are also part of

other coordination processes, such as Section 106 (see Chapter 10 of the EPM).

The requirements in Chapter 5 of this manual and the approved PIP detail the necessary public involvement. Federally-funded projects require some level of public involvement, especially if ROW is required or a protected resource is involved. CEs may not require public involvement if they have minimal impacts, do not require ROW, do not affect protected resources, and are not controversial.

Tribal consultation may be focused on government-to-government (G2G) consultation, defined here as between the federal government (FHWA) and federally recognized tribes (FRT), or may consist of project communication and consultation between the Department and tribes.

While DOT&PF is authorized to consult with tribes under the Section 106 process, for example, FHWA retains responsibility for direct G2G consultation with tribes in accordance with 36 CFR 800.2(c)(2)(ii)(C) and (D), and Part 3.1.3 of the NEPA Assignment Program MOU. Contact with any federally recognized tribe should only be done after consultation and in coordination with the REM and the Professionally Qualified Individual (PQI).

430.5.4. Environmental Analysis

Regional environmental staff analyze and quantify environmental impacts and, if necessary, determine appropriate mitigation measures. The analysis is performed in accordance with the EPM and is documented in the appropriate environmental document

430.5.5. Approvals, Authorizations, Clearances, Consultations, Permits, and Reviews

The environmental analysis and documentation process identifies what approvals, authorizations, clearances, consultations, permits, and reviews are required for the project.

Most of these approvals, authorizations, clearances, permits, and reviews are sought after environmental document approval. Further discussion of these is found in the *EPM*.

430.5.6. Environmental Commitments and Mitigation Measures

The environmental staff will identify any environmental commitments or mitigation measures required for the proposed action. Include these in the

environmental document and in the final design and construction of the project.

430.5.7. Environmental Document Preparation

Regional environmental staff prepares the appropriate environmental documentation (EIS, CE, or EA) as identified in the approved COA and in accordance with the *EPM*.

The environmental document contains the analysis of the environmental and socio-economic impacts and provides required documentation. The environmental document also identifies mitigation measures, if necessary.

430.6. Preliminary Design to Develop and Support the Environmental Document

Preliminary design is all engineering and support group work necessary to develop and support completion of the environmental document.

The duration and level of engineering required depends on the environmental document classification, the complexity of the project, and the environmental issues and impacts present.

Context Sensitive Solutions (CSS)

FHWA mandates the use of CSS for all federally-funded projects. The Department embraces a CSS approach when developing all projects, regardless of funding source. Scale the level of CSS to the complexity of the project and the environmental issues.

430.6.1. Field Reconnaissance

Field reconnaissance is desirable whenever possible as it allows the engineering, environmental, and support group staff to examine the existing conditions. It may also assist in determining additional necessary data.

Assessment of existing conditions should produce an inventory of physical, environmental, cultural, and social features within the study area.

Maintenance and Operations (M&O) is responsible for many recurrent and costly tasks such as snow removal, ditch cleaning, etc., on completed projects, so include the local maintenance foreman in the on-site field reconnaissance. If a field reconnaissance is not conducted, request that the local maintenance foreman provide video or photos of the project as necessary to illustrate conditions and specific concerns. Solicit their comments and coordinate with

them to resolve any conflicts with design/construction interests. If conflicts cannot be resolved, elevate the issue to the regional preconstruction and maintenance engineers.

430.6.2. Development of Alternatives

The development of alternatives depends on the environmental class of action. Consider the existing environment as a baseline to measure the impacts and benefits of the other alternatives. The “no-build” alternative must be carried throughout the process for EA and EIS. It represents the no-action alternative through the same design year as the other build alternatives.

In addition, all classes of environmental actions must consider avoiding or minimizing impacts if wetlands or floodplains are affected (E.O. 11990 & 11988).

Consider ideas and innovative solutions proposed by stakeholders. Seek to develop alternatives that balance the project goals for safety, mobility, community, and the environment while considering budgetary constraints.

Environmental Impact Statement (EIS)

For an EIS, develop preliminary alternatives. Key factors to consider include:

- Purpose and need for the project
- Public comments and concerns
- Avoidance of sensitive environmental, social, and cultural resources
- Avoidance of protected resources
- Avoidance of other physical features that require complex or costly engineering solutions
- Alternative transportation modes or Transportation Systems Management

Once a range of preliminary alternatives has been identified, use a screening process to narrow the list to include only reasonable and feasible alternatives. The screening process normally uses objective criteria and quantitative analysis to eliminate nonviable or infeasible alternatives.

Carry the reasonable and feasible alternatives forward and develop them to a similar level of detail.

Categorical Exclusion (CE)

Alternatives are not developed for CEs - only the proposed action is evaluated.

Environmental Assessment (EA)

Consider the following alternatives on an EA project:

- No-build
- Preferred alternative
- Additional build alternative(s) (optional)
- Avoidance/minimization alternative(s) if the proposed action affects protected resources such as wetlands or floodplains

430.6.3. Design of Alternatives

Design staff develops reasonable and feasible alternatives to the extent necessary to evaluate environmental impacts and develop cost estimates.

Develop a typical section(s) for the improvement based on the approved Design Designation and Project Design Criteria (Figures 1100-1 and 1100-2 in Chapter 11).

Develop preliminary designs to a level sufficient to determine project footprint; environmental, right-of-way, and utility impacts; and estimated total project costs that remain within approved funding limits.

For EAs and EISs, strive for accurate and concise plans that the public can easily understand.

Estimate cost for each alternative and itemize as follows:

- Preliminary Engineering [Design] (Phase 2)
- ROW (Phase 3)
- Construction (Phase 4)
- Utility Relocation (Phase 7)

430.6.4. Support Group Activities

Scheduling and coordinating design activity and project development with support groups is addressed in the PMP. The project manager needs to know what information is required by the support groups and when it is needed.

The level of effort and detail of analysis required by the support groups should be commensurate with the level of environmental analysis required. EISs will require more work, while CEs may require less.

Any work necessary to prepare or support the environmental document is considered eligible for FHWA reimbursement.

The listing of support groups is presented in alphabetical order.

Bridge

The Bridge Section typically designs highway and pedestrian bridges, but is also involved in the design of other structures, such as retaining walls.

The project manager informs the chief bridge engineer when the ATP for PE through Environmental Document Approval is obtained on any project that involves bridge design. The project manager also provides a copy of the PMP.

Provide the Bridge Section with a start-up package so they can begin the preliminary bridge layout, type selection, and cost estimates needed for the bridge type selection process. The Bridge start-up package includes:

- Proposed roadway plan & profile data
- Topographic data in the vicinity of the bridge site including a bridge site survey in accordance with Section 1120.5.4 of this manual
- Roadway typical section
- ROW limits
- Utility locations and utilities to be carried on the new bridge
- Environmental design criteria and commitments
- Preliminary hydraulic and geotechnical recommendations, when available

The Bridge Section will provide a general layout drawing, site plan drawing, and preliminary estimate for each alternative under consideration in the environmental analysis.

Civil Rights

It is the policy of the Department that no person shall be excluded from participation in, or be denied benefits of any and all programs or activities we provide based on race, color, national origin, gender, age, income, or disability regardless of the funding source. This includes Federal Transit Administration, Federal Aviation Administration, Federal Highway Administration, Federal Motor Carrier Safety Association and State of Alaska funds.

Title VI provides that no person shall on the grounds of race, color, religion, sex, national origin, marital status, handicap, or family composition be excluded from participation in, denied the benefits of, or otherwise discriminated against under any program of the federal, state, or local government.

The Department has a Title VI Nondiscrimination Program Plan to ensure compliance with federal civil rights laws and regulations. Each region has civil rights Title VI/Nondiscrimination liaisons.

The Title VI Nondiscrimination Plan is found here:

http://www.dot.state.ak.us/cvlrts/pdfs/TitleVI_Nondiscrimination_Program_Plan.pdf

Title VIII of the Civil Rights Act of 1968 prohibits discrimination in real estate transactions for housing. Housing accommodations made as a result of a highway or airport project must be fair and equitable, without regard to race, color, religion, or national origin.

Executive Order 12898 on Environmental Justice (as well as other USDOT and FHWA orders) requires public consultation for projects that affect a predominantly low-income area or minority community. The purpose is to identify and address disproportionately high and adverse human health or environmental effects of the project on minority populations and low-income populations.

Executive Order 13166 on improving access to services for persons with limited English proficiency (LEP) requires communicating the elements of proposed projects, for public consultation, in languages other than English. It is important to conduct a thorough demographic analysis for the project study area to determine if there is a non-English speaking population. There is no population threshold for required LEP actions.

When a project is located within 50 miles of a community with a federally recognized tribe, there is a separate requirement for GTG consultations as required by 23 USC 135(d)(3) & (e), Executive Orders 13007 & 13175, and P&P 01.03.010. In some areas of Alaska, this consultation may need to be conducted in the native language of the community. The Civil Rights Office has a current list of federally recognized tribes in Alaska.

For all public meetings, the Department and its consultants will document attendance by race, color and gender by using the Public Meeting Sign-in Sheet

found here (race, color and gender are provided on a voluntary basis by attendees):

<http://www.dot.alaska.gov/cvlrts/forms/titlevipublicsigninsheet.pdf>

The quarterly and annual reporting requirements that arise from preliminary design activities are as follows:

- For each consultant contract administered by Design, the contract manager will report to a Title VI/Nondiscrimination liaison using a copy of the contract's Record of Negotiation and Selection (RONS) for Professional Services Agreements. The Title VI/Nondiscrimination liaison will keep and compile these forms for the Annual Title VI/Nondiscrimination Update.
- For each public meeting where the project manager determines that there are no Title VI issues, the project manager will document this finding and send it to the Title VI/Nondiscrimination liaison for the Annual Title VI/Nondiscrimination Update using the Title VI Public Meeting Report form.
- For each public hearing where the project manager determines there are Title VI issues, the Title VI/Nondiscrimination liaison will document them. The Title VI/Nondiscrimination liaison will also document: 1) how these issues were dealt with in the meeting, and; 2) the final resolution of the Title VI issues in the project development process using the Title VI Public Meeting Report form, and compile this information for the Annual Title VI/Nondiscrimination Update.
- For each project where there is a citizen advisory group and the project manager has identified Title VI issues, the project manager will complete the citizen advisory group board breakdown portion of the Title VI Public Meeting Report form and transmit it to the Title VI/Nondiscrimination liaison. The Title VI/Nondiscrimination liaison will keep and compile these forms for the Annual Title VI/Nondiscrimination Update.
- For the Department's annual Title VI/Nondiscrimination Update to FHWA, each regional sends the following information to the Civil Rights Office: 1) a list of all EAs and EISs that found no Title VI impacts, and 2) for all EISs and EAs that did identify Title VI impacts, a short summary of the issues and how the issues were resolved consistent with Title VI.

EAs and EISs must document consideration of impacts on minorities and other groups under the Civil Rights Acts of 1964. They must contain the following standard certification statement:

“This project has been developed in accordance with the Civil Rights Act of 1964 and EO 12898.”

Civil rights forms are found here:

<http://www.dot.state.ak.us/cvlrts/forms.shtml>

Construction

Involve the Construction Section early in project development. Give them the opportunity to provide input on:

- Selection of alternatives
- Constructability of alternatives
- Construction timing and phasing restrictions
- Selection of the preferred alternative

Geotechnical/Materials

Depending on the scope and material requirements, some projects may require an extensive geotechnical investigation. Others may require only an examination of the performance of the existing facility and a review of the as-builts, construction records, and previous geotechnical reports. Geotechnical and materials site investigations are normally performed with regional staff.

For making an initial determination on local material source availability, use the department’s materials site inventory (MSI) that is part of the Geotechnical Asset Management (GAM) Program. The GIS website is found here:

<https://akdot.maps.arcgis.com/apps/mapviewer/index.html?webmap=a3c965428a3b4f5b973d358d9f53096c>

Consult the Regional Materials Section for information relevant to each site and to identify other potential sites not included in the MSI. If there is no information at the project location, or the existing information is insufficient, the project manager in coordination with the Regional Materials should consider conducting a materials site investigation. Section 450.10 includes more detail on material site investigations.

The project manager should convey initial information on alternatives under consideration so the regional engineering geologist and materials engineer can evaluate it. There may be sufficient information for a

reasonable comparison of the alternatives; however, it may be necessary to obtain additional geotechnical data.

If a geotechnical investigation is warranted, perform it in accordance with the Department’s *Geotechnical Procedures Manual*. This manual is online at:

http://www.dot.state.ak.us/stwddes/desmaterials/mat_geology/pop_geotechman.shtml

A draft geotechnical memorandum with preliminary recommendations for design of the project may be prepared. This memorandum supplies information to the Design Section, but is not intended for general publication.

Foundations

Statewide Materials staff perform foundation investigations. A foundation investigation is normally required for a highway bridge or other significant structure.

The investigation is similar to a geotechnical investigation and is in accordance with the *Geotechnical Procedures Manual*. Preliminary recommendations may be made in the pre-environmental document stage.

Hydrology & Hydraulics

Determine the need for the hydraulics engineer’s involvement early in the project scoping. Consider these issues when deciding:

- Is there a bridge proposed on the project? (Note: a culvert installation with a total width of 20 feet or greater, measured along centerline of the roadway, is considered a bridge.)
- Is fill or other physical modification proposed in a floodplain or waters of the United States?
- Does a decision or cost effective analysis need to be made on whether to use a bridge or culvert?
- Are there any new, replaced, or retrofitted culverts proposed on fish streams, or are there any other known fish passage problems that need to be evaluated?*

* **Note:** Refer to the DOT&PF/ADF&G Memorandum of Agreement (MOA) for Design, Permitting and Construction of Culvert for Fish Passage (11/21/02) for specific issues. A copy of this MOA is found at:

http://dot.alaska.gov/stwddes/desenviron/assets/pdf/procedures/dot_adfg_fishpass080301.pdf

For any environmental alternative that encroaches on a floodplain or supports base floodplain development, a Location Hydraulic Study is required per 23 CFR 650.111. Include this study in the Environmental Document.

Fish passage structures can have a significant bearing on project costs and on the significance of environmental impacts. Many fish passage problems are avoided by considering hydraulic factors early in the project development.

In most cases, specific survey data is needed to perform the required hydraulic analysis. Section 1120.5.4 covers the requirements for a hydraulic site survey.

Preliminary hydraulic analysis or recommendations may be necessary to complete the environmental analysis.

Maintenance and Operations (M&O)

Involve the M&O Section early in project development and give them an opportunity to provide input on:

- Existing M&O problems and concerns
- Development of alternatives
- M&O considerations on alternatives
- Selection of the preferred alternative

Planning

Planning field offices perform traffic data collection and forecasting. Planning also assists during the project initiation stage and may assist in public meetings/open houses. Planning field offices are responsible for updating the STIP as needed to account for approved project scope and budget changes.

The design designation should be requested early in the project development process. The project manager requests a design designation for the project from traffic data collection staff. The regional preconstruction engineer approves it.

An approved design designation is necessary to establish project design criteria. See Figure 1100-1 for an example of a design designation form.

Right-of-Way

During preliminary design, the project manager provides ROW staff with preliminary plans for each alternative under consideration. ROW prepares base maps and estimates the probable number of parcels

needed and their acquisition and relocation costs for each alternative.

Each alternative is also assessed in terms of the number and socio-economic effects of residential, farm, and business relocations it causes. The results are reported in a Relocation Study, often in memo format, which is included in the project's Environmental Document. The Relocation Study is utilized, revisited, and updated throughout the project development process.

If there is a public hearing or open house on the project, ROW presents information from the Relocation Study and discusses the acquisition and relocation processes required by the *Alaska Right-of-Way Manual*.

Surveying

The engineering design staff should research the availability of any existing surveys, as-builts, mapping, or imagery that would be helpful in developing the preliminary alternatives.

Depending on the scope of the work (e.g. new construction or 3R) the project manager should determine and convey the survey requirements to the surveying staff. In most cases, a full design survey will be performed during preliminary design, with additional work during final design as needed.

Traffic and Safety

Consult with the Traffic and Safety Section to:

1. Evaluate existing traffic control devices within the project limits and determine whether to include upgrading those devices in the project development, if not previously identified.
2. Review crashes and propose cost-effective measures to address correctable crashes.
3. Review historical safety requests from the general public and agencies for consideration of implementing cost-effective mitigation measures.

The Traffic and Safety Section assists in the following tasks:

- Traffic data collection and forecasting*
- Crash analysis
- Capacity analysis
- Safety analysis

- Signal warrant analysis**
- Intersection analysis
- Signalized intersection traffic simulations
- Lighting analysis

* **Note:** Support group function for this task varies by region.

** **Note:** The Roundabout First Policy requires that a single lane roundabout be considered at all locations where a new traffic signal is being considered. Justification for not installing a roundabout needs to be included in the Final Design Study Report (See Section 450.5.1).

Evaluate and compare alternatives with each other and with the no-build alternative. You may use a decision matrix or other decision making process to evaluate and select a preferred alternative. For any level of environmental document, the project manager will select a preferred alternative for approval in accordance with regional policy.

Once the preferred alternative is approved, the project manager notifies all affected support groups.

Utilities

For each alternative under consideration, the project manager furnishes plans to the utilities engineer that show line, grade, slope limits, and clear zone widths. The utilities engineer will verify adjustments or relocations necessary for each alternative and rough cost estimates. Consider environmental impacts of utility relocation work.

If additional right-of-way is necessary to accommodate utility relocation, the project manager should forward the request to the ROW Section for inclusion into the ROW cost estimates.

Utility agreements may be drafted in the PE through Environmental Document Approval phase.

430.6.5. Evaluation of Alternatives

For an EIS, the project manager works closely with the REM to determine which alternatives require evaluation. Factors to consider include, but are not limited to:

- Ability to satisfy purpose and need
- Direct and indirect impacts to sensitive cultural, economic, environmental, and social resources and to protected resources
- Avoidance of sensitive and protected resources
- Total cost
- Safety

The alternatives under consideration should be given an interdisciplinary review to ensure that all direct and indirect environmental impacts are identified for each alternative. In analyzing the significance of impacts, consider the context and intensity of each impact and the cumulative effect of all the impacts.

440. Scope and Budget Monitoring

440.1 Introduction

440.2 Guidance

440.1. Introduction

Scope and budget control are important in the overall context of a fiscally constrained Statewide Transportation Improvement Program (STIP). Scope creep and budget creep can arise due to a number of reasons – some of which are in the project manager’s control and some which are not. It is important to monitor the project scope and budget during the course of project development.

440.2. Guidance

Complete a scope and confirming estimate update when the project is nearing completion of preliminary design. Use the Scope, Schedule and Estimate from shown in Figure 415-1 for this purpose.

If project elements are outside the project scope, consider eliminating them from the project.

If a modification to the scope or project location (termini) is recommended to keep the project within its scope and budget, consult with the planning field office and Project Control to determine if a new a new ePID is required.

If the confirmed/refined construction estimate is 15%, or more, over the STIP funding, consult with the planning field office and Project Control to determine whether additional funding is available. If no additional funding is available, coordinate with Program Development.

Projects that are near final design completion may be completed and the design “shelved” until sufficient funding is available. This may require the project to go back through the STIP nomination process.

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450. Preliminary Engineering through Final PS&E

- 450.1. Introduction
- 450.2. Authority to Proceed
- 450.3. Update PMP and PIP
- 450.4. Reserved
- 450.5. Design Study
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- 450.8. Reserved
- 450.9. Support Group Activities
- 450.10. Material Sources
- 450.11. Material Disposal Sites
- 450.12. Driveway and Approach Road Design and Permitting
- 450.13. Reserved
- 450.14. Local Review
- 450.15. Reserved
- 450.16. Value Engineering
- 450.17. Local Concurrence
- 450.18. Constructability Review
- 450.19. PS&E Review
- 450.20. Final PS&E
- 450.21. Retention of Project Development and Design Files

450.1. Introduction

Preliminary Engineering through Final PS&E begins after approval of the environmental document and receipt of the Authority to Proceed (ATP). It is the final design stage of the project culminating with a bid-ready set of contract documents.

Support group activities include:

- Topographic and ROW surveying
- Design of bridges, retaining walls, or other significant structures.
- Environmental re-evaluation and permitting
- Geotechnical and foundation investigations
- Hydraulic or hydrologic investigation or design
- ROW plans, appraisals, acquisitions, and relocations
- Traffic signal and illumination design
- Utility relocation

450.2. Authority to Proceed

Once the environmental document is approved, submit a PDA request for ATP for PE through Final PS&E (see Section 420.1 for further information). Final design may begin once FHWA has issued the ATP.

450.3. Update PMP and PIP

Update the PMP and PIP using feedback from appropriate support groups.

Once the schedule is updated and ATP to Final PS&E is approved, notify all affected support groups and provide them with the current project schedule. Send a copy of the updated PMP and PIP to the appropriate planning staff.

450.4. Reserved

450.5. Design Study Report (DSR)

The Design Study Report (DSR) summarizes and documents the design features and decisions made during the Environmental process and in final design.

450.5.1. Design Study Report (DSR)

The DSR is a formal report that documents final design decisions for the preferred alternative brought forward from the environmental document.

Include the following sections in the DSR:

1. Description of project location and existing facilities, and purpose and need for proposed project
2. Design standards used, including project design criteria and design designation
3. Reserved
4. Discussion of the final design
5. Typical sections, including shoulder treatment
6. General horizontal and vertical alignment, including location of bridges and other structures
7. Erosion and sediment control
8. Drainage
9. Soil conditions
10. Access control features

11. Traffic analysis. Discuss the traffic analyses done to support the need for specific project features such as:

- Addition of turn lanes
- Widening of shoulders, or
- Installation of traffic signals

Analyses can include:

- Signal warrants
- Capacity analysis, or
- Roundabout analysis

Include a discussion of the existing and projected traffic volumes and patterns as well. Discuss reported crashes as appropriate.

12. Safety improvements. Discuss project specific safety improvement features included that will reduce known or potential safety deficiencies. If the project is an HSIP project, include the original project nomination.

13. ROW requirements

14. Pedestrian and bicycle accommodations, including provision for accessibility by people with disabilities

15. Utility relocation and coordination

16. Preliminary work zone traffic control for the preferred design alternative including any probable detour routes and impacts along those detour routes. Provide determination of whether the project is “significant” per Section 1400.2 of this manual.

17. Pavement design, including life-cycle cost analysis

18. Updated cost estimate for all phases (PE, ROW, Utility Relocation, and Construction)

19. Environmental commitments and mitigation measures. This section should include a summary of all environmental commitments.

20. Preliminary bridge layout

21. Identification and justification of design exceptions and design waivers

22. Maintenance considerations

23. ITS Features. Discuss ITS elements to be incorporated into the project.

Appendices to the DSR should include the following items as applicable:

- Approved design criteria and design designation
- Approved design exceptions and design waivers
- Traffic analyses (signal warrants, capacity analysis, roundabout analysis in accordance with the Department’s Roundabout First Policy, etc.) and speed studies
- Resurfacing, Restoration, and Rehabilitation (3R) analysis
- Systems Engineering Analysis (SEA)
- Approved environmental document
- VE consideration

Be objective and factual when preparing a DSR. Avoid subjective wording such as “inadequate,” “unsafe,” “dangerous,” “deficient,” “insufficient,” or “substandard.” For example:

Don't write: “The shoulder width is insufficient.”

Do write: “The shoulder width does not meet current standards for new construction.”

Don't write: “The horizontal curve is dangerous.”

Do write: “The 5-year crash history of this horizontal curve indicates 11 major injuries and 1 fatality.”

Prepare a draft DSR and circulate for in-house review and comment.

The final DSR is sealed and signed by a professional engineer, signed by the preparer, concurred by the project manager and design group chief, and approved by the regional preconstruction engineer. Distribute copies in accordance with regional policy.

3R Analysis

On 3R projects, perform a 3R analysis in accordance with Section 1160.4.1 of this manual. Include the analysis as an appendix to the DSR.

Systems Engineering Analysis (SEA)

All significant ITS projects require an SEA. Non-significant ITS projects do not require an SEA. See Section 485 for how to distinguish between the two

and procedures for developing an SEA. Include the SEA as an appendix to the DSR.

450.5.2. Design Approval

Approval of the DSR constitutes design approval. Complete the DSR prior to Final PS&E.

The regional preconstruction engineer may waive design approval for advanced ROW acquisitions, utility-only project, or other similar projects.

450.6. Reserved

450.7. Final Design

Per 23 CFR 636.103, *final design* means any design activities following preliminary design and expressly includes the preparation of final construction plans and detailed specifications for the performance of construction work. In the context of this manual, final design is all design work after completion and approval of the environmental document and receipt of ATP for PE through Final PS&E.

Strive for a context sensitive final design that, to the extent practicable, is in harmony with the community it is located in, and preserves environmental, scenic, aesthetic, historic, and natural resource values of the project area.

450.7.1. Reserved

450.7.2. Plan Set

Develop the content and organization of plan sets according to regional policy. Plans are sealed and signed by the engineer(s) of record. Show environmentally sensitive and restricted work areas in the plans.

Erosion and Sediment Control Plan (ESCP)

Develop an ESCP for all projects, regardless of funding, with disturbed ground that meet either of the following conditions:

- Owned by the Department
- Designed (or design administered by) and constructed (or construction administered) by the Department

See Section 1120.7 for guidance on ESCP preparation.

Traffic Control Plan (TCP)

Develop a TCP to address the safety of motorists, pedestrians, and construction workers on all federal-aid construction projects as required by 23 CFR 630.

Guidance for developing TCPs is found in Chapter 14.

450.7.3. Alaska Standard Plans (ASPs)

ASPs show commonly used plans and details approved by the Department and FHWA for use on projects. ASPs are contained in the *Alaska Standard Plans Manual* available online at:

<http://www.dot.state.ak.us/stwddes/dcsprecon/stddwgeng.shtml>

In accordance with guidance in Chief Engineer's Directive (CED) of January 25, 2019, titled *Alaska Standard Plans, Development and Incorporation*, Standard Plans are not signed and sealed by a professional engineer (PE). This CED is available here:

<http://dot.alaska.gov/stwddes/dcspubs/directives.shtml>

ASPs are adapted from detail drawings that are treated as final drawings and are signed and sealed by a professional engineer in accordance with 12 AAC 36.185. The final drawings are archived at the Statewide Design and Construction Standards office. By sealing the final drawing, the professional engineer certifies their responsible charge for the technical development of the detail drawing used as the basis for the ASP.

The chief engineer approves ASPs for use by the Department.

Each ASP has an associated technical report, called the Standard Plan Development Report (SPDR), prepared by a professional engineer. The SPDR provides background and guidance on the selection, application, restrictions, and qualifying conditions for use of the associated ASP. SPDRs are found here:

<http://dot.alaska.gov/stwddes/dcsprecon/stddwgeng.shtml>

Plans should list the ASPs that apply to a specific project on the project cover sheet, project index sheet, or individual plan sheet. The professional engineer signing and sealing the project plans takes responsibility for inclusion of specific ASPs.

450.7.4. Specifications

Specifications consist of the Standard Specifications, Standard Modifications, and Special Provisions. Specifications describe the material and construction requirements, method of measurement, and basis of payment for the work shown in the plans.

The Alaska DOT&PF Standard Specifications for Highway Construction (SSHC) are approved by the Department and FHWA for general application and repetitive use and are available online at:

<http://www.dot.state.ak.us/stwddes/dcspsecs/index.shtml>

Statewide Standard Modifications are additions or revisions to the Standard Specifications and supersede the Standard Specifications. In most cases, Standard Modifications exist to correct errata or deficiencies in the Standard Specifications. A list of current Statewide Standard Modifications is available at the website noted above. Include all Standard Modifications that apply to the work. Standard Modifications that will be overridden by a Special Provision do not need inclusion.

Special Provisions are additions or modifications to the Standard Specifications or Standard Modifications and cover conditions specific to an individual project. Special Provisions supersede Standard Specifications, Standard Modifications, and the plans. Special Provisions can be statewide, regional, or project-specific. A list of current Statewide Special Provisions is available at the website listed above. Each region develops and maintains its own Regional Special Provisions. Choose which Special Provisions to include in the specifications based on the specific requirements of the project.

Open Competition

In accordance with 2 CFR 200.319, specifications for construction contracts must provide for full and open competition. Incorporate a clear and accurate description of the technical requirements for the materials, products, or services required in the construction contract. Such descriptions must not contain language that unduly restrict competition. The description may include a statement of the qualitative nature of the material, product, or service and, when necessary, must set forth those minimum essential characteristics and standards to which it must conform to satisfy its intended use.

Named Brand Products

It is a best practice to avoid the use of brand (trade) name projects in specifications. When it is impractical or uneconomical to make a clear and accurate description of the technical requirements, a “brand name product or equal” specification may be used. The FHWA Alaska Division has indicated that using a “brand name product or equal” specification provides for sufficient competition; however, the salient features of the named brand product that must be met by the “or equal” product need to be clearly stated.

Special circumstances may require restriction of products to a single brand name:

- The named brand product must match an existing item or system to facilitate operation, maintenance or continuity
- The named brand products is the only one that will perform the required function

When only one named brand product will meet the Department’s need under one of the conditions above, a written determination must be approved by the Contracting Officer prior to advertising the construction contract. See P&P 10.02.050 for further information.

Warranty Clauses

Warranty clauses may be used on federal-aid construction contracts in accordance with 23 CFR 635.413. See the following link for FHWA guidance:

<https://www.fhwa.dot.gov/construction/cqit/warranty.cfm>

Warranty clauses must be for a specific product or feature. General warranties for an entire project are not acceptable, unless the project in question is design-build.

Warranty clauses may not cover work that would be otherwise ineligible for federal-aid participation, including routine maintenance. Warranty clauses may not cover damage caused by others – a contractor cannot be required to warrant items over which the contractor has no control.

Specialty Items

Identify Specialty Items in the Special Provisions in the description of work. A Specialty Item is defined in Section 101-1.03 of the SSHC as “a contract item identified in the contract that requires highly specialized knowledge, abilities, or equipment not

ordinarily available in the type of contracting organizations qualified and expected to bid on the contract.”

450.7.5. Estimates

Estimates are prepared by the engineering design staff and checked by the project manager. The final engineers estimate is approved in accordance with regional policy.

Depending on whether the contract will be unit price, lump sum, or a combination thereof, the design staff will select the appropriate pay items for the project and determine the quantities.

For unit price estimates, the design engineering staff should construct the estimate using standard pay items from the SSHC whenever possible. If a non-standard pay item is used, a special provision will be required for establishing the new pay item, a method of measurement, and a basis of payment. If no historical data exists or the pay item is non-standard, use engineering experience and judgment. Unit price contracts may use lump sum items.

The engineer’s estimate is the final estimate used for contract bidding and programming of construction funding. In addition, the engineer’s estimate includes Indirect Cost Allocation Program (ICAP) and construction engineering costs.

Use AASHTOWare Project software to develop the engineer’s estimate. AASHTOWare Project generates the following when the project goes to advertise and award:

- DBE goals worksheet
- Bid schedule
- Federal-aid agreement
- Coding backup
- Compilation of bids and bid-analysis reports

AASHTOWare Project software is also used to archive the bid results for reference in generating future estimates.

The final engineer’s estimate must be coded prior to the PDA request for Construction funding being submitted to FHWA for approval. Consult with the Project Control for assistance on coding estimates. Coding guidance is available at:

http://dot.alaska.gov/stwddes/dcsprecon/assets/pdf/preconhw/fhwa_improvement_type_code.pdf

Ensure that final coded estimates follow location and improvement type allocations established at project startup. Refer to Section 450.1 for further information.

Lump Sum Projects

The project manager, in consultation with the construction project manager, should consider whether an entire project could be developed as a lump sum, fixed-price contract. Consider lump sum contracting on projects with:

- A well-defined description of work
- A low risk of unforeseen conditions
- A low possibility for changes
- Limited opportunity for contractors to provide less than the required quantity

Further guidance on lump sum contracting is found in the “Lump Sum Project Guidelines”:

<http://www.dot.state.ak.us/stwddes/dcsmisc/assets/pdf/lumpsum/lumpsum0103.pdf>

450.7.6. Bidding and Contract Documents

The regional Contracts Section prepares bidding and contract documents. The project manager should provide the Final PS&E package along with the signed Authority to Advertise (ATA), project bidding description, subcontractable items list, and DBE goal to the contracts officer. Construction contract forms are available at the Design and Construction Standards webpage:

http://www.dot.state.ak.us/stwddes/dcsconst/pop_consfirms.shtml

The Contracts Section will assemble a contract bid package and put the project out to bid per Section 470.

450.8. Reserved

450.9. Support Group Activities

It is the project manager’s responsibility to coordinate and schedule design activities with support groups through the development of the Final PS&E.

450.9.1. Bridge Design

The project manager informs the chief bridge engineer when the environmental document is approved and ATP through Final PS&E have been obtained. The

project manager confirms the preferred bridge alternative (alignment, profile and typical section) and design schedule.

For PIH reviews, the Bridge Section provides a refined general layout, site plan, and cost estimate.

The Bridge Section provides 95 percent complete bridge plans for the PS&E review. They also include the draft special provisions, preliminary bid items, quantities, and cost estimate.

Refer to the Alaska Bridges and Structures Manual for procedures related to the preliminary and final structural foundation engineering report.

Bridge provides sealed and signed drawings, special provisions, bid items, quantities, and cost estimate that the project manager incorporates into the Final PS&E.

450.9.2. Civil Rights

Numerous state and federal laws and regulations pertain to civil rights. Contact the Civil Rights Office (CRO) for specific guidance and information not contained in this manual. Provisions to implement these laws are included in various contract “boilerplate” forms and in the specifications. Provisions for state-funded and federal-aid projects ~~contracts~~ are similar, but not identical.

Disadvantaged Business Enterprise (DBE) Program

The purpose of the DBE program is to provide an equal opportunity to participate in construction contracts and subcontracts for businesses owned and controlled by persons who are socially and economically disadvantaged. The requirement for DBE on federal-aid projects is covered in 49 CFR Part 26.

For all federal-aid projects, provide a copy of the final engineer’s estimate to the Construction Section at least one week prior to the anticipated advertising date. The Construction Section will prepare the DBE Goals Worksheet and submit it to the CRO for approval. The CRO will finalize the DBE Goals Worksheet and prepare the DBE Goal memo and Form 25A-324 DBE - Subcontractable Items list. They will transmit these documents to the Construction Section for review and concurrence. If acceptable, Construction will transmit them to the project manager and the Contracts Section.

The goal must be refreshed if the project is not advertised within three months of the goal setting or if there is a change in the engineer’s estimate.

On-the-Job Training (OJT) Program

The purpose of the OJT Program is to train and employ minorities and women in the construction industry. The requirement for an OJT Program is covered in 23 CFR 230.111.

On all federal-aid projects, coordinate with the Construction Section in preparation of the OJT Goal(s) at least one week prior to the anticipated advertisement date. Submit the final engineer’s estimate to the Construction Section who will calculate the goal(s) based on the basic bid and will then submit it to the CRO for approval. Once approved, the CRO will issue the OJT Goal via memo to the Construction Section. Upon review and acceptance, Construction will transmit the memo to the project manager and Contracts Section.

The goal(s) must be refreshed if the project is not advertised within three months of the goal set, or there is a change in the engineer’s estimate.

The CRO establishes and approves OJT goals on federal-aid highway projects that can support this program. The OJT goal is then added to the contract documents before advertising. Include provisions for Section 645 -Training Program - in the specifications.

Title VI

Pursuant to the Civil Rights Act of 1964, the Department has prepared a Title VI/Nondiscrimination Program Plan to ensure compliance with federal civil rights laws and regulations. The Program Plan stipulates clauses to be included in construction contracts, professional service agreements, and property actions. It also places coordination and reporting requirements on project managers during the project development and public involvement processes.

Copies of the Program Plan may be obtained from the Civil Rights Office.

450.9.3. Construction

Include construction staff in all plans reviews to provide feedback on constructability, materials, scheduling, specifications, and cost issues. Consult with construction on environmental permit stipulations, commitments, or construction restrictions to ensure that the project can be built without violations.

450.9.4. Contracts

The Contracts Section will assist in compiling, printing, and distributing plan review sets. This usually includes inserting the necessary contract boilerplate language into the PS&E review documents.

They also compile the final PS&E and incorporate it into a bid package that goes out for advertisement.

450.9.5. Environmental

Environmental staff typically perform several functions during final design, including obtaining all required approvals, authorizations, clearances, consultations, permits, and reviews; re-evaluation of the environmental document, checking that all necessary environmental commitment and mitigation measures are incorporated into the plans; and assisting design with any special environmental details, plans, or specifications that may be required.

Approvals, Authorizations, Clearances, Consultations, Permits, and Reviews

Some approvals, authorizations, clearances, consultations, permits, and reviews must be obtained during the NEPA process. Most of these will be obtained after environmental document approval. Work with environmental staff to ensure that the appropriate information and plan sets are submitted as required to resource agencies for their review and approval.

Environmental Re-evaluations

The purpose of an environmental re-evaluation is to determine if the environmental document (EA/FONSI, EIS/ROD) or CE designation is still valid before proceeding with a major project approval or authorization.

A re-evaluation is required per 23 CFR 771.129 and EPM Section 6.2 prior to requesting the following ATPs:

- PE through Final PS&E (final design)
- ROW Appraisal and Acquisition
- Construction

After a project has received an approved environmental document, there are other circumstances that trigger the need for a re-evaluation:

- The project, or a phase of the project, is proceeding to the next major federal approval (i.e.

final design, ROW appraisal and acquisition, and construction.)

- When a major step to advance a project has not occurred within three years
- When there is an appreciable change in the scope or design that could result in revised effects
- Changes to laws or regulations potentially affect the conclusions of the original environmental document

Coordinate with the REM regarding re-evaluations. The REM will determine what effects any project changes or changes in the effected environment may have on the validity of the environmental document and consult with the NEPA Program Manager. Procedures for re-evaluations are covered in Chapter 6 of the EPM.

Environmental Commitments and Mitigation

Environmental commitments and mitigation measures detailed in the approved environmental document and necessary permits are incorporated into the project plans and specifications.

Environmental staff may also help develop project specific Best Management Practices (BMPs), recommend erosion and sediment control measures, and review erosion and sediment control plans.

450.9.6. Geotechnical Investigations (Centerline, Materials Source, and Foundation)

A geotechnical centerline, foundation, or material source investigation can be initiated during the design stage, or may be initiated in the preliminary project development stage as a reconnaissance investigation and continue into the design development stage.

Materials staff or consultants conduct geotechnical investigations and prepare a final geotechnical report, in accordance with the *Alaska Geotechnical Procedures Manual* and the *AASHTO Manual on Subsurface Investigations*.

The purpose of a geotechnical investigation is to:

1. Determine the nature of the geotechnical characteristics of the project site, including the surface conditions, geological hazards, and the underlying earth materials along the alignment
2. Assess foundation conditions at the site of structures

3. Recommend structural design parameters for earthwork and foundations
4. Estimate the availability and characteristics of construction materials
5. Identify and make recommendations for resolving special geotechnical problems such as soft ground, slope stability, thaw-unstable permafrost, and rock excavation

Centerline/Material Source Investigations

Centerline investigations are normally completed in support of design of the preferred design alternative, and consist of both centerline and material source investigations (see Section 450.10 for a discussion of material sources) including test borings, test pits, mapping, sample analyses, and preparation of a final report with recommendations for design. Limited centerline and material source investigations may also be completed to assist in evaluation of project alternatives.

To support the field investigation, the project manager provides:

- Line and grade data (existing and proposed)
- Cut and fill locations
- Earthwork quantity estimates
- Anticipated drainage provisions

Generally, for centerline investigations, the alignment is staked and stationed in the field or provided in an electronic format from which the geologist prepares an exploration plan for the regional materials engineer's and project manager's approval.

The project manager or lead designer should accompany the geologist on a field review of the alignment before beginning the field investigation. The project manager or principal designer may return for firsthand review of problem areas during field investigations.

As soon as the results of the field investigation are analyzed, the regional materials engineer submits a memorandum with interim design recommendations and a preliminary report to the project manager.

The final geotechnical report is normally completed by the geotechnical engineer or certified professional

geologist that conducted the investigation after the final alignment, grade, and geometry have been selected. The report should describe surface characteristics and soil and rock conditions, and make design recommendations. The report is submitted to the project manager upon completion.

Foundation Investigations

Perform foundation investigations where structures such as bridges, buildings, or retaining walls are planned.

Foundation investigations are directed by the state foundation engineer, statewide or regional geotechnical engineer or licensed geologist, or geotechnical engineering consultants.

Foundation investigations look at surface and subsurface site conditions at the location of foundation units. The purpose of the investigation is to provide the designer with information on the engineering properties of the natural material for use in the foundation design.

The foundation engineer provides an exploration plan for the foundation investigation. The plan is based on the preliminary layout of the structure, which is normally completed before undertaking the investigation. Provide structure site map and plan/profile information to the foundation engineer for use in developing an exploration plan.

Complete the foundation investigation and geotechnical report in accordance with the *Alaska Geotechnical Procedures Manual* and the *AASHTO Manual on Subsurface Investigations*.

The final foundation report is normally completed after selection of the final structure location and then submitted to the project manager.

450.9.7. Hydrology & Hydraulics

The statewide or regional hydraulics engineer may remain involved in a project into final design if there are any of the following features:

1. Culverts 48 inches or larger, or a bridge structure. In this case, a hydraulic and hydrologic summary is required per Section 1120.5.6. Cross culverts 48 inches in height, or greater, should be evaluated for failure due to hydrostatic and

hydrodynamic forces, erosion, saturated soils, or plugging by debris per Section 1120.5.1

2. Floodplain analysis. Generally, the Location Hydraulic Study (see Section 430.6.5 Hydrology & Hydraulics) is completed during preliminary design, but final analysis may continue into final design
3. Riprap slopes in bodies of water
4. Fish passage design

The statewide hydraulics engineer is responsible for the hydrologic and hydraulic designs of all bridge projects. Regional hydraulics engineers are responsible for all single and multiple culvert installations not considered bridges (e.g. spans of less than 20 feet, measured parallel to centerline of roadway and out-to-out of culverts) and other drainage designs requiring a report.

All hydrologic and hydraulic reports must be sealed and signed by a professional engineer. If a hydrologic or hydraulic report is prepared by a consultant, the hydraulics engineer will review it and provide comments to the project manager prior to the report's finalization. The project manager will provide responses to all comments made by the hydraulics engineer.

The hydraulics engineer should review all changes or addenda related to hydraulic designs prior to the start of construction.

Some hydraulic designs may be prepared by the design staff and then checked by the regional hydraulics engineer.

450.9.8. Maintenance & Operations (M&O)

Consult M&O staff early in the final design stage and include them in all plan reviews.

M&O will comment on any design, maintenance, or operational problems with an existing facility and should comment on features that lower M&O costs. Designers should always remember to include M&O costs in life cycle and benefit-cost analyses.

450.9.9. Right-of-Way (ROW)

The ROW Section in each region obtains and manages the land interests necessary for construction, operations, and maintenance of capital projects, in accordance with the *Alaska Right-of-Way Manual*. This process involves:

1. Identifying real property and land interests based on design plans
2. Researching titles to properties to be acquired
3. Preparing ROW plans, with measurements of areas needed
4. Appraising the fair market value of lands needed, including affected improvements (The receipt of the Authority to Appraise and Acquire [AAA] starts the appraisal process)
5. Negotiating property acquisitions
6. Relocating any displaced families and businesses
7. Certifying the Department's ownership or land interest
8. Controlling encroachments and disposing of lands no longer necessary for public use
9. Preparing programming requests for the project manager's approval

ROW tasks 1-3 may begin in the preliminary design and completed during final design.

ROW task 4 may be done during preliminary design prior to completion of the environmental document – see Subsection 420.2.1.

After environmental document approval and ATP for PE through Final PS&E, ATP for AAA may be requested from FHWA. The receipt of AAA starts the appraisal and acquisition process.

Design plans serve as the basis for the ROW plans. Closely coordinate design changes affecting the amount or location of required land with ROW and other support groups.

Design staff needs to give special consideration to access and space necessary to construct the project. Obtain temporary construction permits or temporary easements for any work space needed beyond the ROW and easement lines.

Property owners may request that construction items be added to the plans. The negotiator submits such requests for project manager approval, on a Memorandum of Agreement (MOA), or a Memorandum of Understanding (MOU), form. After successful negotiations, ROW processes the legal and payment documents, arranges for clearing the

acquired right-of-way of any improvements, and manages any relocation of families or businesses.

Hazardous Materials

The presence of hazardous materials or hazardous waste can significantly affect appraisals. It is important that suspect parcels be identified and investigated early in the project development process, usually as part of environmental activities, so that any problems can be quantified and managed in time to minimize delay in the appraisal process.

Eminent Domain

If negotiations fail or title complications exist, and if administrative settlement at a higher-than-market price is imprudent or unsuccessful, initiate eminent domain proceedings through the Department of Law (DOL).

Approval to proceed with acquisition through condemnation is reserved for the preconstruction engineer. The DOL handles subsequent proceedings. These proceedings significantly affect project schedules and budgets. The proposed taking must be for the greatest public good and the least private injury.

If an eminent domain action is probable, the project manager needs to prepare a decisional document (DD). This DD explains to the landowner and DOL the basis for the Department's decision to acquire property and documents that DOT&PF has selected the project location most compatible with the greatest public good and the least private injury. In the DD, include the following:

1. Summary of relevant project background information
2. Studies that discuss the design alternatives and impacts
3. The public benefit and private loss of the property acquisition
4. A discussion of the necessity of acquiring the property through eminent domain

Department of Natural Resources (DNR) Land Issues

A DNR *Tidelands Lease* may be required for permanent placement of fill or structures on state tidelands.

A DNR *Tidelands Permit* may be required for certain activities of a temporary nature on state tidelands.

A DNR *Land Use Permit* may be required for constructing projects on state-owned lands or crossing state-owned lands for access. Because the state owns most land below the ordinary high water line of navigable streams and lakes, this permit is required for most activities in waters of larger streams.

ROW Certification

When all the ROW is acquired or right of entry obtained, the chief ROW agent certifies the project and signs the project certification form when circulated by the project manager before requesting construction authority.

If specifically listed on the invitation for bids, make ROW information available to bidders.

450.9.10. Surveying

Additional topographic or boundary surveying may be required in support of the final design or determination of ROW lines. The project manager should alert the Survey Section of any additional pick-up work as soon as possible so that the work is scheduled.

450.9.11. Traffic and Safety

The Traffic and Safety Section may continue to work on those items noted in Section 430.6.5. In addition, they may work on or assist in preparing plans, specifications, and estimates for:

1. Traffic control
2. Roadside barrier analysis and design
3. Signing and striping
4. Signals systems
5. Illumination systems
6. Cost-effective crash and historical safety request mitigation measures identified during preliminary design

450.9.12. Utilities

The project manager furnishes plans to the utilities engineer showing line, grade, slope limits, and clear zone widths. These plans are given to each affected utility company. The utility determines the adjustments and relocations necessary to avoid conflict with the project (which may warrant revising design plans), designs the changes to its facilities, and prepares plans and cost estimates to support the relocation agreement. In some cases, DOT&PF or a

consultant performs the utility relocation design for relocation work to be included in the contract.

The utility engineer drafts relocation agreements for all affected utilities. All of the utility relocation design work and drafting of utility relocation agreements may be done under Phase 2.

If additional ROW is necessary to accommodate utility relocation and if it is to be acquired by the utility company, departmental approval is necessary before authorizing the utility company to begin appraisal and acquisition.

Prepare and submit a PDA request for Utility Relocation. (See Section 420.2.1) Approval and execution of utility agreements is required before utility relocation work begins.

Relocation may be performed by the utility company, by a contractor managed by the utility company or as part of the Department's construction project.

450.10. Material Sources

A material source is a location where sand, gravel, rock, or other material may be extracted for use on a project. These types of materials may come from an existing commercial source, but when no commercial source is available, or in order to provide competitive bidding when only a single commercial source is available, DOT&PF may want to consider making a Department-furnished site available for use.

Give special consideration to remote rural projects that require borrow, processed aggregates or rock. It is preferable to use local material sources to the extent possible. Whether materials meeting the project requirements are obtainable in proximity to (locally) the project or must be barged in has a significant effect on project cost and schedule. Providing accurate information on the quality and quantity of locally sourced materials, or clearly delineating that imported materials will be required to meet specifications, reduces risk to bidders and gives the department better pricing.

Best practices for using local material sources on remote rural projects are detailed in the following flow charts:

- Figure 450-1 Determine Local Material Category (Part 1)
- Figure 450-2 Determine Optimal Use of Local Materials Sources (Part 2)

- Figure 450-3 Permits and Landowner Agreements (Part 3)

Tasks shown in Figure 450-3 are intended to provide a fair bidding environment. Items in shaded boxes are most critical to ensuring this and project managers are encouraged to complete these work items during preconstruction.

The standard specification for a material may be modified at the discretion of the project manager after consultation with regional materials section in order to make locally available materials usable.

Part 1: Determine Local Material Availability and Categories (Ref: Figure 450-1)

For making an initial determination on local material source availability, use the Department's Materials Site Inventory (MSI) that is part of the Geotechnical Asset Management (GAM) Program. The GIS website is found here:

<https://akdot.maps.arcgis.com/apps/mapviewer/index.html?webmap=a3c965428a3b4f5b973d358d9f53096c>

Consult the Regional Materials Section for information relevant to each site and to identify other potential sites not included in the MSI. If there is no information at the project location or the existing information is insufficient, the project manager in coordination with the regional materials engineer should consider conducting a materials site investigation.

Suitability is determined by the material's conformance with the *Standard Specifications for Highway Construction* and any modifications to those specifications.

Part 2: Determine Optimal Use of Local Material Sources (Ref: Figure 450-2)

Imported materials are those brought in from outside the vicinity of the project. Give consideration to mode of transportation: whether materials can be hauled in via an ice road or winter road or must be barged.

When the local material category is "suitable only for some material types", the designer is encouraged to consider ways to make the local material suitable by modifying the standard specifications, blending with imported material, or making modifications to the

typical sections, including considering technologies such as geosynthetics or chemical treatments. Consult the Regional Materials Section on how and when materials and specifications can be modified to provide acceptable performance.

Part 3: Permits and Landowner Agreements (Ref: Figure 450-3)

Tasks shown in this figure are intended to provide a fair bidding environment. Items in shaded boxes are most critical to ensuring a fair bid environment and project managers are encouraged to complete these work items during preconstruction.

Include all landowner agreements and permits in contract appendices.

A Fair Bid Letter is a written guarantee from a private material site owner that all bidders will be given the same price. It should include the actual royalty rates for materials obtained from the material site. The Project Manager obtains the Fair Bid Letter.

ROW agreements may include but are not limited to Right of Entry, Temporary Construction Easement, Temporary Construction Permit, and permanent right-of-way.

Material Sales Agreements are obtained by the joint effort of the Project Manager and ROW Section.

Obtaining these agreements can be time intensive and should be initiated early.

When a Mandatory Source is used, complete a public interest finding in accordance with P&P 10.02.013.

Information to include in the Bid and Contract Documents

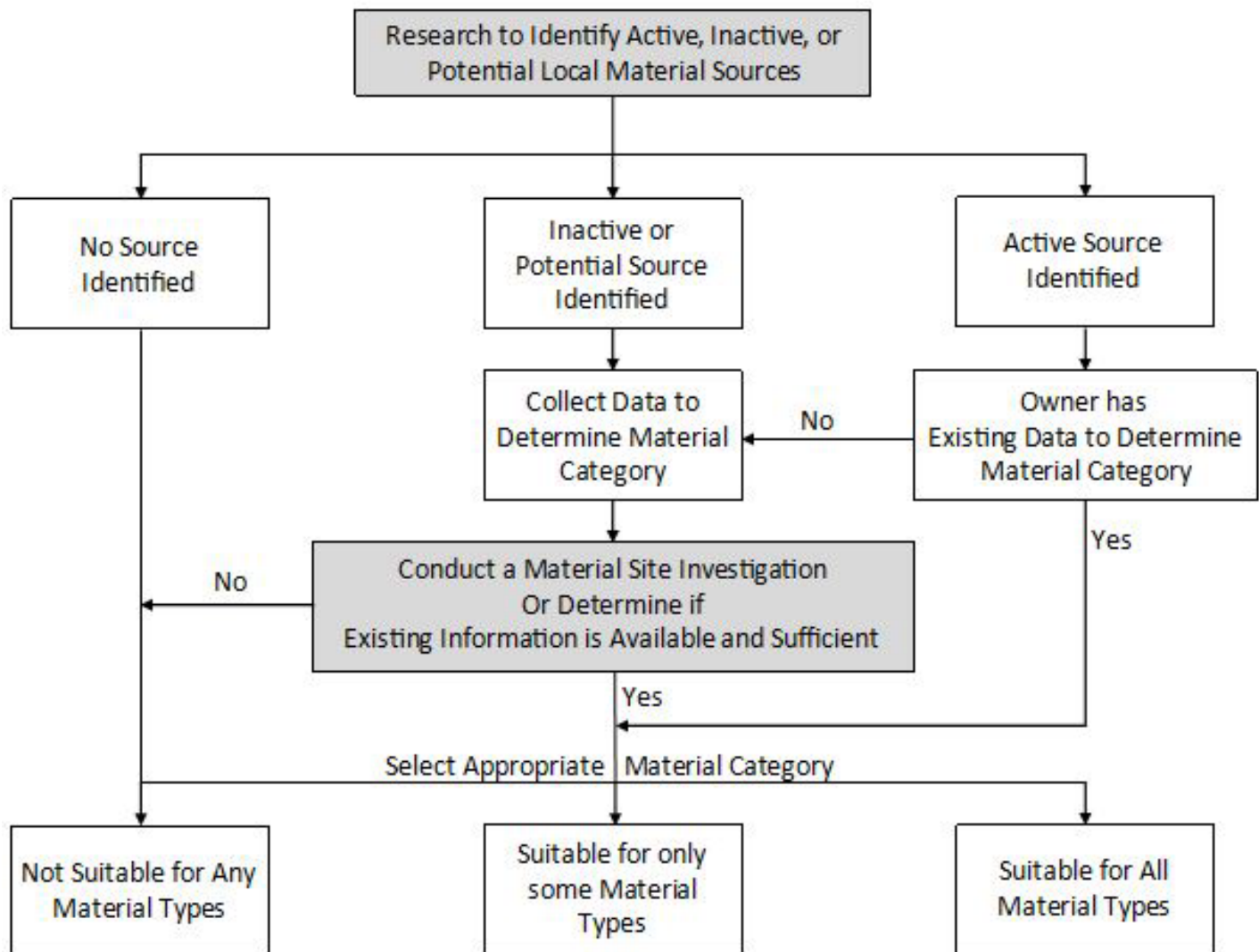
When materials are anticipated to be imported, identify all pay items expected to be imported in a Special Notice to Bidders. Additional information may be included on the plans or in the special provisions.

When a Material Site Agreement is obtained for the project, include a copy in an appendix to the contract.

Fair bid letters shall be included as supplemental information at advertising.

When an Available, Designated, or Mandatory Materials Source (see SSHC Section 106-1.02 for definitions of these) is used on a project, provide available site-specific information as supplemental information to bidders.

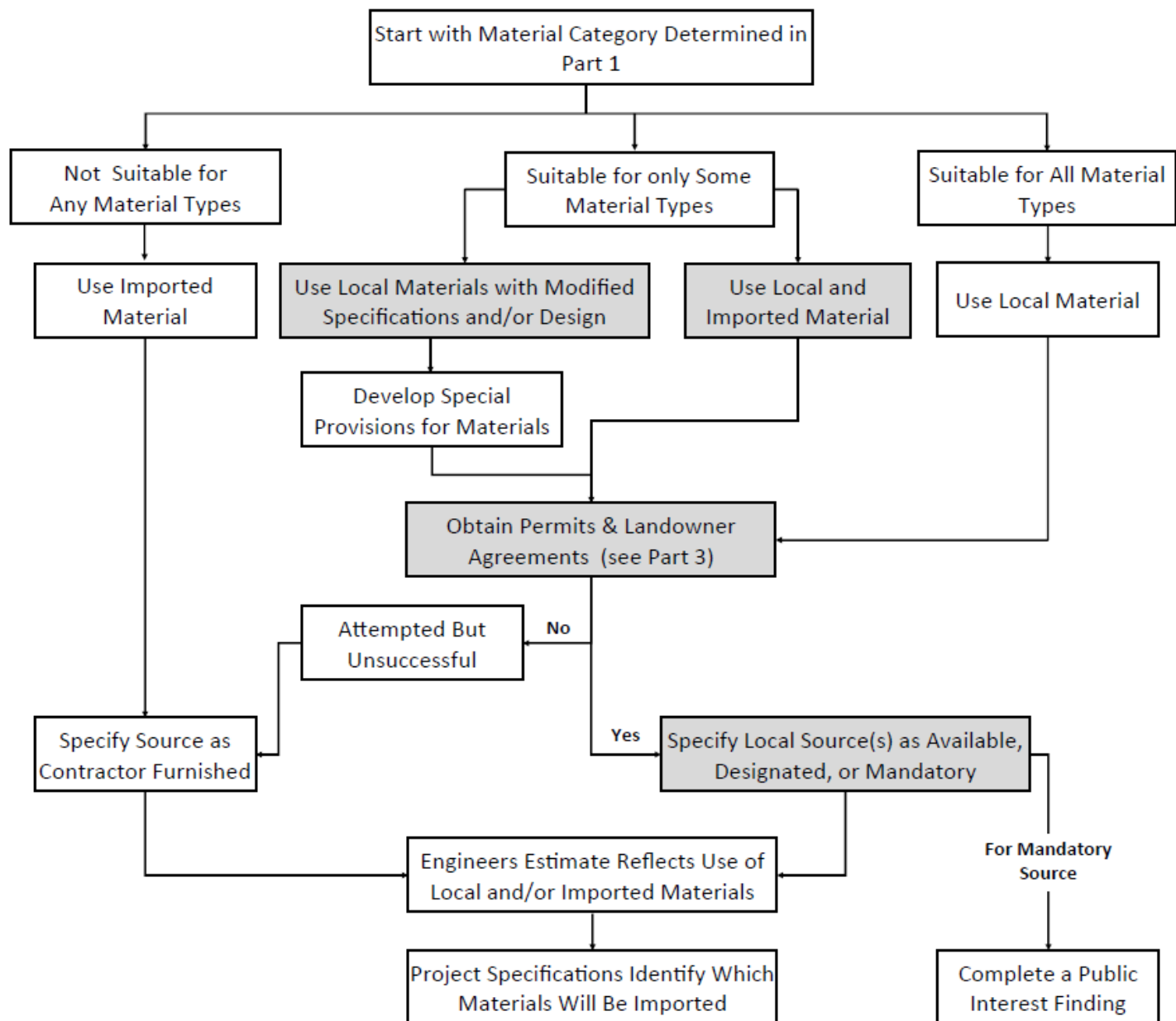
Include copies of all permits and landowner agreement in an appendix to the contract.



Note: Items in shaded boxes may require extra effort in the preconstruction phase but add project value by potentially minimizing the need for imported materials, reducing the contractor's effort and uncertainty during bidding to obtain permits and agreements, and providing a fair bidding environment.

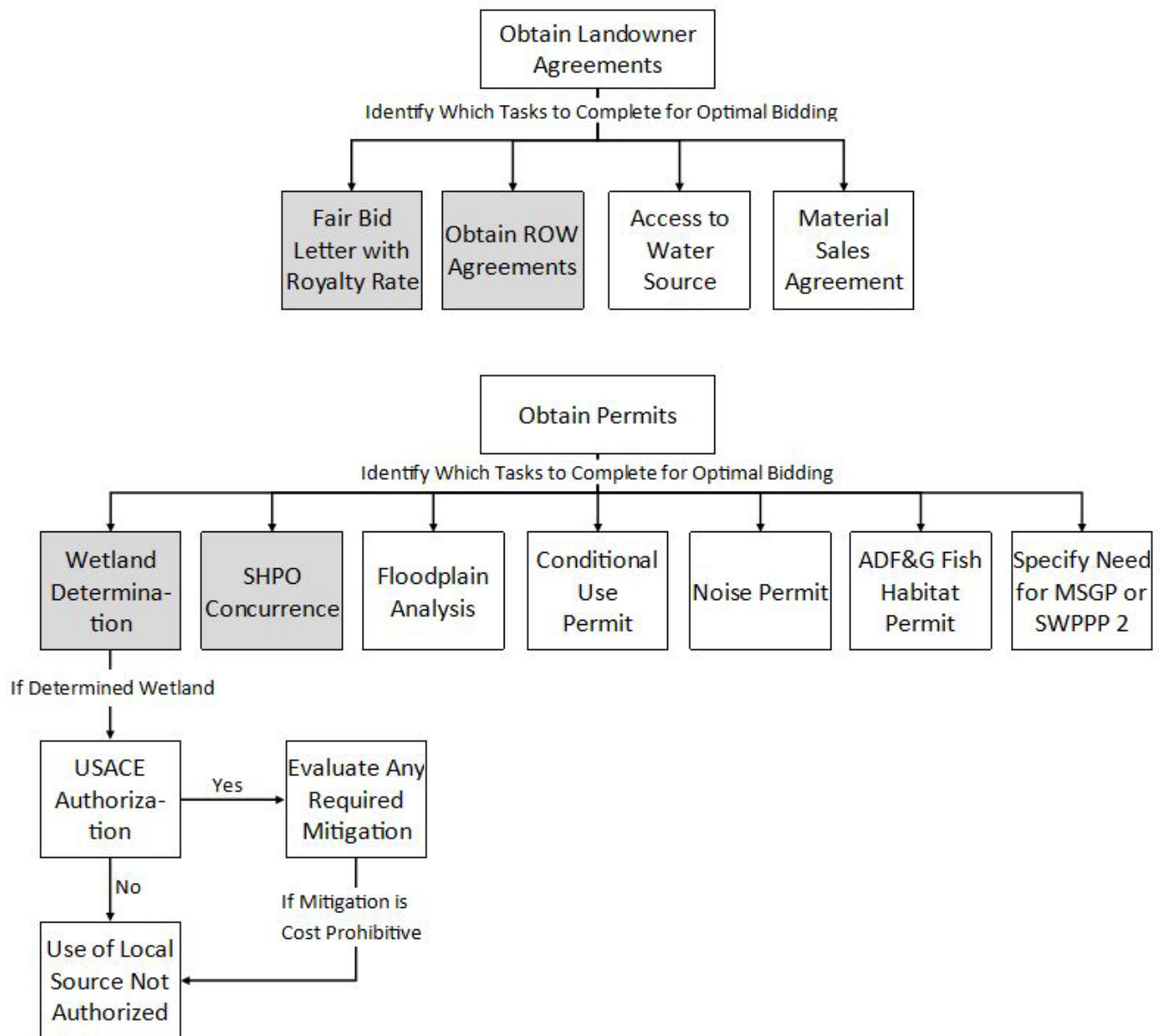
Once Material Category is determined,
Proceed to Part 2 Flow Chart

Figure 450-1
Local Material Sources on Rural Projects Flow Chart
Part 1 – Determine Local Material Category



Note: Items in shaded boxes may require extra effort in the preconstruction phase but add project value by potentially minimizing the need for imported materials, reducing the contractor's effort and uncertainty during bidding to obtain permits and agreements, and providing a fair bidding environment.

Figure 450-2
Local Material Sources on Rural Projects Flow Chart
Part 2 – Determine Optimal Use of Local Material Sources



Note: Items in shaded boxes are most critical to ensuring a fair bid environment and project managers are encouraged to complete these work items during preconstruction.

**Figure 450-3
Local Material Sources on Rural Projects Flow Chart
Part 3 – Permits and Landowner Agreements**

Table 450-1 provides a matrix defining responsibility for obtaining rights to material sources.

**Table 450-1
Material Source Responsibility Matrix**

	Contractor-Furnished Source	Mandatory Source	Designated Source	Available Source
Who owns the subsurface rights?	It depends, see narrative	The Department must obtain rights	The Department must obtain rights	The Department must obtain rights
Who obtains permits?	Contractor	Department	Department	Department or Contractor
Materials Report required	No	Yes	Yes	See below
Who prepares mining and reclamation plan?	Contractor – acceptable to Department	Department	Contractor	Contractor

The following definitions of the various types of material sources are derived from Section 106-1.02 of the SSHC:

Contractor-Furnished Source: A material source that is from a commercial plant or any material source that is not identified below.

Mandatory Source: A material source required for use by the Department. A Public Interest Finding (PIF) is required to designate a material source as mandatory (See P&P 10.02.013 and 23 CFR 635.407).

Designated Source: A material source that is made available to the contractor, but is not required for use.

Available Source: A material source identified as available for use to the contractor. The Department makes no guarantee as to the quality or quantity of material available. Provide any available information as supplemental information and note its availability in the Notice to Bidders. The contractor is responsible for making their own determination of the quality and quantity of material available.

Excluded Material Source: A material source that is excluded from use. It may be considered by the contractor as a contractor-furnished source, unless it is

identified in the contract as an Excluded Materials Source.

To use data from a materials report for a mandatory or designated material source, it must be a project specific report.

The permits necessary for a material source can be numerous and may include:

- Wetlands
- Floodplain
- State Historic Preservation Office (SHPO)
- Conditional use permit
- Noise

Obtain rights to use or otherwise develop a material source prior to advertising a project when it is the responsibility of the Department as indicated in Table 450-1.

Address permits to be obtained by the Department in final design. Permits to be obtained by the contractor and the mining and reclamation plan will be obtained during construction.

450.11. Material Disposal Sites

Many projects will generate unusable or excess materials such as clearing, grubbing, unsuitable

unclassified excavation, and excess unclassified excavation.

Cleared and grubbed material may be burned, buried, or otherwise disposed. The contractor will comply with local laws pertaining to open burning and obtain a Department of Environmental Conservation (DEC) air quality permit when required.

Unusable or excess materials can be buried in non-structural fill sections indicated on the plans

Disposal of unusable or excess material can be accomplished on-site with a state-furnished disposal site or off-site with a state or contractor furnished disposal site or a commercial landfill.

450.11.1. State-Furnished

Designers should consider non-environmentally sensitive upland areas within the right-of-way limits for material disposal. Also consider slope flattening on adjacent segments of roadway.

These areas should be accounted for in the environmental document process and the plans should indicate their locations and the conditions for wasting the material such as vegetating, etc.

450.11.2. Contractor-Furnished

If no State-furnished material disposal areas are made available or they are not adequately sized, the contractor will either secure his own material disposal site or use a commercial landfill.

450.12. Driveway and Approach Road Design and Permitting

The Department has adopted regulations (17 AAC 10) pertaining to the legal requirements for driveways and approach roads placed within its highway ROWs. Those portions of the driveway within the ROW are considered encroachments, and the property of the state, but construction, maintenance, and liability are at the expense of the lands served.

450.12.1. Driveway and Approach Road Design Standards

Section 1190 presents Department standards for driveway and approach road design on highways, streets, and roads it administers or maintains.

Section 1190 applies to all new driveway and approach roads designed and constructed by the Department.

Section 1190, as published in December 1998, applies to:

- All existing driveways and approach roads
- Design and construction of all new private driveways and approach roads applied for and built by the permit applicant
- All existing driveways and approach roads reconstructed or modified by a Department highway or road project

Driveways with permits (considered encroachment permits by state law) issued prior to April 1, 1986, are not required to conform to the standards presented in Section 1190 unless the Department determines the driveway must be changed or relocated for public safety. A new permit is required if a landowner changes the land use, relocates the driveway or approach road, or changes the geometry.

All driveways or approach roads upgraded or constructed on, or after April 1, 1986, must conform to the requirements of Section 1190, as published in December 1998 version of the HPCM, unless the Department makes an exception in writing through a design waiver. This exception is for project related driveways and is not for new driveway applications.

450.12.2. Driveway Permit Procedures

Do not acquire driveway permits as part of the project development and construction process.

Existing driveways and approach roads (herein referred to as an approach) should be located and noted on the project plans. At existing driveways and approach where there is no record of a permit:

1. Determine if the driveway or approach creates an unsafe condition or a traffic operations issue (both considered a “problem”).
2. If a problem exists, the driveway or approach should be removed subject to the extent that a permit would not be issued for it “as-is.” Notify the Permits Officer so that an attempt can be made to contact the property owner and to determine whether the property owner intends to apply for a permit for an alternate access location. If an alternate access location is approved, construct it as part of the project.
3. If it doesn’t create a problem, reconstruct it as part of the project.

4. If the driveway or approach has no permit and appears recently constructed (e.g. after project development commencement) but does not create a problem, then notify the Permits Officer so that the property owner can be contacted and advised of the permit application process requirements. If a permit application is submitted and approved, include reconstruction of it in the project plans. If a permit application is not submitted or approved, it is considered an unauthorized encroachment per AS 19.25.220-250.

450.12.3. Driveways in the Project Plans and As-Builts

Existing driveways and approach roads onto state roads and highways shall be shown in the project plans and noted for removal, relocation, improvement or retention as-is.

The as-built plans and driveway summary constitutes a valid driveway permit for all driveways and approaches reconstructed or allowed to remain as part of the project, whether or not there was a prior permit, unless otherwise noted. Provide a copy of the as-built driveway summary to the regional Permits Officer.

A driveway permit obtained via the construction as-built plans satisfies the landowner's requirement for permitting. The landowner is not required to take additional steps to permit the driveway or approach unless they wish to:

- Change the land use of the property served by it
- Change the location of it
- Otherwise modify it

If any of the aforementioned changes occur, the landowner is required to obtain a new driveway permit.

450.13. Reserved

450.14. Reserved

450.15. Plans-in-Hand (PIH) Review

Plans-in-Hand review consists of an office review of the approximately 75-percent-completed plans, specifications, and cost estimate, and a field review of the proposed project site. The PIH review:

- Ensures conformity with project scope and the approved project design criteria
- Verifies environmental conditions and impacts

- Reviews design details and verifies technical recommendations
- Assesses the cost-effectiveness of the design and accuracy of the construction cost estimate
- Evaluates the quality of the product

In accordance with regional policy, the project manager will determine whether to conduct a PIH review. The project manager allows sufficient time for review of the documents and schedules a meeting to discuss the PIH review comments.

Distribution of review documents for all projects is normally to the following:

- Design
- Bridge
- Construction
- Statewide Materials
- Regional Planning
- Right-of-Way
- Environmental
- Regional Materials
- City or municipality having local planning authority
- Utilities
- Borough
- Surveying/Locations
- Traffic and Safety
- Review engineer
- Maintenance and Operations
- Other involved state/federal agencies
- Consultant(s) (if used)

450.16. Value Engineering (VE)

Department policy requires that all projects with a total estimated value equal to or greater than \$40 million be considered for a VE analysis. For those projects, document the decision to use or not use value engineering in the DSR.

A VE analysis is required for bridge projects on the National Highway System (NHS) with an estimated cost of \$40 million or more; for all other projects on

the NHS, an analysis is required when the estimated total cost is \$50 million or greater, per 23 CFR 627.5.

The total estimated value of a project includes costs for:

- Design (Phase 2)
- ROW (Phase 3)
- Construction (Phase 4)
- Utility Relocation (Phase 7)

A VE analysis is best performed as early as practicable in the design stage. On projects selected for a VE analysis, consult with the regional VE coordinator and follow procedures specified in P&P 05.01.030.

450.17. Local Concurrence

AS 35.30 requires coordination of projects with municipalities, communities, and villages within, or near, the project limits. Copy the planning field office on all correspondence.

Municipalities

Except as noted later, submit plans and specifications for all state facility construction projects within a municipality and all municipal facility projects to the planning commission along with a formal letter requesting they take the following action:

- Review and comment on the plans and specifications
- Complete a specific review to address compliance with municipal planning and zoning ordinances, and other regulations

Maintenance projects are excluded from this requirement.

A template letter for this purpose is shown in Figure 450-4 of this section. An electronic version of this is found on the Preconstruction Resources webpage:

<http://dot.alaska.gov/stwddes/dcsprecon/index.shtml>

Submit the plans and specifications at the earliest time they are sufficiently developed for review of compliance with local planning and zoning ordinances and other regulations.

If the municipality fails to comment within 90 days, the Department may proceed with the project.

For written comments received within the 90 day period, the Department will:

- Bring the project into compliance with planning and zoning ordinances or other regulations per AS 35.30.020, or seek a waiver from municipal planning authority.
- Consider comments to the extent practicable and provide written responses.

AS 35.30.010 states that prior approval by a municipal planning commission is not required before the construction of a highway or local service road if:

1. The Department and the municipality have entered into agreement for the planning of the project under [AS 19.20.060](#) or 19.20.070 and the plans for the project are completed in accordance with the terms of that agreement;
2. The municipality has adopted a municipal master highway plan under [AS 19.20.080](#) and the highway or local service road is consistent with the plan adopted; or,
3. The Department has entered into agreement with the municipality for the planning of transportation corridors under [AS 19.20.015](#) and the plans for the project are completed in accordance with the provisions of that agreement.

For maintenance projects within a municipality to be completed using private contractors, send a letter stating the project scope and estimated advertising date to the municipality's planning director.

Communities with a Community Council

For projects located within one-half mile of the boundary of an area represented by a community council established by municipal charter or ordinance, send a formal letter to the community council requesting that they review and comment on the project plans and specifications.

A template letter for this purpose is shown in Figure 450-5. An electronic version of this is found on the Preconstruction Resources webpage.

Villages

For projects located within two miles of a village, send a formal letter to the community council requesting that they review and comment on the project plans.

A template letter for this purpose is shown in Figure 450-6. An electronic version of this is found on the Preconstruction Resources webpage.

450.18. Constructability Review (CR)

A CR is a plan review involving those with relevant construction experience and expertise. A CR is typically done in conjunction with a PIH for PS&E review.

The purpose of a CR is to ensure the project is biddable and buildable; that the contract documents clearly define when, where, and what work is to be performed; what restrictions exist; and how the contract work will be accepted and paid for.

Additionally, CRs look at:

- Coordination of contract documents
- Construction phasing and scheduling
- Traffic control
- Ease of construction
- Design consistent with field conditions
- Environmental Considerations
 - Erosion and sediment control
 - Timing restrictions
 - Permit conditions and stipulations

Comments from a CR review are handled in accordance with regional policy.

450.19. Plans Specifications and Estimate (PS&E) Review

Perform a PS&E review on all projects, unless waived by the preconstruction engineer. This is the final review of the PS&E, packaged in a format to include the Bid Schedule, Invitation for Bids, and other project-specific contract documents: a final contract mock-up.

Distribution of review assemblies is similar to the PIH Review with the addition of , adding the project control and regional planning. You may combine the PIH review with the PS&E review subject to regional policy.

Distribute PS&E assemblies externally (e.g. FHWA, local agencies, municipalities, etc.) in accordance with regional policy.

It is important that comments receive objective consideration. Regional policy will adjudicate outstanding issues.

Provide reviewers a response to their comments, and provide a copy of all comments and responses to the Construction Section.

450.20. Final PS&E

Upon completion of changes from the PS&E review, the original, reproducible plan sheets are sealed, signed, and dated in ink by the professional engineer(s) responsible for their preparation, in accordance with P&P 70-1003, AS 08.48.221 and 12 AAC 36.185, and the cover sheet is signed by the person(s) delegated by regional authority. Submit the original plans, a copy of the final specifications and engineer's estimate, and any other information necessary for advertising to the Contracts Section.

Electrical power distribution designs (electric utility service connections, step-up and step-down transformers, and electric load centers) for highway lighting systems (including parking, mooring and docking areas) and traffic signal and highway data systems must be sealed and signed by an Alaska licensed professional electrical engineer.

Designs for highway lighting systems and traffic signal and highway data systems “electrically downstream” of load centers may ~~must~~ be signed and sealed by an Alaska licensed professional civil engineer. “Electrically downstream” refers to components between the load side of a branch circuit breaker and utilization equipment.

Plans may include private contractor (company) or public agency names to identify and acknowledge their contribution to a project. No contractor or public agency logos apart from the DOT&PF logo are allowed anywhere in the plans. Other public agency logos are permitted when that agency provides a majority of funding for the project.

Identify contractors or other public agencies involved in the development of plans for the Department by including the company or agency name on the plan sheets in accordance with regional policy and 12 AAC 36.185. Use lettering that is 1/16” or less in height as printed on 11” x 17” plan sheets, and use the same font as other lettering of similar size on the plan sheet.

Production of the final PS&E completes the design stage. The project is ready for advertising once the

Project Certification and Authority to Advertise are obtained (see Section 470). Design changes after Project Certification are not permitted.

If tribal consultations were made during project scoping, notify these tribes that the project is ready for construction and provide an estimated construction start date.

Buy America Provisions

FHWA's Buy America policy (see 23 CFR 635.410) requires a domestic manufacturing process for all steel or iron products permanently incorporated in a federal-aid highway construction project. Federal regulations allow an exemption for minor quantities (0.1% of the total contract amount or \$2,500, whichever is greater) of non-domestic steel or iron products.

When a product manufactured predominantly of steel or iron material is identified in the contract by name and/or manufacturer, determine whether the product is, or is not, manufactured in the US.

Include Statewide Special Provision HSP18-1 to indicate whether a predominantly steel or iron product called for in the contract by name and/or manufacturer is manufactured in the United States. If unable to determine whether or not a product is manufactured in the US, list the product as not manufactured in the US.

A waiver to this policy may be requested from the Alaska Division of FHWA in accordance with 23 CFR 635.410(c). Further guidance on Buy America waivers is found here:

https://www.fhwa.dot.gov/construction/contracts/buyam_qa.cfm

450.21. Retention of Project Development and Design Files

After contract award, consolidate records pertaining to project development as much as possible.

On federal aid highway construction projects, retain project records at least three years after FHWA pays the final voucher.

On state-funded projects, the three-year retention begins when the state issues the letter of acceptance to the contractor. The retention is automatically extended through resolution of any outstanding litigation, claims, or audits, and it may be extended by specific retention schedules or regional policy.

Make records available for public inspection at reasonable times and places in accordance with AS 40.25.110 and with prior coordination with the Department's attorney. This does not include records deemed confidential and exempt from disclosure under the Freedom of Information Act (see 49 CFR Part 7).

Examples of confidential records include attorney-client correspondence, records pertaining to pending claims or litigation, and personnel matters (AS 09.25.110 and AS 09.25.120).



THE STATE
of **ALASKA**
GOVERNOR MIKE DUNLEAVY

**Department of Transportation and
Public Facilities**

Section
DOT&PF Engineering Manager

Address 1
Address 2
Phone
Fax

|
Date

Re: *Project name, number, and location*

Certified Mail #: _____
Return Receipt Requested

Name and Mailing Address of Planning Commission

Dear *Planning Commission*,

The enclosed plans are submitted for your review and comment, and for determination of compliance with local planning and zoning ordinances. Under AS 35.30.020, the Department must comply with local planning and zoning ordinances and other regulations in the same manner and to the same extent as other landowners. If you believe the Department's construction of this project would result in a violation of planning, zoning, or other regulations generally applicable to landowners, please identify the portions of the project that would be in violation, and the specific planning, zoning, or other regulations that you believe would be violated.

Pursuant to AS 35.30.010, you have 90 days from delivery of the plans to provide comments on the project and to notify the Department whether the project violates any planning, zoning, or other regulations. If comments are not received within this time frame, the Department is authorized to proceed with the project.

Thank you for attention to this matter.

Respectfully,

DOT&PF Engineering Manager

Enclosure: Project Plans

"Keep Alaska Moving through service and infrastructure."

**Figure 450-4
Example Letter to Planning Commission**



THE STATE
of **ALASKA**
GOVERNOR MIKE DUNLEAVY

**Department of Transportation and
Public Facilities**

Section
DOT&PF Engineering Manager

Address 1
Address 2
Phone
Fax

Date

Re: *Project name, number, and location*

Certified Mail #: _____
Return Receipt Requested

Name and Mailing Address of Community Council

Dear *Community Council*,

The enclosed plans are submitted for your review and comment in accordance with AS 35.30.010.

You have 90 days from the delivery of the plans for your review and to offer any comments on the project and plans. Failure to provide comments within this time period will result in the Department moving forward with the project without taking your comments into consideration.

Thank you for your attention to this matter.

Respectfully,

|

DOT&PF Engineering Manager

Enclosure: Project Plans

"Keep Alaska Moving through service and infrastructure."

**Figure 450-5
Example Letter to Community Council**



THE STATE
of **ALASKA**
GOVERNOR MIKE DUNLEAVY

**Department of Transportation and
Public Facilities**

Section
DOT&PF Engineering Manager

Address 1
Address 2
Phone
Fax

Date

Re: *Project name, number, and location*

Certified Mail #: _____

Return Receipt Requested

Name and Mailing Address of Village Council

Dear *Village Council*,

The enclosed plans are submitted for your review and comment in accordance with AS 35.30.010.

You have 90 days from the delivery of the plans for your review and to offer any comments on the project and plans. Failure to provide comments within this time frame will result in the Department moving forward with the project without taking your comments into consideration.

Thank you for your attention to the matter.

|
Respectfully,

DOT&PF Engineering Manager

Enclosure: Project Plans

"Keep Alaska Moving through service and infrastructure."

**Figure 450-6
Example Letter to Village Council**

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470. Advertising and Award

- 470.1. Introduction
- 470.2. Shelved Projects
- 470.3. PS&E Approval and Project Certification
- 470.4. ATP for Construction and Authority to Advertise (ATA)
- 470.5. Advertising for Bids
- 470.6. Addenda
- 470.7. Bid Opening, Evaluation and Analysis
- 470.8. Bid Award, Cancellation and Protests
- 470.9. References

470.1. Introduction

Advertising and award of a project generally begins with completion of the final PS&E and ends with an award to a contractor for project construction.

Procedures detailed in this section are required on federal-aid projects. Project certification is different for state funded projects (see Section 490 of this manual).

Design-build contracting is allowed under 23 CFR 636, AS 36.30.200(c) and 2 AAC 12.933. Follow guidelines presented in 23 CFR 636, P&P 10.02.020, and the *Guidebook for Design-Build Highway Project Development* manual when advertising design-build contracts. This manual is located here:

http://www.dot.state.ak.us/comm/design_build.shtml

470.2. Shelved Projects

When a project does not have construction funding available immediately upon completion of the final P&SE, it is shelved. Follow regional policy for shelving projects.

Shelved projects should be reviewed prior to advertising to ensure:

- Current design standards are met
- Engineer's estimates are still accurate
- Environmental documents have not expired and permits are still valid
- Standard specifications and standard modifications have not changed, required FHWA contract provisions have not changed and DBE/OJT goals are still valid.
- Status of utility agreements and ROW certification is still valid

- No field changes within the project limits, such as a change in original ground, new driveways or approaches, signs, utility work, etc.

470.3. PS&E Approval and Project Certification

When the PS&E is final, circulate it with the FHWA Project Certification Form for certification signatures.. Route it to the REM, the regional ROW chief and the regional utilities engineer then sign it before submitting it to the preconstruction engineer for final PS&E approval. The FHWA Project Certification Form is found here:

<http://www.dot.state.ak.us/stwddes/dcsprecon/preconmanual.shtml>

470.4. ATP for Construction and Authority to Advertise (ATA)

Once approval for the Final PS&E is obtained, Project Control prepares the ATP for Construction funding request and submits it to FHWA. The ATP for Construction request must include the FHWA Project Certification Form with the requested Phase 4 programming amount.

Approval of the ATP for Construction constitutes PS&E approval by FHWA.

After FHWA approves the ATP for Construction, Project Control will confirm that authorization has been received. The preconstruction engineer will then grant approval for Authority to Advertise (ATA).

Once the ATA is received, deliver the final PS&E, project certification, and ATA to the Contracts Section for bid advertising.

470.5. Advertising for Bids

Establish the bid advertising period after receiving the ATA. By state and federal law (AS 36.30.130, and 23 CFR 635.112[b]), the minimum advertising period is 21 days prior to bid opening. Four to six weeks is advisable depending on the complexity and location of the project.

The contracting officer may approve a written determination to shorten the minimum advertising period when it is advantageous for a particular bid and adequate competition is anticipated.

The Contracts Section will prepare and post an invitation to bid. Provide them with any additional advertising information they require, such as special notices to bidders.

470.6. Addenda

Addenda are used to make changes to the contract documents or to advise all bidders of pertinent information after a contract is advertised for bids. Changes to the bid proposal, bid schedule, bid bond, specifications, plan sheets, or appendices require an addendum. Prepare, process, and approve addenda in accordance with departmental and regional policy and procedures.

Addenda are posted on the DOT&PF Procurement website and/or faxed to all plan holders generally at least 48 hours prior to the bid opening. The Contracts Section keeps hard copies of the addenda in the plans room and shall keep records relating to the posting and distribution of all addenda in the contracts file.

470.7. Bid Opening, Evaluation and Analysis, and Recommendation

470.7.1. Bid Opening

Open bids in accordance with P&P 10.02.011. After the Bid Tabulation is checked and certified, total bid amounts are posted on the DOT&PF Procurement and Contracting web site:

<http://www.dot.state.ak.us/procurement/bidding/index.shtml>

470.7.2. Bid Evaluation and Analysis

After bid opening, the project manager examines the low bid tabulation, conducts a bid evaluation and analysis, and then prepares a recommendation memo to submit to the contracts officer.

On federal-aid projects, FHWA requires the apparent low bid be checked for reasonable conformance with the engineer's estimate. It also requires a bid analysis on a bid where (a) there are extreme variations from the engineer's estimate, or (b) there is an unbalanced bid situation.

Bid analysis is advisable, but not required, on State funded projects.

The two types of unbalanced bids are mathematically unbalanced and a materially unbalanced bid.

Mathematically Unbalanced Bid

A mathematically unbalanced bid contains lump sum or unit price items which do not reflect reasonable actual costs plus a reasonable proportionate share of the bidder's anticipated profit, overhead, and other indirect costs.

Materially Unbalanced Bid

A materially unbalanced bid contains mathematical unbalancing, and:

- Raises doubt that award to the bidder will result in the lowest ultimate cost to the department, or
- Is so unbalanced it results in a significant advance payment to the bidder.

The *Standard Specifications for Highway Construction* (SSHC) states that materially unbalanced bids shall be rejected as nonresponsive (see Section 102-1.06); thus, a bid evaluation and analysis is necessary in the bid award process.

To perform a bid evaluation and analysis, do the following:

1. Sum the total of the bid, construction engineering and ICAP amounts and determine whether they are within the programmed funding amount. If so, advance to 2.

If they are not, consult with Project Control and the Planning Section to determine if additional funding is available. If additional funding is unavailable the Department may consider: (1) rejecting all bids or (2) repackaging and rebidding the project with possible modifications to lower the cost.

2. Determine if the bid prices are in reasonable conformance with the engineer's estimate and other bids.
3. Determine whether the bid is mathematically unbalanced (as defined above).

If the answer to (2) is yes and the answer to (3) is no, the bid analysis can stop here. If the answer to (2) is no and (3) is yes, then proceed to the following steps:

4. Verify that the bid quantities are correct. If not, will the contract cost increase if the quantities are corrected? Will the low bidder remain the low bidder if quantities are corrected?

5. On bid items where quantities may vary, will the low bidder remain as low bidder if quantities change?
6. Determine whether the contractor can manipulate the final quantity of any mathematically unbalanced bid items.
7. Is the bid materially unbalanced? If so, did the unbalancing have a detrimental effect on the competitive bid process or could it cause contract administration problems after award?

470.7.3. Recommendation Memo

After evaluating and analyzing the bids, the project manager will prepare a recommendation memo. This memo will recommend either awarding the contract to the low bidder or rejecting all bids and cancelling the award. In the event of a materially unbalanced bid, recommend either rejecting the apparent low bid and awarding it to the next low bidder, or cancelling the bid.

A recommendation to award should comment on the following:

- Competitiveness of the bids received
- Recommendation for awarding the contract

A non-award recommendation should comment on the following:

- Competitiveness of the bids received
- Conformance of bid prices with the engineer's estimate
- Any mathematical unbalancing
- Any material unbalancing and the nature of the detrimental effects on the bidding process or contract administration
- In the case of a materially unbalanced bid rejection, whether the next low bid should be evaluated

470.8. Bid Award, Cancellation, and Protests

The project manager will submit the recommendation memo to the Contracts Section and send a copy to the preconstruction engineer. The Contracts Section issues either a Notice of Intent to Award (NOI) or a Notice of Cancellation (NOC) to all bidders.

A recommendation to cancel a bid or reject all bids on a construction project must be submitted to the chief

contracts officer (CCO). If the CCO concurs, an NOC is sent to all bidders. See P&P 10.02.017.

The NOI and NOC trigger a protest period of 10 days in which unsuccessful bidders may dispute the contract award (AS 36.30.365) or bid cancellation (2 AAC 12.615).

If the Contracts Section receives a bid protest within the protest period, it must decide whether to award the contract or issue a written "Stay of Award" in accordance with AS 36.30.575.

If a written "Stay of Award" is issued, it will automatically continue if there is a timely appeal of the protest decision until the Commissioner makes a written determination that the award of the contract without further delay is necessary to protect substantial interests of the State. Without a Stay of Award, a contract may be awarded at any time during the protest and/or appeal.

After the low bidder executes and returns the necessary forms, the Letter of Award and Notice to Proceed is issued.

Within 90 Days of the Letter of Award and Notice to Proceed, adjustments of over \$250,000 shall be submitted through Project Control for adjustment to the Federal-aid Agreement to comply with 23 CFR 630.108.

470.9. References

1. Code of Federal Regulations 23 CFR 635.112 – Advertising for Bids and Proposals
2. 23 CFR 635.113 - Bid Opening and Bid Tabulation
3. 23 CFR 635.114 – Award of Contract and Concurrence in Award
4. DOT&PF Policy and Procedure 10.02.011 – Bid Openings
5. DOT&PF Policy and Procedure 10.02.017 – Cancellation of a Solicitation and Rejection of all Bids or Proposals Procurements.
6. FHWA Memorandum to Regional Federal Highway Administrators and Direct Federal Program Administrators, "Bid Analysis and Unbalanced Bids" May 16, 1988. Reference No. HHO-32

<http://www.fhwa.dot.gov/programadmin/contracts/051688.cfm>

7. AS 36.30.130 – Public Notice of Invitation to Bid
8. AS 36.30.140 – Bid Openings
9. AS 36.30.150 – Bid Acceptance and Bid Evaluation
10. 2 AAC 12.860 – Rejection of All Bids or Proposals

480. Preventive Maintenance Force Account Projects

480.1. Introduction

480.2. Project Development

480.1. Introduction

Preventive Maintenance Force Account (PMFA) projects use state maintenance and operations equipment and personnel to complete preventive maintenance activities. Preventive maintenance work is only done by state forces when it is cost effective and in the best interest of the state, and falls within P&P 07.05.080. Force account construction is covered in 23 CFR 635 Subpart B.

480.2. Project Development

Requests for PDAs, and PDAs requesting ATP for projects using PMFA shall specifically state: “This is a Force Account construction project.”

The development of PMFA projects is similar to other projects discussed in this chapter. Prepare an environmental document as described in Section 430 and in accordance with the *EPM*. Plans and specifications for PMFA projects need not be as comprehensive as for competitively bid projects.

Other steps in the design process are covered in P&P 07.05.080, Procedure, Part C.

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485. Intelligent Transportation System (ITS) Projects

- 480.1. Introduction
- 480.2. Policy
- 480.3. Definitions
- 480.4. Identification of ITS Projects
- 480.5. Systems Engineering Analysis

485.1. Introduction

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

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

485.2. Policy

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

23 CFR 940 provides policies and procedures for implementing that part of Section 6002 of the FAST ACT pertaining to conformance with the National Intelligent Transportation Systems Architecture and Standards. 23 CFR 940 requires that ITS projects conform to the National ITS Architecture and Standard through the regional ITS architecture. 23 CFR 940 provides policies and procedures for conformance with the National ITS Architecture and Standards. Two regional architectures have been established in Alaska:

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

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

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

This section provides guidance to meet those requirements.

485.3. Definitions

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

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

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

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

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

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

Crash Data Reporting System: A computerized system that allows the electronic transfer of crash data

from incident/accident response agencies to transportation agencies for analysis to benefit traffic safety.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Maintenance Decision Support System: A computer-based system that collects information from various weather databases and disseminates it

electronically to transportation-related agencies with the intent of improving road weather forecasting.

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

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

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

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

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

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

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

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

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

Examples of a Traffic Management System include:

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

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

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

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

<https://511.alaska.gov/map>

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

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

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

485.4. Identification of ITS Projects

An ITS project is one that includes elements or systems of elements contributing to one or more ITS service areas.

The project manager determines whether the scope of the project includes ITS elements. Table 485-1 lists ITS elements, the associated ITS service area, and the ITS system manager. Consult with the ITS system manager(s) to determine which, if any, ITS elements to include in your project. If a project is federally funded and contains any of the elements listed in Table 485-1, it must be developed as an ITS project. Non-federally funded projects that contain any of the elements listed in Table 485-1 are considered ITS projects and should be developed in accordance with this Section.

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

Examples of a non-significant ITS project are:

- Does not include any ITS devices
- Only includes signal system equipment upgrades, signal re-timing, or signal coordination
- Stand-alone ITS devices that do not or will never communicate
- Only fiber optics cable or conduit
- Upgrade of opticom sensors and controller equipment to prevent unauthorized users or

devices from activating the system while maintaining authorized users activation capabilities.

- A traffic signal installation that only includes technologies already present in the current system.
- A Temporary Traffic Control device not interconnected with the ITS Architecture or one with an established interconnection protocol.
- Connecting a device to a system that does not provide new technological capabilities or alter the relationships of similar previously installed devices or the system.

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

485.5. Systems Engineering Analysis

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

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

All significant ITS projects require a Systems Engineering Analysis (SEA), except for Non-Systems Engineering Projects. Non-Systems Engineering Projects are ones that:

- Do not include any ITS devices
- Only include signal systems equipment upgrades or signal re-timing/re-coordination
- Only include stand-alone ITS devices that do not/will never communicate
- Only include fiber or conduit

Non-significant ITS projects do not require an SEA. See 485.4 for the differentiation between significant and non-significant ITS Projects.

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

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

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

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

The following online table with contact information for individual ITS system managers can be found here:

<http://www.dot.state.ak.us/stwddes/dcsprecon/index.shtml>

The SE Checklist and instructions are found at the same location.

For examples of SE checklists, contact the Iways ITS coordinator.

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

**Table 485-1
ITS Elements**

ITS ELEMENT	ITS SERVICE AREA *	ITS SYSTEM MANAGER
Archived Data Management System	Data Archive	Regional Traffic Data Manager
Automated Anti-Icing System	Winter Maintenance	Regional M&O Chief
Automated Pedestrian Detection	Traffic Management	Regional Traffic and Safety Engineer
Automatic Vehicle Location	Winter Maintenance Public Transportation	Regional M&O Chief State Transit Office
Avalanche Detection System	Winter Maintenance Incident and Emergency Management	Regional M&O Chief
Bridge Scour Detection Systems	Other	State Bridge Engineer
Crash Data Reporting System	Data Archive	Regional Traffic Data Manager
Credentials Administration System	CVO and Freight	MS&CVE ITS Coordinator
Dynamic Message Signs	Traffic Management CVO	Reg.. Traffic & Safety Engineer MSCVE
Electronic Screening	CVO and Freight	MS&CVE ITS Coordinator
Environmental Sensors	Winter Maintenance	Statewide ITS Coordinator (RWIS)
Ferry Tracking	Public Transportation	AMHS
Freight Management System	CVO and Freight	MSCVE ITS Coordinator
Fleet Management System	Public Transportation State Equipment Fleet	AMHS SEF Manager
Infrared Inspection System	CVO and Freight	MS&CVE ITS Coordinator

Table 485-1 (Con't)
ITS Elements

ITS ELEMENT	ITS SERVICE AREA *	ITS SYSTEM MANAGER
Intelligent Specialty Vehicle System	Winter Maintenance	Regional M&O Chief
Intersection Collision Warning System	Traffic Management	Regional Traffic and Safety Engineer
Land Mobile Radio System	Multiple	Central Region M&O Manager
Maintenance Decision Support	Winter Maintenance	Regional M&O Chief
Maintenance Management Systems	Winter Maintenance	Regional M&O Chief
IT Communications Interface Projects	Multiple	Statewide ITS Coordinator
Onboard Safety and Security System	Commercial Vehicle Operations	MS&CVE ITS Coordinator
Roadway Lighting System Control	Traffic Management	Regional Traffic and Safety Engineer
Traffic Detection	Traffic Management	Regional Traffic and Safety Engineer
Traffic Signal Systems, Subsystems, and Equipment	Traffic Management	Regional Traffic and Safety Engineer
Traveler Information	Traffic Management / Multiple	State ITS Coordinator
Video Surveillance and CCTV	Traffic Management	Regional Traffic and Safety Engineer

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490. State-Funded Projects

- 490.1. Purpose
- 490.2. State Project Development
- 490.3. General
- 490.4. Project Development Authorizations
- 490.5. Civil Rights Program
- 490.6. Design Criteria Approval
- 490.7. Environmental Requirements
- 490.8. Right-of-Way (ROW) Requirements
- 490.9. Local Concurrence
- 490.10. Non-Required Process

490.1. Purpose

This section establishes procedures for state-funded capital improvement projects, from authorization through construction contract award.

While this chapter establishes minimum requirements, the project manager may determine that additional steps are appropriate for a project.

When not specifically exempted or altered by this subsection, follow the guidance provided in the remainder of this manual.

490.2. State Project Development

The project manager receives the project nomination package with state funding information, including bonding, if applicable.

490.3. General

The flow chart in Figure 490-1 shows the relative progression of design, right-of-way, and environmental work on a state project. There are no FHWA approvals required on state-funded projects.

490.4. Project Development Authorizations

Proper authorization to obligate funding and commence project development activities consists of an approved PDA.

Request ATP for PE through Final PS&E on the initial design PDA for state-funded projects. Project Control prepares the initial PDA based on input from the Planning and Design Sections. The planning field office provides the project scope, project purpose, vicinity map, funding source, and amount authorized by the Legislature.

Design provides estimated funding requirements by phase similar to those of a federally-funded project. State-funded projects are not usually included in the STIP.

When the project has finished development through Final PS&E, complete the State-Funded Project Certification form and submit to the preconstruction engineer along with the request for Authority to Advertise (ATA). Once the project is certified, submit the PDA for construction. The State-Funded Project Certification form is located here:

<https://dot.alaska.gov/stwddes/dcsprecon/preconmanual.shtml>

See Section 420.1 of this manual for further information on project development authorization.

490.5. Civil Rights Program

490.5.1. Disadvantaged Business Enterprise (DBE)

Bidders are not required to meet minority business recruitment goals on state-funded projects.

490.5.2. On-The-Job Training (OJT)

OJT positions are not included in state-funded projects.

490.5.3. Title VI

Title VI compliance and reporting is required for state-funded projects. (See Section 430.6.5 and the State Projects Environmental Form)

490.6. Design Criteria Approval

Design criteria is established by the project manager and approved by the preconstruction engineer.

Approval of design criteria constitutes design approval.

490.7. Environmental Requirements

Environmental documentation on state-funded projects is addressed in Chapter 9 of the *Alaska FHWA Program Environmental Procedures Manual*, which is found here:

<http://www.dot.state.ak.us/stwddes/desenviron/resources/docprep.shtml>

490.8. Right-of-Way (ROW) Requirements

The *Alaska Right-of-Way Manual* provides specific guidance for state-funded projects.

Project ROW plans must be complete before acquisition begins on any property that is less than a total acquisition.

Advanced acquisition prior to completion of ROW plans may be undertaken for total takes.

490.9. Local Concurrence

Comply with Section 450.17 of this manual.

490.10. Non-Required Process

Many processes, policies, and procedures contained in Chapter 4 of this manual are not required for state-funded projects, but may be prudent for specific complex or controversial projects. The regions may decide whether or not to do the following:

- Design Study Report (DSR)
- PIH Review
- Public Involvement

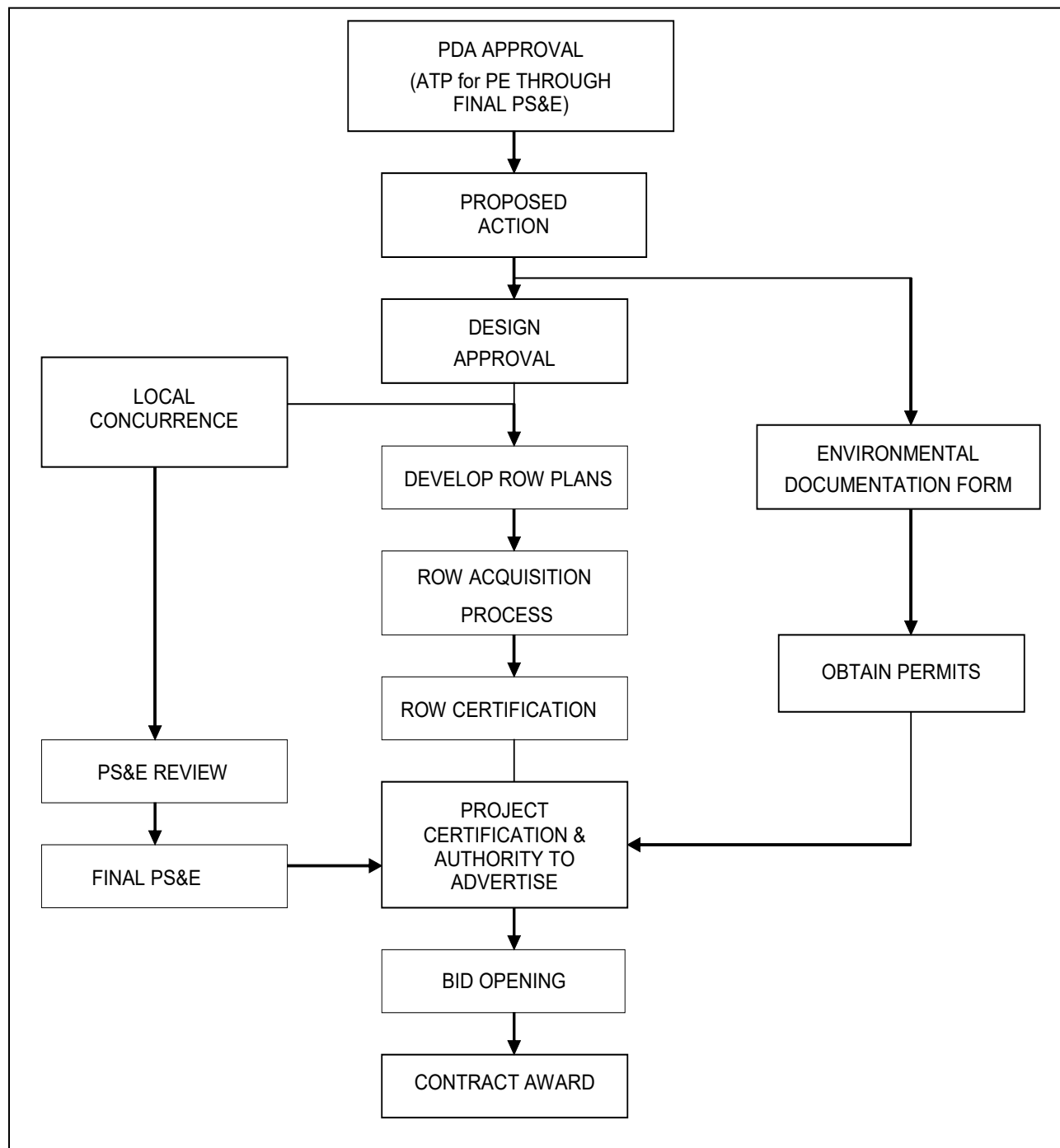


Figure 490-1
State Funded Design Process

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495. Denali Commission Projects

- 495.1. Purpose
- 495.2. General
- 495.3. Project Grant Award
- 495.4. Project Development Authorizations
- 495.5. Coordination with Owner/Public Involvement
- 495.6. Project Management Plan (PMP)
- 495.7. Civil Rights Program
- 495.8. Design Study Report (DSR)
- 495.9. Project Reviews
- 495.10. Environmental Requirements
- 495.11. Right-of-Way (ROW)
- 495.12. Utilities
- 495.13. Maintenance Agreements

495.1. Purpose

This chapter establishes the procedures for capital improvement projects funded by the Denali Commission (Commission). It covers activities from authorization to contract award for construction.

495.2. General

The Denali Commission was established by Public Law 105 – 277 enacted in 1999, as amended by Section 1520 of MAP-21. The purpose of the Commission is to:

1. Deliver the services of the Federal Government in the most cost-effective manner practicable by reducing administrative and overhead costs.
2. Provide job training and other economic development services in rural communities, particularly distressed communities.
3. Promote rural development; provide power generation and transmission facilities, modern communication systems, water and sewer systems, and other infrastructure needs.

The Commission is composed of appointed members with a statewide perspective and knowledge of rural Alaska matters, including:

- Transportation
- Design
- Construction
- Maintenance of rural infrastructure
- Community and regional planning

- Workforce development
- Health
- Energy
- Communications infrastructure

The Commission establishes projects through the authority granted to it and seeks the services and expertise of the Department on some projects.

The “Memorandum of Agreement between the Denali Commission and the Alaska Department of Transportation and Public Facilities” (MOA) is found here:

<http://www.dot.state.ak.us/stwddes/dcsprecon/index.shtml>

The MOA establishes three levels of Department involvement in Commission projects, which are:

1. DOT&PF Administered Projects
2. DOT&PF Design, Procure and Monitor Projects
3. DOT&PF Project Cost Accounting and Periodic Inspection projects.

Table 1 of the MOA establishes general responsibilities associated with the three levels of Commission projects. Responsibilities may be altered or refined in the project Grant Award (see subsection 495.3.).

The flow chart in Figure 495-1 shows the relative progression of design, ROW, and environmental work on projects funded by the Commission.

495.3. Project Grant Award

The Commission prepares the project Grant Award. After negotiation, the Commission and DOT&PF execute the mutually agreed upon project Grant Award.

The Grant Award establishes the responsibilities of DOT&PF and the Commission. The responsibilities established in the grant award will usually follow those provided in Table 1 of the MOA; however, changes to the responsibility matrix may be made in the Grant Award on a project by project basis.

495.4. Project Development Authorizations

ATP through Final PS&E and Authority to Advertise (ATA) are the only authorizations required on Denali Commission projects.

Request ATP through Final PS&E on the initial design PDA. Project Control prepares the initial PDA based on input from the Planning and Design Sections.

Authorization to obligate funding and commence project development activities may begin once the ATP through Final PS&E is obtained.

Planning provides:

- Project purpose and scope
- Vicinity map(s)
- Schedule
- Funding source and programmed amount

Design provides estimated funding requirements by phase. Because Commission projects are not included in the STIP, use a preliminary engineering estimate to establish funding amounts per phase.

The PDA establishes the authorized funding levels by project phase. Subsequent PDAs are initiated by the project manager.

Once the Final PS&E is complete, the project manager prepares, circulates for signature, signs and submits the Project Certification Form to the preconstruction engineer for approval along with the request for ATA. The Denali Commission Project Certification Form is found here:

<http://www.dot.state.ak.us/stwddes/dcsprecon/preconmanual.shtml>

495.5. Coordination with Owner/Public Involvement

Commission projects may be developed for local entities provided they own the ROW where the project is to be constructed and assume maintenance responsibilities for the completed project.

Coordinate with the owner(s) to establish responsibility and the extent of local public involvement before any work begins. Participate in,

or lead, any public workshops, meetings, or hearings as agreed through coordination with the owner(s).

495.6. Project Management Plan (PMP)

Guidance for developing a PMP is provided in Section 430.3 of this manual.

Add a section to the PMP designating the general guidance to be followed in the project design. Use this manual as a guide unless other design guidance is specified in the Grant Award.

495.7. Civil Rights Program

Civil rights program requirements are the same as those for FHWA-funded projects (see Section 450.9.2.).

495.8. Design Study Report (DSR)

The regional preconstruction engineer determines if a DSR is necessary. Complete a DSR after identification of the proposed action.

495.9. Project Reviews

Typically, a combined PIH and PS&E review is conducted for Commission projects. The project manager may determine that a separate PIH review is necessary due to project complexity or in the interest of assuring understanding between DOT&PF and the owner(s) concerning project scope.

495.10. Environmental Requirements

Environmental documents for Denali Commission projects are developed by the Department or the owner of the project in accordance with the *Alaska DOT Environmental Procedures Manual*, with the exception of approval authorities, which reside with the Denali Commission.

495.11. Right-of-Way (ROW)

The Department is generally not involved in ROW actions needed for non-Department administered Commission projects. The owner or partner will certify that ROW interests necessary for project construction are obtained.

On Department administered projects, the regional ROW chief transmits a letter of ROW certification recommendation to the Commission.

When DOT&PF resources are used to accomplish ROW acquisitions, follow the *Alaska Right-of-Way Manual* state-funded project guidance.

495.12. Utilities

The Department is generally not involved in utility relocations for non-Department administered Commission projects. The owner(s) will certify that appropriate and adequate utility relocation coordination has taken place prior to construction.

On Department administered projects, the regional utility engineer transmits a letter of recommendation for certification to the Commission.

When DOT&PF resources are used to accomplish utility relocations, follow the *Alaska Utility Manual*.

495.13. Maintenance Agreements

Maintenance agreements are normally prepared and executed between the Commission and the local owner or partner. If the project is state owned, the Department will draft the maintenance agreement and transmit it to the Commission for approval.

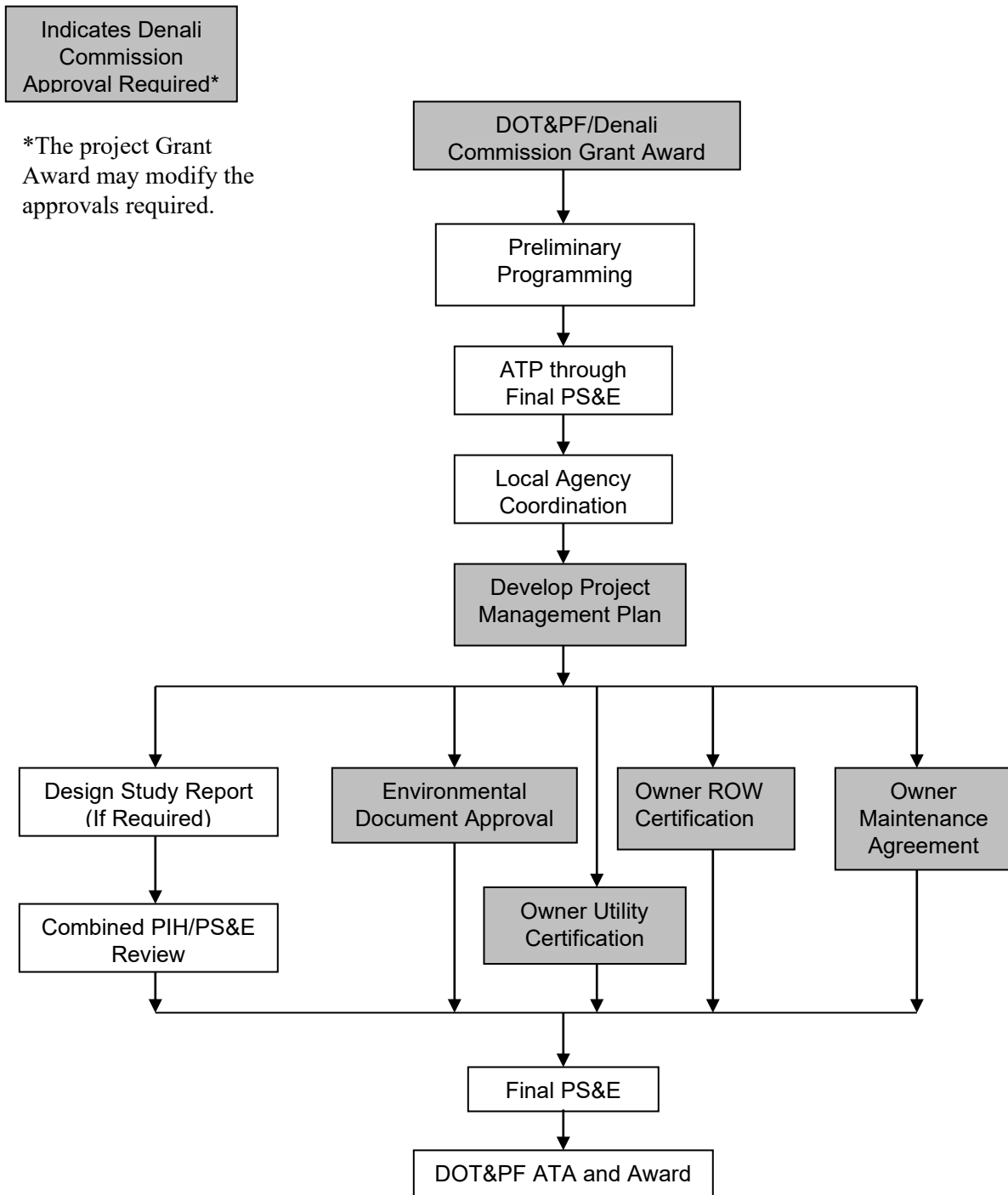


Figure 495-1
Denali Commission Project Flow Chart

497 Projects of Division Interest (PoDIs)

- 497.1. Introduction
- 497.2. Project Responsibilities

497.1. Introduction

This section highlights procedures specific to FHWA Projects of Division Interest (PoDIs). PoDI projects are:

- Major projects estimated to have a total project cost of more than \$500 million
- TIGER and BUILD Discretionary Grant Projects
- Projects selected by FHWA for Risk Based Stewardship and Oversight.
- Programmatic

The FHWA Alaska Division office selects projects designated as PoDI. Individual PoDI are common and are selected based upon an individual project risk assessment. Programmatic PoDI are uncommon – they reflect the risk-based need for FHWA to retain responsibilities for certain project approval actions on a program-wide basis.

Project risk areas that FHWA considers include:

1. Complexity
2. Cost
3. Schedule
4. Urgency
5. Environmental Considerations/Stakeholders
6. Funding
7. Project Administration
8. National/Regional Significance
9. Corporate Actions
10. Local Considerations

497.2. Project Responsibilities

The Stewardship and Oversight (S&O) Agreement identifies federal-aid highway project approval and related responsibilities which are subject to DOT&PF assumption. For each individual PoDI, the FHWA Alaska Division office prepares a project-specific Stewardship and Oversight (S&O) Plan. The S&O Plan describes the project risk areas that FHWA Division has identified, as well as FHWA's planned

risk response strategies. Risk response strategies usually include approvals and responsibilities otherwise assumed by the DOT&PF which are reverted back to the FHWA Alaska Division for the individual project. Because each individual S&O Plan is unique to the project, it is important to be familiar with the approvals and responsibilities which FHWA has retained.

When the FHWA Alaska Division office creates a new PoDI or updates an existing one, the new or updated S&O Plan is provided to DOT&PF. The project-specific S&O Plan will normally include the following information:

1. Project information
2. FHWA contact person
3. Primary PoDI type
4. Risk areas associated with the project (from FHWA's risk-based assessment)
5. Project elements that will be reviewed by FHWA in response to the risks
6. Activities to be conducted on the project – i.e. retained/reassumed approval action(s), inspections, etc.
7. A request for Federal-aid modification should be part of this process for projects that already have their initial ATP
8. Regions shall be notified when projects are selected from the STIP, and the Field Office Planner shall assure the S&O Agreement PoDI oversight will be included on the PDA
9. Once a project is selected as a PoDI, the oversight status shall remain the same until the project is closed.

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500. Public Involvement and Agency Coordination

500.1. Public Involvement Personnel

500.1. Public Involvement Personnel

500.1.1 *Headquarters (Reserved)*

500.1.2 *Regions*

Each regional director will assign public information functions, including preparation of news releases and news articles for publication and/or broadcast on the status of projects within the region.

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510. Planning

- 510.1. Public Involvement Program
- 510.2. Participants

510.1. Public Involvement Program

Include a public involvement program as necessary in planning studies, such as modal system plans, regional multimodal transportation plans, area multimodal plans (i.e. AMATS, FMATS, STIP), master plans and facility plans, project feasibility studies, and other transportation and public facility planning studies.

510.2. Participants

Public involvement in planning studies and in the ongoing planning process will include, where applicable, involvement of the following groups:

- All DOT&PF divisions
- Local, state, and federal governments, and elected officials
- Native corporations and associations
- User groups (airlines, trucking firms, etc.)
- Other interest groups (local Chambers of Commerce, Americans With Disabilities Act advisory groups, Associated General Contractors, Trucking Association, etc.)
- The public

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520. Project Development

- 520.1. Public Involvement Plan
- 520.2. Coordination With Agencies
- 520.3. Local Planning Authority
- 520.4. Highways
- 520.5. Airports
- 520.6. Harbors, Ports, and Buildings Projects

520.1. Public Involvement Plan

Prepare a Public Involvement Plan (PIP) for each project. Each region shall assign a responsible party to take the lead in preparing the Public Involvement Plan.

The plan shall address, at a minimum, all state and federal public involvement requirements and assign responsibility for implementation. Regional Design and Construction Standards and the regional environmental coordinator must concur on the Public Involvement Plan. Always consult Planning for information on publicly sensitive issues.

520.2. Coordination With Agencies

- a. During the project development phase, the degree of involvement of other agencies varies depending on the issues that must be addressed. This degree of involvement may include other agencies providing:
 - 1. Input to the information base for project development
 - 2. Conceptual reviews, including project purpose and need and practicable alternatives
 - 3. Participation in specific project studies
 - 4. Participation in project specific meetings/groups
 - 5. Participation in cooperative research
 - 6. Participation as cooperating agencies as defined by the Council on Environmental Quality (CEQ).
- b. Regardless of the degree of involvement, you normally contact agencies identified to have expertise or jurisdiction within an area affected by a project three times during the course of project development; i.e. during:

- Scoping
- Environmental document review
- Review for permits

These contact points include the Notice of Intent to Develop a Project, the formal agency review of a project, and the Notice of Availability of the Environmental Document. Invite some agencies to participate in public hearings, meetings, etc.

- c. The Environmental Section of each region will maintain a master list containing the addresses and contacts for all agencies.

The Environmental Section will prepare a project-specific list for each project.

Periodically review and update the project mailing list during project development.

520.3. Local Planning Authority

For guidance on local planning authority project involvement, see sections 430.2., 460.2. and 460.4. of this manual.

520.4. Highways

520.4.1 Federal-Aid Highway Projects

- 1. Depending on the impact classification of the project, specific public hearing requirements must be met (23 CFR 771.111[h]). You must hold a public hearing or offer the opportunity for a public hearing for projects:
 - Requiring significant amounts of right-of-way
 - Having an adverse affect on abutting property
 - Modifying legal access rights—either vehicular or pedestrian
 - Substantially changing the layout of connecting streets or nearby pedestrian facilities
 - Having an obvious, suspected, or known significant and/or controversial

environmental, social, or economic impact

For projects that have long-term design activities or where concepts change after the initial hearing, resulting in the reevaluation of project environmental documents, consider having a second public hearing, though not required, prior to completing the design study report.

All projects shall offer at least an opportunity for a public hearing during the environmental analysis process, unless the project meets Federal Highway Administration criteria for a categorical exclusion. (If an EA or EIS is required, early public involvement will be required.)

If preliminary impact studies show a project to be without significant impacts, the region may elect to hold or offer an opportunity for a public hearing later during project development.

2. For most projects meeting the FHWA criteria for a categorical exclusion, a hearing or opportunity for public hearing is usually not necessary, but consider public meetings/workshops.

For example, improvements that are normally noncontroversial, such as resurfacing, widening existing lanes, adding auxiliary lanes, replacing existing grade separation improvements, etc., do not require specific hearings, unless the project:

- Requires the acquisition of significant amounts of right-of-way that is in private ownership
- Would have an adverse effect on abutting real property
- Would substantially change the layout or function of connecting roads, streets, or adjacent pedestrian features of the facility being improved
- Has a significant social, economic, environmental or other effect, or for which FHWA determines that a public hearing is in the public interest

3. All formal public hearings must be preceded by one or more of the following activities to ensure maximum opportunity for public participation (many of these activities are good practice even if no formal public hearing is required):

- An informal public meeting or workshop targeting participation by businesses and residents affected by the proposed project
- Addressing directly and personally the concerns of local groups expressing a desire to discuss the project before the hearing
- Conducting face-to-face meetings with the people involved
- Corresponding with businesses and residents who may be affected by or on the mailing list for the project
- Making data available for public inspection at locations and times convenient to the public
- Providing announcements to radio and television and other available media (radio is a primary source of information for blind people) concerning the project
- Issuing news releases in conjunction with meetings when the information would be of public interest
- Scheduling public meetings within accessible facilities and at times that will enable maximum public participation
- Posting notices for meetings within the study area
- Publishing notices in the Alaska Administrative Journal

4. Place notices for public hearings in local or regional newspapers and, where possible, include the information necessary to satisfy the Public Notice requirements of state and federal permits, wetlands and flood plains, executive orders, and the Alaska Coastal Zone Management Program.

5. The Department may satisfy the requirements for a formal public hearing by:

- Holding a public hearing, or
- Publishing two notices of opportunity for public hearing and holding a hearing if any written requests are received that cannot be resolved by contact with the requester

Requirements for Notices of Opportunity for Public Hearing and Public Hearings are found in Section 570.

520.4.2 State-Funded Highway Projects

There is no state law requiring public hearings on a state-funded project. Keep in mind that urban or neighborhood residents may expect the same type of opportunity to comment on a state-funded project that they get on a federally-funded project. If the Department does not provide the opportunity, it may suffer loss of credibility and have difficulty with the next federal project. In some cases, it may be desirable to hold or offer an opportunity for a public hearing for these projects if:

1. Federal-aid funds could be used at a future date on the route
2. Significant controversy can be avoided by explaining the project through the public hearing format
3. Holding a public hearing would facilitate permit requirements for the project

520.5. Airports

520.5.1 Federal-Aid Airport Projects

In accordance with the Airport and Airways Improvement Act, the sponsoring agency for a proposed airport development project must offer the opportunity for public hearing if the project involves any of the following:

1. New airport location
2. New runway
3. Extension of existing runway

In general, hold the public hearing prior to formal submission of the sponsor's environmental report.

In all other situations, whether or not to hold a public hearing is discretionary. The Federal Aviation Administration has provided guidelines for

determining whether hearings should be held based on:

1. The magnitude of the proposal in terms of environmental impacts
2. The degree of interest in the proposal as evidenced by requests for a hearing from residents and public officials
3. The complexity of issues and likelihood that relevant information will be presented at the hearing
4. The extent to which effective public involvement has already been achieved through means other than public hearings

The FAA requires that the sponsor consult with air carriers and fixed base operators regarding the proposed project and should submit documentation of the consultation.

520.5.2 Community Approval

The FAA requires that when a new airport is constructed in a non-metropolitan area, the sponsor must provide a certification that the community supports the location of the proposed airport.

520.5.3 State-Funded Airport Projects

Same as for Federal-Aid Airport Projects.

520.6. Harbors, Ports, and Buildings Projects

Local governments shall review all harbors, ports, and building projects as described in the Local Planning Authority, Section 520.3.

Local government approval or permit processes normally fulfill all the requirements for public hearings. Keep in mind that urban or neighborhood residents may expect the same opportunity to provide input on a state-funded project that they get on a federally funded project. If that opportunity is not given, the Department could suffer a loss of credibility and difficulties in future projects.

Depending on the nature and sensitivity of the project, also consider public hearings, a notice of opportunity for a public hearing, or a public meeting.

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530. Construction

530.1. General

530.1. General

Note in the project files questions and coordination with the public and other agencies that come up during construction.

Construction staff will handle controversial construction issues, such as traffic interruptions and noise complaints, with assistance from other regional staff when requested.

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540. Maintenance and Operation

540.1. General

540.1. General

When a project is complete and open to public use, the public may again submit questions and comments. Regional Maintenance and Operations staff may keep a record of the issues, and call on other sections to help answer questions and evaluate comments.

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550. Public Involvement Activities

- 550.1. Public Meetings (Workshops)
550.2. Notice of Opportunity for Public Hearing

550.1. Public Meetings (Workshops)

A meeting or workshop is an informal exchange of information that allows for informal procedures. Use meetings or workshops throughout the public involvement process where appropriate, and you may record or transcribe them. Include a summary of events at the meeting or workshop in the project file.

To acquire resident input that is timely and representative, the Department may use interviews and questionnaires. Surveys provide comprehensive information on general attitudes and preferences related to the project development process. This is an effective way of finding characteristics such as:

- Mobility
- Income level
- Length of residence in the area
- Dependence on the neighborhood for making project-relative decisions, especially among marginally different alternatives

550.2. Notice of Opportunity for Public Hearing

- a. Explain the procedure for requesting a public hearing in the notice and publish it in local or regional newspapers, and in the Alaska Administrative Journal.
- b. A request for a public hearing cannot be made more than 21 days after the date of publication of the first notice, and not more than 14 days after the date of publication of the second notice. Advertise an opportunity for a public hearing on aviation airport projects for at least 30 days.

State in the notice of opportunity for a public hearing that the hearing is “for the purpose of considering the economic, social, and environmental effects of the project and its consistency with the goals and objectives of such urban planning as has been carried out by the community.”

- c. Include in each notice a description of the proposed project and a map or other graphic, contact person and phone number, and deadline for the request for a public hearing. Include in the notice the location of the following information:
1. Drawings, maps, plans, reports, or other project information
 2. Environmental documents prepared or being prepared for the project
 3. Written views from other agencies, private groups, and individuals
- d. All of the information in c. above must be available for copying and/or public inspection.
- e. Furnish a copy of the notice of opportunity for public hearing to the responsible federal agency, and to the commissioner's office. If the Department receives no requests in response to a notice within the time specified, the Department will document this.
- f. Provide the opportunity for a public hearing when either the Department or the federal funding agency is in doubt about whether a hearing is required.

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560. Changes in Scope/Public Hearing Opportunity

560.1. General

560.1. General

Provide the opportunity for another public hearing when proposed changes in location or design would have substantially different social, economic, or environmental effects.

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570. Public Hearings

- 570.1. Definition
- 570.2. Notice of Public Hearing
- 570.3. Conduct of Public Hearings
- 570.4. Post-Hearing Public Involvement
- 570.5. ADA Requirements

570.1. Definition

A public hearing is a formal meeting required by specific regulations requiring complete, verbatim transcripts.

570.2. Notice of Public Hearing

- a. Publish a Notice of Public Hearing at least twice in at least one local or regional newspaper. The notices should also be published in any newspapers having substantial local readership, such as foreign language newspapers and community newspapers. Publish the first notice 30 to 40 days before the hearing, and publish the second notice five to 12 days before the hearing. The timing of additional notices is optional. Also publish the notices in the Alaska Administrative Journal.
- b. In addition to publishing a formal Notice of Public Hearing, mail copies to appropriate agencies, local public officials, and public advisory groups.

Attempt to contact owners of affected property who may not realize a hearing is scheduled, especially absentee landowners. Consider the use of tax rolls, where they are available, to notify these people by letter.

Establish and maintain a list of federal and state agencies, local public officials, public advisory groups or agencies, civic associations, or other community groups who may request notices of area projects.
- c. Include in each Notice of Public Hearing the same background information required under Notice of Opportunity for Public Hearings and the procedure for submitting written comments.
- d. Include in the Notice for a Public Hearing the project's purpose and need, alternatives, and tentative schedules for right-of-way acquisition and construction.

- e. Indicate in the notice that relocation assistance programs will be discussed when applicable.
- f. Furnish a copy of the Notice of Public Hearing to the federal funding agency, the commissioner's office, and the regional Design and Construction Standards director upon first publication.
- g. Include in the notices other issues as required by local, state, and federal regulations (*Note:* Mandatory ADA-related text is available from the Department's ADA coordinator).

570.3. Conduct of Public Hearings

Hearings are conducted to exchange information and help make decisions. Concerns raised during the hearing process are addressed before final decisions are made. Activities will include:

- a. Obtaining an attendance list or registration card for future reference
- b. Establishing time limits for comments to allow equitable public participation
- c. Providing pre-addressed envelopes for submitting written comments
- d. Devising appropriate non-technical graphics to aid understanding. This may include:
 - 1. Models of the proposed action to be displayed at hearings
 - 2. Mosaics or maps presented through a series of aerial photos depicting detail of a specific area
 - 3. Slides or video tapes
 - 4. Other appropriate methods
- e. Providing appropriate auxiliary aids and services (see Section 570.5.)
- f. Holding public hearings in accessible facilities and at a time generally convenient for those wishing to attend
- g. Providing for submission of written statements and other exhibits in place of, or in addition to, oral statements at a public hearing. Describe the procedure for the submissions at the public hearing. The final date for submitting statements or exhibits shall be at least 10 days after the public

hearing. All statements will become part of the project records.

h. When the project is a federal-aid highway project:

1. Make suitable arrangement for responsible highway officials to conduct public hearings and respond to questions.
2. Describe the state-federal relationship in the federal-aid highway program with an appropriate brochure, pamphlet, statement, or by other means.

In addition, use the topical information comprising the Design Study Report (see Section 450.3.) as a basis for discussing the details of the project (*Note:* The Design Study Report may not be available when EA or EIS hearings are held).

3. Arrange for local public officials to conduct a required public hearing. The state shall be appropriately represented at a public hearing and is responsible for meeting other requirements.
4. Compile the public hearing record along with a summary of testimony, an analysis of comments received, and any recommendation for the engineering manager, who distributes the information.

When the state or the FHWA receive location or design approval for federal-aid highway projects, they will notify the public of the availability of the environmental document or Design Study Report by placing an advertisement in a local paper, or by other methods.

570.4. Post-Hearing Public Involvement

Regional staff will be available to answer public questions on post-hearing activities, schedules, and decisions.

Prior to and during right-of-way acquisition and final plan preparation, the Department responds to inquiries on the project's status. Information must also be continuously available to public officials, civic organizations, and other interested groups.

Upon the award of contract for construction of the project, the Department may arrange for notice of award in the Alaska Administrative Journal or local

media. During and after construction, staff assists in answering inquiries, issuing news releases, and handling other project-related publicity.

570.5. ADA Requirements

The *Americans with Disabilities Act*, Public Law 101-366, requires that:

- a. A public entity takes all appropriate steps to ensure that communication with applicants, participants, and members of the public with disabilities is as effective as communication with others.
- b. A public entity furnishes appropriate auxiliary aids and services:
 - Necessary to provide a person with a disability an equal opportunity to participate in, and enjoy the benefits of, a service, program, or activity conducted by a public entity
 - With primary consideration given to the requests of the person with disabilities
- c. Auxiliary aids and services might consist of the following: qualified interpreters, transcription services, listening assistance systems, video-text displays, or other effective means of delivering aural material, *and* qualified readers, taped texts, audio recordings, Braille or large-print materials, or other effective visual aids.

580. Separate Activities

580.1. General

580.1. General

The following is a list of activities that require notices for publication. Combine notices when appropriate.

1. Environmental Notice of Intent (published in the Federal Register–EIS projects only)
2. Notice of Floodplain Involvement
3. Notice of Wetlands Involvement
4. Notice of Availability of the Environmental Document
5. Record of Decision (EIS projects only)

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10. Highway Capacity

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1000. Design

- 1000.1. General
- 1000.2. HCM Supplement
- 1000.3. Waivers from Design Criteria

1000.1. General

The Alaska Department of Transportation and Public Facilities (DOT&PF) adopted the Transportation Research Board Special Report 209, Highway Capacity, 2010, (HCM) as policy. The HCM is a tool for calculating capacity.

Target Level of Service (LOS) goals are not established in the HCM, LOS targets for 3R and new construction are established on a project-by-project basis using the 2011 AASHTO Green Book, Section 2.4.5. The result is the opportunities for transit and non-motorized LOS will be no less than for mainline or side street vehicular LOS. Traffic control devices to improve LOS are subject to selection criteria in the Alaska Traffic Manual.

This chapter supplements the HCM.

Where discrepancies occur between the HCM, this manual, and the 2011 AASHTO *A Policy on Geometric Design of Highways and Streets* (AASHTO Green Book), a listed part shall take precedence over those listed below it:

- This manual
- The AASHTO Green Book
- The HCM

1000.2. HCM Supplement

Chapters 1-15: No changes.

Chapters 16-23: Transit and non-motorized LOS design analysis is not required.

1000.3. Waivers from Design Criteria

Develop waivers to the design criteria presented in this chapter in accordance with Section 1100.3 of this manual.

No waiver is required to use above-minimum stated design standards.

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1100. Introduction

- 1100.1. Establishment of Design Criteria
- 1100.2. Project Design Criteria
- 1100.3. Design Exceptions and Design Waivers
- 1100.4. Specific Project Criteria

1100.1. Establishment of Design Criteria

Alaska statutes require the Department to establish design standards, and the Federal Highway Administration (FHWA) encourages the development of design standards by states in the interest of uniformity. AS 19.10.160(a) states:

The Department shall prepare and adopt uniform standard plans and specifications for the establishment, construction, and maintenance of highways in the state. The Department may amend the plans and specifications as it considers advisable. The standards must conform as closely as practicable to those adopted by the American Association of State Highway and Transportation Officials.

The FHWA lists standards, specifications, policies, guides, and references that are approved for use on federal-aid projects in the *Code of Federal Regulations, Title 23 Highways, Part 625 – Design Standards for Highways*.

The *Alaska Highway Preconstruction Manual* (HPCM) establishes or references standards for design of highways by the Department. This manual interprets, amends, and supplements AASHTO standards.

Standards, specifications, policies, guides, and references are routinely revised or replaced with newer versions. The Department does not necessarily and immediately adopt these newer versions. Table 1100-1 lists the version dates formally adopted.

1100.2. Project Design Criteria

1100.2.1. General

Use design criteria contained or referenced in this manual. Criteria in this manual takes precedence if there is a conflict between criteria provided in this manual and criteria in referenced publications. When

selecting design criteria, use expertise and judgment to achieve designs that fit into the natural and human environments while considering preservation and enhancement of scenic, aesthetic, historic, community, and environmental resources; while also improving or maintaining safety, efficiency, mobility, operations, and infrastructure conditions. Consider economics, but do not use it as the sole determination for design criteria selection.

Design criteria varies according to the type of project, e.g. New Construction, Reconstruction, 3R, or Pavement Preservation project. The type of project is identified in the planning and scoping of the project. Generally, the type of project is reflected in the project title, scope, description, electronic Project Information Document, Project Development Authorization, and Design Designation. Any questions or inconsistencies regarding the type of project should be resolved with planning and project control as this can affect the applicable design criteria.

In some situations, it may be necessary to use values less than the minimums, or greater than the maximums, provided due to constraints beyond the engineer's control. In such cases, follow the procedures set forth in Section 1100.3. – Design Exceptions and Design Waivers.

Document project design criteria and any exceptions using Figure 1100-2, Project Criteria Summary, for New Construction / Reconstruction and 3R projects.

Use U.S. customary units of measure for all designs.

1100.2.2. Application of Design Criteria

Designers need to recognize that every project is unique and that flexibility in the design standards exists. This flexibility is permitted to allow independent designs tailored to a particular project. Minimum values are given by the lower value in a given range of values. Larger values within a given range can be used when the social, economic, and environmental impacts are not critical.

The Department follows a context sensitive solutions approach in designing projects. This approach encourages designers to take advantage of the flexibility in design standards to produce designs that fit their natural and human environments while functioning efficiently and operating safely.

Designers are directed to the following publications for a further, more detailed, discussion of design flexibility:

- Forward to the AASHTO “A Policy on Geometric Design of Highways and Streets”
- FHWA’s “Flexibility in Highway Design”
- AASHTO’s “A Guide for Achieving Flexibility in Highway Design.”

1100.2.3. New Construction and Reconstruction Project Design Criteria

Design new construction and reconstruction projects in accordance with the criteria provided in Figure 1100-2(a). For any criteria not provided in Figure 1100-2(a), refer to the Green Book version noted in Table 1100-1.

1100.2.4. 3R Project Design Criteria

The design criteria for 3R projects are documented using Figure 1100-2(b). Waivers or design exceptions of 3R design criteria are required only when the results or determinations of the 3R design procedures provided in Section 1160 require a feature improvement and the proposed project does not include that improvement.

1100.2.5. HSIP Project Design Criteria

The design criteria for Highway Safety Improvement Program (HSIP) projects are different from other projects. Because HSIP projects are intended to be cost-effective solutions to specific safety problems, project scope is limited to that which was HSIP-approved by the FHWA. In general, it is not necessary to improve features that do not meet current standards unless the improvements contribute to solving the safety problem targeted by the project. However, it is necessary to make improvements that are *legally* required, such as those covered by the Americans with Disabilities Act, on all facilities that are physically altered by an HSIP project.

In some cases, it may be appropriate to expand the scope of an HSIP project beyond that approved by FHWA. Submit proposed scope change to the regional traffic and safety engineer (RTSE) for consideration. If the additional work qualifies under the HSIP process, the RTSE submits the recommended changes to the state traffic engineer for scope modification and HSIP funding change

approvals. If the additional work does not qualify under the HSIP process, the RTSE submits the recommended scope change to the state traffic engineer for scope modification approval prior to seeking funding for the work from other sources.

1100.2.6. Pavement Preservation Project Design Considerations

Design considerations for Pavement Preservation projects are found in Section 1140.

1100.3. Design Exceptions and Design Waivers

1100.3.1. General

A design exception or waiver may be granted for an individual project element or a segment of the project where design criteria does not satisfy applicable design standards. 23 CFR 625.3(f) provides that design exceptions may be given on a project-specific basis to designs which do not conform to minimum design criteria. The Americans with Disabilities Act legally imposes design requirements that cannot be waived.

Justification for an exception or waiver may include:

- High cost of construction
- Negative environmental impacts
- Difficulty or cost of obtaining right-of-way
- Sensitivity to context or community values

The careful application of flexibility in design standards and policies, appropriate use of design exceptions and waivers, and coordination with transportation enhancement activities can result in projects that provide safe and efficient transportation facilities and are sensitive and responsive to scenic and historical resources.

Two types of roadway design criteria are provided in Figure 1100-2: controlling design criteria and non-controlling design criteria. Use Section 1100.3.2 - Design Exceptions - for controlling design criteria and Section 1100.3.3 Design Waivers for non-controlling design criteria.

Design exceptions and waivers are not required for Pavement Preservation projects due to their scope, except for vertical clearance.

1100.3.2. Design Exceptions

Design exceptions apply only to controlling design criteria. FHWA identifies controlling design criteria as those having substantial importance to the operational and safety performance of a highway such that special attention should be paid to them in design decisions.

The 10 controlling design criteria for high-speed NHS roadways with a design speed greater than or equal to 50 mph are:

1. Design speed
2. Lane width
3. Shoulder width
4. Horizontal curve radius
5. Superelevation
6. Maximum grade
7. Stopping sight distance (SSD)
8. Cross slope
9. Vertical clearance
10. Design loading structural capacity

The two controlling design criteria for low-speed NHS roadways with a design speed less than 50 mph are:

1. Design speed
2. Design loading structural capacity

Design exceptions to these controlling criteria can, for the most part, be easily identified and defined.

Design speed is a design control rather than a specific design element. It is used to determine the range of design values for many of the individual design elements such as stopping sight distance and horizontal curvature. Exceptions for design speeds are rare and can often be handled by exceptions for specific design elements rather than the design control (design speed).

Justification, Evaluation, and Approval of Design Exceptions

When design standards for controlling design criteria are not met, a design exception is required. If no minimum or maximum design standards are provided for the specific controlling design criteria, an exception is not required.

Design exceptions need to document all of the following:

- Specific design criteria not met
- Existing roadway characteristics
- Alternatives considered
- Comparison of the safety and operational performance of the roadway
- Right-of-way
- Environmental impacts
- Cost
- Comparison of usability of all modes of transportation
- Proposed mitigation measures
- Compatibility with adjacent sections of roadway

When a design exception involves design speed, additional documentation is required:

- Length of section with reduced design speed compared to the overall length of the project
- Measures used in transitions to adjacent section with higher or lower design or operating speeds

Refer to the *Alaska Bridges and Structures Manual* for design exceptions involving design loading structural capacity.

Submit the design exception request, including the proposed preliminary design, cost estimates, justification, and evaluation to the regional preconstruction engineer. The regional preconstruction engineer will either approve the design exception request in writing or reject it. Furnish an informational copy of all approved design exceptions to FHWA. FHWA must concur with design exception approvals on PoDI projects.

Discuss all design exceptions in the Design Study Report (DSR) and include approvals in the DSR appendix.

For further information regarding design exceptions, see FHWA publication *Mitigation Strategies for Design Exceptions*, July 2007 (FHWA-SA-07-011):

http://safety.fhwa.dot.gov/geometric/pubs/mitigationstrategies/fhwa_sa_07011.pdf with accompanying memo:

1100.3.3. Design Waivers

A design waiver is a documented decision to design a highway element or a segment(s) of a highway project to design criteria that do not meet standards as established for that highway or project. The design criteria, for this definition, are all design criteria not considered controlling design criteria as previously defined in Section 1100.3.2.

Submit the design waiver request, including the proposed preliminary design, cost estimates, justification, and evaluation to the regional preconstruction engineer. The regional preconstruction engineer will either approve the design waiver request in writing or reject it.

Discuss all design waivers in the DSR and include approvals in the DSR appendix.

1100.4. Specific Project Criteria

The engineering manager is provided source program documents that describe the proposed design project which are used to develop the Design Designation.

1100.4.1. Design Designation

The Design Designation requires written approval by the regional preconstruction engineer. The Design Designation contains the data which is the basis for establishing the design criteria. The Design Designation contains the following:

- State route number
- Route name
- Project limits
- State project number
- Federal project number
- General project description
- Project type
- Design functional classification
- Project design life
- Traffic projections
- Traffic mix
- Design vehicle(s) description
- Design vehicle loading
- Equivalent single-axle loads (ESALs)
- Level of service (urban)
- Design Speed
- Terrain Type

An example Design Designation form is shown in Figure 1100-1.

Functional Classification

The design designation establishes the appropriate functional classification for design.

Chapter 1 of the Green Book provides definitions and descriptions of functional systems for rural and urban areas. The portion of Chapter 1, titled Functional Classification as a Design Type, provides guidance for establishing appropriate functional classification for design.

Design Life

The engineering manager establishes the project design life.

AS 19.10.160 requires use of the minimum design life listed in the following table for new construction and reconstruction projects (Pavement Preservation and 3R projects are excluded) within federally recognized metropolitan planning areas:

Contract Amount ¹	Min. Design Life ²
0 - \$5 Million	10 Years
> \$5 Million	20 Years

¹The Contract Amount is the estimated construction contract amount at Environmental Document approval.

²The beginning of the design life period is the calendar year following the estimated calendar year of construction final acceptance.

For reconstruction and new construction highway projects outside recognized metropolitan planning areas, use the above table as guidance.

The design life for all projects, including 3R projects, should at least equal the expected service life of the improvements.

For Pavement Preservation projects, the design life equals the pavement design life as specified in Section 1140.

1100.4.2. Project Design Criteria

Project design criteria are developed from the Design Designation and the project development process. The Project design criteria are integral to the DSR and the regional preconstruction engineer must approve them. Summarize the Project Design Criteria in a form similar to Figure 1100-2.

DESIGN DESIGNATION

State Route Number: _____ Route Name: _____

Project Limits: _____

State Project Number: _____ Federal Aid Number: _____

Project Description: _____

Design Functional Classification: ☐ Freeway ☐ Collector, type _____ ☐ Rural Local Rd.
☐ Rural Arterial ☐ Local Recreational Rd. ☐ Urban Local St.
☐ Urban Arterial ☐ Local Resource Recovery Rd. ☐ Local Service Rd.
☐ Other _____

Project Type: ☐ New Construction - Reconstruction ☐ 3R
☐ Pavement Preservation (PM, 1R, 2R) ☐ HSIP

Project Design Life (years): 5 ☐ 10 ☐ 20 ☐ 25 ☐ 30 ☐ Other _____

Traffic Projections:

	Current Year	Construction Year	Mid - Life Year	Design Year
	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2-Way AADT*	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
2-Way DHV	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Peak Hour Factor	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Directional Distribution	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Percent Recreational Vehicles	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Percent Commercial Trucks	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Compound Growth Rate	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
ESALs	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pedestrians (Number/Day)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Bicyclists (Number/Day)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

* Request Transportation Data on-line at: <http://dotsobdeviis1.dot.soa.alaska.gov/>

Design Vehicle: _____

Level of Service (Urban Only): _____

Design Speed : _____

Terrain : ☐ Level ☐ Rolling ☐ Mountainous

Attach intersection diagrams to this document, when appropriate

APPROVED _____ DATE _____

Preconstruction Engineer

Figure 1100-1
Design Designation Form

DESIGN CRITERIA CHECKLIST

Project Name Page of
 State Project No. Fed. Project No.
 Functional Classification: Terrain:
 Present Year (&ADT): Design Year (&ADT):
 DHV (%): Directional Split (%): Percent Trucks:
 Pavement Design Year: Pavement Design ESAL:
 Design Turning Vehicle: Design Accommodated Vehicle:
 Project Type: Choose an item.

FEDERAL 10 CONTROLLING DESIGN CRITERIA		SOURCE	STANDARD	AS DESIGNED	EXCEPTION ¹
1. Design Speed ¹			<input type="text"/> mph	<input type="text"/> mph	Choose an item.
2a. Travel Lane Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item.
2b. Auxiliary Lane Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item.
3a. Outside Shoulder Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item.
3b. Inside Shoulder Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item.
3c. Auxiliary Lane Shoulder Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item.
4. Horizontal Curvature Radius			<input type="text"/> ft	<input type="text"/> ft	Choose an item.
5. Superelevation Rate*, e(max)			<input type="text"/> %	<input type="text"/> %	Choose an item.
6. Stopping Sight Distance (SSD)*			<input type="text"/> ft	<input type="text"/> ft	Choose an item.
7. Grade	Min.		<input type="text"/> %	<input type="text"/> %	Choose an item.
	Max.		<input type="text"/> %	<input type="text"/> %	Choose an item.
8. Cross Slope			<input type="text"/> %	<input type="text"/> %	Choose an item.
9. Vertical Clearance*			<input type="text"/> ft	<input type="text"/> ft	Choose an item.
10. Design Loading Structural Capacity ¹			<input type="text"/>	<input type="text"/>	Choose an item.

* Attach calculations.

1. On low speed roadways (<50 mph) on the NHS only Design Speed and Design Loading Structural Capacity require a Design Exception; all other criteria become a Design Waiver. For projects off the NHS, all criteria become a Design Waiver.

Figure 1100-2(a)
Project Design Criteria
For New Construction and Reconstruction Projects

OTHER DESIGN CRITERIA		SOURCE	STANDARD	AS DESIGNED	WAIVER
Superelevation Transition*, Δ			<input type="text"/> %	<input type="text"/> %	Choose an item
Bridge Clear-Roadway Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Vertical Curvature, Min.	K(crest)		<input type="text"/>	<input type="text"/>	Choose an item
	K(sag)		<input type="text"/>	<input type="text"/>	Choose an item
Lateral Offset to Obstruction			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Surfacing Material			<input type="text"/>	<input type="text"/>	Choose an item
Clear Zone Slope			<input type="text"/>	<input type="text"/>	Choose an item
Clear Zone Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Bicycle Lane Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Sidewalk Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Intersection Sight Distance, Left Turn*			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Right Turn*			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Crossing*			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Passing Sight Distance			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Degree of Access Control			<input type="text"/>	<input type="text"/>	Choose an item
Median Treatment			<input type="text"/>	<input type="text"/>	Choose an item
Median Width			<input type="text"/> ft	<input type="text"/> ft	Choose an item
Illumination			<input type="text"/>	<input type="text"/>	Choose an item
Curb Type			<input type="text"/>	<input type="text"/>	Choose an item

* Attach calculations.

Notes:

Proposed by: _____ Date: _____
 Designer Signature (Consultant or Staff)

Recommended by: _____ Date: _____
 Engineering Manager Signature

Accepted by: _____ Date: _____
 Regional Preconstruction Engineer Signature

Figure 1100-2(a)
Project Design Criteria
For New Construction and Reconstruction Projects

PROJECT DESIGN CRITERIA - 3R PROJECTS

Project Name:				
Project Number:				
Functional Classification:				
Design Year:		Present ADT:		
Design Year ADT:		Mid Design Period ADT:		
DHV:		Directional Split:		
Percent Trucks:		Equivalent Single Axle Loading:		
Pavement Design Year:		Design Vehicle:		
Terrain:		Number of Roadways:		
Design Speed:	<input type="checkbox"/> As-Built <input type="checkbox"/> Posted			
85th Percentile Speed:	<input type="checkbox"/> Speed Study <input type="checkbox"/> Project Drive-thru <input type="checkbox"/> Derived from existing geometrics			
Existing Lane Width				
Existing Shoulder Width				
Existing Lane + Shoulder Width				
Lane + Shldr Width for New Const.				
Exist. Superelevation Rate:				
Min. Radius for New Const.	(Evaluate Curves tighter than this)			
Min K-Value for Vert. Curves (new)	Sag:		Crest:	
Stopping Sight Distance:				
Passing Sight Distance:				
Exist. Bridge No(s):				
Exist. Bridge Width(s):				
Surface Treatment:	T/W:		Shoulders:	
Degree of Access Control:				
Median Treatment:				
Existing Illumination:				
Proposed Illumination:				
Existing Bicycle Accomodation:				
Proposed Bicycle Accomodation:				
Existing Pedestrian Provisions:				
Proposed Pedestrian Provision s:				
Misc. Criteria:				

The shaded area represents features requiring 3R evaluation per Section 1160.

Proposed - Designer/Consultant: _____

Date: _____

Accepted - Engineering Manager: _____

Date: _____

Approved - Preconstruction Engineer: _____

Date: _____

Figure 1100-2(b)
Project Design Criteria
For 3(R) Projects

**Table 1100-1
Adopted Design Standards**

Acronym	Design Publication	Date
ABSM	Alaska Bridges and Structures Manual	See Note 1
ADA ²	U.S. Department of Transportation ADA Standards for Transportation Facilities, and	2006
	U.S. Department of Justice ADA Standards for Accessible Design	2010
AGTF ³	AASHTO Guide for Transit Facilities	2014
AHDM	Alaska Highway Drainage Manual	2006
ASP	Alaska Standard Plans Manual	See Note 4
ATM	Alaska Traffic Manual	See Note 5
GB	AASHTO A Policy on Geometric Design of Highways and Streets (Green Book) – 7th Edition	2018
GDBF	AASHTO Guide for the Development of Bicycle Facilities	2012
GDLVR	AASHTO Guidelines for Design of Low-Volume Roads	2019
HCM	Highway Capacity Manual	2010
RDG	AASHTO Roadside Design Guide	2011
RPRL	IES Recommended Practice for Roadway Lighting (RP-8-14)	2014
SSSS ⁶	AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals	2013
	AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals	2015

Note 1: Use latest edition with interims effective at time of design approval

Note 2: In most cases, the 2006 US DOT ADA Standards for Transportation Facilities applies. See ADA design policy below for when the 2010 US DOJ ADA Standards apply

Note 3: Use existing transit operator guidance, if available.

Note 4: Use the latest edition at the time of advertising

Note 5: Use the latest edition at the time of design approval

Note 6: Either standard may be used. Use version indicated with interim revisions effective at the time of design approval.

ADA Design Policy:

Transportation facilities and their appurtenances constructed in public rights-of-way are required to accommodate those with disabilities. These disabilities include, but are not limited to: limited mobility, impaired vision, and impaired hearing.

Design all new public transportation facilities, including bus stops and stations, and rail stations, to meet the *Americans with Disabilities Act (ADA) Standards for Transportation Facilities* adopted by the U.S. Department of Transportation (DOT) (2006). Other types of facilities covered by the ADA are subject to the *2010 ADA Standards for Accessible Design* adopted by the U.S. Department of Justice (DOJ). 49 CFR 37, Appendix D, Subpart B, Section 37.21 states, “Both sets of rules apply; one does not override the other.

The DOT rules apply only to the entity’s transportation facilities, vehicles, or services; the DOJ rules may cover the entity’s activities more broadly. For example, if a public entity operates a transit system and a zoo, DOT’s coverage would stop at the transit system’s edge, while DOJ’s rule would cover the zoo. DOT and DOJ have coordinated their rules, and the rules have been drafted to be consistent with one another. Should, in the context of some future situation, there be an apparent inconsistency between the two rules, the DOT rules would control within the sphere of transportation services, facilities and vehicles.”

The following figure contains the initial design references for project type and design particular. The initial design reference may direct the designer to succeeding references.

Design Particular	New Construction and Reconstruction			3R
	Urban	Rural	Very Low Volume Local Roads	All
1. Design Speed*	GB	GB	N/A	HPCM Sect. 1160
2. Lane Width	GB	GB	N/A	HPCM Sect. 1160
3. Shoulder Width	GB	GB	N/A	HPCM Sect. 1160
4. Horizontal Curve Radius	GB	GB	N/A	HPCM Sect. 1160
5. Superelevation Rate	GB	GB	N/A	HPCM Sect. 1160
6. Stopping Sight Distance (SSD)	GB	GB	N/A	HPCM Sect. 1160
7. Maximum Grade	GB	GB	N/A	HPCM Sect. 1160
8. Cross Slope	GB	GB	N/A	HPCM Sect. 1160
9. Vertical Clearance	GB	GB	N/A	HPCM Sect. 1160
10. Design Loading Struct. Capacity*	GB	GB	N/A	HPCM Sect. 1160
<i>Note: All 10 apply to high-speed facilities. Those with an * apply to low-speed facilities.</i>				

Figure 1100-3(a)
Highway Design Controlling Criteria Summary
For Roads on the NHS

Design Particular	New Construction and Reconstruction			3R
	Urban	Rural	Very Low Volume Local Roads	All
Alleys	GB	Not Applicable	Not Applicable	HPCM Sect. 1160
Bicycle Facilities	HPCM Ch. 12	HPCM Ch. 12	HPCM Ch. 12	HPCM Sect. 1160
Bridge Width	GB	GB	GDLVR	HPCM Sect. 1160
Bus Turnouts	AGTF ¹	AGTF ¹	AGTF ¹	HPCM Sect. 1160
Capacity	HPCM Ch. 10	HPCM Ch. 10	HPCM Ch. 10	HPCM Sect. 1160
Clear Zone	GB ²	HPCM Sect. 1130	GDLVR	HPCM Sect. 1160
Climbing Lanes	GB	GB	GB	HPCM Sect. 1160
Cross Slope	HPCM Sect. 1130	HPCM Sect. 1130	GDLVR	HPCM Sect. 1130
Cul De Sacs	GB	GB	GB	HPCM Sect. 1160
Curbs	ASP	ASP	ASP	HPCM Sect. 1160
Design Loading Structural Capacity	ALBDS	ALBDS	ALBDS	HPCM Sect. 1160
Design Speed	GB	GB	GDLVR	HPCM Sect. 1160
Design Vehicle (Turning) ³	GB	GB	GB	HPCM Sect. 1160
Drainage	AHDM	AHDM	AHDM	HPCM Sect. 1120.6
Driveways	HPCM Sect. 1190	HPCM Sect. 1190	HPCM Sect. 1190	HPCM Sect. 1160
Escape Ramps	GB	GB	GB	HPCM Sect. 1160
Foreslopes	HPCM Sect. 1130	HPCM Sect. 1130	GDLVR	HPCM Sect. 1160
Freeways	GB	GB	N/A	HPCM Sect. 1160
Grade	HPCM Sect. 1120	HPCM Sect. 1120	HPCM Sect. 1120	HPCM Sect. 1160
Horizontal & Vert. Curvature	HPCM Sect. 1120	HPCM Sect. 1120	GDLVR	HPCM Sect. 1160
Interchanges	GB	GB	N/A	HPCM Sect. 1160
Intersection Design	GB	GB	GDLVR	HPCM Sect. 1160
Lane & Shoulder Width (ADT<2000)	GB	HPCM Sect. 1130	GDLVR	HPCM Sect. 1160
Lane & Shoulder Width (ADT>2000)	GB	GB	N/A	HPCM Sect. 1160
Lane & Shoulder Width (Interstate)	HPCM Sect. 1120	HPCM Sect. 1120	N/A	HPCM Sect. 1160
Level of Service	GB Table 2-5 ⁴	GB Table 2-5 ⁴	GB Table 2-5 ⁴	HPCM Sect. 1160
Lighting	RPRL	RPRL	RPRL	HPCM Sect. 1160
Medians	HPCM Sect. 1150	HPCM Sect. 1150	HPCM - Sec. 1150	HPCM Sect. 1160
On-Street Parking	GB	GB	GB	HPCM Sect. 1160
Pavement	HPCM Sect. 1180	HPCM Sect. 1180	HPCM Sect. 1180	HPCM Sect. 1160

Figure 1100-3(b)
Highway Design Criteria Summary
(Page 1 of 2)

Design Particular	New Construction and Reconstruction			3R
	Urban	Rural	Very Low Volume Local Roads	All
Rail Road Grade Crossing	GB	GB	GB	HPCM Sect. 1160
Sidewalks	GB	GB	GB	HPCM Sect. 1160
Stopping Sight Distance (SSD)	HPCM Sect. 1120	HPCM Sect. 1120	GDLVR	HPCM Sect. 1160
Structural Supports for Signs, Luminaires and Traffic Signals	SSSS	SSSS	SSSS	SSSS
Superelevation	HPCM Sect. 1130	HPCM Sect. 1130	GDLVR	HPCM Sect. 1160
Super Transitions	HPCM Sect. 1130	HPCM Sect. 1130	GDLVR	HPCM Sect. 1160
Traffic Control Devices	ATM	ATM	ATM	HPCM Sect. 1160
Traffic Barriers	HPCM Sect. 1130	HPCM Sect. 1130	GDLVR	HPCM Sect. 1160
Turn Lanes	HPCM Sec. 1150	GB	GB	HPCM Sect. 1160
Turnouts	HPCM Sec. 1120.6	HPCM Sec. 1120.6	HPCM Sec. 1120.6	HPCM Sect. 1160
Vertical Clearance	HPCM Sect. 1130	HPCM Sect. 1130	HPCM Sect. 1130	HPCM Sect. 1160

- 1 Consult with the local transit authority to determine local area specific requirements. Verify that GB minimums are being met.
- 2 Follow the requirements of HPCM Section 1130 for uncurbed urban sections.
- 3 Reference 17 AAC 25.012 and 17 AAC 25.014 for allowable legal vehicle sizes.
- 4 For urban and suburban arterials, see section 7.3.2 of the Green Book for further discussion on selecting the design level of service. For urban and suburban freeways, see section 8.2.3 of the Green Book for further discussion on selecting the design level of service.

Figure 1100-3(b)
Highway Design Criteria Summary
(Page 2 of 2)

1110. (Reserved)

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1120. Elements of Design

- 1120.1 General
- 1120.2 Horizontal Curves, Grades and Sight Distances
- 1120.3 Interstate
- 1120.4 Bridges
- 1120.5 Retaining Wall Design
- 1120.6 Drainage
- 1120.7 Turnouts
- 1120.8 Erosion & Sediment Control Plans (ESCPs)
- 1120.9 Nondomestic Wastewater Systems
- 1120.10 ADA Accessibility

1120.1. General

Figure 1100-3, Highway Design Criteria Summary, provides the acceptable initial design references for project types and design specifics. The initial design reference may direct the designer to succeeding references. For any criteria not provided in Table 1100-3, refer to the *AASHTO A Policy on the Geometric Design of Highways and Streets* (GB).

Follow the guidance provided in Section 1100.3 for design exceptions and design waivers.

1120.2. Horizontal Curves, Grades and Sight Distance

1120.2.1. General

When developing alignments for a given design speed use generally flat curves, reserving the minimum radii for the most critical conditions.

1120.2.2. Horizontal Curves

Design horizontal curves following guidance in Section 3.3 of the GB.

For gravel roads, use the guidance presented in Figure 1120-1 and the AASHTO Guidelines for Design of Low-Volume Roads (GDLVR).

Simple curves should be used for the design of all roadways. Rehabilitation projects and interchanges may require use of compound or spiral curves to meet site constraints.

1120.2.3. Grades

Use the following for determining maximum grades on specific functional classes:

On low volume local and minor collector roads, use

the GDLVR.

Local	GB Table 5-2
Collector	GB Table 6-2
Arterial	GB Table 7-2

On non-NHS highways, short grades of 500 feet in length, or less, and one-way downhill grades may be 1.0% steeper than those given in the GB tables listed above.

Grades may be 2.0% steeper for low-volume rural highways off the NHS.

For streets with curb and gutter, use GB Subsection 3.4.2.2.2, with a preferred minimum grade of 0.5%.

1120.2.4. Sight Distance

Use the following for determining minimum stopping and passing sight distance on specific functional classes:

Local	GB Table 5-3 & 5-4
Collector	GB Table 6-3 & 6-4
Arterial	GB Table 7-1

On Low Volume Local and Minor Collector Roads, use the GDLVR.

1120.3. Interstate

1120.3.1. General

Interstate design criteria are essentially the same as for any limited-access, high-speed arterial. Some exceptions apply to Alaskan Rural Interstate roadways by agreement with the FHWA. This section describes these exceptions.

1120.3.2. Roadway Width

Interstate criteria generally require a minimum four-lane divided facility. In Alaska, unless the DHV exceeds the capacity of a two-lane, two-way facility, a two-lane is acceptable provided the width requirements for arterials in the GB are followed and the interstate surface is no less than 36 feet from outside shoulder to outside shoulder.

1120.3.3. Access Control

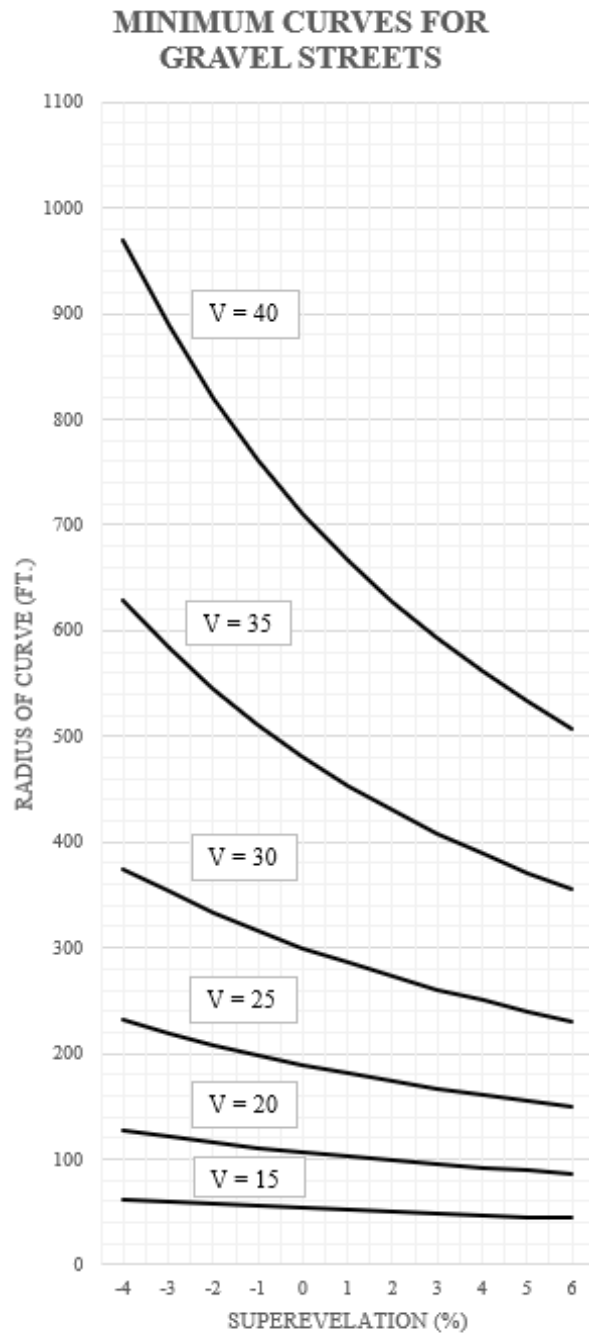
Interstate roadways by definition are major arterials and continuous control of legal access is highly

desirable. In urban and suburban areas, legal access to interstate roadways should only be via a public roadway; there should be no private access points. In rural areas, public roadways are desirable access points. However, private access points may be required where the route traverses major private land holdings.

In accordance with 23 USC 111 all new or modified access points to the Interstate Highway System require FHWA approval. See Section 1190.1 for additional requirements.

1120.4. Bridges

Design Bridges in accordance with the *Alaska Bridge and Structures Manual (ABSM)*.



V	f
15	0.27
20	0.23
25	0.20
30	0.17
35	0.15
40	0.13
45	0.12

Figure 1120-1
Minimum Curves for Gravel Streets

1120.5. Retaining Wall Design

1120.5.1. General

DOT&PF uses retaining walls to provide lateral support for a variety of applications.

Before retaining wall design can begin, the geotechnical engineer conducting the foundation investigation must complete a written foundation report. The requirements for this report are found in the Alaska Geotechnical Procedures Manual.

Submit the report to the project manager upon completion.

After completion of the foundation report, design and plan preparation can begin. All contract documents for retaining walls must contain a fully detailed Department-approved wall system, or a list of acceptable retaining wall systems selected from the Department's current list of pre-qualified retaining wall systems.

Additional requirements and details regarding retaining walls can be found in Chapter 21 of the *ABSM*.

1120.5.2. Retaining Wall Classification

Earth retaining structures are divided into three classifications.

State-Designed Structures

State-designed structures are designed completely by the Department or a consultant without use of proprietary systems.

Pre-Approved Proprietary Structures

These are patented systems. Pre-approved status means that these retaining walls may be listed in the special provisions as an alternative retaining wall system based on the recommendation of the Statewide Materials Section.

Proprietary Structures Pending Approval

A vendor has submitted these retaining wall system designs for approval. They may be added to the pre-approved list if they meet the Statewide Materials Section requirements.

1120.5.3. Federal Requirements, Proprietary Items

See Section 450.7.4 for requirements.

1120.5.4. Wall Selection

Selection of wall types depends on several

performance variables:

- Material availability and cost
- Ease of Construction
- Walls in Cut vs. Fill
- Potential Settlement
- Service Life
- Surcharge
- Aesthetics
- Railings

Refer to Chapter 21 of the *ABSM* for more in-depth discussion on wall selection.

1120.5.5. Wall Design

In all cases, determine the wall controlling geometry. The wall must fit the facility site. Design the structural aspects of retaining walls in accordance with the *ABSM*.

Walls are classified according to their construction method (e.g. fill-wall construction, cut-wall construction) and the mechanism used to develop lateral support (externally stabilized or internally stabilized). Common fill-wall construction types are MSE walls and CIP concrete cantilever walls. Cut wall construction may include:

- Soldier-Pile walls
- Anchored walls
- Soil-Nail walls
- Sheet Pile walls

The DOT&PF Bridge Section, or a consultant experienced in retaining wall design, will design all non-proprietary cast-in-place retaining walls over 4 feet in height.

1120.5.6. Alternative Wall Designs (Proprietary)

Consider alternative or proprietary wall designs where different wall systems appear to be equal in performance and approximately equal in estimated cost. Provide sufficient information in the contract plans so that the Department-designed wall system or pre-qualified retaining wall systems can be competitively bid. Proprietary wall systems must have the approval of the Statewide Materials Section. Provide sufficient geometric controls on the contract plans so that a vendor may prepare a wall system structural design.

It is the responsibility of the designer to ensure that the wall can be constructed within the constraints of

the site. Contact the Statewide Materials Section for the most current list of pre-approved retaining wall systems.

1120.5.7. Contract Plans

The contract plans must include a Department-approved wall system design that typically provides geometric/design information and figures such as wall dimensions, elevations, and cross-sections. Refer to the *ABSM* for a complete list.

1120.6. Drainage

1120.6.1. General

This section provides design criteria for the hydraulic and hydrologic development of drainage systems for highways. Use the hydraulic and hydrologic design methods found in the *Alaska Highway Drainage Manual* (AHDM) and the *AASHTO Highway Drainage Guidelines* in coordination with the guidance provided in this section.

Use the design flood frequencies presented in Chapter 7, Appendix A, of the AHDM for design of the various types of hydraulic structures.

Consult with the regional hydraulics engineers when designing drainage systems.

1120.6.2. Cross Drainage Culverts

Design culverts for the appropriate Hw/D Ratio. See Chapter 9 of the AHDM for the Hw/D Ratio for the particular application.

The minimum diameter for round cross-drainage culverts shall be 24 inches (Equivalent pipe-arch culverts shall have a minimum span-to-rise of 29 inches by 18 inches.). However, in icing problem areas, 36-inch diameter, round culvert pipes will be the minimum. Equivalent pipe-arch culverts in icing areas is not recommended.

Evaluate all culverts 48 inches in diameter or greater for the potential to fail during a design discharge due to hydrostatic and hydrodynamic forces, erosion, saturated soils, or plugging by debris. Any culvert that is found to have a failure potential must be restrained at the ends by half-height concrete headwalls or an equivalent, deadmen, or other form of vertical restraint. Consult with the regional hydraulic engineer for designs of culverts 48" or larger.

Restrain all mitered pipes with half-height concrete

headwalls or an equivalent. Deadmen or other forms of comparable vertical restraint are acceptable if the culvert invert lip is structurally reinforced.

1120.6.3. Storm Sewers

Inlets in sag locations require special attention from the designer and special design criteria are required to size and space them properly. A sag is any portion of the roadway where the profile grade changes from a negative grade to a positive grade. The depression formed is capable of ponding water that extends more than halfway into the nearest traveled lane if all the grate inlets become plugged with debris. This ponded area is generally contained by a curb, traffic barrier, retaining wall, or any other obstruction that prevents it from flowing off the traveled roadway.

A sag vertical curve that is located in a fill section would not be considered a sag in the above sense if the runoff can overtop the curb and flow down the fill slope without ponding water over more than half of the nearest traveled lane. Width of spread criteria for gutter flow can be found in the AHDM.

Avoid placing sags on bridges. It is difficult to fit inlets among the reinforcing steel and the location of downspouts is often limited.

Locate and size the inlets using the procedures outlined in the AHDM.

Provide inlet grates that are hydraulically-efficient and bicycle-safe on all storm sewer inlets. The AHDM lists acceptable grates.

1120.6.4. Filter Courses or Subsurface Drainage Matting

All required filter cloth, geotextile filters or fabrics, geomembrane systems, geosynthetic materials, or granular material filter courses must be specifically designed for the application and be called for and/or detailed in the project plans.

1120.6.5. Bioengineered Bank Stabilization

Use bioengineered bank stabilization with caution.

Do not use bioengineered bank stabilization in areas of critical infrastructure. Critical infrastructure includes bridges, guide banks and other river training work, and single access roadways or roadways where concern about stream erosion exists. Bridges in particular are vulnerable to stream erosion processes and must be well protected.

If the engineering manager determines an area is low

risk and use of bioengineered bank stabilization would provide substantial benefit, it may be used in an area of critical infrastructure if written approval of the State Hydraulics Engineer is obtained.

1120.6.6. Hydraulic Site Surveys

Coordinate site survey efforts with the Statewide Hydraulics Engineer for all bridge structures.

Bridge structures are defined as all hydraulic structures greater than 20 feet in length measured parallel to the roadway centerline, including single and multiple culvert installations.

Coordinate with the Regional Hydraulics Engineer for culvert installations (especially fish passage culverts), other drainage structures such as stormwater facilities, and erosion and sediment control.

Early coordination is critical. The hydraulics engineer may be required to visit the site prior to or with the survey crew.

Site survey consultant contract designs shall be under the direction of the consultant's engineer-in-responsible-charge.

Conduct all hydraulic site surveys in accordance with the guidance provided in section 6.4 of the AHDM.

1120.6.7. Hydrologic and Hydraulic Standards

Use the hydrologic methods prescribed in the AHDM to determine flood flow frequencies.

Use the hydraulic design standards prescribed in the AHDM and the *AASHTO Highway Drainage Guidelines*.

1120.6.8. Hydrologic and Hydraulic Reports

For design of all bridges over water and all culverts 48 inches in diameter or greater, an engineered Hydrologic and Hydraulic Report is required.

For projects that include maintenance and rehabilitation of existing drainage facilities, perform the level of hydrologic and hydraulic study commensurate with the significance of risk and environmental impacts.

Minimum requirements for Hydrologic and Hydraulic Reports are included in Chapter 4 of the AHDM.

Final hydrological and hydraulic reports are signed and sealed by a professional engineer.

1120.6.9. Summary Hydraulic Report

A Summary Hydraulic Report may be used for projects that have minor hydraulic impacts or risks such as smaller bridges, maintenance or rehabilitation of existing drainage facilities, projects with culverts only, or minor encroachments.

Consultant-prepared reports may use a Summary Hydraulic Report after consultation with the responsible DOT&PF hydraulics engineer.

Minimum requirements for Summary Hydraulic Reports are included in Chapter 4 of the AHDM.

1120.6.10. Hydrologic and Hydraulic Summary

Include a Hydrologic and Hydraulic Summary Table in the plans as follows:

1. For bridges – on the site plan sheet
2. For floodplain encroachments – on the applicable plan and profile sheet. If the encroachment spans more than one sheet, place the summary on the sheet where the encroachment begins.
3. For culverts – in a summary table, culvert detail sheet, or on the plan and profile sheet as follows:
 - a. All culverts 48 inches in diameter or greater
 - b. Any multiple culvert installation that has a total high water flow of 500 cubic feet per second (cfs) or greater for an exceedance probability of 2 percent (Q50)
 - c. All culverts smaller than 48 inches in diameter for which a hydraulic analysis has been performed

Minimum requirements for the Hydrologic and Hydraulic Summary are included in Chapter 4 of the AHDM.

1120.6.11. Minor Structure - Culverts

Minor structure culverts are culverts with a span, combined or single, from 10 feet to 20 feet. Provide a signed and sealed final design for all minor structures for incorporation into the Final PS&E package for construction. Provide a copy of the structural and hydraulic calculations to the Bridge Section upon request.

1120.7. Turnouts

1120.7.1. Types

Truck Emergency Turnout: This is a widened shoulder area that is used at locations where frequent truck stops are anticipated or experienced. Typically these turnouts are provided at the beginning of passes to install tire chains or at the top of steep grades to check brakes.

Slow Vehicle Turnout: A widened shoulder area provided for slow moving vehicles to pull over without stopping to allow a queue to pass. Generally, two-lane highways with substantial recreational vehicle traffic and limited passing opportunities can benefit from these turnouts.

Scenic Turnout: This is a widened shoulder area or a separated turnout for the motorist to stop to view a point of interest. Anticipated stays are short and rest facilities generally are not provided.

Rest Area: This is a separated turnout to provide breaks for motorists. Convenience and comfort facilities may be provided.

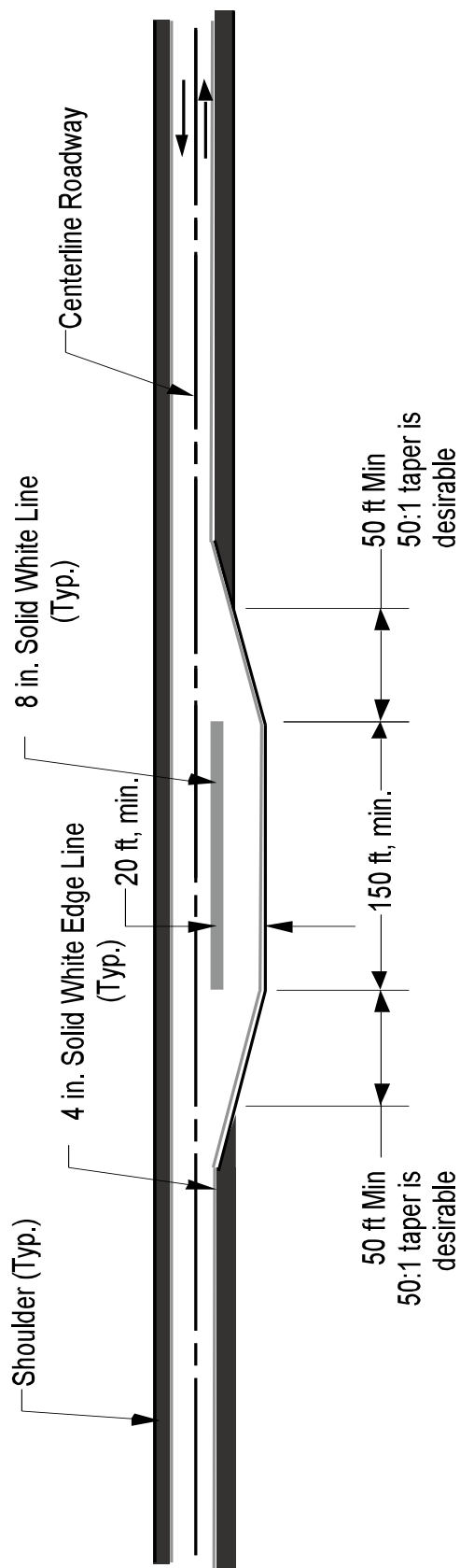
1120.7.2. References

Figures 1120-2 through 1120-5 are examples of minimum recommended scenic turnouts and rest areas. Geometric, geomorphic, and environmental conditions generally dictate a custom design. References available for rest area design are provided below:

- *A Guide for Development of Rest Areas on Major Arterials and Freeways*, AASHTO, 2001
- *A Guide for Transportation Landscape and Environmental Design*, AASHTO, 1991
- FHWA-IP81-1, *Safety Rest Areas: Planning, Location and Design*, FHWA, 1981
- FHPM 6-2-5-1 *Landscape and Roadside Development*
- RD-77-07 *Waste Water Treatment Systems for Safety Rest Areas*, FHWA, 1977

1120.7.3. Accessibility

Scenic turnouts and rest areas and any included facilities must be accessible in accordance with the

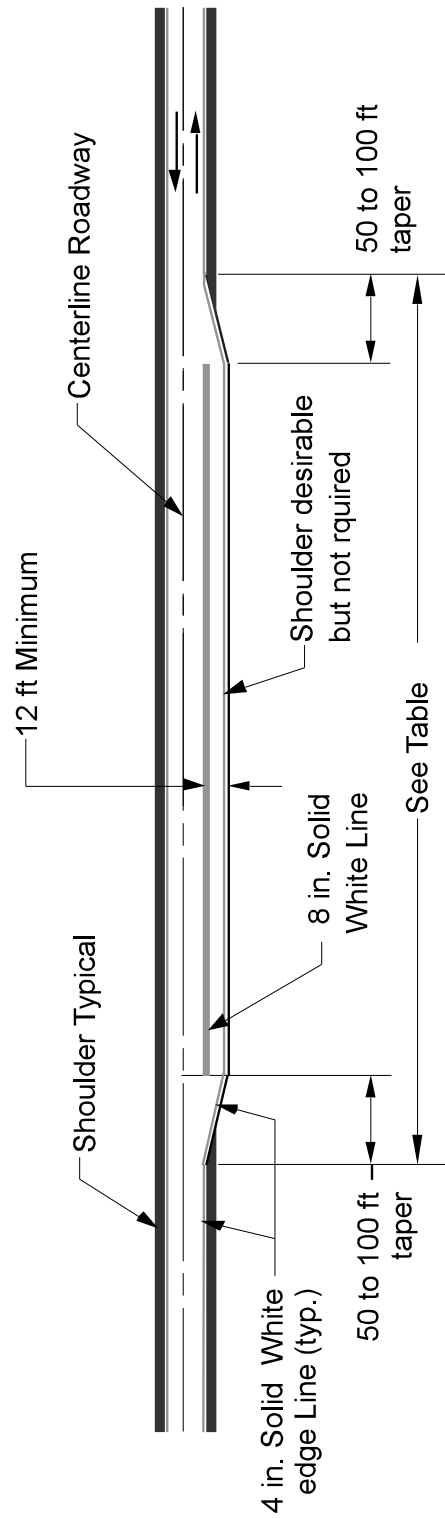


NOTES:

1. Install drainage system where required.
2. Turnout should be graded and surfaced with the same type and depth material as specified for the roadway.

Figure 1120-2
Recommended Minimum Truck Emergency Turnout

RECOMMENDED MINIMUM TRUCK EMERGENCY TURNOUT



APPROACH SPEED (mph) OF SLOW VEHICLE	MINIMUM LENGTH (ft) *
25	200
30	200
40	300
45	350
50	450
55	550
60	600

* Maximum Length should be 1250 ft where opportunities exist.

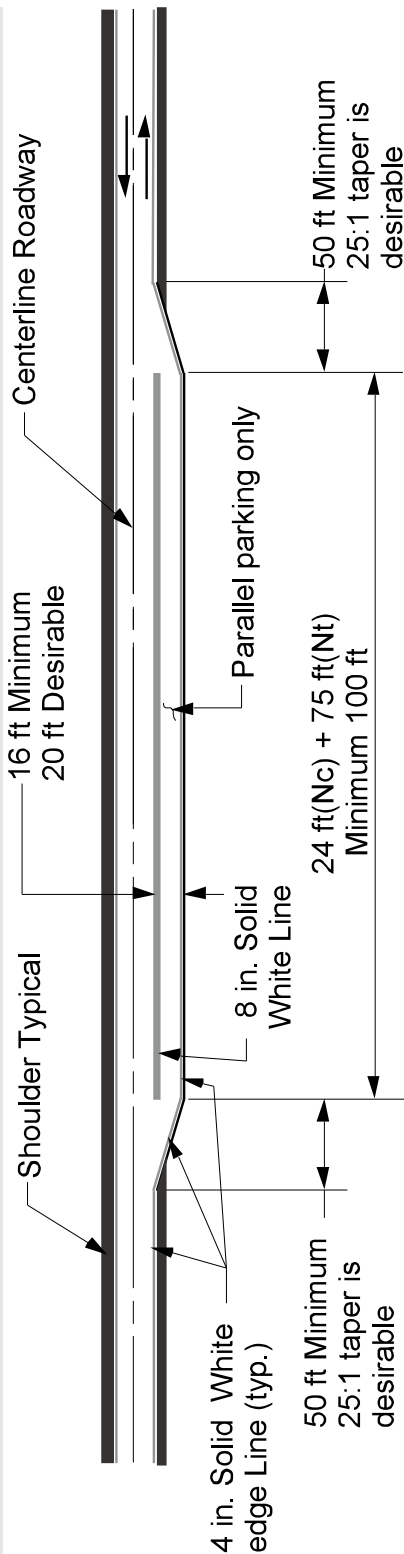
SIGNS

See Alaska Sign Design Manual for applicable signs.

See the Alaska Traffic Manual for sign placement.

SLOW VEHICLE TURNOUT FOR RURAL TWO LANE ROADWAYS

Figure 1120-3
Slow Vehicle Turnout for Rural Two-Lane Roadways



RECOMMENDED MINIMUM SCENIC VIEW POINT

PARKING

Car parking space = 24 ft x 8 ft
 Truck parking space = 75 ft x 8 ft
 N_c = Car parking spaces required
 N_t = Truck parking spaces required
 ADT = Average daily traffic with access to scenic view point
 D_c = percent of traffic composed of cars
 D_t = percent of traffic composed of trucks or large RV's
 P = Total percent on mainline traffic stopping at rest area adjusted by the ratio $DSL/50$
 DSL = Design section length or distance between turnouts in miles.
 Interstate $P = 0.12(DSL)/50$ Primary (recreational) $P = 0.08(DSL)/50$ Primary (rural) $P = 0.055(DSL)/50$

$N_c = 0.09(ADT)(P)(D_c)$

$N_t = 0.09(ADT)(P)(D_t)$

Source: Minnesota DOT Road Design Manual (rest areas)

SIGNING

Specifications: MUTCD/Alaska Supplement and the Alaska Sign Design Specifications

Ref: AASHTO Guide for Transportation Landscape and Environmental Design -1991
 AASHTO Green Book
 Transportation and Land Development by Institute of Transportation Engineers

Figure 1120-4
Recommended Minimum Scenic Viewpoint

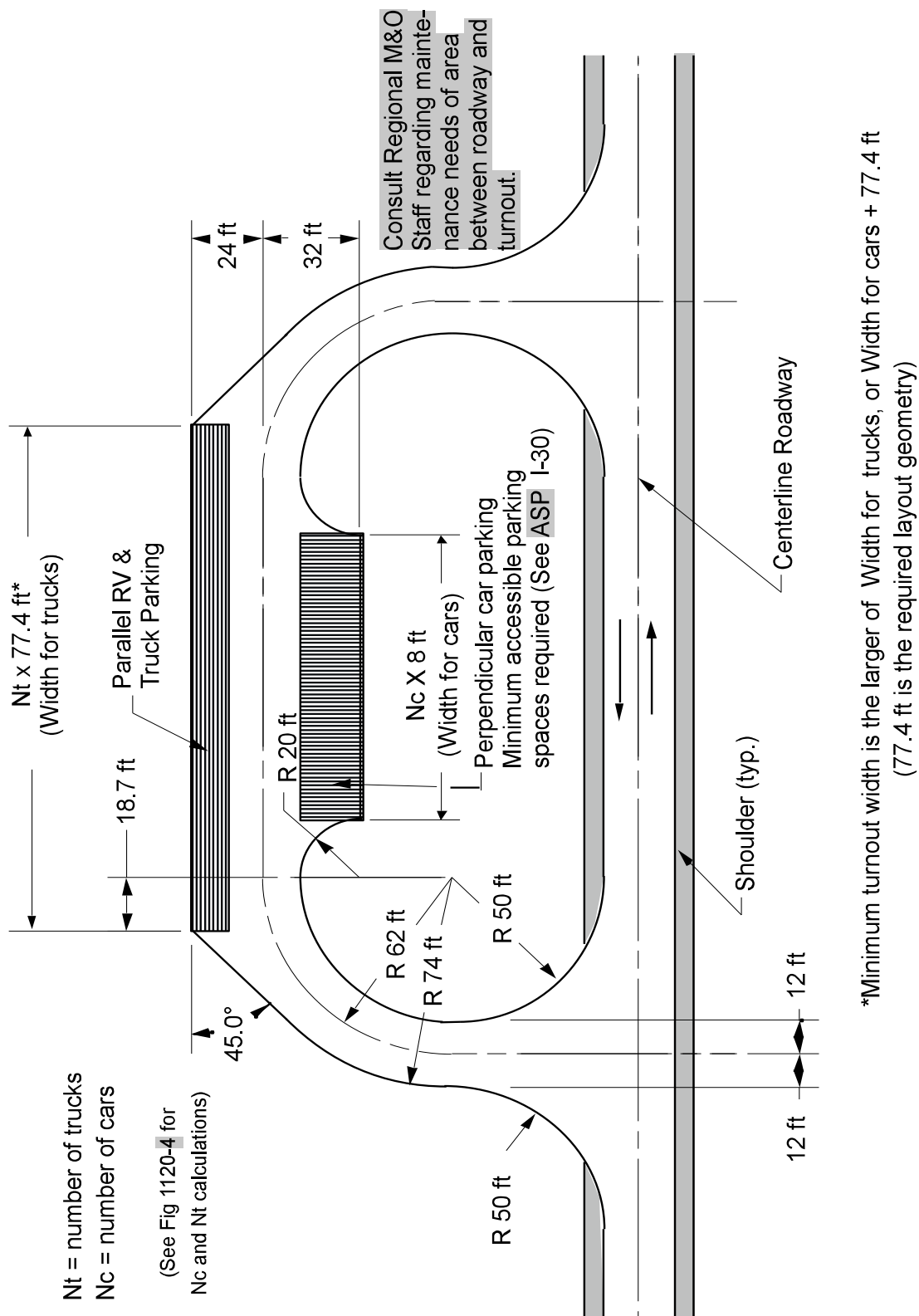


Figure 1120-5
Recommended Minimum Separated Turnout With 90-Degree Entrances

RECOMMENDED MINIMUM SEPARATED TURNOUT
WITH 90 DEGREE ENTRANCES

1120.8. Erosion & Sediment Control Plans (ESCPs)

1120.8.1. Background

Water pollution in the U.S. is regulated under the Federal Water Pollution Control Act of 1972, now referred to as the Clean Water Act (CWA). Eroded sediment from construction sites that discharges into waters of the U.S. is considered pollution.

Section 402 of the CWA provides the legal basis for the Alaska Pollutant Discharge Elimination System (APDES) permit program. The Department conducts construction activities under APDES permits, primarily, the DEC Construction General Permit (CGP). The CGP requires a site-specific erosion control plan for construction activities.

DEC assumed the issuance, inspection and enforcement of all storm water permits from the EPA on November 1, 2009.

23 CFR 650 Subpart B states that:

“ . . . all highways funded in whole, or in part under title 23, United States Code, shall be located, designed, constructed and operated according to standards that will minimize erosion and sediment damage to the highway and adjacent properties and abate pollution of surface and ground water resources.”

Construction contractors developing a Storm Water Pollution Prevention Plan (SWPPP) as required by the CGP, must receive sufficient information and guidance in the contract documents to prepare a well-conceived, cost effective SWPPP. The purpose of an Erosion and Sediment Control Plan (ESCP) is to provide this information.

1120.8.2. ESCP Policy

Develop an ESCP for all projects with disturbed ground that meet either of the following conditions:

- Owned by the Department, or
- Designed (or design administered by) and constructed (or construction administered) by the Department

Utility Relocations - There are three types of utility relocation:

1. **Concurrent Relocation** - When the utility construction work happens at the same time as

the highway construction.

2. **Partial Advance Relocation** – When the utility construction work starts prior to the highway construction project.
3. **Complete Advance Relocation** – When all of the utility construction work is complete prior to award of the highway construction project.

All utility relocation projects require an ESCP. Types 1 and 2 generally have the ESCP developed in conjunction with the highway project's ESCP. For type 3, a specific stand-alone ESCP must be developed for the utility relocation project.

1120.8.3. ESCP Development

Develop the ESCP early and in collaboration with Construction and the environmental analyst. An ESCP can consist of the following components:

- Plan sheets
- *Alaska DOT&PF Standard Specifications for Highway Construction* (SSHHC)
- Special provisions
- Narrative (as an Appendix to the contract document or notes on the ESCP sheets)
- SWPPP template pre-filled to extent possible

Show permanent Erosion and Sediment Control (ESC) features, including final stabilization, on the roadway plan and detail drawings. These drawings are sealed and signed in accordance with 12 AAC 36.185.

Show temporary ESC features and construction phasing in the ESCP drawings, if known, and reference permanent ESC features identified elsewhere in the plans and specifications. ESCP drawings are intended to be modified by the construction contractor in preparation of his SWPPP. Do not seal ESCP drawings.

Develop the ESCP with the DOT&PF SWPPP Template format and content in mind. Designers should prepare a draft electronic copy of the project-specific SWPPP by populating the DOT&PF SWPPP Template with data, as appropriate, from the project design.

Provide a copy of the initial electronic DOT&PF SWPPP Template to Construction who will provide it to the construction contractor to assist in developing

their SWPPP.

Use Chapter 16 of the *Alaska Highway Drainage Manual* (AHDM) for:

- Fundamentals of erosion control
- Guidance and technical principals for controlling erosion
- Preparation and requirements of an ESCP

ESCP preparers are allowed to use other recognized resources for selection and application of temporary and permanent Best Management Practices (BMPs), such as:

- Alaska DOT&PF SWPPP Guide
- Alaska Storm Water Guide
- EPA National Menu of Stormwater BMPs
- Other state DOT or municipal stormwater/BMP manuals

Do not use Appendix B of Chapter 16 in the *AHDM* for seed mixes. Use the following revegetation resources instead:

- Alaska Department of Natural Resources (DNR) “*A Revegetation Manual for Alaska*” – 2008 updated version
- DNR’s “*Alaska Coastal Revegetation and Erosion Control Guide*”, if located in a coastal area.
- DNR’s “*Interior Alaska Revegetation & Erosion Control Guide*”, if located in the interior of the state.

The AHDM is found here:

www.dot.state.ak.us/stwddes/desbridge/pop_hwydrnmn.an.shtml

The DNR manuals are located here:

<http://plants.alaska.gov/>

1120.8.4. Payment for Erosion, Sediment, and Pollution Control

Include the following pay items (refer Section 641 of the SSHC on all projects with ESC work:

- 641.0001.0000- Erosion, Sediment, and Pollution Control Administration.
- 641.0002.0000 or 641.0003.0000- Temporary

Erosion, Sediment, and Pollution Control (contingent sum or lump sum payment – use one or the other, not both).

- 641.0006.0000- Withholding

Every project should contain the combination of:

- 641.0001.0000, 641.0002.0000, and 641.0006.0000 or
- 641.0001.0000, 641.0003.0000, 641.0004.0000, and 641.0006.0000 pay items.

Pay items 641.0005.0000 and 641.0007.0000 should be added at the discretion of the designer or regional policies.

The project’s temporary and permanent ESC items can be paid for under:

- Pay items 641.0002.0000 through 641.0005.0000
- SSHC pay items outside of Section 641
- Items established by special provision.

1120.9. Nondomestic Wastewater Systems

1120.9.1. Background

The Alaska Department of Environmental Conservation (DEC) has defined storm water runoff from highways as nondomestic wastewater. By Alaska Code (18 AAC 72.600), DEC must review and approve any project that constructs, alters or modifies (an existing), or operates any part of a nondomestic wastewater system.

1120.9.2. Policy

Ensure DEC review and approval of projects with certain types of nondomestic wastewater systems prior to certifying and advertising projects. If the project does not require a review, either by exemption (see 1120.9.4) or as determined by consultation with DEC, include documentation in the contract documents.

1120.9.3. Design

Consult the Alaska Highway Drainage Manual (AHDM) for guidance on design of storm water elements and systems.

Refer to Chapter 15 – *Surface Water Environment* – of the *AASHTO Model Drainage Manual* for design guidance on treatment systems for removing water pollutants of concern such as:

- Sediment, including turbidity
- Hydrocarbons
- Heavy metals
- De-icing chemicals and other toxic contaminants
- Nutrients (BOD)
- Pathogenic organisms, or
- pH

<https://www.access-board.gov/files/ada/ADAdotstandards.pdf>

For reconstruction and 3R projects, all new and reconstructed pedestrian facilities must meet the referenced ADA Standards.

For ADA upgrade requirements on Preservation Projects, see Section 1140.

Use regional hydraulics expertise as necessary.

1120.9.4. DEC Review Submittal

Where applicable, submit storm water system plans to DEC for review and approval prior to construction.

Certain types of wastewater treatment features require a review, including:

- Detention or retention ponds
- Constructed wetlands
- Wet ponds
- Sand filters
- Oil/grit separators
- Rotational flow separators
- Other similar treatments controls

Information regarding the DEC Engineering Plan Review of storm water systems is found at:

<https://dec.alaska.gov/water/wastewater/stormwater/>

Note that Plan Review Checklist found at the link above must be completed and submitted with the stormwater plans.

Plan review fees are listed at 18 AAC 72.955.

DEC typically gives approval by a “Letter of Non-Objection.” Include this letter in an appendix of the contract documents.

1120.10. ADA Accessibility

Transportation facilities and their appurtenances constructed in public right-of-ways are required to accommodate those with disabilities. These disabilities include, but are not limited to; limited mobility, impaired vision, and impaired hearing.

Design all new construction to meet the ADA Standards for Transportation Facilities:

1130. Cross Sections

- 1130.1. Roadway Surfaces
- 1130.2. Roadside Geometry
- 1130.3. Sideslopes, Roadway Sections, and Drainage Channels
- 1130.4. Mailboxes
- 1130.5. Roadside Barriers
- 1130.6. Cost-Effective Analysis
- 1130.7. Pedestrian Crossings

1130.1. Roadway Surfaces

1130.1.1. Vertical Clearance

Provide vertical clearances conforming to Table 1130-1.

1130.1.2. Cross-Slopes (See Figure 1130-1)

1. Two-lane and wider two-way undivided roadways on tangents should be crowned on the centerline dividing traffic flow. Traveled ways should slope downward from the crown to the outside edges in a plane surface at a slope not flatter than 2.0% for paved surfaces and not flatter than 3.0% for unpaved gravel surfaces.
2. One-way traveled ways on tangent divided roadways with two lanes may slope downward from the median or left edge of the traveled way in a single plane at a slope no flatter than 2.0% or may be crowned as in two-lane, two-way undivided roadways. We suggest that you use a crowned section if you anticipate future widening. Crown one-way traveled ways on tangent divided roadways with three lanes or more with slopes not flatter than 1.5%.
3. On all superelevated sections where the rate of cross-slope exceeds the normal shoulder rate, the superelevated rate should be carried across the entire shoulder area. If superelevation is not carried across the full shoulder width due to site specific constraints the algebraic difference in slopes shall not exceed 8 percent.

1130.1.3. Superelevation

Use guidance provided in the AASHTO *A Policy on Geometric Design of Highways and Streets* (GB) for superelevation design on new construction and reconstruction projects on urban, rural and all low-volume roads unless otherwise directed in this section.

The superelevation rate is limited to 6.0% maximum due to icing of roadways. 4.0% maximum superelevation may be warranted in some conditions, such as signalized intersections.

Superelevation Rates, ADT >2000

Use the GB to determine acceptable superelevation rates for normal superelevation conditions.

Superelevation Rates for

- Local Roads with ADT \leq 2000
- Collector Roads with ADT < 2000 that primarily serve drivers who are familiar with the roadway

You may use the AASHTO Guidelines for Geometric Design of Low-Volume Roads (GDLVR) or the GB to determine acceptable superelevation rates for normal superelevation conditions.

1130.1.4. Lane and Shoulder Widths

New Construction and Reconstruction

For projects on the National Highway System (NHS) use the roadway widths presented in the GB as minimum design criteria.

On unpaved roads off the NHS and local roads with design ADTs less than 2,000, use the lane and shoulder widths shown in the GDLVR.

For all urban roads use the roadway widths presented in the GB as minimum design criteria.

1130.2. Roadside Geometry

1130.2.1. General

This Subsection applies to new construction and reconstruction. Section 1160 applies to 3R projects.

The term “clear zone” is used to designate the unobstructed, traversable area provided beyond the edge of the through traveled way for the recovery of errant vehicles. The clear zone distance is a function of traffic volumes, speed, and roadside geometry. The speed used to determine the clear zone distance should be the design speed. The general design procedure using the clear zone concept consists of:

1. Determine the suggested clear zone distance
2. Identify obstacles in the clear zone

3. Determine alternative treatments for obstacles within the clear zone. Except where modified by Sections 1130.2, 1130.3, and 1130.4, discussions, graphs, figures, and examples from the *AASHTO Roadside Design Guide* (RDG) should be the basis of roadside design. Section 1130.6 presents a method for evaluating and selecting treatment alternatives.

1130.2.2. Lateral Offset

In urban or restricted environments it may not be practical to establish a clear zone using the guidance in Chapter 3 of the RDG. In these instances, use the guidance provided in Chapter 10 of the RDG to establish a lateral offset to obstructions.

Characteristics of urban and restricted environments that preclude development of a full clear zone include, but are not limited to: lower operating speeds, limited rights-of way, curb and gutter, sidewalks, on-street parking, non-motorized and transit users, closely spaced intersections and driveways, and dense abutting development.

1130.2.3. Clear Roadside Concept

The Clear Zone Concept

It is desirable to provide a roadside clear of obstacles for a distance related to speed, traffic volume, and geometric conditions of the site. Provide clear zone or cost-effective alternative obstacle treatment for all new construction and reconstruction designs.

Clear Zone Distance

Use guidance in Chapter 3 of the RDG for selection of clear zone distances. Use Table 3-1 of the RDG, as modified below, to establish suggested clear zone distances for various combinations of design speeds, design ADTs, and roadside geometry. The suggested clear zone distances are measured from the edge of travelled way and include shoulders, bike lanes, and auxiliary lanes, except those auxiliary lanes that function like through lanes.

Modifications to Table 3-1 of the RDG:

1. Clear zones are limited to 30 feet for practicality and economy. Consider increasing the clear zone where a specific site investigation or engineering judgment indicate that an area has a higher probability of crashes and high severity conditions are present beyond 30 feet.

Where there are through-auxiliary lanes see Section 3.3.6 of the RDG.

Treatment of Roadside Obstacles

Design alternatives for reducing roadside obstacles in order of preference are as follows:

1. Remove the obstacle
2. Redesign the obstacle so that it is traversable.
3. Relocate the obstacle to a point where it is less likely to be struck.
4. Reduce the impact severity by using an appropriate breakaway device. Use breakaway devices meeting MASH requirements or have approved eligibility determinations under the roadside hardware eligibility program.
5. Shield the obstacle with a longitudinal traffic barrier designed for redirection, or a crash cushion.
6. Delineate the obstacle if the previous alternatives are not appropriate.

Evaluate the alternatives by using the cost-effective analysis procedures in Section 1130.6 where warranted.

Culvert Ends in Clear Zone

Refer to Chapter 3 of the RDG for treatment of obstacles and traversable features, including approach culvert ends and cross slope pipe ends.

Standard Plans D-42, 43, 44, and 45-show Type C and D inlets, which have traversable designs. Verify hydraulic capacity will meet design flows before using in the project design. Other treatments are described in Sections 3.4.2, 3.4.3, and 3.4.4 of the RDG.

Trees in the Clear Zone

Remove all trees greater than 4 inches in diameter, or those that are likely to be greater than 4 inches in diameter at full maturity, from the clear zone unless there are unusual circumstances—for example, an eagle nesting tree, or the existence of cost-effective alternate treatments.

If clear zone is not provided, evaluate the trees using cost-effective analysis in Section 1130.6 to determine the appropriate treatment.

1130.2.4. Clear Zones on Horizontal Curves

Designers may consider increasing the clear zone distance on the outside of horizontal curves. This should be done when (1) crash histories indicate such a need, and (2) increases are cost-effective.

Use Table 3-2 of the RDG for horizontal curves clear zone adjustment factors.

1130.2.5. Clear Zones on Slopes Steeper Than 4:1

Where embankment slopes are steeper than 4:1, but equal to or flatter than 3:1, a vehicle is considered to have the ability to traverse that slope but not recover. Slopes steeper than 3:1 are not considered traversable and should be treated as obstacles.

In short, the recovery area is the required clear zone plus the horizontal distance occupied by slopes steeper than 4:1. Do not use slopes steeper than 4:1 as part of the clear zone. For additional guidance on traversable slopes, see Section 3.2 of the RDG. The clear runout area shown in the RDG should have a desirable minimum width of 10 feet.

1130.3. Sideslopes, Roadway Sections and Drainage Channels

1130.3.1. Transverse Sideslopes

Refer to the RDG, Section 3.2.3 Transverse Slopes, for guidance in designing transverse slopes within the clear zone.

1130.3.2. Roadway Sections

Roadway sections should reflect the clear roadside concept. Provide recoverable slopes within the clear zone unless more cost-effective alternatives are used or site constraints prohibit.

1130.3.3. Ditches and Drainage Channels

Figure 1130-3 shows recommended ditch section in rock slopes. The recommended rock excavation section uses the additional consideration of trapping falling debris by dissipating kinetic energy prior to reaching the traveled way.

The RDG presents traversable channel configurations and design considerations.

Examples of slope averaging and ditch section calculations with regard to clear zones are shown in Chapter 3 in the RDG. In some circumstances, these recommended sections will not be adaptable to

certain design demands. Use the cost-effective analysis procedures in Section 1130.6 to analyze other designs.

1130.4. Mailboxes

Mailboxes are generally found in the clear zone and, to maintain mail service, they usually cannot be relocated outside of the clear zone. Although a mailbox and the supporting structure are obstacles, you can reduce the severity of impact to an acceptable level.

See Chapter 11 of the RDG for guidance on installing mailboxes on streets and highways. Also see the Alaska Standard Plans Manual for approved details on locating, installing, mounting and anchoring mail boxes.

**Table 1130-1
Vertical Clearance Requirements**

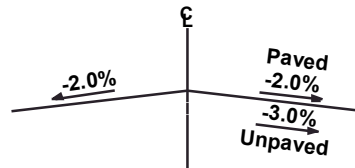
		Overpassing Facility						
		State Hwy	Local Roads or Streets	Rail-road	Ped. Structures	Bottom of Signals	Sign Bridges	Overhead Utilities ^{1,3}
Underpassing Facility	State Hwys and local roads or streets NOT between the port of Alaska in Anchorage and the North Slope ⁶	17.5 ft			17.5 ft	18.5 ft ⁵	18.5 ft	20.0 ft * New Const. ³
	State Hwys and local roads or streets from the port of Alaska in Anchorage to the North Slope ⁶	18.5 ft			18.0 ft * Existing ³			
	Railroad ⁴	24.0 ft *						
	Pedestrian Facility	8.5 ft						

*Value does not include 6-inch allowance.

- Notes:**
1. Provide minimum vertical clearances for the entire right-of-way surface in accordance with this table.
 2. All clearance height values identified in the table include a 6-inch allowance for future resurfacing of the roadway, except those noted with an asterisk.
 3. These overhead utility vertical clearances are codified in 17 AAC 15.201 (a) & (b). Overhead utility vertical clearances for new construction may be greater if required by 17 AAC 15.201 (1981 National Electric Safety Code). DOT&PF projects and relocations should strive for an additional 6" of clearance to provide for future overlays.
 4. For further guidance on overhead railroad crossings, refer to the AARC *Technical Standards for Roadway, Trail and Utility Facilities in the AARC Right-of-Way*
 5. In the event of a conflict between this manual and a Standard Plan the manual controls.
 6. Check regional guidance for specific route vertical clearance needs that exceed the values indicated in the table.

RECOMMENDED CROSS SLOPES

TWO-LANE 2-WAY



DIVIDED HIGHWAYS

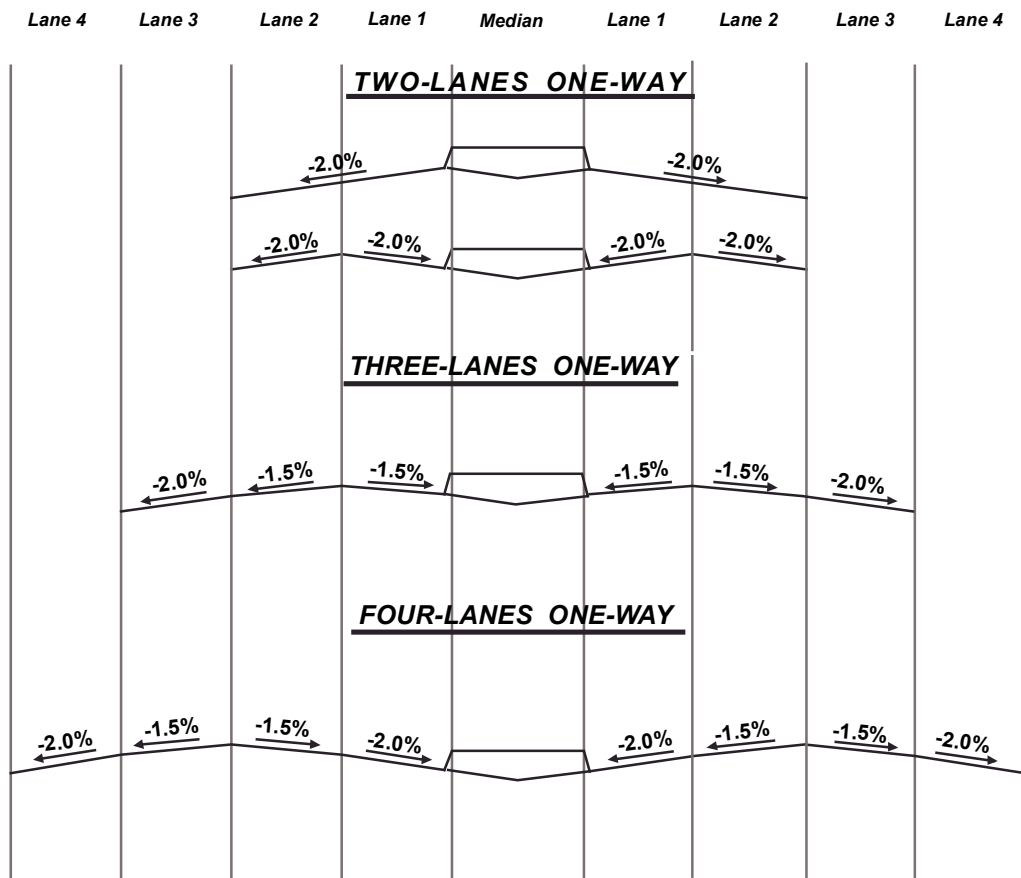


Figure 1130-1
Recommended Cross Slopes

1130.5. Roadside Barriers

1130.5.1. Introduction

There are three categories of barriers commonly used on Alaska roadways: flexible, semi-rigid, and rigid. These can serve as less severe obstacles that redirect traffic from impacting more severe hazards. Strong post w-beam guardrail (semi-rigid) is the most common longitudinal barrier, though concrete barrier (rigid), weak post box-beam (semi-rigid), weak post cable (flexible) and other types of solutions are available to meet site-specific needs. Guidance on performance, design concepts, and selection of roadside barriers is provided in Chapter 5 of the RDG.

End treatments are used at the ends of roadside barriers to provide one or more of the following functions: anchor the barriers, lessen the severity of impacts with the end of the barriers, and bring an errant vehicle to a controlled stop. There are a wide variety of end treatments available, and they generally fall into one of the following categories: anchorages, terminals, and crash cushions. Guidance on performance, design concepts, and selection of end treatments is provided in Chapter 8 of the RDG.

Because no policy can address every real-world condition, temper these guidelines with engineering judgment. See Figure 1130-5 for guidance in evaluating when barrier use is appropriate. Installing barrier is fifth in the order of precedence for treating roadside obstacles. In general, if removing the obstacle and barrier installation are similarly cost-effective, it is preferred to remove the obstacle.

1130.5.2. Guardrails

General

Barriers shall comply with MASH, but may be increased to higher test levels as discussed in RDG Section 5.3.

Guardrail Warrants for Embankments

The primary highway factors contributing to embankment crash severity are the height and slope of the embankment. The embankment height comprises the height of a fill, a natural hillside, or a combination of both. An “embankment” can also be a cut if the subject road exists at the top of that cut.

A cost-effective analysis may be used to determine if guardrail is not warranted (see Section 1130.6.).

Where cost-effective, the flattening of warranting slopes is preferable to guardrail installation.

Guardrail Warrants for Roadside Obstacles

Roadside obstacles may be classified as non-traversable or fixed objects.

Longitudinal Non-Traversable Obstacles

Examples of longitudinal non-traversable obstacles that may warrant guardrail are:

- Rough rock cuts
- Permanent bodies of water over 3' deep
- Drop-offs with slopes steeper than 3:1

Because of the extended length of the obstacles along the roadway, the probability of an errant vehicle striking the non-traversable obstacles is greater than that of a vehicle hitting a fixed object.

Fixed Objects

Examples of fixed objects that may warrant guardrail are:

- Bridge piers and abutments
- Retaining walls
- Fixed sign bridge supports
- Trees
- Approach roadway embankment

For clear zone distances, see Subsection 1130.2.3 and 1130.2.4.

Length of Need

Length of need is equal to the length of guardrail needed to shield the obstacle plus a length in advance to prevent vehicle penetration behind the rail into the obstacle. The obstacle may be a fixed object such as a tree, or a longitudinal area such as a roadway section with non-traversable slopes.

Where slopes beyond the graded shoulder are flat enough (see Guardrail Position Requirements: Guardrail Beyond Shoulder Edge), locate the guardrail as far away from the graded shoulder as possible to minimize this length of need, but with adequate clearance for guardrail deflection. In the more common instances, where slopes are steeper, the guardrail will run along the shoulder.

Section 5.6.4 of the RDG discusses length-of-need considerations. Figure 5-39 in the RDG illustrates

the variables that should be considered in designing a roadside barrier to shield an obstruction effectively. The primary variables are (1) the lateral extent of the area of concern, and (2) the runout length. Use Table 5-10(b) for runout lengths.

For additional information on calculating the length of need, as shown in Figure 1130-2, refer to the RDG. The assumption of a specific encroachment angle to determine a length of barrier, as mentioned in the RDG, is not an approved method for DOT&PF.

Guardrail Position Requirements

Guardrail Beyond Shoulder Edge: At fixed objects, it is best to locate guardrail as far away from the travelled way as practical to maximize recovery area and minimize the length of need. Adequate deflection space must be allowed between the guardrail and the object (See Chapters 5 & 6 of the RDG for deflection data.) For roadside barriers installed on foreslopes steeper than 10:1, see Section 5.6.2.2 of the RDG for guidance.

Guardrail Back of Curb: Curbs in front of guardrail should be avoided where possible. Where no alternative is available, refer to the RDG Sections 3.4.1 and 5.6.2.1 for additional guidance on the design of traffic barriers near curbs.

Bridge Approaches: Guardrail at bridge approaches shall have appropriate transitions to alleviate pocketing for impacts just in front of the abutment or bridge rail ends. Generally, embankments at bridges are steep and may also warrant guardrail protection.

Gaps Between Warranting Features: Avoid gaps in guardrail less than 200 feet where possible to minimize guardrail endings, which are obstacles.

Road Approaches, Driveways, and Turnouts: See Section 5.6.6 (*Guardrail Placed in a Radius*) of the RDG for guidance.

Shy-Line Offset: The distance from the edge of traveled way beyond which a roadside object will not be perceived as an obstacle and result in a motorist's reducing speed or changing vehicle position on the roadway is called the shy-line offset. This is discussed in Section 5.6.1 of the RDG. Shy-line offset is sometimes referred to as shy distance. Use the suggested shy-line offset values in Table 5-7 of the RDG where feasible.

Flare Rate: A roadside barrier is considered flared when it is not parallel to the edge of the traveled way. Flare is normally used to:

- locate the barrier terminal farther from the roadway
- minimize a driver's reaction to an obstacle near the road by gradually introducing a parallel barrier installation
- transition a roadside barrier to an obstacle nearer the roadway, such as a bridge parapet or railing
- reduce the total length of guardrail needed

Refer to Section 5.6.3 of the RDG for a discussion of flare rates. Use Table 5-9 of the RDG for suggested flare rates.

Other Guardrail Considerations

One of the problems with guardrails is they must end somewhere. It is desirable to bury the rail end in the backslope. All guardrail ends must be anchored.

All upstream guardrail ends must be crashworthy. All downstream guardrail ends must be crashworthy except:

1. On one-way roadways
2. On divided highways or two-lane roadways where the downstream end is outside the clear zone for opposing traffic

Consider using crashworthy downstream terminals outside of the opposing traffic flow's clear zone when in the engineer's judgment it is likely that there will be a higher than normal incidence of vehicle encroachment beyond clear zone.

The RDG notes strong-post guardrail exhibits better performance when allowed to rotate in soil (Section 5.6.7). Although posts in rigid foundations, such as partially or fully frozen in the ground, paved around, or in rock formations limit post rotation, Alaska has not noted a demonstrated problem with strong-post or rail performance under these conditions. Alaska does not require pavement leave-outs or other special details to allow strong post guardrail posts (W-beam, thrie beam, or thrie beam transitions), to rotate under rigid foundation conditions.

Proprietary guardrail end terminals must be installed in accordance with the applicable manufacturer's requirements.

1130.5.3. Median Barriers

The principles of guardrail usage are equally applicable to median barriers. However, median barriers additionally prevent errant vehicles from crossing the median area of divided highways and entering the opposing traveled ways. Therefore, they must be capable of containing and redirecting from two directions and on both sides.

Available median width may limit the choice of barrier. If a narrow median exists, a rigid barrier, which does not deflect into the opposing travel lanes, is necessary.

If space limitations present a borderline choice between rigid (concrete “safety shape”) and semi-rigid (back-to-back blocked-out W sections) barrier, then take into account economic and other considerations for the particular site. While the concrete barrier may have a slightly higher initial cost, yearly maintenance costs of the W-section barrier may be substantially more than that of the concrete median barrier. Sloped medians may require special consideration. See the RDG.

A true median barrier usually requires a different end treatment than typical guardrail installation unless the median widens sufficiently to terminate outside the clear zones of the two roadways, in which case only structural (anchorage) considerations are mandatory.

Cable safety rail may be used as a flexible median barrier in areas where slopes are 6:1 or flatter and have enough width to accommodate an obstruction free area within the barrier’s lateral deflection distance, approximately 12 feet. Coordinate placement locations with maintenance staff to ensure adequate response can be provided to reinstall following any crashes.

Operational median barrier end treatments are provided in the RDG.

Again, eliminate gaps where possible. Coordination with emergency services and enforcement agencies in the design stage may allow elimination of unnecessary emergency crossovers.

Warrants for Median Barriers

Low speed and intermediate speed urban section roadways generally do not require median barriers. Rural section intermediate speed roadways and all high-speed roadways may require median barriers. Section 6.2 of the RDG provides information on

median barrier applications and warrants procedures. Median barrier warrants for rural intermediate and all high-speed roadways are shown in Figure 6.1 of the RDG.

1130.5.4. Bridge Rail Transitions

Bridge rail to guardrail transition designs are provided by the Bridge Design Section.

1130.5.5. Crash Cushions

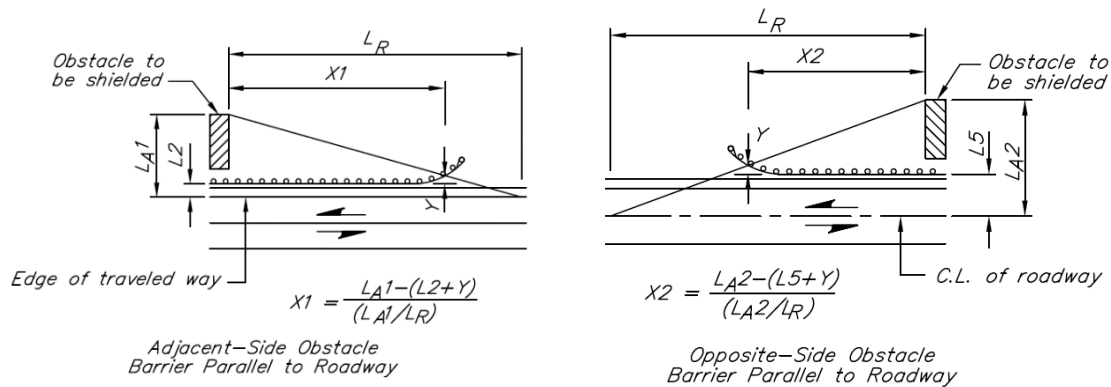
Crash cushions are sometimes used to absorb vehicle energy at a rate that is tolerable to the average, properly restrained vehicle occupant. In many cases, such as at elevated gore areas and bridge piers in medians at underpasses, they should also provide for redirection in side-angle impacts to alleviate pocketing near the fixed object.

Continuing maintenance considerations for crash cushions is extremely important. For proper performance, almost all crash cushions depend on meticulous attention to functional details during installation, routine maintenance, and post-crash replacement or rehabilitation.

Refer to Chapter 8 of the RDG for additional information about crash cushions. For areas of documented repeat impacts, consider using low maintenance or reusable crash cushions, which can be reconstructed in place. Chapter 8, Section 8.4.2.2 and Table 8-6 of the RDG have additional information, including maintenance and crash repair.

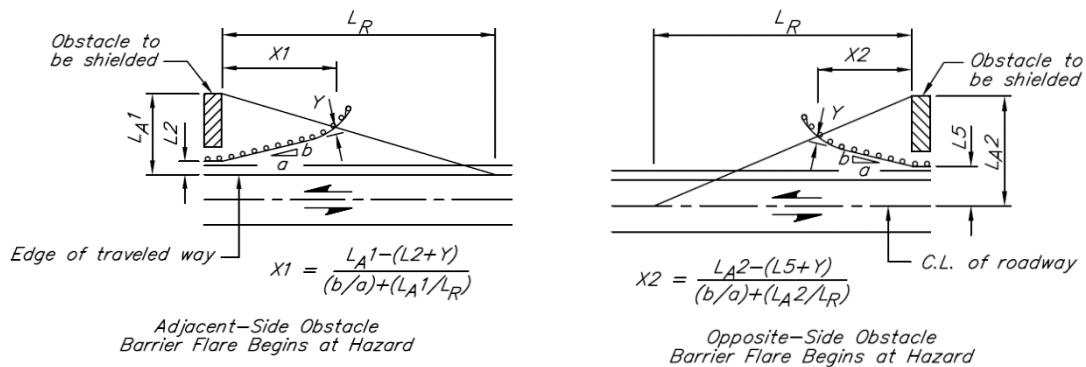
1130.5.6. Guardrail End Terminal Replacement

Replace all guardrail terminals within the project limits, unless they are currently MASH compliant.

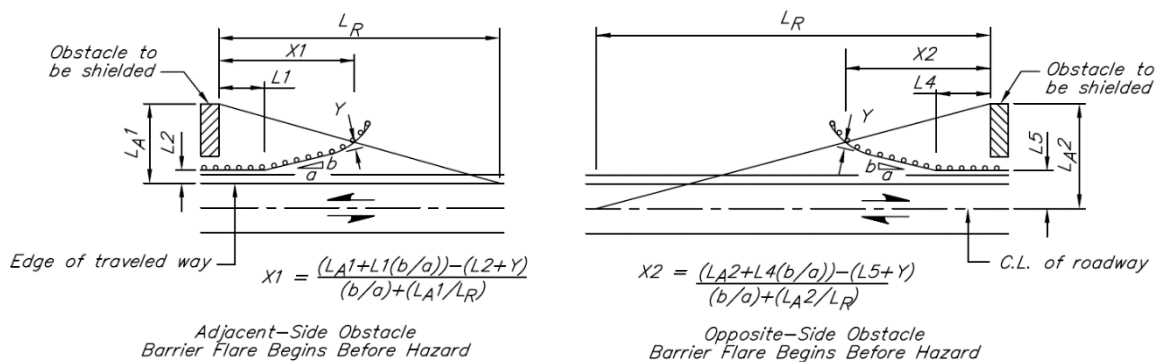


Subfigure 1130-2a

Use Figure 1130-4a for inside of curve and for outside of curve with $L_R < T$



Subfigure 1130-2b



Subfigure 1130-2c

Figure 1130-2

Barrier Advancement Length for G-4S & G-4W Beam Guardrail with Approved End Treatment

Notes on Figure 1130-2: 1. For outside of curves with $L_R \geq T$ Use Figure 1130-3

Key to the variables shown in Figure 1130-2 shown on the previous page:

L1 = Length of barrier parallel to roadway from adjacent-side obstacle to beginning of barrier flare.

This is used if a portion of the barrier cannot be flared (such as a bridge rail and the transition).

L2 = Distance from adjacent edge of traveled way to portion of barrier parallel to roadway.

L4 = Length of barrier parallel to roadway from opposite-side obstacle to beginning of barrier flare.

L5 = Distance from center line of roadway to portion of barrier parallel to roadway. Note: if the obstacle is outside of the Clear Zone when measured from the center line, it may only be necessary to provide a crashworthy end treatment for the barrier if the barrier end is within the clear zone.

L_A 1 = Distance from outside edge of traveled way to back side of adjacent-side obstacle.

Note: if an obstacle extends past the Clear Zone, the Clear Zone can be used as LH1.

L_A 2 = Distance from center line of roadway to back side of opposite-side obstacle.

Note: if an obstacle extends past the Clear Zone, the Clear Zone can be used as LH2.

L_R = Runout length (measured parallel to roadway). See Table 5-10(b) of the RDG.

T = Tangent length (on inside of curve) from point of vehicle departure to obstacle.

X1 = Length of need for barrier to shield an adjacent-side obstacle.

X2 = Length of need for barrier to shield an opposite-side obstacle.

b/a = Flare rate value. See Table 5-9 of the RDG.

Y = Offset distance required at the beginning of the length of need*.

***Note: Different end treatments require different offsets.**

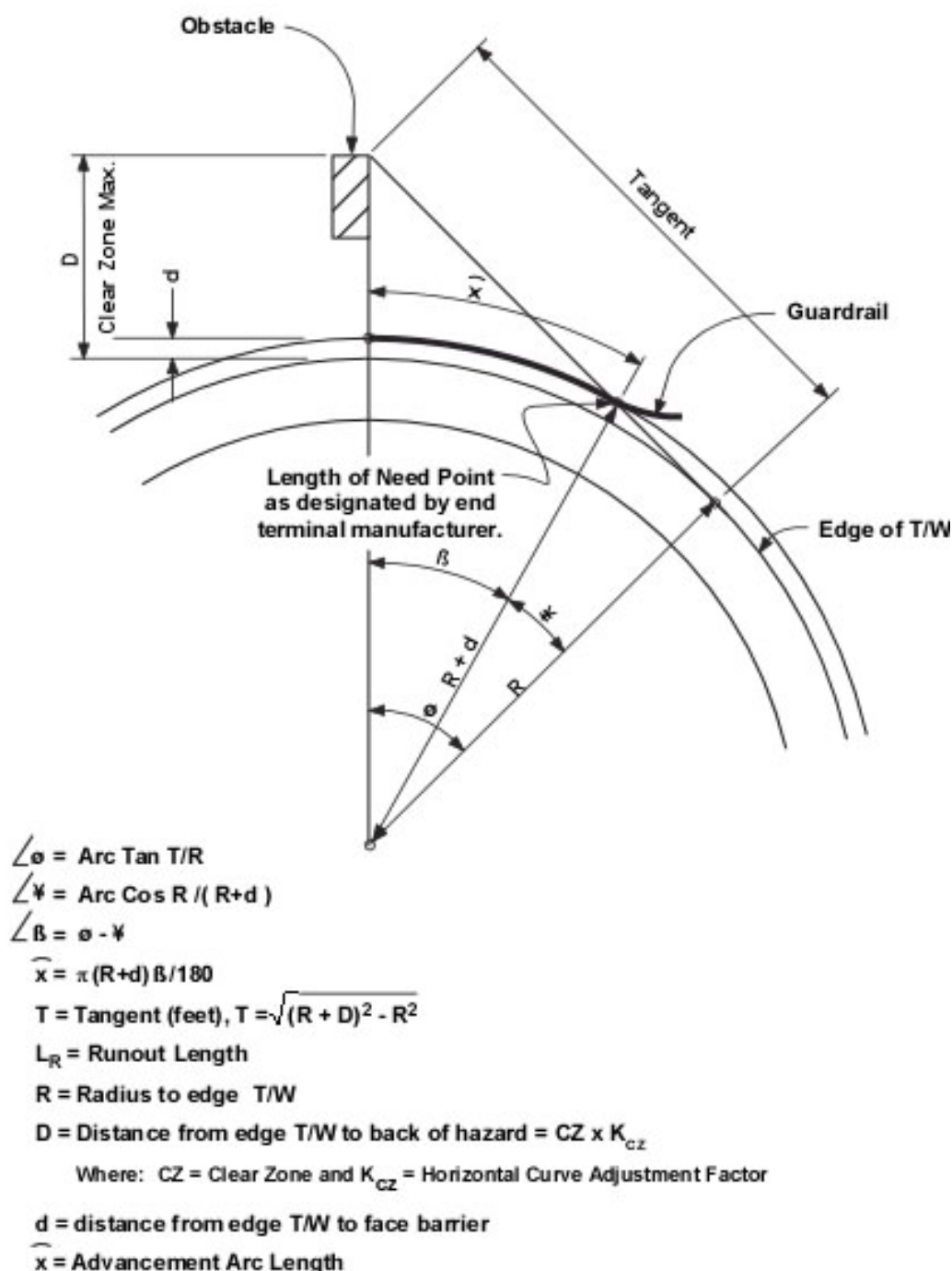
For existing end treatments, use the measured Y.

For other approved proprietary end terminals use the manufacturer's recommendations for Y.

No offset is required for non-flared terminals, or impact attenuator systems. Use Y = 0

Buried terminal end treatments are used with barrier flares and have no offset. Use Y = 0

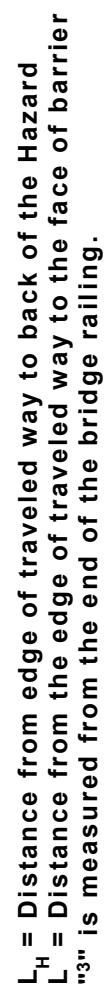
**TRAFFIC BARRIER ADVANCEMENT
LENGTH on OUTSIDE of HORIZONTAL CURVE
 $TANGENT \leq L_R$**



Flare rates are not used on horizontal curves

Figure 1130-3
Traffic Barrier Advancement Length on Outside of Horizontal Curve $Tangent \leq L_R$

PARALLEL WINGWALLS



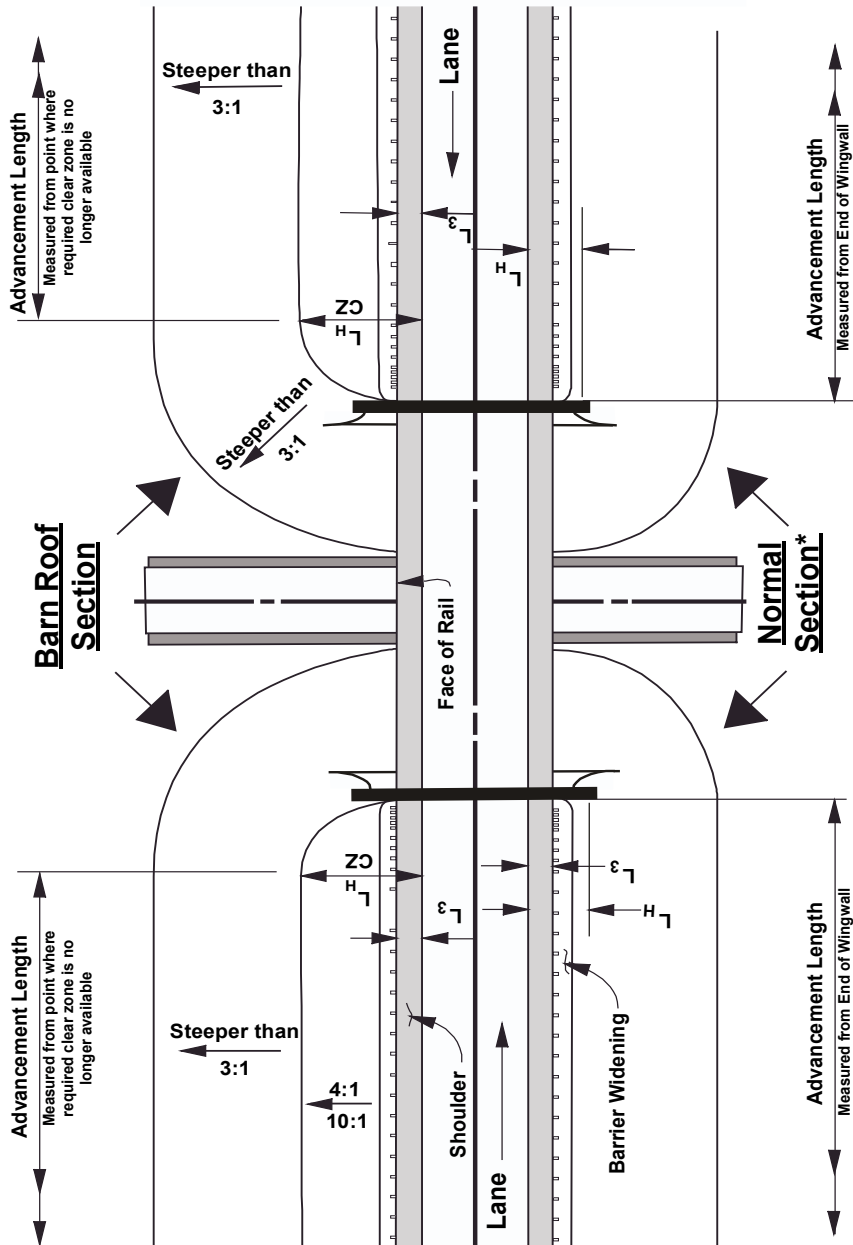
* "Normal Section" indicates clear zone requirements are satisfied to or past end of wingwall.

1130. Cross Sections

January 1, 2025

BARRIER ADVANCEMENT LENGTH @ BRIDGE APPROACHES

Perpendicular Wingwalls



L_H = Distance from edge of traveled way to back of the Hazard.
 L_{H3} = Distance from the edge of traveled way to the face of barrier.
 "3" is measured from the end of the bridge railing.

* "Normal Section" indicates clear zone requirements are satisfied to or past wingwall.

Figure 1130- 4b
 Barrier Advancement Length at Bridge Approaches (Perpendicular Wingwalls)

1130.6. Cost-Effective Analysis

1130.6.1. Introduction

A cost-effective analysis (CEA) is one that compares the benefits of an improvement to the cost of that improvement. This subsection focuses on roadway improvements where costs are borne by the Department and benefits accrued by the public.

The CEA procedures presented in Subsection 1130.6 apply to engineering analyses that compare alternatives with respect to the reduction of crash costs (fatalities, injuries, and property damage) to motorists.

The CEA procedures presented here do not apply to Highway Safety Improvement Program (HSIP) projects. See the HSIP Handbook for its own specific procedures.

1130.6.2. Procedure

The procedure presented here is an overview. Consult the *ROADSIDE or RSAP User's Manual* for more detailed procedures. *ROADSIDE and RSAP are analysis programs discussed further in this subsection.*

To perform a CEA, you must estimate the costs and benefits for a given alternative. These are calculated as an equivalent uniform annual cost for the design life of the roadway improvement.

Costs

The general formula for cost is: $\text{Cost} = \text{Improvement Costs} + \text{Maintenance Costs} + \text{Accident Costs} + \text{Salvage Value}$, where:

- **Improvement Costs** = Construction Costs + Right-of-Way Costs + Utilities Costs.
- **Maintenance Costs** = Cost of maintaining the roadside, including repairing and maintaining obstacles that are damaged by vehicular impacts.
- **Crash Costs** = Predicted or actual costs of fatalities, injuries or property damage due to vehicles impacting obstacles or hazards.

Costs for actual crashes come from crash reports that identify the type of crash and whether there were fatalities, injuries or property damage. These crash costs are monetized so they can be compared to the cost of the improvement.

Actual crash data is obtained from the Department's statewide crash database. This data is reported in conformance with the Model Minimum Uniform Crash Criteria (MMUCC). Under the MMUCC crash report system, data is presented in the following format, with the corresponding KABCO value (refer to the Benefits section below) identified:

INJURY STATUS		KABCO Value
Code	Injury Description	
00	No Apparent Injury	O
01	Possible Injury	C
02	Suspected Minor Injury	B
03	Suspected Serious Injury	A
04	Fatal Injury (Killed)	K

Predicted crash costs come from the use of an engineering analysis program, which is discussed later.

- **Salvage Value** = Value of the material or hardware at the end of its economic life. The salvage value is commonly considered zero for highway applications.

Benefits

In order to determine the benefits of a roadway improvement alternative, it is necessary to monetize the value of reducing fatalities and injuries. The benefit of preventing one fatality is quantified by the Value of a Statistical Life (VSL). The VSL is not the valuation of life as such; rather, it is the valuation in reduction of risks.

The US DOT issues the VSL number and updates it periodically. The following KABCO values are derived from the VSL:

K = Fatality = VSL
A = Incapacitating Injury
B = Non-incapacitating Injury (Evident)
C = Possible Injury
O = Property Damage

The KABCO values are used by engineering analysis programs to predict the crash costs of a given alternative or existing condition. Official KABCO values and discount rates are updated annually and published on the Design and Engineering Services Preconstruction webpage located here:

<http://dot.alaska.gov/stwddes/dcsprecon/index.shtml>

There are two department approved analysis programs available for predicting crash costs for roadway improvements:

- ROADSIDE
- Road Side Analysis Program (RSAP)

ROADSIDE is an engineering analysis tool that determines the benefits and costs of a given alternative under consideration. The value of ROADSIDE is its ability to predict accident rates and crash costs associated with a given roadside model. It requires input of estimated costs and modeling of the roadway segment under analysis, including cross-sectional geometry, horizontal and vertical alignment, obstacles, et.al.

ROADSIDE was included with early versions of the AASHTO Roadside Design Guide (RDG) beginning in 1989. Copies of this program and its user manual can be found on the Design and Engineering Services Preconstruction webpage located here:

<http://dot.alaska.gov/stwddes/dcsprecon/index.shtml>

The RSAP (Roadside Safety Analysis Program) is a roadside evaluation model that was developed under National Cooperative Highway Research Program Project 22-9 to assist designers in benefit-cost analyses. It is similar to ROADSIDE in function.

RSAP was included with the RDG (Appendix A) beginning in 2002. Copies of the current RSAP program and user manual can be found on the Design and Engineering Services Preconstruction webpage located here:

<http://dot.alaska.gov/stwddes/dcsprecon/index.shtml>

Designers may use either, or both, of these programs and should apply engineering judgement in interpreting the results from their use.

CEA Procedure

The discount rate, KABCO values, design life, and improvement costs need to be selected for use in the selected analysis program. In addition, the roadway alignment and cross section geometry, including roadside hardware, need to be modeled and input into the analysis program. The analysis program will compute the uniform annualized cost and benefit for each alternative under consideration and provide the benefit-to-cost (B/C) ratio.

As illustrated in Figure 1130-5, evaluation of alternatives is based on the following order of precedence:

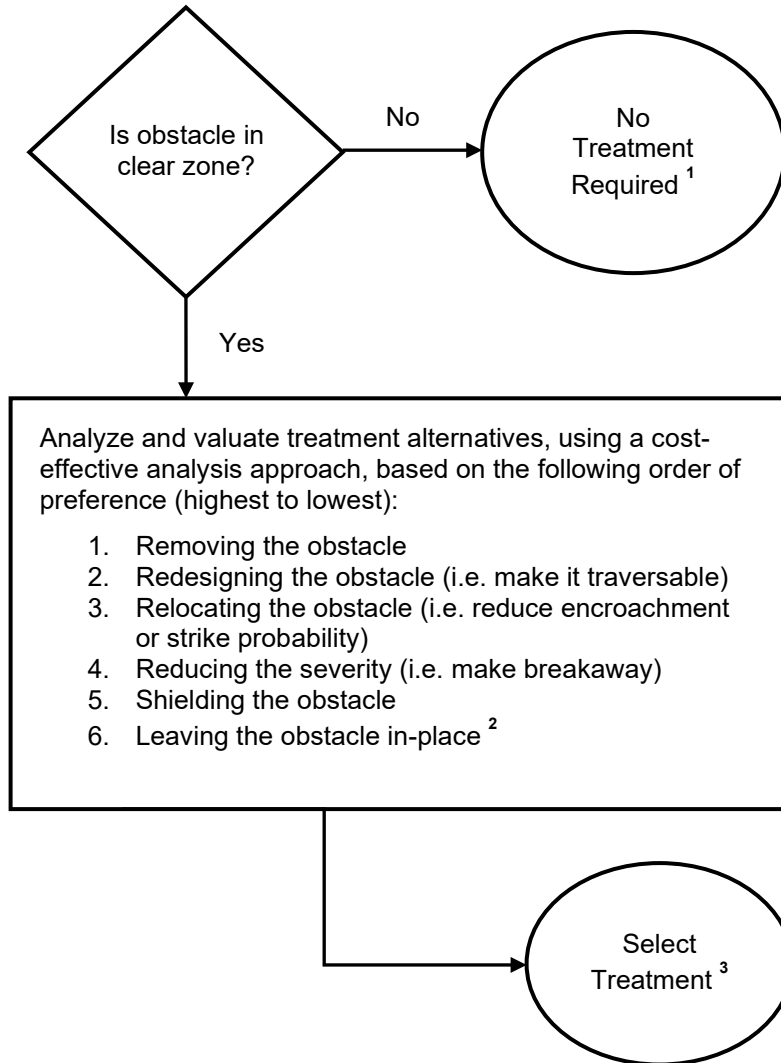
1. Remove the obstacle
2. Redesign the obstacle
3. Relocate the obstacle
4. Reduce the Severity of the obstacle
5. Shield the obstacle
6. Delineate the obstacle

An alternative with a B/C ratio greater than 1.00 is considered cost-effective; however, having a B/C ratio greater than one is not, in itself, sufficient justification for selection of a given alternative.

When comparing several alternatives, do not rely on the magnitude of the B/C ratio as the indicator of the best alternative. Use incremental B/C ratios to determine the most cost-effective solution. Consult the ROADSIDE or RSAP user's manual for further information on incremental B/C ratios and selection of the most cost-effective alternative.

Any alternatives under consideration that are within 10 percent of each other are essentially equal given the accuracy of estimating, analysis program modeling (user input), and analysis program output. The designer should ultimately use engineering judgement in selecting a final solution.

**Process for Determining Treatment of Roadside Obstacles
for New Construction and Reconstruction Projects**



¹ Treatment may be provided if dictated by sound engineering judgment. Instances where pedestrians congregate near roadways (such as playgrounds and multiuse paths), especially adjacent to the outside of curves on high speed roadways and in areas with a history of run-off-road type crashes, should receive special consideration.

² Delineate the obstacle when, in the judgment of the engineer, delineations would be effective in reducing accident frequency or severity.

³ When alternatives have a similar benefit-cost ratios, select the preferred alternative based on the order of precedence provided above.

Figure 1130- 5
Process for Determining Roadside Treatments on New and Reconstruction Projects

1140. Preservation Projects

- 1140.1. Introduction
- 1140.2. Project identification
- 1140.3. Project Scope
- 1140.4. Project Development and Design
- 1140.5. References

1140.1. Introduction

Preservation projects are those that extend the service life of existing roadways and bridges by restoring them to a state of good repair. Preservation is a proactive approach to maintaining highway facilities while they are still in relatively good condition.

Preservation performed before the onset of serious damage delays or eliminates the need for major rehabilitation or reconstruction.

FHWA recognizes preservation as an essential and cost-effective tool for achieving and sustaining highway facilities in a state of good repair and supports the increased flexibility in using federal-aid funds for cost-effective preservation.

Preservation projects are categorized as follows:

1. Preventive Maintenance (PM) Projects
2. Resurfacing (1R) Projects
3. Resurfacing and Minor Restoration (2R) Projects

Resurfacing, Restoration and Rehabilitation (3R) projects are covered in Section 1160.

Routine Maintenance is not eligible for federal-aid funding.

1140.2. Project identification

Highway segments and bridges needing preservation are identified and prioritized through the Pavement Management System (PMS) and Bridge Management System. The policy and procedure for these are contained in P&P 07.05.020 and P&P 07.05.025, respectively.

Predictive modeling software uses information from the PMS, Bridge Management System and the Maintenance Management System (MMS) to identify locations that would benefit from preservation. The Pavement Management Engineer and the Bridge Management Engineer select from the software output to create a list of proposed locations, including recommended preservation actions. In addition,

segments that are not candidates for preservation (i.e. needing a more substantial treatment) are submitted to Planning for consideration in the STIP. Finalized recommendations are included in the Annual Preservation Plan (APP). The final selection of locations are made by the Regions, which then feeds projects into the Preservation Projects development pipeline.

1140.3. Project Scope

Preservation project scope depends on the preservation treatments needed. It is important to apply the right preservation treatment at the right time. Pavement Preservation projects do not add capacity or alter existing road geometry.

See Table 1140-1 for a summary of Pavement Preservation categories.

All pavement preservation projects are required to:

1. Assure replacement striping is in accordance with the *Alaska Traffic Manual* (ATM).
2. Assure rumble strips are replaced or installed to meet current DOT&PF policy.
3. Follow vertical clearance policy for structures and utility lines per Table 1130-1. If the existing vertical clearance is less than 18 feet or the resulting project improvements will result in a vertical clearance less than 18 feet, relocate the overhead utility with a minimum clearance of 20 feet. When mitigating factors exist, the relocated utility may be installed with a vertical clearance no less than 18 feet.
4. Include required ADA improvements (see Section 1140.4.3.).
5. Assure warning devices for any highway-rail grade crossings within the project limits or near the project terminus are installed and functioning properly per 23 CFR 646.214.
6. Maintain functionality of traffic signal vehicle detection and other ITS elements.
7. Adjust appurtenances (i.e., manholes, valve boxes, monuments, etc.) in pavement as necessary.

8. Approach bridge work in accordance with Section 1140.4.2.

Pavement preservation projects may also include mitigation of pavement edge drop offs per Section 1160.3.7, installation of a safety edge or safety improvements.

**Table 1140-1
Pavement Preservation Project Categories**

Project Scope	Category	Purpose	Work Types
Pavement Preservation	Preventive Maintenance (PM)	Keep good roads in good condition	Typically pavement seals - fog, sand, scrub, chip seals
	Resurfacing (1R)	Restore fair roads to good condition. Address surface defects beyond preventive maintenance, such as ruts, or areas of high roughness	Mill/fill, overlay or other resurfacing treatment limited to 2" of new HMA
	Resurfacing & Minor Restoration (2R)	Restore roads beyond preventive maintenance or resurfacing to good condition	Mill/fill, overlay or reclamation with an overlay limited to 2" of HMA. Reclamation can include base stabilization.

1140.3.1. Preventive Maintenance Projects

Preventative Maintenance (PM) is the lowest level preservation strategy utilized by the PMS and a cost-effective, proactive means of extending the useful life of highways and bridges. PM slows or delays future deterioration and maintains or improves the functional condition of highway and bridge facilities. PM projects should consider maintaining or enhancing the current level of safety and accessibility. Consider addressing isolated or obvious deficiencies.

Typical activities performed on PM projects include:

1. Crack sealing
2. Profiling
3. Milling
4. Microsurfacing
5. Fog sealing
6. Sand sealing
7. Chip sealing
8. Scrub sealing
9. Roadway surface (gravel) replacement
10. Area-wide or system-wide activities:
 - a. Systematic replacement and/or upgrade of light and signal poles, light fixtures, signal heads, signal bulbs or LEDs near the end of their service life, and bases

- b. Area-wide striping
- c. Systematic sign replacement

This list is only a summary of work items previously determined to be federal-aid eligible after consultation with FHWA. Consult with FHWA regarding eligibility on work items not included in this list.

1140.3.2. 1R Projects

1R projects focus on resurfacing and typically have a pavement design life of five to 10 years. A capacity screening analysis is not required for this short duration design life. A safety screening is not required, but addressing known safety issues or enhancing the existing level of safety may be considered.

1R projects:

- May include any work allowed on PM projects
- Do not alter roadway geometry
- Minimizes fill beyond the existing slope limits
- Do not typically include guardrail work, unless approved by the Preconstruction Engineer
- May include structural section replacement, or digout, limited to 25% of the project area(s) – (example: digout existing structural section to 48 inch depth and replace with new structural section for 25% of project area).

1140.3.3. 2R Projects

2R projects focus on resurfacing and minor restoration, and may include minor rehabilitation

work. Minor rehabilitation consists of enhancements to eliminate age-related, top-down surface cracking in flexible pavements that develop due to environmental exposure. Thin overlays (of 2 inches or less) over recycling treatments (hot in-place recycling or cold recycling) are considered minor rehabilitation activities.

2R projects:

- Are cost-effective preservation projects done on facilities that are in a state of good repair and do not require rehabilitation (3R) or Reconstruction
- Do not alter roadway geometry
- Address safety through a Safety Screening
- Check capacity through a Capacity Screening. Projects needing capacity improvements are not good candidates for 2R
- Consider installing, replacing or upgrading guardrail and guardrail end treatments

Work allowed on 2R projects includes:

- Any work allowed on a PM or 1R project.
- Treatment of roadside obstacles
- Upgrade non-crashworthy sign supports in the clear zone, except those permitted under 17 AAC 10 and 17 AAC 60
- Repair drainage, but only as required for the structural integrity of the roadway, or to restore function which has deteriorated

2R projects typically have a 10-year minimum pavement design life. This design life length warrants both a capacity screening and safety screening.

Safety Screening

Regional Traffic and Safety will review the latest available Safety Screening lists summarized through the HSIP Program. Use this data to identify those segments or intersections that need to be addressed on the project, based on the following criteria:

- The overall five-year crash rate or crash frequency (concentration) exceeds 1.5 times the statewide average*
- The overall fatal and serious injury crash rate or crash frequency (concentration) exceeds 1.5 times the statewide average*

* Notes (to the bulleted list above):

1. Obtain the statewide crash rate from Statewide Traffic & Safety.

2. A three-year rate or frequency may be used in the absence of five years of available data.
3. Crash rate screening is not applicable for ADT's of less than 2,000 vehicles per day.
4. Crash frequency (concentration) applies at all traffic volumes.

Other safety elements to consider for improvement include:

- Segments or intersections listed on other HSIP Program screening lists for serious injury and fatal crashes. These may include crash strategies listed in the Alaska Strategic Highway Safety Plan.
- All affected railroad crossings, school zones, and marked non-motorized crossings

In addition, review other recent Reconnaissance and Design Study Reports in the project location to identify segments of safety concern. Any other safety concerns previously raised by the public or other stakeholders may also be considered for inclusion during design development.

If a 2R project is unable to address the issues identified in the Safety Screening, a 3R, HSIP, or other type of project should be developed.

Capacity Screening Analysis

A simplified highway capacity calculation method (such as FHWA Report PL-18-003) may be used to determine if there is sufficient capacity to support existing and projected vehicular traffic volumes for the design life of the project.

If the Capacity Screening analysis indicates the roadway cannot handle projected traffic volumes, develop it as a 3R or Reconstruction project.

1140.4. Project Development and Design

Preservation projects generally follow the project development and highway design standards detailed in Chapter 4 and Chapter 11 of this *Manual*, respectively, and those found in the *Alaska Flexible Pavement Design Manual* and the *Alaska Bridges and Structures Manual*.

1140.4.1. Pavement Design

The Pavement Management Engineer provides recommendations for pavement preservation needs. Regional staff may contact the Pavement Management

Engineer for treatment recommendations. If there is no recommendation, the project manager develops the preservation strategy and pavement design. Prepare pavement designs in accordance with the *Alaska Flexible Pavement Design Manual*. Per general policy statement GP-1, a pavement design analysis is only required on arterials and interstates.

1140.4.2. Bridge Work

Evaluate bridges in *fair* or *good* condition located within the limits of Preservation Projects. Bridges in poor condition may also be considered; however, they will generally require major rehabilitation or replacement, which are beyond the scope of preservation.

See Table 23-1 of the *Alaska Bridges and Structures Manual* (ABSM) for bridge railing criteria for all project types.

See the *FHWA Bridge Preservation Guide, Maintaining a Resilient Infrastructure to Preserve Mobility, Spring 2018*, for criteria for bridge preservation goals and activities.

PM and IR Projects

Apply cost-effective deck surface treatments to bridges in *fair* or *good* condition to extend their service life. These treatments are typically either cyclical or condition-based maintenance activities.

Cyclical maintenance is performed at predetermined intervals and includes cleaning bridge decks, joints, drains and applying concrete sealers. Condition-based maintenance is commonly identified from bridge inspection reports and may include:

- Expansion joint cleaning, repair and replacement
- Deck sealing, overlays and wearing surfaces
- Railing repair

Note, routine maintenance activities (snow and trash removal, crash damage repair, storm damage repair, etc.) are not typically eligible for federal funding.

Evaluate existing surfacing and its impact on load ratings and bridge rail height. Remove existing asphalt surfacing and install waterproofing membrane on concrete decks that do not already have membrane or show signs of excessive leakage. Limit new surfacing thickness to avoid significantly changing load ratings and bridge rail height.

Evaluate vertical clearances at all overcrossings and undercrossings regardless of bridge condition.

Consider the impact of new surfacing on the vertical clearance beneath these structures.

2R Projects

Perform the same evaluations as for PM and IR Projects. Additionally, consider the following preservation treatments, rehabilitation and replacement strategies as defined in Section 10.2.3 of the ABSM:

- Crack sealing and concrete spall repairs
- Channel debris removal
- Scour countermeasures
- Railing retrofit and replacement
- Painting and metalizing structural steel

1140.4.3. ADA Improvements

Projects considered alterations are required to make certain simultaneous ADA upgrades while projects considered maintenance are not.

Maintenance includes:

- Chip seals
- Crack filling and sealing
- Diamond grinding
- Dowel bar retrofitting
- Fog seals
- Joint crack seals
- Joint repairs
- Pavement patching
- Scrub sealing
- Slurry seals
- Spot high-friction treatments
- Surface sealing

Alterations include:

- Addition of a new layer(s) of asphalt
- Cape seals
- Hot in-place recycling
- Microsurfacing / thin-lift overlays
- Mill & fill / mill & overlays

If a project is considered an alteration, and there are adjacent pedestrian walkway amenities, then curb ramps and crosswalks must be constructed or improved to current ADA standards as part of the alteration project, except as noted in the following paragraphs.

If a curb ramp was built or altered prior to March 15, 2012, and complies with the requirements for curb ramps in either the 1991 ADA Standards for

Accessible Design or Uniform Federal Accessibility Standards (UFAS), it does not have to be modified to comply with the requirements of the 2010 ADA Standards. However, if that existing curb ramp did not comply with either the 1991 Standards or UFAS as of March 15, 2012, then the “safe harbor” provision does not apply and the curb ramp must be brought into compliance with the requirements of the 2010 ADA Standards concurrent with the road alteration.

Any features disturbed by construction must be replaced so they are accessible, even on maintenance projects. Pedestrian amenities other than curb ramps and crosswalks, such as sidewalks, paths, bus stops, etc., do not require upgrading as part of an alteration project, but should be evaluated for accessibility and any identified deficiencies noted.

When existing curb ramps and crosswalks meeting 1991 ADA Standards or UFAS will remain in place, transmit this information to the Civil Rights Office (CRO). Inform the CRO of any known accessibility deficiencies within the public right-of-way for inclusion into the Transition Plan. The Transition Plan identifies non-compliant features and serves as a guide for future planning and prioritization of ADA improvements.

1140.4.4. Design Study Report (DSR)

Preservation projects do not require a DSR. On 2R projects, safety and capacity analyses are retained in the project design files.

1140.5. References

1. FHWA Guidance on Highway Preservation and Maintenance, dated Feb. 5, 2016
2. US DOJ/US DOT joint technical assistance on requirement to upgrade curb ramps on resurfacing projects:
3. Q & A for Supplement to the 2013 DOJ/DOT Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements To Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing (Safe Harbor provisions discussed in Q1/A1)
4. FHWA Office of Civil Rights guidance document. FAQs on ADA and Section 504. Discussion of transition plans, timing of accessibility improvements, and other relevant topics.

5. FHWA Good Practices: Incorporating Safety into Resurfacing and Restoration Projects, dated Dec. 2006.

1150. Urban Streets

- 1150.1. Urban Streets
- 1150.2. Urban Arterials and Collectors
- 1150.3. Roundabout First Policy

1150.1. Urban Streets

Lane configuration at intersections should be determined through capacity analysis procedures presented in the Highway Capacity Manual (HCM). Configure the number and movement assignments for lanes to meet the range of level of service guidelines in the GB, or guidelines adopted by the local transportation authority. Reference the GB to determine the geometry of urban arterials, collectors, and local streets. For urban local streets with ADT < 2000, reference the GDLVR.

Urban streets are defined by roads within an urbanized boundary with a population of 5,000 or above.

For non-NHS Routes other standards and guides may be used if adopted by the local transportation authority and the local transportation authority is the owner of the road and project sponsor. If the project is FHWA funded, the standards and guides must be recognized by FHWA in accordance with 23 USC 109(o)(B). Current FHWA accepted standards are available at: <https://www.fhwa.dot.gov/design/altstandards/index.cfm>

1150.2. Urban Arterials and Collectors

1150.2.1. Design Considerations

Design of urban arterials on the National Highway System shall begin with the recommendations in the GB and be adjusted within the flexible range of GB guidelines for the context of the area.

1150.2.2. Medians and Two-Way Left-Turn Lane (TWLTLs)

Roads with design speeds of 45 mph or higher and with forecast average daily traffic of 20,000 vehicles per day or less should be designed with non-traversable medians.

Full median openings permit cross traffic and left turns, which conflict with the through traffic on the arterial. Full median openings should be limited to locations that are signalized or may be signalized in the future, such as major shopping centers and intersections with other arterial or collector roadways to minimize delays and crash exposure. Because of

the potential for signalization, full median openings should be spaced consistent with signal spacing in 1150.2.3.

Consider directional median openings at minor street intersections or to provide u-turn opportunities where adjacent signal capacity for left turns is limited. These conflicts result in delays and crash exposure, which you can minimize by managing and limiting median openings to those that are critical to access the area.

Median openings should be sufficiently spaced to provide adequate length for storage in the left turn lane and an appropriate length taper. Lane and taper requirements are found in the GB and the Alaska Traffic Manual (ATM).

When restricting mid-block left turns, balance safety and capacity. Consider how much traffic will use alternative routes and how much will become u-turns. When adjacent signals are already at capacity for left turns and u-turns, at least one mid-block opening may be of benefit to maintain signal efficiency. A similar situation exists where a minor street intersects the arterial and does not provide a median opening.

Provide median openings only if the volume of cross- or left-turn traffic is warranted, such as at another arterial or major collector street or, in some cases, at an access point to a major traffic generator, such as a regional shopping center or industrial plant. Because the openings are at major traffic points, assume that at some time, if not immediately, these median opening locations will be signalized. Additionally, where signalized intersections are 0.5 mile or less apart, efficiency and safety require interconnected or synchronized signals to achieve smooth traffic flow along the arterial.

For median widths reference the GB. Provide a minimum width of 4 feet to allow for sign width for separation of traffic in opposing directions. Additional width may need to be provided to accommodate wider signs.

If medians will provide pedestrian refuge, ensure the minimum width meets or exceeds the appropriate ADA standard. Reference the ATM for mid-block crossing for non-motorized users.

In areas with frequent driveways and side streets, and volumes <20,000 vpd, a continuous two-way left-turn

lane (TWLTL) can provide additional capacity and reduce crash potential. Perform a capacity analysis to determine the number of thru lanes needed. A 3-lane section can often replace a 4-lane section with minimal impact on travel time while providing space for non-motorized users.

1150.2.3. Signalized Intersections

One of the most critical design criteria for smooth, two-way operation of a signalized arterial is to evenly space signalized intersections along the arterial. It is not necessary that the distance between signalized intersections be exactly even, provided the longer distances are integer multiples of the ultimate minimum spacing. Each traffic signal per mile added to a roadway reduces speeds by 2-3 mph. Ideal signal spacing is 0.5 mile, although 0.25 mile spacing for signals may be necessary in some contexts. As indicated above, assume that every median opening will eventually be signalized and hence, median openings should be evenly spaced or spaced at integer multiples along the arterial. More guidance on signal spacing can be found in the ITE Traffic Engineering Handbook.

The minimum distance between median openings is also critical if reasonable progression speed is to be achieved along the arterial. Analysis of progression is most efficiently performed with software that is specifically designed for that purpose. The longer the distance and/or the shorter the cycle, the better the progression speed.

As a rule, alternating signals should be greater than 0.25 miles apart. Although you may achieve closer spacing between signalized intersections by using simultaneous signal groups with alternating group displays, be aware that when using adjacent simultaneous signals, the available green time for continuous through-movements on the arterial is substantially reduced.

1150.2.4. Auxiliary Lanes

In addition to signal progression considerations, median openings should be sufficiently spaced to provide adequate length for storage in the left turn lane and an appropriate length taper. Turn lane lengths should be designed to meet storage and deceleration requirements presented in Table 1150-1. Storage, or queue lengths, should be determined through methods in the HCM or through simulation software. Deceleration length should be determined through methods presented in the GB.

Space median openings to accommodate the full length of the left turn lane, including taper. Lane and taper requirements are found in the GB and the ATM.

1150.3. Roundabouts First Policy

The Roundabout First Policy requires that a single lane roundabout be considered at all locations where a new traffic signal is being considered. Justification for not installing a roundabout needs to be included in the Design Study Report (See Section 450.5.1).

Table 1150-1
Auxiliary Lane Length Guidelines for Urban Streets

Unsignalized Intersections			References
Approach	Length Component		NCHRP 457
	Left-Turn Bay	Right-Turn Bay	
Free-flow, Main Street	Storage & Deceleration	Deceleration	
Stopped, Minor Street	Storage	Storage	
Signalized Intersections			
Approach Speeds	Left-Turn Bay	Right-Turn Bay ¹	NCHRP 279
30-35 mph	Storage	Storage	
40-45 mph	Storage & Deceleration	Storage & Deceleration	
> 50 mph	Storage & Deceleration	Storage & Deceleration	

¹These guidelines are derived from left-turn recommendations presented in NCHRP 279

References: *NCHRP 457 Evaluating Intersection Improvements- An Engineering Study Guide*, *NCHRP 279 Intersection Channelization Design Guide*

Notes :

- 1) It is undesirable for storage to spill out and block access of other lanes to the adjacent signal during green indications for other lanes. However, where constrained, the turning vehicle may enter the turn lane taper at 10 mph less adjacent through lane speeds.
- 2) The minimum turn lane length shall accommodate at least one design vehicle, but shall be no less than 100 feet.

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1160. Resurfacing, Restoration, & Rehabilitation Projects (3R)

- 1160.1. Guidelines
- 1160.2. Factors
- 1160.3. 3R Geometric Design Standards
- 1160.4. Studies
- 1160.5. Gravel to Pavement

1160.1. Guidelines

1160.1.1. General

This chapter presents the procedures for development of 3R projects in Alaska, which are cost-effective and enhance highway safety. These procedures are required where projects are federally funded or on federal-aid routes. In nonfederal projects, these procedures represent good engineering, but they are not mandatory.

1160.1.2. Background

Prior to 1976, federal-aid highway funds were generally limited to participation in the new construction of highways. Preservation of the existing highways was a state or local agency responsibility.

By 1975, it became evident that many sections of the existing highway system were reaching the end of design life, and the rate of deterioration was exceeding the funding levels available for preservation. In recognition of this problem, Congress, in the 1976 Federal-Aid Highway Act, broadened the scope of the Federal-Aid Highway Program to include preservation work by adding resurfacing, restoration, and rehabilitation (3R) to the definition of construction under Title 23, USC, Section 101(a).

However, since many existing highways do not meet current design standards and have safety deficiencies, the amount of upgrading to current 3R project standards has been a continuing concern. This concern was recognized in the 1982 Surface Transportation Assistance Act, Section 101(a), which emphasizes safety by stating that 3R projects “shall be constructed in accordance with standards that preserve and extend the service life of the highways *and enhance highway safety*.” (Emphasis added.)

1160.1.3. Definition

Rehabilitation (3R) projects consist of the resurfacing, restoration, and rehabilitation of an existing roadway on the same alignment or modified alignment. The principal objective of 3R projects is to restore the structural integrity of the existing roadway, thereby extending the service life of the facility. In addition,

the safety and capacity of the facility should be enhanced, if required.

Generally, a 3R project consists of the repaving or the asphalt paving of an existing gravel surface. It can also include drainage improvements and reconstruction of the structural section. Safety enhancements include improvement of deficient geometry identified by a performance criterion found in this section. Capacity enhancements include the addition of truck climbing lanes, passing lanes, and slow moving vehicle lanes. Turnouts may be added as safety enhancements where driver fatigue or sightseeing are factors in accidents.

Section 1160.5. describes a modified design procedure for non-NHS road construction projects whose primary purpose is to reduce maintenance costs and improve the quality of life for Alaskans by hard surfacing of gravel roads, but that may include limited shoulder, drainage, and other work related to preserving the road structure.

1160.1.4. Determining the Type of Project

Follow normal project planning and programming procedures for determining the type of improvement: new construction, reconstruction on existing alignment, or restoring the existing facility (3R). This determination is specified on the Design Designation.

Select a design year that at least equals the expected life of the improvement. Designate the design year in five-year increments.

1160.2. Factors

Evaluate the following in determining type and scope of a project:

1. **Pavement Condition:** The existing pavement condition and the scope of needed pavement improvements dictate to a large extent what improvements are feasible. The project analysis should indicate how existing pavement condition and the scope of pavement improvements will interrelate with the scope of geometric improvements and the values used for design of geometric improvements.
2. **Physical Characteristics:** The physical characteristics of a highway and its general location often determine what improvements are necessary, desirable, possible, practical, or cost-effective. Consider topography, climate, adjacent

development, existing alignment (horizontal and vertical), cross-section (pavement width, shoulder width, cross slope, and sideslopes), and similar characteristics in determining the scope of geometric or safety improvements to be made in pavement-type 3R work.

3. **Traffic Volumes:** Traffic data are needed in the design of all highway improvements, including 3R. Traffic volume is an important consideration in determining the appropriate level of improvement (for example, reconstruction versus 3R) and in the selection of values for the various geometric elements.
4. **Traffic Controls and Regulations:** Signing and marking in all highway projects, including 3R, must conform to the *Alaska Traffic Manual* (ATM). Where roadway geometry or other roadway or roadside features do not meet the drivers' expectancy and reconstruction is not appropriate, consider additional signs, markings, and other devices beyond the normal requirements of the ATM. While traffic control devices cannot fully mitigate all problems associated with substandard geometric features, they can compensate for certain operational deficiencies. In addition, judicious use of special traffic regulations, positive guidance techniques, and traffic operational improvements can often forestall expensive reconstruction by minimizing or eliminating possible adverse safety and operational features of existing highways.
5. **Accident Records:** Accident records are an integral part of these 3R standards. It is necessary to reference the state reporting system to evaluate existing geometric features for accident performance. Generally, use a three- to five-year period. When evaluating historical accident records, examine each accident as a whole, regardless of the number of vehicles or people involved. Moose accidents and alcohol-related accidents are eligible. Obtain average accident rates from the January 25, 2002, DOT&PF *Highway Safety Improvement Program Handbook*.
6. **Skid Resistance:** A skid-resistant surface should be an essential part of any pavement surface improvement, regardless of the scope of geometric problems or improvements. The Alaska design method for asphalt pavement provides a skid-resistant surface. Portland cement concrete requires a broom or similar finish.
7. **Economics:** By their purpose and definition, 3R projects reflect and emphasize the economic management of the highway system. The purpose of 3R is to prolong and preserve the service life of existing highways and to enhance highway safety to protect the investment in, and derive the maximum economic benefit from, the existing highway system. Economic considerations should be a major factor in determining the priority and scope of 3R work.
8. **Potential Impact of Various Improvements:** Often, development and effects on the land influence the scope of geometric improvements made by 3R projects. Typically, social, environmental, and economic impacts severely limit the scope of 3R projects, particularly where the existing right-of-way is narrow and there is considerable adjacent development.

1160.3. 3R Geometric Design Standards

1160.3.1. General (Design Exceptions)

Design all 3R-type projects using the 3R design criteria found in this section. Design standards for 3R projects that are not in this section shall be dictated by the remaining applicable sections of Chapter 11 and the current *AASHTO A Policy on the Geometric Design of Highways and Streets 2001*. All signing and pavement markings must conform to the *Alaska Traffic Manual*. Upgrade all warranted guardrail terminals and bridge rail terminal connections to current standards (see Table 1130-12 of this manual for guardrail terminal replacement guidance). If an engineering analysis indicates that a section of existing guardrail is not warranted for obstacle protection or other operational factors, it may be removed. Design exceptions, in accord with Section 1100.3., shall be required when the results or determinations of the 3R design procedures require a feature improvement and the proposed project does not include that improvement.

Continuity may require that routes be analyzed as a whole with respect to lane, shoulder widths, and cross-section geometry. Apply 3R standards to individual projects, but regional policy may be required for minimum acceptable geometry on individual routes.

Urban and Multilane Rural Highways

Less is known about the safety cost-effectiveness of widening urban and multilane rural highways, and minimum values have not been proposed that highway agencies can adopt as standards. Use the minimum widths recommended for rural two-lane highways as a guide to safety cost-effective improvements for multilane rural and urban highways. However, routinely upgrading lane and shoulder widths in urban areas to the minimum widths recommended for rural two-lane highways is likely to produce some widening projects that are not safety cost-effective, particularly when there are physical constraints or high right-of-way costs. In such situations, determine the scope of widening improvements on a case-by-case basis.

Gravel Surfaced Roads

Roads in this class do not have to be analyzed for routine safety enhancement unless a prodigious accident history at specific locations warrants an improvement.

Design Volume

Determine ADT for the design life of the project. The design ADT shall equal the mid-design period ADT. Generally, design life periods for 3R projects are equal to the pavement design periods and should be compatible with the service life of the improvement.

Design Speed

The recommended minimum design speed is the 85th percentile speed. You should consider that the actual 3R improvement may increase the operating or measured 85th percentile speed over that currently posted.

On lower volume roadways, AADT less than 2,000, it may be cost prohibitive to obtain a sample size that provides a statistically valid speed study to define 85th percentile speeds for design. In these cases, the engineer should drive the project and use operating speeds observed during field investigations for the design speed, or use the safe speeds defined by existing geometrics.

Where AADT is greater than or equal to 2,000, it is likely that the Department has speed studies for the roadway on file and these should be used to estimate the 85th percentile speeds for 3R evaluation and design. If not, speed studies at these locations are usually economically feasible. Consider additional speed studies or field observations to estimate speeds in areas where there are significant accident clusters.

1160.3.2. Lane and Shoulder Widths

Rural Two-Lane Paved Highways

Select lane and shoulder width improvements in accordance with a performance evaluation based on historical accident rates versus a predicted rate A. Compilation of actual accident rates and computation of a predicted accident rate A are required. Calculate the actual accident rate for the previous three- to five-year period for comparison to the predicted rate A.

If the historical accident rate is equal to or less than the predicted rate A, then the existing total lane and shoulder width may remain unchanged.

If the historical accident rate exceeds the predicted rate A, widen the total lane and shoulder width, in each direction, by 1 foot on each side for every 10 percent increment the historical accident rate exceeds A. The widening shall not exceed the values required for new construction.

Study accident data to identify accident clusters that may result from high hazard locations atypical to the route or project. You may remove the accident data from these locations for the determination of lane and shoulder widths, but analyze them on an individual basis as required by the 3R Procedure Outline shown in Figures 1160-1 and 2.

When evaluating lane and shoulder widths, consider route continuity. Adjoining projects could have a bearing on the width selection.

$$A = 0.0019 \text{ ADT}^{0.882} \times 0.879^W \times 0.919^{PA} \\ \times 0.932^{UP} \times 1.236^H \times 0.882^{TER1} \times 1.322^{TER2}$$

(Ref. Transportation Research Board Special Report 214, Appendix C)

A = number of run-off road, head-on, opposite-direction sideswipe, and same-direction sideswipe accidents per mile per year. Does not include intersection accidents

ADT = two-directional average daily traffic volume for the study period

W = existing lane width in feet

PA = existing width of paved shoulder in feet

UP = existing width of unpaved (gravel, turf, earth) shoulder, in feet

H = median roadside hazard rating for the highway segment, measured subjectively on a scale from 1 (least hazardous) to 7 (most hazardous). See Figures 1160-1 through 1160-7.

TER1 = 1 for flat terrain, 0 otherwise

TER2 = 1 for mountainous terrain, 0 otherwise

This accident model is limited because it applies only to:

- Lane widths of 8 to 12 feet and shoulder widths of 0 to 10 feet. Combinations of lane and shoulder widths that can be reasonably modeled are limited to those shown in Figure 3-2, Chapter 3 of *TRB Special Report 214*.
- Two-lane, two-way paved rural roads
- Homogeneous roadway sections. It does not include the additional accidents expected at intersections.

**Table 1160-1
3R Procedure Outline (Case I)**

3R PROCEDURE OUTLINE CASE I

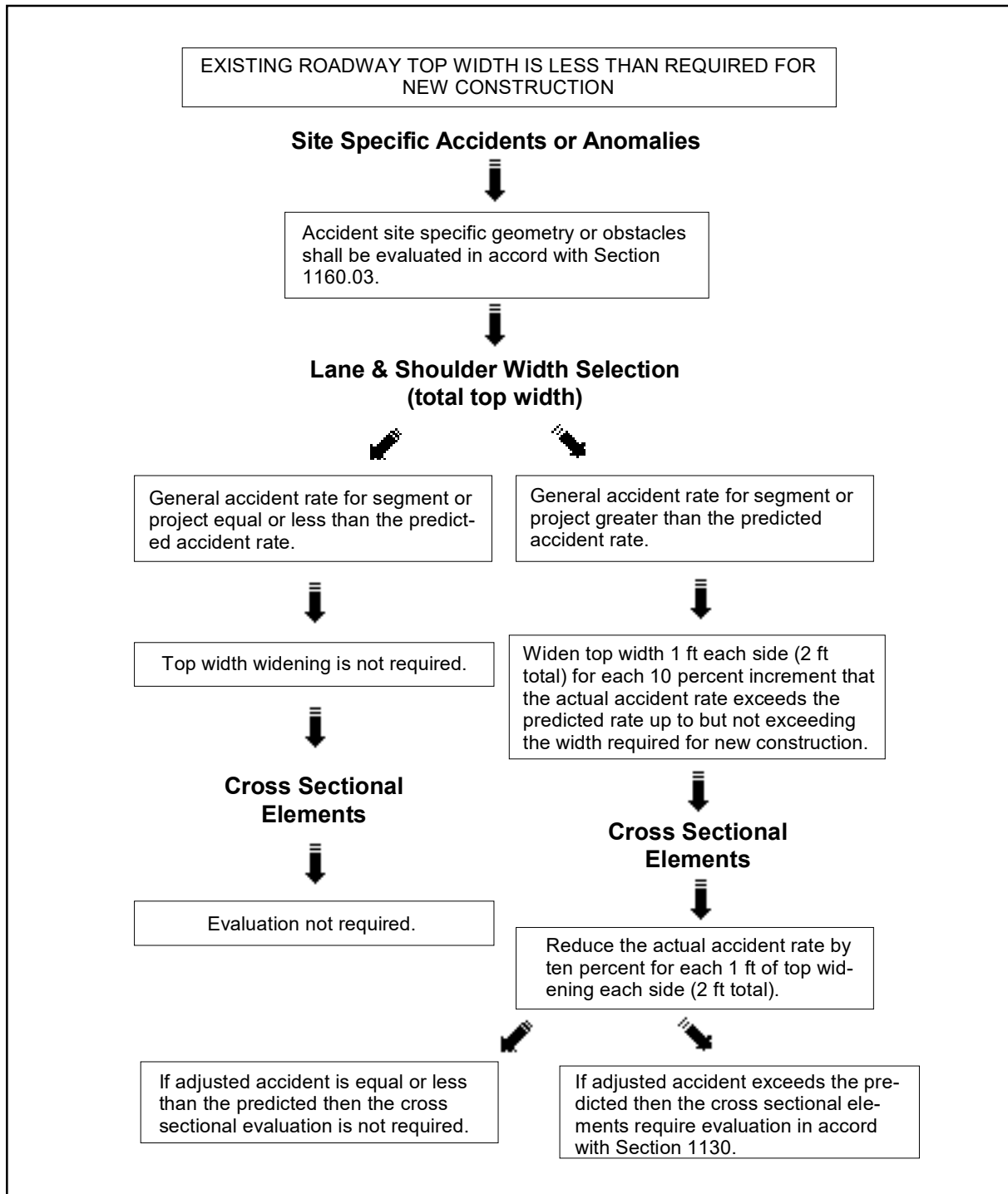
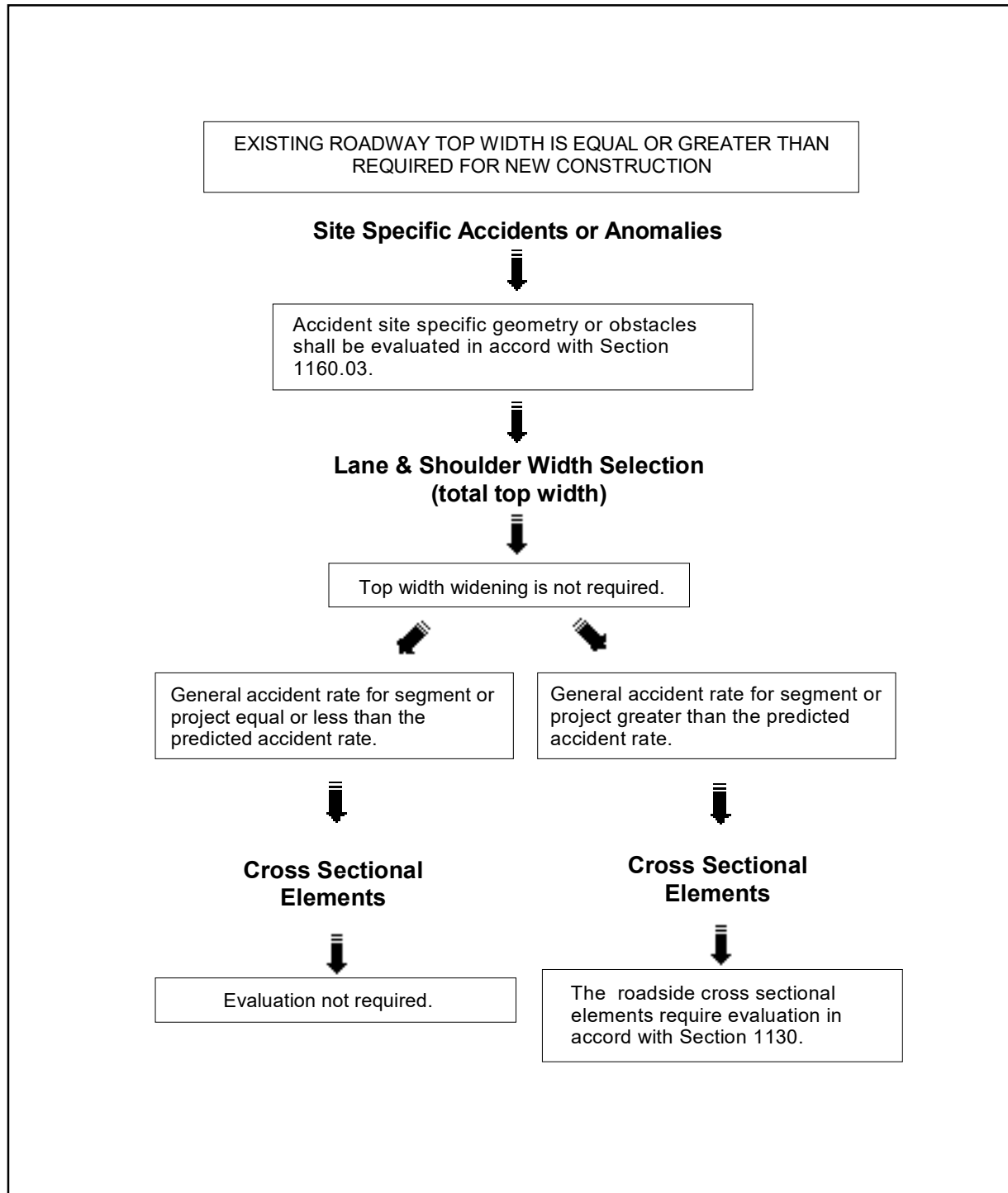


Table 1160-2
3R Procedure Outline (Case II)

3R PROCEDURE OUTLINE

CASE II



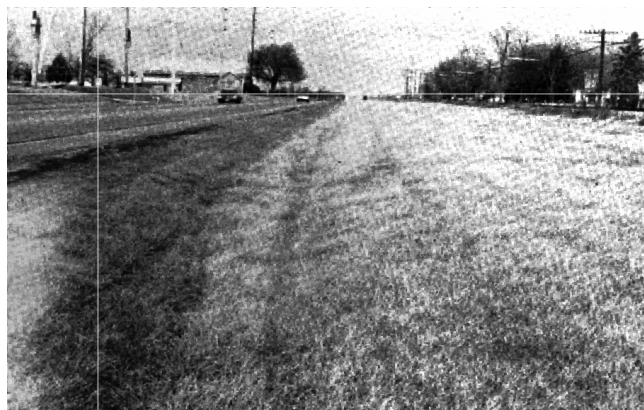


Figure 1160-1
Rural Roadside Hazard Rating of 1

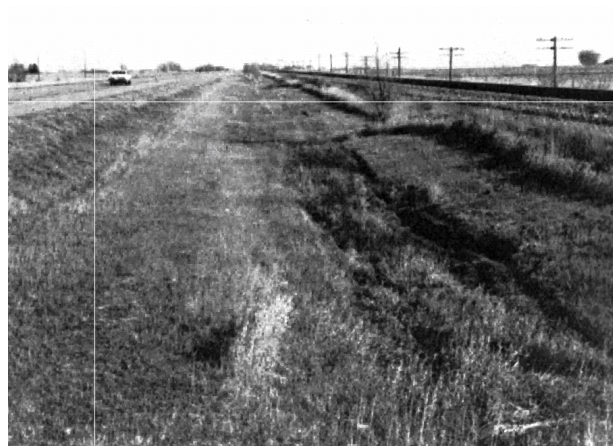
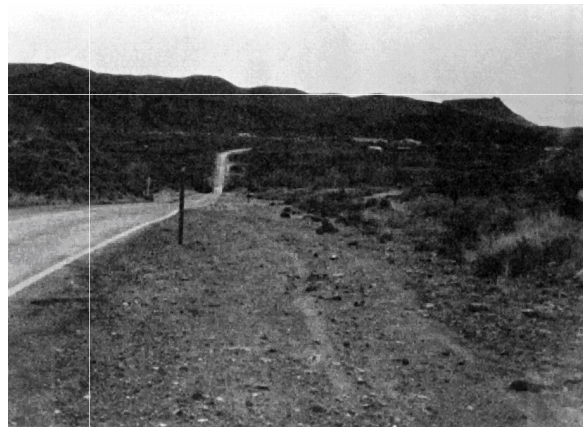
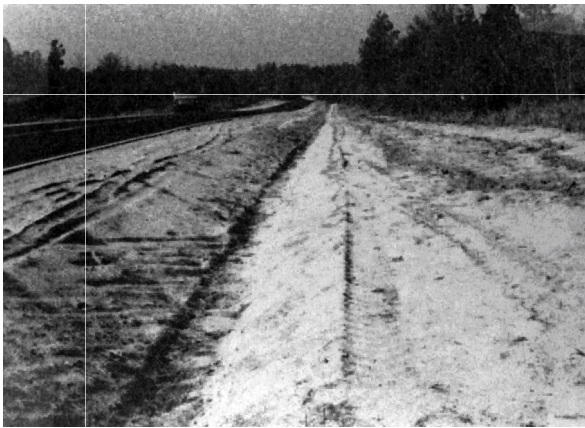
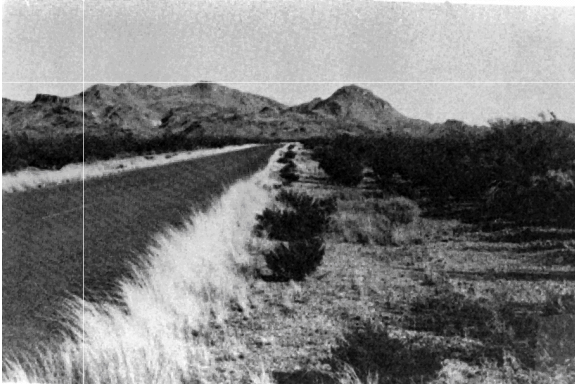


Figure 1160-2
Rural Roadside Hazard Rating of 2

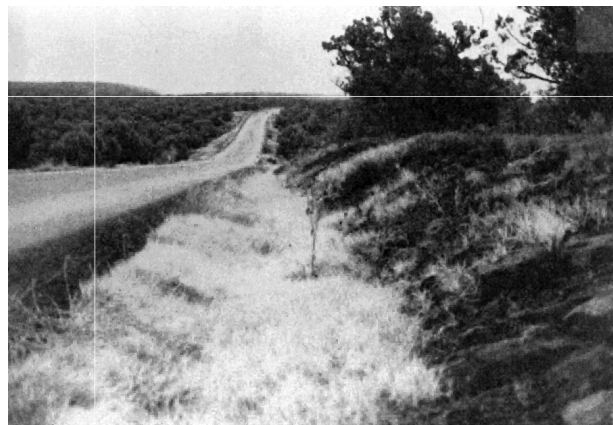
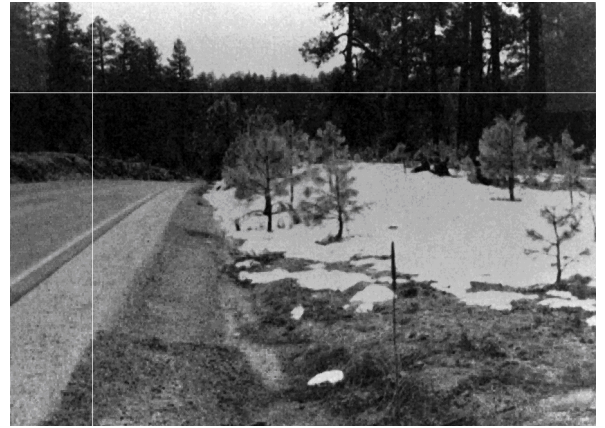
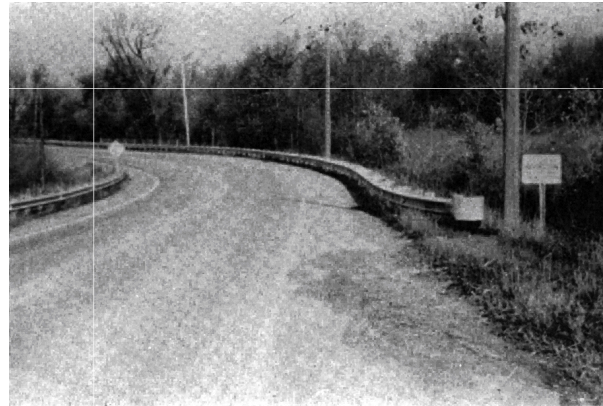


Figure 1160-3
Rural Roadside Hazard Rating of 3



**Figure 1160-4
Rural Roadside Hazard Rating of 4**



Figure 1160-5
Rural Roadside Hazard Rating of 5

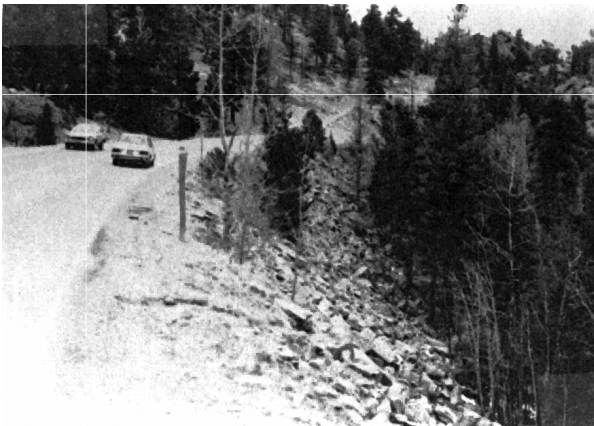
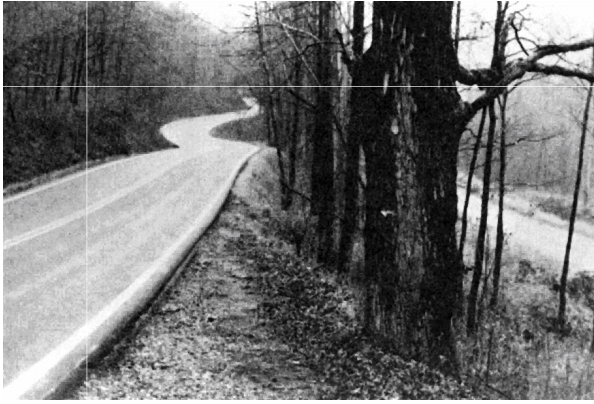


Figure 1160-6
Rural Roadside Hazard Rating of 6



**Figure 1160-7
Rural Roadside Hazard Rating of 7**

1160.3.3. Horizontal Curves

Radius of Curvature

The existing horizontal curvature may be used if superior (or equal) to the values required for new construction, or if the actual number of accidents for the previous three- to five-year period on the section of road under consideration is less than A_h . If the number of accidents is equal to or greater than A_h , improve the horizontal curvature to the standards of new construction unless it is not cost-effective. Horizontal curves that have no accident history do not require an evaluation and may remain unmodified.

$$A_h = AR_s(L)(V) + [0.0336 * D * V] \quad \text{for } L \geq L_c$$

(Ref. Transportation Research Board, Special Report 214, Appendix C)

where:

A_h = predicted total number of accidents on the segment

AR_s = accident rate on comparable straight segments in accidents per million vehicle miles

L = length of highway segments in miles

V = total traffic volume in millions of vehicles

D = curvature in degrees

L_c = length of curved component in miles

Consider in the cost-effective analysis the historic accident rate for the previous three- to five-year period and the related societal costs (See Example 1160-4). An annual accident cost can be calculated and compared to the annual cost of the improvement.

An annual accident cost savings should be determined as the product of the accident reduction factor (ARF) (Equation 4 in Appendix D, TRB 214; Table D-7, TRB 214; or DOT&PF's Highway Safety Improvement Program Handbook, January 25, 2002) produced by the improvement and the historic annual accident cost over the study period. The improvement is considered cost-effective if the annual accident cost savings exceeds the annual cost of the improvements.

When it is not cost-effective to improve curve alignment, consider other safety improvement measures. These improvements can consist of widening and paving shoulders, widening the clear zone, flattening steep sideslopes, removing or relocating roadside obstacles, and installing traffic

control devices such as raised pavement markings or reflective guideposts.

Superelevation

Superelevation may remain unchanged if there are no related accidents. When accidents are related to the existing superelevation, modify it to conform to the requirements for new construction. In unusual cases, it may be possible to show by a cost-effective analysis, based on a three- to five-year accident history, that an existing cross slope may remain.

Superelevation Transition Length

Transition length requirements generally control driver comfort and roadway appearance rather than safety, so existing transition lengths that do not meet the requirements for new construction may remain.

Minimum Length of Curve

Curve length requirements generally control driver comfort and roadway appearances rather than safety, so existing curve lengths that do not meet the requirements for new construction may remain.

1160.3.4. Vertical Curvature and Stopping Sight Distance

Sag Vertical Curves

An analytical method is not available to analyze accidents at sag vertical curves. Generally, sag vertical curves that do not meet AASHTO requirements may remain. If a grouping of accidents at a sag vertical curve appears to be an anomaly when compared to similar curves, an improvement may be needed if cost-effective.

Crest Vertical Curves

Existing crest vertical curvature may be used if superior or equal to the values required for new construction, or if the actual number of accidents for the previous three- to five-year period on the section of road under consideration is less than N_c . If the number of actual accidents is equal to or greater than N_c , then improve the crest vertical curvature to the standards of new construction unless it can be shown not cost-effective. Vertical curves that have no actual accident history do not require an evaluation and may remain unmodified.

$$N_c = AR_h(L_{vc})(V) + AR_h(L_r)(V)(F_{ar})$$

(Ref. Transportation Research Board, Special Report 214, Appendix C)

where:

N_c = number of predicted accidents attributable to the crest vertical curve segment

Ar_h = average accident rate for the highway in consideration in accidents per million vehicle miles

L_{vc} = length of vertical curve (highway segment) in miles

V = total traffic volume in millions of vehicles

L_r = length of restricted sight distance in miles (The length of restriction is the distance over which the available sight distance is less than that considered adequate by AASHTO procedures for the actual highway operating speed.)

$$L_r = \frac{[a_0 + (a_1 \times A)]}{5280}$$

A = the absolute value of grade difference in percent

F_{ar} = accident rate factor. See Table 1160-3 and Table 1160-4.

Equation 7 in Appendix E of TRB 214 predicts the change in accidents resulting from lengthening crest vertical curves. An annual cost savings can be estimated using the historic annual accident cost over the study period. The improvement is considered cost-effective if the annual accident cost savings exceeds the annual cost of the improvements.

1160.3.5. Bridges

Width

Improve bridge widths to the minimums established in the *AASHTO A Policy on the Geometric Design of Highways and Streets 2001* when the length is less than 100 feet and the usable width is less than the following values:

Mid Design Period ADT	Usable Bridge Width (ft) ^a
0-750	Width of Approach Lanes
751-2,000	Width of Approach Lanes plus 2 feet
2,001-4,000	Width of Approach Lanes plus 4 feet
Over 4,000	Width of Approach Lanes plus 6 feet
^a : If lane widening is planned as part of the 3R project, the usable bridge width should be compared with the planned width of the approaches after they are widened.	

You may leave qualified bridges above in place if no improvement is necessary based on a cost-effective analysis considering the previous 10-year accident history.

Bridges longer than 100 feet that are substandard in width generally are not considered for width improvement under 3R standards.

Structural Capacity

If any existing structural member has a design capacity less than HS 15 (HS 20 for interstate bridges), replace that member.

Bridge Rail and Transitions

On projects containing major bridge rehabilitation (widening, strengthening, and/or deck replacement), ensure all bridge rail and rail transitions meet strength and crash test criteria for the appropriate rail performance level. In lesser rehabilitation projects, determine by a cost-effective analysis the appropriate rail upgrade (previously discussed in this chapter). The Bridge Section will be responsible for maintaining the procedures to be used and for applying the current bridge rail upgrade guides.

Earthquake Capacity

All bridges on rural or urban arterials and rural or urban collectors, where there are no feasible detour routes, are essential. In addition, classify bridges as essential if they provide the only feasible access to:

- Military bases, supply depots, and National Guard installations
- Hospitals, medical supply centers, and emergency depots
- Major airports
- Defense industries and those that could easily or logically be converted to them
- Refineries, fuel storage, and distribution centers
- Major railroad terminals, railheads, docks, and truck terminals
- Major power plants, including nuclear power facilities and hydroelectric centers at major dams
- Major communication centers

- Other facilities that the state considers important from a national defense viewpoint or during emergencies resulting from natural disasters or other unforeseen circumstances

Bridges on 3R projects shall be assigned to a Seismic Performance Category in accordance with the current *AASHTO Specifications for Seismic Design of Highway Bridges*.

You do not have to investigate bridges rated SPC “A” for earthquake retrofitting.

Investigate bridges rated SPC “B,” “C,” or “D” for bearing width, bearing height, joint restraint, bearing restraint, support width, and other evident areas of potential seismic motion distress. Retrofit those structures that do not conform to the *AASHTO Specifications for Seismic Design* in the above areas in accord with the Federal Highway Administration publication FHWA-RD-94-052, *Seismic Retrofitting Manual for Highway Bridges*.

The Headquarters Bridge Section will be responsible for the retrofitting investigation. If required, the Bridge Section will also prepare retrofitting plans and specifications for inclusion in the 3R project documents.

The estimated cost of any individual bridge earthquake retrofit shall not exceed 10 percent of the estimated total structure value. If the cost exceeds 10 percent, qualify the structure for retrofitting under another funding source.

1160.3.6. Sideslopes and Clear Zones

Evaluate section geometry and obstacles within the clear zone when required by the 3R Procedure Outline shown in Tables 1160-1 and 2.

1160.3.7. Pavement Edge Drop

Edge drops at the edge of the traveled way are a recognized safety hazard. These drops generally occur with degradation of unpaved shoulders. Paving shoulders is the best solution for eliminating the edge drop. If shoulders won’t be paved, bring the existing shoulders to a grade with new material that matches the top edge of the driving surface.

1160.3.8. Intersections

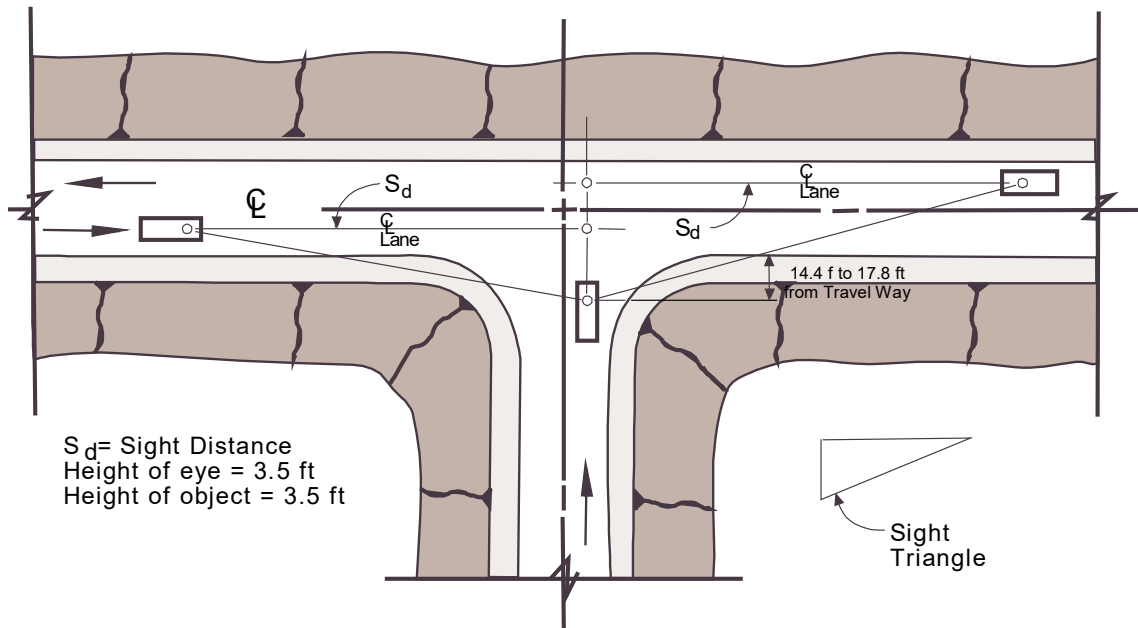
The relative risk of accidents at intersections is high. It is normal to observe accident clustering at intersections. Study the accident history of an intersection to determine if accidents are caused by a design deficiency or operator error. Correct a geometric deficiency related to accidents to the new design standards of this manual or the *AASHTO A Policy on the Geometric Design of Highways and Streets 2001*, if cost-effective or corrected by actions such as signing, signaling, or channelization.

Sight distance is of primary importance at intersections to allow operators sufficient time to observe and react to conflicts. The sight triangle shown in Figure 1160-8 is the minimum allowable at any existing intersection (driveway). The sight distances required (S_d) are the minimum stopping sight distances required by Section 1120.1. of this manual.

1160.3.9. Driveways

Existing driveway geometry may remain except if accident records indicate an anomaly. In that case, the driveway requires an engineering evaluation for improvement to meet the requirements of Section 1190 of this manual.

MINIMUM INTERSECTION SIGHT DISTANCE



DESIGN SPEED or POSTED SPEED LIMIT mph	SD MINIMUM (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

Note: Minimum sight distances are stopping sight distances for level grades, between -3% and +3%. Refer to AASHTO *A Policy on Geometric Design of Highways and Streets 2001*, for desirable intersection sight distances and for grade adjustments.

**Figure 1160-8
Minimum Intersection Sight Distance**

**Table 1160-3
Accident Rate Factor (F_{ar})**

Severity of sight Restriction (mph)	Degree of Hazard in Sight Restricted Area ^a		
	Minor	Significant	Major
0	0	0.4	1.0
5	(0.3)	(0.8)	(1.4)
10	0.5	1.1	1.8
15	1.2	2.0	2.8
20	2.0	3.0	4.0

^a: See Table 1160-4

Note: Numbers in parentheses were interpolated from J.C. Glennon "Effects of Alignment on Highway Safety: A Synthesis of Prior Research" In TBR State of the Art Report. TRB, National Research Council, Washington D.C.

**Table 1160-4
Relative Hazard**

Relative Hazard	Geometric condition
Minor	Tangent horizontal alignment Mild curvature (less than 3 degrees) Mild downgrade (less than 3 percent)
Significant	Low-volume intersection Intermediate curvature (3 to 6 degrees) Moderate downgrade (3 to 5 percent) Structure
Major	High-volume intersection Y-diverge on road Sharp curvature (greater than 6 degrees) Steep downgrade (greater than 5 percent) Narrow bridge Narrow pavement

**Table 1160-5
Constants for L_r**

Operating Speed on Vertical Curve (mph)	Equivalent speed to existing crest Vertical curve stopping sight distance (mph) (1)							
	60	55	50	45	40	35	30	25
Values of a_0								
60	-524	-138	-25	113	202	256	305	382
55		-452	-163	11	111	172	221	301
50			-405	-65	45	115	169	248
45				-332	-76	21	82	167
40	No sight restriction				-272	-55	15	110
35						-231	-74	51
30							-193	19
25								-130
Values of a_1								
	207.3	152.6	120.9	80.2	56.6	38.6	29.4	15.3

$$L_r = \frac{[a_0 + (a_1 \times A)]}{5280}$$

A = the absolute value of grade difference in percent

(1) TRB Special Report 214 uses the definition Highway Design Speed of the existing vertical curve.

1160.3.10. Passing Sight Distance

Operational and passing sight distances are given in Section 3B of the *Alaska Traffic Manual*.

Improvements of passing distances are not required within the context of 3R projects.

1160.3.11. Grades

Grades that do not meet new construction standards should be evaluated as a potential contributing factor where there are clusters of accidents on or in the vicinity of the grade section. Grade-related accidents might include single or multiple vehicle accidents where a vehicle lost control and leaves the travel lane or is unable to stop. Countermeasures for steep grades may include warning signs or realignment.

1160.3.12. Safety Mitigation

Even though these 3R standards may not require a geometric improvement, the designer should anticipate circumstances where mitigating improvements could be made at minimum cost. For example, geometric changes at an intersection or horizontal curve to increase sight distance may not be cost-effective, but cutting brush or trees can partially alleviate the problem.

1160.4. Studies

1160.4.1. Design Study Report

Prepare a Design Study Report in accord with Chapter 4, Section 450. In addition to the Section 450 requirements, include the following in the report:

- A list of all existing horizontal and crest vertical curves that do not meet the current minimum design requirements of AASHTO for new construction
- A discussion of the design speed determination in accord with Section 1160.3.3
- A discussion of the determination of lane widths in accord with Section 1160.3.4 and the clear zone requirements as determined by Section 1160.3.8
- A discussion of horizontal curve treatments in accord with Section 1160.3.5
- A discussion of vertical curve treatments in accord with Section 1160.3.6
- A discussion of bridge features that require improvement

- A discussion of accidents at intersections and what improvements may be made

Include supportive calculations for the above items in the report.

1160.5. Gravel to Pavement

1160.5.1. General

Section 1160.5, Gravel to Pavement, applies to non-NHS road construction projects whose primary purpose is reducing maintenance costs and improving the quality of life for Alaskans by hard surfacing of gravel roads, but which may include limited shoulder, drainage, and other work related to preserving the road structure.

The existing alignment, profile, and sideslopes may remain as long as the project does not degrade any existing safety or geometric aspects. Guardrail, guardrail terminals, and bridge rail terminal connections will not routinely be upgraded to more current standards.

Signing and Markings

Inventory and evaluate all existing signing for sign placement and condition. Conform signing to the requirements of the *Alaska Traffic Manual* (ATM) and the *Alaska Sign Design Specifications* (ASDS). Install regulatory speed limit signing conforming to the chosen design speed of the roadway. Install curve, grade, advance intersection, and other warning signs as required to warn of conditions where the safe speed is lower than the posted speed limit. Other regulatory signing requirements include stop signs at side street approaches.

Upgrade signposts that do not conform to current safety standards.

1160.5.2. Design Year

The design year should at least equal the expected surface life of the selected surface type.

1160.5.3. Design Speed

Use the current posted as a minimum design speed. In the absence of posted speeds, use the criteria in *A Policy for the Geometric Design of Highways and Streets 2001*, to establish a minimum design speed.

In selecting the design speed, consider the anticipated speed of traffic traveling on the newly surfaced roadway. You may use the speed limit on paved roads of similar character in selecting design speed.

1160.5.4. Lane and Shoulder Widths

Rural Two-Lane Paved Highways

Table 1160-6 shows minimum lane and shoulder width improvements.

Waiver of Roadway Width

For roadway width less than shown in Table 1160-6, obtain a design waiver in accordance with *Alaska Preconstruction Manual* Section 1100.3. guidelines.

The minimum width for two-lane roads is 18 feet.

1160.5.5. Horizontal Curves

Radius of Curvature

No change is required under these standards.

1160.5.6. Grades

Grades do not require improvement under these standards.

**Table 1160-6
Two-Lane – Two-Way Traffic
Combined Roadway Minimum Lane & Shoulder Widths
For Use With Gravel to Pavement Modified Procedure**

Design Year ADT 0-2000 vpd					
Minimum Lane and Shoulder Width (ft)					
Design Year Traffic Volumes (ADT) in vpd					
Design Speed (mph)	0-250	250-400	400-750	750-1500	1500-2000
20	18	20	22	22	22
30	18	20	22	22	22
45	18	22	22	22	22
50	22	22	22	22	22

Superelevation

Superelevation should match the design speed for the project. Follow *AASHTO A Policy on the Geometric Design of Highways and Streets 2001*. Maximum superelevation is 6 percent cross-slope.

Superelevation Transition Length

When possible, provide minimum superelevation transition length in accordance with the *AASHTO A Policy on the Geometric Design of Highways and Streets 2001*.

Minimum Length

No change is required under these standards.

1160.5.7. Vertical Curvature and Stopping Sight Distance

Sag and Crest Vertical Curves

No change is required under these standards.

Stopping Sight Distance

No change is required under these standards.

Intersection Sight Distance for Side Streets

No change is required under these standards.

Consider clearing to the right-of-way limits to improve sight distance that does not meet AASHTO minimum sight distance standards.

Driveway Sight Distance

No change is required under these standards.

Consider clearing to the right-of-way limits to improve sight distance that does not meet AASHTO minimum sight distance standards.

1160.5.8. Bridges

No change to the existing structure or railing is required, except as necessary to keep structures serviceable through the design period.

1160.5.9. Clear Zones

No change is required under these standards.

1160.5.10. Bicycles

No enhancements required.

1160.5.11. ADA

Do not construct anything that will diminish the access to, or use of the facility by, a disabled person.

1160.5.12. Design Study Report

For gravel to pavement projects, the requirements of Chapter 4 of this manual concerning preparation of the Design Study Report are modified to include the following:

- Structural section, addressing embankment suitability. Reference section 1180.8.
- Materials sources
- A copy of the Design Study Report to the regional maintenance director/chief

Example 1160-1 Lane-Shoulders & X-Section

Glacier Highway, North Lena Loop Road to Point Stephens Road

Design Period	20
Current ADT	1027
Design Year ADT	1383
Mid Period ADT	1205
Percent Trucks	6.4%
Average Running Speed	45 mph
Terrain Values	Use "0"

Existing Lanes = 11 feet and Shoulders = 0 feet

Accident Study Period

1977 to 1987

Mid-study Period ADT 900

Cross-Section Elements

Roadside Hazard Rating selected as 6, see Figures 1160-1 through 1160-7

$$A = 0.0019 \text{ ADT}^{0.882} \times 0.879^W \times 0.919^{PA} \times 0.932^{UP} \times 1.236^H \times 0.882^{TER1} \times 1.322^{TER2}$$

$$A = 0.0019 (900)^{0.882} \times 0.879^{11} \times 0.919^0 \times 0.932^0 \times 1.236^6 \times 0.882^0 \times 1.322^0$$

$$= 0.7 \text{ accidents /mi /year}$$

Route No. 296000

CDS mile points from Alaska DOT&PF General Road Log: 22.93 to 21.68 = 1.25 miles

See accidents for Period = 1977 through 1987 (shown on next page)

(Note: Category 7, 8, 10, 11, & 12 intersection accidents do not qualify)

Example 1160-1
Lane-Shoulders & X-Section, continued

ACCNBR	ACCDTE YYMMDD	TIME	ROUTE	MI	ACC DIA	NBR VEH	TOT	MAJ INJ	MIN INJ	DAMAGE	ACC TYPE	ROAD CHAR	ROAD COND
7912635	791125 04	1630	296000	21.95	9		1				1,200	17	2
7815249	780509	1539	296000	21.72	9	1			1	800	40	4	01
8012890	801124	0640	296000	22.57	9	2				800	08	1	0
7709900	770707	1630	296000	22.14	9	1			1	2,000	25	5	01
8200598	820110	0230	296000	21.71	9	3				1,400	12	1	04
8202582	820221	1520	296000	21.75	7	3		1	3	9,000	06	1	04
8218451	821129	0750	296000	22.57	2	2				200	07	5	04
8400740	840110	0745	296000	22.55	9	1				900	29	5	05
8521909	851226	1530	296000	21.82	9	1			2	8,000	17	4	04
8606011	860422	2057	296000	21.92	9	1			1	3,000	29	4	02
8606208	860429	1426	296000	22.53	1						40	4	01
8702618	870214	2154	296000	21.71	9	1				4,000	17	1	04
8712934	871104	0825	296000	21.68	9	1					17	5	04
8715589	871216	2249	296000	21.94	9	2				600	08	5	04

Roadway Character

1. Straight and level
2. Straight and grade
3. Straight and hillcrest
4. Curve and level
5. Curve and grade
6. Curve and hillcrest

Roadway Surface Condition

1. Dry
3. Muddy
5. Slush
2. Wet
4. Snow/Ice
6. Other

Type of Accident

Collision With

1. Pedestrian
3. Train
5. Moose
2. Pedacycle
4. Animal

MV in Transport

6. Head on
8. Angle
7. Rear end

MV in Other Roadway

9. Head on
11. Angle
10. Rear end

Parked MV

12. Parked

Fixed Object

13. Bridge/Overpass
14. Building
16. Curb/Wall
18. Divider
20. Traffic light
22. Sign post
24. Other support
26. Fence
28. Machinery
30. Other object
15. Culvert
17. Ditch
19. Parking meter
21. Light support
23. Utility post
25. Embankment
27. Guardrail
29. Tree/Shrub
31. Aircraft

Non-Collision

40. Overturn
42. Immersion
44. Other
41. Fire/Explosion
43. Gas inhalation

Total 14 accidents, 10 accidents qualify.

$$\text{Actual} = \frac{10 \text{ acc}}{(1.25 \text{ mi} \times 10 \text{ yrs})} = 0.8 \text{ acc / mi / yr}$$

$$\left(\frac{\text{Actual}}{\text{Predicted}} - 1 \right) \times 100 = \left(\frac{0.8}{0.7} - 1 \right) \times 100 = 14.3$$

- Round 14.3 percent to the nearest 10 percent increment, or 10 percent
- The 10 percent increment requires an increased traveled way width by 2 feet.
- Clear zone need not be addressed after 4-foot widening. The widening reduces the accident rate sufficiently to preclude clear zone investigation.

Example 1160-2 Lane-Shoulders & X-Section

Denali Highway Rehabilitation

Design Period	10
Current ADT	100
Design Year ADT	150
Mid Period ADT	125
Percent Trucks	4.0%
Average Running Speed	50 mph
Terrain Values	"0"

Existing Lanes = 10 feet and Shoulders = 2 feet

Accident Study Period

1975 to 1985

Mid-study Period ADT 80

Roadside Hazard Rating selected as 5, see Figures 1160-1 through 1160-7

$$A = 0.0019 (80)^{0.882} \times 0.879^{10} \times 0.919^2 \times 0.932^0 \times 1.236^5 \times 0.882^0 \times 1.322^0$$

= 0.1 accidents / mi / year

Route No. 140000

CDS mile points from Alaska DOT&PF General Road Log: 0.0 to 21.5 = 21.5 miles

See below accidents for the Period = 1975 through 1985

ACCNBR	ACCDTE YYMMDD	TIME	ROUTE	MI	ACC DIA	NBR VEH	TOT FAT	MAJ INJ	MIN INJ	DAMAGE	ACC TYPE	ROAD CHAR	ROAD COND
7712183	770722	2340	140000	5.18	9	1	1			2,000	40	4	01
8106618	810704	0901	140000	15.90	9	1				30,000	40	4	01
8106947	810712	1000	140000	21.50	1	2				4,700	07	2	03

Total 3 accidents, 2 accidents qualify (*Note:* Category 7 accident does not qualify)

$$\text{Actual} = \frac{2 \text{ acc}}{(21.5 \text{ mi} \times 10 \text{ yrs})} = 0 \text{ acc/mi/yr}$$

A > Actual Lane \Rightarrow shoulder improvements not required.

Cross-Section Elements

Investigation not required by accident rate, see Tables 1160-1 and 2.

Example 1160-3 Horizontal Curve

Alaska Highway, Mile 1303 to 1285

Project Parameters

Project Length	17.52 miles
Design Speed	
(as defined in Section 1160.3.3)	60 mph
Design Period	20
ADT 1985	485
ADT 2005	750

Curve Location CDS mile 68.1 to 68.4

Curve Data $D = 5^0 - 45^0$

$$L = 1502.07 \text{ ft}$$

Accident Record for curve 10-year period 1975 to 1985, 3 recorded accidents

$$A_h = [AR_s \times L \times V] + [0.0336 \times D \times V]$$

Solve AR_s

Project Length = 17.5 mi, CDS mile 62.6 to 80.1

Period: 1975 to 1985, 33 qualified accidents

(Total non-intersection accidents on straight roadway segments only)

Mid Period ADT (1980) = 300

Total Vehicle Miles = 300 ADT x 365 days x 10 yrs. x 17.5 mi. = 19.2 mvm

$$AR_s = \frac{33 \text{ accidents}}{19.2 \text{ mvm}} = 1.7 \frac{\text{acc}}{\text{mvm}}$$

$V = 300 \text{ ADT} \times 365 \text{ days} \times 10 \text{ yrs.} = 1,095,000 \text{ vehicles}$

$$A_h = [1.7 \text{ acc/mvm} \times 0.3 \text{ mi} \times 1.095 \text{ Milveh}] + [0.0336 \times 5.75^0 \times 1.095 \text{ Milveh}] = 0.8 \text{ accidents}$$

Actual accidents (3) exceeds predicted A_h ($3 > 0.8$)

Therefore, improve curve to new construction minimums or check with cost-effective analysis
See following Example 1160-4.

Example 1160-4 Cost-Effective Analysis

Horizontal Curve; See Previous Example 1160-3

Given: Typical cut section

Shoulder	6 feet from new typical section
Cut height	50 feet
Horizontal line shift to accommodate new alignment	100 ft
Excavation cost	\$3 per yd ³

First cost: Curve length = 1502.07 ft from previous example 1160-3

Excavation EFC = $[1502.07 \times 50' \times 100'] / [2 \times 27] \times \$3.00 = \$417,242$

CRF = Capital Recovery Factor, to compare present cost of multi-year cost of improvement

$$CRF = \frac{(1.07)^{20} \times 0.07}{(1.07)^{20} - 1} = 0.0944$$

Annual First Cost = $0.0944 \times \$417,242 = \$39,388$ per yr.

Accident cost:

ACCNBR	ACCDTE YYMMDD	TIME	ROUTE	MI	ACC DIA	NBR VEH	TOT FAT	MAJ INJ	MIN INJ	DAMAGE	ACC TYPE	ROAD CHAR	ROAD COND
7910447	791203	1345	180000	68.25	9	2	1			25,000	06	x	x
8012908	801115	1630	180000	68.25	9	1				3,000	40	5	04
7811753	781002	1145	180000	68.25	9	1			1	800	17	6	04

Fatality	1		=	\$2,600,000
Major injury	0			
Property Damage	3	\$25,000 + \$3,000 + \$800	=	\$28,800
Total accident cost			=	\$2,628,800

10-year period (from Example 1160-3)

Annual accident cost = $\$2,628,800 / 10 = \$262,800$

Annual accident cost greater than annual first cost of improvement; therefore, the curve geometry should be changed.

Discussion

There is the question of whether the fatality was an anomaly. Was high speed involved, an object in the traveled way, or some other factor not related to the curvature? In this case, two vehicles were involved, and it is possible that the accident cause was unrelated to the curvature. If the fatality was an anomaly, then it may be reasonable to only consider the remaining accidents. In that case, the annual accident cost would be \$380 $([\$3,000 + \$800] / 10)$, and the curve would not require improvement.

Example 1160-5 Vertical Curve

Unknown Highway, Mile 31 to 44

Project Parameters

Project Length = 13.8 miles, CDS mile 31 to 44.8

Design Speed (as defined in Section 11603.3) = 50 mph

Design Period = 20

ADT 1990 804

ADT 2010 981

Sight Distance = 475 ft (See AASHTO Policy on Design)

Curve Location CDS mile 31.6 to 31.7.

Curve Data $g_1 = 2.00\%$
 $g_2 = -3.00\%$
 Length = 500.00 ft

Existing Sight Distance

Select the following value for “S” which meets the stated relationship of “S” to “L.”

$S > L$

$$S = \frac{1}{2} \left(L + \frac{1329}{A} \right) = \frac{1}{2} \left(500' + \frac{1329}{5} \right) = 383 \text{ ft} \quad \text{Not OK; less than “L”}$$

$S < L$

$$S = \left(\frac{1329 \times L}{A} \right)^{\frac{1}{2}} = \left(\frac{1329 \times 500}{5} \right)^{\frac{1}{2}} = 364 \text{ ft} \quad \text{OK; less than “L”}$$

Existing sight distance = 364 ft and is substandard to the required 475 ft.

See Section 1160.3.6, Vertical Curvature and Stopping Sight Distance.

Accident Record for curve 10-year period 1978 to 1987, three recorded accidents

Mid Period ADT(1983) = 600

$$N_c = \left[AR_h \times L_{vc} \times V \right] + AR_h (L_r)(V)(F_{ar}) \quad \text{See 1160.3.6a, Sag Vertical Curves}$$

Determine AR_h

Project Length = 13.80 mi, CDS mileage 31 to 44.8

Period: 1978 to 1987, 27 qualified non-intersection accidents

Mid Period ADT (1983) = 600

(continued on next page)

Example 1160-5
Vertical Curve, continued

Total vehicle miles = (600 ADT x 365 days x 10 yrs x 13.8 mi)/1,000,000 = 30.2 mvm

$$AR_h = \frac{27 \text{ accidents}}{30.2 \text{ mvm}} = 0.9 \frac{\text{acc}}{\text{mvm}}$$

Solve for L_r

Equivalent speed to existing crest vertical curve stopping sight distance of 364 ft = 45 mph (nearest 5 mph) from Table 1160-5, value for a_o

From Table 1160-5, using a design speed of 45 mph

$$a_o = -65$$

$$a_1 = 80.2$$

$$L_r = (a_o + (a_1 \times A)) \left(\frac{1}{5280} \right) = (-65 + (80.2 \times 5)) \left(\frac{1}{5280} \right) = 0.064 \text{ miles}$$

Find F_{ar}

From Tables 1160-3 and 4

$$F_{ar} = 0.8$$

Severity of sight restriction = (50 mph)-(45 mph) = 5 mph

Moderate down grade @ -3% = significant

Find Vertical Curve Volume

$$V = (600 \text{ ADT} \times 365 \text{ days} \times 10 \text{ yrs}) / 1,000,000 = 2.190 \text{ mv}$$

Solve N (Number of accidents for ten year period in question.)

$$N_c = [AR_h \times L_{vc} \times V] + AR_h (L_r)(V)(F_{ar})$$

$$N_c = \left[0.9 \frac{\text{acc}}{\text{mvm}} \times \frac{500'}{5280 \frac{\text{ft}}{\text{mi}}} \times 2.19 \text{mv} \right] + 0.9 \frac{\text{acc}}{\text{mvm}} (0.064 \text{ mi}) (2.19 \text{mv}) (0.8) = 0.29 \text{ acc}$$

Actual accidents (3) exceeds predicted N_c

Therefore, improve curve to appropriate minimums or check with cost-effective analysis.

1170. Special Design Elements

- 1170.1. Roadway Illumination
- 1170.2. Bus Stops
- 1170.3. Bus and HOV Lane
- 1170.4. Board Roads
- 1170.5. Boat Ramps
- 1170.6. Airway-Highway Clearances
- 1170.7. Highway Signs, Luminaires, Traffic Signals, Poles, and Posts
- 1170.8. Fencing
- 1170.9. Rumble Strips
- 1170.10. At-grade Railroad Crossings
- 1170.11. Landscaping
- 1170.12. Pavement Markings and Delineators

1170.1. Roadway Illumination

Select and design new roadway lighting systems in conformance with the ANSI/IES RP-8-14 “Roadway Lighting” and the following:

- Do not exceed the allowable veiling luminance ratios, as shown in Table 2-3 of the RPRL.
- Use cutoff or full cutoff luminaires where feasible.
- Avoid staggered light pole arrangements where feasible.

“Small Target Visibility” results (as defined in section 2.3 of RPRL) may be used as a tiebreaker when choosing between systems that otherwise perform similarly.

1170.2. Bus Stops

Bus transit is an integral part of the operation of many urban streets and highways. Follow local transit operator guidance and when none exists following guidance in AASHTO Guide for Transit Facilities (AGTF). Coordinate with existing transit organizations and consider the existing operating policies and the future transit needs of communities where applicable, particularly where bus movements caused by bus stops will affect intersection capacity.

Normally, locate bus stops on the far corner of intersections to free the approach shoulder lane for right-turning vehicles.

Consider other transit facilities for buses, such as bus passenger shelters, park-and-ride lots, and turnouts (separate loading zone). Base the decision to include bus turnouts on the volume and turning movements of

both the bus traffic and through traffic, the distance between bus stops, and right-of-way limitations. Base the design features for turnouts on the size and turning radius of the bus. Generally, radii allow buses to remain in the outer lane during the full turn. For ADA access considerations, also see Americans with Disabilities Act Accessibility Guidelines.

1170.3. Bus and HOV (High Occupancy Vehicle) Lane

Include special lanes for buses and HOVs on projects only where such an auxiliary lane is part of an integrated network for buses and/or HOVs. Typically, these lanes are shoulder lanes of sufficient width to accommodate the wider buses. A normal bus/HOV lane is 12 to 14 feet wide, with no additional shoulder provisions.

Bus/HOV lanes should be to the right of normal traffic. This makes the shoulder lane available during off-peak hours for disabled and right-turning vehicles.

1170.4. Board Roads

1170.4.1. General

This section describes criteria for the design of board roads, otherwise considered drivable boardwalks.

The construction and maintenance of roads are sometimes extremely expensive due to natural constraints and the lack of locally available materials. An economical alternative to a road is a drivable board road. These facilities should be designed to accommodate light vehicle use.

1170.4.2. Board Roads

Water, sewer, and solid waste conveyance systems in rural Alaska are not always feasible without great expense due to permafrost and other natural constraints. As an alternative, water may have to be delivered to each home from a community well and sewage collected and hauled to a sewage lagoon. It may be necessary to transport solid waste to a community dumpsite.

It is common practice to handle most of this transport with four-wheel, all-terrain vehicles (ATVs) pulling trailers loaded with tanks. Sizes of vehicles and tanks vary depending on the size of the community. Other transportation systems may be necessary to provide

maintenance access. For ADA accessibility considerations, see Section 1120.10. Consider the following in design for a board road:

1. Use a design speed of 5 mph, or as recommended by the regional traffic engineer.
2. Use as the minimum design vehicle a four-wheel, all-terrain vehicle pulling a two-wheel trailer with an 80-gallon tank, with a design load of up to 700 pounds per wheel.
3. Use a minimum design clear width of 8 feet including wheel rails, with a recommended 10.5 feet minimum in locations where larger vehicles, like a Utility-Task Vehicle (UTV), are anticipated.
4. Design and specify horizontal and vertical geometry, if required, on a per project basis. Angled corners may be necessary to ensure adequate turning radii for ATV's using the boardwalks. Ensure board roads adequately span any existing or proposed utility lines or other obstructions on the ground surface.
5. Design turnouts, if required, to accommodate the design vehicle.
6. Space surface planks 1/4" minimum and 1/2" inch maximum apart to enable drainage.
7. Ensure timber treatment complies with the Clean Water Act.
8. Galvanized connecting hardware is preferred. Ensure any hardware is recessed (1/8" max) on the driving surface of boardwalks. Designers should consider using stainless steel hardware in coastal environments.
9. Maintain access to adjacent properties and other facilities.
10. Assess foundation design needs with regional materials section to develop any specific requirements.
11. An anchoring system may be required in areas that are subject to seasonal flooding.
12. Board roads installed in or near tidal areas may need to be built on pilings to avoid flooding during extreme high tides.

13. Engage the community regarding emergency response procedures to ensure access is available.

14. Include the following design elements:

- a. The size of the gap between the boards.
- b. Direction of the boards.
 - i. Perpendicular – Required in areas where board roads are designed to serve primarily non-motorized traffic. Must be considered as a design alternative in cases where non-motorized traffic is anticipated. This may require additional transition details.
 - ii. Parallel – Preferred where board roads are designed to serve motorized traffic. Consider surface plank spacing of 0.5-inches. Parallel board installations are typically more resilient to snowmachine and ATV traffic and simpler to maintain in remote areas.
- c. Vertical grades.
- d. Wheel curbs and handrail, when applicable. Wheel curbs are not permitted at access points.
- e. Detectable warning tiles when entering vehicular path, when applicable.

Document ADA compliance and exceptions, as applicable, in the DSR.

1170.5. Boat Ramps

1170.5.1. General

This section describes basic criteria for the design of boat ramps. However, the final design will involve many other engineering factors to provide a safe, efficient facility. Grades, alignment, and surface materials are probably the most important factors.

1170.5.2. Grades

The maneuvering portion of the ramp should be relatively flat at 4 to 8 percent slope. The main ramp slope should be greater than 12 percent and less than 15 percent. Flatter ramps require backing the motorized towing vehicle too far into the water before the boat floats free of the trailer. Steeper grades make

it difficult to pull the loaded trailer up the ramp. A 14 percent grade is desirable.

1170.5.3. Alignment

If possible, design the ramp and approaches so that the combination of towing and towed vehicles lines up directly down the ramp. Avoid turning movements while backing if possible.

1170.5.4. Surface

Use concrete planks from two feet above the high-water line to a minimum of three feet below the mean low-water line to permit unloading a boat without the trailer wheels leaving the planking, even at mean lower low-water. The ramp above the planking should be firm and have a surface that provides adequate traction to the towing vehicle when pulling a loaded trailer from the water. Extend and bury the last three to four planks beyond the lowest part of the concrete ramp, extents described above, for scour protection against power loading or prop wash.

1170.5.5. Lanes

Generally, a facility should have one ramp lane for every 20 to 30 boat trailer parking spaces for areas with high-turnover rates. Facilities with low turnover may have a ratio of one ramp lane for every 30 to 50 boat trailer parking spaces. Boat ramp lane width should range from 12 to 20 feet, where 16 feet wide is recommended.

1170.5.6. Other Considerations

Wherever you construct a boat ramp, provide sufficient areas for parking, including for boat trailers. Provide piers or floats adjacent to the ramp for access to the boat after flotation. Consider providing the following based on the use in the area:

1. Staging area adjacent to the ramp to prepare the boat for launching.
2. Tie-Down area adjacent to the ramp to prepare the boat for trailer after it is hauled from the water.
3. Lighting on the float if used frequently at twilight or night.
4. Wash-down location on site. This ensures that invasive species that may be present in the water are not transferred to other locations the boat may be launched at.

5. A spill kit mounted at the top of the float that includes oil absorbents.
6. Small covered sign board for posting of emergency contact information and relevant ramp information.
7. “Kids Don’t Float” life jacket loan station at the launch through the Alaska office of Boating Safety.

1170.5.7. References

1. States Organization for Boating Access (SOBA) design handbook
2. Department of Natural Resources, Alaska State Parks, Design and Construction Section. Recreational Standard Drawings are located here for reference: <https://dnr.alaska.gov/parks/designconstruct/standarddrawings.htm>

1170.6. Airway-Highway Clearances

Whenever a highway project will involve construction or operations within 1.74 nautical miles (2.00 statute miles) of an airport, airstrip, heliport, or other aircraft facility, be aware of the airspace navigational requirements of the aircraft facility (reference FAA Order 5000.3). 23 CFR, Part 620, Section 620.103 (c) states:

“Federal-aid funds shall not participate in projects where substandard clearances are created or will continue to exist.”

14 CFR Part 77, Federal Aviation Regulations, describes standards used to determine obstructions to air navigation that may affect the safe and efficient use of navigable airspace and the operation of planned or existing air navigation and communication facilities. Conform to these standards whenever any of the following conditions exist:

1. The project is near an FAA-recognized or FAA-controlled aircraft facility
2. The project involves a federal-aid route
3. The project is federally funded in whole or in part.

If a new or existing road is found to be a Part 77 obstruction, an obstruction evaluation study must be performed to determine if the Part 77 obstruction will have an adverse effect that necessitates changing the approach procedures at the nearby airport.

On air strips and other non-FAA facilities, conform to federal regulations or document justification for noncompliance. Furnish a copy of the documentation to the commissioner.

1170.7. Highway Signs, Luminaires Traffic Signals, Poles, and Posts

1170.7.1. General

Sign, electroliner, and signal design must conform to the requirements of the *Alaska Traffic Manual*.

Design highway lighting structures, high tower lighting structures, and traffic signals to conform to the SSSS as indicated in Section 1100.

1170.7.2. Sign Supports

Design sign post supports in accordance with Figures 1170-1 through 1170-11.

Place all new roadside signs and luminaires on breakaway supports on high-speed highways located within the clear zone width, unless you locate them behind a barrier or crash cushion that is necessary for other reasons. Supports outside this suggested clear zone should preferably be breakaway where there is a probability of being struck by errant vehicles.

Replace all existing sign supports that do not comply with the DOT&PF Roadside Hardware Eligibility Program.

1170.7.3. Breakaway Supports

The design of breakaway support mechanisms allows them to function properly when loaded primarily in shear. The design of most mechanisms allows them to be hit at bumper height. If hit at a significantly higher point, the bending moment in the breakaway base may be sufficient to bind the breakaway device.

1170.7.4. Large Roadside Signs

Large roadside signs are greater than 50 square feet. They typically have two or more breakaway support posts. To achieve satisfactory breakaway performance, they should meet the following criteria (see Figure 1170-11):

- Place a hinge at least 7 feet above the ground so no portion of the sign or upper section of the support is likely to penetrate the windshield of an impacting vehicle (see Standard Plan S-31, Sign Post Base and Foundation).

- A single post, if 7 feet or more from another post, or all posts within a 7-foot path, should weigh less than 45 lbs/ft. The total weight below the hinge, but above the shear plate of the breakaway base, should be less than 600 pounds.
- Do not attach supplementary signs below the hinges if such placement is likely to interfere with the breakaway action of the support post or if the supplemental sign is likely to strike the windshield of an impacting vehicle.

1170.7.5. Small Roadside Signs

Small roadside signs are those supported on one or more posts and having a sign panel area less than 50 square feet. Small sign supports are driven directly into the soil, set in drilled holes, or mounted on a separately installed base.

The breakaway mechanisms of small signs supports consist of a base bending fracture or breakaway coupling design (see frangible coupling details on Std Plan S-31). The bottom of a small sign panel should be a minimum of 7 feet above the ground and the top of the panel a minimum of 9 feet above the ground to minimize the possibility of the sign panel and post rotating on impact and striking the windshield of a vehicle.

Fracturing sign supports are wood or steel posts connected at ground level to a separate anchor. Wood posts are typically set in drilled holes and backfilled.

1170.7.6. Multiple Post Supports for Sign Supports

Consider all breakaway supports within a 7-foot width in multiple post sign structures as acting together. This 7-foot criterion is based on a need to minimize the potential for unacceptable performance of breakaway hardware. In some cases, a vehicle could leave the roadway at a sufficiently high angle that it would hit two posts within a 7-foot path. In other cases, a vehicle could yaw in the roadside to such an extent that it would strike two posts within a 7-foot path. In many instances, the greatest change in vehicle velocity occurs when hitting breakaway hardware at slower speeds because less energy is available to activate the breakaway mechanism. Since vehicles leaving the roadway at very high angles or yawing vehicles would likely be traveling at slower speeds, the 7-foot criterion is a reasonable safety factor that

you should use in roadside design of breakaway hardware.

Do not use sign installations with 2 or more 2.5" PST posts closer than 7 feet. See Chapter 4 of the Roadside Design Guide (RDG) for more information.

1170.7.7. Signal Poles

Signal poles are obstacles. The mastarm loading overturning moment (due to equipment positioning) and wind loads require substantial poles with fixed bases and foundations. For signal pole installations in urban or restricted environments, refer to Chapter 10 of the RDG for installation considerations.

Where signalization is required for intersection control on high-speed roadways (>45 mph) or in rural areas, place signal poles outside of the clear zone where practical. However, offset location of the pole is constrained by the need to position mastarm equipment over lanes, and because mastarm length is limited to 75 feet. Removal or relocation of the signal pole outside of the clear zone may not be an option. The design loads prohibit breakaway supports, so the only obstacle treatment options are to shield the poles with crash cushions or barriers, or to provide obstacle delineation.

Evaluate signal poles in high-speed, rural locations for cost-effectiveness to determine if a barrier should be installed, or if a pole can stand without treatment (the signals on the structure should provide adequate delineation). Use the procedures and methods in 1130.6 of this manual to complete a cost-effective analysis and determine the appropriate treatment for signal poles located inside the clear zone at high-speed locations.

1170.8. Fencing

1170.8.1. Introduction

Fencing may be required or desirable on some highway projects. The need for fencing can be identified during planning, scoping, environmental document, design, ROW, or construction phases of a project.

This section covers permanent fence installation. Temporary installations, such as during construction, are not covered in this Section.

1170.8.2. Functions

Fencing serves a number of purposes, and often do serve multiple purposes, including:

1. Barrier to human and wildlife encroachment
2. Safety
3. Property boundary delineation
4. Security
5. Channelization
6. Privacy
7. Noise reduction
8. Snow drift abatement

1170.8.3. Types

The *Standard Specifications for Highway Construction* – Section 607 – covers construction of fences. The *Alaska Standard Plans Manual* contains standard plans and details for these types of fences.

1170.8.4. Design Considerations

Install fence consistent with the clear zone concept outlined in Section 1130.2.3 of this manual. Avoid installing fence in drainage collection areas.

Barrier Fence

Barrier fence provides maximum protection against ROW encroachments by pedestrians, bicyclists, wildlife and other motorized vehicles such as snow machines and ATVs.

Consider barrier fence:

- Along fully or partially access controlled highways
- Between freeways or expressways and adjacent frontage roads or business districts
- Near schools, colleges, playgrounds, parks and athletic fields
- Where existing streets dead end at a freeway controlled access line
- In industrial areas or large residential developments
- Adjacent to military reservations

- At other locations where a barrier is needed to protect against vehicular, pedestrian, bicycle, or wildlife encroachment.

Barrier fence is generally installed parallel to centerline and on, or just inside, the ROW line or access control line. Fencing on a continuous alignment usually has a pleasing appearance and is the most economical to construct and maintain.

Safety Fence

Safety fence is installed:

- To protect users of sidewalks and paths located within the ROW from hazards adjacent to or near these transportation features
- To protect the general public and maintenance workers from other readily accessible hazards within the ROW
- To protect adjacent private property from hazards at or near the ROW line

Consider safety fence when:

1. Vertical drop offs equal, or exceed 4 feet
2. Side slope and slope height is steeper than 2H:1V and greater than 8 feet, respectively
3. Permanent bodies of water over 3 feet deep or swift flowing water are present
4. Children or mobility impaired persons are present in significant numbers near the hazard(s)

Other factors such as proximity and likelihood of exposure to hazard from paths and sidewalks, and severity of hazard need consideration. When deciding the necessity for safety fence, engineering judgment should prevail.

Install 4 foot high, minimum, safety fence. In some circumstances, safety rail will serve the same function as safety fence. Safety rail is not part of this Section.

Property Boundary Delineation

Fencing can delineate property boundaries, but this purpose is usually secondary to a primary function such as a barrier or safety fence.

Security Fence

Security fence is commonly used on or adjacent to military reservations.

Channelization Fence

Channelization fence is commonly used for directing and funneling pedestrians or wildlife to, or away from, specific locations or structures. In the case of wildlife, this could be an at-grade crossing or an underpass structure.

Privacy Fence

Privacy fence is used for visual screening. Materials, geometry and alignment are selected to meet the location-specific terrain, vistas and aesthetics.

Plastic coated chain link with vinyl slats, available in a variety of colors, is a cost-effective privacy fence.

Custom privacy fence may be used in special cases where the context of the physical and human environmental dictates it, or when stipulated in ROW agreements.

Noise Barrier

Refer to the Alaska DOT&PF Alaska Environmental Procedures Manual Noise Policy for guidance on when to consider installing noise fence.

<http://www.dot.state.ak.us/stwddes/desenviron/resources/noise.shtml>

Select alignment, geometry and material for the target level of noise reduction.

Snow Drift Abatement Fence

Consider the use of snow fence where blowing and drifting snow can inhibit maintenance and operations. Also consider fencing where snow removal operations could cause private property damage.

1170.8.5. Other Considerations

Except where warranted for highway applications, fencing is normally the responsibility of the abutting property owner. Existing private fences within the State ROW are considered encroachments that property owners must remove at their own expense.

If a request by a private property owner, public agency or local government is made for additional fencing during construction, field personnel should confer with Design on its merits. If warranted,

provide documentation justifying the need in the change order.

Metallic fencing can interfere with airport traffic control radar. When locating fencing in the vicinity of an airport, contact the Federal Aviation Administration to determine whether metal fence will create radar interference at the airport. If so, use non-metallic fencing.

1170.8.6. References

AASHTO – *An Informational Guide on Fencing Controlled Access Highways* - 3rd Edition November 1990.

1170.9. Rumble Strips

1170.9.1. Introduction

Rumble strips are a cost-effective safety treatment to reduce the number and severity of run-off-road and lane departure crashes. Rumble strips provide an auditory and tactile warning to errant or inattentive drivers that they are leaving their lane.

1170.9.2. Policy

Install rumble strips on rural roads with:

- a. Speed limits of 50 mph and above, and
- b. 6-foot or wider shoulders without guardrail, or 7-foot or wider shoulders with guardrail

Install gaps on roads where bicycles are allowed.

Do not install rumble strips:

- a. On roads with speed limits of 45 mph or lower.
- b. On pavements or surface treatments less than 2" thick
- c. On pavement with substantial alligator and/or fatigue cracking
- d. Between through lanes and turning lanes
- e. On bridge decks, bridge approach slabs, or concrete weigh-in-motion slabs
- f. On roads programmed for overlay, rehabilitation, or reconstruction in less than three years.

Centerline rumble strips may be installed between opposing lanes of traffic on segments of highway with

a history of severe head-on/crossover crashes. Centerline rumble strips are continuous throughout the stretch of highway, whether or not passing is permitted. Consult with the regional traffic and safety engineer when considering installation of centerline rumble strips.

Install rumble strips in accordance with Standard Plan T-25.

1170.10. At-Grade Railroad Crossings

1170.10.1. Introduction

Alaska has two railroads: the Alaska Railroad and the White Pass-Yukon Railroad. These facilities contain nearly 200 at-grade railroad-highway crossings that the railroad companies and Department share responsibility for maintaining and providing traffic control devices for public crossings.

1170.10.2. Policy

Projects with at-grade railroad crossings will bring any existing crossing up to the basic safety standards presented in the Alaska Traffic Manual (ATM).

New crossings must be constructed to meet the ATM, the *American Association of Railroads Rail/Highway Grade Crossing Handbook*, and other State standards for the installation of passive and active warning devices.

At-grade railroad crossings located wholly, or partially, within the limits of a project shall be upgraded to current ATM standards. The limits of an at-grade railroad crossing include the portions of the highway in advance, and on both sides, of the railroad tracks in which traffic control devices (signs, traffic markings, signals, etc.) are located to warn highway users of the track crossing. Project improvements on any portion of the at-grade railroad crossing requires upgrade of traffic control devices for the entire crossing.

1170.10.3. References

See the Traffic and Safety Resources Railroad-

Highway Crossings webpage for further information and resource links.

<http://www.dot.state.ak.us/stwddes/dcstraffic/rail-hwy.shtml>

The latest guidance from the railroad company should be considered when designing. *Technical Standards*

for Roadways Trails Facilities in the ARRC ROW, dated January 2014.

1170.11. Landscaping

1170.11.1. Introduction

Comply with DOT&PF Policy and Procedure 5.05.030, Beautification of the Highway Right-of-Way (P&P 5.05.030), when placing landscaping in a project right-of-way. P&P 5.05.030 is available online at:

https://dot.alaska.gov/admsvc/pnp/local/dot-jnu_123693.pdf

If landscaping is determined to be appropriate on a State of Alaska owned or maintained facility, collaborate with the local M&O superintendent, or designee, requirements regarding type of landscaping, maintainability and survivability, and budgetary impacts. This applies even if a maintenance agreement will be utilized for maintaining landscaping.

If the facility is not State of Alaska owned or maintained, consult with the appropriate maintenance entity for that facility.

Document all new landscaping in the project Design Study Report. If landscaping is proposed outside of a capital improvement project, provide similar documentation to that required in a Design Study Report to document the rationale for adding landscaping.

1170.12. Pavement Markings and Delineators

1170.12.1. General

Pavement markings and delineators define the vehicular roadway travel lanes and identify the locations of barriers.

1170.12.2. Durable Pavement Markings

Based on marking type, number of lanes and AADT use durable pavement markings on stable pavements on new construction projects, NHS routes, control routes and numbered routes. Use Table 1170-1 to select minimum requirements for projects that require durable markings. Inlaid preformed symbols are an option in short term low wear situations, however methyl methacrylate (MMA) is preferred. Do not use Preformed marking tape (PMT) in any permanent situation.

1170.12.3. Recessed Pavement Markings

Recessed Pavement Markers (RPMs) are typically used in areas with higher amounts of rainfall to supplement the painted pavement markings. Alaska Standard Plan T-06 provides layout and installation details.

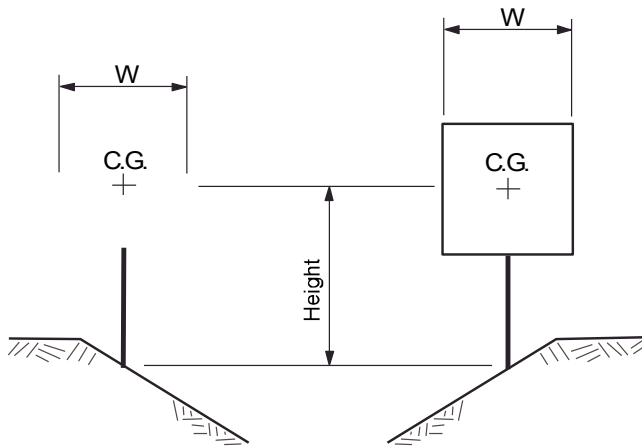
1170.12.4. Delineators

Delineators such as terminal marker posts and snow poles provide travel lane guidance and extend barrier locations, especially during inclement weather. Shoulder snow pole delineators may be applicable in areas with poor winter visibility or in areas with heavy snow accumulation. Chapter 3F of the Alaska Traffic Manual provides guidance on the applicability of delineators.

Table 1170-1
Design Durable Marking Guide for Stable Pavements

Design Durable Marking Guide for Stable Pavements							
Marking Materials and Application							
	<3000 AADT	3000 < 6000 AADT		> 6000 AADT		Any volume: NHS interstate, controlled access routes	
Marking Type	One or Two Thru Lanes, Each Direction	One Thru Lane Each Direction	Two Thru Lanes Each Direction	One Thru Lane Each Direction	Two Thru Lanes Each Direction	Three Thru Lanes Each Direction	
Longitudinal Lines between Lanes (Skips, Solids): & Unsignalized Sidestreet Stop Bars	DOT&PF Paint Spec, or Regional Guidance	Surface MMA 60-125 mils	Grooved-In MMA 60-125 mils	Grooved-In MMA 125-250 mils			
Transverse Lines for All Way Stops, Signalized Crosswalks, Symbols, Letters		Grooved-In MMA 250 mils					
Transverse Lines and Symbols - Unsignalized School Zones, Railroad Crossbucks							
Roundabouts (functional areas)	Grooved-In MMA 125-250 mils	Grooved-In MMA 250-500 mils					
Note: When determining marking thickness, the maximum allowable in the range shall be used. If minimum allowable thickness is selected, engineering judgement based on regional and climatic conditions must be used for justification.							

SIGN POST DESIGN SPECIFICATIONS



GENERAL NOTES for SIGN POST SELECTION

1. Post Materials are indicated on appropriate Alaska Standard Plans or in Specifications.
2. Solid lines on Figure 1170-5 through 1170-10 indicate maximum use of the indicated post. Any combined value of sign area and height to the right or above the solid line indicates the use of the next larger post.
3. Designer should determine the type of sign support by the following: Wind velocities expected in the project area, location of sign in sheltered or exposed areas, temporary or permanent type sign, expected life of sign, and maintenance cost in relation to construction cost.

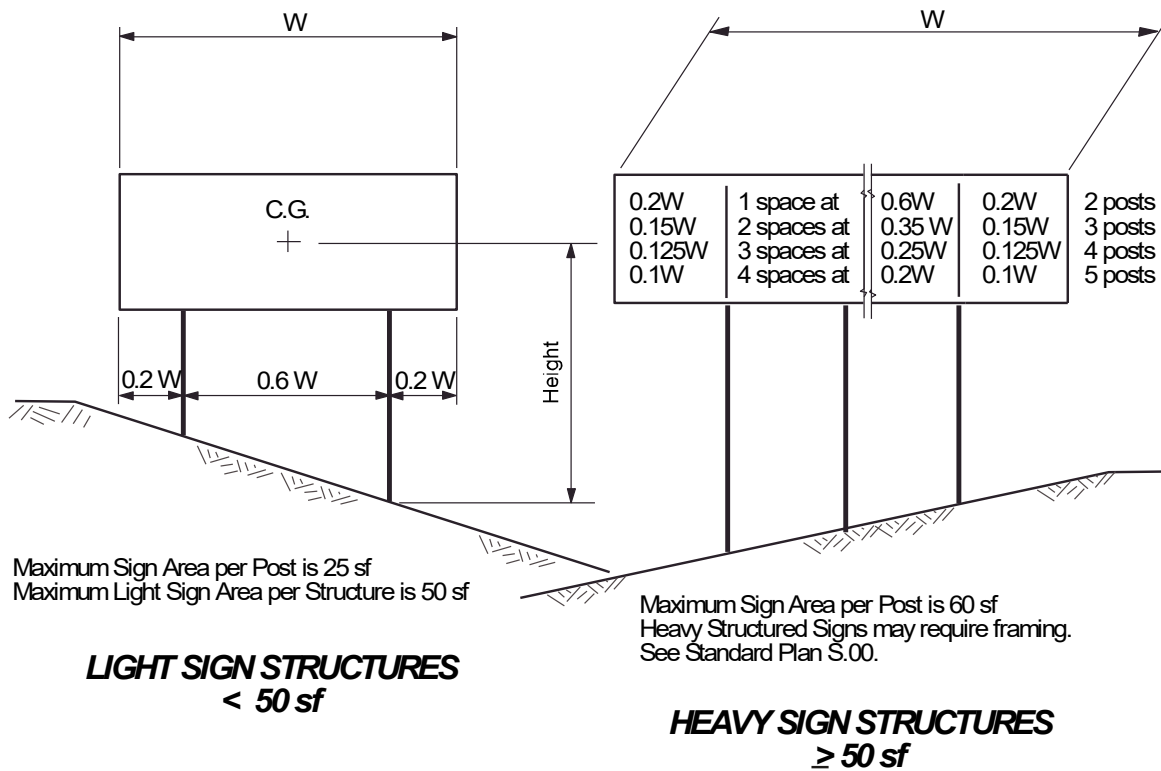
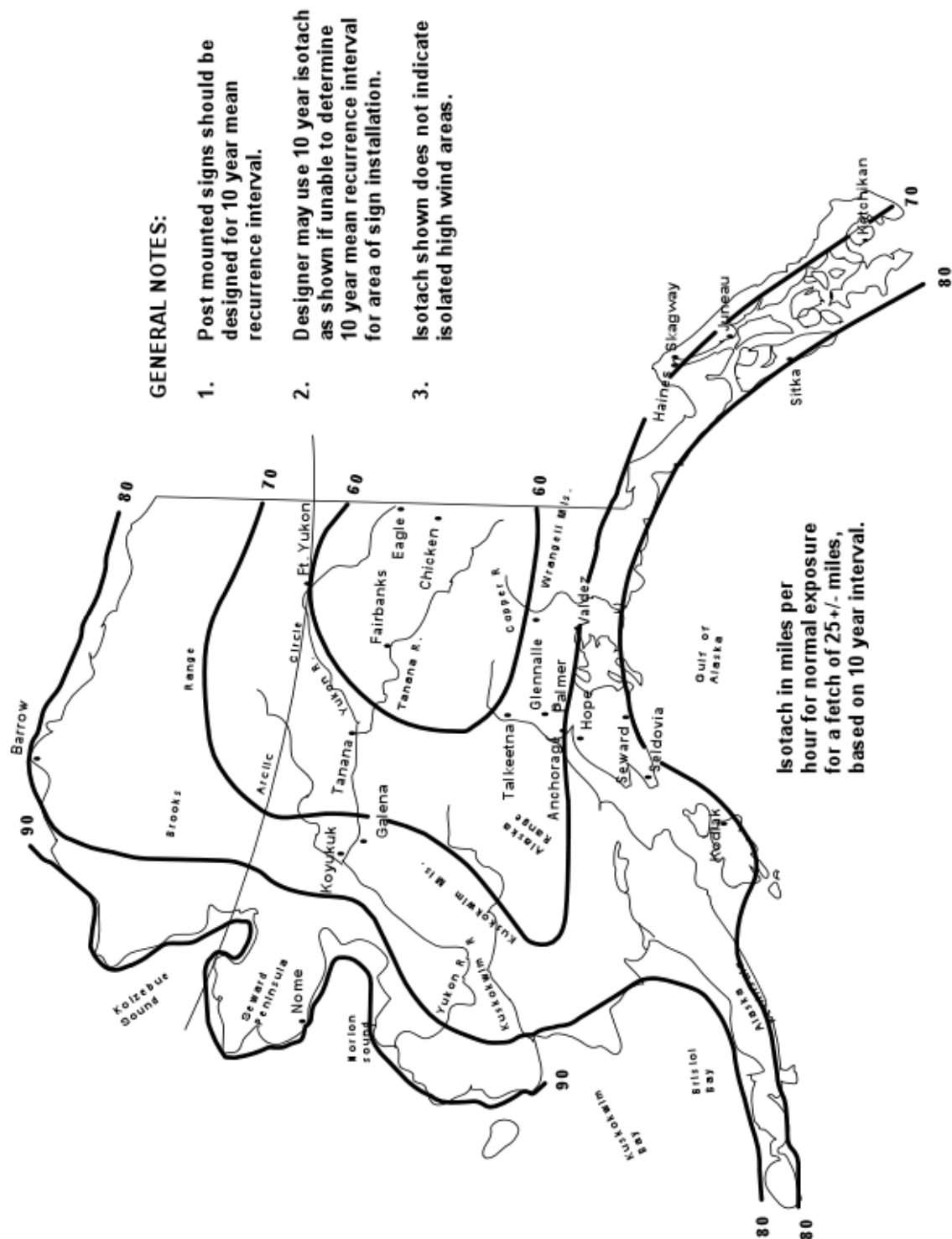


Figure 1170-1
Sign Post Design Specifications



WIND ISOTACH FOR 10 YEAR INTERVAL

Figure 1170-2
Wind Isotach for 10-Year Interval

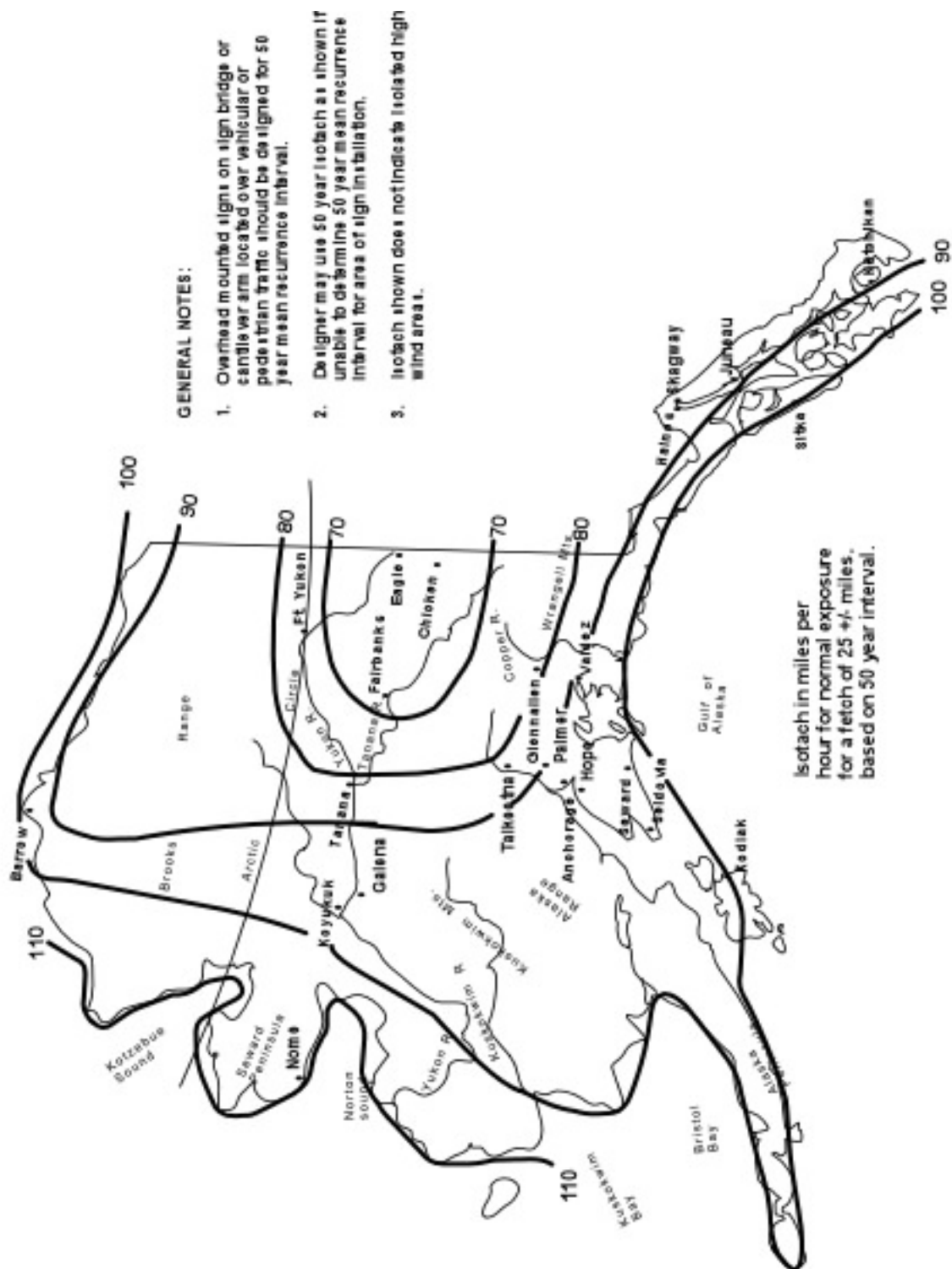
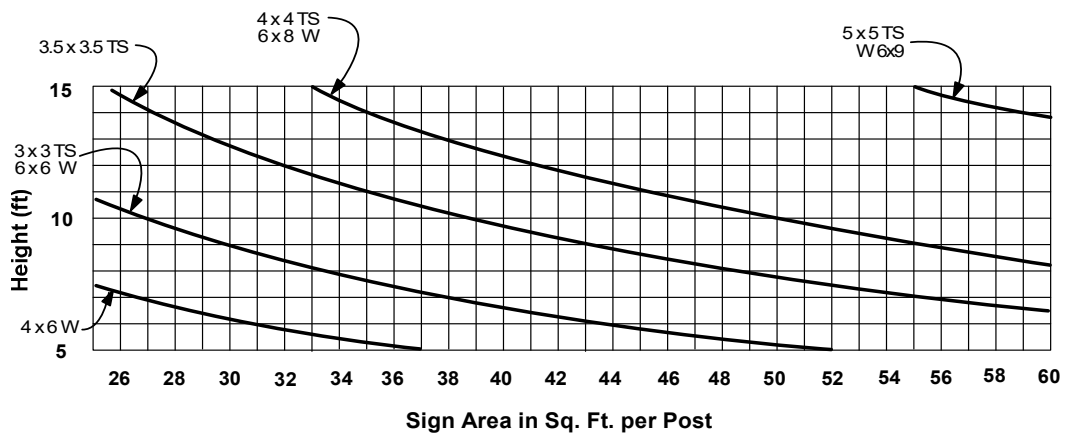
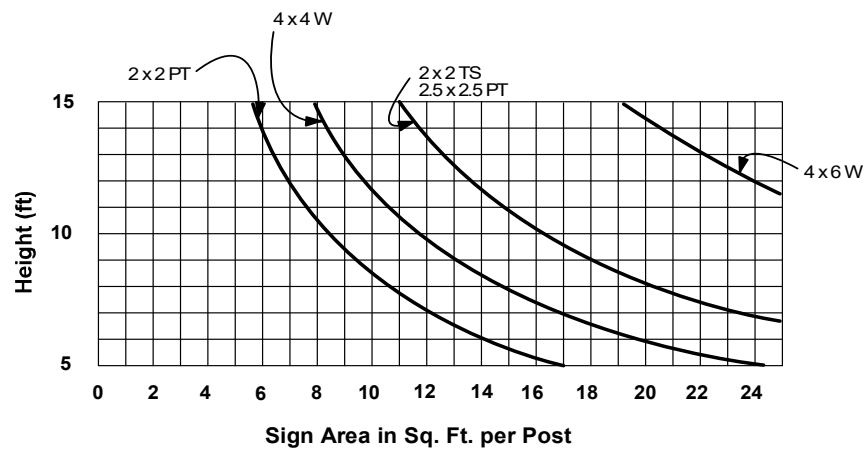


Figure 1170-4
Wind Isotach for 50-Year Interval

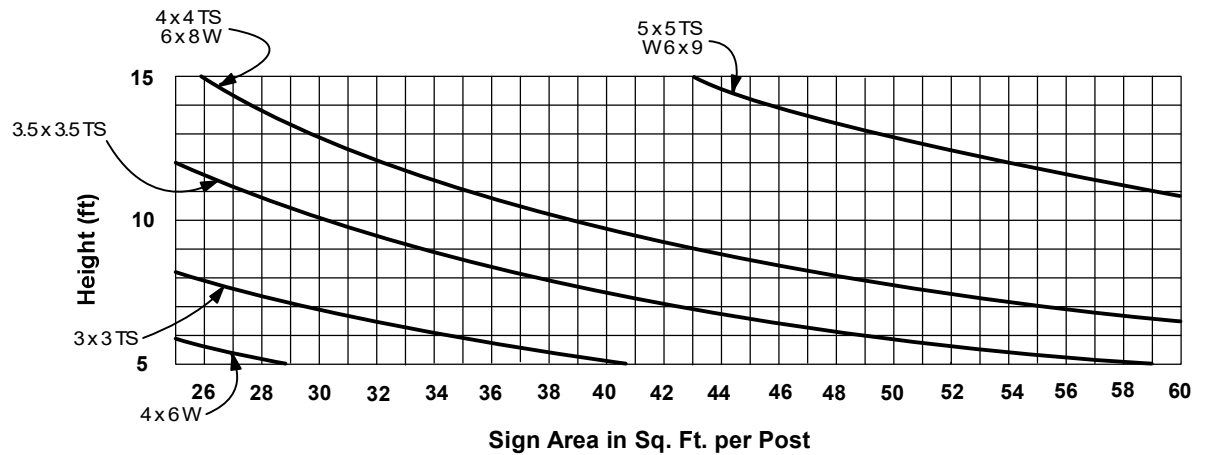
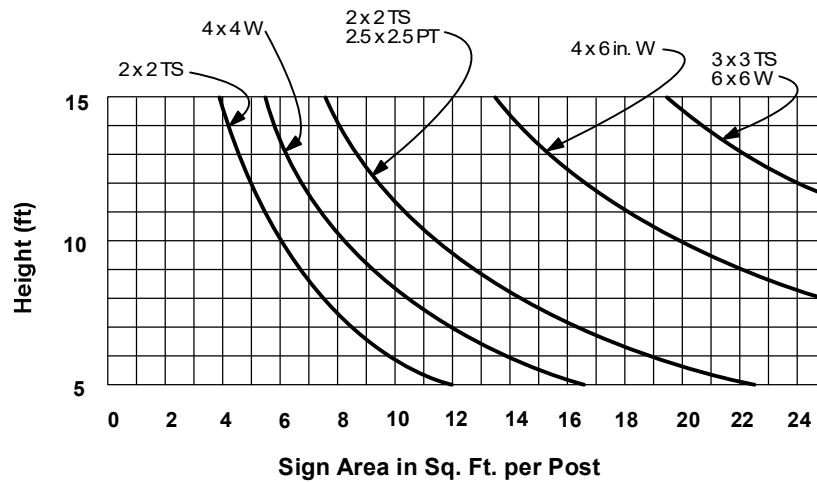
WIND ISOTACH FOR 50 YEAR INTERVAL



POST MATERIAL

PT..... Perforated steel tubing (0.105 in. wall)
 TS..... Steel tube square (0.1875 in. wall)
 x W.... Treated wood
 W_x.... Steel W shapes

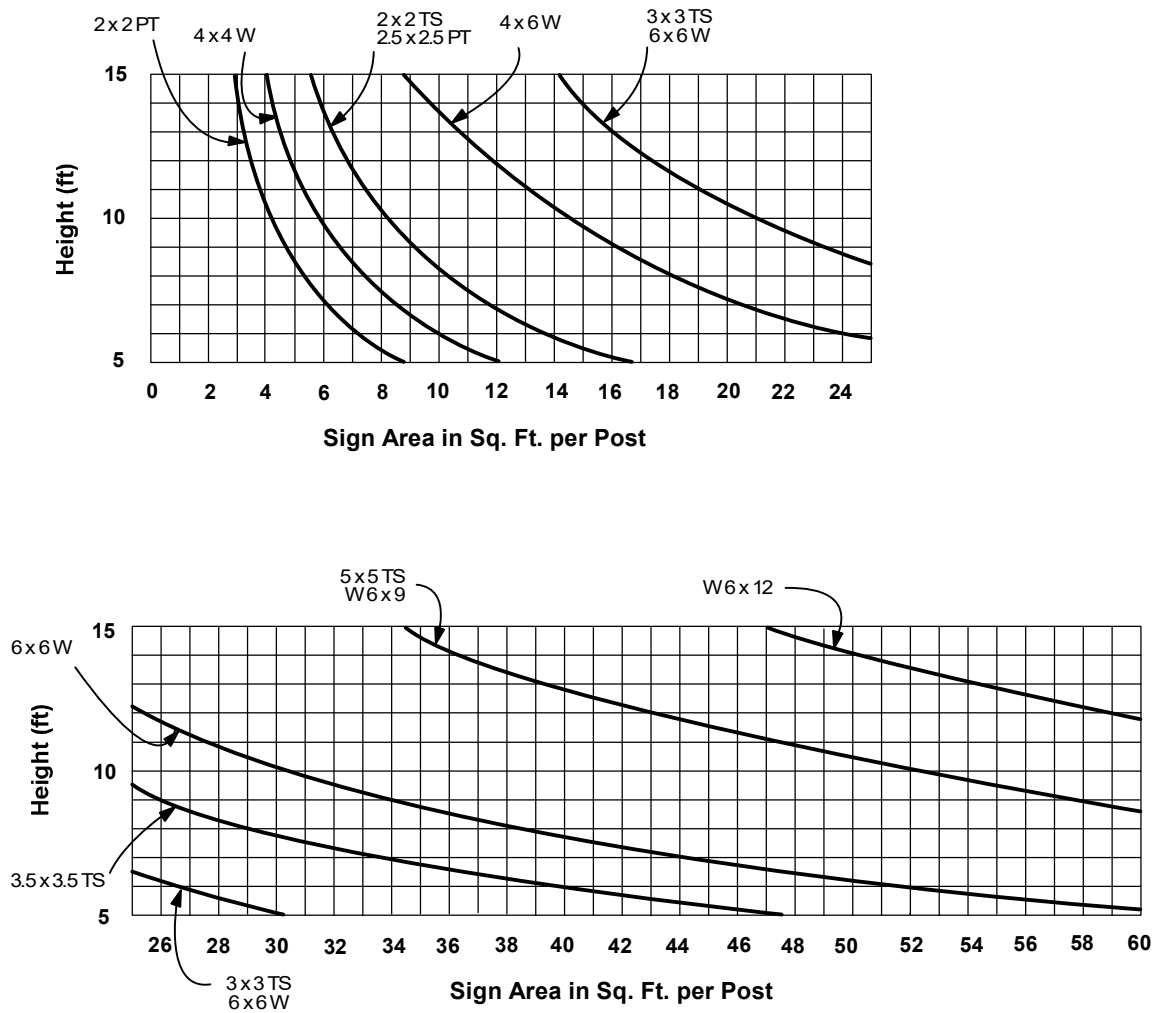
Figure 1170-5
Sign Post Selection for 50 mph Design Wind Speed



POST MATERIAL

PT.....Perforated steel tubing (0.105 in. wall)
 TS.....Steel tube square (0.1875 in. wall)
 _x_W....Treated wood
 W_x_....Steel W shapes

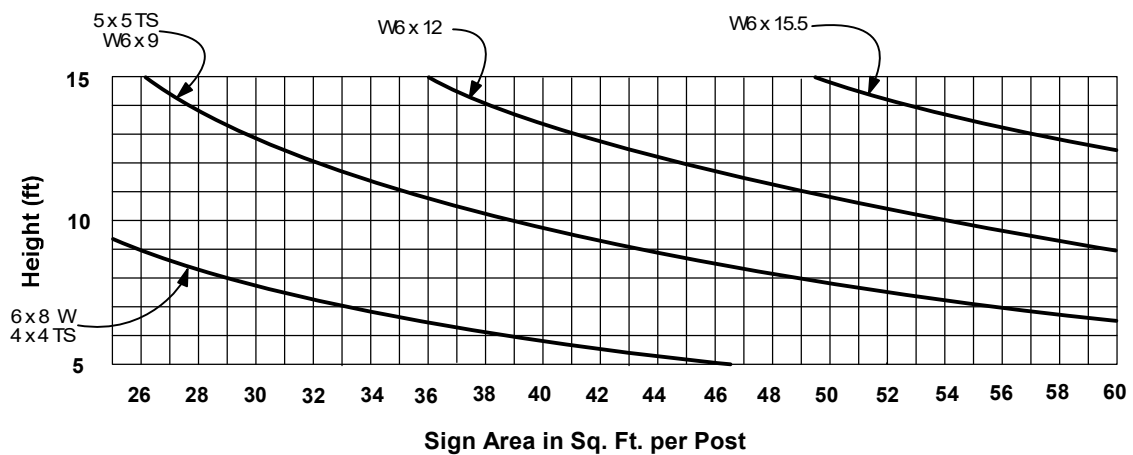
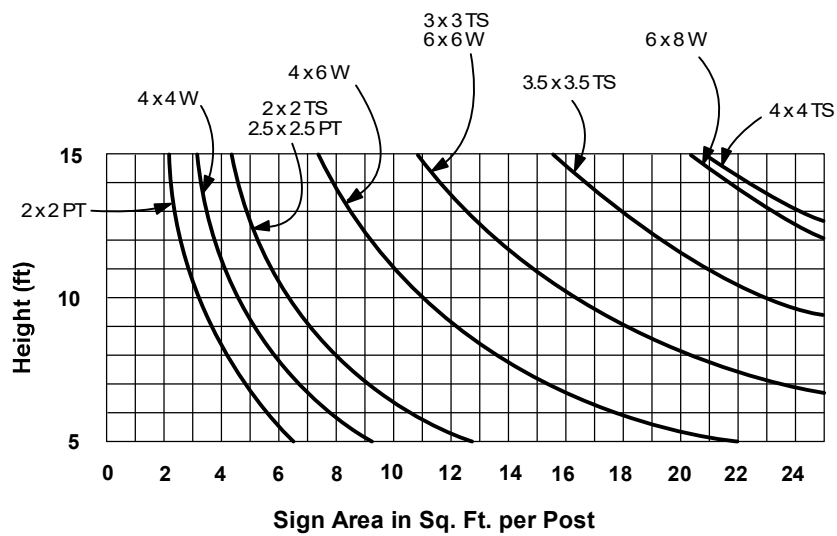
Figure 1170-6
Sign Post Selection for 60 mph Design Wind Speed



POST MATERIAL

PT..... Perforated steel tubing (0.105 in. wall)
 TS..... Steel tube square (0.1875 in. wall)
 _x_W.... Treated wood
 W_x..... Steel W shapes

Figure 1170-7
Sign Post Selection for 70 mph Design Wind Speed



POST MATERIAL

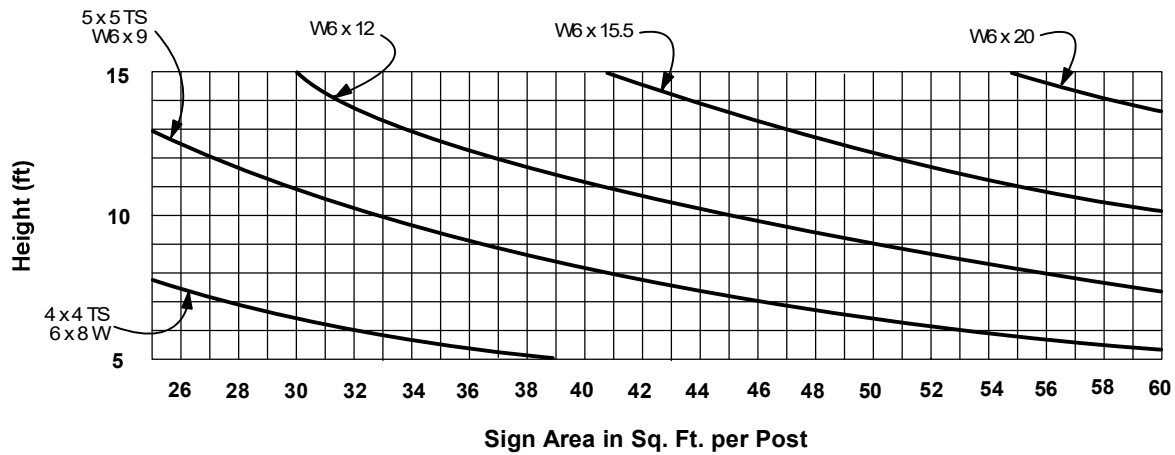
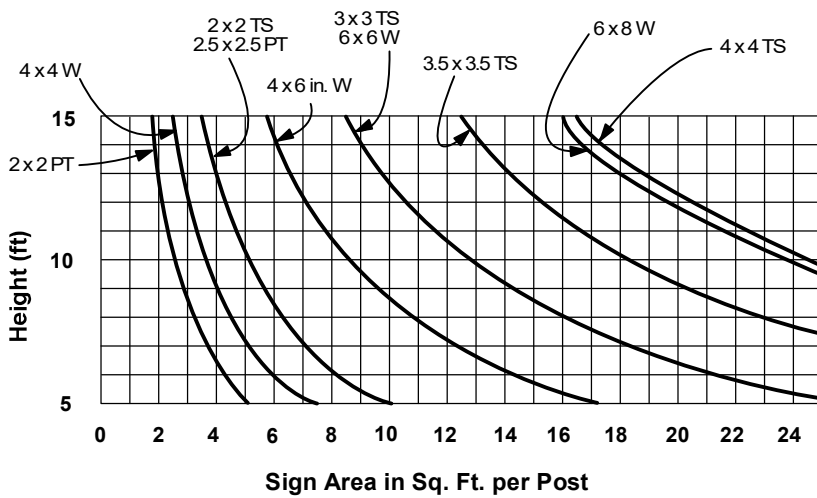
PT.....Perforated steel tubing (0.105 in. wall)

TS.....Steel tube square (0.1875 in. wall)

x_W....Treated wood

W_x_....Steel W shapes

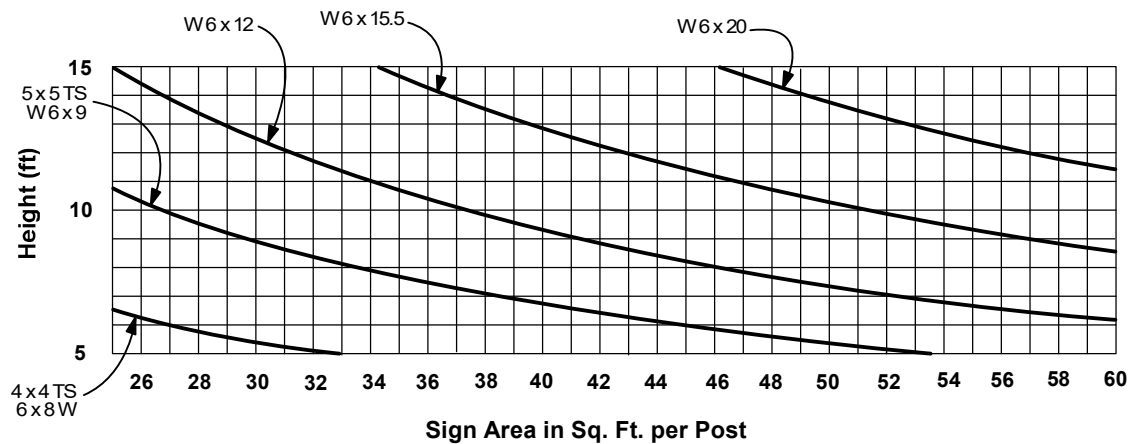
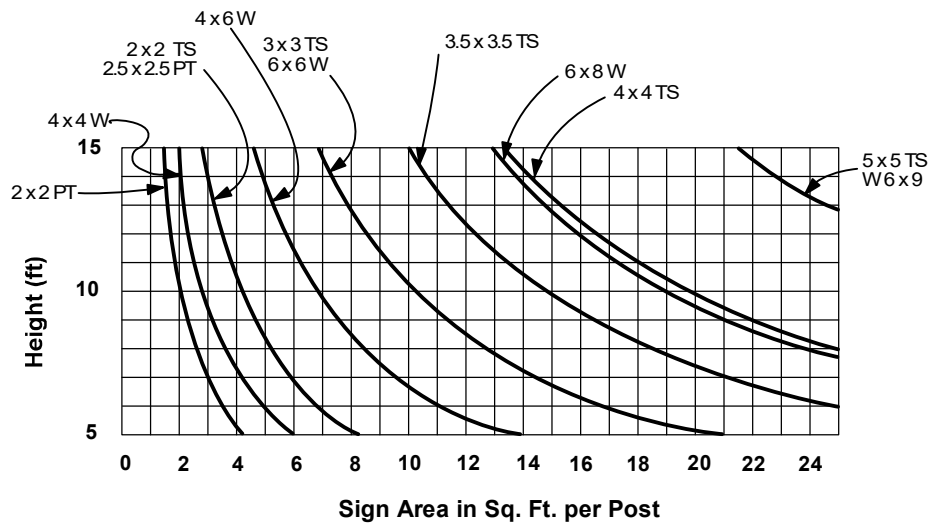
Figure 1170-8
Sign Post Selection for 80 mph Design Wind Speed



POST MATERIAL

PT.....Perforated steel tubing (0.105 in. wall)
 TS.....Steel tube square (0.1875 in. wall)
 x W....Treated wood
 W_x_.....Steel W shapes

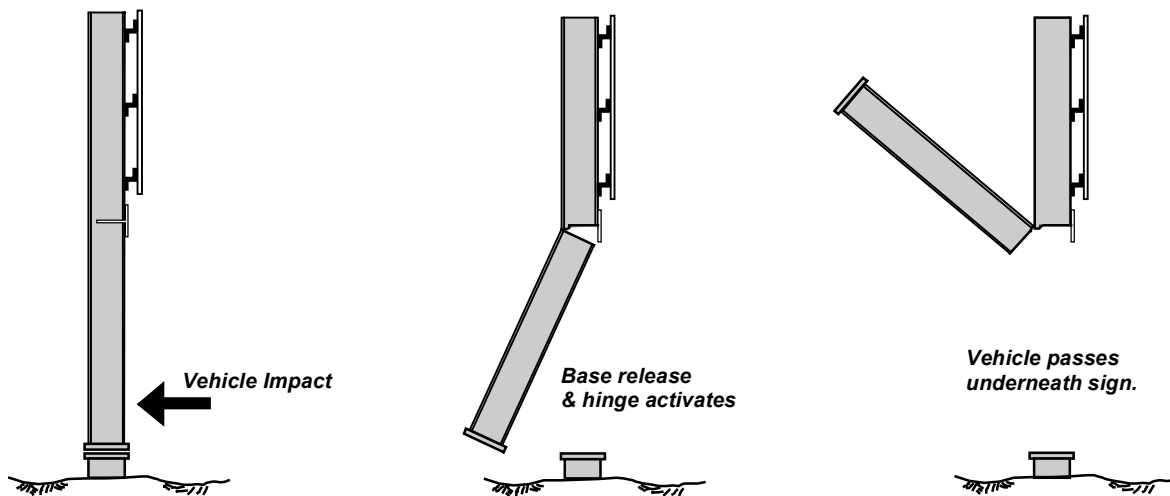
Figure 1170-9
Sign Post Selection for 90 mph Design Wind Speed



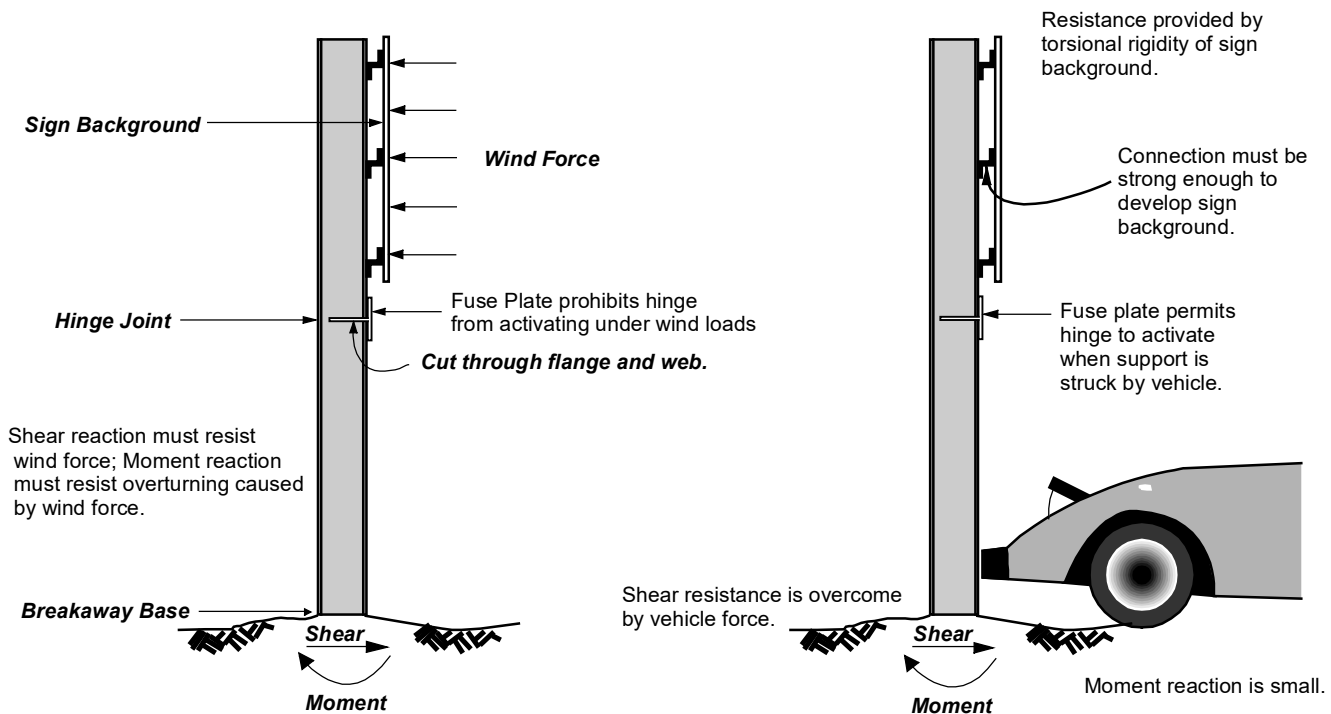
POST MATERIAL

PT.....Perforated steel tubing (0.105 in. wall)
 TS.....Steel tube square (0.1875 in. wall)
 x W....Treated wood
 W_x_Steel W shapes

Figure 1170-10
Sign Post Selection for 100 mph Design Wind Speed



VEHICLE IMPACT OPERATION



WIND LOADING CONDITION

COLLISION CONDITION

LARGE ROADSIDE SIGN SUPPORTS

Figure 1170-11
Large Roadside Sign Supports

1180. Pavement Design

- 1180.1. Introduction
- 1180.2. Pavement Overview
- 1180.3. Wearing Course
- 1180.4. Binder Course
- 1180.5. Base Course
- 1180.6. Subbase, Selected Material, and Borrow
- 1180.7. Gravel Roads
- 1180.8. Pavement Smoothness Price Adjustment

1180.1. Introduction

Alaska's road transportation system is vital to the state's residents and economy. Pavements must:

- withstand a variety of traffic and environmental conditions
- serve the public in a safe and comfortable manner.
- perform over extended periods of time.

This chapter is an overview of the DOT&PF policy and design philosophy for pavements. Detailed policy and procedures that govern Alaska's flexible pavement design are provided in the *Alaska Flexible Pavement Design Manual* (AKFPD Manual) and its companion software.

The *AKFPD Manual* is available online at:

http://www.dot.state.ak.us/stwddes/desmaterials/pop_flexpaveman.shtml

1180.2. Pavement Overview

1180.2.1. Pavement Structure

Pavement structure is a layered system of materials built on top of a prepared subgrade to protect it from excessive deformations due to traffic loads. In general, a pavement structure consists of (top to bottom): wearing course, binder course (if needed – see 1180.4), base course (stabilized or non-stabilized) and subbase or selected material (individually or in combination). The principal function of the layers is to distribute traffic load stresses within the pavement structure, thus protecting the subgrade from excessive deflection. Layer properties (i.e. density, strength, and stiffness) normally decrease from the top to the bottom of the system.

Regional materials staff provide recommendations or reviews of full pavement structure to evaluate frost susceptibility of the section and stability of foundation (subgrade) soils.

1180.2.2. Highway Pavements

Consult with the Regional Materials Section on pavement designs.

Regional materials staff perform this analysis or review proposals from design staff for design recommendations. The Regional Preconstruction Engineer is responsible for final pavement design approval.

1180.2.3. Non-Highway Pavements

Consult regional materials staff for assistance with non-highway pavements, such as parking areas. Pathways and sidewalk sections are outlined in Section 1210.4.3 Shared Use Path, Pavement Structure.

1180.3. Wearing Course

The wearing course is the top layer of a surfacing system that is in direct contact with traffic loads. The wearing course is designed to:

- Provide resistance to abrasion
- Provide a smooth ride
- Resist plastic deformation
- Resist water permeability
- Resist fatigue
- Resist thermal cracking

Available surfacing types are listed in section 7.3 of the *AKFPD Manual*.

See the *AKFPD Manual* for definition of hard aggregate and guidance.

1180.3.1. Hot Mix Asphalt (HMA)

Hot Mix Asphalt (HMA, or asphalt concrete pavement) is the predominant type of wearing course used on DOT&PF roadways. A pavement that receives such a surfacing is called a flexible pavement. HMA is appropriate for highway and non-highway pavements.

1180.3.2. Asphalt Surface Treatment (AST)

An asphalt surface treatment (AST) is an asphalt/aggregate application to a road surface. Usually less than 1-inch thick, asphalt surface treatments do not increase the load bearing capacity of pavement structures. They provide friction and decrease dust generation. ASTs are appropriate when unstable embankments are present and/or for low-traffic roadways or as a pavement preservation strategy.

Regional Materials Section provides guidance on the selection of project specific surface treatments.

General information on ASTs can be found in the *Asphalt Surface Treatment Guide*, which is available online at:

http://www.dot.state.ak.us/stwddes/research/assets/pdf/fhwa_ak_rd_01_03.pdf

1180.3.3. Portland Cement Concrete (PCC)

Portland cement concrete (PCC) is rarely used in Alaska pavements. High cost and damage due to foundation settlement preclude its use in roadways.

If a PCC pavement is used, refer to the *AASHTO Guide for Design of Pavement Structures*. Consult the regional materials engineer for special provisions, specific concrete mix designs, and subgrade requirements.

1180.4. Binder Course

The binder course is the bottom layer of pavement below the wearing course. The binder course supports the wearing course. A binder course has all the properties of a wearing course except that resistance to abrasion is not essential. Comply with Alaska Renewable Pavement Policy. See Section 7.4.3 of *AKFPD Manual*.

The wearing course and binder course may be composed of the same material when advantageous; however, the binder course often has a different asphalt content and gradation or hardness of aggregate. A binder course is not necessarily required in a specific pavement design.

1180.5. Base Course

The base course is the layer of material placed on top of the subbase or embankment that supports the wearing and binder courses. A base course can be stabilized or non-stabilized.

Use of a stabilized base is required on all roadway construction, reconstruction, and rehabilitation projects except for projects exempted in writing by the Regional Preconstruction Engineer. Rationale for an exemption may include:

- Projects with a low AADT
- Areas underlain by unstable foundations, such as ice-rich permafrost or compressible soils, where settlement results in frequent maintenance.
- Projects for which a stabilized base will not provide a cost-effective improvement in the pavement performance, reduced maintenance, or reduced future rehabilitation costs through a comprehensive life-cycle cost analysis. The period of the life-cycle cost analysis shall be 30 years.
- Roads designed on behalf of agencies other than DOT&PF. See Section 2.3 of the AKFPD Manual for base course requirements and guidance.

1180.5.1. Stabilized Bases

Stabilized bases are normally defined as standard base course materials containing one or more of the following binder additives:

- Asphalt emulsion
- Asphalt cement
- Foamed asphalt cement
- Lime
- Portland cement
- Reclaimed asphalt pavement (RAP)

Stabilized bases are used to improve long-term pavement performance, reduce maintenance costs, and reduce future rehabilitation costs.

In developing flexible pavement designs using stabilized bases, coordinate with the Regional Materials Section.

In addition, you may also refer to the AKFPD Manual and the *Alaska Soil Stabilization Guide* (Report No. FHWA-AK-RD-01-6B) found online at:

http://www.dot.state.ak.us/stwddes/research/assets/pdf/fhwa_ak_rd_01_06b.pdf

The resilient modulus, M_R , of the stabilized base is determined from regional experience, back

calculation, or testing and is a necessary input variable to run the AKFPD analysis program.

Following are stabilized bases used relatively frequently in Alaska:

Asphalt Treated Base

Asphalt treated base (ATB) is a stabilized base course constructed using a minimum of 4 % asphalt cement binder. Refer to Sections 7.4.2 and 7.4.3 of the *AKFPD Manual* for a detailed discussion of ATBs and the *Alaska Renewal Pavement*.

There is some functional overlap with HMAs, but ATBs have different asphalt content, can use softer aggregate, and are less restrictive on aggregate gradation and in placing and leveling requirements. Asphalt treated base course is addressed in Section 306 of the specifications.

Emulsified Asphalt Treated Base

Emulsified asphalt treated base course (EATB) is addressed in Section 307 of the specifications.

When used with emulsified asphalt, crushed asphalt base course (CABC) is also considered a stabilized base when containing 3% or greater emulsion content. Crushed asphalt base course is covered in Section 308 of the specifications.

Reclaimed Asphalt Pavement

Reclaimed asphalt pavement (RAP) that contains greater than 50 % asphalt concrete pavement or greater than 2 % residual asphalt content is considered a stabilized base.

1180.5.2. Non-Stabilized Bases

Non-stabilized bases comprise materials that do not have any binder additive. Crushed aggregate is the most common type of base course.

Aggregate base course is covered in Section 301 of the specifications. RAP may be used as base course, or blended with aggregate base course. Coordinate with the Regional Materials Section for guidance on incorporating RAP into base course materials.

1180.6. Subbase, Selected Material, and Borrow

The lower pavement structure typically includes subbase or selected material, individually or in combination. Where existing natural material is of adequate quality (meeting frost and foundation

requirements), it may serve as the lower portion of the pavement structure.

Subbase is the layer(s) of material placed on a subgrade to support a base course. If the subgrade soil is of adequate quality, it may serve as the subbase. Section 304 of the specifications covers subbase.

Selected Material is material type indicated on the plans used to construct the subgrade embankment, see Section 703-2.07 for material specifications.

Useable excavation material meeting the requirements of the indicated Selected Material type are incorporated in the project embankment prior to utilizing Borrow, see Sections 104-1.04, 106-1.02, and 203. Borrow is embankment material (Selected Material) obtained from sources outside the right-of-way limits of the project.

1180.7. Gravel Roads

1180.7.1. General

Alaska has several existing major gravel roads and gravel surfacing is appropriate for some new, very low-volume roads in rural areas.

Maintenance cost of gravel roads may be considerably higher than that for HMA or AST surfaced roads and is an important consideration when performing a cost-effective or life-cycle cost analysis. Consider applicable dust controls as advised by the Maintenance & Operations (M&O) Section in the cost analysis when determining the appropriate surface material.

1180.7.2. Gravel Surface Structure

New Gravel Roads

The following references provide guidance that will assist in design of gravel roads:

- *AKFPD Manual*
- *AASHTO Guidelines for Geometric Design of Low-Volume Roads (ADT < 2000)*
- *AASHTO Design of Pavement Structures-Part II (Chapter 4 Low-Volume Road Pavement Design)*

When future paving of a gravel road is planned, evaluate the pavement structure in accordance with the design guidance appropriate to the anticipated future pavement.

Consult the Regional Materials Engineer for more specific gravel roadway design guidance.

Consult the Regional M&O Section to determine if adequate personnel and equipment will be available to maintain the roadway prior to selecting gravel as surfacing.

Existing Gravel Roads

The roadway surfacing design process for existing gravel roads is as follows:

1. Evaluate the existing gravel road for previous performance and drainage system adequacy. M&O should participate.
2. Determine the adequacy of the embankment strength. In the determination, consider whether the existing roadway structure has the capacity to support new base and surface course, or if it requires strengthening prior to new surfacing. Consult Regional Materials Section for recommendations.

If the embankment has adequate strength, provide sufficient aggregate surface course to shape cross slope and superelevation as a minimum.

If the embankment does not have adequate strength, follow the guidance provided in the “New Gravel Roads” portion of this subsection.

1180.8. Pavement Smoothness Price Adjustment

Smoothness represents the level of comfort experienced by the traveling public and is an important indicator of pavement performance. Rough or uneven pavement surfaces affect driver safety, vehicle wear and tear, fuel efficiency, and increase pavement deterioration.

Pavement smoothness is measured as the International Roughness Index (IRI), reported as inches/miles at 0.1-mile increments. Section 401 of the Specifications outlines the requirements during construction, evaluation, method of measurement, and basis of payment for the Pavement Smoothness Price Adjustment item.

The smoothness price adjustment does not apply to all conditions such as low volume, low speed, or low tonnage projects. The smoothness price adjustment applicability and method varies based on the region, roadway characteristics, type of project, etc.

Consult the Regional Materials Engineer and Construction Section prior to including on a project.

Method 1 is the preferred method, and should be used for projects that include construction of new base and/or subbase courses.

Method 2 is typically applicable only to resurfacing and minor rehabilitation projects. Method 2 should only be used where reliable pre-construction IRI can be established and improvement to a final IRI of greater than 120 is not anticipated.

Neither method should be used where embankment or foundation conditions are poor and post-construction settlement is anticipated.

1190. Driveway and Approach Road Standards

- 1190.1. General
- 1190.2. Exceptions and Waivers
- 1190.3. Definitions
- 1190.4. Functional Classifications
- 1190.5. General Principles
- 1190.6. Control Dimensions

1190.1. General

Driveways and approach roads that intersect public roadways are a type of at-grade intersection. The numbers of crashes at driveway intersections are disproportionately higher than at public road intersections and consequently, driveway intersection design merits special attention.

Construct or Reconstruct driveways in accordance with the standards established in this Section. Build public road intersections, also known as approach roads, to the standards established for Intersections in the *AASHTO A Policy on the Geometric Design of Highways and Streets* (GB).

For this Section, the terms “driveway” and “approach road” are used interchangeably where the topic does not require a differentiation between them for application.

1190.1.1. Municipal Geometric Standards

Use municipal geometric standards approved for use on Department roadways within a municipality instead of the geometric standards contained in this section for all driveways within the municipality.

The Regional Director will grant approval of municipal driveway geometric standards for use on roadways administered or maintained by the Department after review by the following people:

- Regional Preconstruction Engineer
- Regional Maintenance and Operations Chief
- Statewide Chief Engineer

1190.1.2. Interstate Highway Access

Any new or modified access point, including driveways, to an Interstate must be approved by FHWA under 23 U.S.C. 111. A safety, operational, and engineering analysis is required. The type of access (e.g., driveway or approach road) and type of facility (e.g., traffic volume, design) will determine the level of analysis required. Any modifications to

existing access control will require additional FHWA approval in accordance with the Stewardship & Oversight Agreement. For new or modified interchanges and partial interchanges, an Interchange Justification Report (IJR) is required. Develop an Interchange Justification Report (IJR) using the FHWA’s *Policy on Access to the Interstate System and Framework for Developing and Reviewing Interstate Justifications Reports* as guidance. The policy is available at:

<https://www.fhwa.dot.gov/design/interstate/170522.cfm>

23 CFR 624, effective December 9, 2024, provides final regulatory requirements for Interstate access changes. Compliance is required by December 9, 2025, and may require additional changes to the PCM.

1190.2. Exceptions and Waivers

The Regional Director or their designee may grant exceptions on driveways to be constructed or reconstructed along existing highways built to design standards prior to the GB. These exceptions do not supersede FHWA authority under 23 U.S.C. 111 for Interstate Highway access.

Driveways to be constructed or reconstructed along highways built according to the GB must follow the procedures of Section 1100.3 in the consideration of waivers from the driveway standards.

1190.3. Definitions

(See Figures 1190-1 through 1190-7b).

Angle of Intersection: The horizontal angle of 90 degrees or less between the driveway centerline and the edge of the traveled way of the public roadway.

Buffer Area: The border area along the property frontage between the edge of traveled way and the right-of-way line bounded at each end by the frontage boundary lines.

Corner Clearance: The distance along the edge of traveled way of a public road or street from the near edge of traveled way of another public road or street to the tangent projection of the nearest edge of any driveway, not including transition slopes, tapers, or return-radii.

Distance Between Driveways: The distance measured parallel to the centerline of roadway between intersection of the inside edges of two adjacent driveways and the right-of-way line.

Driveway Foreslope: In cross-section, that portion of the driveway embankment that slopes downward from the driveway.

Edge Clearance: The distance measured along the edge of traveled way between the frontage boundary line and the tangent projection of the nearest edge of driveway, not including returns, flares, or transition.

Frontage: The length along the road or street right-of-way line of a single property tract, measured parallel to the centerline of the road or street, between the edges of the property. Corner property at a road or street intersection has a separate frontage along each road or street.

Frontage Boundary Line: A line perpendicular or radial to the public road or street centerline at each end of the frontage, extending from the right-of-way line to the edge of traveled way.

Return: The curbed or uncurbed edge of the road, street, or driveway intersection that connects the edge of the public roadway with the adjacent edge of the driveway or another public roadway; usually as a single radius.

Right-of-Way (ROW): A strip of land owned by a municipality or the state upon which a public road is constructed.

Setback: The distance measured perpendicular or radial to the right-of-way line and the nearest building, pump island, display stand, or other manmade object over 6 inches in height within the property

Width: The distance across the driveway at its narrow point within the right-of-way measured at right angles to the centerline of the driveway

1190.4. Functional Classifications

Highways, roads, and streets are classified according to their intended function as arterials, collectors, or local roads or streets. Arterials are primarily, if not exclusively, for through traffic along the roadway. Local roads and streets are primarily, if not exclusively, to provide access to the public road system from the property adjacent to the roadway. Collectors serve as limited through traffic ways and

provide access from the adjacent property. For safety and efficiency, arterials should have few, if any, private driveways.

Freeways and expressways are special, high-design-type arterials that are exclusively for through traffic. Access is legally controlled along the arterial and no private driveways are permitted.

Driveways will not be allowed on other arterials if other access is available. The Department's primary concern is the safe, efficient movement of through traffic. If driveways directly accessing the arterial are necessary, then their number, location, and design will be controlled to minimize the effect on through traffic.

On local roads and streets, the roadway's primary purpose is to provide access to adjacent lands. Consequently, the Department only exercises driveway controls that are necessary to a safe roadway. Collector roadways require more driveway controls than local roads and streets, but less than arterials.

Where there are differences in the required degree of control for driveway design and placement due to variance in functional classes, we provide differing criteria. If a particular roadway is not classified, the Regional Director or their designee will determine the interim classification for administering the driveway design standards.

1190.5. General Principles

1. **Buffer Area:** Buffer areas should be graded and landscaped to ensure adequate sight distance along the roadway, proper drainage, adequate clear zones, and a good appearance.
2. **Sight Distance:** The profile grade of a driveway and the treatment of the buffer area should allow the driver on the driveway to see sufficiently along the roadway to enable entry to the roadway without creating a hazard, and without encroaching into the traveled way (See Figure 1190-1).
3. **Setbacks:** The location of improvements on private property adjacent to the right-of-way line should not require parking, stopping, and maneuvering of vehicles within the right-of-way for vehicles or patrons to be properly served.

4. **Location of Driveways:** The location of driveways must minimize interference with the free movement of normal roadway traffic. This will reduce the hazards caused by congestion. Do not place driveways adjacent to or within an intersection's functional area. They also should not be located on a separate turning roadway, auxiliary speed change lane, or exclusive turning lane. Driveway placement must not provide direct access to the through roadways, ramps, or collector-distributor roadways of a freeway or expressway.

5. **Number and Arrangement of Driveways:** The number of driveways provided to a property should be the minimum required to adequately serve the needs of that property. Frontages of 50 feet or less must be limited to one driveway per frontage. Not more than two driveways should be provided to any single property tract or business establishment, but where the single ownership frontage exceeds 1,000 feet, additional driveways may be allowed provided they are required for servicing the property, and the distance between adjacent driveways is at least 330 feet.

Where two driveways are provided for one frontage less than 1,000 feet long, the clear distance between driveways should not be less than the minimum distances presented in Section 1190.6. Corner clearances at intersections should also be in accordance with the distance shown in 1190.5.

Develop driveways and adjacent property so that vehicles entering any arterial or collector roadway are not required to do so by backing into the right-of-way. Develop all frontages having two or more driveways and all commercial developments so that backing into a public roadway isn't necessary. Multi-family residential developments of more than four units per lot are considered commercial development as far as driveway standards are concerned.

6. **Curbs:** Where the posted speed limit on an existing roadway or the design speed on a proposed roadway is 50 mph or greater, driveway curbs, if used, must be the mountable type and you must place them no closer to the edge of through traveled way than the outside edge of shoulder or 8 feet, whichever is greater. On rural roadways with speed limits or design

speeds less than 50 mph, curbs, if used, should be mountable and placed at the outside edge of shoulder, but no closer than 4 feet from the edge of traveled way. Surface all roadway areas between the edge of traveled way and curbs placed parallel to the edge of traveled way with the same material as the traveled way.

7. **Drainage:** Construct all driveways and buffer areas so that there will be no right-of-way surface drainage onto the traveled way of the public roadway. Where driveways are on the high side of a superelevated roadway, or are otherwise on a descending grade into the edge of traveled way, special drainage structures, including drop inlets or slotted drains, may be required to prevent non-right-of-way drainage from flowing into or across the public roadway traveled way. It is the responsibility of the property owner or permittee to maintain these drainage structures.

In addition, design and construction of the driveway and buffer must not impair or alter drainage within the right-of-way, which may damage or threaten the stability of the public roadway. All drainage facilities within the right-of-way must conform to any applicable Department standards.

8. **Embankment (Transverse Slopes):** Driveway foreslopes, when constructed in a roadway ditch section on high-speed roadways, should have a 6:1 or flatter slope within the roadway's clear zone. Low-speed roadways or urban areas may have transverse foreslopes steeper than 6:1. Refer to Section 1130 and the *AASHTO Roadside Design Guide* (RDG), Transverse Slopes, for additional information on driveway transverse slopes within the clear zone.
9. **Lighting:** The Department will not provide roadway illumination solely for private driveways. The adjacent property owner may, except as stated here, install such lighting as long as it conforms to accepted highway lighting criteria indicated in Section 1100. A property owner may not illuminate a driveway if it is within 500 feet of an unlit public road intersection.
10. **Anticipated Traffic:** It is not necessary to estimate the volume of traffic for the majority of driveways. However, for larger developments

and approach roads, it may be desirable, if not necessary, to do so to determine the number, size, and design needed to serve the development. A few well-designed driveways are preferable to many smaller driveways.

When the volume of traffic is expected to exceed 100 vehicles during the peak hour, a competent licensed professional engineer should conduct an analysis of the vehicle trip generation characteristics of the development. If such an analysis is not available, you may use the average trip generation factors in the Institute of Transportation Engineers Informational Report, *Trip Generation*, to determine anticipated traffic for establishing the number, size, and design needed to accommodate the development.

“Peak hour” is the peak traffic-generating hour of the off-street facility.

11. **Median Openings:** Where a median exists or is to be constructed on a public roadway, driveways should be designed and controlled to allow right turns only. Median openings should not be provided unless all the following conditions exist:

- a. There is a sufficient volume of traffic using the subject location to warrant intersection design as an approach road.
- b. The intersection is evenly spaced between adjacent arterial or collector intersections.
- c. Installation of a signal at present or in the future at the subject driveway intersection will not adversely affect the capacity of the public roadway.

To minimize wrong way movements on the divided public roadway, driveways planned near a median opening should be placed either directly opposite the median opening or at least 200 feet from the median opening. See Section 1150 for additional considerations.

12. **Design Vehicles:** Refer to the GB, Chapter 2, Design Vehicles General Characteristics, for guidance in selecting the appropriate design vehicle for the driveway. At least one driveway shall have widths, intersection alignments, and corner radii designed to accommodate the turning paths of the largest vehicles generated by the site.

This would include large single units or tractor-trailer combination vehicles that deliver freight.

1190.6. Control Dimensions

Specific control dimensions implement the general principles. Exceed minimum dimensions as much as possible. Due to differing conditions in rural and urban areas, different dimensions are provided. Where appropriate, the control dimensions also reflect the difference between differing functional classes of roadways.

In administering these driveway standards, urban areas have populations of 500 or more within a defined compact area. The defined area need not be incorporated, but an incorporated place containing 500 people would be an urban area. Unincorporated places that have the characteristics of an incorporated community of 500 should be considered urban. In addition, if a roadway has urban characteristics such as small lot frontages, you may use the urban control dimensions.

1. **Sight Distances:** Figure 1190-1 illustrates the unobstructed sight distance along the public roadway, which should be available to a motorist entering the roadway. On arterial collector roadways, if the appropriate sight distance cannot be reasonably achieved, relocate the driveway.

The sight line used to set sight distance is from the entering height of eye (3.5 feet above the driveway surface) to the driver eye height of the design vehicle (3.5 feet above the surface of the public roadway at the required distance from the driveway). The driver’s eye is assumed to be between 14.4 to 17.8 feet from the edge of the nearest through traveled way, and the triangle formed by the sight lines left and right from this point to the required sight distances left and right along the public roadway is the sight distances triangle. Nothing should substantially obstruct the entering driver’s view of public roadway traffic anywhere within this triangle.

2. **Width:** Residential driveways, rural and urban, should be a minimum of 14 feet wide and a maximum of 20 feet wide. Rural farm driveways should be a minimum of 14 feet wide and a maximum of 24 feet wide to accommodate machinery. Commercial driveways should be a minimum of 24 feet wide for traffic volume up

to 100 vehicles per hour and may be a maximum of 34 feet wide for up to 200 vehicles per hour. Where repetitive peak hour traffic is expected to exceed 200 vehicles per hour, the driveway should be designed as an approach road intersection in accordance with the *GB* and Chapter 11.

3. **Driveway Angle:** The driveway angle should be 90 degrees. It must not be less than 60 degrees except where designed as a one-way, one-lane, right-turn-only ramp, in which case it should be designed in accordance with the *GB*.
4. **Return Radii:** Curb or edge of pavement returns should connect the edge of the driveway with the face of curb on curbed roadways and with the edge of a 9-foot paved shoulder on uncurbed roadways. Where uncurbed roadways have paved shoulders less than 9 feet wide, the return should terminate 8 feet from the edge of traveled way and be connected to the edge of pavement (traveled way or paved shoulder) with a 10:1 taper (10 feet longitudinally along the roadway for each 1 foot transversely).

The return radii for driveways using returns, curbed or uncurbed, should conform to Table 1190-1.
5. **Curb Cuts:** The bottom width of curb cuts should equal the width of driveway and should match the flow line (or bottom of curb face line) of the curb section at the edge of roadway. Transitional slopes should begin at the edge of driveway and slope upward to reach the top of a 6-inch-high curb face in 6 feet. The transitional slopes behind the curb face may have a constant width with a variable slope or a constant slope with a variable width.
6. **Distance between Driveways:** The minimum distance between two adjacent driveways, on the same parcel, measured along the right-of-way line between the adjacent edges, should conform to Table 1190-2.
7. **Setback:** Setback distances must conform to local zoning requirements. Where local zoning ordinances do not provide a minimum setback, the minimum setback should be 16.5 feet, and where angle parking is permitted adjacent to the right-of-way line, the setback should be 50 feet.

8. **Edge Clearance:** The property line edge clearance should be equal to the return radius for driveways using returns and should be 16.5 feet for driveways using curb cuts with transitional slopes. *Exception:* Where a common-use driveway is to serve two adjoining properties, the approximate centerline of the driveway may be on the frontage boundary line.
9. **Corner Clearance:** The minimum distance from the nearest face of the curb, or nearest edge of traveled way for uncurbed roadways, of an intersecting public roadway to the nearest edge of driveway should conform to Table 1190-3.
10. **Driveway Profiles:** The maximum access grade for a residential driveway should be 15 percent. Commercial driveways should have a maximum algebraic difference of 8 percent between access grade and landing grade. The maximum landing grade is ± 2 percent for all driveways. Driveway profiles must conform to the following descriptions.
 - a. **Driveway with Uncurbed Returns:** Public roadway with a negative cross-slope (i.e. outer edge of traveled way lower than lane or centerline):

From the outer edge of the traveled way to the edge of the shoulder or 9 feet, whichever is greater, the driveway profile grade should be the same as the traveled way or shoulder cross-slope.

From the outer edge of the shoulder, a vertical curve should connect the profile to a positive or negative grade, which will bring the driveway profile to the adjacent property grade.
 - b. **Driveway with Curbed Returns:** Public roadway with a negative cross-slope (i.e. outer edge of traveled way lower than lane or centerline):
 - 1.) Beginning with an angle point at the flow line (bottom of face of curb) along the roadway, the driveway profile should rise at a gradient such that the algebraic difference in grade between the cross-slope of the roadway and the grade of the driveway does not exceed 8 percent.

- 2.) A landing zone must begin after a rise of 6 inches.

- c. **Driveway with Returns:** Public roadway with positive cross-slope (i.e., on high side of superelevated section):

From the outer edge of traveled way to the edge of the shoulder or 8 feet, whichever is greater, the driveway profile grade should be the same as the traveled way superelevation rate.

From the outer edge of the shoulder, a vertical curve should connect the profile to a positive or negative grade, which will bring the driveway profile to the adjacent property grade.

- d. **Driveway with Curb Cuts**

From the bottom face of curb or flow line, the driveway profile grade should slope uniformly upward at a grade not to exceed an algebraic difference of 8 percent with the adjacent lane or shoulder cross-slope.

If a sidewalk or portion thereof remains to be crossed, the driveway profile may match the surface of the sidewalk.

The profile should then follow a vertical curve or have an angle point, if necessary, to connect with a positive or negative grade, which will bring the driveway profile to the adjacent property grade.

- e. **Vertical Curves:** Vertical curve should be symmetrical and as flat as feasible. Crest vertical curves should not exceed a 3...-inch hump in a 12-foot chord, and sag vertical curves should not exceed a 2-inch depression in a 12-foot chord. Vertical curves must not have humps or depressions exceeding 3.6 inches in a 12-foot chord.
- f. **Landings:** All driveways are to have landing zones. Landing length depends on anticipated traffic. Passenger cars require 10 feet minimum while semi-tractor trailers require 30 feet based on wheel bases.
- g. **Pedestrian Areas:** Where curbed returns intersect a pedestrian way, provide appropriate ADA compliant curb ramps.

11. **Speed Change Lane and Left-Turn Lanes:** On high-speed (50 mph or over) or high-volume arterial roadways, speed change lanes may be required for the acceleration or deceleration of vehicles entering or leaving the public roadway from or to a higher-volume traffic generation (greater than or equal to 100 vehicles per hour) or attracting development. Use Figure 4-23 of NCHRP 279 Intersection Channelization Design Guide as a guideline for the right-turn treatments. On a one-way street, the above criteria also apply to the left through lane. For guidelines on the need for left-turn lanes on a main street or road at a driveway, refer to Figure 1190-8.

Table 1190-1
Driveway Return Radii (feet)

Driveway	Residential		Farm		Commercial	
	Curbed	Uncurbed	Curbed	Uncurbed	Curbed	Uncurbed
14 - 20	*20	20	-	20	-	-
24 - 34	-	-	-	40	*40	40

* For curbed roadways where residential driveways or commercial driveway have a 100-vehicles-per-hour or fewer repetitive peak, use a curb cut rather than a return.

Table 1190-2
Distance Between Driveways
(On Same Parcel)

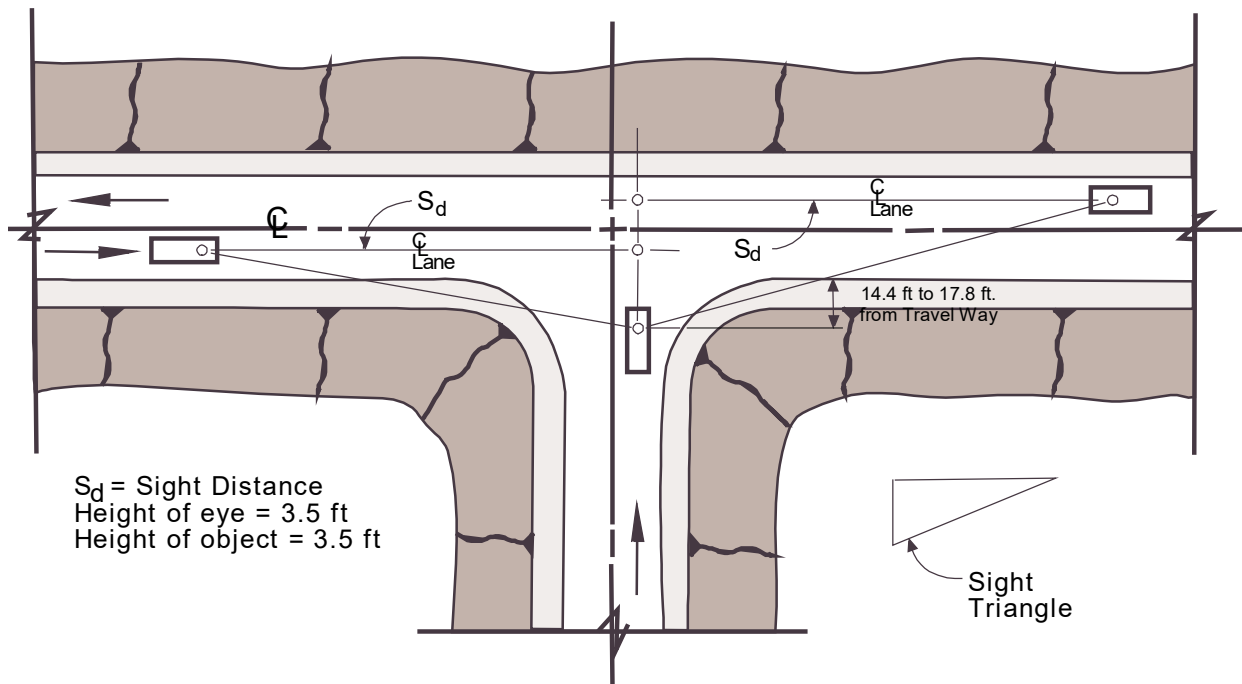
Hourly Volume: Greater than 10 vph				Hourly Volume: Less than or equal to 10 vph	
Speed (mph)	Rural: Arterials and Collectors	Urban: Arterials and Collectors	Urban & Rural: Local	Functional Classification	Distance
30	370 feet	200 feet	200 feet	Arterials	75 feet
35	400 feet	260 feet	250 feet	Collectors	50 feet
40	440 feet	340 feet	310 feet	Local	35 feet
45	540 feet	430 feet	390 feet	-	-
50	690 feet	510 feet	490 feet	-	-

Note: This assumes level terrain.

Table 1190-3
Corner Clearance

Hourly Volume: Greater than 10 vph				Hourly Volume: Less than or equal to 10 vph			
Speed (mph)	>250 vph	100 - 250 vph	10 - 100 vph	Functional Classification	Curbed Crossroad	Uncurbed Crossroad	
						Urban	Rural
30	200 feet	150 feet	80 feet				
35	260 feet	210 feet	110 feet	Arterials	60 feet	70 feet	100 feet
40	330 feet	260 feet	150 feet	Collectors	50 feet	60 feet	60 feet
45	390 feet	310 feet	180 feet	Local	40 feet	50 feet	60 feet
50	460 feet	340 feet	230 feet				

DRIVEWAY SIGHT DISTANCE



DESIGN SPEED or POSTED SPEED LIMIT mph	SD MINIMUM (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

Note: Minimum sight distances are stopping sight distances for level grades, between -3% and +3%. Refer to the **GB**, for desirable intersection sight distances and for grade adjustments.

**Figure 1190-1
Driveway Sight Distance**

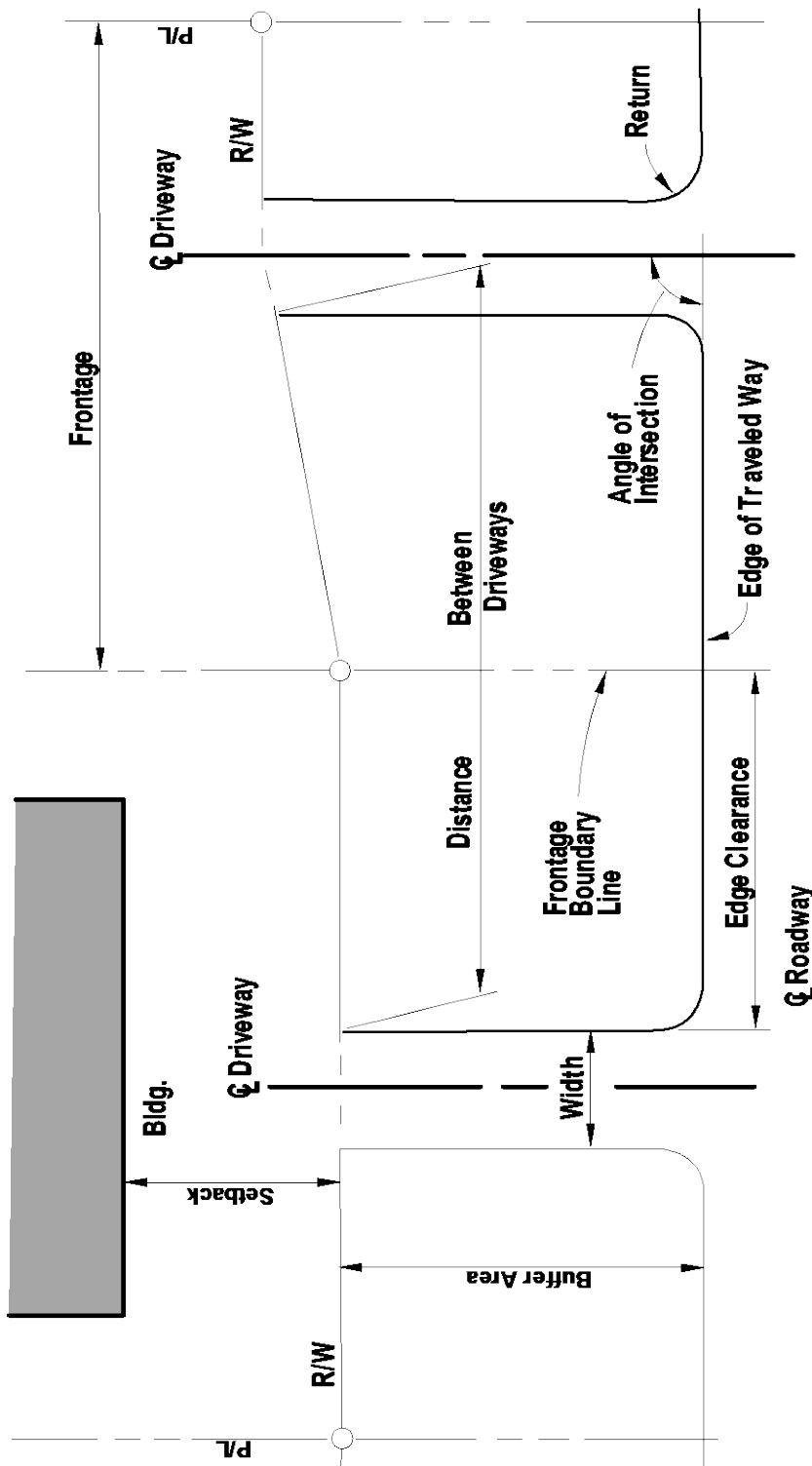
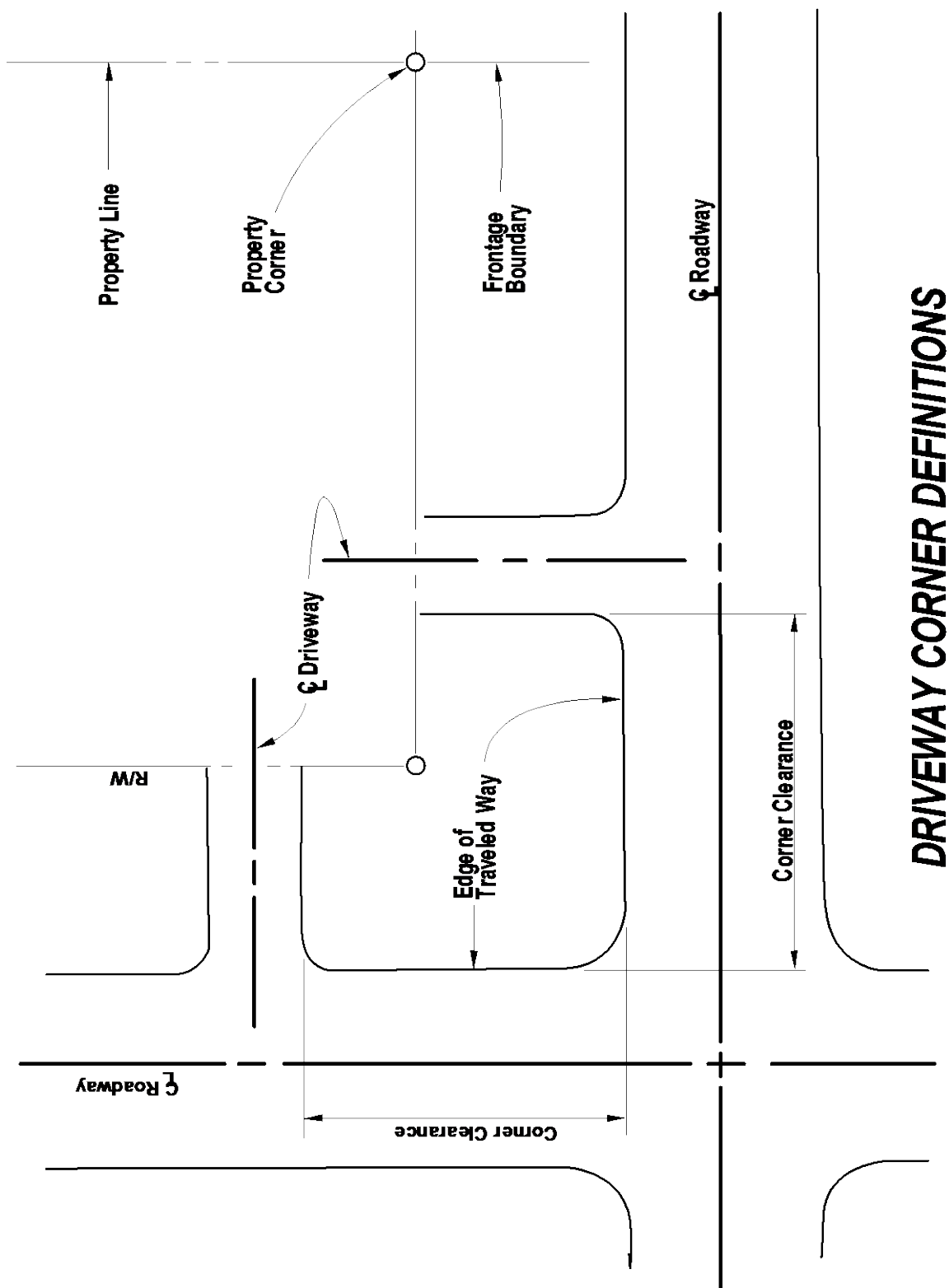


Figure 1190-2
Driveway Definitions

DRIVEWAY DEFINITIONS



DRIVEWAY CORNER DEFINITIONS

Figure 1190-3
Driveway Corner Definitions

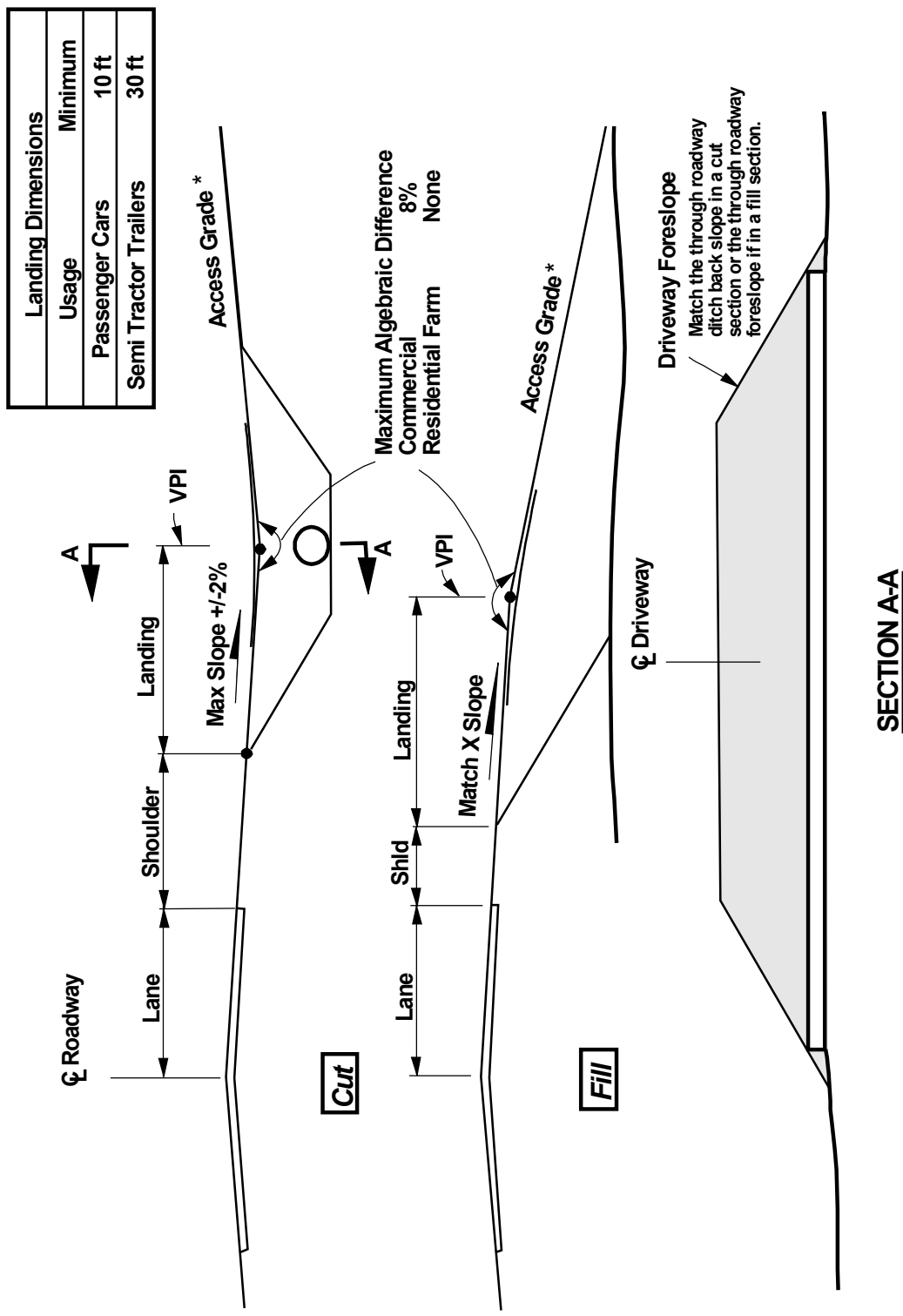
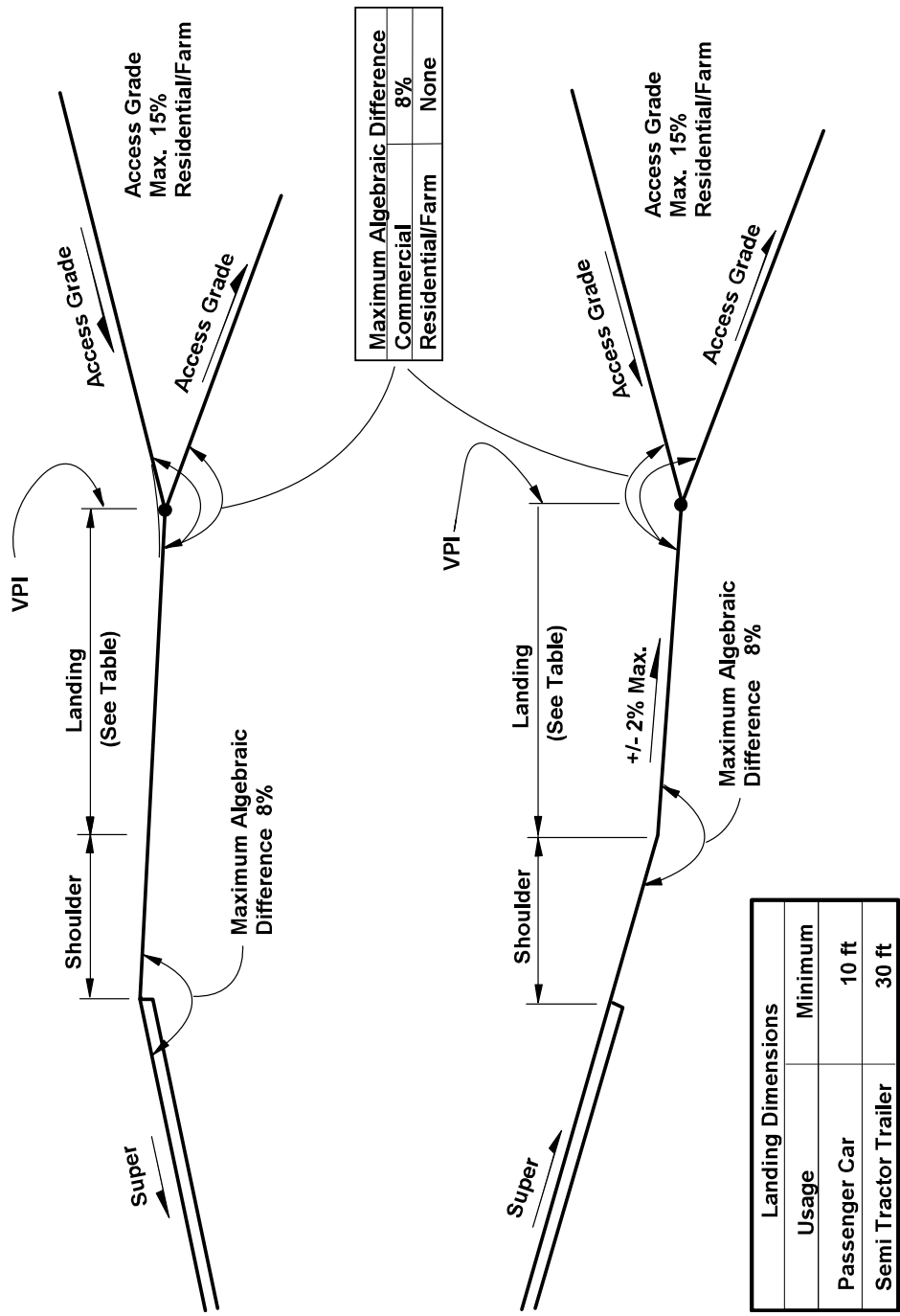


Figure 1190-4
Driveway Profiles

* Access Grade
Max. 15%
Residential/Farm

DRIVEWAY PROFILES

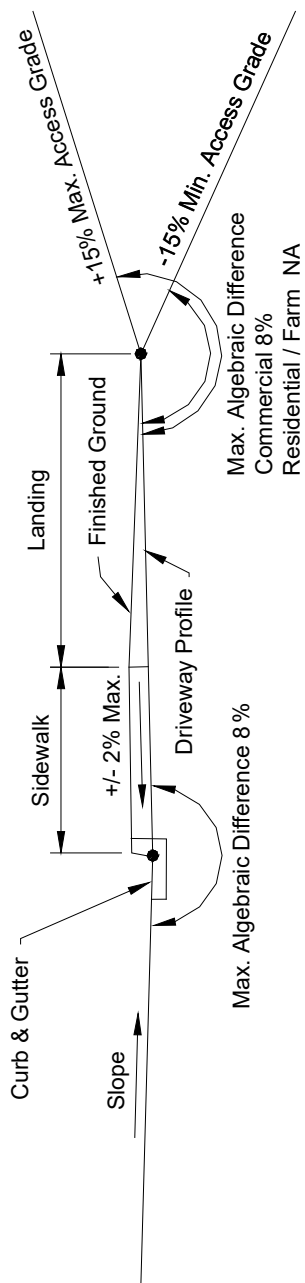
SECTION A-A



DRIVEWAY PROFILES with SUPER

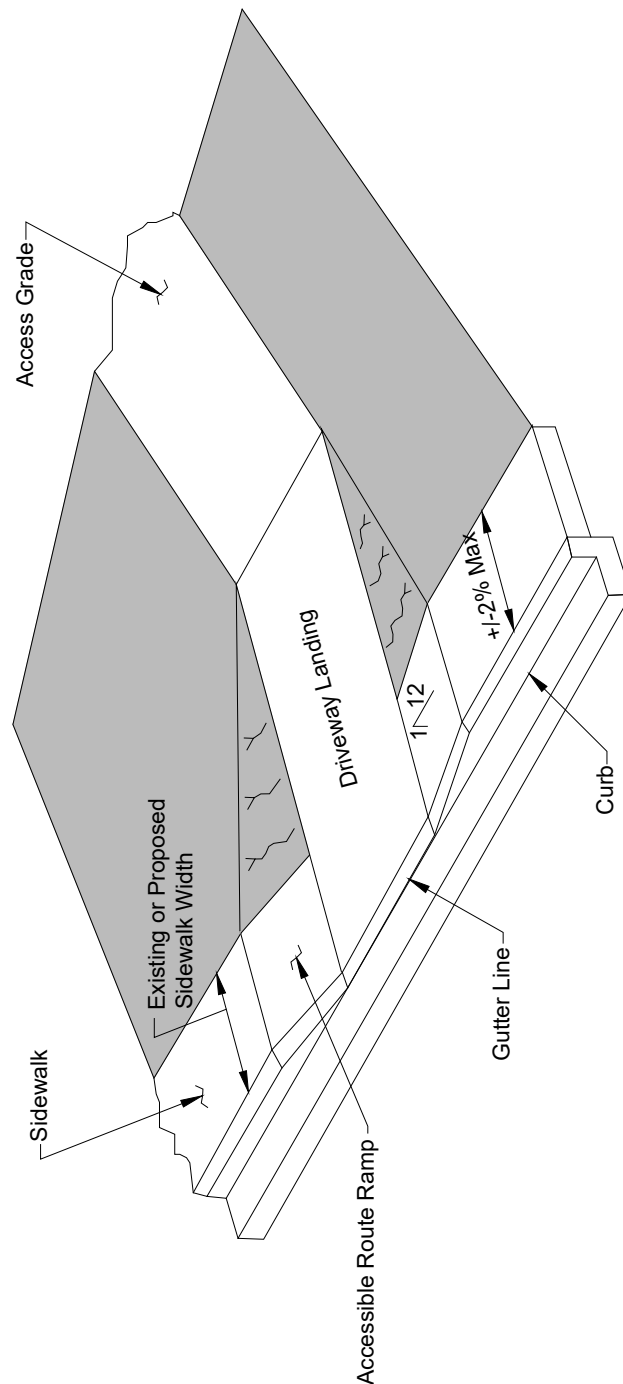
Note: Consider vehicles that will use driveway to ensure grades will accommodate needs.

**Figure 1190-5
Driveway Profiles With Super**



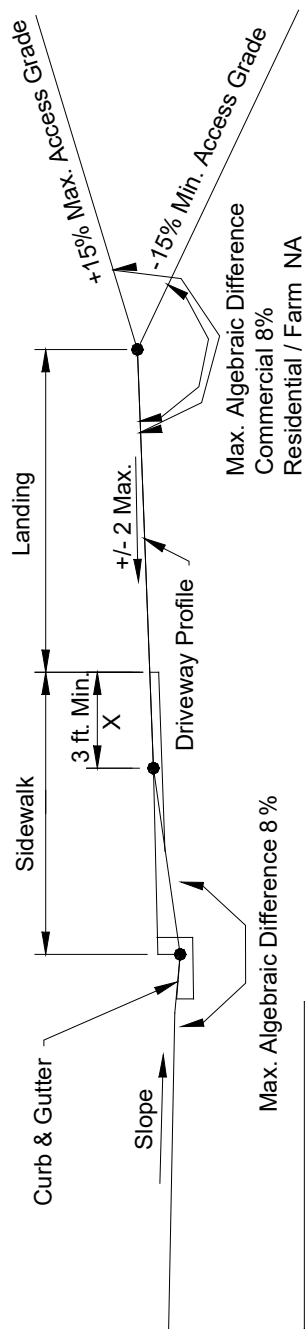
CURB CUT PROFILE

Landing Dimensions	
Usage	Minimum
Passenger Car	10 ft
Semi Tractor Trailer	30 ft



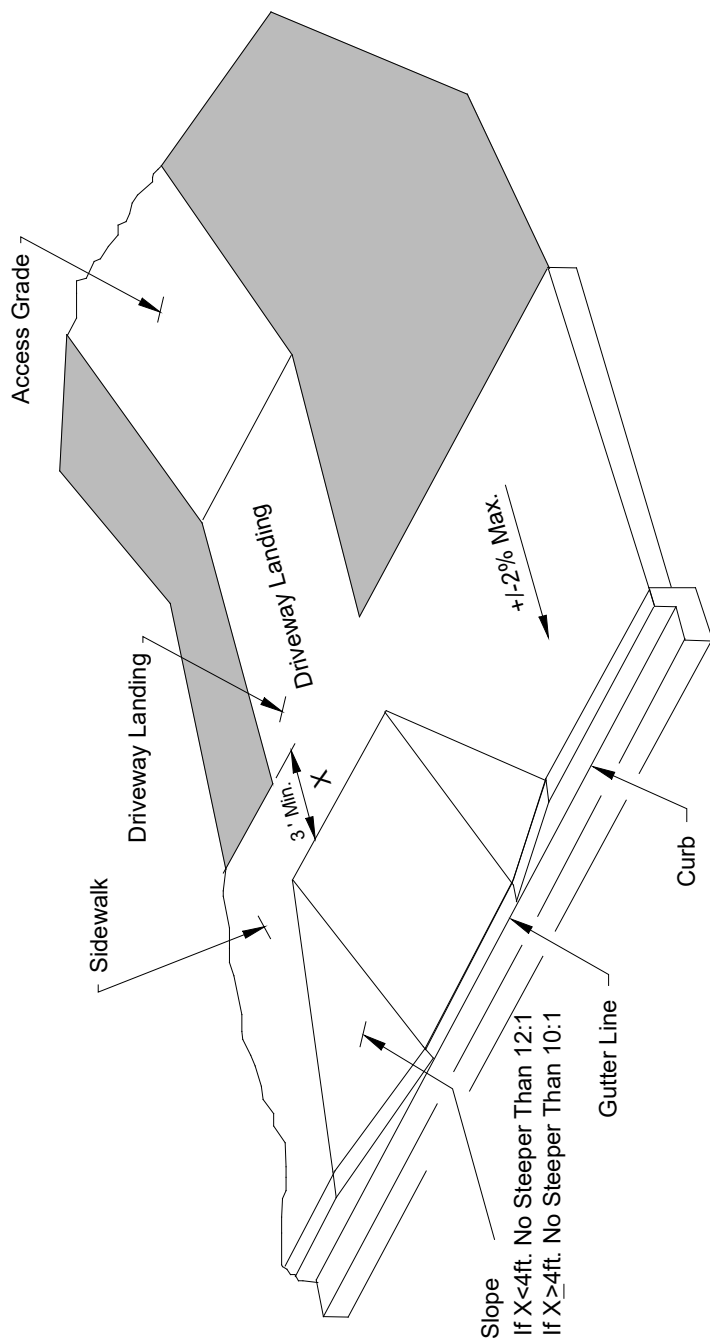
CURB CUT Where Near Level Sidewalk Path (Min 3 ft width & Max 2% X-slope) Can not be constructed

Figure 1190-6a
Curb Cut Profile



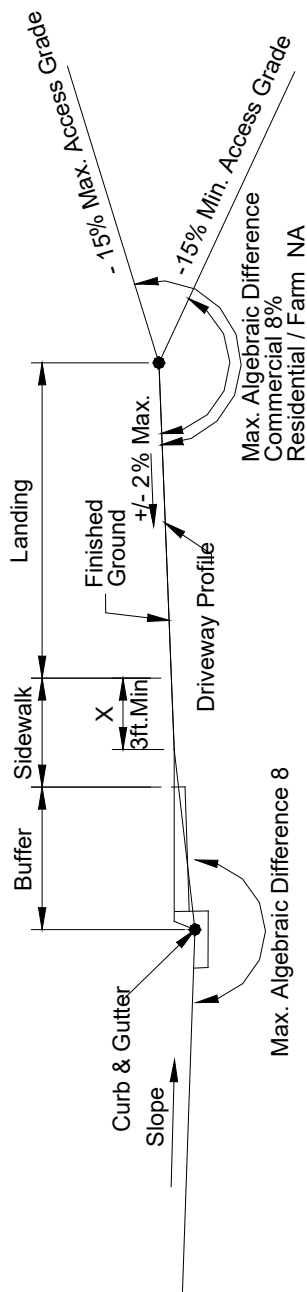
CURB CUT PROFILE

Landing Dimensions	
Usage	Minimum
Passenger Car	10 ft
Semi Tractor Trailer	30 ft



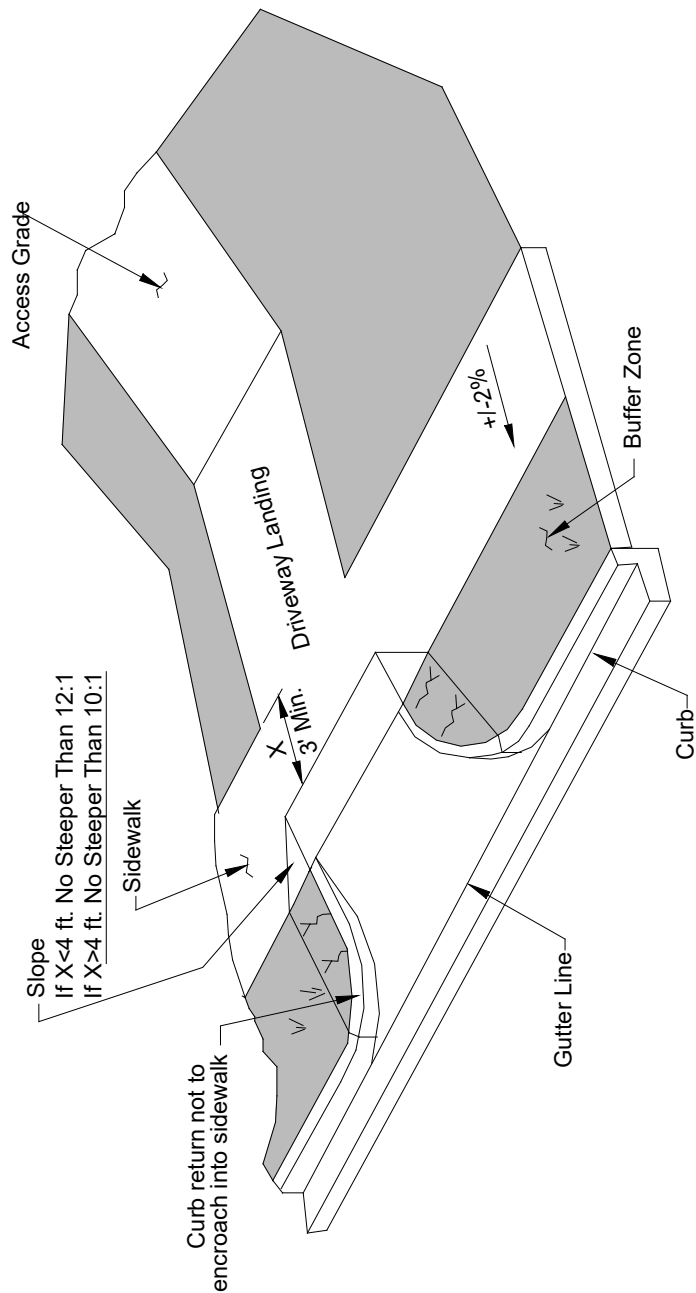
CURB CUT Where Near Level Sidewalk Path (Min 3 ft width & Max 2% X-slope) Can be constructed

**Figure 1190-6b
Curb Cut Profile**



CURB CUT PROFILE

Landing Dimensions	
Usage	Minimum
Passenger Car	10 ft
Semi Tractor Trailer	30 ft



CURB RETURN CUT Where Near Level Sidewalk Path (Min 3 ft. width & Max 2% X-slope) Can not be constructed

**Figure 1190-7b
Curb Cut Profile**

Metric					US Customary				
Opposing volume (veh/h)	Advancing volume (veh/h)				Opposing volume (veh/h)	Advancing volume (veh/h)			
	5% left turns	10% left turns	20% left turns	30% left turns		5% left turns	10% left turns	20% left turns	30% left turns
60-km/h operating speed					40-mph operating speed				
800	330	240	180	160	800	330	240	180	160
600	410	305	225	200	600	410	305	225	200
400	510	380	275	245	400	510	380	275	245
200	640	470	350	305	200	640	470	350	305
100	720	515	390	340	100	720	515	390	340
80-km/h operating speed					50-mph operating speed				
800	280	210	165	135	800	280	210	165	135
600	350	260	195	170	600	350	260	195	170
400	430	320	240	210	400	430	320	240	210
200	550	400	300	270	200	550	400	300	270
100	615	445	335	295	100	615	445	335	295
100-km/h operating speed					60-mph operating speed				
800	230	170	125	115	800	230	170	125	115
600	290	210	160	140	600	290	210	160	140
400	365	270	200	175	400	365	270	200	175
200	450	330	250	215	200	450	330	250	215
100	505	370	275	240	100	505	370	275	240

Source: 2004 GB, Exhibit 9-75

Figure 1190-8
Guide for Left-Turn Lanes on Two-Lane Highways

12. Non-Motorized Transportation

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1200. Definitions

The following definitions supplement the *AASHTO Bike Guide*.

AASHTO Bike Guide: The American Association of State Highway and Transportation Officials 1999 Guide for the Development of Bicycle Facilities

Adjacent Path: A path alignment that closely parallels the main roadway corridor

ADT: Average Daily Traffic

Commissioner: The Commissioner of the Alaska Department of Transportation and Public Facilities

Mid-block Crossing: Intersections formed when paths or sidewalks cross other transportation facilities at locations other than roadway-to-roadway intersections

Non-Motorized Transportation: Transportation by human power, including bicycling, walking, in-line skating, skiing, and other methods

Path: An improved facility, greater than or equal to 8 feet in width, physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Bicyclists, pedestrians, skaters, wheelchair (both self- and electric-powered) users, joggers, skiers, and other non-motorized users may use paths.

Shared Use Path: See “Path”

Rules of the Road: Regulations in the State of Alaska Administrative Code that govern the operation of motorized and non-motorized use of transportation facilities

Small Community: Topographically concentrated, unincorporated population areas large enough to support a nearby post office or local school

Trail: An unpaved or unimproved route, which may serve non-motorized or motorized off-road uses

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1210. Bicycle Facilities

- 1210.1. General
- 1210.2. Waivers
- 1210.3. Facility Types
- 1210.4. Design

1210.1. General

Expect bicycle traffic along most roads and streets. Where bicycles are allowed, all new construction and reconstruction must provide for use by bicyclists and pedestrians unless specifically exempted under the requirements of this chapter. Consider bicycle use on all other project types, and consider existing local bicycle plans when determining appropriate facilities for a project.

Shared use of a roadway is usually preferable to paths because accident rates are usually lower and because it is typically more cost effective.

When desirable values are provided without minimum values, the engineer must use other references, past experience, and/or engineering judgment to determine acceptable minimum values.

Required design criteria are normally stated in the form, “Use the following offsets” or “The offset *shall be*.” Design criteria that are desirable or allowable, but not required, are normally stated in the form, “The offset *may be*” or “The offset *should be*.”

1210.2. Waivers

Due to Alaska's developing nature and the need to provide basic transportation facilities within the limited transportation budget, there may be situations where use of full design criteria will price the improvement beyond reasonable cost. In such cases, develop a preliminary design to establish a basic construction cost estimate. Next, develop a second design using criteria less than stated minimums, including a construction cost estimate and a written comparison of the cost differential versus the negative aspects of the reduced geometric design standards.

Submit the proposed preliminary design with analysis and rationale for using below-minimum design criteria to the regional preconstruction engineer as a design waiver request. The regional preconstruction engineer will approve or disapprove the design waiver. If the regional preconstruction engineer concurs, furnish informational copies to the Department's chief engineer and bicycle/pedestrian coordinator. Furnish

an informational copy of the approved waiver to the FHWA for national highway system (NHS) projects only.

When a waiver is necessary for the elimination (as opposed to reduction) of a facility that is normally required under the guidelines of this section, the waiver requires the endorsement of the regional preconstruction engineer and chief engineer, and the approval of the commissioner.

1210.3. Facility Types

1210.3.1 Freeways and Other Controlled-Access Facilities

Place signs on freeways or other controlled-access facilities to prohibit bicycle use in accordance with AS 19.20.020. If no reasonable alternate bicycle route is available, bicycle use of a controlled access facility, or portion of a controlled access facility, may be allowed.

1210.3.2 Rural

Bicycle facilities are not required on rural roadways with less than 1,000 ADT unless cost-effective analysis of accidents indicates improvements are needed.

Design for Class A riders, minimum. Paths for other classes of bicyclists are generally not cost effective in rural areas.

1210.3.3 Urban

Business and Commercial

Design for Class A riders, minimum.

Residential Areas and Small Communities

Design for all classes of riders, or design for Class A riders and identify/provide alternate routes for Class B/C riders.

1210.4. Design

1210.4.1 General

Use the *AASHTO Bike Guide*, as modified by this section, to design bicycle facilities.

If there is a conflict between the *AASHTO Bike Guide* and the *Alaska Traffic Manual* (ATM) for striping and signing, use the ATM.

1210.4.2 Shared Roadway

General

Use “Selecting Roadway Design Treatments to Accommodate Bicyclists” FHWA publication RD-92-073 to determine all shared roadway facility configurations. Shoulders may take the place of bike lanes for all sections except those with adjacent on-street parking.

1210.4.3 Shared Use Path

Separation Between Shared Use Paths and Roadways

The *AASHTO Bike Guide* recommends at least a 5-foot separation from the edge of roadway shoulder to edge of the path.

When paths are plowed during winter or when non-motorized use is available year-round, it is desirable to maintain a 10-foot separation between the edge of road traveled way and the nearest edge of the path, except where it is necessary to bring paths closer to the roadway (such as at public intersections as described in the Adjacent Path Crossings portion of this subsection).

Width and Clearance

Low ADT Paths

Paths meeting all the following criteria may use the widths in Table 1210-1:

- Less than 200 ADT (bicycles)
- Less than 100 ADT (pedestrians)
- Stopping sight distances meet minimum requirements of the *AASHTO Bike Guide*
- Not subject to edge damage by maintenance vehicles

Railings

End openings between rail panels must not exceed 6 inches.

Use fences only where they are needed for safety.

Path-Roadway Intersections

Mid Block Crossings

Skew median crossings of 6 feet or more in width by 45 degrees. This aligns the bicyclists so that they are looking in the direction of approaching traffic. See Figures 1210-1 and 1210-2.

Adjacent Path Crossings

Figure 1210-3 illustrates a design for path approaches to signalized intersections that improves visibility for cyclists.

At adjacent path crossings, the edge of path should be 6 feet, minimum, from the edge of traveled way on the parallel mainline roadway (see Figures 1210-4 [Desirable] and 1210-5).

Another, usually less desirable, option is to place the path crossing beyond the influence of stopping traffic at the intersection and where path users will be visible to motorists as shown in Figure 1210-4 (Mid-Block Crossing).

If you cannot provide sight triangles, and the path cannot be realigned in front of the stop location at side streets, provide regulatory and warning signing along the roadway and the path in accordance with the ATM.

Beyond the crossing, maintain normal path separation.

End of Path

Paths should end at a logical destination, such as a side street, school, or park.

The path should end at a highway shoulder where there is adequate sight distance and where it is convenient to cross the road. See Figure 1210-5. Designate and sign the path terminus to discourage wrong-way bicycle travel on road shoulders.

A path may also end perpendicular to any location along the road. Treat it the same as a side street intersection with a mainline through-route.

Pavement Structure

In general, paved shared-use paths should provide 2 inches of asphalt pavement concrete overlying 4 inches of crushed aggregate base course, on top of 2 feet of selected material, Type B or better quality.

You may use other surfacing materials. Unpaved paths are acceptable, although it is best to prevent erosion and material degradation due to rainfall, wind, or heavy use, and to allow for wheelchair use with a “hard, unyielding surface.”

Structures

Bridges

It is desirable to provide the same widths for bicycle facilities across bridges that are provided approaching the bridge. For example, if there are 10-foot-wide

shoulders approaching a bridge, then it is desirable to provide 10-foot shoulders, plus any required shy distances, across the bridge. You may provide a separate structure to accommodate a path.

The clear width on structures between railings must not be less than 10 feet for two-way paths and 6 feet for one-way paths. The minimum vertical clearance to obstructions across the clear width of the path is 8 feet, 4 inches. Provide adequate access for maintenance and bridge inspection equipment.

See Section 1160.3.7a of this manual for allowable improvements to bridges for accommodation of bicycles on projects other than new construction or reconstruction.

Use 54-inch rail heights on bridges.

Path Undercrossings

Refer to Section 1130.7. of this manual for pedestrian crossing grade separation warrants and access control for grade-separated pedestrian crossings.

Where minimal fill heights are available, provide at least an 8-foot wide and 8-foot, 4-inch high clear area for two-way bicycle passage. A 10-foot by 10-foot clear area for two-way bicycle passage is desirable.

Options for undercrossings include metal multi-plate underpasses and concrete box culverts. Concrete box culverts require less overall height and width than metal underpasses.

Provide sight distance at each end of the underpass when reasonable. Right-of-way limitations and obstructions may limit the feasibility of providing adequate sight distance. In these cases, other traffic control measures, such as warning signs and striping, may be used. While skewing of the undercrossing usually increases cost, it is another method that you may consider to provide sight distance.

Path alignments are typically designed leading into pipes rather than skewing the pipes to meet the path alignment.

Guidance for maximum skew angles is provided in the *Handbook for Steel Drainage and Highway Construction Products*, American Institute of Steel Construction, AISC.

Drainage

When there are width constraints or when it is more cost effective, you may carry drainage across a sloped (uncrowned) path to a single ditch.

Lighting

If lighting is to be applied to a path, refer to the AASHTO publication, *An Informational Guide for Roadway Lighting*.

Table 1210-1
Minimum Path and Path Shoulder Widths for Low ADT Paths

The widths presented in this table may be used for shared use paths:

- With less than 200 ADT (bicycles)
- With less than 100 ADT (pedestrians)
- With stopping sight distances that meet minimum requirements of the *AASHTO Bike Guide*
- That will not be subject to edge damage by maintenance vehicles

For paths that do not meet any one or more of the above parameters, follow the guidance for path and shoulder width provided in the *AASHTO Bike Guide*.

Side Slope	Max. Slope Height	Min. Path Width	Min. Shoulder Width
4:1 (inclusive) or flatter	Any	8 feet	0
3:1 (inclusive) to 4:1 (not inclusive)	10 feet	8 feet	0
3:1 (inclusive) to 4:1 (not inclusive)	Over 10 feet	8 feet	2 feet
1.5:1 (inclusive) to 3:1 (not inclusive)	Any	8 feet	2 feet
Steeper than 1.5:1	6 inches or less	8 feet	0
Steeper than 1.5:1	Over 6 inches	*	*

* Use the guidance for shared-use path width and clearance provided in the *AASHTO Bike Guide*.

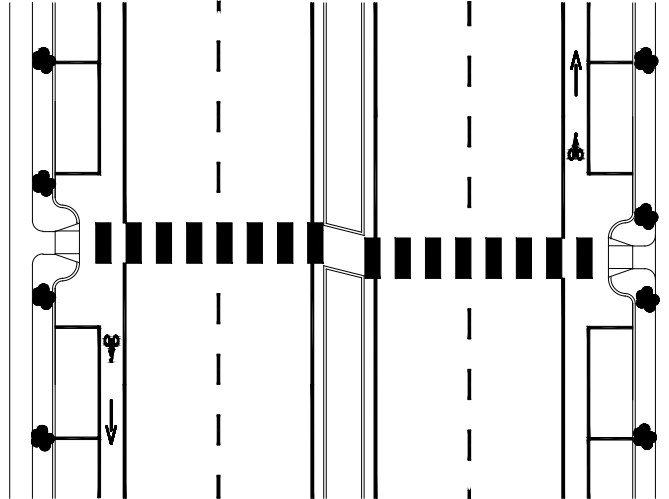


Figure 1210-1
Urban Mid-Block Crossing, With Parking
and Median

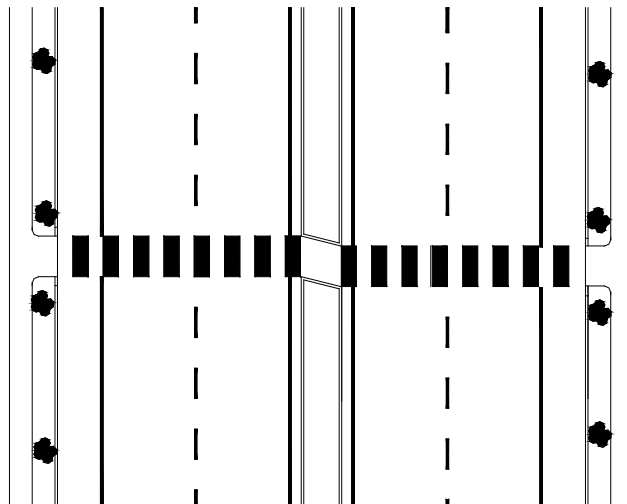


Figure 1210-2
At-Grade Mid-Block Crossing, with Median
Without Parking

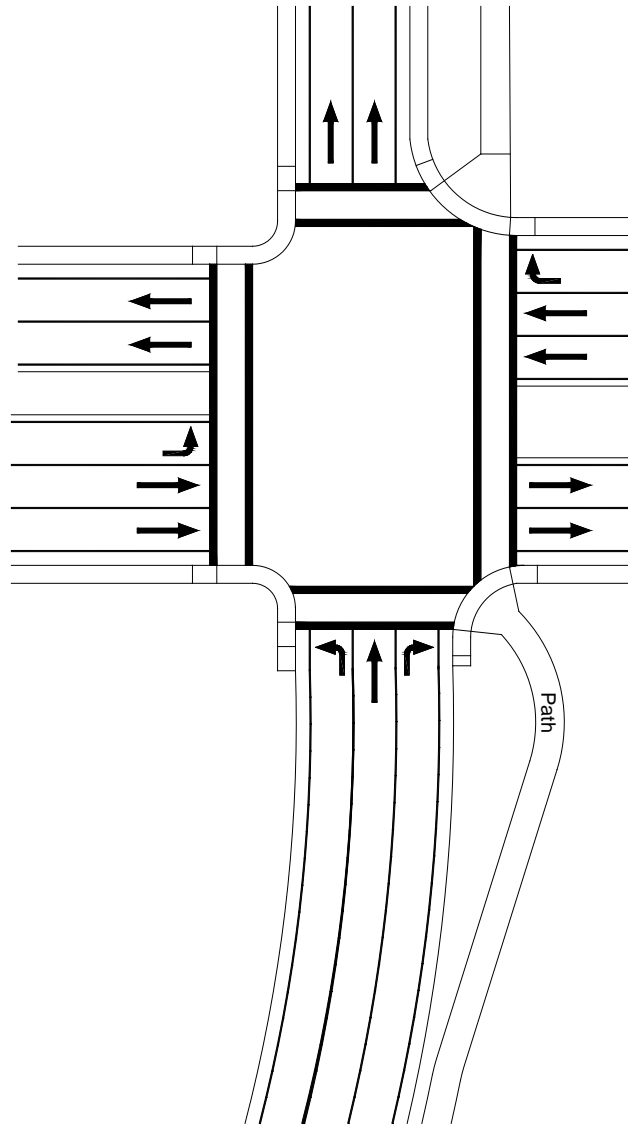
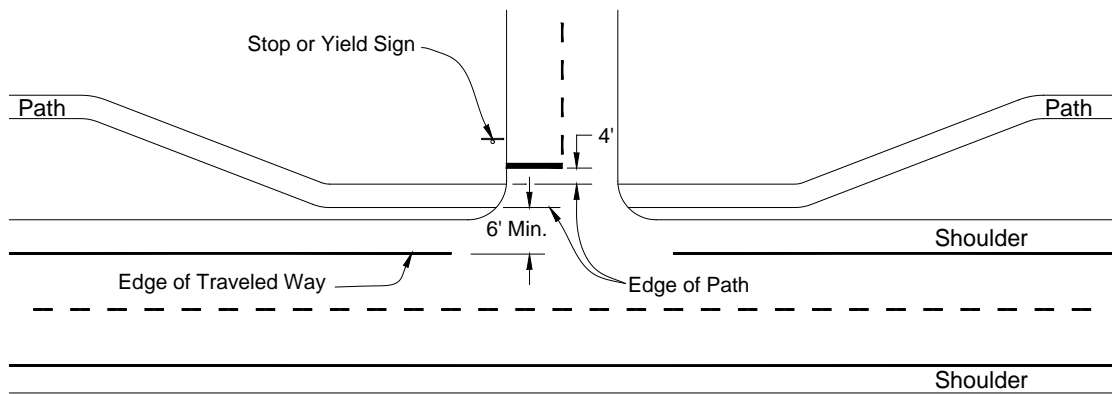
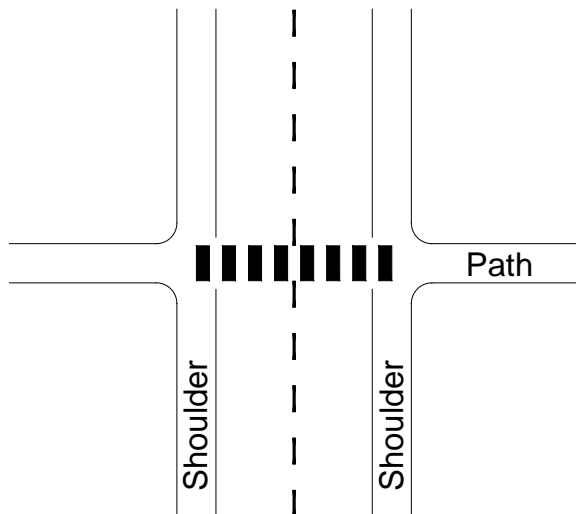


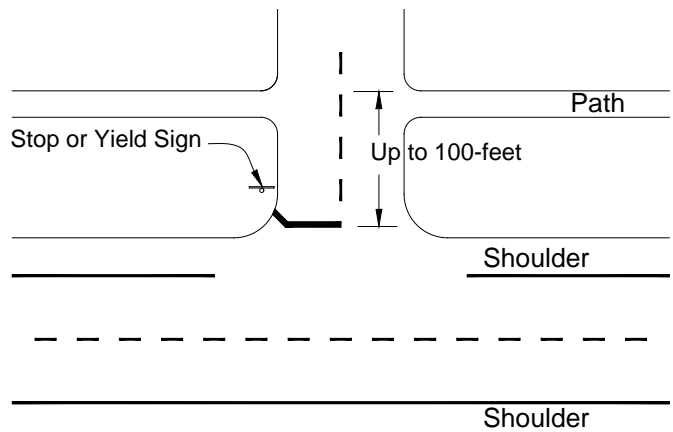
Figure 1210-3
Path Curves to Improve Visibility at Signalized Intersection
Reference: Oregon Bicycle and Pedestrian Plan, June 1995



Desirable



Mid-Block Crossing



Undesirable

**Figure 1210-4
Path Configurations
At Crossings**

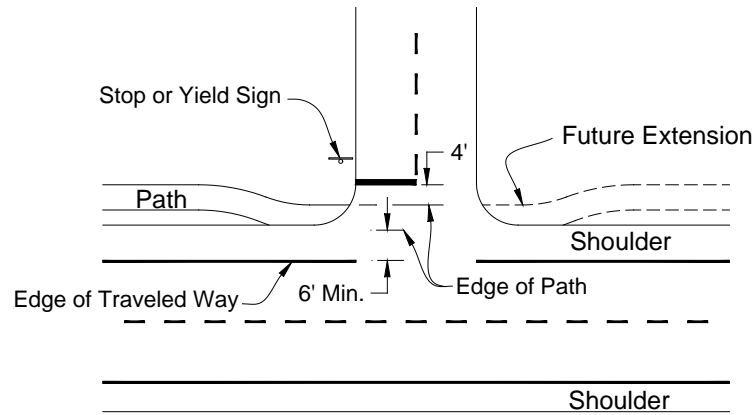


Figure 1210-5
Desirable Begin/End Path

1220. Pedestrian Facilities (Reserved)

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1230. Other Non-Motorized Facilities (Reserved)

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14. Highway Work Zone Safety and Traffic Control Plans

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1400. Highway Work Zone Safety and Traffic Control Plans

- 1400.1. Introduction
- 1400.2. Definitions
- 1400.3. State & Federally Funded Projects and Work on State Highways
- 1400.4. References

1400.1. Introduction

Work zones directly impact the safety and mobility of road users and highway workers. Addressing these safety and mobility issues starts early in the project development process and continues through project completion.

This section provides guidance and establishes procedures for developing Traffic Control Plans, Traffic Management Plans, and Traffic Operations Plans in accordance with 23 CFR 630, Subparts J & K, and P&P 05.05.015.

1400.2. Definitions

Positive Protection Devices: Traffic barriers that contain and/or redirect vehicles and meet the crashworthiness evaluation criteria contained in NCHRP Report 350, Recommended Procedures for the Safety Performance Evaluation of Highway Features, 1993, or MASH 2016.

Project: Any work in the highway right of way that may have an impact on traffic.

Public Information Plan: A communications plan to inform affected road users, the general public, area residences and businesses, and appropriate public entities of project scope, expected work zone impacts, closure details, and recommended action (if any) to avoid impacts and changing conditions during construction.

Significant Project: A significant project falls into either a Category 1 or Category 2 classification.

A Category 1 significant project occupies a location for more than three consecutive days with either intermittent or continuous lane closures on Interstate Highways within a Transportation Management Area.

A Category 2 significant project is one that, alone or in combination with other concurrent projects nearby, is anticipated to require greater than normal attention to traffic control to eliminate sustained work zone

impacts greater than what would be considered acceptable.

Traffic Control Plan (TCP): A plan identifying what traffic control devices to use and showing their location and operation in a work zone to ensure traffic flow. TCPs also include phased staging and traffic routing plans where needed. TCPs may include positive protection devices or on-project law enforcement to improve worker and motorist safety.

Transportation Management Area (TMA):

1) An urbanized area with a population of over 200,000 or 2) any urbanized area for which TMA designation has been requested by the Governor and the area's metropolitan planning organization and granted by the Secretary of the United States Department of Transportation (USDOT.) Currently, Anchorage is the only TMA in Alaska. Its boundary coincides with the Anchorage Metropolitan Area Transportation System boundary. Check with Planning for any changes in TMA designations.

Transportation Management Plan (TMP): A plan to manage work zone impacts of a highway project. It includes a Traffic Control Plan and may include Transportation Operations and Public Information Plans. Neither the TMP nor its three component plans are standalone documents. Plan provisions are included in project plans, specifications, or agreements with other parties and are scaled as appropriate for the complexity of individual projects.

Transportation Operations Plan (TOP): A plan to minimize project impacts not covered under a Public Information Plan or TCP. In general, these activities consist of coordination with external agencies, events, projects and systems, and may include:

- Plans for on-project law enforcement and other activities by external agencies
- Coordination with other projects to minimize cumulative impact
- Coordination with agencies that manage signal operations
- Plans to maintain access for emergency vehicles, school buses, transit, etc.
- Plans to minimize impacts to major traffic-generating events

- Travel demand management

1400.3. State & Federally Funded Projects and Work on State Highways

Every project will have a TMP. A TMP must include a TCP and may contain a TOP and a Public Information Plan.

The regional design section working in conjunction with the regional construction and traffic sections, and in coordination with external agencies, events, projects, and systems, as necessary, should prepare a project specific TMP.

Emergency incidents are exempt from the requirements of this section, except for development of a TCP, which is done in accordance with section 1400.3.5. Emergency incidents may benefit from the other TMP elements.

1400.3.1 Transportation Management Plan

All Projects

For all projects, the Project Manager should:

1. Involve stakeholders as appropriate.
2. Provide information on potential construction impacts on traffic mobility during public hearings and meetings.
3. Identify existing road users, including vulnerable road users.
4. Consider whether road capacity under anticipated construction conditions needs to be analyzed.
5. Consider whether there are particular safety concerns that need to be addressed.
6. Consider whether it is appropriate to include a TOP and/or Public Information Plan or portions thereof.
7. Consider access requirements for the contractor, inspectors, and other agency stakeholders to get in and out of: work zones; storage and stockpile areas; and the project office.
8. Consider whether any utilities hinder access to perform the work.
9. Coordinate with the Division of Measurement Standards and Commercial Vehicle Enforcement (MSCVE) to identify existing and pending

oversize/overweight vehicle permits that will require accommodation on the project.

10. Consider whether there is adequate room and ROW to perform the work with the size and types of equipment expected.
11. Ensure anticipated temporary construction impacts are consistent with the relevant section in the Environmental Document.
12. Prepare a TCP.

Significant Projects

Refer to the definitions in Section 1400.2. The Project Manager is responsible for determining whether the project is “significant”. When a project may be significant under Category 2, seek concurrence in the determination from the Preconstruction Engineer. Document whether a project is significant or not in the *Preliminary Work Zone Traffic Control* section of the DSR.

When projects are “significant”, prepare a full TMP for the design, including TOP, Public Information Plan, and TCP unless exempted.

Outreach on a significant project should begin no later than the scoping process. Development and analysis of traffic impacts, stakeholder involvement, and agreements with law enforcement and other parties take effort. Addressing the elements of a TMP late in the project development can lead to significant delays and unexpected costs.

Exempt Significant Projects

Some significant projects may be exempt from requiring a full TMP as anticipated traffic impacts are minimal or insignificant. For an exempt significant project, a TCP is still required, but the TOP and Public Information Plans are optional.

For a significant project, an exemption is requested in accordance with 23 CFR 630.1010 (d) by the Preconstruction Engineer. The Preconstruction Engineer sends a memo to the FHWA Division Administrator requesting an exemption and includes a discussion of the justification. If approved, copy the exemption request and FHWA approval memos to the Chief Engineer.

Example justification for exemptions may be:

- lane-closures occur only at night,

- lane-closures occur only during off-peak and weekend hours,
- roadway capacity under construction conditions substantially exceeds traffic volumes; or
- alternate routes and intersections are available and provide reserve capacity without unreasonable delay.

Include a discussion and documentation of exemptions in the *Preliminary Work Zone Traffic Control* section of the DSR.

1400.3.2 Transportation Operations Plans

The design and construction sections share joint responsibility for developing TOPs. Some of these tasks are prepared in design but are not finalized until the project is under construction. Coordination between design and construction is essential and inclusion of TMPs is important in plan reviews.

When agreements made under the TOP place requirements on the contractor, include the requirements in the construction contract. Agreements made under the TOP that are not incorporated in project plans or specifications shall be retained in project files.

Law Enforcement

Development of the TOP should consider the use of law enforcement on projects with high traffic speeds and volumes, and where the work zone is expected to result in substantial disruption to or changes in normal traffic flow patterns, and where work zone risks may be mitigated by improved driver behavior and awareness of the work zone such as;

- frequent worker presence adjacent to high speed traffic without positive protection devices;
- during traffic control setup or removal that presents significant risks to workers and road users;
- complex or very short term changes in traffic patterns with significant potential for road user confusion;
- night work operations that create substantial traffic safety risk for workers and road users;
- when work zone operations require brief stoppage of all traffic in one or both directions; and
- where unexpected or sudden traffic queuing is anticipated on high speed roadways especially if the queue forms a considerable distance in

advance of the work zone or immediately adjacent to the work space.

Participation of law enforcement is dependent upon the law enforcement agency being willing and able to provide resources. Participation requires an agreement outlining the responsibilities of both parties, communication requirements, and how law enforcement will be reimbursed. Develop agreements in coordination with the construction section.

Consider prearranged regional agreements with police departments, rather than project-by-project agreements.

Coordination with Other Projects

Project Managers should investigate whether other department or municipal projects in the vicinity will be constructed concurrently.

If the advanced warning area for traffic control plans would overlap, the projects should address coordination of traffic control devices.

If the area where expected traffic impacts extends outside of the projects overlap, the projects should coordinate impacts.

Signal Coordination

Impacts to signals may extend beyond the physical limits of construction; consult with regional traffic and safety staff for assistance in identifying which signals may be impacted. When traffic signals are impacted by the project, the signal timing or function may require adjustment. Additionally, equipment may need to be moved or adjusted to accommodate changes to lanes or the presence of traffic control devices.

The Project Manager should coordinate with the operator of any signals to develop a plan for ensuring the intersection will function as required during the construction of the project.

Emergency Services

Project Managers should coordinate with emergency services to ensure they can respond throughout construction. This may require wider lanes than necessary for normal traffic, construction of turn-arounds, coordination on alternate routes, etc. If emergency services are within the project limits, consider how the construction will impact access to the facilities.

School Bus and Transit

Project Managers should coordinate with schools and transit operators. Timing restrictions, relocating stops, alternate access to stops, or additional signing may be required to keep impacts at an acceptable level.

Special Events

Project Managers should become familiar with major special events that may occur during construction. Coordinate with organizers of these events to either hold them outside of the construction duration, or include restrictions in the contract that will enable the events to occur. ROW should have a file of reoccurring permitted special events.

Travel Demand Management

If capacity during construction is a concern, consider traffic demand management strategies that may reduce the travel demand to meet the available capacity.

Work Zone Speed Limits

If work zone speed limits are established, set them in accordance with P&P 05.05.020 - "Establishment of Speed Limits and Zones."

1400.3.3 Public Information Plans

The Public Information Plan outlines what information needs to be given to the public, when it is given, and how it is given. The standard specifications in 643-3.03 requires the contractor to give notice before major changes, delays, lane restrictions, road closures, and traffic signal shutdowns. If the Public Information Plan requires the contractor to do more, include the requirements in the project special provisions.

The public involvement plan during the environmental process may identify interested businesses, property owners, government entities, tourist venues, and other organizations that request additional notice. It benefits construction if a contact list of known interested parties is passed to the construction team. The Project Manager should consider whether the public involvement during the environmental process indicates a need for additional public involvement beyond the standard specification.

When MSCVE has existing or pending oversize/overweight vehicle permits, include the permittees in the Public Information Plan.

When multiple projects overlap, the Project Managers should meet with the regional public information

officer and determine a strategy for the adjoining projects.

When a Public Information Plan is used, the information may be distributed directly by:

- Social media thru the regional public information officer
- The Department's construction section thru the Department's Navigator and 511 systems
<https://www.alaskanavigator.org/>
<http://511.alaska.gov/>
- Television, radio and/or newspaper advertisements
- The contractor
- Other location-specific communication tools

1400.3.4 Traffic Control Plans

Traffic control plans are required on all highway projects where work occurs in a State maintained right-of-way.

Do not seal TCPs, except as noted below, as TCPs are commonly field modified during construction. When TCPs are not sealed, do not include them in the plans.

Seal temporary traffic signal systems and geometric designs for 45 mph posted speed (prior to construction), or higher, detour or bypass routes.

On projects where the work is outside the clear zone but the activities may impact traffic flow, consider whether a TCP is desirable or necessary. Signing and flagging for truck crossings are examples of traffic control that may be desirable or necessary when work is accomplished outside the clear zone only.

Phasing

TMPs assume a certain phasing of events. For example, the designer expects new embankment to be built first, and traffic routed onto it.

The contract documents should inform the contractor the assumed phasing. If the contractor does not know the assumed phasing and plans to construct the project differently, the TOP, Public Information Plan, and TCPs may no longer work.

Scope, Preparation and Detail

Prepare all TCPs to be consistent with the ATM and Chapter 9 of the AASHTO Roadside Design Guide.

The ATM sets forth basic principles and prescribes standards for the application, installation, and maintenance of various traffic control devices for highway and street construction. However, it does not address all potential traffic situations in work zones. Tailor TCPs to specific project conditions and requirements.

The scope and detail of a TCP will depend on project complexity and the extent to which construction interferes with traffic flow. TCPs may include:

- Plans and detail drawings
- Special provisions
- Typical applications from the ATM.

In developing a TCP:

- Consider if there is enough room within the right-of-way for both the construction activity and a travel route. If not, consider obtaining temporary construction permits.
- Verify that any temporary, constructed diversions meet acceptable geometric and structural standards for the posted speed limit and design vehicle. Detours routed onto existing streets do not require adjustment to geometric standards, but should be evaluated for the ability of the design vehicle to travel on the detour.
- Confirm that any detours or diversions comply with the environmental document and project permits.
- Verify that traffic volumes can be adequately handled with available lanes at all hours.
- Provide access to businesses, residences and work zones if feasible. If access cannot be provided to businesses or residences, coordinate with the ROW section to see if specific agreements are needed.
- Provide for non-motorized traffic accommodations, including ADA accessible routes when they currently exist.

For all projects:

1. Establish times and dates, if any, when lane and/or road closures are prohibited. This may include requirements for night and/or weekend work.

2. Provide guidance for mitigation of specific safety concerns, when any exist.
3. Consider establishing allowable delay/queue standards.
4. Consider whether road volumes under anticipated construction conditions need evaluation.
5. To minimize worker exposure to traffic and exposure of road users to construction activities, consider including the following exposure control measures:
 - a. Road or ramp closures
 - b. Detours
 - c. Median crossovers
 - d. Accelerated construction techniques
 - e. Night or off-peak work hours* (noise permits or variances may be necessary for night work.)

* A detailed procedure for assessing the feasibility of performing highway work at night is provided in NCHRP Report 475, *"A Procedure for Assessing and Planning Nighttime Highway Construction and Maintenance."*
6. Identify whether and under what conditions to install positive protection devices. In making this determination, consider the following factors:
 - a. Project scope and duration
 - b. Anticipated traffic speeds through the work zone
 - c. Anticipated traffic volumes
 - d. Vehicle mix
 - e. Type of work (as related to worker exposure and crash risks)
 - f. Distance between traffic and workers, and degree of worker exposure
 - g. Escape paths available for workers to avoid vehicle intrusion into the work space
 - h. Time of day the work occurs (e.g., night work)
 - i. Work area restrictions (including impact on worker exposure)
 - j. Consequences from/to road users resulting from roadway departure
 - k. Potential hazard to workers and road users presented by device itself and during device placement and removal

- l. Geometrics that may increase crash risks (e.g., poor sight distance and sharp curves)
- m. Access to/from work space
- n. Roadway traffic volume and speed
- o. Impacts on project cost and duration

In particular, consider installation of positive protection devices under the following conditions:

- a. Work zones that provide workers no means of escape from motorized traffic (e.g., tunnels, bridges, trenches, etc.)
 - b. Long term stationary work zones
 - c. Projects with anticipated operating speeds of 45 mph or greater, especially when combined with high traffic volumes
 - d. Work operations that place workers close to travel lanes open to traffic
 - e. Roadside hazards, such as drop-offs or unfinished bridge decks, that will remain in place overnight or longer
7. Consider truck mounted attenuators for short duration or mobile work on roads with a posted speed of 45 mph or greater and in other areas as appropriate.
 8. Consider a visit to the project site during preparation of TCPs to verify access, location of signs and other devices, presence of utilities or other obstructions to the work, and adequacy of detour routes.

Work Zone Roadside Safety

Provide direction in the specifications or drawings on

- How to treat roadside slope or obstacle hazards
- Required construction clear zone
- How to treat pavement drop-offs
- Acceptable channelization devices, barriers, and barrier end treatments

Pre-existing roadside safety hardware should be preserved or improved for use until the progress of construction necessitates its removal. From that time until permanent roadside safety hardware is installed, describe how to maintain roadside safety hardware in the plans and specifications.

1400.3.5 Payment for Traffic Control

Payment for traffic control can vary depending on project size, duration, and complexity. Do not make

payment for work zone traffic control features and operations incidental to the contract or other items of work not related to traffic control and safety.

Consult with construction regarding choice of pay items. It is best to provide flexibility here so the contractor can submit their own TCP based on their sequencing and schedule. The contractor's plan may differ from the TCP preparer's assumptions.

Traffic control devices may be paid for by lump sum, contingent sum, unit price, or a combination thereof. Contingent sum is the most common method of paying for most traffic control items.

Lump Sum

Traffic control may be paid for as lump sum only on projects, or portions thereof, where:

1. Traffic control is not complex,
2. The contractor can readily evaluate the required traffic control work, and
3. The number and placement of traffic control devices is easily determined

Use contingent sum and/or unit price payment strategies on all projects that do not meet these conditions.

When lump sum payment is an option, consider the following when deciding whether to use it:

1. Lump sum traffic control is more difficult to monitor and change because the contractor is not paid for individual traffic control items and it requires closer oversight to ensure all necessary traffic control items are in place.
2. The use of lump sum traffic control payment requires a detailed TCP. All necessary traffic control devices need be shown on the TCP to reduce disagreement between the engineer and the contractor about what is required and to reduce the potential for claims for increased traffic control payments from the contractor.

If the use of lump sum for traffic control is questionable, consult the FHWA Alaska Division for guidance.

Traffic Maintenance

Include a Traffic Maintenance item – either Pay Item 643.0001.0000 or 643.0002.0000 - on all projects with traffic control, except for lump sum projects, where it

is optional. Inclusion of this pay item allows the contractor to directly allocate costs associated with:

- Providing a Worksite Traffic Supervisor.
- Preparing TCPs.
- Preparing and publishing public information notices.
- Preparing a Construction Phasing Plan.
- Maintaining all roadways, approaches, crossings, intersections and pedestrian and bicycle facilities.
- Providing any traffic control devices required, but not shown on the bid schedule.

Traffic Control Devices

There are two types of unit price pay items used to pay for traffic control devices:

- Contractor bid unit price
- Department-set (fixed) unit price

In contractor bid unit price, the contractor establishes the payment price for particular traffic control items. A list of common unit price pay items is contained in the SSHC. New pay items are established by special provision for specific or special needs.

When Department-set unit price is used, a Traffic Control Rate Schedule (TCRS) is provided in the special provisions. The TCRS includes a list of all the commonly used traffic control devices and their respective predetermined fixed prices. When using this method of payment, use SSHC Pay Item 643.0025.0000 and allocate an appropriate amount of contingent sum money to pay for these devices.

Contractor bid unit price items should be considered when

- The contractor has little control over the bid quantity, or
- There is a firm estimate on the bid quantity, and the Department has control of the actual quantity required during the project, or
- The bid item in question is high cost and likely to have one time or limited use by the contractor.

Use of a TCRS and the inclusion of a 643.0025.0000 Pay Item is the most common way to pay for traffic control devices. This reduces the opportunity for bid unbalancing by contractors.

Positive Protection Devices

Pay for positive protection devices separately from other types of traffic control devices in contract documents. This may be through separate bid items, or through rates for individual devices in the traffic control rate schedule table.

Separate payment for positive protection devices may be either lump sum, unit price or contingent sum. If used on a project with lump sum payment for traffic control, positive protection devices must still be paid for as a separate pay item.

Flagging

Flagging is primarily used for public safety or at the convenience of the contractor to support his operations.

The Department is responsible for paying for flagging required for construction of the project. Contractors should pay for flagging solely for their own convenience, benefit or productivity.

When not included in a lump sum pay item, pay for flagging by contingent sum at the Department's approved rate or by the hour. See the Statewide Construction Standards Resources webpage for the current rate,

<https://dot.alaska.gov/stwddes/dcsconst/index.shtml>

Traffic Price Adjustment

Special consideration should be given in the use of the contingent sum Traffic Price Adjustment pay item. Traffic Price Adjustment is a liquidated damage charge assessed for unauthorized contractor activity or traffic control that results in any lane of traffic not being open to full use by the public. Set the bid amount on the bid schedule for this pay item to \$0 (zero).

Estimates

Total traffic control costs typically range from 5 to 15% of the total construction cost. The lower end of this range is for rural, low-volume projects with simple traffic control plans and low impacts to traffic, while the upper end represents urban, high-volume projects with complex traffic control.

1400.4. References

1. Code of Federal Regulations 23 CFR 630 Subparts J & K

2. Part 6 of the *Alaska Traffic Manual* (ATM). The ATM consists of the *Manual on Uniform Traffic Control Devices* (MUTCD) and the *Alaska Traffic Manual Supplement*
3. *Alaska Construction Manual*
4. *Alaska Standard Specifications for Highway Construction*, Section 643
5. Alaska Standard Plans (“C & G” Series)
6. P&P 05.05.015 – *Work Zone Safety and Mobility*
7. P&P 05.05.020 - *Establishment of Speed Limits and Zones*

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