United States
Department of
Agriculture

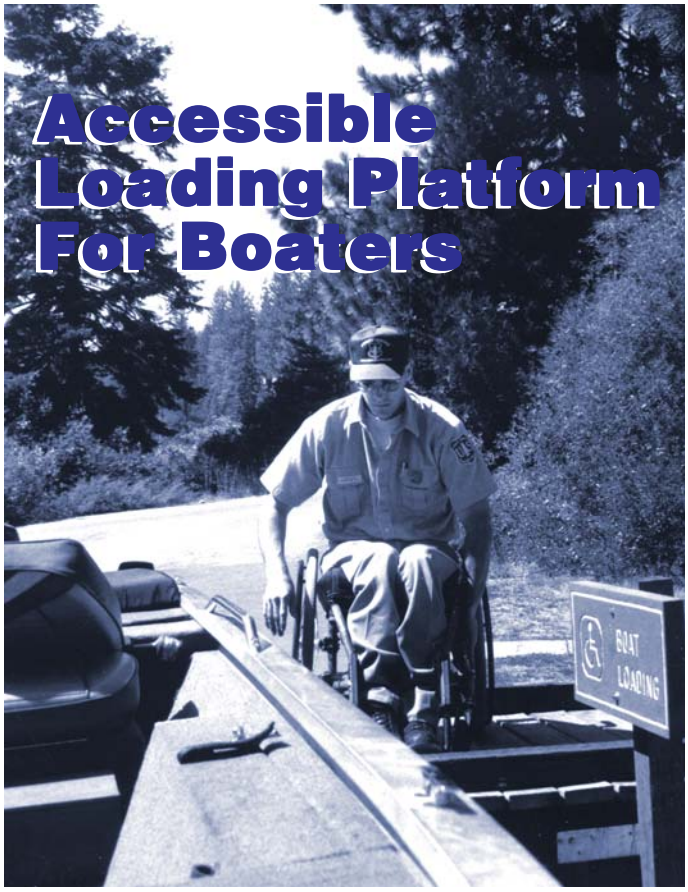
Forest Service

Technology &
Development
Program

2300 Recreation
7100 Engineering
July 2000
0023-2837-MTDC

Accessible Loading Platform For Boaters

Accessible Loading Platform For Boaters



Bob Beckley
Project Leader

USDA Forest Service
Technology & Development Program
Missoula, Montana

9E92A43—Access Ramp for Boaters

July 2000

Contents

Acknowledgments

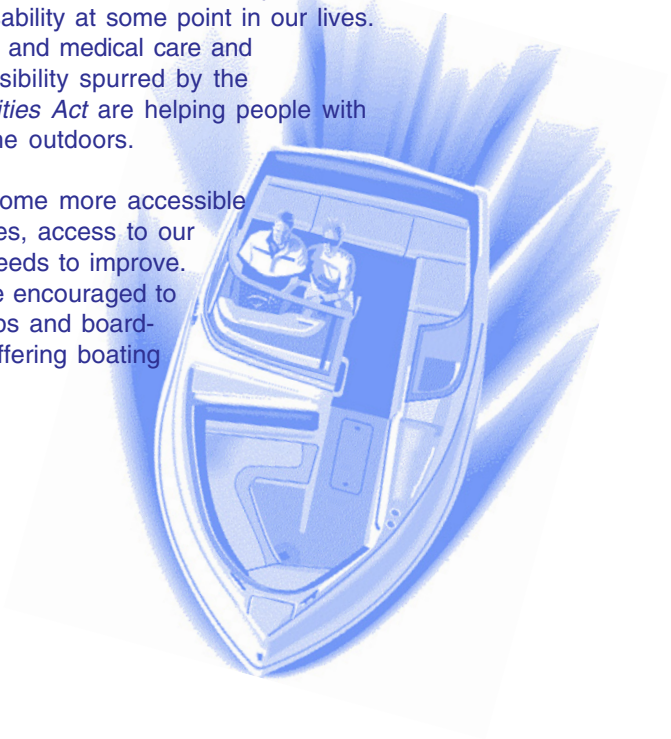
I would like to thank the following persons for their support of this project:

Gary Hoshide ..... Missoula Technology and Development Center
Deb Mucci ..... Missoula Technology and Development Center
Steve Orvavetz ... Missoula Technology and Development Center
Dick Paterson ..... Washington Office Recreation

Special thanks to Greg Marks, from the Prather Ranger District on the Sierra National Forest for his valuable insight, assistance, and commitment to the accommodation of people with disabilities.

Introduction

Outdoor recreation opportunities abound on Federal, State, and private lands. More and more people with disabilities are venturing into the great outdoors. People with disabilities represent about 15 percent of the United States population. Most of us will experience at least a temporary disability at some point in our lives. Advances in technology and medical care and improvements in acces-sibility spurred by the *Americans With Disabilities Act* are helping people with limited mobility enjoy the outdoors.



As recreation sites become more accessible to people with disabilities, access to our lakes and waterways needs to improve. Recreation planners are encouraged to include accessible ramps and board-ing platforms at sites offering boating access.

Need for Safe Access

Safely getting into or out of a boat can pose problems for anyone. The boat may be moving and unstable. In cases where a floating dock is being used, both the boat and dock may be moving. Entering a boat that has been pulled to shore also poses problems, especially if the shore-line is steep or rugged.

For an individual with a mobility impairment, getting into or out of a boat poses additional hazards and risks. A boarding platform on the shore can help reduce the risks (Figure 1).

Figure 1—A boarding platform on the shore can reduce the risks of getting into and out of a boat.

Project Assessment

Greg Marks, Forest Accessibility Coordinator for the Sierra National Forest, was injured in a helicopter accident in 1983. Although Greg now depends on a wheelchair for mobility, he remains an avid fisherman and boating enthusiast (Figure 2). Greg asked the Missoula Technology and Development Center (MTDC) to evaluate and modify several ramps to assist resource and recrea-tion planners in making our waterways more accessible.

Figure 2—Greg Marks, Sierra National Forest, shows how he gets into a boat from his wheelchair.

Types of Ramps

MTDC evaluated, modified, and redesigned three ramps to meet accessibility standards.

The types of ramps covered in this report include: the con-crete ramp (Figure 3), the earth ramp with retaining wall, and the timber ramp (Figure 4).

The concrete ramp shown in this report is a split-level ramp to accommodate boats of different heights. All ramps may be modified to single or split level, as long as accessibility codes are met (Appendix B).

Construction plans for these ramps are included in this doc-ument and are also available on the Forest Service's internal network at *http://fsweb.mtdc.wo.fs.fed.us*. Any modifications that affect accessibility standards should be documented along with the reason for the modifications and a risk and liability assessment.

Figure 3—Split-level concrete ramps allow easy access to boats of different heights.

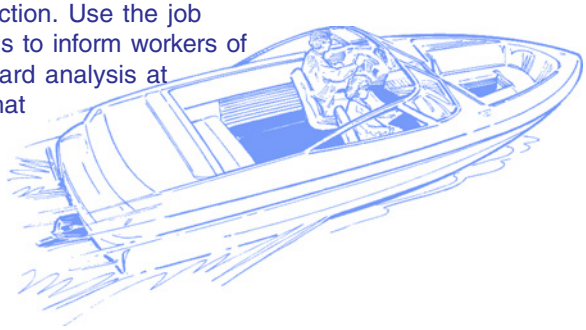
Figure 4—A typical timber ramp.

Costs

Costs associated with the construction of these camps vary greatly depending on the location, site preparation, construction materials, and construction method (pri-vate contractor, agency employees, Job Corps, or volunteer groups). Several of the sites MTDC visited were developed with the assistance of organizations such as the Lions Club and the Boy Scouts of America.

Employee Safety

When agency employees, volunteers, or charitable organizations are helping to develop a site, you should conduct a site inspection and develop a job hazard analysis before construction. Use the job hazard analysis and safety meetings to inform workers of potential dangers. Post the job hazard analysis at the construction site and ensure that workers wear appropriate personal protective equipment.



The Ramp and Boarding Platform

An accessible ramp and boarding platform allow boaters to get into the boat before it is placed in the water (Figure 5). The boat is pulled alongside the ramp so it is next to the boarding platform. With the boat in position, the passengers can board. A $1\frac{1}{4}$-inch-thick steel plate bolted to the end of the platform and protruding up a minimum of 2 inches will prevent wheelchairs from rolling off (Figure 6). After passengers are on board, safely seated, and secured, the driver can proceed to the boat launch. When unloading, the process works in reverse.

Figure 5—The boarding platform allows passengers to get into a boat while it is still on land, reducing the risks during loading and unloading.

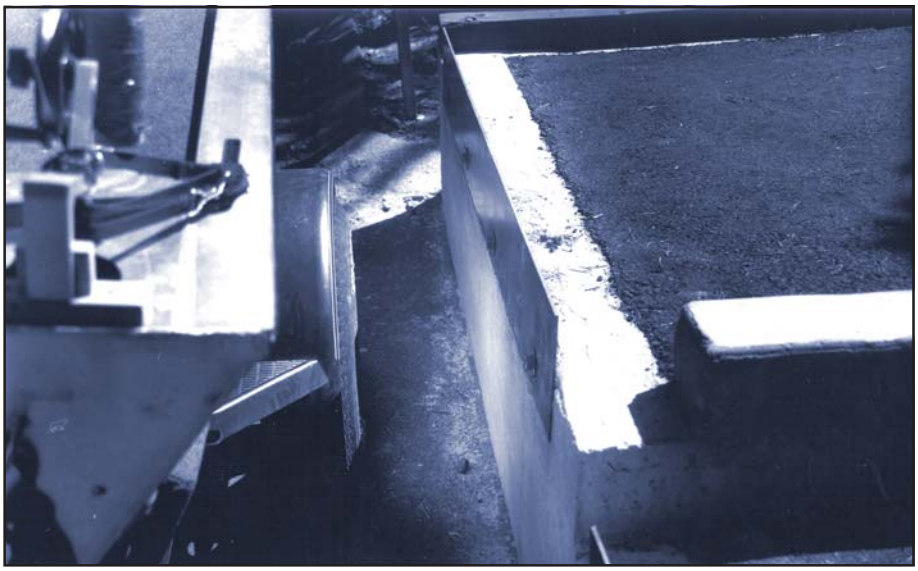


Figure 6—The $1\frac{1}{4}$-inch-thick steel plate on the end of the platform allows boat trailers to get close to the platform while preventing wheelchairs from rolling off.

Siting Ramps

Platforms are generally sited along the perimeter of a parking area near the water (Figure 7).

Ramps should be built on flat ground. This is especially important when building a split-level ramp. Otherwise, the boat will rise or fall as it is pulled alongside the ramp, pre-venting the split levels from working as intended. Straight access to the ramp will allow drivers to align the boat closer to the boarding platform. Drivers need a straight approach 40 feet before and 40 feet after the ramp for the vehicle and trailer to enter and exit. The area should be kept clear of brush and debris that can interfere with the line of sight.

Rubber fenders or bumpers should be placed alongside the front of the ramp and the platform to prevent them from being damaged by boats or vehicles. Bumpers should not be very thick because the boat will not be able to get close enough to the platform for easy loading and unloading.

The platform should be even with the edge of the roadway or parking area. When modifying an existing site for an accessible ramp, be sure curbs do not interfere with access to the platform. For an individual with limited mobility, inches can make a big difference in gaining safe access from the platform to the boat (Figure 8).

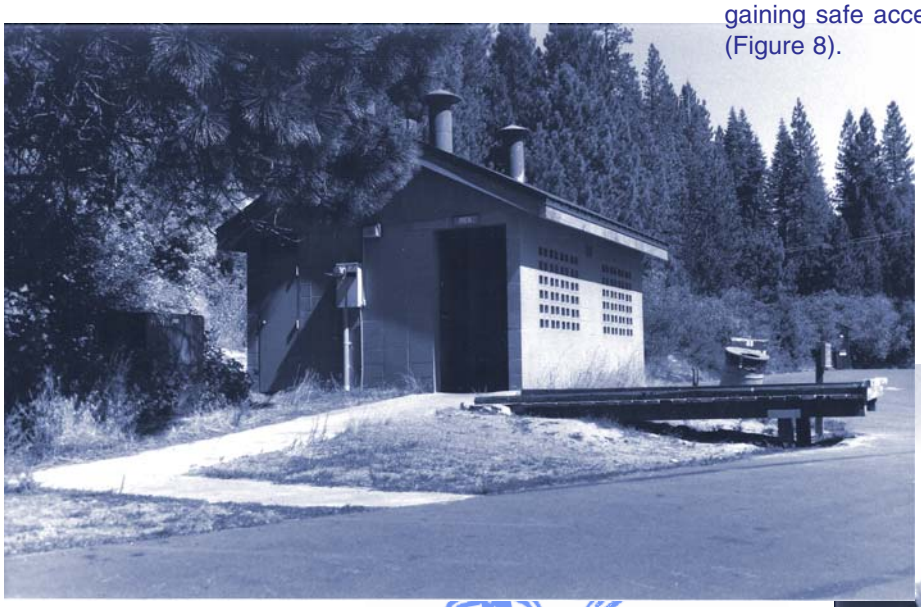


Figure 7—A timber boarding platform built alongside an existing restroom.

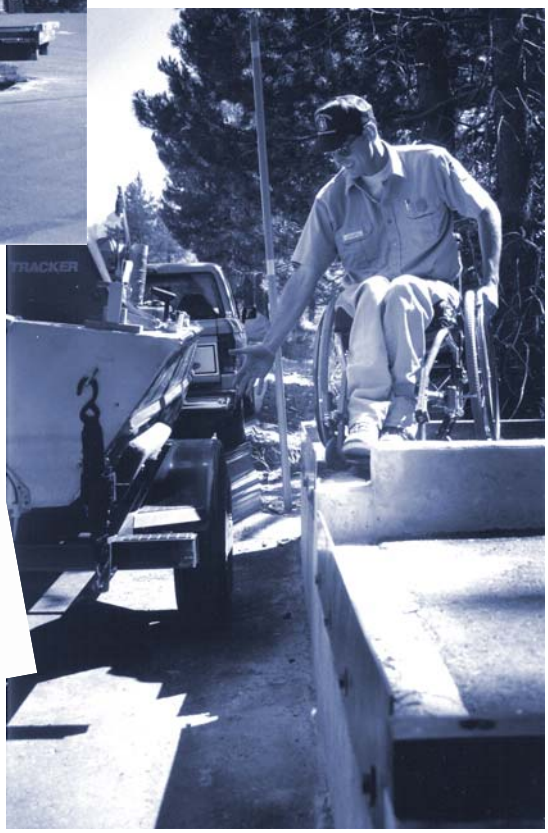


Figure 8—A ramp recessed behind curbs makes loading and unloading difficult.

Signs

Stripe the pavement in front of the ramp, 40 feet before the ramp, and 40 feet after the ramp as a no-parking zone.

Ramps should be identified with the international symbol of accessibility (Figure 9). These boat ramp signs were not commercially available in early 2000. They must be custom made. A separate sign could explain how the ramp is to be used. Other signs could identify safety concerns like the ramp's abrupt edge, or towing a boat with passengers to and from the water.

In areas of deep snow, poles can help snow plow operators identify the edges of the ramp. The snow poles could be removed each spring or left in place to help drivers line up with the ramp. Reflectors are recommended (Figure 10).

Rules for signs, ramps, handrails, and pathways are in Appendix B.

Figure 9—The international wheelchair symbol identifies this loading platform as accessible.

Figure 10—Reflectors are recommended for loading platforms.

Accessibility Standards

Information on accessibility standards is available from the following sources:

Access Board
1331 F Street NW, Suite 1000
Washington, DC 20004-1111
Phone: 202–272–5434
Fax: 202–272–5447
TDD: 202–272–5449

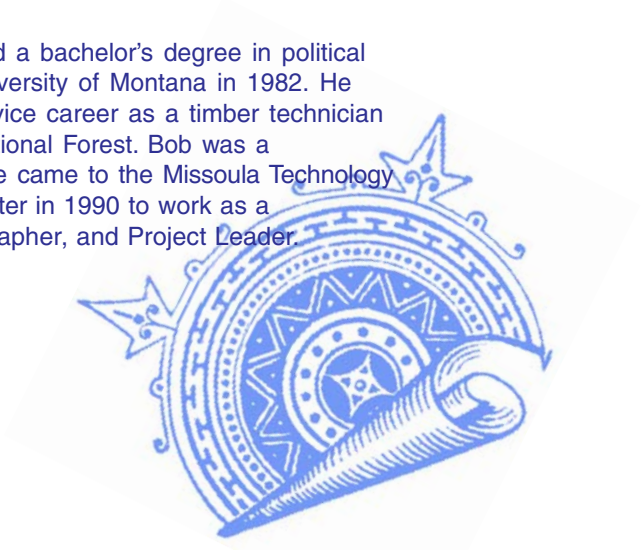
- **Uniform Federal Accessibility Standard, Federal Standard–795**. April 1988. Free.
- **Americans With Disabilities Act Accessibility Guide-lines, Federal Register–Vol. 56, No.144**. July 1991. Free.

MIG Communications
1802 Fifth Street
Berkeley, CA 94710
Phone: 800–790–8444

- **Universal Access to Outdoor Recreation.** 1994. $44.95
- **A Pocket Guide to Universal Access to Outdoor Recreation.** 1994. $9.95

About the Author...

Bob Beckley received a bachelor's degree in political sci-ence from the University of Montana in 1982. He began his Forest Service career as a timber technician on the Nez Perce National Forest. Bob was a smokejumper when he came to the Missoula Technology and Development Center in 1990 to work as a videographer, photographer, and Project Leader.



Appendix A—Plans for Concrete Ramp, Earth Ramp With Retaining Wall, and Timber Ramp

See separate PDF files for

architectural drawings 1 through 8.

Copies of these drawings have been distributed for review. Final approval and signature are pending.

DRAFT

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Appendix B—Accessibility Rules, Definitions, and Handrail Diagrams

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Appendix C—Ramp Diagrams and Tables

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architectural drawings 1 through 8.

Copies of these drawings have been distributed for review. Final approval and signature are pending.

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Library Card

Beckley, Bob. 2000. Accessible ramps and boarding platforms for boaters. Tech. Rep. 0023-2837-MTDC. Missoula, MT: U.S. Department of Agriculture, Forest Service, Missoula Technology and Development Center. 22 p.

Describes ways to allow disabled boaters to get into and out of a boat safely. The boat is pulled alongside a wheel-chair-accessible ramp on dry land and the boater is loaded there. Then the boat is driven a short distance to the launch site. Includes plans for three ramp designs (concrete ramp, earth ramp with retaining wall, and timber ramp).

Keywords: Americans With Disabilities Act, disabilities, drawings, physically handicapped persons, recreational facilities

For further technical information, contact Bob Beckley at MTDC.

Phone: 406–329–3996
Fax: 406–329–3719
Internet: bbeckley@fs.fed.us
Lotus Notes: Robert G Beckley/WO/USDAFS

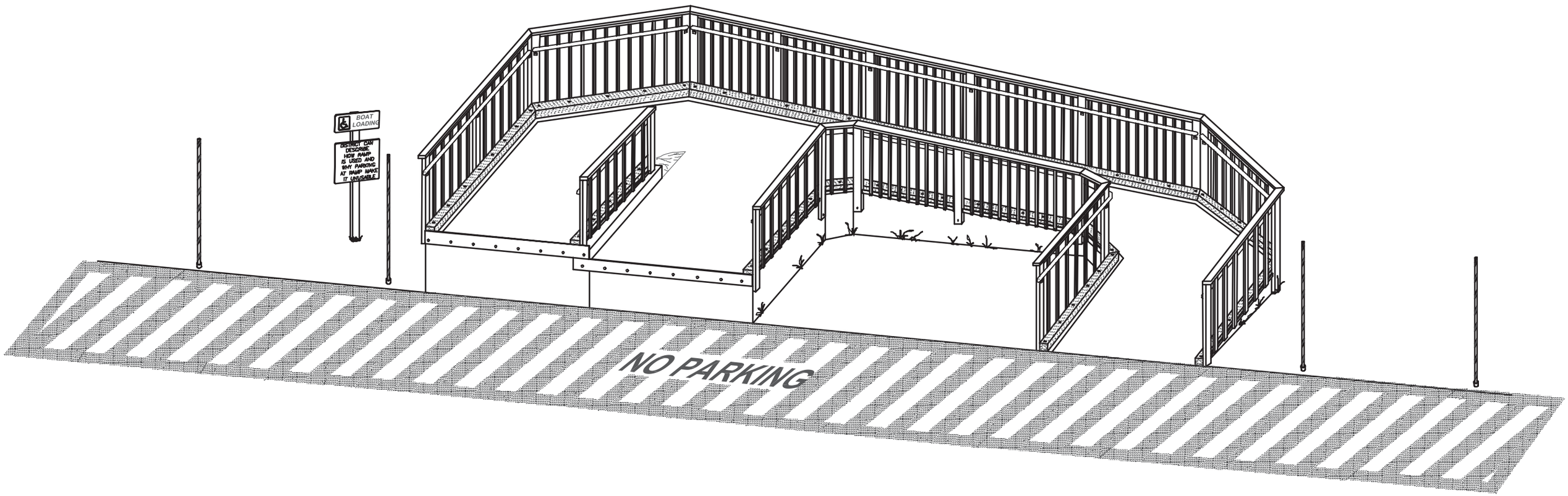
Additional single copies of this document may be ordered from:

USDA Forest Service, MTDC
Building 1, Fort Missoula
Missoula, MT 59804–7294
Phone: 406–329–3978
Fax: 406–329–3719
Internet: wo_mtdc_pubs@fs.fed.us

An electronic copy of this document is available on the Forest Service's FSWeb intranet at:

http://fsweb.mtdc.wo.fs.fed.us

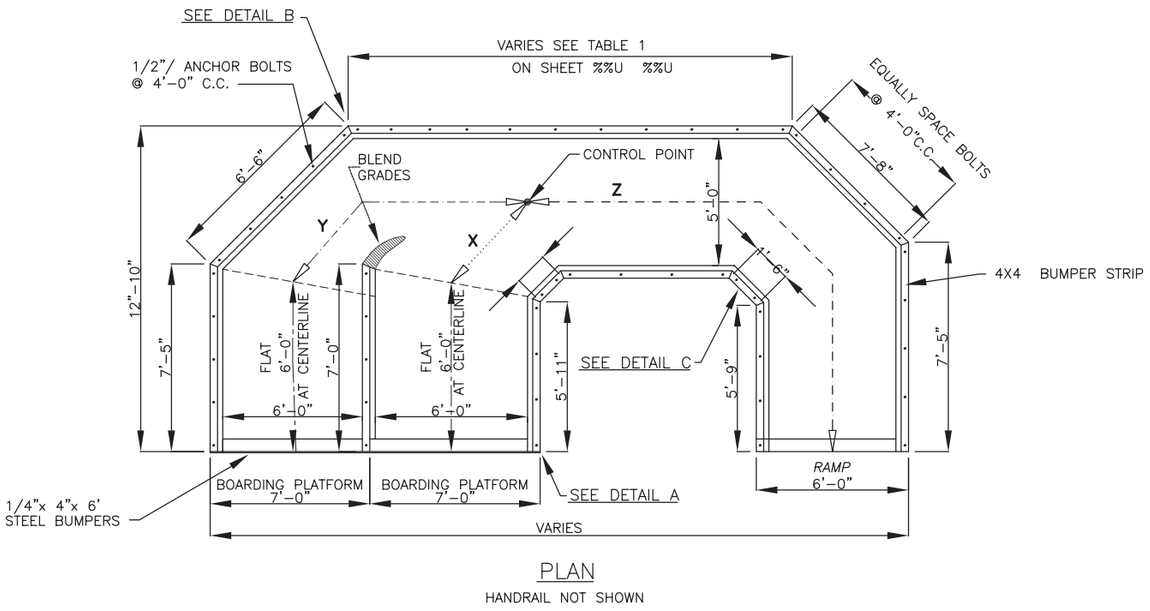
TYPICAL CONCRETE RAMP
ACCESSIBLE BOAT RAMP
FOR DRY LAND LOADING & UNLOADING



GENERAL NOTES:

1. THERE IS MINIMUM OF 40 FEET EACH WAY OF THE THE RAMP REQUIRED FOR LOADING AND UNLOADING.
2. SEE SHEET 7 FOR HANDRAIL DETAILS.
3. SNOW POLES ARE OPTIONAL AND CAN BE USED TO HELP LOCATE THE EDGE OF RAMP WHILE BACKING AND FOR SNOW REMOVAL.
4. RUBBER DOCK FENDERS OR BUMPERS SHOULD BE PLACED ACROSS THE FRONT OF THE LOADING RAMP TO PREVENT DAMAGE TO VEHICLES.
5. ALL WOOD SHALL BE PRESSURE TREATED AND SUITABLE FOR HUMAN CONTACT.

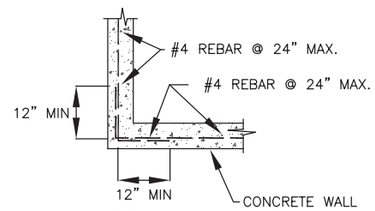
UNLESS OTHERWISE SPECIFIED	DATE	REVISION	BY
TOLERANCES: FRACTIONS +/- ____ DECIMALS +/- ____ ANGLES +/- ____ DIMENSIONS ARE IN INCHES BREAK SHARP EDGES	U. S. DEPT. OF AGRICULTURE FOREST SERVICE TECHNOLOGY & DEVELOPMENT CENTER MISSOULA, MONTANA		
DRAWN D.MUCCI	TITLE		
DESIGNED M.HARRINGTON	ACCESSIBLE BOAT RAMP		
CHECKED S.ORAVETZ	FOR DRY LAND LOADING & UNLOADING		
APPROVED S.ORAVETZ	.979-1.DWG		
SCALE NONE	SHEET 1 OF 8	MTDC- .979	
DATE JAN 2000			



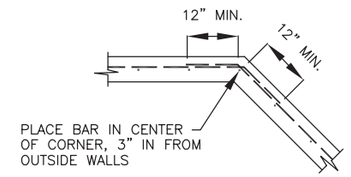
PLAN

HANDRAIL NOT SHOWN

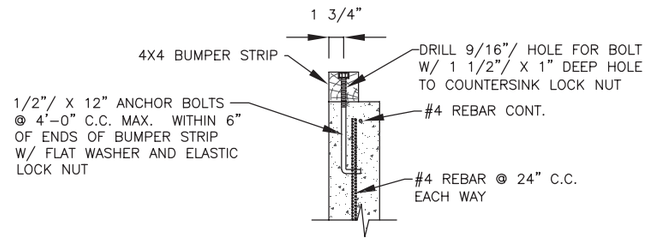
NOTE:
DETAILS A, B, AND C SHOW DIMENSIONS FOR LAPPING #4 REBAR.



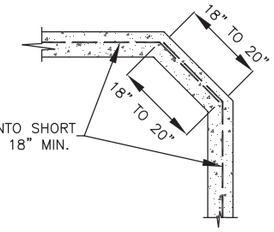
DETAIL A



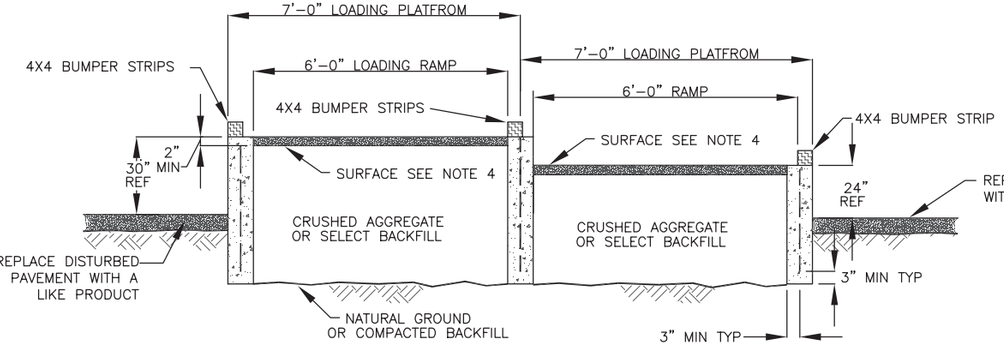
DETAIL B



ANCHOR BOLT DETAIL



DETAIL C



SECTION A-A

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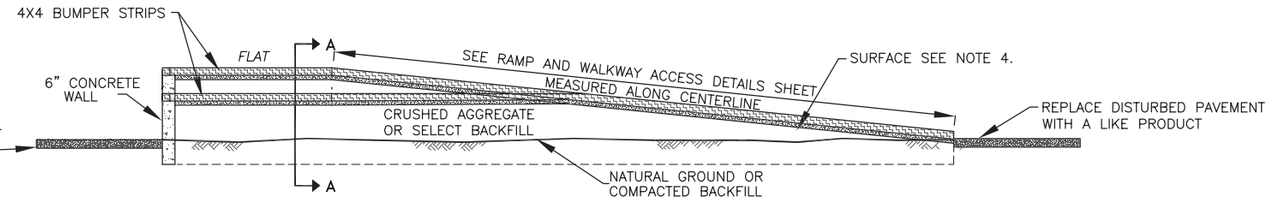
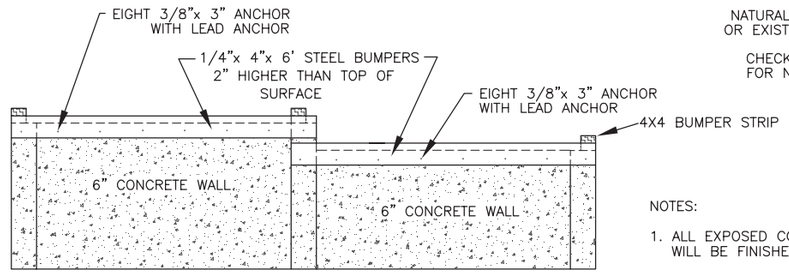
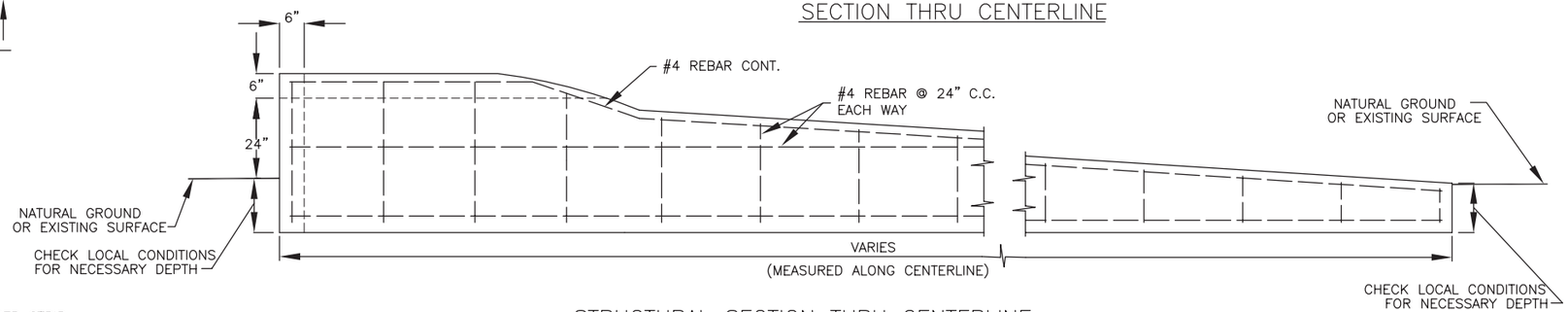


SECTION THRU CENTERLINE



FRONT ELEVATION

HANDRAIL NOT SHOWN



STRUCTURAL SECTION THRU CENTERLINE

NOTES:

1. ALL EXPOSED CONCRETE SURFACES WILL BE FINISHED.
2. REMOVED ASPHALT MAY BE REDUCED TO 2 INCH MINUS MATERIAL AND MIXED WITH THE BACKFILL MATERIAL.
3. ALL CONCRETE WALLS SHALL BE 8 INCHES THICK.
4. SURFACE SHALL EQUAL 4" MIN FOR CONCRETE OR 2" MIN FOR ASPHALT
5. BASE SHALL EQUAL 4 TO 6" CRUSHED AGGREGATE UNDER SURFACING
6. 4X4 WOOD BUMPER STRIPS SHALL BE PRESSURE TREATED WOOD THAT ALLOWS HUMAN CONTACT

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UNLESS OTHERWISE SPECIFIED
TOLERANCES:
FRACTIONS +/- ____
DECIMALS +/- ____
ANGLES +/- ____
DIMENSIONS ARE IN INCHES
BREAK SHARP EDGES

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12/99	REVISED BY MTDC	DWM

U. S. DEPT. OF AGRICULTURE
FOREST SERVICE
TECHNOLOGY & DEVELOPMENT CENTER
MISSOULA, MONTANA

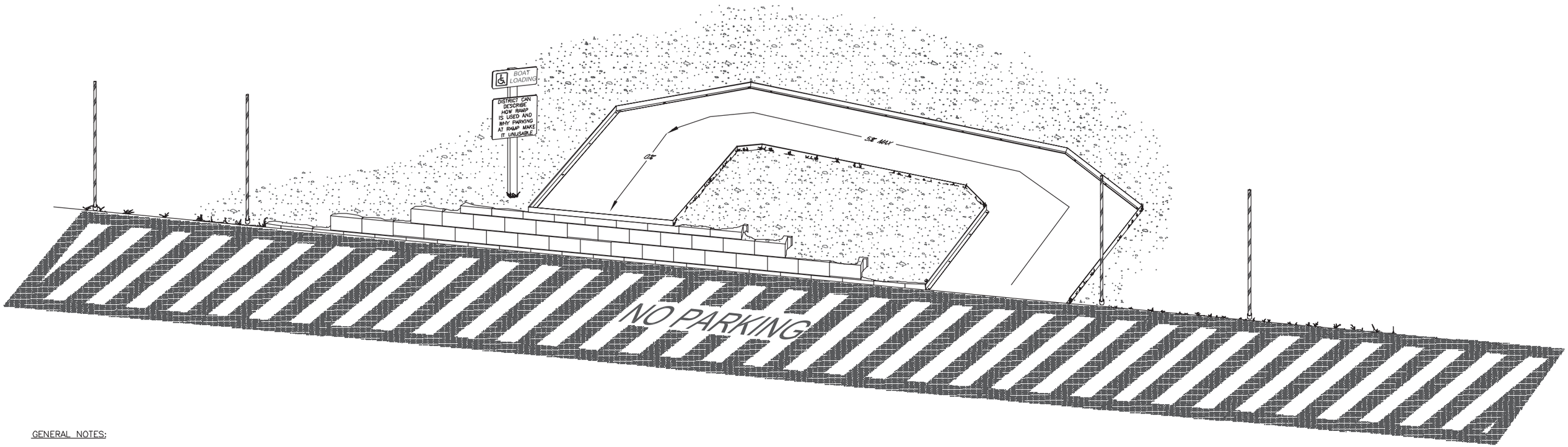
DRAWN	R.VIERRA
DESIGNED	M.HARRINGTON
CHECKED	S.ORAVETZ
APPROVED	S.ORAVETZ
SCALE	NONE
DATE	JAN 2000

TITLE
ACCESSIBLE BOAT RAMP
FOR DRY LAND LOADING AND UNLOADING
979-2

SHEET 2 OF 8

MTDC- 979

TYPICAL EARTH RAMP WITH RETAINING WALL
ACCESSIBLE BOAT RAMP
FOR DRY LAND LOADING & UNLOADING
SURFACE WILL BE PAVED OR APPROVED BASE FOR ACCESSIBLE WALKWAYS



GENERAL NOTES:

1. THERE IS MINIMUM OF 40 FEET EACH WAY OF THE THE RAMP REQUIRED FOR LOADING AND UNLOADING.
2. MAXIMUM RAMP SLOPE = 5%
3. SNOW POLES ARE OPTIONAL AND CAN BE USED TO HELP LOCATE THE EDGE OF RAMP WHILE BACKING AND FOR SNOW REMOVAL.
4. RUBBER DOCK FENDERS OR BUMPERS SHOULD BE PLACED ACROSS THE FRONT OF THE LOADING RAMP TO PREVENT DAMAGE TO VEHICLES.
5. FOR APPROVED BASES SEE PUBLICATION:
   2300 RECREATION
   OCT 1995
   9523 1804–SDTDC
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   FOR USE ON UNIVERSALLY
   ACCESSIBLE TRAILS.

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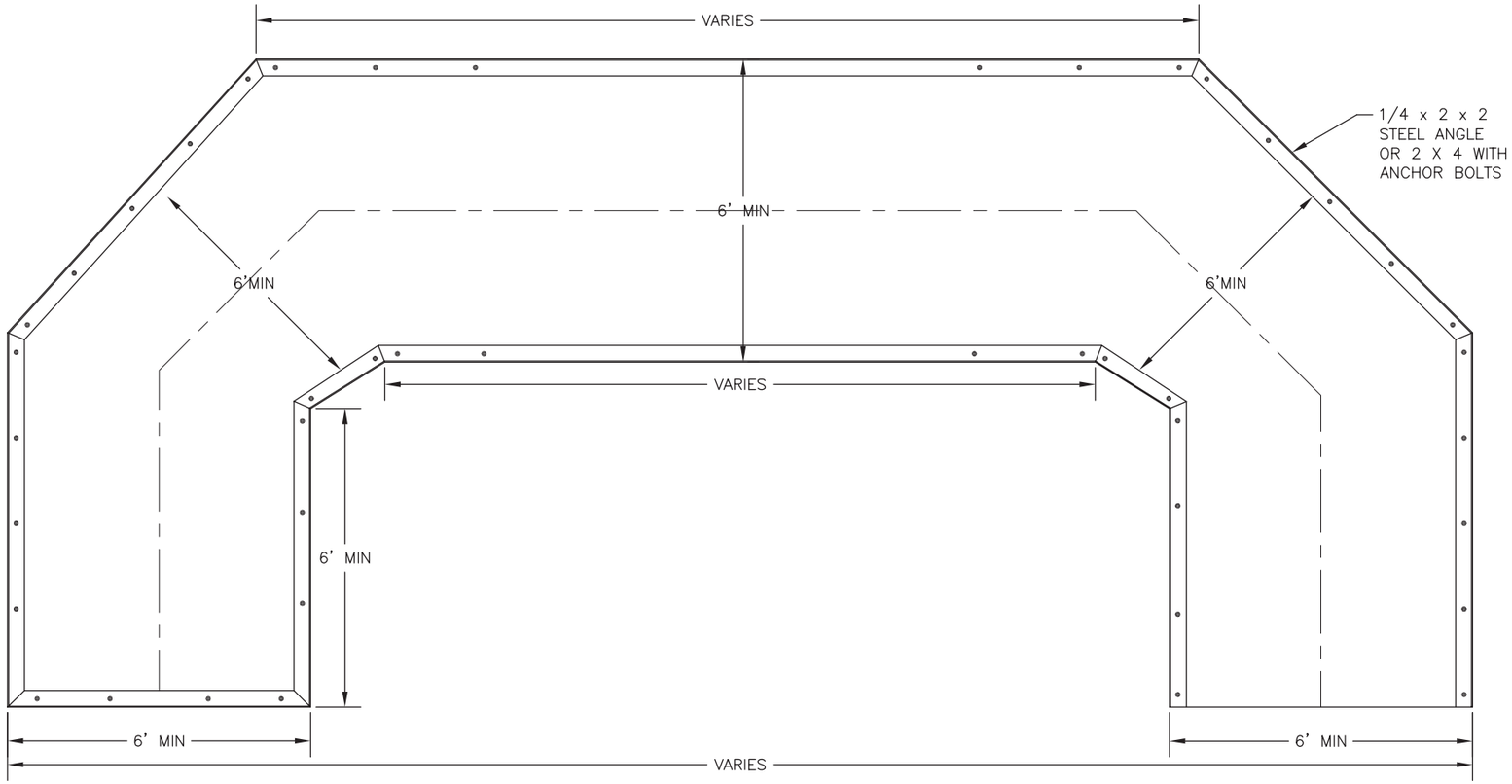
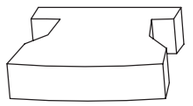
DRAWN D.MUCCI	TITLE ACCESSIBLE BOAT RAMP FOR DRY LAND LOADING & UNLOADING		
DESIGNED MUCCI/ORAVETZ			
CHECKED S.ORAVETZ			
APPROVED S.ORAVETZ			
SCALE NONE	979-3.DWG		
DATE JAN 2000	SHEET 3 OF 8	MTDC– .979	



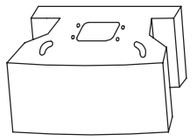
PLAN

NOTES:

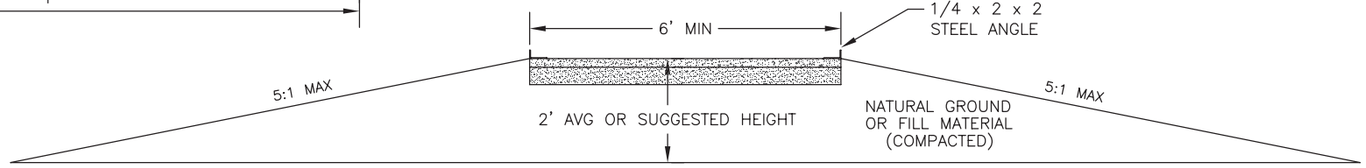
1. THERE ARE SEVERAL DIFFERENT TYPES OF BLOCKS AVAILABLE. WE SUGGEST THAT A BLOCK SUCH A WITH A STRAIGHT FACE THAT CAN BE PLACED VERTICAL BE USED SUCH AS THE KEYSTONE BLOCK. BY KEYSTONE RETAINING WALL SYSTEMS.
   KEYSTONE RETAINING WALL SYSTEMS
   4444 W. 78TH ST.
   MINNEAPOLIS MN 55435
   E–MAIL: KEYSTONE@KEYSTONEWALL.COM
   WEB HTTP://WWW.KEYSTONEWALLS.COM
2. SUBGRADE FOR THE RETAINING WALL SHALL BE CONSTRUCTED ACCORDING TO MANUFACTURES SPECIFICATIONS.
3. BLOCKS SHALL BE SET ACCORDING TO MANUFACTURES SPECIFICATIONS.
4. SURFACING SHALL BE FINISHED IN ACCORDANCE WITH SOIL STABILIZER FOR USE ON UNIVERSALLY ACCESSIBLE TRAILS. SEE TECH TIP SOIL STABILIZER FOR USE ON UNIVERSALLY ACCESSIBLE TRAILS. 9523 1804–SDTDC.



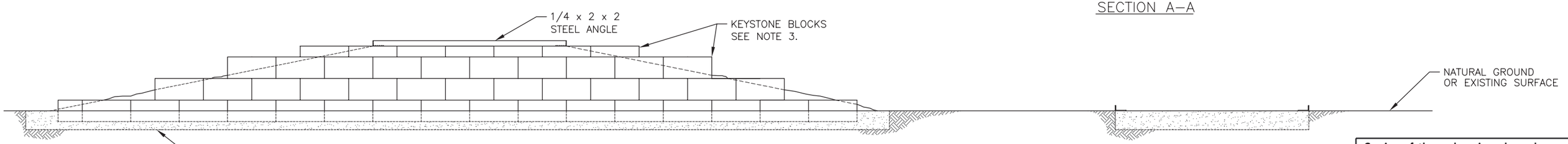
CAP
4" x 18" x 12"



8" x 18" x 12"

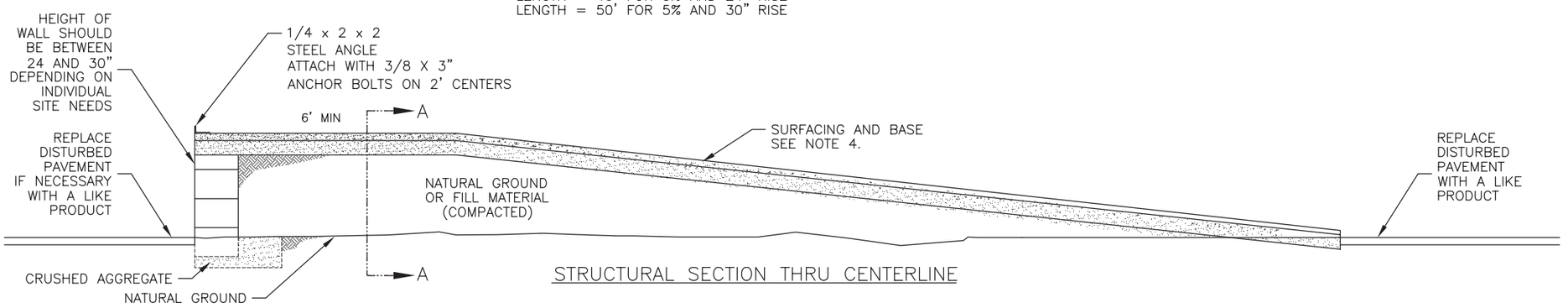


SECTION A–A



FRONT ELEVATION

LENGTH = 40' FOR 5% AND 24" RISE
LENGTH = 50' FOR 5% AND 30" RISE



STRUCTURAL SECTION THRU CENTERLINE

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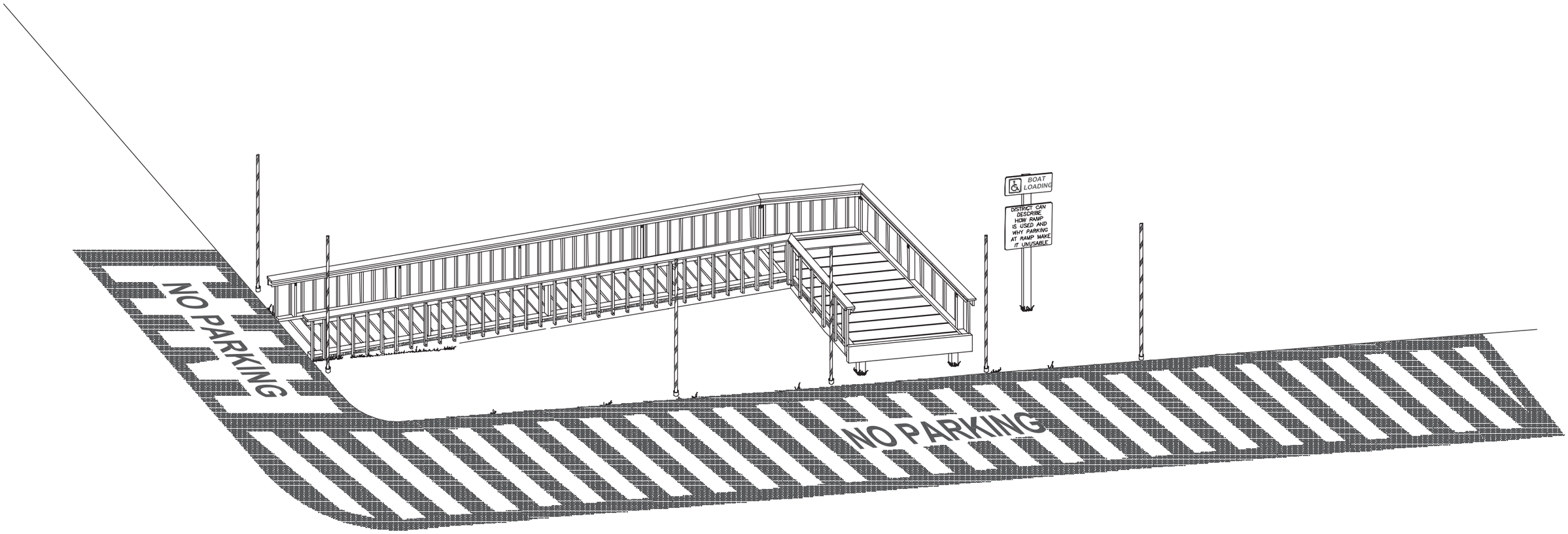
UNLESS OTHERWISE SPECIFIED TOLERANCES: FRACTIONS +/– ____ DECIMALS +/– ____ ANGLES +/– ____ DIMENSIONS ARE IN INCHES BREAK SHARP EDGES	DATE	REVISION	BY
	U. S. DEPT. OF AGRICULTURE FOREST SERVICE TECHNOLOGY & DEVELOPMENT CENTER MISSOULA, MONTANA		
DRAWN D.MUCCI	TITLE ACCESSIBLE BOAT RAMP FOR DRY LAND LOADING & UNLOADING		
DESIGNED MUCCI/ORAVETZ			
CHECKED S.ORAVETZ			
APPROVED S.ORAVETZ			
SCALE NONE	979–4		
DATE JAN 2000	SHEET 4 OF 8	MTDC– 979	

TYPICAL TIMBER RAMP
ACCESSIBLE BOAT RAMP
FOR DRY LAND LOADING & UNLOADING



GENERAL NOTES:

1. THERE IS MINIMUM OF 40 FEET EACH WAY OF THE THE RAMP REQUIRED FOR LOADING AND UNLOADING.
2. SEE SHEET 7 FOR HANDRAIL DETAILS.
3. SNOW POLES ARE OPTIONAL AND CAN BE USED TO HELP LOCATE THE EDGE OF RAMP WHILE BACKING AND FOR SNOW REMOVAL.
4. RUBBER DOCK FENDERS OR BUMPERS SHOULD BE PLACED ACROSS THE FRONT OF THE LOADING RAMP TO PREVENT DAMAGE TO VEHICLES.
5. ALL WOOD SHALL BE PRESSURE TREATED AND SUITABLE FOR HUMAN CONTACT.

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U. S. DEPT. OF AGRICULTURE
FOREST SERVICE
TECHNOLOGY & DEVELOPMENT CENTER
MISSOULA, MONTANA

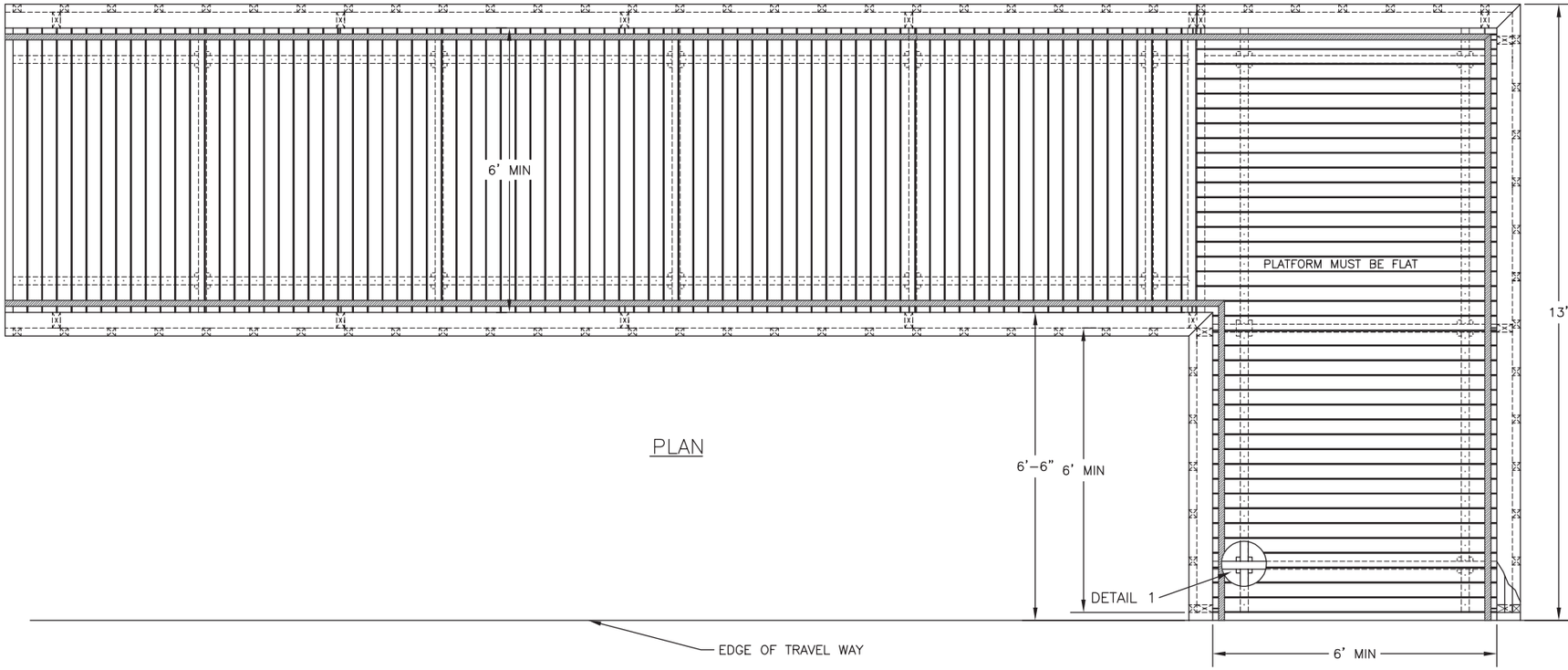
DRAWN	D.MUCCI
DESIGNED	MUCCI/ORAVETZ
CHECKED	S.ORAVETZ
APPROVED	S.ORAVETZ
SCALE	NONE
DATE	JAN 2000

TITLE
ACCESSIBLE BOAT RAMP
FOR DRY LAND LOADING & UNLOADING

979-5.DWG

SHEET 5 OF 8

MTDC- .979



PLAN

NOTES:

1. SEE SHEET 7 FOR ACCESSIBILITY RULES FOR RAMPS AND HANDRAILS.
2. USE 1/2" SPACERS AS NEEDED UNDER BUMPERS AS MINIMUM HEIGHT FOR BUMPERS IS 2".
3. REINFORCE ENDS OF HANDRAILS IF NECESSARY FOR LOCAL AREA VANDALISM.

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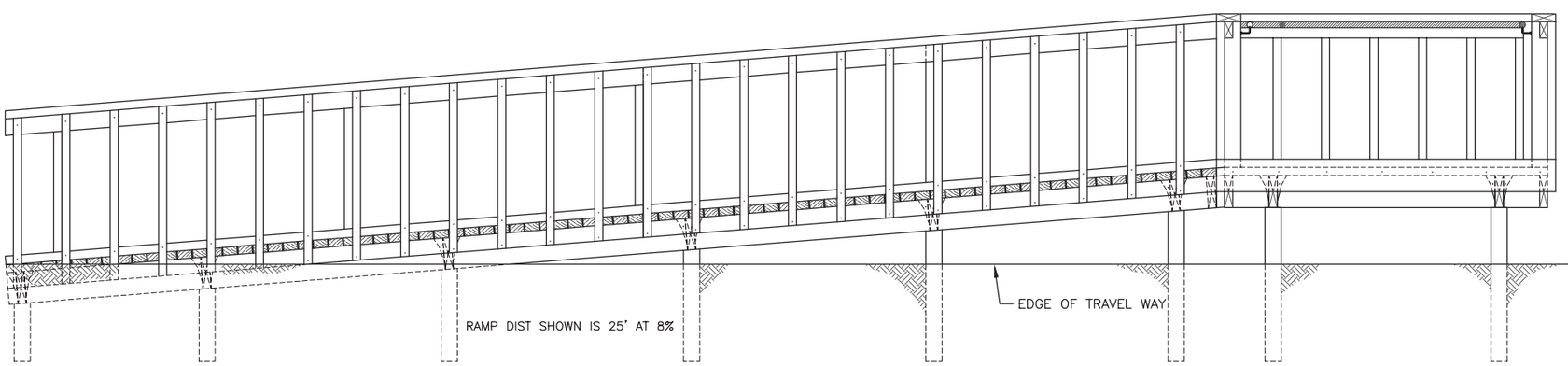
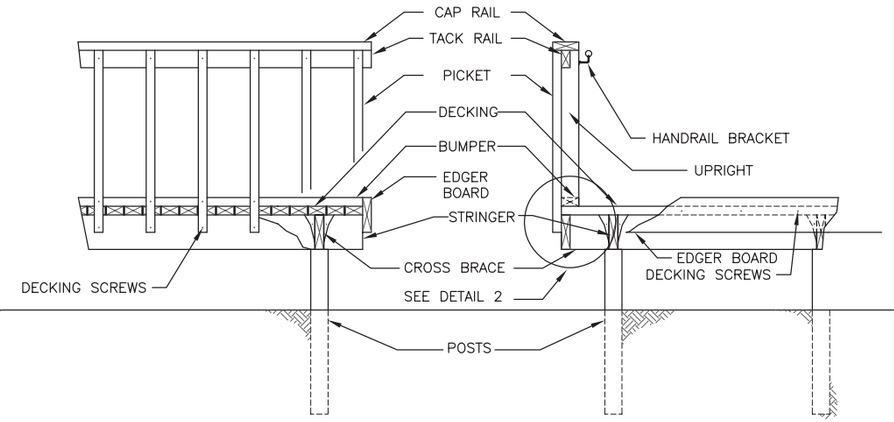


FRONT ELEVATION



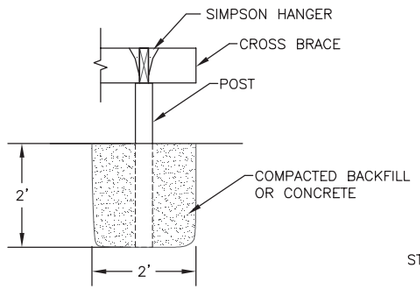
PLATFORM

CONSTRUCTION DETAIL SIDE VIEW

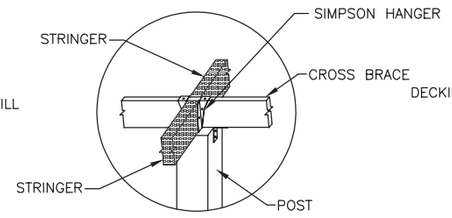
CONSTRUCTION DETAIL FRONT VIEW

MATERIALS

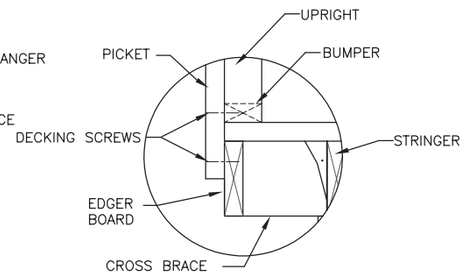
2 X 6	CAP RAIL
2 X 4	TACK RAIL
2 X 2	PICKET
2 X 4	DECKING
2 X 4	BUMPER
2 X 4	UPRIGHT
2 X 8	EDGER BOARD
2 X 8	STRINGERS
2 X 8	CROSS BRACES
SIMPSON POST FRAME HANGER	BRACKET
4 X 4	POST
SEE SHEET 7	HANDRAIL
SEE SHEET 7	HANDRAIL BRACKET
	DECKING SCREW



POST DETAIL



DETAIL 1



DETAIL 2

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DESIGNEDMUCCI/ORAVETZ			
CHECKED ORAVETZ			
APPROVED ORAVETZ			
SCALE NONE	979-6.DWG		
DATE JAN 2000	SHEET 6 OF 8	MTDC- 979	

ACCESSIBILITY RULES FOR RAMPS

1. ANY PART OF AN ACCESSIBLE ROUTE WITH A SLOPE GREATER THAN 1:20 WILL BE CONSIDERED A RAMP.
2. THE MAXIMUM SLOPE OF A RAMP IN NEW CONSTRUCTION SHOULD BE 1:12 OR LESS.
3. THE MAXIMUM RISE OF ANY RUN SHOULD BE 30 INCHES OR LESS.
4. THE CROSS SLOPE OF THE RAMP SHOULD BE NO GREATER THAN 1:50.
5. THE RAMP SURFACE MUST BE NON-SLIP.
6. ALL GRATING OPENINGS MUST BE 1/2 INCH OR SMALLER AND MUST BE PLACED PERPENDICULAR TO THE USUAL DIRECTION OF TRAVEL.
7. THE CLEAR WIDTH OF THE RAMP MUST BE AT LEAST 36 INCHES.
8. A LEVEL LANDING MUST BE PROVIDED AT THE TOP AND BOTTOM OF EACH RUN.
9. THE LANDING MUST BE AT LEAST AS WIDE AS THE RAMP AND AT LEAST 60 INCHES LONG.
10. WHERE RAMPS CHANGE DIRECTION, THE LANDING MUST BE AT LEAST 60 BY 60 INCHES.
11. DESIGN RAMPS WITH PROPER DRAINAGE SO THAT WATER WILL NOT ACCUMULATE ON SURFACES.

SIGNS

1. THE CHARACTER PROPORTION OF THE LETTERS AND NUMBERS ON SIGNS MUST HAVE A WIDTH TO HEIGHT RATIO BETWEEN 3:5 AND 1:1 AND A STROKE WIDTH TO HEIGHT RATIO BETWEEN 1:5 AND 1:10.
2. CHARACTERS AND SYMBOLS MUST CONTRAST WITH THEIR BACKGROUND (LIGHT CHARACTERS ON A DARK BACKGROUND OR DARK CHARACTERS ON A LIGHT BACKGROUND) AND BE A NON-GLARE FINISH.
3. RAISED OR INDENTED CHARACTERS OR SYMBOLS ON SIGNS MUST BE RAISED OR INCISED 1/32 INCH MINIMUM AND SHOULD BE SANS SERIF CHARACTERS. RAISED CHARACTERS OR SYMBOLS MUST BE AT LEAST 5/8 INCH HIGH, BUT NO HIGHER THAN 2 INCHES. INDENTED CHARACTERS OR SYMBOLS MUST HAVE A STROKE WIDTH OF AT LEAST 1/4 INCH.
4. SYMBOLS OF ACCESSIBILITY MUST BE THE INTERNATIONAL SYMBOL OF ACCESSIBILITY.

ACCESSIBILITY RULES FOR HANDRAILS

1. A HANDRAIL ON EITHER SIDE MUST BE PROVIDED IF THE RAMP RISES MORE THAN 6 INCHES OR IS LONGER THAN 72 INCHES.
2. THE HANDRAILS MUST BE CONTINUOUS AND FIXED SO THEY DO NOT ROTATE OR RACK.
3. THE TOP OF THE HANDRAILS MUST BE BETWEEN 34 AND 38 INCHES ABOVE THE RAMP SURFACE. SEE DIAGRAM 1.
4. AT THE END OF THE HANDRAILS THERE MUST BE AT LEAST 12 INCHES OF LEVEL HANDRAIL BEYOND THE TOP AND BOTTOM OF THE RAMP SEGMENT.
5. ALL HANDRAIL ENDS MUST BE ROUNDED AND RETURNED SMOOTHLY TO THE FLOOR, WALL OR POST.
6. THE DIAMETER OF THE HANDRAIL MUST BE BETWEEN 1 1/4 AND 1 1/2 INCHES, SEE DIAGRAM 2.
7. ALL WALL-MOUNTED HANDRAILS MUST BE MOUNTED WITH EXACTLY 1 1/2 INCHES BETWEEN HANDRAIL AND WALL SEE DIAGRAM 2.
8. WHERE RAMPS OR LANDINGS HAVE DROP OFFS, PROVIDE A 2 INCH CURB, WALL, RAILING OR PROJECTING SURFACE TO PREVENT PEOPLE FROM FALLING OFF THE RAMP.

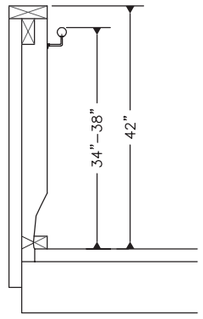

DIAGRAM 1

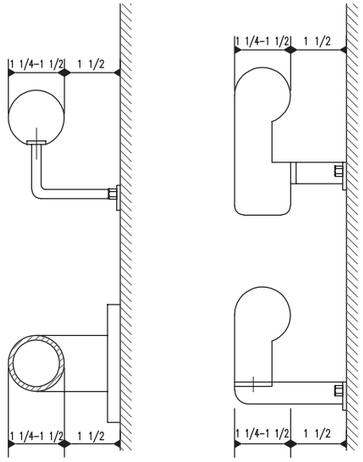

DIAGRAM 2
HANDRAIL TYPES

ACCESSIBILITY RULES FOR PATHWAYS

1. THERE MUST BE AN ACCESSIBLE ROUTE LINKING ACCESSIBLE PARKING AND PASSENGER LOADING ZONES WITH THE ACCESSIBLE BUILDING ENTRANCE.
2. THE ACCESSIBLE PATHWAY MUST BE FREE OF STEPS AND STAIRS.
3. THE ACCESSIBLE PATHWAY MUST BE AT LEAST 36 INCHES WIDE.
4. IF THE PATHWAY IS LESS THAN 60 INCHES WIDE, PROVIDE PASSING SPACES AT LEAST 60 INCHES WIDE AND 60 INCHES LONG AT INTERVALS NOT EXCEEDING 200 FEET.
5. PROVIDE AT LEAST 80 INCHES OF CLEAR HEAD ROOM ALONG PATHWAY.
6. ACCESSIBLE PATHWAYS MUST BE FIRM AND SLIP RESISTANT.
7. THE SLOPE OF THE ACCESSIBLE PATHWAY MUST BE NO GREATER THAN 1:20.
8. WHERE WALKWAY LEVELS CHANGE, THE VERTICAL DIFFERENCE BETWEEN THEM MUST BE LESS THAN 1/4 INCH.
9. CHANGES IN LEVEL BETWEEN 1/4 INCH AND 1/2 INCH ANYWHERE ON THE ACCESSIBLE ROUTE MUST BE BEVELED WITH A SLOPE OF 1:2.
10. CHANGES GREATER THAN 1/2 MUST BE RAMPED.
11. THE TRANSITION FROM THE CURB RAMP TO THE WALKWAY, ROAD AND GUTTER MUST BE FLUSH AND FREE TO ABRUPT CHANGES.

DEFINITIONS

RAMP:
A WALKING SURFACE IN AN ACCESSIBLE SPACE THAT HAS A RUNNING SLOPE GREATER THAN 1:20.

RAMP SLOPE:
THE RATIO OF THE RISE TO THE RUN OF THE RAMP (Y:X). SEE SHEET 8.

WALK:
AN EXTERIOR PATHWAY WITH A PREPARED SURFACE INTENDED FOR PEDESTRIAN USE, INCLUDING GENERAL PEDESTRIAN AREAS SUCH AS PLAZAS AND COURTS.

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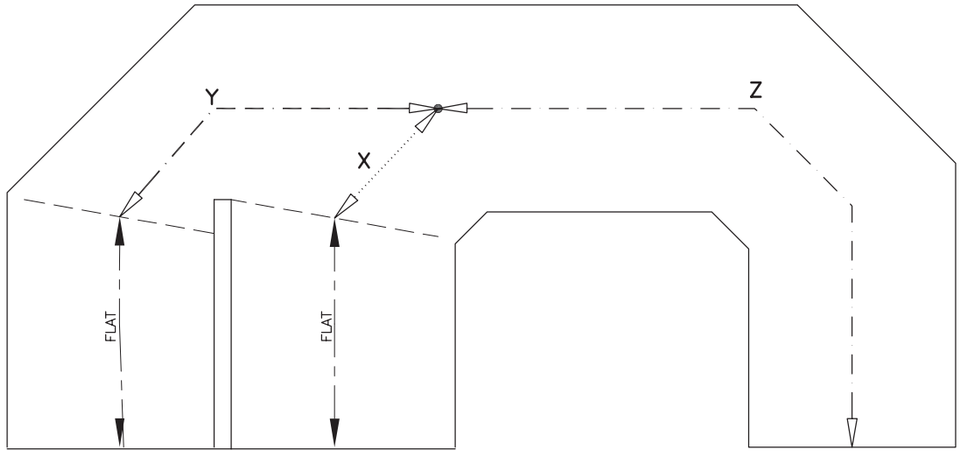
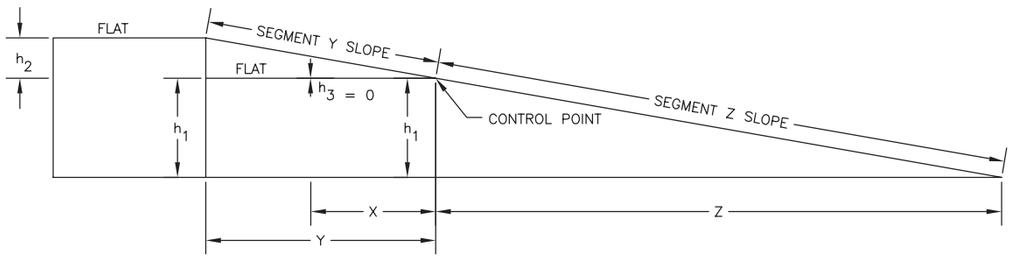




DOUBLE RAMP SLOPE

TABLE 1

	SLOPE IN %	SEGMENT Z	(h_1)	SEGMENT Y	(h_2)
WALK WHEN SLOPE IS LESS THAN 5% (PATH IS CONSIDERED A WALK)	4.0	50	(2.0)	12.5'	(.5)*
	5.0	40	(2.0)	10.5'	(.5)**
RAMP ANY SLOPE OVER 5% (THE WALKWAY IS CONSIDERED A RAMP AND NEEDS TO MEET GUIDELINES)	6.0	33	(2.0)	10.5'	(.5)
	7.0	29	(2.0)	10.5'	(.5)
	8.0	25	(2.0)	10.5'	(.5)

TABLE 2

SLOPE IN %	SEGMENT X	(h_3)	SLOPE
4.0	4'6"	0	0***
5.0	4'6"	0	0
6.0	4'6"	0	0
7.0	4'6"	0	0
8.0	4'6"	0	0

* MIN LENGTH – NOT SHOWN ON DRAWING

** LENGTH SET BY DESIGN

*** SLOPE IS SET AT ZERO FOR SIMPLICITY

h_1 CORRESPONDS TO SEGMENT Z

h_2 CORRESPONDS TO SEGMENT Y

h_3 CORRESPONDS TO SEGMENT X

$Y + Z = \frac{2.5}{SLOPE}$

$X + Z = L$

$\frac{h}{L}$ = SLOPE %

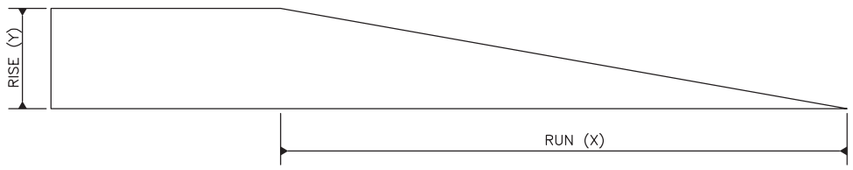
$h = 2.5'$

$\frac{2.5}{SLOPE} = L$

$h_1 + h_2 = 2.5'$

$h_2 = 0.5'$

$h_3 = 0$



(EXAMPLE: IF Y=1'–0" AND X=12'–0", THE SLOPE = 1:12 OR IF Y=2'–0" AND X=24'–0", THE SLOPE =1:12)

SINGLE RAMP SLOPE

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DECIMALS +/- ____
ANGLES +/- ____
DIMENSIONS ARE IN INCHES
BREAK SHARP EDGES

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ACCESSIBLE BOAT RAMP
FOR DRY LAND LOADING & UNLOADING

979-8.DWG

SHEET 8 OF 8

MTDC– 979