CONSTRUCTION PLAN

PRACTICE POND (378) – PLUNGE POOL ONLY

LANDOWNER MIKE AND BONNIE MUSIAL

ADDRESS LOT 2, PLAT OF BONE LAKE ACRES

LANDOWNER PHONE NO. 612-207-5254 COUNTY POLK

TOWNSHIP BONE LAKE T 36 N, R 16 W, Sec. 31

FIELD OFFICE POLK COUNTY LWRD TELEPHONE NO. 715-485-8699

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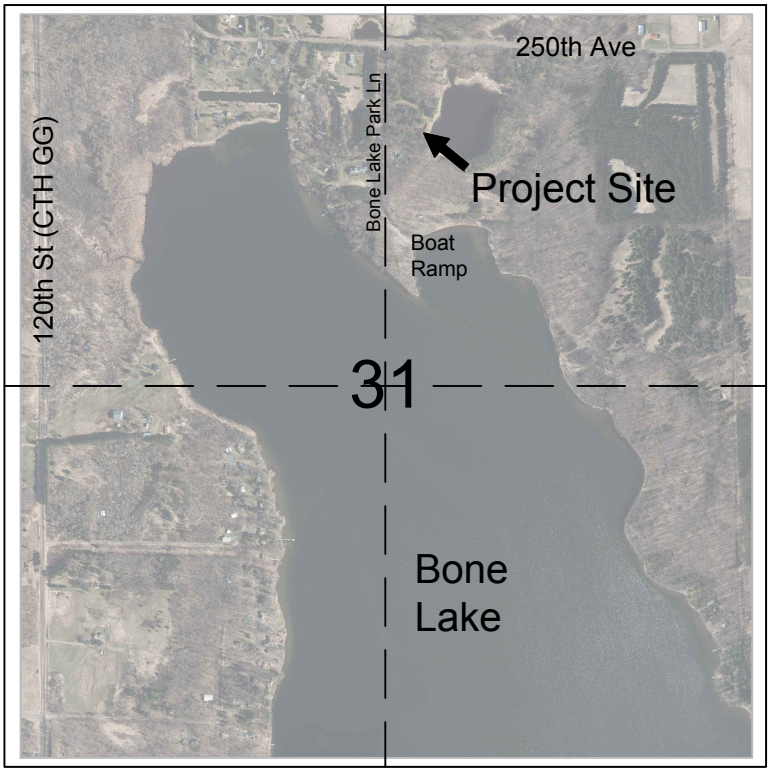


LOCATION MAP

N

Not to
Scale

NOTICE TO LANDOWNERS AND EXCAVATORS

Any representation made by the USDA, Natural Resources Conservation Service, or the POLK County LWRD, as to the approximate location or nonexistence of above or under ground hazards does not relieve the owner of the property or the excavator that is hired to complete construction, from notifying Diggers Hotline of the pending construction. You will be liable for damages resulting from construction activities. (Call Diggers Hotline) Ticket # _____

Designed by: SCOTT GEDDES, P.E. Date: 10/10/2018

Checked by: Patti Schmidt Date: 11/09/2018

Approved by: Patti Schmidt Date: 10/23/2018

The installed practices comply with applicable NRCS technical standards and specifications. The "redlined" construction plans (as-built drawings) reflect changes made during construction.

Construction Approved by: _____ Date: _____

Job Approval Class V

CONSTRUCTION NOTES

1. ALL UNDERGROUND HAZARDS AND UTILITIES MUST BE INVESTIGATED PRIOR TO CONSTRUCTION. NOTIFICATION OF AFFECTED UTILITY COMPANIES IS THE RESPONSIBLITY OF THE CONTRACTOR. CONTACT DIGGERS HOTLINE AT LEAST THREE DAYS PRIOR TO START OF CONSTRUCTION.

2. A PRE–CONSTRUCTION MEETING SHALL BE SCHEDULED WITH POLK COUNTY LWRD PERSONNEL, THE CONTRACTOR, AND THE LANDOWNER PRIOR TO CONSTRUCTION START–UP.

3. THE CONTRACTOR AND/OR LANDOWNER SHALL NOTIFY POLK COUNTY LWRD AT LEAST 3 DAYS PRIOR TO START–UP OF CONSTRUCTION.

4. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH WISCONSIN NRCS CONSTRUCTION SPECIFICATIONS (ATTACHED TO THIS PLAN).

5. STRIP AND STOCKPILE TOPSOIL FOR RE–SPREADING.

6. INITIAL SURVEY LAYOUT WILL BE PERFORMED BY POLK COUNTY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE ADDITIONAL GRADE STAKES DURING CONSTRUCTION AS NECESSARY, OR IF DAMAGED BY THEIR OPERATIONS.

7. ANY MATERIALS MUST BE ON–SITE AT THE TIME OF CONSTRUCTION AND MUST BE APPROVED BY THE ENGINEER/TECHNICIAN PRIOR TO INSTALLATION.

8. IF MORE EARTH FILL IS NEEDED TO MEET PLANNED LINES AND GRADES, THEN A BORROW AREA WILL BE DESIGNATED BY THE LANDOWNER AND MUST BE APPROVED FOR USE BY THE ENGINEER/TECHNICIAN.

9. ALL VEGETATION, ROOTS AND DEBRIS SHALL BE REMOVED FROM THE PROPOSED EMBANKMENT AND BORROW AREAS. TOPSOIL IS TO BE STRIPPED, STOCKPILED AND RESPREAD ON THE FINISHED EMBANKMENT AND BORROW AREAS TO PROVIDE AN ADEQUATE SEED BED.

10. ALL FILL SHALL BE COMPACTED TO THE REQUIREMENTS OF WI CONSTRUCTION SPECIFICATION 3, EARTHFILL. THIS INCLUDES USING THE PROPER EQUIPMENT BASED ON THE APPLICABLE SOILS, MINIMUM FILL HEIGHT, LAYER THICKNESS, AND MINIMUM PASSES.

11. SEED AND APPLY EROSION CONTROL BLANKET TO ALL DISTURBED AREAS AS SOON AS POSSIBLE AFTER CONSTRUCTION ACCORDING TO DETAILS CONTAINED IN THIS PLAN.

12. ROCK RIP RAP SHALL BE FURNISHED FROM AN APPROVED QUARRY AND SHALL MEET THE SPECIFICATIONS CONTAINED IN WISCONSIN CONSTRUCTION SPEC 9 WITH REGARDS TO SPECIFIC GRAVITY, ABSORPTION, AND SOUNDNESS. ROCK RIP RAP FROM IGNEOUS OR METAMORPHIC ORIGINS SUCH AS GRANITE, BASALT, AND QUARTZITE MAY BE USED WITHOUT TESTING.

13. ROCK GRADATION MUST BE APPROVED PRIOR TO CONSTRUCTION

14. GEOTEXTILE FILTER FABRIC SHALL CONFORM TO WISCONSIN CONSTRUCTION SPECIFICATION 13. RIP RAP SHALL BE PLACED IN THE MANNER DESCRIBED IN THIS SPECIFICATION AND SHALL ENSURE THAT NO DAMAGE TO THE GEOTEXTILE FABRIC OCCURS.

15. THIS CONSTRUCTION PLAN IS LIMITED IN SCOPE TO THE EMBANKMENT DAM OUTLET PIPE AND THE SCOUR HOLE CREATED BY THE OUTFLOW STRUCTURE. NO INSPECTION OF THE EMBANKMENT DAM IS EXPRESSED OR IMPLIED BY THE ACTIONS CONTAINED WITH THIS PLAN.

PROJECT QUANTITIES:

ITEM	QUANTITY	UNITS
EXCAVATION	150	CU YD
RIP RAP D50=14"	120	TONS
BEDDING	40	TONS
GEOTEXTILE FABRIC	80	SQ YD

Date 10/18
Designed PoCo LWRD
Drawn
Checked PTS 10/23/18
Approved

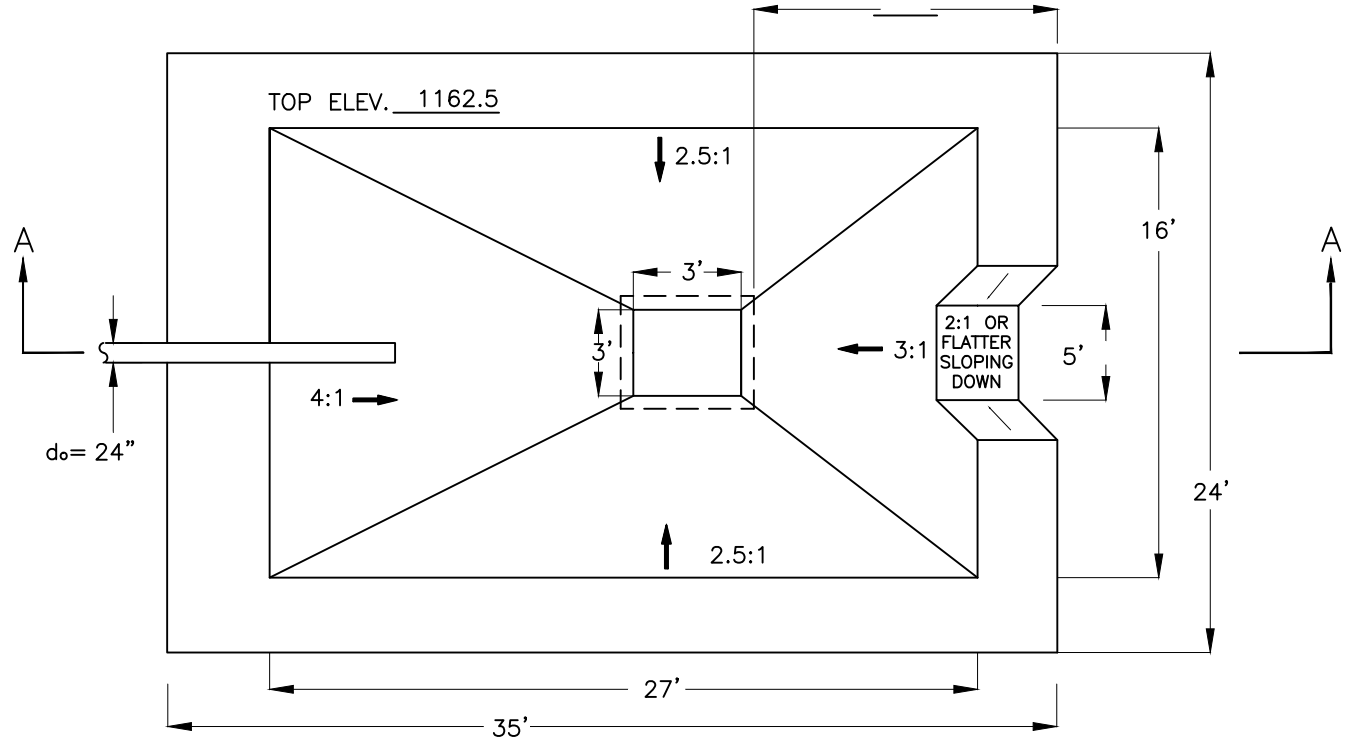
PLAN VIEW

OWNER: Musial
COUNTY: Polk

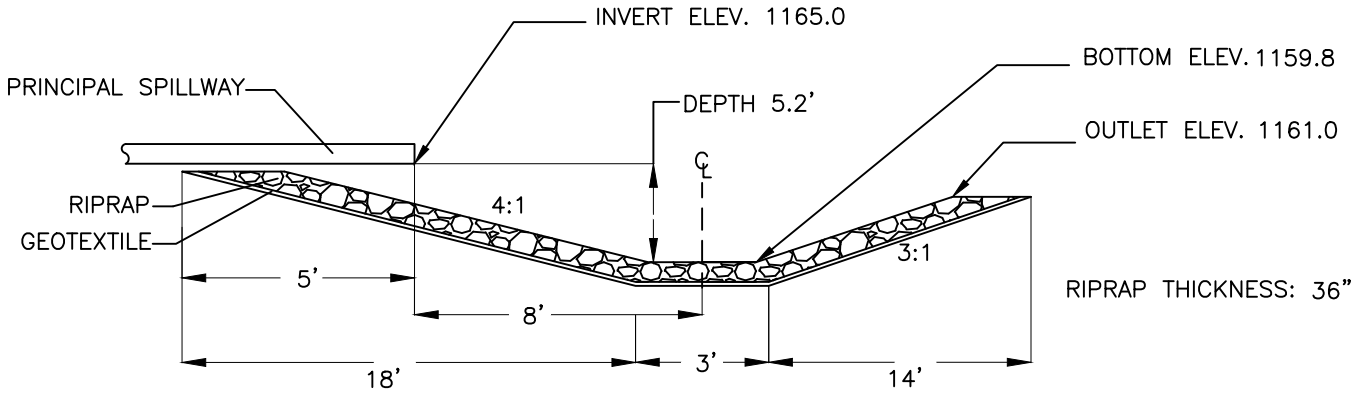
United States Department of Agriculture
Natural Resources Conservation Service

Drawing Name
WI-014

Date
06/14



PLAN



SECTION A–A

D_{50}= 14"

ROCK GRADATION	
PERCENT PASSING BY WEIGHT	SIZE IN INCHES
100	28
60–85	21
25–50	14
5–20	7
0–5	2.8

QUANTITIES	
EXCAVATION (W.C.S.* 2)	150 CU. YD.
ROCK RIPRAP (W.C.S. 9)	120 TON
GEOTEXTILE (W.C.S. 13)	80 SQ. YD.

*WIS. CONSTRUCTION SPECIFICATION

United States Department of Agriculture
Natural Resources Conservation Service

RIPRAP–LINED PLUNGE POOL FOR CANTILEVER OUTLET

CLIENT: Musial
COUNTY: Polk

		Date
Designed	PCLWRD	10/15/18
Drawn		
Checked	PJS	10/23/18
Approved		

File Name WI–320
Date 07/14
Sheet 4 of 4

WISCONSIN CONSTRUCTION SPECIFICATION

2. EXCAVATION

A. SCOPE

The work shall consist of the excavation of all materials necessary for the construction of the work.

B. USE OF EXCAVATED MATERIALS

To the extent that they are needed, all suitable materials removed from the specified excavations shall be used in the construction of the required earthfill. The suitability of materials for specific purposes will be determined by the Technician. The Contractor shall not waste or otherwise dispose of suitable excavated materials.

C. DISPOSAL OF WASTE MATERIALS

All surplus or unsuitable excavated materials will be designated as waste and shall be disposed of at the locations shown on the drawings or as approved by the Technician. Waste materials shall not be placed in wetlands or regulated floodplains.

Material placed in designated waste disposal areas shall be left in a sightly condition and sloped to provide positive drainage. Compaction of the waste materials will not be required unless specified by the construction plans.

Waste material excavated from channels may be deposited in leveled spoilbanks or areas adjacent to the channel work (if permissible). The shape and slopes of the spoilbanks shall be indicated on the drawings or as approved by the Technician. Spoil piles shall be located a minimum of 12 feet from the top of the channel side slope.

Spoil piles or disposal areas shall be protected to minimize site erosion and the production of sediment. Protective measures may include but are not limited to diversions, seeding, mulching, sediment basins, and silt fences.

D. SPECIAL REQUIREMENTS FOR STRUCTURE AND TRENCH EXCAVATION

The required dimensions and side slopes of all structure and trench excavations shall be as shown on the drawings.

Excavation beyond the limits of the specified lines and grades shall be corrected by filling the resulting voids with approved compacted materials.

Excavation for the installation of pipes shall follow the practices contained in the Occupational Safety and Health Administration (OSHA) Subpart P, Excavation, of 29 CFR 1926.650, .651 and .652.

Side slopes shall be excavated or braced to safeguard the work and workers. When bracing or supporting is required, the width of the excavation shall be adjusted to allow for the space occupied by the sheeting, bracing, or other supporting installations. The Contractor shall furnish, place, and subsequently remove such supporting installations.

E. REMOVAL OF WATER

The Contractor shall construct and maintain all necessary cofferdams, channels, flumes, pumping equipment, and/or other temporary diversion and protective work for dewatering the various parts of the work. Foundations, cutoff trenches, and other parts of the work shall be maintained free from water as required for constructing each part of the work. After having served their purpose, all cofferdams and other temporary protective works shall be removed or leveled to give a sightly appearance and so as not to interfere in any way with the operation, usefulness, or stability of the permanent structure.

F. BORROW EXCAVATION

When the quantities of suitable materials obtained from specified excavations are insufficient to construct the specified fill portions of the permanent works, additional materials shall be obtained from the designated borrow areas.

When shown on the drawings, sediment basins, terraces, diversions, or other measures shall be constructed to protect the borrow areas from erosion and retain sediment within the borrow area.

The upper six (6) inches of soil shall be stripped from all borrow areas. This stripping shall be performed immediately prior to use of the borrow material to reduce the time the area is exposed to erosion. For large borrow areas, only a portion of the area should be stripped at a time. This material shall be redistributed over the area from which it came after borrow excavation is completed.

The extent of excavation and the selection of materials from the borrow area shall be as directed by the Technician. On completion of excavation, all borrow areas shall be left in a sightly condition. All borrow areas shall be graded to blend with existing topography and sloped to prevent ponding and provide positive drainage.

WISCONSIN CONSTRUCTION SPECIFICATION

9. ROCK RIPRAP

A. SCOPE

The work shall consist of testing, furnishing, transporting, and placing rock riprap, including filter, bedding or geotextile materials where specified, in the construction of loose rock riprap revetments, blankets, rock toes, crossings, rock chutes, channel linings and other similar structures.

B. QUALITY OF MATERIALS

The rock shall be obtained from tested sources unless exempted below. Rock sources used for streambank protection, lined waterways, rock chutes, or other similar major projects (Engineering Job Approval Authority Job Class II and greater) shall be tested prior to use. A test is required a minimum of every ten (10) years. The Technician may require a more current test.

Rock riprap from igneous or metamorphic origins such as granite, basalt, and quartzite may be used without testing. Dolomite from quarries within the map legend units shown in Figure 1 may also be used without testing:

- Dolomite (Sd) - all counties.
- Sinnipee Group (Os) and Prairie du Chien (Opc) exempt only in the following counties: Marinette, Oconto, Shawano, Brown, Outagamie, Calumet, Winnebago, Green Lake, and Fond du Lac.

The Technician shall inspect and approve sources of these rock types prior to use and determine if testing is required.

Rock for equipment or cattle channel crossings, access roads, heavy use area protection or similar minor structures need not be tested.

Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. The rock fragments shall be angular to subrounded in shape. The least dimension of each individual rock fragment shall be not less than one-third the greatest dimension of the fragment. It should also be free from dirt, clay, sand, rock fines and other materials not meeting the gradation limits. Rock shall be excavated, selected and handled as necessary to meet the grading requirements stated in the construction plans.

Representative samples of rock requiring testing shall conform to the following requirements:

Bulk Specific Gravity (saturated surface-dry basis). Not less than 2.50 when tested in accordance with ASTM Specification C 127 on samples prepared as described for soundness testing.

Absorption. Not more than four (4.0) percent when tested in accordance with ASTM C 127 on samples prepared as described for soundness testing.

Soundness. The weight loss in five cycles shall not be more than 28 percent when tested by the sodium sulfate soundness test method in the modified ASTM C 88 or AASHTO T 104. Losses in excess of 20 percent are acceptable only when the design D_{50} rock size has been increased by 10 percent for a loss of 20-23.9 percent or 20 percent for a loss of 24-28 percent.

C. METHODS OF TESTING

Bulk Specific Gravity and Absorption shall be determined by ASTM C 127 on samples prepared as described for rock cube soundness testing.

Rock Cube Soundness. Soundness testing shall be performed by ASTM C 88 for coarse aggregate modified as follows.

The sodium sulfate soundness test shall be performed on a test sample of 5000 ± 300 grams of rock fragments, reasonably uniform in size and cubical in shape and weighing, after sampling, approximately 100 grams each. The test sample shall be obtained from rock samples that are representative of the total rock mass, as noted in ASTM Specification D 4992, and that have been sawed into slabs as described in ASTM Specification D 5121. The samples shall be further reduced in size by sawing the slabs into cubic blocks. The thickness of the slabs and the size of the sawed blocks shall be determined by the size of the available test apparatus and as necessary to provide, after sawing, the approximate 100 gram samples.

Due to internal defects, some of the cubes may break during the sawing process or during the initial soaking period. Cubes that break during this preparatory process shall not be tested. Such breakage, including an approximation of the percentage of cubes that break, shall be noted in the test report.

After the sample has been dried, following completion of the final test cycle and washing to remove the sodium sulfate, the loss of weight shall be determined by subtracting from the original weight of the sample the final weight of all fragments which have not broken into three or more fragments. (Samples that break into three or more large fragments during testing will be assigned a final weight of 0.0.) The test report shall show the percentage loss of the weight. Photographic documentation of all samples before and after testing shall be part of the test report.

A rock source may be rejected if the rock from that source deteriorates in less than 5 years under similar use and exposure conditions expected for the rock to be installed under this specification, even though it meets the testing requirements stated above.

Deterioration is defined as the visual loss of more than one-quarter of the original rock volume, or severe cracking that would cause a rock to split.

D. GRADATION

The gradation of the rock riprap and filter or bedding material shall be as shown in the construction plans.

Rock used for streambank protection, lined waterways, rock chutes, or other similar major projects (Engineering Job Approval Authority Job Class II and greater) shall have a gradation verification be done by one of the following methods.

Method A

Measurement of a random truck load of stone (reference sample) according to the procedure outlined in EFH-17, Procedure for Determining Rock Weights, Sizes, and Gradations; or ASTM D5519, Standard Test Methods for Particle Size Analysis of Natural and Man-Made Riprap Materials (Test Method A).

Method B

Creation of reference samples of rock of at least 0.5 tons, made according to the procedure outlined in EFH-17 (Tables 1 - 5), creating the envelope limits of the gradation specified.

Control of project gradation will be by visual inspection comparing rock delivered to the reference samples.

The reference sample(s) may be used as part of the finished riprap or remain at the quarry.

Any difference of opinion between the Technician and the Contractor shall be resolved by dumping and checking (by measurement) the gradation of a random truck load of stone by Method A. Mechanical equipment, a sorting site, and labor needed to assist in checking gradation shall be provided by the Contractor at no additional cost.

E. SUBGRADE PREPARATION

The subgrade surfaces on which the riprap, filter or bedding material is to be placed shall be cut or filled and graded to the lines and grades as shown on the drawings or as directed by the Technician. When fill to subgrade lines is required, it shall consist of approved materials and shall be compacted as specified in Wisconsin Construction Specification 3, Earthfill. Riprap, filter, bedding or geotextile shall not be placed until the foundation preparation is completed, and approved by the Technician.

F. FILTER AND BEDDING

Filter or bedding material, when required, shall be spread uniformly on the prepared subgrade surfaces to the depth shown on the drawings. The surfaces of the layers shall be finished reasonably free of mounds, dips or windrows and shall meet the gradation shown on the plans or as specified in Wisconsin Construction Specification 8.

Geotextile, when required, shall meet the requirements shown on the drawings and as specified in Wisconsin Construction Specification 13, Geotextiles.

G. PLACING ROCK RIPRAP

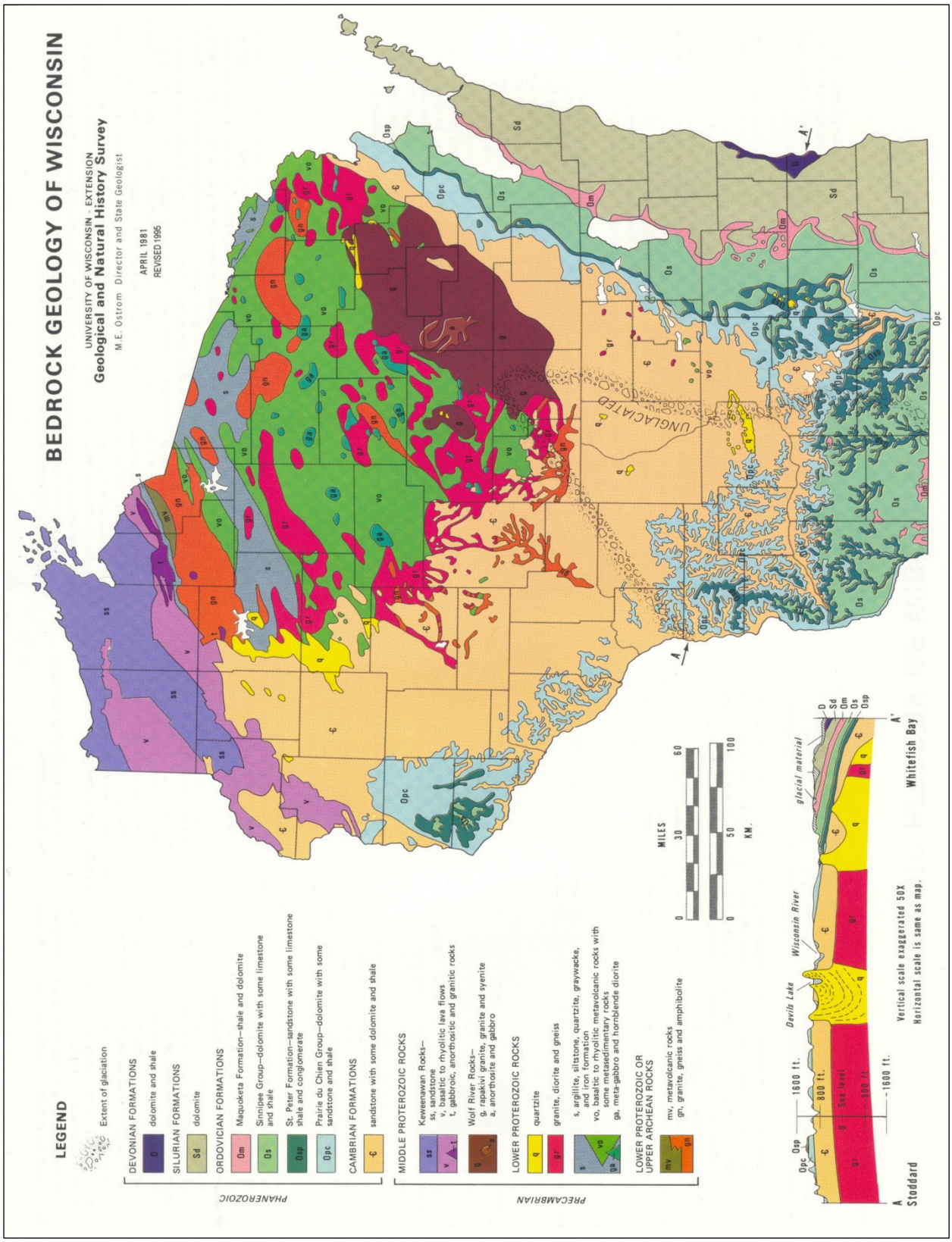
The rock riprap shall be placed by equipment on the surfaces and to the depths specified. The rock riprap shall be installed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The rock for riprap shall be delivered and placed in a manner that will ensure that the riprap in-place shall be reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. Some hand placing may be required to provide a neat and uniform surface or to prevent damage to structures.

H. VEGETATED ROCK RIPRAP

If the rock riprap is to be vegetated, topsoil shall be placed by equipment in the riprap voids (surface) and on the surface of the rock to the depth specified. The topsoil placement shall not take place before the placement of the rock riprap is approved by the Technician. Topsoil shall be placed in such a manner as to avoid displacement of the underlying rock.

The topsoil may extend from the top of the riprap down to the bankfull elevation (OHWM) or as shown on the drawings. Care shall be taken so topsoil is retained on the rock and is not allowed into the water body. The area shall be seeded and mulched within 12 hours following topsoil placement.

Figure 1


BEDROCK GEOLOGY OF WISCONSIN
UNIVERSITY OF WISCONSIN - EXTENSION
Geological and Natural History Survey
M.E. Ostrom Director and State Geologist
APRIL 1981
REVISED 1996
LEGEND
Extent of glaciation
PHANEROZOIC
DEVONIAN FORMATIONS
D dolomite and shale
SILURIAN FORMATIONS
Sd dolomite
ORDOVICIAN FORMATIONS
Om Maquoketa Formation—shale and dolomite
Os Sinnipee Group—dolomite with some limestone and shale
Osp St. Peter Formation—sandstone with some limestone shale and conglomerate
Opc Prairie du Chien Group—dolomite with some sandstone and shale
CAMBRIAN FORMATIONS
€ sandstone with some dolomite and shale
PRECAMBRIAN
MIDDLE PROTEROZOIC ROCKS
Keweenawan Rocks—
ss, sandstone
v, basaltic to rhyolitic lava flows
t, gabbroic, anorthositic and granitic rocks
Wolf River Rocks—
g, rapakivi granite, granite and syenite
a, anorthosite and gabbro
LOWER PROTEROZOIC ROCKS
q quartzite
gr granite, diorite and gneiss
s, argillite, siltstone, quartzite, graywacke, and iron formation
vo, basaltic to rhyolitic metavolcanic rocks with some metasedimentary rocks
ga, meta-gabbro and hornblende diorite
LOWER PROTEROZOIC OR UPPER ARCHEAN ROCKS
mv, metavolcanic rocks
gn, granite, gneiss and amphibolite
UNGLACIATED
MILES
KM.
A Stoddard
Devils Lake
Wisconsin River
glacial material
A' Whitefish Bay
1600 ft.
800 ft.
Sea level
Vertical scale exaggerated 50X
Horizontal scale is same as map.

WISCONSIN CONSTRUCTION SPECIFICATION

13. GEOTEXTILES

1. SCOPE

This work shall consist of furnishing all materials, equipment, and labor necessary for the installation of geotextiles.

2. MATERIALS

The class and type of geotextile shall be as shown on the drawings.

Geotextiles shall be manufactured from synthetic long chain or continuous polymeric filaments or yarns composed of at least 95 percent by weight of polypropylene, polyethylene, polyester, polyamide, or polyvinylidene-chloride. Fibers shall contain stabilizers and/or inhibitors to enhance its resistance to ultraviolet light. The geotextile shall be formed into a stable network of filaments or yarns that retain dimensional stability relative to each other, including selvages. The geotextile shall be free of any chemical treatment or coating that might significantly reduce its permeability and shall have no flaws or defects that significantly alter its physical properties.

Thread used for factory or field sewing shall be of a contrasting color to the fabric and made of polypropylene, polyester, or polyamide thread. The sewing thread shall have a minimum breaking strength of 28 pounds when tested in accordance to ASTM D 2256. The thread shall be as resistant to ultraviolet light as the geotextile being sewn.

Additional requirements for geotextile materials are as follows:

a. Slit Tape Geotextile

Slit tape geotextile shall conform to the physical properties listed in Table 1. The slit tape geotextile shall be manufactured from a filament that is woven. The edges of the material shall be selvaged or otherwise finished to prevent the outer filament from unraveling.

b. Woven Geotextile

Woven geotextile shall conform to the physical properties listed in TABLE 1. The woven geotextile shall be manufactured from monofilament yarn that is woven into a uniform pattern with distinct and measurable openings. The fabric shall be manufactured so that the yarns will retain their relative position with regard to each other. The edges of the material shall be selvaged or otherwise finished to prevent the outer yarn from unraveling.

c. Nonwoven Geotextile

Nonwoven geotextile shall conform to the physical properties listed in TABLE 2. Nonwoven geotextile shall be manufactured from randomly oriented fibers that have been bonded together by needle-punching.

3. SHIPPING AND STORAGE

Geotextiles labeling, shipment, and storage shall follow ASTM D 4873. Product labels shall clearly show the manufacturer or supplier name, style name, and roll number. Each geotextile roll shall be wrapped with a material that will protect the geotextile, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants. The protective wrapping shall be maintained during periods of shipment and storage.

Prior to use, the geotextile shall be inspected and approved by the Technician, then stored in a clean, dry, place, out of direct sunlight, not subject to temperature extremes, and with the manufacturer's protective cover in place.

4. SURFACE PREPARATION

The surface on which the geotextile is to be placed shall be graded to the neat lines and grades as shown on the drawings. The surface shall be reasonably smooth and free of holes, vegetation, excessive mud, and projections. The surface preparation will be inspected and approved by the Technician prior to placing the geotextile.

5. PLACEMENT

a. General

The geotextile shall be placed on the approved, prepared surface at the locations and in accordance with the details shown on the drawings. The geotextile shall be unrolled along the placement area and loosely laid (not stretched) in such a manner that it will conform to the surface irregularities when the stone or other material is placed on or against it. The geotextile may be folded and overlapped to permit proper placement in the designated area.

No cuts, punctures, tears, or gaps in sewn or overlapped joints will be permitted in the geotextile.

The panel length shall be placed parallel to the direction of water flow, except as stated below in paragraph b. Slope Protection and d. Road Stabilization.

The geotextile panels may be joined by overlapping the roll ends 36 inches and sides a minimum of 18 inches and securing the overlap against the underlying foundation materials. The fabric shall be restrained as needed to prevent lifting and displacement during construction. Allowable restrainment methods include backfilled trenches, stitching, sandbags, rocks, and securing pins that are approved and provided by the geotextile manufacturer. The upstream or up-slope geotextile shall overlap the abutting down-slope geotextile.

The geotextile panels may be joined by machine sewing using thread described under 2. Materials. The seam shall conform to Federal Standard SSa-2, SSn-2 or SSd-2.The sewing shall consist of two parallel stitched rows spaced approximately 1 inch apart. Each row of stitching shall be located a minimum of 2 inches from the geotextile edge. The seam type and sewing machine to be used shall produce a seam strength, in the specified geotextile, that provides a minimum of 90 percent of the tensile strength in the weakest principal direction of the geotextile being used, when tested in accordance with ASTM D 4884. The seams may be factory or field sewn. All seaming and stitching of woven geotextiles shall be in the selvage.

Non-woven geotextiles shall be sewn a minimum of ½ inch from the edge. Geotextile shall be installed with the sewn seams pointing up.

The geotextile shall be restrained as needed during placement of overlying materials to prevent slippage, folding, or other movements of the geotextile.

Prior to covering, the geotextile shall be inspected by the Technician to ensure that the geotextile has not been damaged during construction. Backfill shall be placed by end dumping onto the geotextile from the edge of the geotextile or over previously placed backfill. Vehicles shall not be allowed directly on the geotextile. Materials shall be placed on the geotextile without causing tears, punctures, or separations of overlaps or sewn joints. Should such damage occur, the backfill around the damaged or displaced area will be removed and the subgrade restored to the original approved condition. Repair of the area shall consist of a patch of the same type of geotextile overlaying the existing geotextile. The patch shall extend a minimum of 2 feet from the edge of any damaged area.

b. Slope Protection

The geotextile shall not be placed until it can be anchored and protected with the intended covering within 48 hours. Temporary cover, for protection from ultraviolet light, may be used if the 48-hour limit will be exceeded. Material will not be dropped from a height of more than 3 feet on to uncovered geotextile. In lakeshore applications, the geotextile may be unrolled parallel or perpendicular to the bank. The geotextile shall be joined by machine sewing if the panel length is placed perpendicular to the direction of water flow (wave runup).

c. Subsurface Drains

The geotextile shall not be placed until drainfill or other material can be used to cover it within the same working day. Material will not be dropped from a height of more than 5 feet on to the geotextile and sharp, angular aggregates will not be used unless the drawing details state otherwise.

d. Road Stabilization

The geotextile shall be unrolled in a direction parallel to the roadway centerline in a loose manner permitting it to conform to surface irregularities when the roadway fill material is placed on it. Overlap shall be in the direction of construction. The minimum overlap of geotextile panels joined without sewing shall be 24 inches. The geotextile may be temporarily secured with pins recommended by the manufacturer. They shall be removed prior to placement of the covering material. Slit tape geotextile shall not be used in a wet location. Material will not be dropped from a height of more than 5 feet on to uncovered geotextile.

Table 1. Requirements for Woven Geotextiles by Use

Property	Test Method	Slope Protection		Road Stabilization	
		Unprotected (Class I)	Protected (Class II)	(Class IV)	Slit Tape
Tensile Strength (lbs.)[1]	ASTM D 4632 Grab Test	≥ 250 in any principal direction	≥ 120 in any principal direction	≥ 180 in any principal direction	≥ 200 in any principal direction
Elongation at failure (Percent)[1]	ASTM D 4632 Grab Test	≤ 20	≤ 35	≤ 35	≤ 10
Puncture (lbs.) [1]	ASTM D 6241	≥ 900	≥ 350	≥ 350	≥ 700
Ultraviolet Light (percent residual tensile strength)	ASTM D 4355 150 hours exposure	70 minimum	70 minimum	70 minimum	70 minimum
Apparent Opening Size (AOS)	ASTM D 4751	≥ #100 (.150 mm) and ≤ #70 (.212 mm) [3]	≥ #100 (.150 mm) and ≤ #70 (.212 mm) [3]	≥ #100 (.150 mm) and ≤ #70 (.212 mm) [3]	As specified or a min. size > #50 [3]
Percent Open Area (POA)	CW-02215 [2]	4.0 min.	4.0 min.	1.0 min.	N/A
Permittivity (1/seconds)	ASTM D 4491	0.20 minimum	0.10 minimum	0.10 minimum	0.05 minimum
Water Flow (gal/sq. ft./minute)	ASTM D 4491	15 minimum	7.5 minimum	7.5 minimum	3.8 minimum

[1]Minimum average roll values (MARV); calculated as the mean minus two standard deviations, yielding a 95 percent confidence level that the table value will be equaled or exceeded.

[2]Test Methods prepared by U. S. Army Corps of Engineers

[3]U. S. Standard Sieve Size

Table 2. Requirements for Nonwoven Geotextiles by Use

Property	Test Method	Slope Protection		Subsurface Drainage	Road Stabilization
		Unprotected (Class I)	Protected (Class II)	(Class III)	(Class IV)[3]
Tensile Strength (lbs.) [1]	ASTM D 4632 Grab Test	≥ 180	≥ 120	≥ 90	≥ 180
Elongation At failure (percent)[1]	ASTM D 4632 Grab Test	≥ 50	≥ 50	≥ 50	≥ 50
Puncture (lbs.) [1]	ASTM D 6241	≥ 350	≥ 250	≥ 200	≥ 200
Ultra-Violet Light (percent residual tensile strength)	ASTM D 4355 150 hours exposure	70 minimum	70 minimum	70 minimum	70 minimum
Apparent Opening Size (AOS)	ASTM D 4751	As specified or max. #40 [2]	As specified or max. #40 [2]	As specified or max. #40 [2]	As specified or max. #40 [2]
Permittivity (1/seconds)	ASTM D 4491	0.70 minimum	0.70 minimum	0.70 minimum	0.10 minimum
Water Flow (gal/sq. ft./ minute)	ASTM D 4491	52.5 minimum	52.5 minimum	52.5 minimum	7.5 minimum

[1]minimum average roll values (MARV); calculated as the mean minus two standard deviations, yielding a 95 percent confidence level that the table value will be equaled or exceeded.

[2]U. S. Standard Sieve Size.

[3]Heat-bonded or resin-bonded geotextile may be used.

Operation and Maintenance Plan
Lined Waterway or Outlet

Cooperator: Mike & Bonnie Musial Date: _____

By: Polk County LWRD Title: _____

Project Location: Lot 2, PLAT OF BONE LAKE ACRES

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I agree to the following for the next 10 years.

1. Maintain a vigorous growth of desirable vegetation. This includes reseeding, fertilization, and controlled application of herbicides when necessary. Periodic mowing may also be needed to control height.
2. Inspect channel linings and outlets periodically and after runoff events.
3. Replace weathered or displaced rock riprap to its original grade.
4. Remove all debris that hinders system operation.
5. If fences are installed, they shall be maintained to prevent unauthorized human or livestock entry.
6. Eradicate or otherwise remove all burrowing animals. Immediately repair any damage caused by their activity.
7. Repair any damage to structures, vegetated areas adjacent to structures or any appurtenances.
8. Additional Recommendations:

Cooperator's signature: _____ Date: _____

I have discussed the maintenance guidelines with the above cooperator.

Conservationist's signature: _____ Date: _____

Construction Quality Assurance Plan
Lined Waterway

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LANDOWNER: Mike/Bonnie Musial ENGINEERING JOB CLASS III

LOCATION OF PRACTICE OR PLAN ID: Lot 2, Plat of Bone Lake Acres, Polk County, WI

INSPECTOR: _____ APPROVER: _____

Initial and date items as completed. Date all additional documentation and keep in construction file.

PRE-CONSTRUCTION

_____ Verify that the landowner or contractor notified all utilities prior to construction. Document DIGGERS HOTLINE Ticket Number _____

_____ Obtain copies of PERMITS, or documentation that they aren't needed.

_____ Inspect EROSION CONTROL PRACTICES (silt fence, etc.). Document proper installation with photographs and diary notation.

MATERIALS

_____ GEOTEXTILE MATERIALS. Verify that they comply with Wisconsin Construction Specification 13. Obtain a material invoice with the required information, or a tag from the material itself, or a digital photograph of the tag.

_____ SAND AND GRAVEL MATERIALS. Verify that they comply with sheet 3 of the plan. Document observations in the job diary.

_____ GRADED ROCK RIPRAP MATERIALS. Verify the GRADATION per procedure in section 4 of Wisconsin Construction Specification 9. Document the QUALITY of materials per sections 2 and 3 of Wisconsin Construction Specification 9.

CONSTRUCTION

_____ STAKE THE LAYOUT of the practice. Set channel GRADES.

_____ OBTAIN PROFILE AND CROSS-SECTIONS of completed excavation PRIOR TO LINER placement. Minimum is one cross-section per design reach. Verify:

- □ Correct Grade – Planned grade _____
- □ Channel Width – Planned channel width _____
- □ Side Slopes – Planned side slopes are _____ : 1.
- □ Depth – Planned channel depth _____
- □ Final Length – Planned length _____

_____ OBSERVE THE GEOTEXTILE PLACEMENT. Verify correct overlap and anchorage per plans and Wisconsin Construction Specification 13. Obtain photographs or record observations in the job diary.

_____ OBSERVE THE SAND AND GRAVEL PLACEMENT. Verify correct thickness per plans. Obtain photographs and record observations in the job diary.

_____ OBSERVE THE GRADED ROCK RIPRAP PLACEMENT. Verify correct thickness per plans. Record height rock is dropped onto geotextile.

FINAL INSPECTION

_____ OBTAIN FINAL PROFILE AND CROSS-SECTIONS of completed practice AFTER LINER PLACEMENT. Minimum is one cross-section per design reach.

_____ Verify a stable, adequate OUTLET. Document with a notation in the job diary. Photograph.

_____ Document installed quantities (payment units) of the practices. Note: Financial assistance programs may have payment units different than the e-FOTG conservation practice standards reporting units.

Document all of the above with photographs, data in engineering field book and job diary.

I have reviewed this plan and understand my responsibilities in the quality assurance needed for my project.

Landowner's Signature: _____ Date: _____

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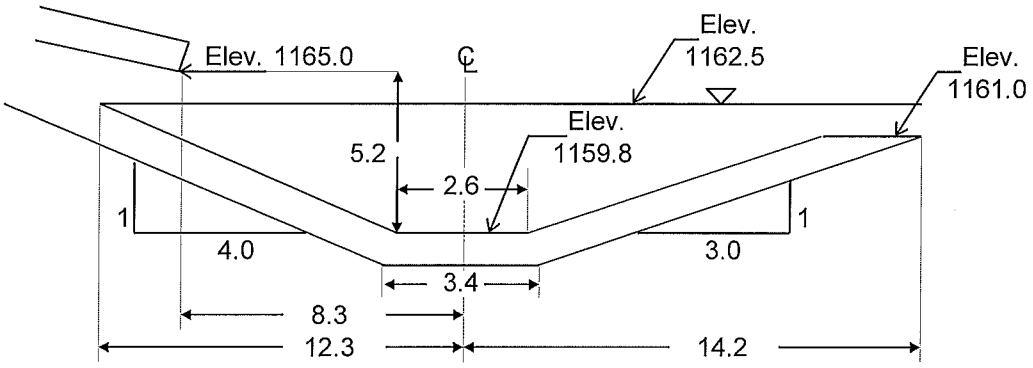
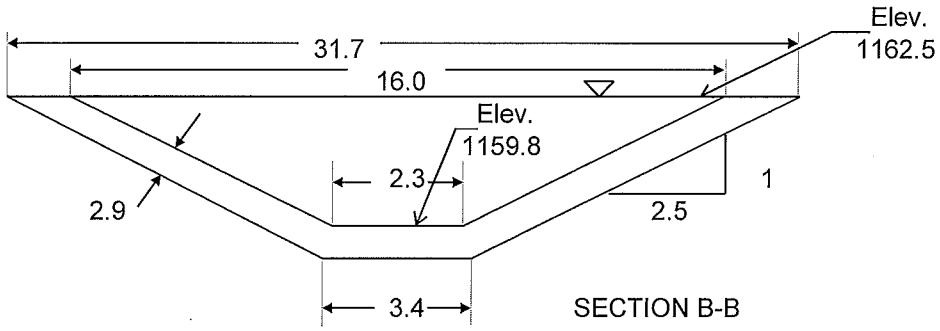
Checked 10/23/18

RIPRAP LINED PLUNGE POOL FOR CANTILEVER OUTLET

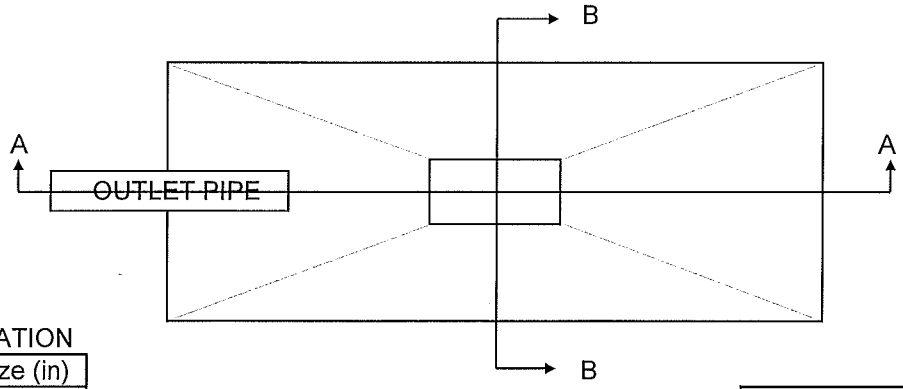
Reference Design Note No. 6 (Second Edition), Jan. 23, 1986



SECTION A-A



SECTION B-B



ROCK GRADATION

% Passing	Size (in)
100	28
60-85	21
25-50	14
5-20	7
0-5	2.8

LANDOWNER

DESIGNER:

SHEET ___ OF ___

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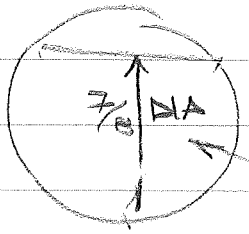
$Q = 40$ cfs $Q = AV$

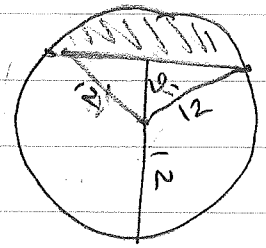
Outlet pipe = 24" dia cmp

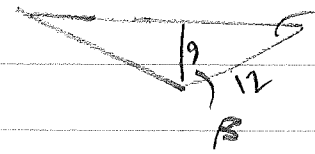
Assume full flow @ 7/8 dia



$24 \times 0.875 = 21"$

FLOW AREA





$\alpha = \sin^{-1}\left(\frac{9}{12}\right) = 48.6°$

$\beta = 90 - 48.6 = 41.4°$

$A_{12} = 452.4 \text{ in}^2$

$A_{7/8} = 419.7 \text{ in}^2 = 2.91 \text{ ft}^2$

$$V = \frac{Q}{A} = \frac{40 \text{ cfs}}{2.91} = 13.7 \text{ ft/sec}$$

Appendix 16A Size Determination for Rock Riprap

Isbash Curve

The Isbash Curve, because of its widespread acceptance and ease of use, is a direct reprint from the previous chapter 16, Engineering Field Manual. The curve was developed from empirical data to determine a rock size for a given velocity. See figure 16A–1. The user can read the D_{100} rock size (100 percent of riprap ≤ this size) directly from the graph in terms of weight (pounds) or dimension (inches). Less experienced users should use this method for quick estimates or comparison with other methods before determining a final design.

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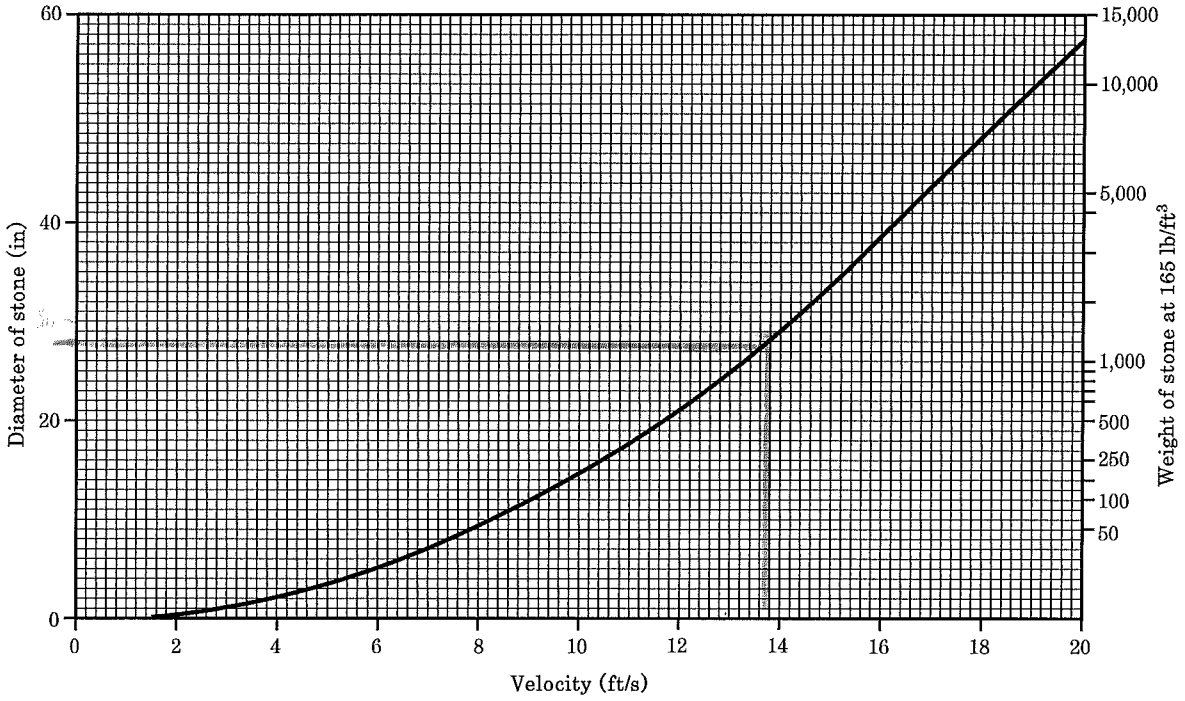
Figure 16A–1 Rock size based on Isbash Curve



Procedure
1. Determine the design velocity.
2. Use velocity and fig. 16A-1 (Isbash Curve) to determine basic rock size.
3. Basic rock size is the D_{100} size.