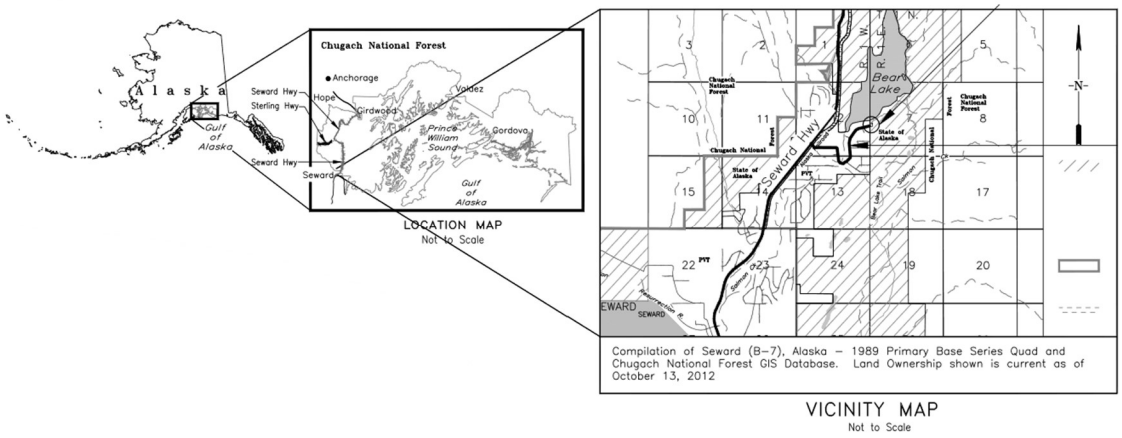
Bear Lake Trailhead Project

Design Study Report

Prepared for United States Forest Service



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LIST OF APPENDICIES

LIST OF ACRONYMS

ABA: Architectural Barriers Act
ADA: Americans With Disabilities Act
ADEC: Alaska Department of Environmental Conservation
ADNR: Alaska Department of Natural Resources
APDES: Alaska Pollutant Discharge Elimination System
CatEx: Categorical Exclusion
CEQ: Council for Environmental Quality
CPEP: Corrugated Polyethylene Pipe
EA: Environmental Assessment
EIS: Environmental Impact Statement
FONSI: Finding of No Significant Impact
HMA: Hot Mix Asphalt
INHS: Iditarod National Historic Trail
KPB: Kenai Peninsula Borough
NEPA: National Environmental Policy Act
NPDES: National Pollutant Discharge Elimination System
POTW: Publicly Owned Treatment Works
SWPPP: Storm Water Pollution Prevention Plan
USFS: U.S. Forest Service
WELTS: Well Log Tracking System
SHPO: State Historic Preservation Officers

1.0 PROJECT DESCRIPTION

1.1 BACKGROUND

The U.S. Forest Service (USFS) has proposed the development of the trailhead at Bear Lake. Bear Lake Trailhead (Site) is located in the Bear Lake subdivision approximately 7 miles north of Seward, Alaska. The site provides public access to the Southern Trek of the Iditarod National Historic Trail (INHS), a 200-mile system of historic and commemorative trails running through South-Central Alaska. The proposed development will provide parking and facilities to improve access to the historic trail system and provide visitors with an improved experience.

1.2 SITE DESCRIPTION

The proposed project site is an approximately one-acre lot owned by USFS located near the intersection of Bear Lake Road and Bleth Street, approximately 190 feet south of the shore of Bear Lake. The Site is a rectangular plot with dimensions of approximately 175 feet east to west by 250 feet north to south, and borders State of Alaska land and private property. The proposed development area is currently undeveloped and covered with native trees and plants.

1.2.1 HISTORICAL SURVEY INFORMATION

Limited survey has been performed at the Site, including lot corners. Survey data indicates approximately five feet of elevation change, increasing in elevation from north to south. LOGO Engineering recommends performing a full survey of the Site to provide more detailed locations and elevations.

1.2.2 HISTORICAL GEOTECHNICAL INFORMATION

No known geotechnical evaluation has been performed on the site. Historic well logs from wells drilled in the Site vicinity have been obtained from Alaska Department of Natural Resources (ADNR) Well Log Tracking System (WELTS) (Appendix A). Based on the geographic location and forest coverage of the site, in addition to the well logs, Site soils can generally be expected to consist of organic topsoil underlain by silty sand and gravel. Based on the Sites proximity to Bear Lake, the groundwater level is anticipated to be five feet to ten feet below the existing ground surface and is likely to be encountered during excavation. Groundwater levels will likely fluctuate depending on season and precipitation. LOGO Engineering recommends performing a geotechnical evaluation of the Site to produce a more accurate and detailed soil profile, determine groundwater levels, and calculate reliable soil bearing capacities.

1.3 PROJECT PURPOSE AND OBJECTIVES

Currently, there are no designated parking areas or facilities at the Site. Visitors seeking trail access are limited to street parking along Bear Lake Road and Bleth Street. The street parking leads to congestion along Bear Lake subdivision roads due to narrow shoulders. Visitors are likely to exit their vehicles in the street, potentially leading to safety issues. Additionally, the limited street parking may lead to private driveway blockage.

The primary objective of the proposed project is to provide Bear Lake Trailhead visitors with adequate parking, safe facilities, and an overall improved experience.

2.0 DESIGN

2.1 ASSUMPTIONS

1) The site is not located on wetland.
2) Site soils generally consist of organic topsoil underlain by firm silty sand and gravel.
3) The soil bearing capacity is presumed to be 2000 pounds per square foot based on the International Building Code.

2.2 DESIGN STANDARDS AND GUIDELINES

Design of the proposed development of Bear Lake Trailhead is governed by the standards and guidelines listed in Appendix B.

2.2.1 ACCESSIBILITY ACCOMODATIONS

As the Bear Lake Trailhead Development project is on Federal land, guidelines for both the Americans with Disabilities Act (ADA) and the Architectural Barriers Act (ABA) have been followed. In compliance with the US Department of Justice “ADA Compliance Brief”, of the eleven parking spaces one van accessible parking space has been included. This also complies with the ABA’s “Section F208: Parking Spaces” Table F208.2. (Appendix B)

2.2.2 PERMITTING

A list of considered permits is shown in Appendix B. According to the Kenai Peninsula Borough Road Service Area “Amended Policy Statement No. 2004-01" a Project Specific Right-of-Way Permit will be necessary. Construction of the entrance to the parking lot will meet all guidelines set forth in the policy. This includes, but is not limited to, creating a sufficient transition from the run of the driveway to the shoulder of the road and ensuring that the driveway and road intersection are at as close to a right angle

as possible. In addition, using a culvert beneath the driveway must be at least 30 feet long.

Moving the outhouse south of its original location helped mitigate the risk of the contamination of the lake. However, an ADEC Domestic Wastewater Plan Approval will still be needed. This will involve acquiring an individual permit for the outhouse facility. The document required is Alaska Pollutant Discharge Elimination System (APDES) Form 2A. It is to submitted by an operator of Publicly Owned Treatment Works (POTW).

2.3 DESIGN CONSIDERATIONS

2.3.1 PEDESTRIANS

Walking paths have been placed to reduce the number of pedestrian/vehicle interactions. Paths leading from the parking spaces to the trailhead and the outhouse run along the inside of the driving loop, therefore the only pedestrian crossing is at the North end of the lot leading to the trailhead. The outhouse is easily reached from the parking areas, but far enough removed from the information kiosk and trailhead to minimize odors reaching that area.

2.3.2 DRAINAGE

Five 18-inch culverts made of corrugated polyethylene pipe (CPEP) were chosen as the method for drainage at the site. They will serve to divert excess runoff downhill and away from all onsite structures and aggregate surfaces. In order to assign the lengths and positions of the culverts, the planned alignment and grade for the site was examined. Lengths for the culverts were based on the shoulder to shoulder roadway width, the elevation of fill above the flow line, and the side slopes of the embankment. The ditches for the culverts required a grade of 2:1 with the foreslopes and backslopes. Care will be taken in order to avoid installing the culverts in frozen ground as well as ensuring even slopes and placing backfill.

2.3.3 MINIMUM TURNING RADIUS

The design vehicle for the parking lot is a 30-foot RV. According to "AASHTO – Geometric Design of Highways and Streets" the minimum centerline turning radius is 36 feet; as seen in Appendix C. The design of the parking lot meets these criteria with the smallest turning radius being 37 feet.

2.3.4 VERTICAL CURVE K VALUES

The minimum K value for a speed of 15 mph is 3, according to "AASHTO – Geometric Design of Highways and Streets," as seen in Appendix C. The smallest K value of the roadway centerline is 14.

2.4 CONSTRUCTION MATERIALS

Hot mix asphalt and aggregate surface materials were considered for project roads, parking areas, and pedestrian pathways. The primary consideration when selecting the material for this site is cost effectiveness.

2.4.1 HOT MIX ASPHALT SURFACE

Hot mix asphalt (HMA) is a mix of stone, sand, or gravel bound together by asphalt cement. It is the most commonly used pavement surface in Alaska. It produces three to five decibels less road noise than other surface materials. Construction and maintenance costs of HMA surfaces are higher than that of aggregate surfaces, however, HMA has a greater life expectancy. HMA has low drainage capabilities, which can cause water to pool up on the surface. HMA also produces a smooth pavement, which gives motorists a more comfortable experience.

2.4.2 AGGREGATE SURFACE

Aggregate is a collective term used for materials such as sand, gravel, and crushed stone. Multiple grades of aggregates can be used for pavement design, from coarse aggregate which has a large average grain size, to fine which has a small average grain size. Aggregate pavement surfaces have low upfront and maintenance costs. It also has a high hydraulic conductivity, meaning fluids can transmit easily through the spaces between the grains, assisting with drainage of the surface. Aggregate surfaces create a higher level of road noise than other materials, as well as creating dust when driven over. They also deteriorate more quickly than HMA surfaces, needing maintenance more often.

2.4.3 CHOSEN SURFACE MATERIAL

Aggregate surfacing best suits the needs of this project. The USFS predicts that the parking lot and road will see relatively low traffic. It will be less expensive overall to use aggregate rather than HMA due to the low amount of wear and tear resulting from the low traffic volume.

3.0 ALTERNATIVES ANALYSIS

LOGO Engineering analyzed four project design alternatives for suitability and practicality. The alternatives included a no-build option and three different design layouts. All alternatives include one prefabricated double vault waterless restroom (outhouse), one information kiosk, and one fee kiosk. The details and considerations of each analysis is outlined below. Additionally, all alternatives maintain the wooded northwest region of the site to maximize privacy for the private property adjacent to the site.

3.1 INITIAL CONCEPT

The initial concept is an approximately 115x175 foot pad with an entrance/exit from Bear Lake Road at the southwestern corner and connecting to the trail at the northern edge. This includes adequate space for up to 15 parking spaces, and four RV/truck-trailer spaces.

3.1.1 ADVANTAGES

The advantage of the initial concept is that it is a simple, standard design, reducing the overall design and construction time. This alternative allows for maximum parking area.

3.1.2 DISADVANTAGES

A disadvantage of this concept is that the simplicity of the design is not particularly aesthetically pleasing and does not compliment the natural surroundings. Additionally, the material costs of this design may be higher than other options due to the additional prepared surface area.

3.2 ALTERNATIVE A:

Alternative A, presented below in Figure 2: Alternative A Layout, features a 15 foot wide, one-way loop. The eastern and western sections of the loop are straight to accommodate parking areas and the turning radius of the curve at the north end of the loop is narrower than radius at the south end. The loop connects with Bear Lake Road on the southwestern edge. Alternative A provides passenger vehicle parking in the interior of the loop on the east side and on the exterior of the loop on the southwest and west side of the loop, accommodating 18 passenger vehicle parking spaces and one ADA compliant van space. All facilities, including the outhouse, information kiosk, and fee kiosk, are located on the north end of the loop. Pedestrian pathways connect each parking area to a central location within the loop and up to the facilities and beginning of the trail at the north end of the loop. The total prepared surface area in Alternative A is approximately 13,000 square feet.

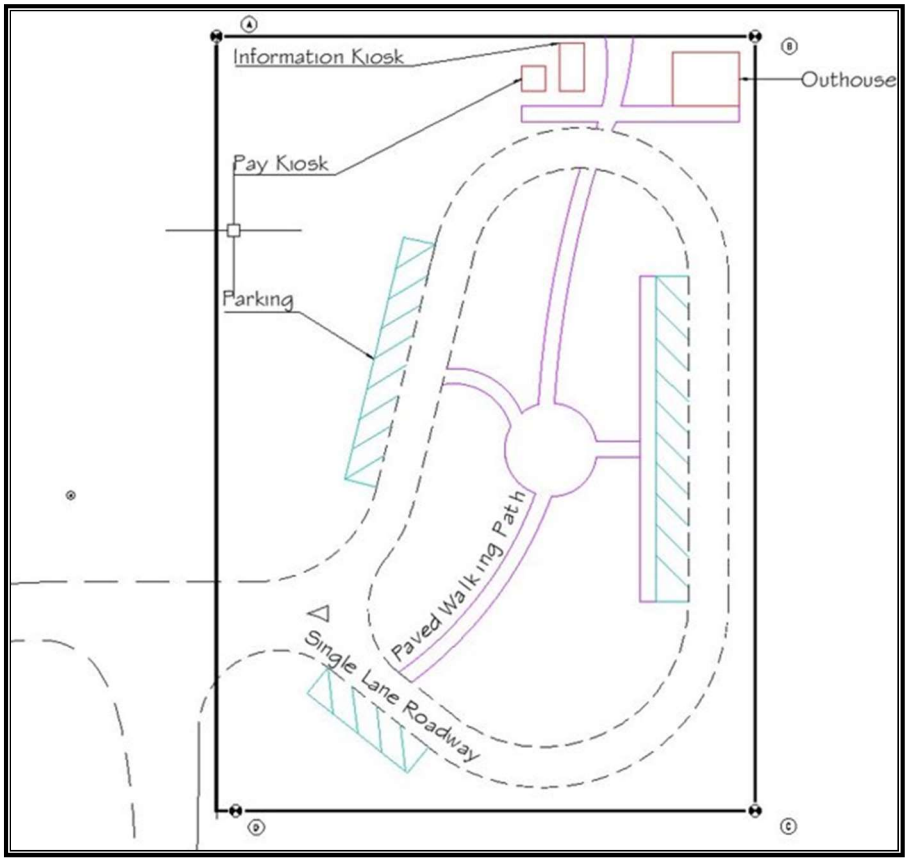


Figure 2: Alternative A Layout

3.2.1 ADVANTAGES

Alternative A provides an adequate amount of parking and simplifies visitor trail access. The turning radii throughout the driveway is sufficient for RVs to traverse the loop, permitting RVs to pass through the site without becoming entrapped and allowing the optional addition of RV parking spaces if desired in the future. The pedestrian paths reduce the need for pedestrians to traverse the driveway. Alternative A maintains natural vegetation within and surrounding the developed area and along with the asymmetrical loop design of the driveway, generally providing an aesthetically pleasing experience to trailhead visitors.

3.2.2 DISADVANTAGES

The major disadvantage of Alternative A is that it has multiple pedestrian path intersections with the driveway. Additionally, the path system location within the loop will lead to the ponding of stormwater and require multiple culverts to encourage adequate drainage in all segments.

3.3 ALTERNATIVE B:

Alternative B, presented below in Figure 3: Alternative B Layout, features a 15 foot wide, one-way, asymmetrical loop. The loop connects with Bear Lake Road on the southwestern edge and the trailhead on the northern edge. Vehicle parking areas are located along the exterior of the south end of the loop and within the interior of the loop, accommodating 26 passenger vehicles. The outhouse and information kiosk are located north of the loop adjacent to the trail and the fee kiosk is located within the loop at the south end. Alternative B features four multi-functional circular aggregate surfaced pads that may be used for picnic areas or decorative foliage. The total prepared surface area in Alternative B is approximately 20,500 square feet.

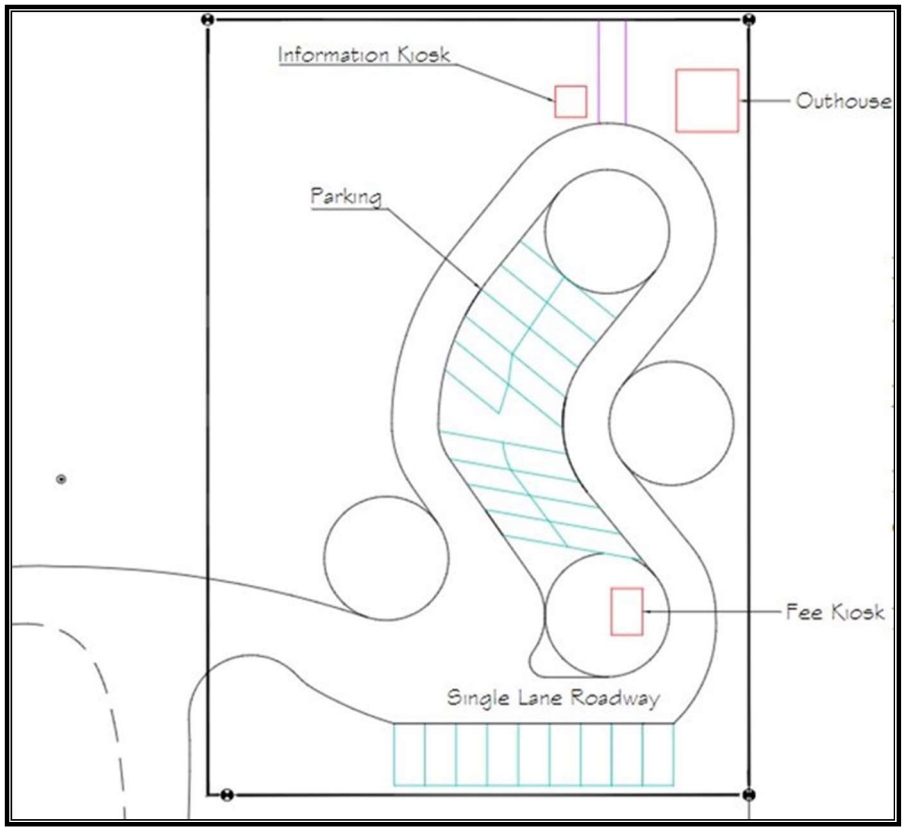


Figure 3: Alternative B Layout

3.3.1 ADVANTAGES

Alternative B provides an adequate amount of parking and simplifies visitor trail access. Additionally, this design provides four developed circular pads that may be used as picnic areas, decorative vegetation, or other purposes as the client desires. The location of the fee kiosk close to the parking areas allows for ease of access by visitors. Alternative B maintains natural vegetation surrounding the developed area and along with the asymmetrical, winding loop design of the driveway, generally providing an aesthetically pleasing experience to trailhead visitors.

3.3.2 DISADVANTAGES

One disadvantage of Alternative B is that this design does not provide any pedestrian pathways, so pedestrians must walk along the driveway to access facilities and the trail system. Additionally, the design is more complex and the developed surface area is greater than Alternative A and Alternative C, resulting in greater construction cost.

3.4 ALTERNATIVE C:

Alternative C, presented below in Figure 4: Alternative C Layout, features a 13 foot wide, symmetrical, one-way loop. The eastern and western sections of the loop are straight to accommodate parking areas. The loop connects with Bear Lake Road on the southwestern edge. Alternative C provides passenger vehicle parking in the exterior of the loop on the east side and parallel RV parking along the interior of the west side of the loop, accommodating parking for ten passenger vehicles with one ADA compliant van space and two RV spaces. The outhouse and the information kiosk are located north of the loop, adjacent to the trail, and the fee kiosk is located along a path northeast of the loop. Pedestrian pathways connect the passenger vehicle parking area to the facilities and trail north of the loop and an additional pathway in the interior of the loop leads to an aggregate surfaced picnic area southeast of the loop. The total prepared surface area in Alternative C is approximately 14,000 square feet.

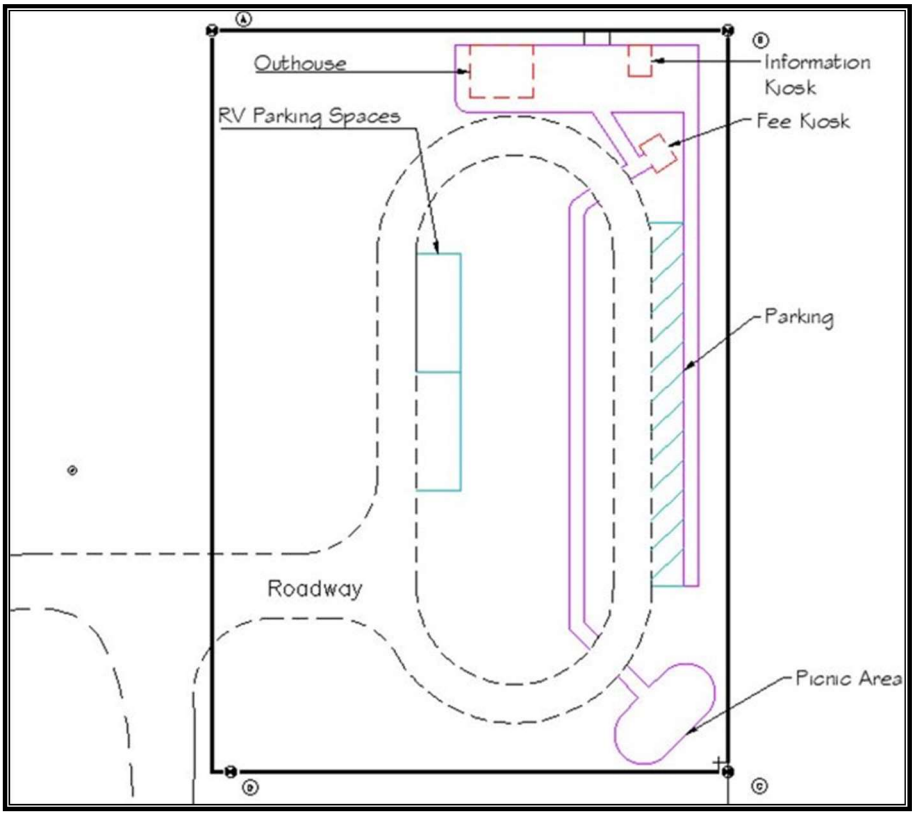


Figure 4: Alternative C Layout

3.4.1 ADVANTAGES

Alternative C provides an adequate amount of parking and simplifies visitor trail access. It has wide turning radii, allowing RV's and trucks with trailers to easily navigate the driveway. It provides pedestrian pathways to the trailhead from the parking area as well as the picnic area. The outhouse and kiosks are on a paved pad, providing easy access. Alternative C maintains natural vegetation within and surrounding the developed area and along with the asymmetrical loop design of the driveway, generally providing an aesthetically pleasing experience to trailhead visitors.

3.4.2 DISADVANTAGES

A disadvantage of Alternative C is that there is no paved pedestrian access to the RV parking spaces. Additionally, having separate walking paths to the parking area and the picnic area increases construction and maintenance costs.

4.0 PREFERRED ALTERNATIVE

Alternative A has been chosen as the preferred alternative. It has a visually interesting design, while maintaining functionality. The curves are large enough to allow for larger vehicles and there is enough space for adequate parking. It also has the smallest developed surface area of the three alternative designs, decreasing material and construction costs.

4.1 CHANGES

The shape of the driveway has been identified as the most important aspect of the design, ensuring that it has remained static. However, several changes to the original design are necessary, based on input from the client as well as geometrical constraints and land area considerations.

The fee kiosk has been removed from the final design, as the Forest Service does not believe the trailhead will generate enough revenue to cover the cost of collecting it. The parking spaces on the southern edge of the driveway are removed as the total number of necessary parking spaces is a maximum of 12, as determined by the client. To reduce the amount of pedestrian/vehicle interactions, the western parking spaces are moved from outside the loop of the driveway to the inside, creating a single crossing. The walking paths are reduced in order to minimize paved surface area.

The entire design was shifted westward by 2 feet to allow room for a drainage ditch along the outside of the loop. Adding the parking bumpers resulted in a necessary lengthening of the parking spaces. In order to maintain the shape of the driveway they were extended farther into the center of the loop. Relocating the outhouse will reduce the odor at the information kiosk and trailhead. Placing it in a central area of the loop ensures that there is sufficient area for the lengthened parking spaces. With the outhouse moved, the shape of the converging walking paths is adjusted. Finally, the placement of culverts and signs was determined as depicted in Figure 5: Preferred Alternative Final Design. The final design has a prepared area of 12,948 square feet and a disturbed area of 26,054 square feet.

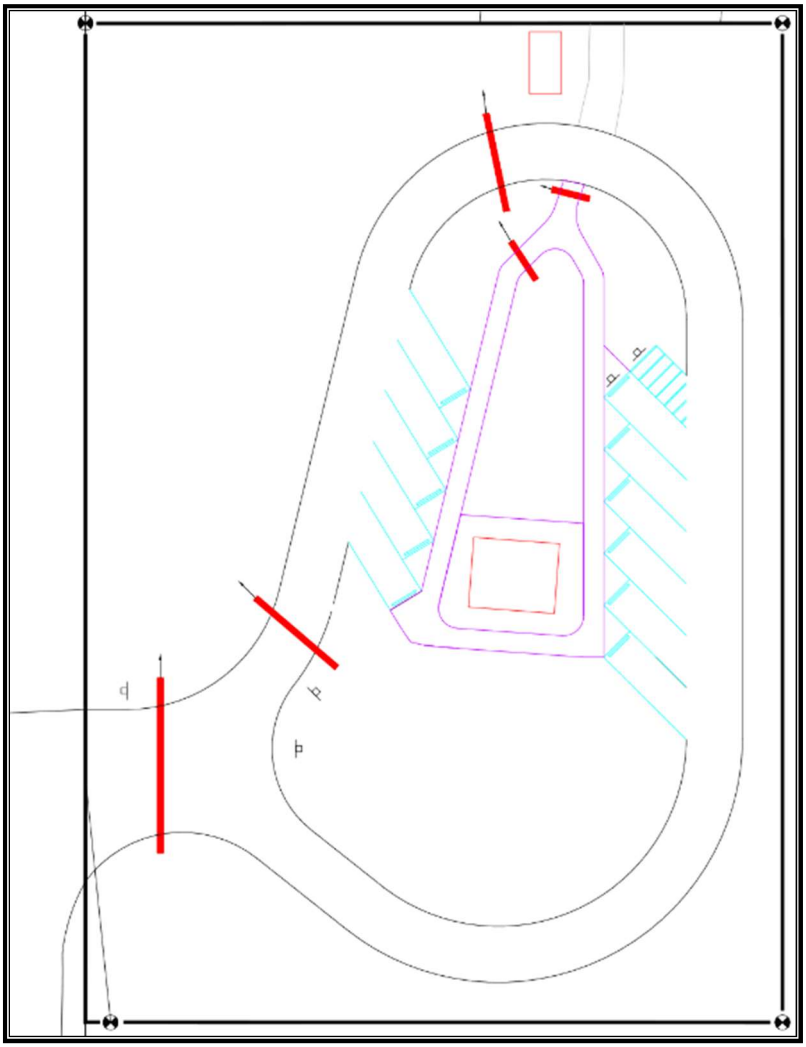


Figure 5: Preferred Alternative: Final Design

5.0 STRUCTURAL SECTION

The structural section of the proposed development, as seen in Figure 6: Structural Section, consists of an F-1 aggregate surface course followed by borrow material underlain with separation geotextile. The F-1 aggregate will have a thickness of 4 inches minimum on the road and parking areas and 2 inches minimum on the pedestrian pathways. The borrow material will have a thickness of 24 inches minimum on the road and parking areas and 6 inches minimum on the pedestrian pathways.

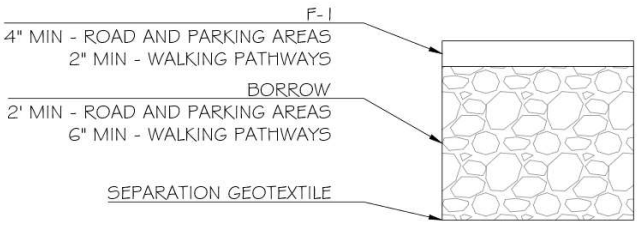


Figure 6: Structural Section

6.0 COST ESTIMATE

The Engineer's Cost Estimate for this project totals just over $250,000. Costs were largely based on ones seen in previous USFS projects. However, some prices required more investigation since some items were unique to this project and other products that were needed had been discontinued. Because of this, other estimates came directly from Romtec, Belson Outdoors, and Anchorage Sand and Gravel. The cost estimate details can be seen in Appendix D.

7.0 ENVIRONMENTAL IMPACTS

Federal and local government agencies are used as guidance to remain compliance with environmental laws, and are listed in Appendix B. This project must meet National Environmental Policy Act (NEPA) guidelines since a federal agency (USFS) is initiating this proposal. During preliminary reviews for environmental factors, it was determined that the site did not contain wetlands.

According to the Alaska Department of Environmental Conservation Division of Water, since the region that will be disturbed encompasses less than one acre, a Pollution Discharge Elimination Assessment, covered in Construction General Permits for Storm Water Discharges for Large and Small Construction Activities (2016 CGP, AKR100000) will not be necessary.

A survey from 2009 titled "*Cultural Resources Survey Results Iditarod Trail Surveys (2002-2006) Seward to Ingram Creek"* was completed by USFS Archaeologist Lesli Schick for the proposed trailhead. The report found that "no historic cultural resources will be affected by the upgrades to the existing Bear Lake Trail, the Bear Lake Trailhead and the logging road (outside of the Nash Road Trailhead area)." Later in October of 2010, State Historic Preservation Officers (SHPO) agreed with Schick's report.

7.1 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) requires federal agencies to run through a compulsory analysis. This analysis has three levels that may be issued: Categorical Exclusion (CatEx), Environmental Assessment (EA), and Finding of No Significant Impact (FONSI) or Environmental Impact Statement (EIS). CatEx is used

when it has been found that there will not be a substantial effect on the human affected habitat. An EA occurs when it has been determined that negative impacts will occur in the area. FONSI happens when it has been found that environmental impacts will be negligible and usually lets the agencies involved move forward without having to do an EIS. An EIS is a written document which describes the effects that a project will have on the environment and includes an array of realistic alternatives. These alternatives must have enough detail that they can be analyzed in their own right. The Council for Environmental Quality (CEQ) prescribes the standard format and content matter that an EIS should address.

From the Forest Service Handbook FSH 1909.15 – National Environmental Policy Act Handbook, Chapter 30 – Categorical Exclusions from Documentation, this project does not appear to include any extraordinary circumstances outlined in the handbook. This project is expected to fall under the Categorical Exclusion 32.2 – Categories of Actions for Which a Project or Case File and Decision Memo Are Required – (1) Construction and Reconstruction of Trails. This category falls under 36 CFR220.6(e)(1). The project does not include construction or reconstruction of the trail; however, it does include development of the trailhead. The project also considers and incorporates in its design the accessibility of individuals who may be handicapped or disabled. As such, it is recommended to verify that no extraordinary circumstances apply and that a Case File and Decision Memo be prepared. The cultural resources information gathered and the results that were found by Archaeologist Lesli Schick for the site was an example of what would help lead to a CatEx.

7.2 SOIL EROSION PREVENTION (BEST MANAGEMENT PRACTICES)

As the design site is only one acre in size, a Stormwater Pollution Prevention Plan (SWPPP) will not be necessary. During construction, the contractor must follow best management practices, a form of stormwater control measure. Care will be taken to limit the physical extent of and duration that erodible soil is susceptible to storm water. Any surfaces that are affected should be stabilized soon thereafter. There will be sediment control implements in the form of fiber rolls which have been authorized for this project.

The fiber rolls will act as barriers, used for slowing down stormwater runoff and to capture the sediments on the upside of higher ground to avoid further sediment erosion. They should be installed before any erodible soil is left unprotected and will be held down by wooden stakes. To accommodate for construction, rolls will have to be removed and reinstalled regularly.

The contractor should inspect the rolls weekly or within 24 hours after each half inch of rainfall, any accumulated soil should be disposed, and damaged rolls should be replaced. Sediment must be removed once it has accumulated to a height of five inches in regions not predisposed to erosion. In addition, there must be at least a one-foot difference in elevation between top edges of the road shoulder and barrier.

8.0 RECOMMENDATIONS

LOGO Engineering recommends the construction of this project. LOGO Engineering also recommends that further survey data and geotechnical information be collected before the design is finalized. Some additional permits may need to be explored, such as whether an eagle permit or noise permit are needed. The eagle permit will be necessary if a bald or brown eagle active or inactive nest is found or suspected to be within 660 feet of the planned developed area, based on The Bald and Golden Eagle Protection Act. Additionally, the projected usage of the trailhead has determined that a fee kiosk is unnecessary, however new site usage data may necessitate one in the future, therefore a site usage study may be beneficial.

9.0 CONCLUSIONS

The primary objective of the Bear Lake Trailhead Project is to provide visitors with a better overall experience by providing parking and facilities while being aesthetically pleasing and complimenting the natural surroundings. The design that best meets the needs of the United States Forest Service is Alternative A, which was selected as the preferred alternative. Modifications were made at the client's request, resulting in the design as seen in Figure 7: Preferred Alternative Change 3. The general layout is a one-way loop with ten passenger vehicle parking spaces and one ADA compliant van space. The proposed development includes an outhouse and an information kiosk.

APPENDICES

Appendix A

Alaska Department of Natural Resources (ADNR) Well Log Tracking System (WELTS)

W8761 14986

HOODROW DRILLING & CONSTRUCTION

P.O. Box 917 Mile 6.5 Seward Hwy.
Seward, Alaska 99664 224-5602
Rick Jones, Driller

DRILLERS WELL LOG FOR: Truman Boling

DATE STARTED 1/20/87 DATE COMPLETED 1/21/87

LOCATION Meridian Park Subd Blk 2 Lot 6

MACHINE B.E. 22W

FT. PER DAY	
0 to 4 Silty soil & duff	to
4 to 17 Dirty sand, gravel, cobbles	to
17 to 28 Sand & silt, wet	to
28 to 30 Pea gravel "	to
30 to 39 Sand & silt "	to
39 to 41 Water gravel	to

DEPTH OF WELL 41' TOTAL CASING 43'

OPEN END CASING ✓ SCREENED ____ PERFORATED ____ OPEN HOLE ____

OTHER ____

by owner
PUMP SET AT ____ TYPE OF PUMP ____

PIPE: Sched 80 ____ Galvanized ____ Ft.

HYDROSTATIC LEVEL 13'8" ✓ (Below) (Above) Tip of Casing

YIELD. Bail 24 gpm Pump ____ Air ____

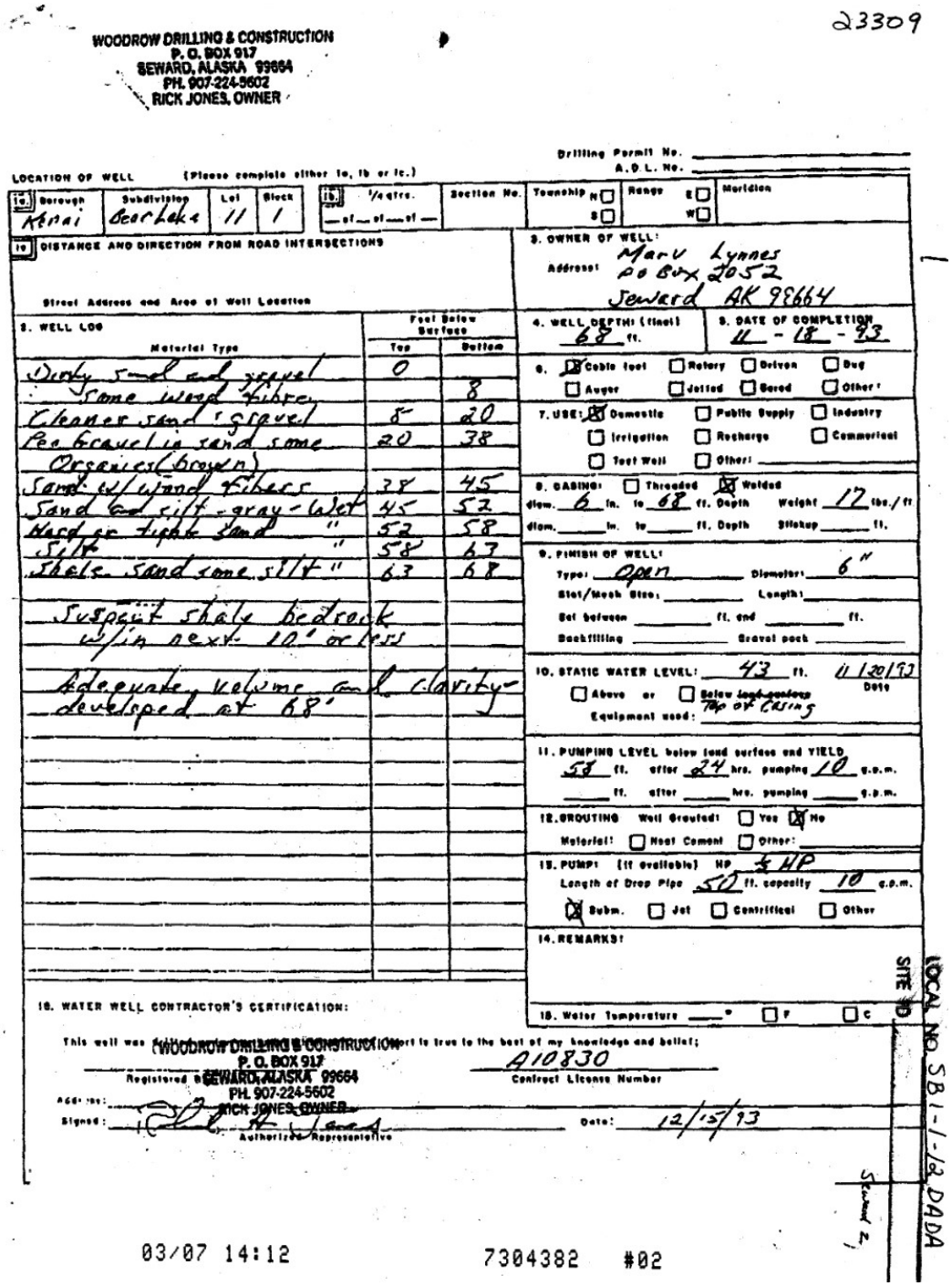
DRAWDOWN Less than 2' - @ 24 gpm bail

RECOVERY ____

REMARKS ____

Richard R. Jones

LOCAL NO. SBL-1-12DABD-9
SITE ID 601116149213401
SW02



23309

WOODROW DRILLING & CONSTRUCTION
P. O. BOX 917
SEWARD, ALASKA 99664
PH. 907-224-5602
RICK JONES, OWNER

Drilling Permit No. _____
A.D.L. No. _____

LOCATION OF WELL (Please complete either 1a, 1b or 1c.)

1a Borough: Kenai | Subdivision: Bear Lake | Lot: 11 | Block: 1 | 1b ¼ qtrs. | Section No. | Township N/S | Range E/W | Meridian

2 DISTANCE AND DIRECTION FROM ROAD INTERSECTIONS

Street Address and Area of Well Location

3. OWNER OF WELL:
Address: Marv Lynnes
PO Box 2052
Seward AK 99664

5. WELL LOG Material Type	Feet Below Surface Top	Bottom
Dirty sand and gravel some wood fibres	0	8
Cleaner sand & gravel	8	20
Pea gravel in sand some Organics (brown)	20	38
Sand w/ wood fibers	38	45
Sand & silt - gray - wet	45	52
Hard or tight sand "	52	58
Silt "	58	63
Shale sand some silt "	63	68
Suspect shaly bedrock w/in next 10' or less		
Adequate volume & clarity developed at 68'		

4. WELL DEPTH: (final) 68 ft.
5. DATE OF COMPLETION 11 - 18 - 93
6. ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Auger ☐ Jetted ☐ Bored ☐ Other:
7. USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Recharge ☐ Commercial ☐ Test Well ☐ Other: _____
8. CASING: ☐ Threaded ☒ Welded
diam. 6 in. to 68 ft. Depth Weight 17 lbs./ft
diam. _____ in. to _____ ft. Depth Stickup _____ ft.
9. FINISH OF WELL:
Type: Open Diameter: 6"
Slot/Mesh Size: _____ Length: _____
Set between _____ ft. and _____ ft.
Backfilling _____ Gravel pack _____
10. STATIC WATER LEVEL: 43 ft. 11/20/93 Date
☐ Above or ☐ Below Land surface Top of Casing
Equipment used: _____
11. PUMPING LEVEL below land surface and YIELD
58 ft. after 24 hrs. pumping 10 g.p.m.
_____ ft. after _____ hrs. pumping _____ g.p.m.
12. GROUTING Well Grouted? ☐ Yes ☒ No
Material: ☐ Neat Cement ☐ Other: _____
13. PUMP: (If available) HP ½ HP
Length of Drop Pipe 50 ft. capacity 10 g.p.m.
☒ Subm. ☐ Jet ☐ Centrifical ☐ Other
14. REMARKS:

15. Water Temperature ____° ☐ F ☐ C

16. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was [illegible] WOODROW DRILLING & CONSTRUCTION P. O. BOX 917 SEWARD, ALASKA 99664 PH. 907-224-5602 RICK JONES, OWNER report is true to the best of my knowledge and belief;
Registered Operator: _____ Contract License Number: A10830
Address: _____
Signed: _____ Authorized Representative Date: 12/15/93

SITE ID
LOCAL NO. SB1-1-12 DADA
Sheet 2 of 2

03/07 14:12 7304382 #02

Appendix B

Standards and Guidelines

International Building Code

- 2018 edition
    - Table 1806.2

Permits and Authorizations

• Right-of-Way, Project Specific Permit	Yes
• USACE, Section 404/10 Includes Abbreviated Permit Process, Nationwide Permit, and General Permit	No
• Coast Guard, Section 9	No
• ADF&G Fish Habitat Permit (Title 16.05.871 and Title 16.05.841)	No
• Flood Hazard	No
• ADEC Domestic Wastewater Plan Approval	Yes
• ADEC 401	No
• ADEC APDES	No
• Noise	To be determined
• Eagle Permit	To be determined
• NEPA	Yes

Accessible Accommodations

- Americans with Disabilities Act (ADA)
    - US Department of Justice "ADA Compliance Brief"

Minimum Number of Accessible Parking Spaces
2010 Standards (208.2)

Total Number of Parking Spaces Provided in Parking Facility (per facility)	(Column A) Minimum Number of Accessible Parking Spaces (car and van)	Mininum Number of Van-Accessible Parking Spaces (1 of six accessible spaces)
1 to 25	1	1
26 to 50	2	1
51 to 75	3	1
76 to 100	4	1
101 to 150	5	1
151 to 200	6	1
201 to 300	7	2
301 to 400	8	2
401 to 500	9	2
500 to 1000	2% of total parking provided in each lot or structure	1/6 of Column A*
1001 and over	20 plus 1 for each 100 over 1000	1/6 of Column A*

*one out of every 6 accessible spaces

- Architectural Barriers Act (ABA)
    - Section F208: Parking Spaces

Table F208.2 Parking Spaces

Total Number of Parking Spaces Provided in Parking Facility	Minimum Number of Required Accessible Parking Spaces
1 to 25	1
26 to 50	2
51 to 75	3
76 to 100	4
101 to 150	5
151 to 200	6
201 to 300	7
301 to 400	8
401 to 500	9
501 to 1000	2 percent of total
1001 and over	20, plus 1 for each 100, or fraction thereof, over 1000

Appendix C

Design Considerations

Minimum Turning Radius

- AASHTO – Geometric Design of Highways and Streets
  (Minimum Turning Radii based on a maximum speed of 10 miles per hour)

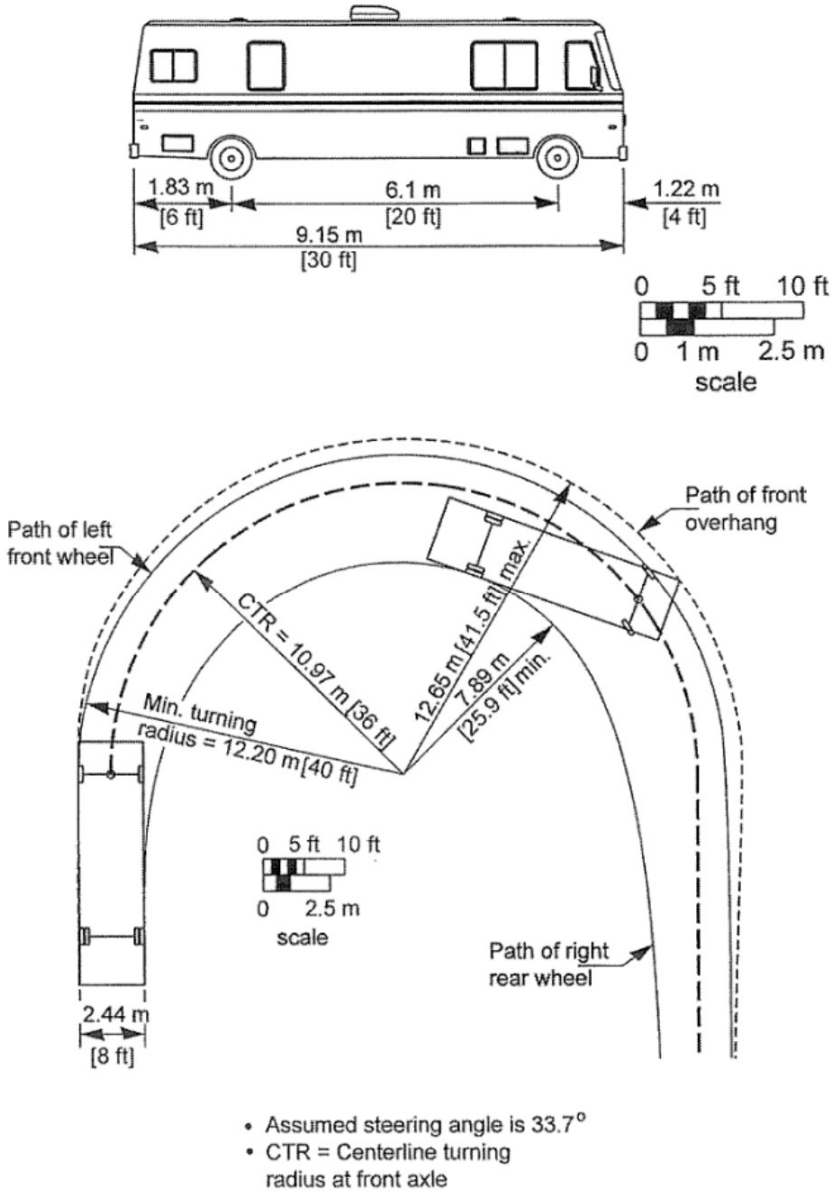
  - Exhibit 2-2. Minimum Turning Radii of Design Vehicles

Design Vehicle Type	Pas-senger Car	Single-Unit Truck	Intercity Bus (Motor Coach)		City Transit Bus	Conven-tional School Bus (65 pass.)	Large[2] School Bus (84 pass.)	Articu-lated Bus	Intermed-iate Semi-trailer	Intermed-iate Semi-trailer
Symbol	P	SU	BUS-40	BUS-45	CITY-BUS	S-BUS36	S-BUS40	A-BUS	WB-40	WB-50
Minimum Design Turning Radius (ft)	24	42	45	45	42.0	38.9	39.4	39.8	40	45
Center-line[1] Turning Radius (CTR) (ft)	21	38	40.8	40.8	37.8	34.9	35.4	35.5	36	41
Minimum Inside Radius (ft)	14.4	28.3	27.6	25.5	24.5	23.8	25.4	21.3	19.3	17.0

Design Vehicle Type	Interstate Semitrailer		"Double Bottom" Combina-tion	Triple Semi-trailer/ trailers	Turnpike Double Semi-trailer/ trailer	Motor Home	Car and Camper Trailer	Car and Boat Trailer	Motor Home and Boat Trailer	Farm[3] Tractor w/One Wagon
Symbol	WB-62*	WB-65** or WB-67	WB-67D	WB-100T	WB-109D*	MH	P/T	P/B	MH/B	TR/W
Minimum Design Turning Radius (ft)	45	45	45	45	60	40	33	24	50	18
Center-line[1] Turning Radius (CTR) (ft)	41	41	41	41	56	36	30	21	46	14
Minimum Inside Radius (ft)	7.9	4.4	19.3	9.9	14.9	25.9	17.4	8.0	35.1	10.5

* = Design vehicle with 48-ft trailer as adopted in 1982 Surface Transportation Assistance Act (STAA).
** = Design vehicle with 53-ft trailer as grandfathered in with 1982 Surface Transportation Assistance Act (STAA).
1 = The turning radius assumed by a designer when investigating possible turning paths and is set at the centerline of the front axle of a vehicle. If the minimum turning path is assumed, the CTR approximately equals the minimum design turning radius minus one-half the front width of the vehicle.
2 = School buses are manufactured from 42-passenger to 84-passenger sizes. This corresponds to wheelbase lengths of 11.0 ft to 20.0 ft, respectively. For these different sizes, the minimum design turning radii vary from 28.8 ft to 39.4 ft and the minimum inside radii vary from 14.0 ft to 25.4 ft.
3 = Turning radius is for 150–200 hp tractor with one 18.5 ft long wagon attached to hitch point. Front wheel drive is disengaged and without brakes being applied.

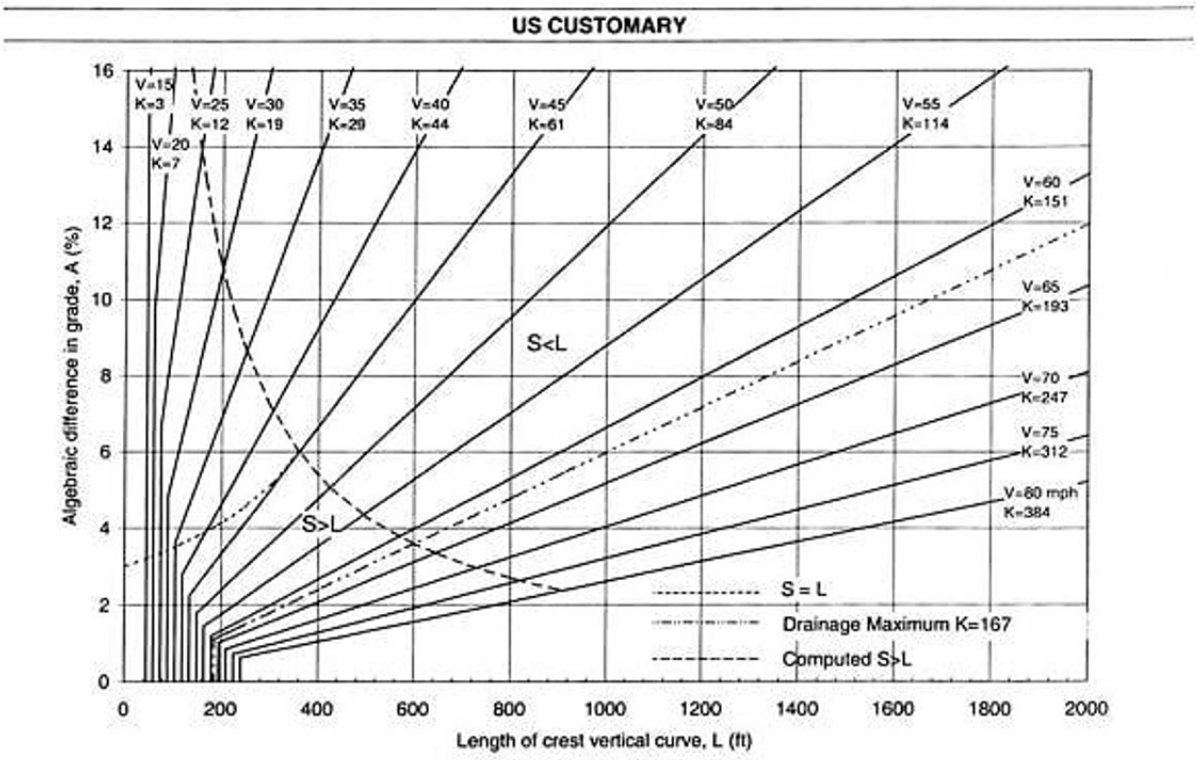
- Exhibit 2-20. Minimum Turning Path for Motor Home (MH) Design Vehicle



- Assumed steering angle is 33.7°
- CTR = Centerline turning radius at front axle

Vertical Curve - Minimum K Value

- AASHTO – Geometric Design of Highways and Streets
    - Exhibit 3-71. Design Controls for Crest Vertical Curves – Open Road Conditions



- Exhibit 3-72. Design Controls for Stopping Sight Distance and for Crest Vertical Curves

Metric				US Customary			
Design speed (km/h)	Stopping sight distance (m)	Rate of vertical curvature, K[a]		Design speed (mph)	Stopping sight distance (ft)	Rate of vertical curvature, K[a]	
		Calculated	Design			Calculated	Design
20	20	0.6	1	15	80	3.0	3
30	35	1.9	2	20	115	6.1	7
40	50	3.8	4	25	155	11.1	12
50	65	6.4	7	30	200	18.5	19
60	85	11.0	11	35	250	29.0	29
70	105	16.8	17	40	305	43.1	44
80	130	25.7	26	45	360	60.1	61
90	160	38.9	39	50	425	83.7	84
100	185	52.0	52	55	495	113.5	114
110	220	73.6	74	60	570	150.6	151
120	250	95.0	95	65	645	192.8	193
130	285	123.4	124	70	730	246.9	247
				75	820	311.6	312
				80	910	383.7	384

[a] Rate of vertical curvature, K, is the length of curve per percent algebraic difference in intersecting grades (A). $K = L/A$

Appendix D

Cost Estimate

Estimates for Preliminary Tasks						
Item #	Item	Source	Cost/Unit	Unit	Quantity	Cost
1	survey measurement	Atelier	$ 20,000.00	LS	1	$ 20,000.00
2	survey crew (2 person)	USFS	$ 350.00	HR	10	$ 3,500.00
3	timber clearing	USFS	$ 20,000.00	AC	0.28	$ 5,546.27
4	clear & grub/disposal	USFS	$ 3.00	SY	2564	$ 7,691.56
5	excavation	USFS	$ 12.00	CY	1979	$ 23,745.74
	Subtotal					$ 60,483.57
Estimates for Surfaces						
Item #	Item	Source	Cost/Unit	Unit	Quantity	Cost
6	geotextile	USFS	$ 6.50	SY	1285	$ 8,349.81
7	borrow (gravel)	USFS				$ 33,727.50
	material & delivery		$ 20.00	CY	861	
	place, spread, & compact		$ 15.00	CY	861	
	fine grade		$ 2.50	SY	1437	
8	aggregate (F-1)	USFS				$ 11,489.50
	material & delivery		$ 38.00	CY	149	
	place, spread, & compact		$ 15.00	CY	149	
	fine grade		$ 2.50	SY	1437	
	Subtotal					$ 53,566.81
Estimates for Structures						
Item #	Item	Source	Cost/Unit	Unit	Quantity	Cost
9	outhouse	Romtec				$ 104,505.39
	building		$ 49,005.39	each	1	
	installation		$ 55,500.00	each	1	
	Subtotal					$ 104,505.39
Estimates for Other Items						
Item #	Item	Source	Cost/Unit	Unit	Quantity	Cost
10	culvert (18 in., furnish & install)	USFS	$ 60.00	LF	118	$ 7,052.40
11	parking bumper	AS&G				$ 1,237.00
	7 ft length		$ 67.00	each	11	
	shipping/installation		$ 500.00	all	1	
12	info. kiosk w/ roof (11'6"x14')	Romtec	$ 18,446.00	each	1	$ 18,446.00
13	bear proof trashcan	Belson				$ 1,617.25
	can		$ 1,186.00	each	1	
	shipping		$ 431.25	each	1	
14	signage	USFS	$ 30.00	SF	16	$ 480.00
	Subtotal					$ 28,832.65
15	Erosion and Sediment Control (1%)					$ 2,473.88
16	Mobilization and Demobilization (2%)					$ 4,947.77
17	Contingency Budget (10%)					$ 25,481.01
	Total Cost					$ 277,817.20