

**REGIONAL GENERAL PERMIT NO. 12
AQUATIC HABITAT IMPROVEMENT FOR STREAM CHANNELS IN COLORADO**

EFFECTIVE DATE: October 11, 2011

EXPIRATION DATE: October 11, 2016

In accordance with Section 404 of the Clean Water Act (33U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403), the District Engineer, U.S. Army, Corps of Engineers, Albuquerque, Omaha, and Sacramento Districts, hereby authorize certain limited discharges of dredged and fill material within waters of the U.S. associated with stream habitat improvement structures in Colorado.

LOCATION: This regional general permit (RGP) is applicable to all waters of the United States within the State of Colorado.

NOTIFICATION: Written notification requesting verification and concurrence with the requirements of the RGP must be sent to the Corps of Engineers (Corps) office that services the area of the project location. For assistance in determining the appropriate regulatory office and point of contact, please visit the Colorado Regulatory website: <http://www.nwo.usace.army.mil/html/od-tl/coloreg-home.htm>, or call one of the following Colorado Regulatory offices:

**Denver Regulatory Office
(Omaha District)**
9307 South Wadsworth Blvd.
Littleton, CO 80128-6901
Phone: (303) 979-4120

**Grand Junction Regulatory Office
(Sacramento District)**
400 Rood Ave., Rm. 224
Grand Junction, CO 81501-2563
Phone: (970) 243-1199

**Durango Regulatory Office
(Albuquerque and Sacramento District)**
1970 E 3rd Ave., Ste. 109
Durango, CO 81301
Phone: (970) 259-1764

**Southern Colorado Regulatory Office
(Albuquerque District)**
200 S. Santa Fe Ave., Ste. 301
Pueblo, CO 81003
Phone: (719) 543-9459

The applicant must first notify the Corps in writing according to the Notification procedures of the RGP as described below. Work cannot proceed until the Corps has provided written approval to the applicant.

COORDINATION: Coordination with the Colorado Division of Parks and Wildlife (CPW) is required for projects considered for authorization by this RGP. Pre-application consultation with the CPW, preferably on-site, is highly recommended. Providing documentation of pre-application consultation with CPW stating that CPW has no concerns with the proposed project will satisfy the coordination requirements of this permit resulting in quicker processing times. Please visit the following state website to determine the appropriate office for coordination: <http://wildlife.state.co.us>.

Once a complete application is received, the Corps will coordinate with the CPW. CPW will have 10 days from the receipt of Corps notification to indicate that they will be commenting on the proposed project. CPW will then have an additional 15 days after the initial 10-day period to

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provide those comments. If CPW raises concerns during coordination, the applicant may either modify their plan, in coordination with CPW, or apply for a Standard Individual Permit. If no comments are received from the CPW within the comment period, the Corps will assume that CPW has no objections to the project design.

For projects located within Tribal reservation boundaries, coordination is required with the appropriate Tribal entity. All aspects of the Tribal coordination process will be the same as those outlined above for CPW coordination. Pre-application consultation with the Tribe, preferably on-site, is highly recommended.

AUTHORIZED ACTIVITIES AND MATERIALS: Activities authorized by this RGP are limited to stream habitat improvement intended to create or enhance fish habitat components. Types of authorized activities are listed below. Examples of typical structural designs can be found online at: <http://www.spa.usace.army.mil/Missions/RegulatoryProgramandPermits/Stream.aspx>. These figures and guidelines are intended to be examples and are not to be interpreted as project recommendations or limitation to structural designs.

1. Log/Timber Overpour Plunges. Log/Timber Overpour plunges are structures in which logs are placed perpendicular to the flow of the stream and are keyed into the bank on both sides to prevent erosion. A scour hole is then constructed immediately below the log. These features are used to provide additional pool habitat and will be authorized only in step-pool reaches. Step-pool reaches are channels dominated by boulders, cobbles, or gravel with a slope range of 0.2 to 0.4, an entrenchment ratio of 1.4 to 2.2, a width/depth ratio greater than 12, and a sinuosity greater than 1.2. The structures must be installed at an elevation to allow fish passage. Log/Timber structures must be properly anchored into the stream banks to prevent movement during high flows. Generally, anchoring must utilize rocks larger than its bed load and/or burying significant portions of the log/timber into the bank.

2. Digger Logs. Digger logs are structures in which a log is placed within an excavated pool, perpendicular to the flow of the stream and is keyed into the banks on both sides to prevent erosion. Typically, gravel material is placed directly below the excavated pool for additional spawning habitat, and excavated material from the stream is placed below the gravel to protect from scour. These features are used to provide additional cover and slack water areas for velocity protection, resting habitat, and minor scouring to create pools. These structures are only authorized in step-pool reaches and must be installed at an elevation to allow fish passage. Step-pool reaches are channels dominated by boulders, cobbles, or gravel with a slope range of 0.2 to 0.4, an entrenchment ratio of 1.4 to 2.2, a width/depth ratio greater than 12, and a sinuosity greater than 1.2. Digger Log/Timber structures must be properly anchored into the stream banks to prevent movement during high flows. Generally, anchoring must utilize rocks larger than its bed load and/or burying significant portions of the log/timber into the bank.

3. Drop Structures. (Cross-vanes; diagonal or perpendicular; J-hook vanes; W-weirs; K-sills; K-dams). Drop structures are designed to provide grade control to a stream reach. They generally span the river, or two-thirds of the river, and are anchored into the bank at the bankfull bench elevation to prevent erosion. These structures are generally installed at a 20 to 30 degree angle from the bank facing upstream with the lowest rock elevation being the apex of the structure. These features are used to increase channel pool areas and assist in bank building. They provide additional holding, cover and resting habitat. Structures that cross the entire channel, including cross-vanes, K-sills, and K-dams, must be installed at an elevation to allow

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fish passage over them. Generally, the change in water surface elevation should be no greater than 6 inches during low-flow conditions. The District Engineer may waive the 6-inch drop requirement; however, the notification must include a justification for the need for a greater drop. K-sills and K-dams are generally only authorized for channels with a slope range of 0.2 to 0.4, an entrenchment ratio of 1.4 to 2.2, a width/depth ratio greater than 12, and a sinuosity greater than 1.2. However, they may also be authorized in low bed load channels that are dominated by cobble and have a slope less than 0.02, an entrenchment ratio greater than 2.2, a width/depth ratio greater than 12, and a sinuosity greater than 1.2. Trapezoidal weirs are excluded from this class of structures since they generally lead to lateral bank scour under high flows. Cross-vanes with headgates can only be constructed under this permit if the cross-vane is a replacement of an already existing structure with a headgate. Drop Structures must be properly anchored into the stream banks to prevent movement during high flows. Generally, anchoring must utilize rocks larger than its bed load and/or burying significant portions of the log/timber into the bank.

4. Scattered Boulders, Boulder Clusters, and Cover Trees. These features are used to provide slack water areas for velocity protection and resting areas.

5. Tree and/or Rock Revetments. Tree and rock revetments are structures in which trees or rocks are anchored or keyed into the bank parallel with the flow of the stream. Generally, these structures are used in the outside bend of a meander, but they can also be used within relatively straight reaches that are experiencing erosion. These features are used to increase cover and resting habitat (sometimes in conjunction with a need for bank stabilization). Log/Timber or Rock structures must be properly anchored into the stream banks to prevent movement during high flows. Generally, anchoring must utilize rocks larger than its bed load and/or burying significant portions of the log/timber into the bank. A maximum of 1,000 linear feet of channel may be modified per project. The District Engineer may waive the 1,000 linear feet limitation of rock or tree revetments or channel modification; however, the notification must include a justification for the need for this work.

6. Wing Deflectors and Single Boulder Deflectors. Deflectors are generally comprised of large rock or trees and are designed to deflect flows away from the bank. These features are used for increasing resting habitat. The upstream “arm” of this structure should be placed at a higher elevation than the downstream pointing/facing arm to prevent the development of eddies, which could cause bank erosion. The fill inside the structure (crib) should be comprised of large rocks to prevent mobilization and scouring. Deflector structures must be properly anchored into the stream banks to prevent movement during high flows.

7. Point Bar/Channel Realignment with Associated Pools. These features are used to provide increased velocity and deeper water areas for increased spawning and holding habitat. Generally, point bar construction and channel realignment is used when the channel's width/depth ratio is unnaturally high or the channel sinuosity has been adversely modified through man or natural events. A maximum of 1,000 linear feet of channel may be modified per project. The District Engineer may waive the 1,000 linear feet limitation of channel modification; however, the notification must include a justification for the need for this work.

8. Excavation to Create Pools. This activity involves the excavation of pools and redistribution of the excavated material back into the stream. The goal of this activity is often to restore to its former condition a degraded stream reach that has deteriorated due to sedimentation in pools. Filling of wetlands with excavated materials is not authorized by this permit.

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9. Spawning Gravels. These fills are used to create and enhance spawning areas. Generally, gravel is imported and discharged along the bottom of the channel at glides and upstream head of riffles.

10. Fish Barriers. These features are used to produce controlled habitat areas for the purpose of inhibiting upstream or downstream migration of undesirable species, as well as provide grade control. Gabion baskets are not to be used as fish barriers, unless waived by the District Engineer.

11. Fish Bypass Structures. These features are used to facilitate upstream and downstream movement of fish around artificial barriers, generally by increasing channel roughness. This activity does not include cross-vanes with headgates.

12. Fish Ladders. These features are used to facilitate upstream and downstream movement of fish around artificial barriers.

13. Fish Screens. These features are used to prevent fish from moving into irrigation canals and ditches, or to prevent nonnative fish species from migrating into streams from adjacent ponds and lakes. They may be constructed as part of headgates or as separate structures. Basin-specific regulations regarding screen opening sizes may be required (e.g., ¼" screening required for any waters connected to the Colorado River below 6500 elevation (critical habitat)). The permittee should consult with the CPW to determine if such regulations exist in the project basin.

14. Bankfull Bench. A bankfull bench is a terrace installed into the bank at the bankfull elevation. These benches are generally planted with riparian tree species to provide additional shelter and cover, along with providing stability. In addition, bankfull benches generally provide diversity and stability to vertical or near vertical banks.

15. Temporary Fills and Temporary Diversion Structures. This permit authorizes temporary structures, fills, and work necessary to construct aquatic habitat improvement structures. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable. Temporary fills must consist of materials and be placed in a manner that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations immediately upon construction completion. The areas affected by temporary fills must be revegetated, as appropriate. Temporary fills placed in wetlands require a horizontal marker (i.e. fabric, certified weed-free straw, etc.) to delineate the existing ground elevation of wetlands that will be temporarily filled during construction.

16. Other Structures. Other structures not specifically listed above, may be authorized by this permit on a case-by-case basis.

GENERAL CONDITIONS: All activities authorized under this RGP are subject to the following General Conditions (GC).

1. Structures or fill authorized by this permit shall not impede waterborne navigation, including rafting and canoeing, or create a hazard to navigation in waterways. Any interference with navigation may require removal or modification of the structure at the permittee's expense.

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2. Activities authorized by this permit shall be designed to withstand expected high flows and maintain preconstruction surface flow rates from the site to the maximum extent practicable.

3. The permittee must take precautions to avoid and minimize impacts and protect wetlands from damage during construction. The permittee will restore wetlands to preconstruction conditions for all impacts associated with temporary fill activities. Compensatory mitigation shall be required for all wetland losses that exceed 1/10 acre. For wetland losses of 1/10 acre or less, the District Engineer may determine on a case-by-case basis that compensatory mitigation is required. This permit does not authorize the loss of greater than 1/3 acre of wetland.

4. The construction of water parks (e.g., kayak courses) and flood control projects are not authorized by this permit.

5. In order to provide a permanent record of the completed work, the permittee shall provide a complete set of as-built drawings within 90 days following the completion of work. Drawings shall contain enough detail to compare post-construction conditions to baseline conditions. The permittee shall monitor all completed work in accordance with the stated project goals and objectives (e.g., fish populations, spawning gravel, invertebrate populations, etc.). The permittee must submit a monitoring report for evaluation of objectives and effectiveness by December 31 of the third year after project completion. Monitoring reports shall include, at a minimum, the following information:

- a. Permit number and a location map;
- b. A description of the successes, failures, and potential problem areas;
- c. A description of the recommendations for maintenance or remedial efforts that the permittee feels should be implemented to support the success of the project;
- d. Documentation of any remedial activities that were completed during the monitoring period;
- e. Maps and drawings as needed for illustration; and
- f. Photos taken from the same points and bearings as pre-construction photos (required by the Notification Procedures below) to be compared to preexisting site conditions. Photos should include labels with time, date, bearing, and a general description of the site.

6. Concrete/Grouting is not authorized by this permit except for activities 10, 11, 12, and 13 of this permit, as stated above.

7. Discharges into fish spawning areas during spawning seasons are not authorized by this permit unless the CPW provides recommendation to the Corps that the applicant's discharge will not have adverse impacts.

8. All construction debris (including excess dredged or fill materials, wood, cleared vegetation, concrete, and all other materials not specifically authorized by the permit) shall be disposed of in an upland area in such a manner that it cannot enter a waterway or wetland.

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9. The discharge of dredged or fill material shall not consist of unsuitable material (e.g. trash, debris, car bodies, asphalt, etc.) and must be free from toxic pollutants in toxic amounts.

10. All disturbed areas, including the riparian and upland buffer zones, shall be revegetated with native species to prevent erosion. Erosion control fabrics/blankets may be required on a case-by-case basis. These areas shall be monitored and maintained to ensure vegetative success. Revegetation will be deemed successful when there is at least 70% cover of the planted species or other desirable species.

11. This permit does not authorize work in a component of the National Wild and Scenic River System, nor in a river officially designated by Congress as a "study river" for possible inclusion in the system, while the river is in an official study status.

12. The activity shall not impact any public water supply intake.

13. This permit does not authorize any activity that is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act, or that is likely to destroy or adversely modify the critical habitat of such species. This permit does not authorize any activity that "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed. Federal permittees must provide the District Engineer with the appropriate documentation to demonstrate compliance with those requirements. For activities that might affect federally-listed endangered or threatened species or designated critical habitat, the District Engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat. The applicant shall not begin work until notified by the Corps that the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. After consultation with the U.S. Fish and Wildlife Service, the Corps will either include required special conditions, a "Take Statement", and/or best management practices to the permit; or require the applicant modify their proposed project to reduce impacts to T&E Species; or deny authorization under the RGP and require the applicant to apply for a Standard Individual Permit.

14. This permit does not authorize any activities that may affect historic properties listed, or eligible for listing, in the National Register of Historic Places (Register) until the Corps has complied with the provisions of Title 33, CFR, Part 325, Appendix C. The applicant must notify the Corps if the activity may affect any historic properties listed, determined to be eligible, or that the prospective permittee has reason to believe may be eligible for listing on the Register. The proposed activities shall not commence until notified by the Corps that the requirements of the National Historic Preservation Act have been satisfied and that the activities are authorized. Information concerning the location and existence of historic resources can be obtained from the Colorado State Historic Preservation Officer.

15. If any previously unknown historic or prehistoric materials or remains are discovered while accomplishing the activity authorized by this permit, the permittee must immediately stop work and notify the Corps of the discovery. The Corps shall initiate the appropriate federal, state, and/or tribal coordination required to determine if the discovery warrants a recovery effort or if the site is eligible for inclusion in the Register.

16. The permittee shall maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. The permittee is not relieved

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of this requirement if construction of the permitted activity is abandoned, although the permittee may make a good faith transfer to a third party in compliance with GC 18 below. Should the permittee wish to cease maintenance of the authorized activity, or should the permittee desire to abandon it without a good faith transfer, the permittee shall obtain a modification of the permit from the Corps, which may require restoration of the area.

17. Representatives from the Corps shall be allowed to inspect the authorized activity at any time deemed necessary to ensure that it is being, or has been built, in accordance with the terms and conditions of this permit.

18. If the site contains evidence of grazing impacts to the stream channel and the Corps determines that grazing is a significant source of aquatic habitat degradation at the project site, then the Corps may require the permittee to restrict grazing within the project area for a minimum of five years in order to allow regrowth of native vegetation within the area.

19. If the permittee sells the property associated with the permit verification, the permittee may transfer the permit verification to the new owner by submitting a letter to the Corps to validate the transfer. A copy of the permit verification must be attached to the letter, and the letter must contain the following statement and signature: "When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit, including any special conditions, shall continue to be binding on the new property owner(s). To validate the transfer of this permit and the liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

20. The permittee must submit a signed compliance certification to the Corps within 30 days of the completed work.

BEST MANAGEMENT PRACTICES:

1. In order to prevent the spread of New Zealand Mud Snails and other aquatic hitchhikers, **the permittee is strongly encouraged** to clean heavy equipment prior to and after construction if the equipment was previously used in another stream, river, lake, pond or wetland within 10 days of initiating work. The following are recommended methods for preventing the spread of invasive aquatic organisms:

- a. Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and keep the equipment dry for 10 days; or
- b. Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with either a 1:1 solution of Formula 409 Household Cleaner and water, or a solution of Sparquat 256 (5 ounces Sparquat per gallon of water). Treated equipment must be kept moist for at least 10 minutes; or
- c. Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with water greater than 120 degrees F for at least 10 minutes.

2. When possible, work shall be conducted in a manner that will minimize turbidity of the water in the work area.

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3. Whenever possible, operations shall be conducted during low flow periods.

4. No petroleum products, chemicals, or other deleterious materials should be allowed to enter or be disposed of in such a manner in which they could enter the waterway or adjacent wetlands. Accordingly, it is recommended that oil absorbent “booms” be installed downstream of the project site during construction activities.

NOTIFICATION PROCEDURES: The applicant shall notify the Corps in writing. Work cannot proceed until the Corps has provided written approval to the applicant. The applicant must provide the following information:

1. Name, address, and telephone number of the party responsible for the work and the owner of the affected land, if different from the applicant. The applicant must demonstrate written permission to enter upon and perform work on property not belonging to the applicant. The applicant should be the entity retaining long-term maintenance responsibility for constructed features. The notification must include a letter, signed and dated by the applicant, stating that they certify that the information in the notification is complete and accurate and that they will abide by the terms and conditions of this permit.

2. A set of drawings/sketches (on 8 ½" x 11" paper) with pertinent dimensions including:

- a. Location map including name of the waterway, nearest town, county, section, township and range, and latitude and longitude (NAD 83) at both ends of the work area, if known;
- b. Pre-construction photos depicting the physical setting (to be compared to post-construction site conditions from the same photo points, as required by GC 4 for monitoring). Photos should contain figure labels with time, date, bearing, and a general description of the site;
- c. Plan view to scale of all work within waters of the U.S. clearly identifying types and locations of structures/impacts, along with dimensions and location of aquatic resources. To aid in visual understanding, this plan can be overlaid on a recent aerial image of the project site. The plan should include information such as the proposed and existing slope, width/depth ratio, sinuosity, and sediment size;
- d. Cross-sectional and profile views to scale of the existing stream channel and the proposed structures. The limits of the ordinary high-water mark must be clearly identified; and
- e. A wetland delineation of the project site if the project will involve impacts to wetlands. The wetland delineation report must be submitted in accordance with the wetland delineations protocols for the individual Corps District that covers the project area.

3. Project purpose, including a list of measurable objectives or project design targets.

4. A complete description of the work, including the composition, source, and volume in cubic yards of all material to be placed or redistributed in waters of the U.S. The description

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should contain a proposed procedure to be taken to reduce sedimentation and a rationale for the volume of material to be placed or redistributed in waters of the U.S.

5. A description/assessment of the existing stream conditions (i.e., baseline information) and an explanation for why habitat structures are needed, including a description of how the project will improve stream habitat relative to existing fluvial processes and the project design targets.

6. Quantity of waters of the U.S to be impacted by the work in terms of acreage of wetlands and riparian vegetation and linear feet of stream channel.

7. A monitoring plan that describes the proposed method of monitoring as it relates to the project objectives. The monitoring plan must include quantifiable success criteria to determine if the project has met its objective.

The information should reference Regional General Permit No. 12 and be sent to the appropriate Corps office. The Corps will review the applicant's request for authorization under this RGP and will inform the applicant in writing that the work may proceed. The applicant may not start work until notified by the Corps. If the work is not authorized under this RGP, the applicant must apply to the Corps for a Standard Individual Permit or other appropriate Department of the Army permit(s).

DURATION OF THE REGIONAL GENERAL PERMIT: Upon receiving approval to perform work under this RGP, the permittee will have two years to complete the work or until the permit expires or is revoked, unless specified otherwise in a Corps verification letter. If the permittee commenced work on the authorized activity or is under contract to commence work, when the permit expires or is revoked, the permittee will have one more year or until the original expiration, whichever is less, to complete the construction.

FURTHER INFORMATION:

1. Water Quality Certification: In accordance with Section 401 of the Clean Water Act, this Regional General Permit in the State of Colorado has been certified by statute pursuant to Colorado Revised Statutes 25-8-202 and 25-8-308. On July 26, 2011, the Colorado Department of Public Health and Environment (CDPHE) issued a Section 401 Water Quality Certification (WQC) No. 4280 for the permit. To ensure that there are no adverse effects to water quality, activities authorized by this permit will be required to comply with the conditions specified in the WQC.

The U.S. Environmental Protection Agency (EPA) is responsible for Clean Water Act Section 401 WQC for activities occurring within the boundaries of the Southern Ute Indian Tribe Reservation. On September 9, 2011, the EPA issued a 401 WQC for activities authorized by this RGP within the boundaries of the Southern Ute Indian Tribe Reservation.

The Ute Mountain Ute Tribe is responsible for 401 WQC within the boundaries of the Ute Mountain Ute Reservation. On August 29, 2011, the Ute Mountain Ute Tribe denied WQC for this permit. As such, all activities considered for authorization by this permit on Ute Mountain Ute tribal lands requires application for an individual WQC from the Ute Mountain Ute Tribe. Applications for WQC for the Ute Mountain Ute Tribe should be addressed to:

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Ute Mountain Ute Tribe
Environmental Programs Department
520 Sunset Boulevard
Post Office Box 448
Towaoc, Colorado 81334
Phone: 970-564-5430
<http://www.utmountainuteenvironmental.org>

2. Other Laws: The permittee is responsible for obtaining all other federal, state, or local authorizations required by law.

3. Congressional Authorities: This RGP is authorized pursuant to Section 404 of the Clean Water Act (33 U.S.C. 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

4. Limits of this Authorization: This RGP does not grant any property rights or exclusive privileges; does not authorize any injury to the property or rights of others; and does not authorize interference with any existing or proposed Federal project.

5. Limits of Federal Liability: In issuing this permit, the Federal Government does not assume any liability for the following: damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes; damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest; damages to persons, property, or to other permittee or unpermitted activities or structures caused by the activities authorized by this RGP; design or construction deficiencies associated with the permitted work; or damage claims associated with any future modification, suspension, or revocation of this permit.

6. Reevaluation of Permit Decision: The Corps may reevaluate its decision on this RGP or individual activities authorized under this RGP at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following: the permittee fails to comply with the terms and conditions of this RGP; the information provided by the applicant in support of their application proves to have been false, incomplete, or inaccurate; or significant new information surfaces which the Corps did not consider in reaching the original public interest decision. Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring the permittee to comply for the issuance of an administrative order requiring the permittee to comply with the terms and conditions of the RGP and for the initiation of legal action where appropriate. The permittee will be required to pay for any corrective measures ordered by the Corps, and if fails to comply with such directive, the Corps may in certain situation (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill the permittee for the cost.

7. Renewal of the RGP: This RGP may be reviewed for reissuance prior to its expiration date. Any reissuance will be processed in accordance with 33 CFR 325.2 including a public notice and environmental procedures and documentation required by the national Environmental Policy Act of 1969.

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This permit becomes effective when the federal official, designated to act for the Secretary of the Army, has signed below.

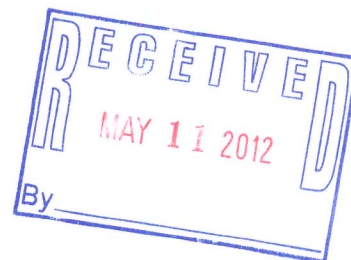
Issued for and in behalf of Lieutenant Colonel Jason D. Williams, Albuquerque District Commander.



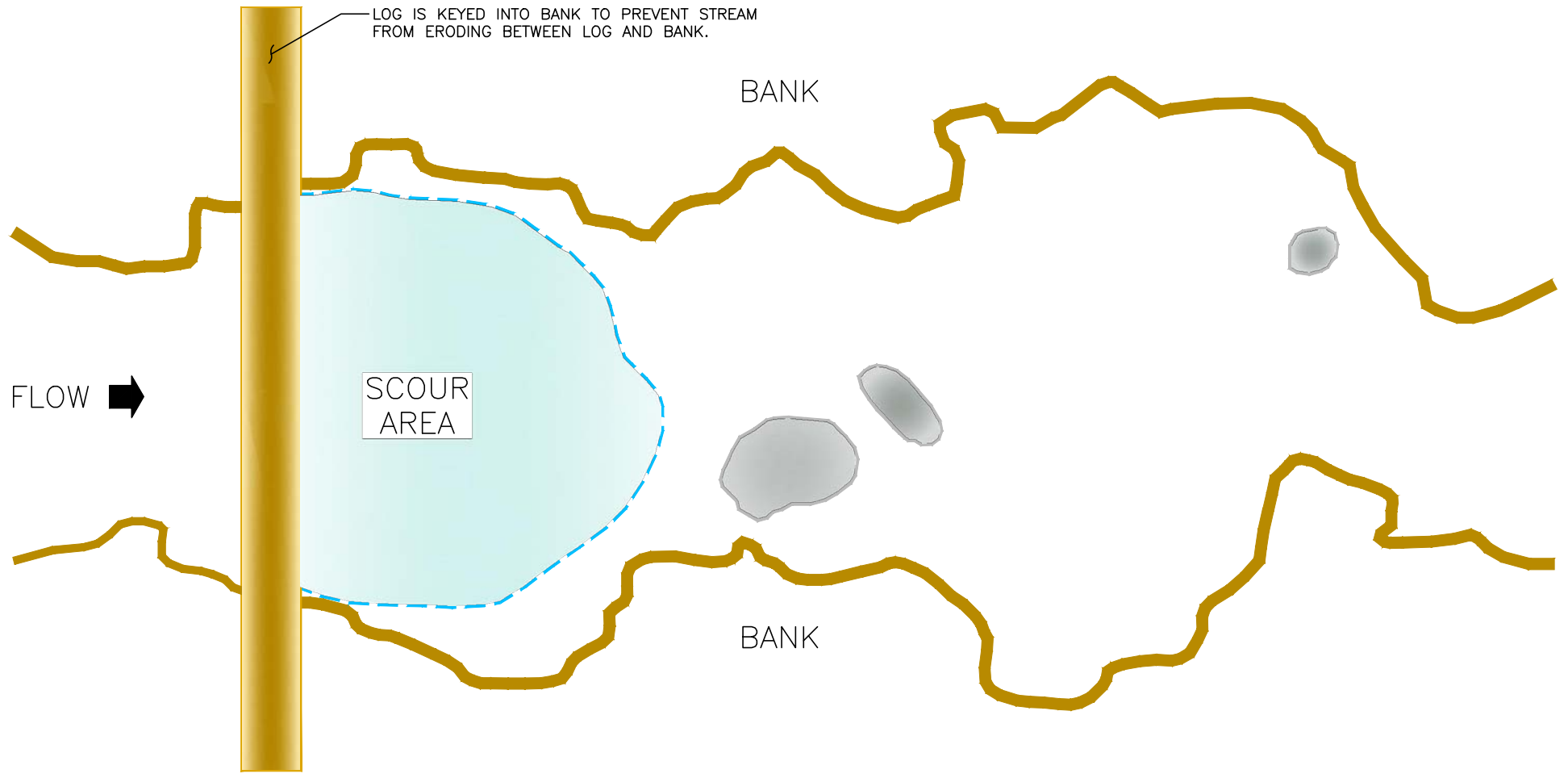
Allan Steinle, Chief
Albuquerque District Regulatory Division

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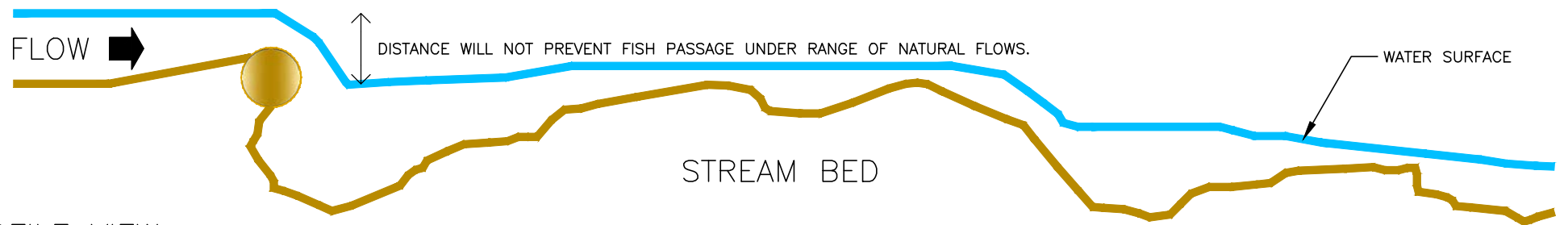
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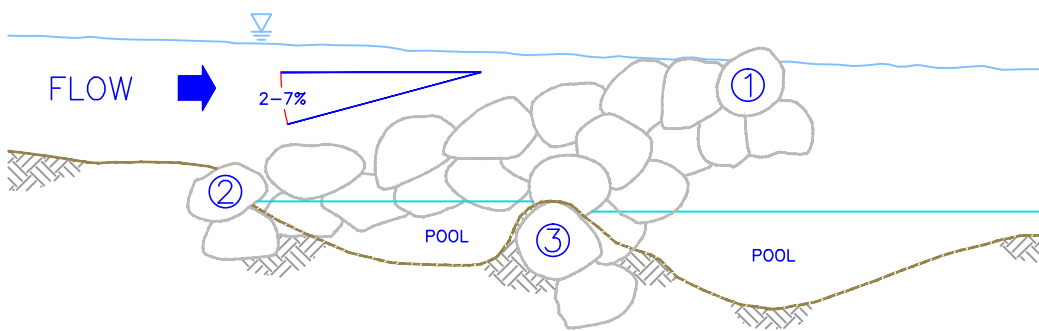
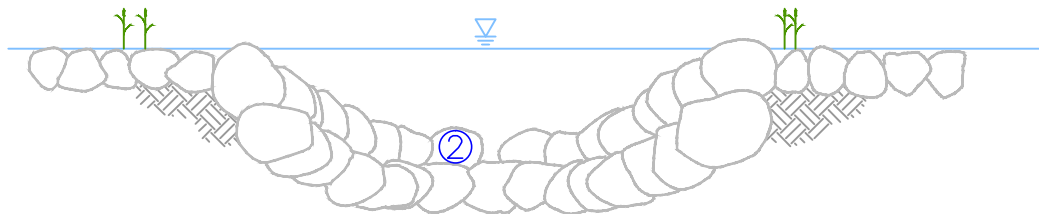
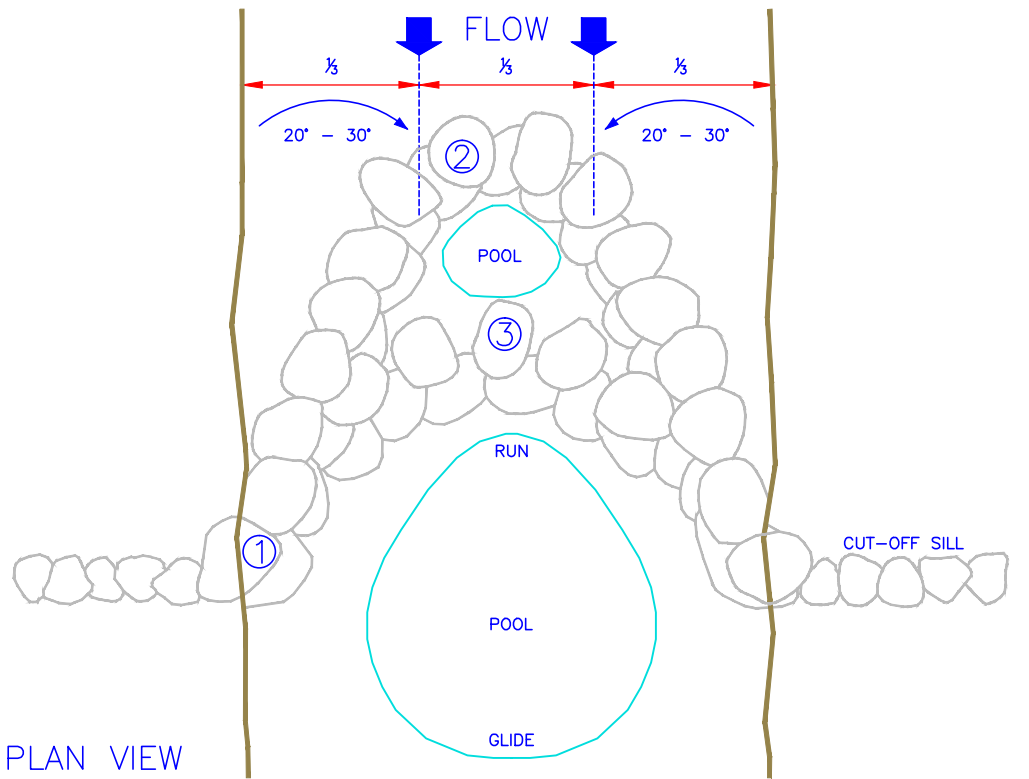
LOG/TIMBER OVER POUR PLUNGE



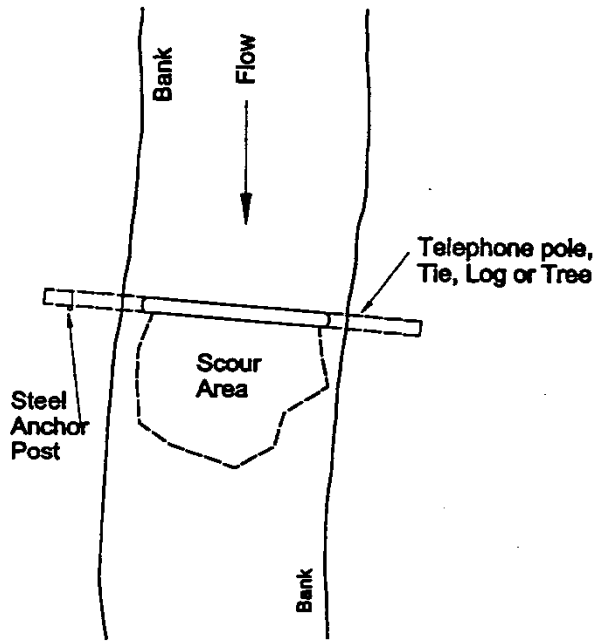
PLAN VIEW



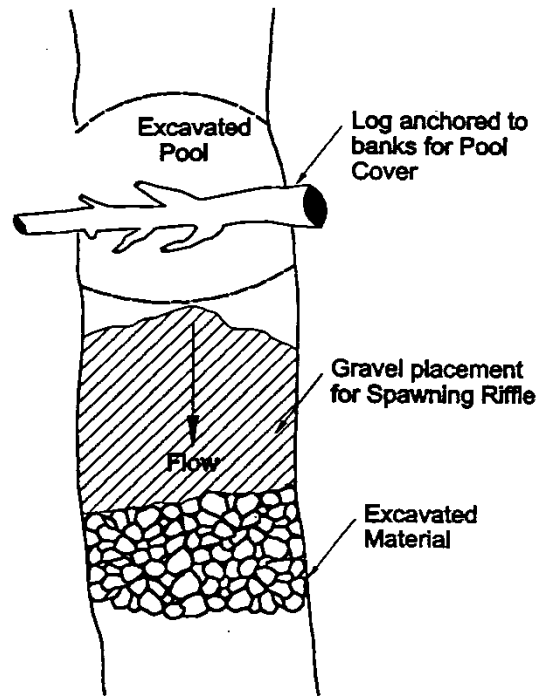
PROFILE VIEW



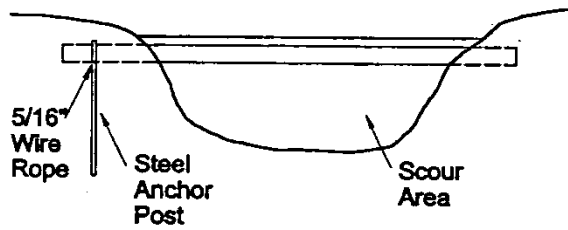
CROSS-VANE – PLAN, SECTION AND PROFILE VIEW



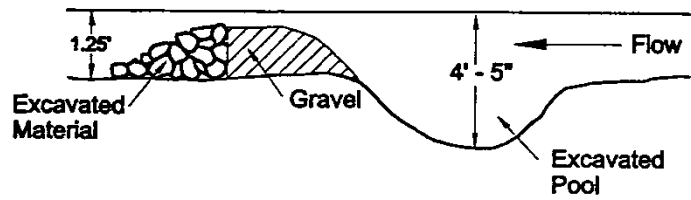
Digger Log
Plan
Scale: None



Log Covered Pool
& Downstream Spawning Riffle
Plan
Scale: None

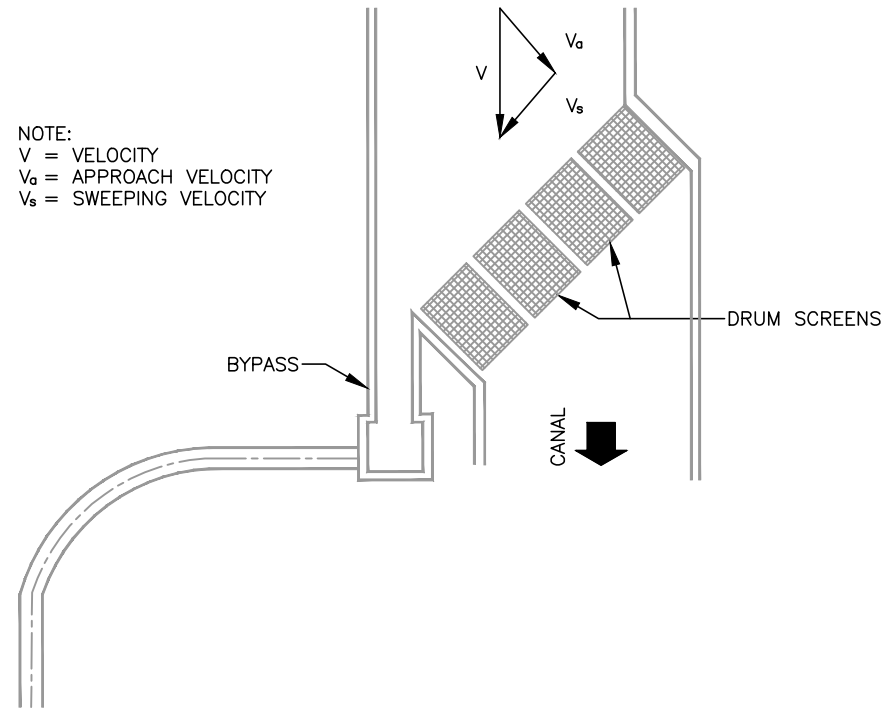


Section
Scale: None

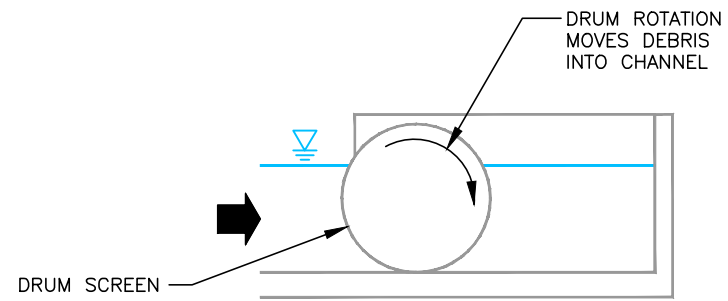


Section
Scale: None

ROTARY DRUM SCREEN



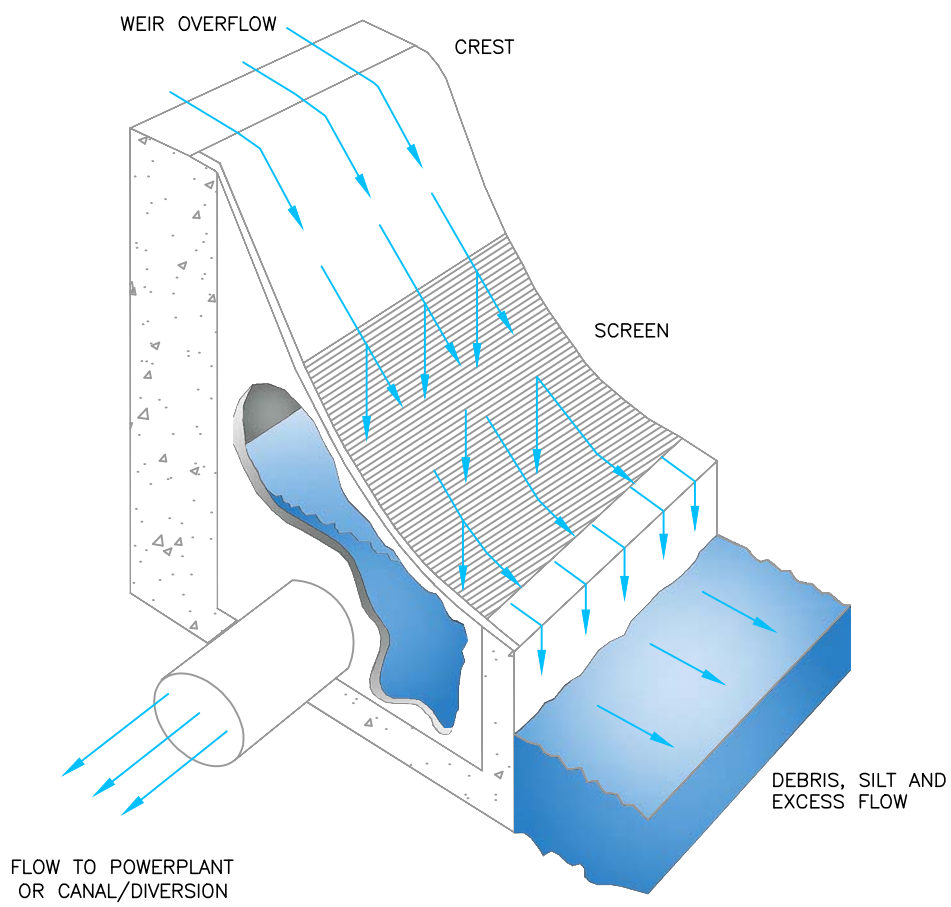
PLAN VIEW



PROFILE VIEW

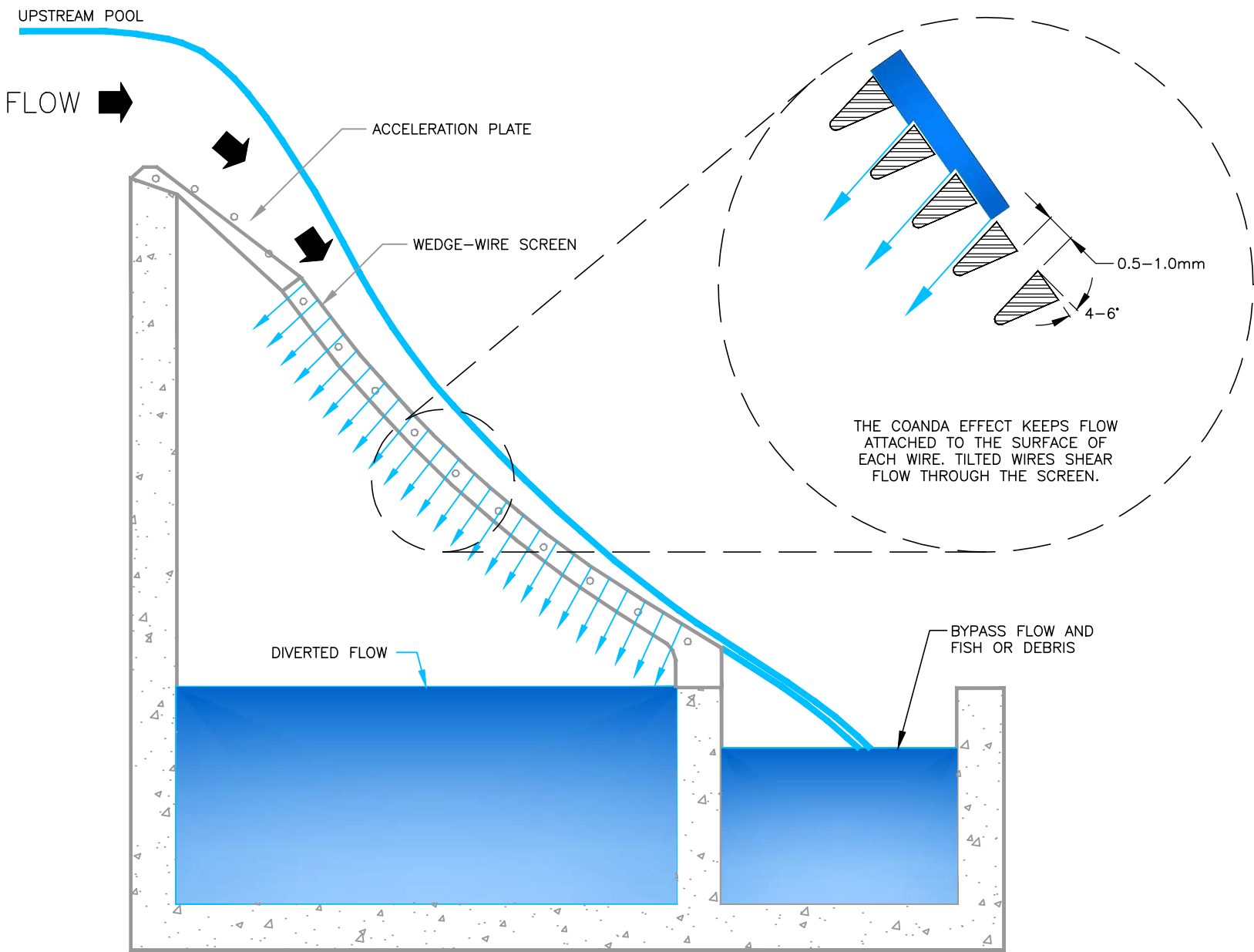
COANDA SCREEN

SCHEMATIC



COANDA SCREEN

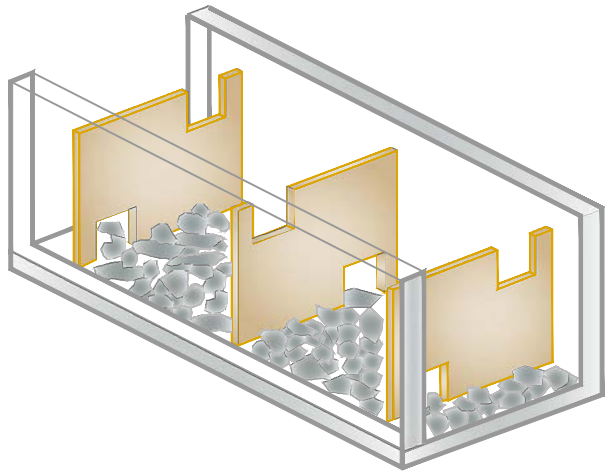
PROFILE VIEW



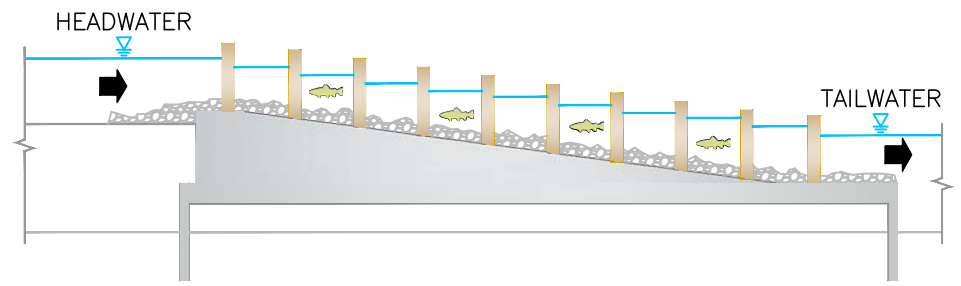
FEATURES AND TYPICAL ARRANGEMENT OF A COANDA-EFFECT SCREEN

DENIL FISHWAY

CONVENTIONAL POOL PASS (PROFILE SECTION AND POOL STRUCTURE)
(MODIFIED AND SUPPLEMENTED AFTER JENS, 1982)

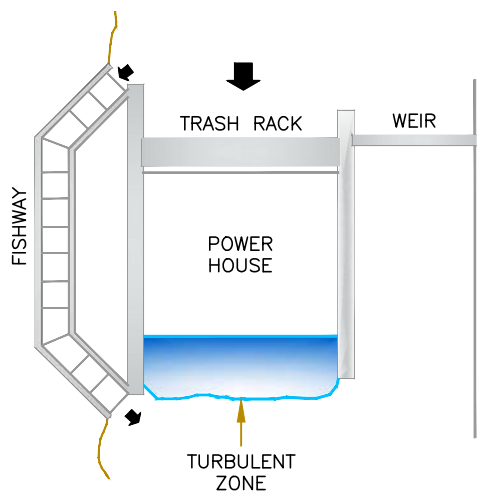


DETAIL

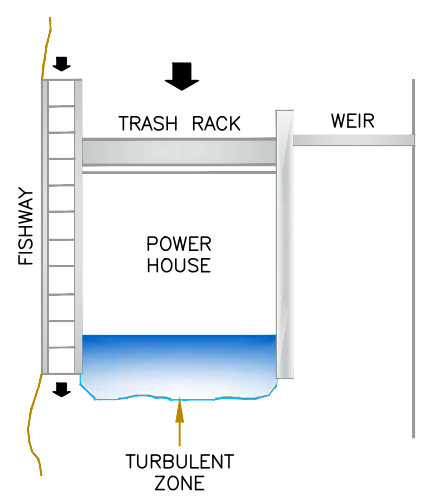


PROFILE VIEW

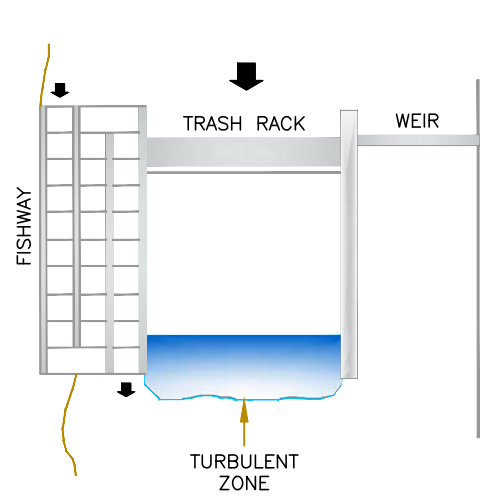
POOL PASSES (PLAN VIEW)
(MODIFIED AND SUPPLEMENTED AFTER LARINIER, 1992a)



CURVED FISHWAY



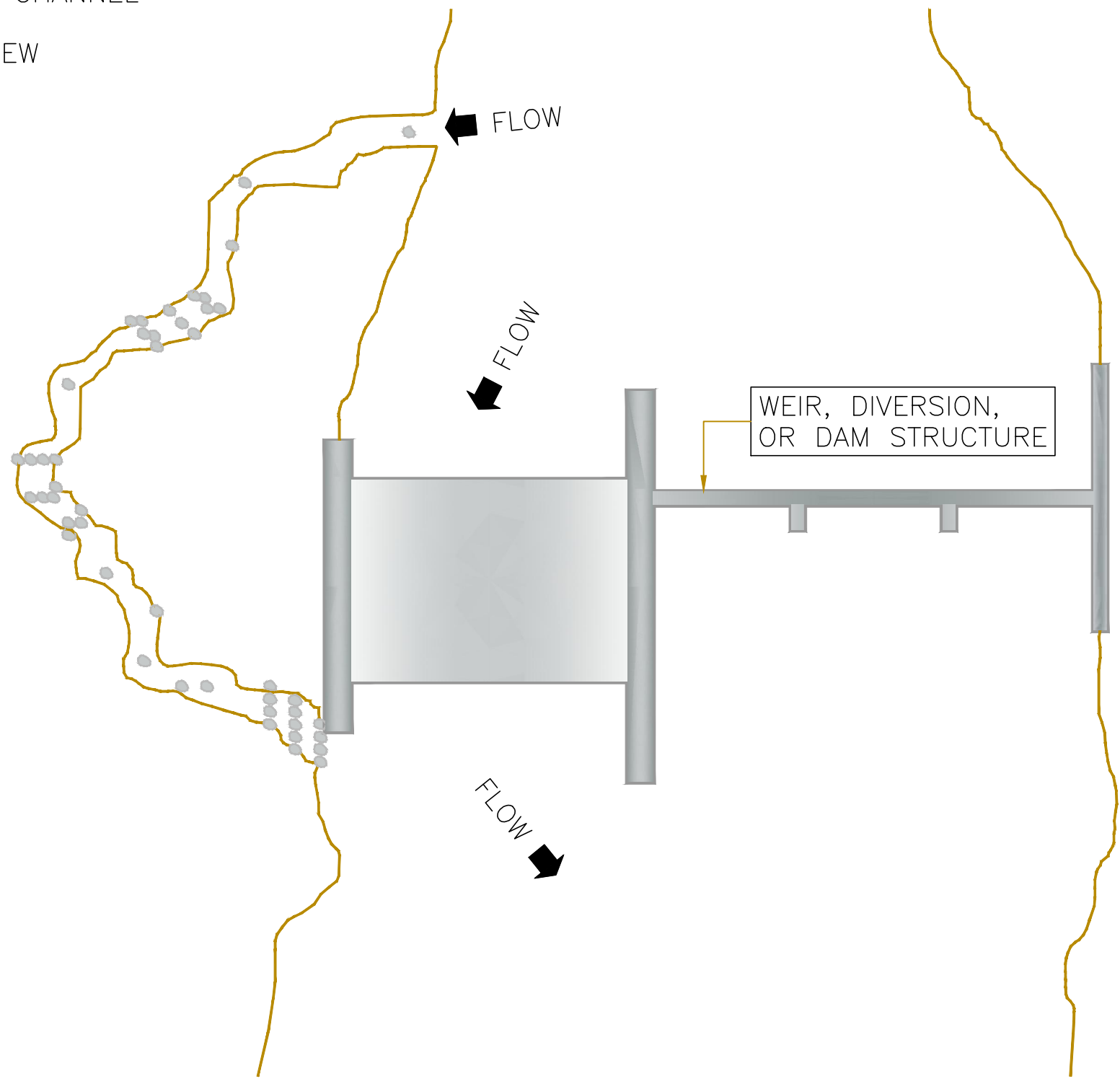
LINEAR FISHWAY



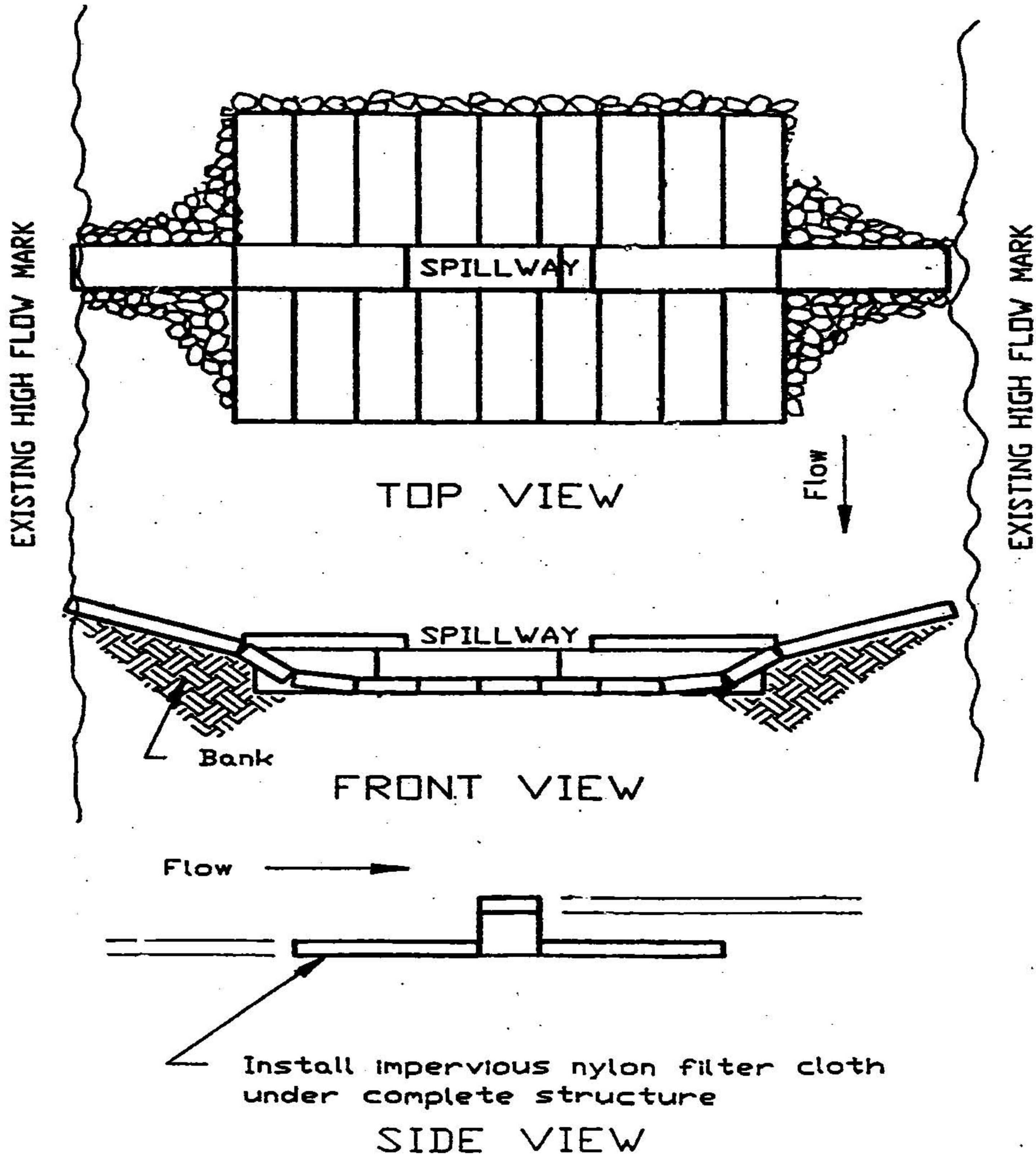
FOLDED FISHWAY
(REVERSED SEVERAL TIMES)

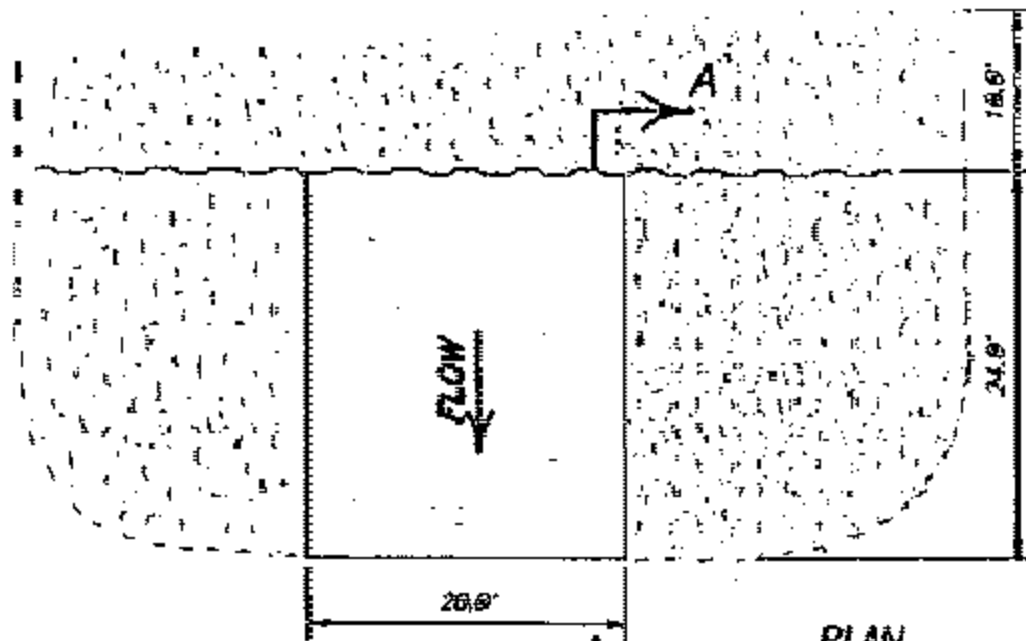
BYPASS CHANNEL

PLAN VIEW

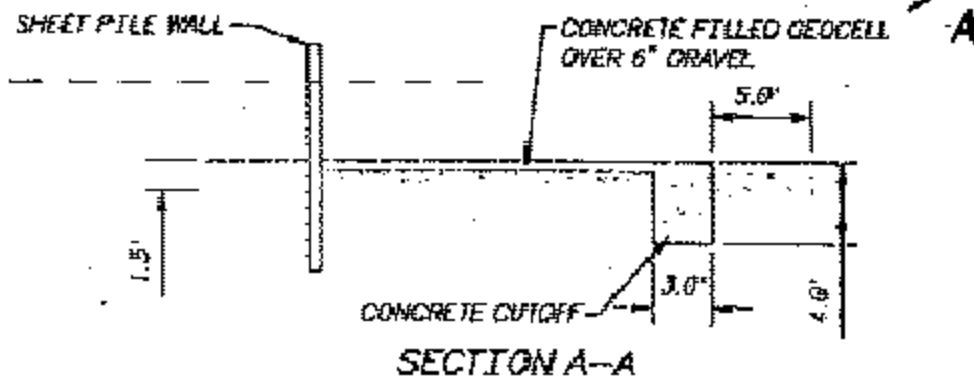


Large rock on corners to prevent high water from cutting around structure

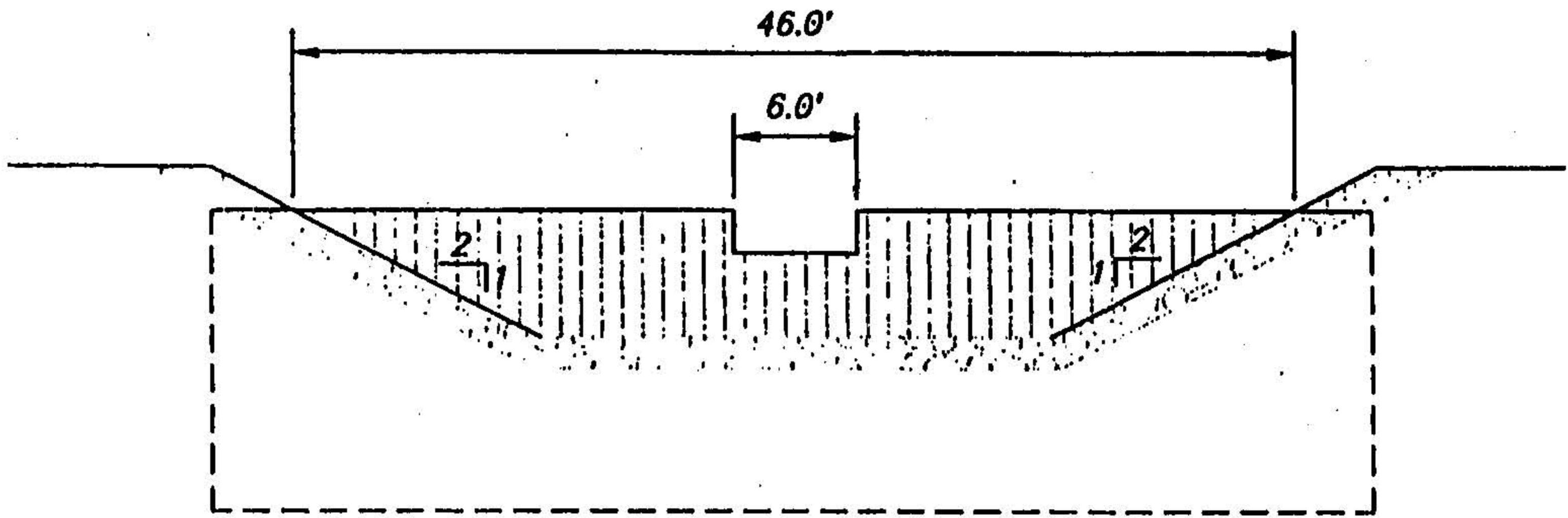




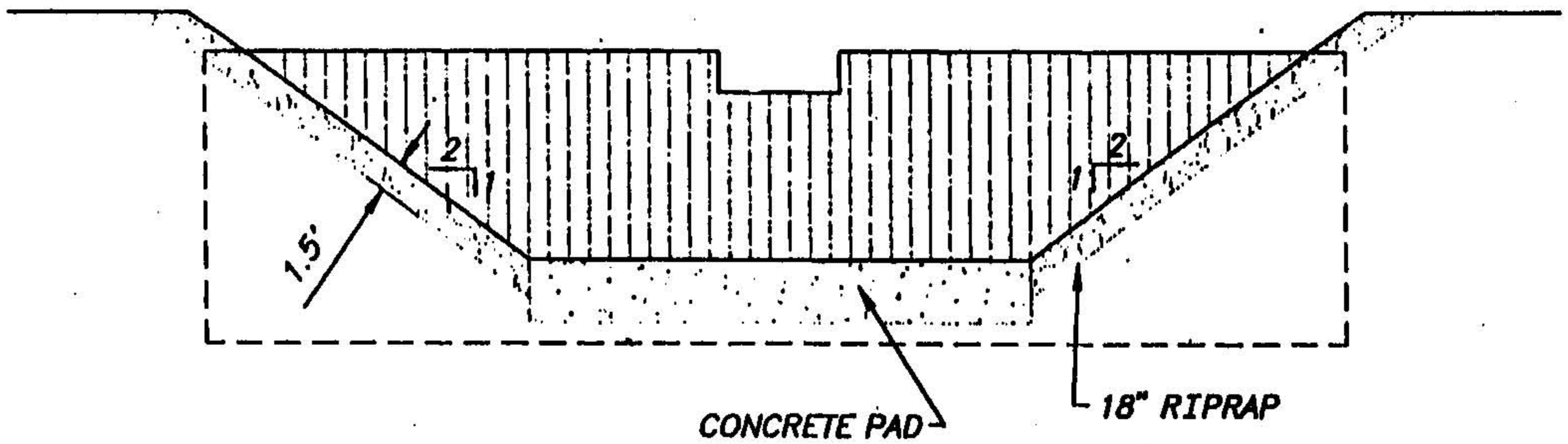
PLAN



SECTION A-A



UPSTREAM ELEVATION



DOWNSTREAM ELEVATION

SPAWNING GRAVELS

PROFILE VIEW

IMPORTED GRAVEL PLACEMENT FOR SPAWNING
AT GLIDES AND UPSTREAM HEAD OF RIFFLES.

WATER SURFACE

RIFFLE

RUN

POOL

GLIDE

RIFFLE


RUN

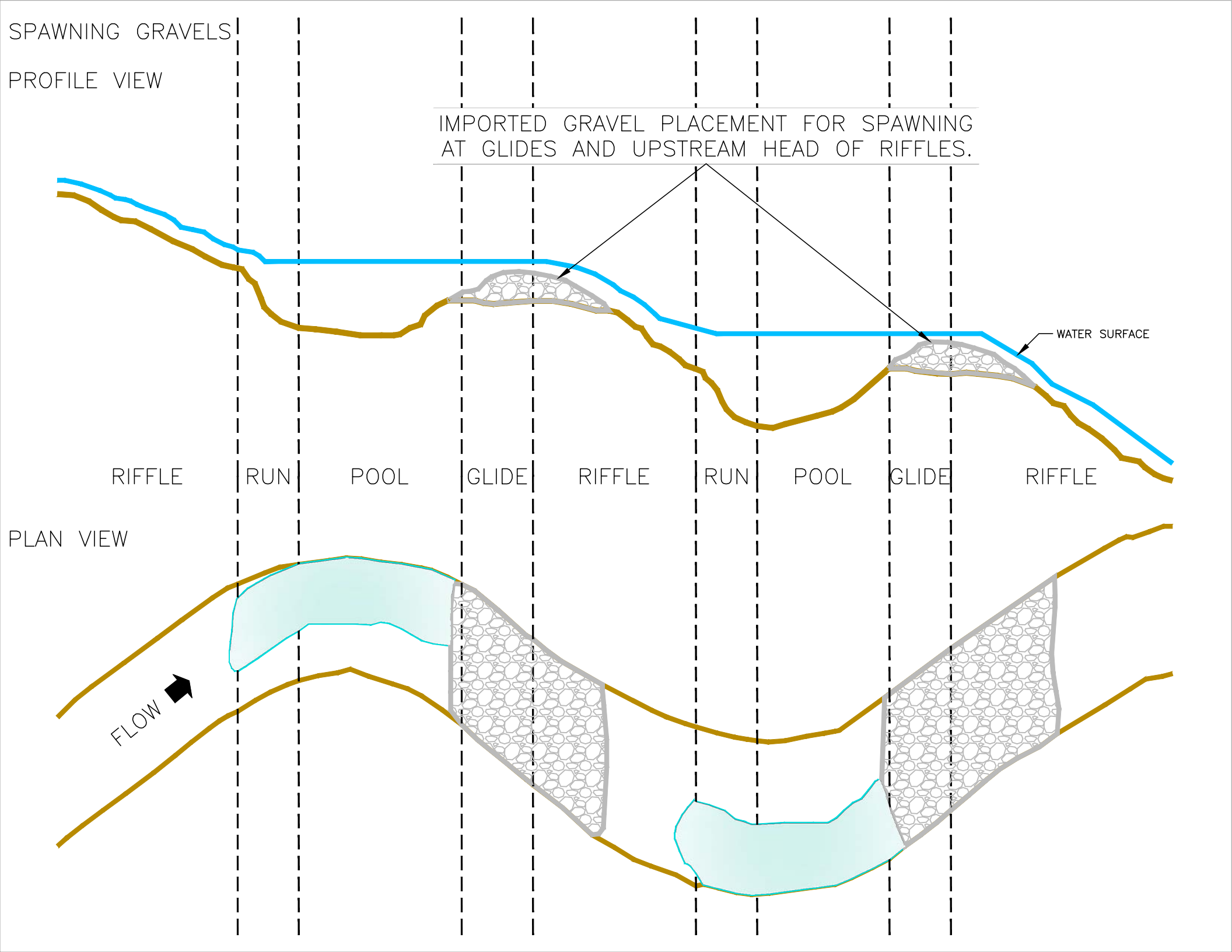
POOL

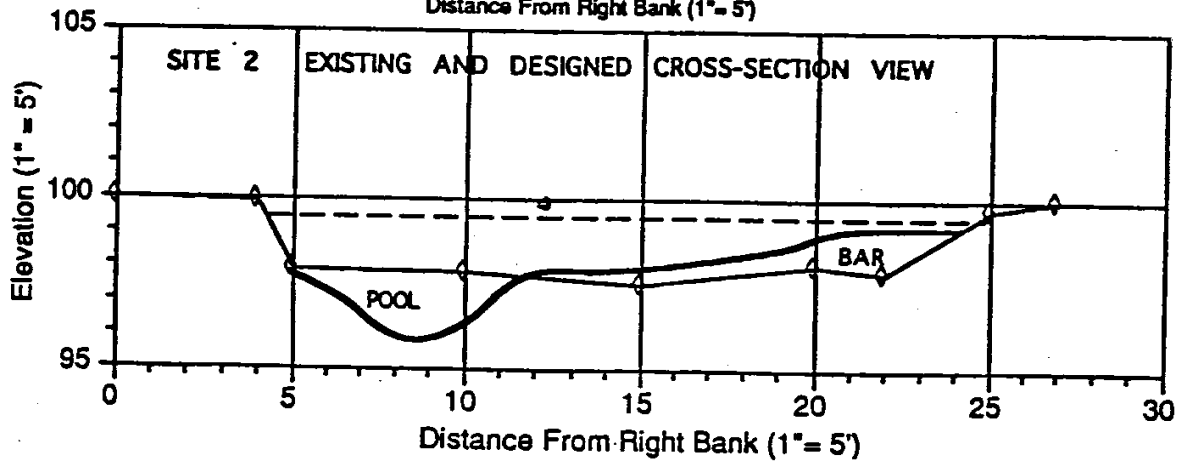
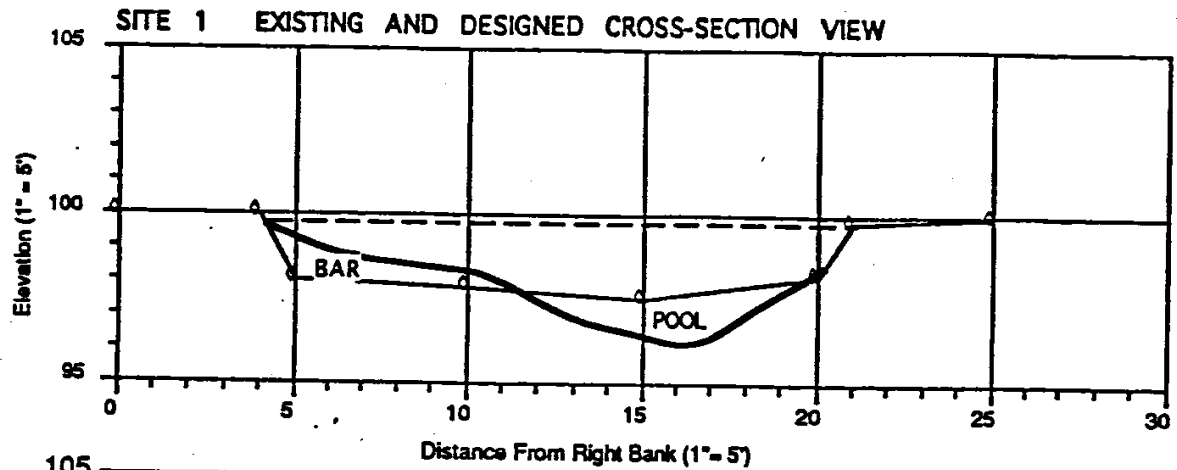
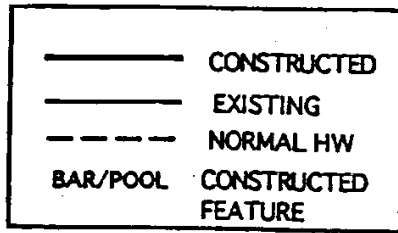
GLIDE

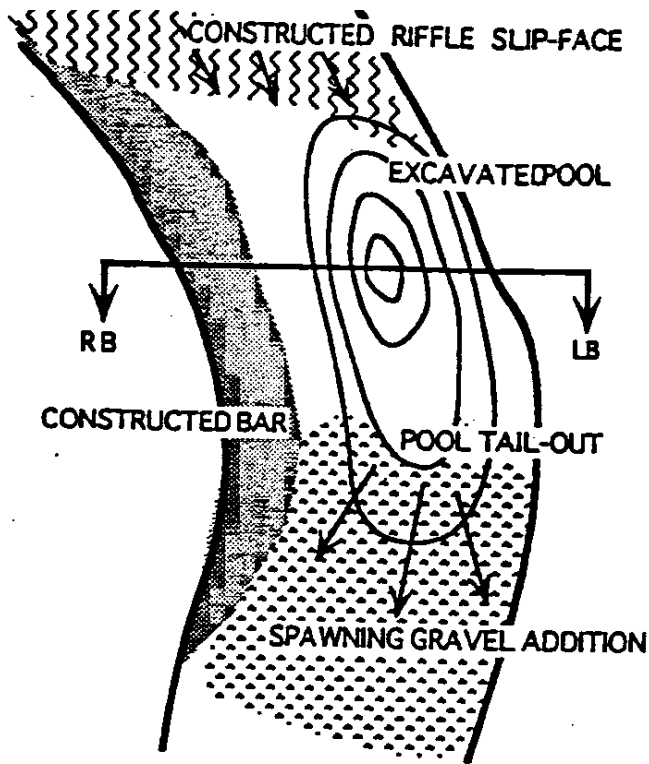
RIFFLE

PLAN VIEW

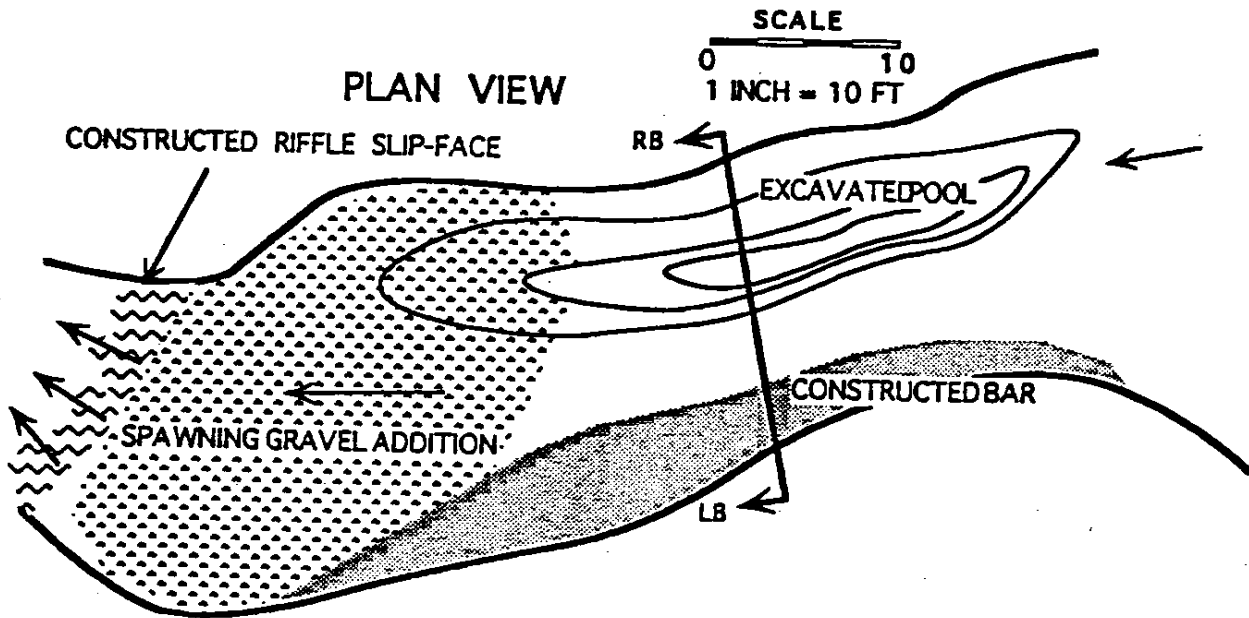
FLOW 





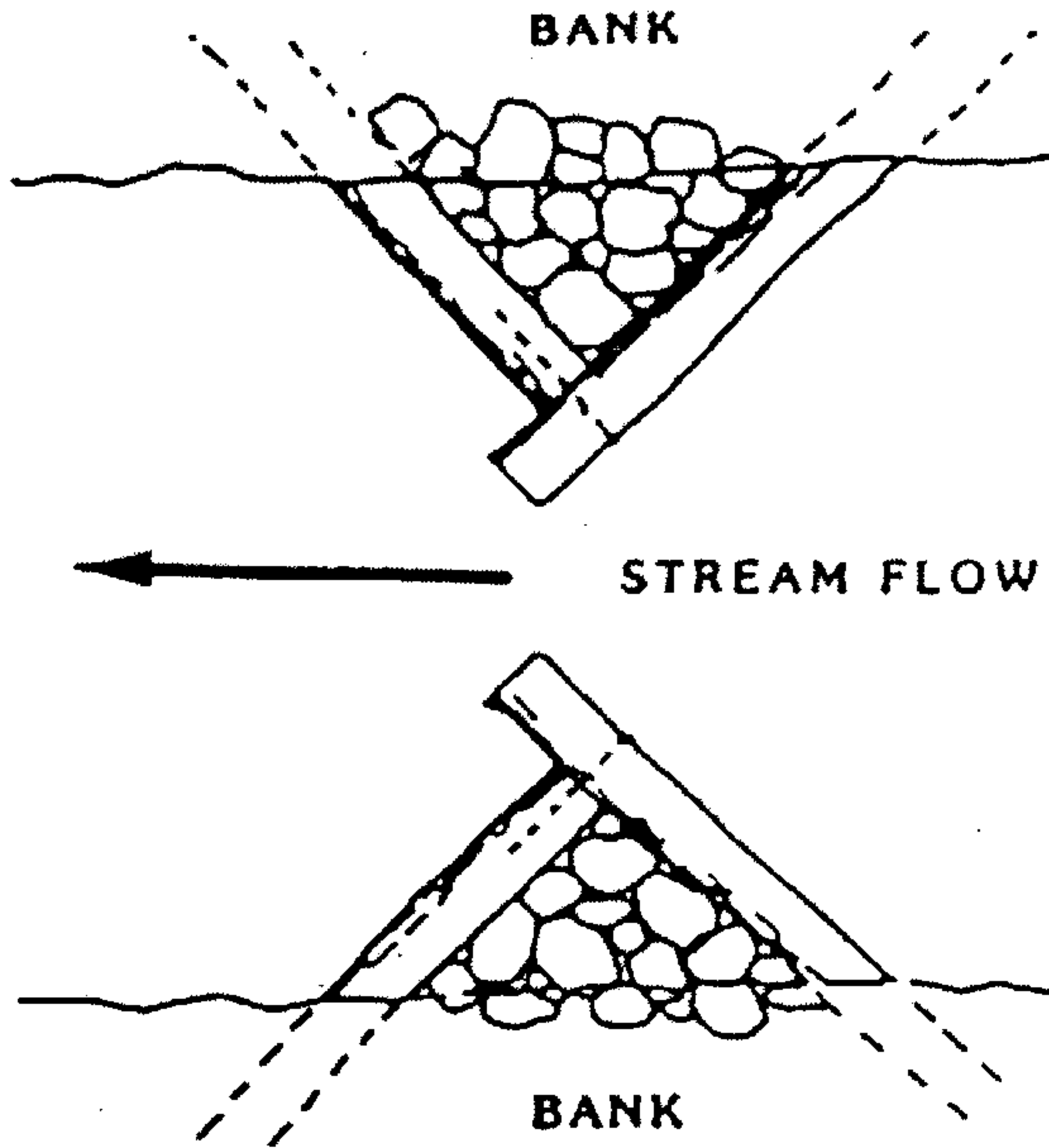


MATERIAL QUANTITIES: EXCAVATE 9.2 CU-Y POOL TO BUILD BAR AND RIFFLE. PLACE 8 CU-Y GRAVEL.

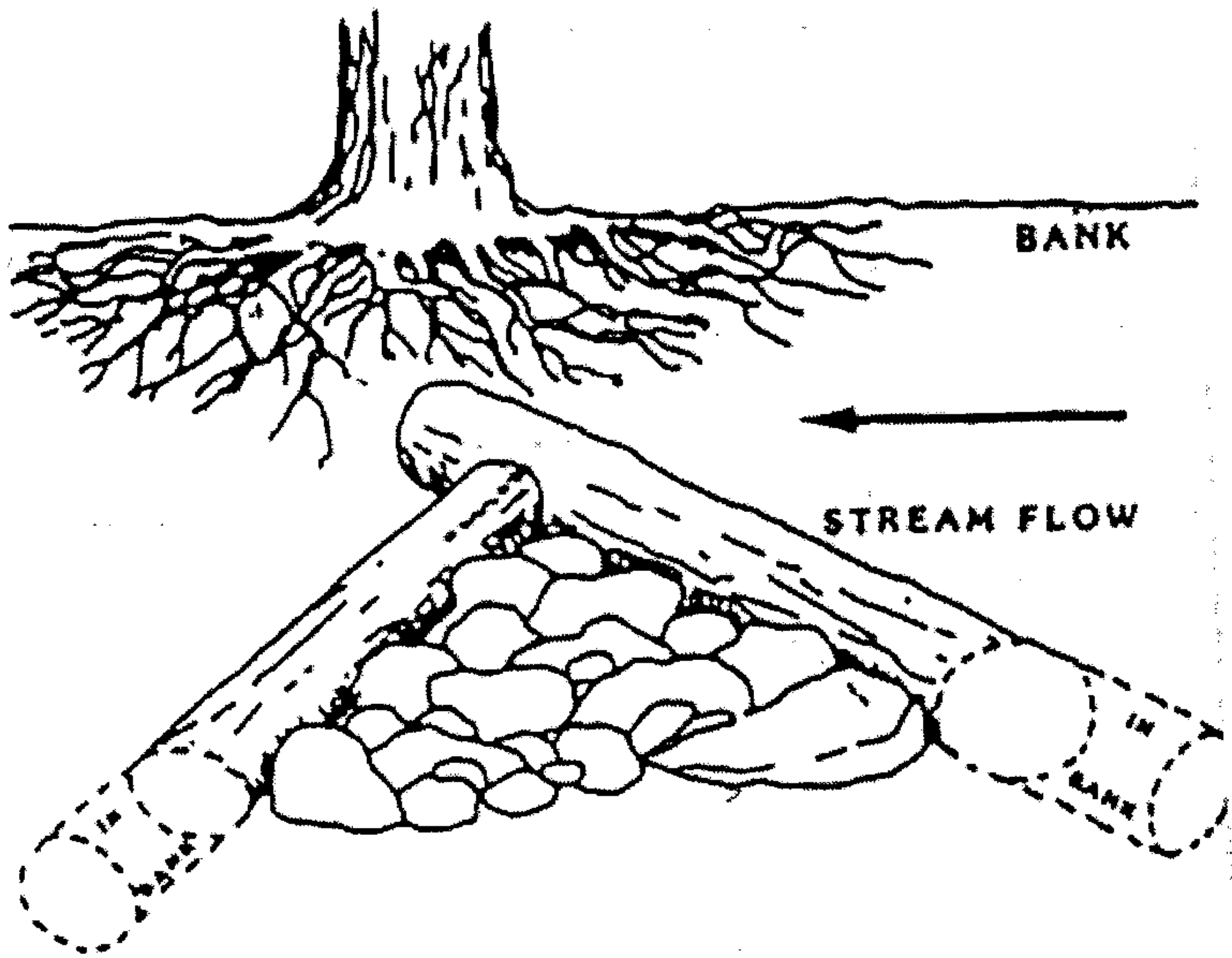


SCALE
0 10
1 INCH = 10 FT

MATERIAL QUANTITIES: EXCAVATE 8.5 CU-Y POOL TO BUILD BAR AND RIFFLE. PLACE 8 CU-Y GRAVEL.

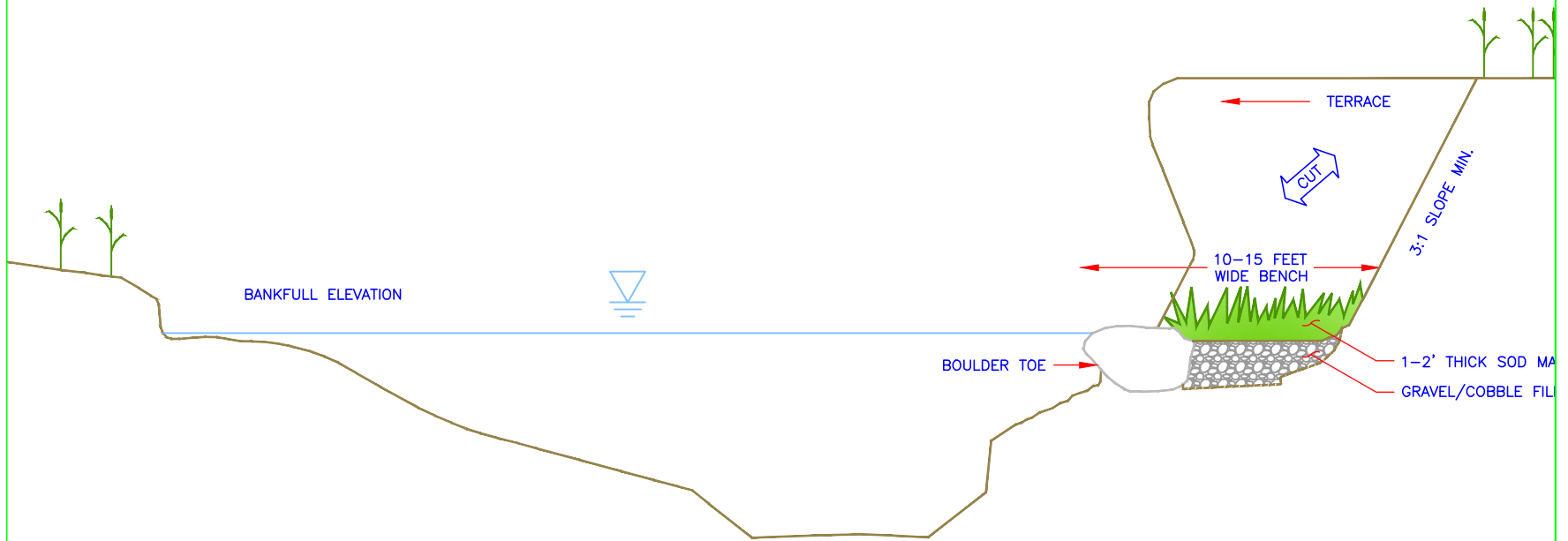


Double-wing deflector. (Seehorn, 1985)



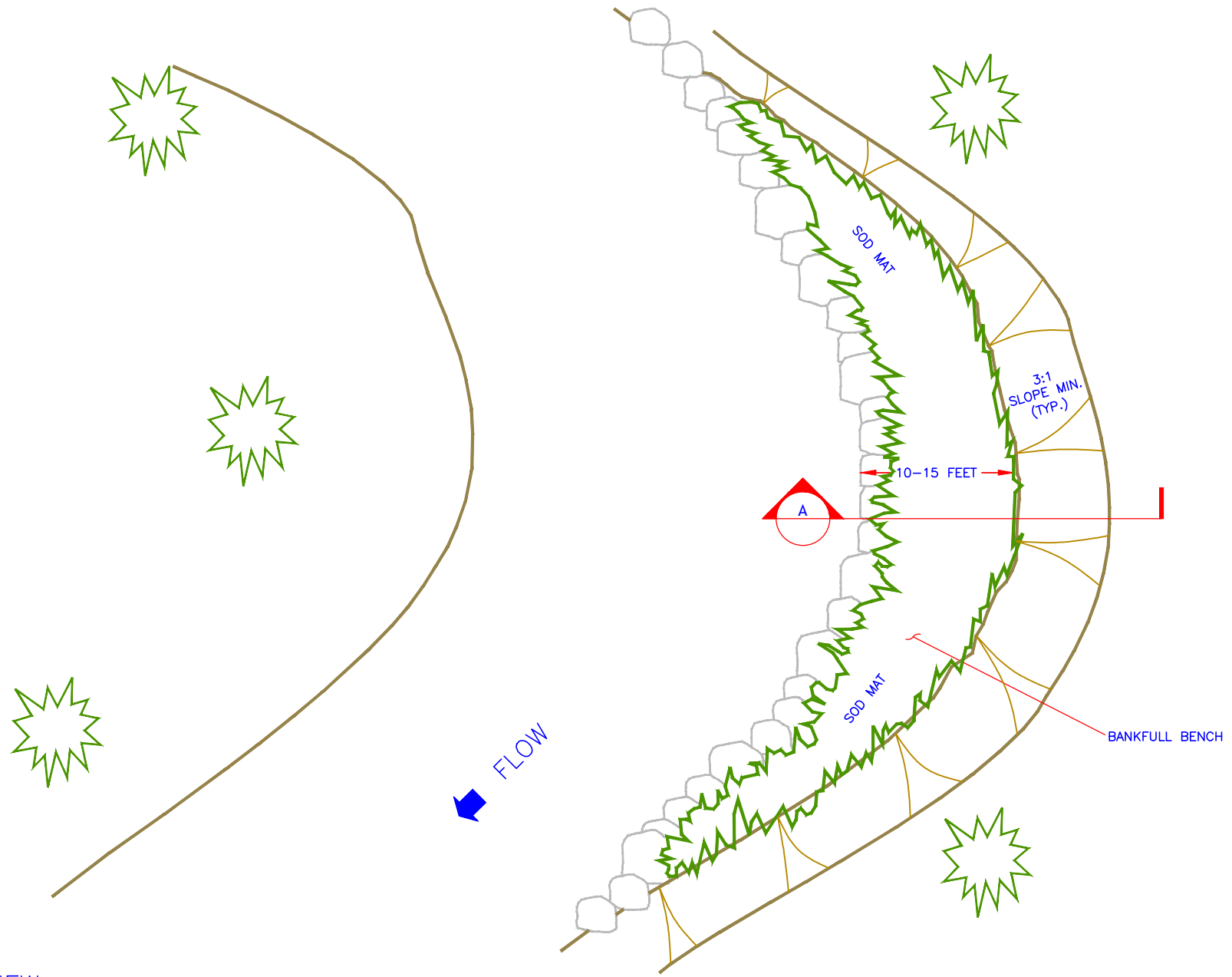
Single-wing deflector. (Seehorn, 1985)

BANKFULL BENCH: TOE STONE SOD MAT



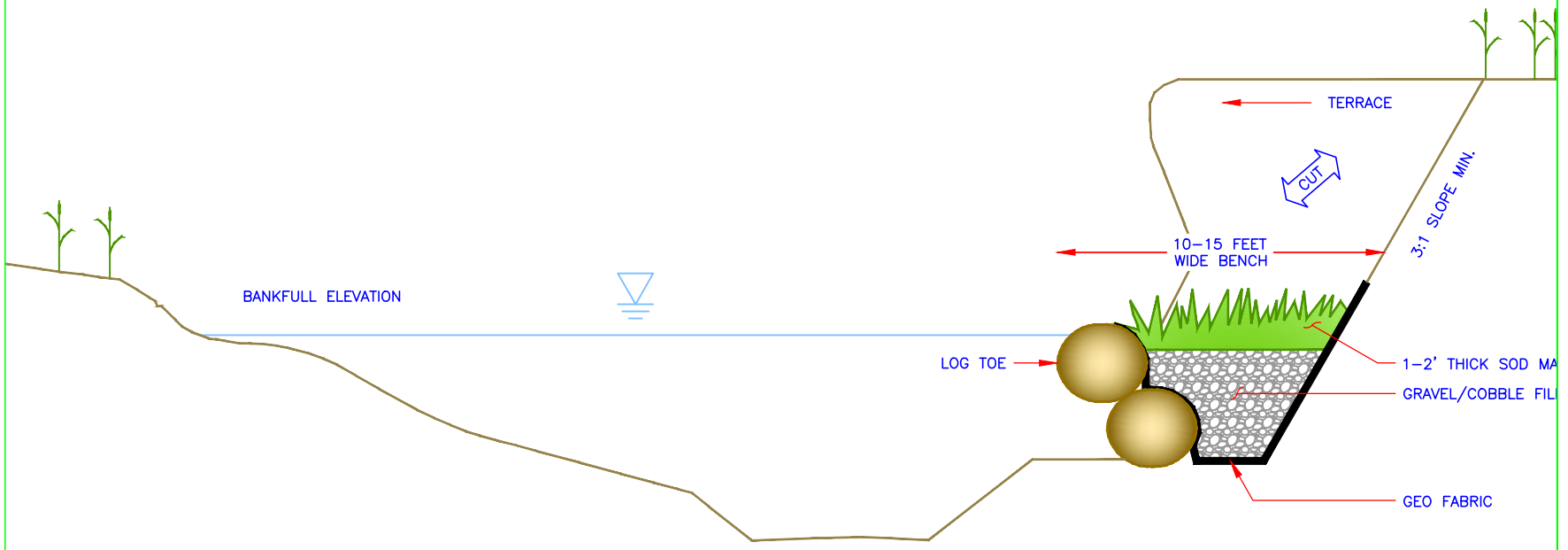
CROSS-SECTION VIEW A

BANKFULL BENCH: TOE STONE SOD MAT



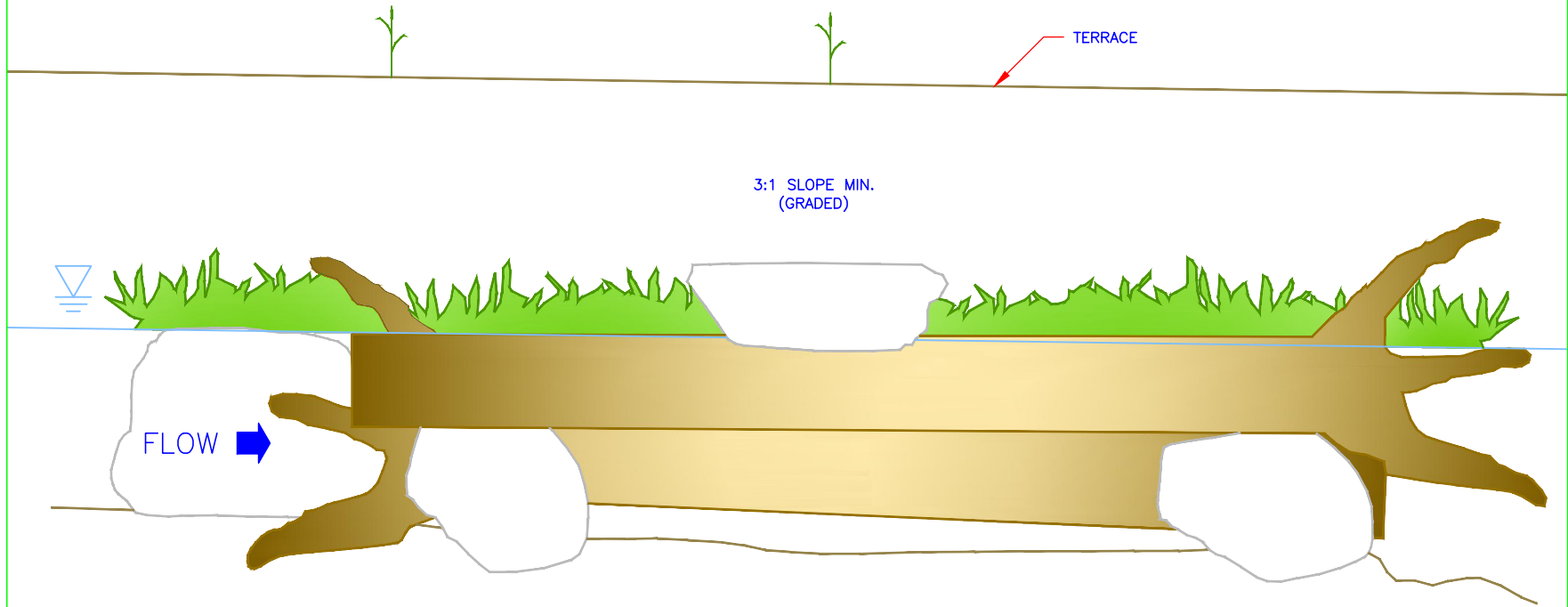
PLAN VIEW

BANKFULL BENCH: TOE LOG SOD MAT



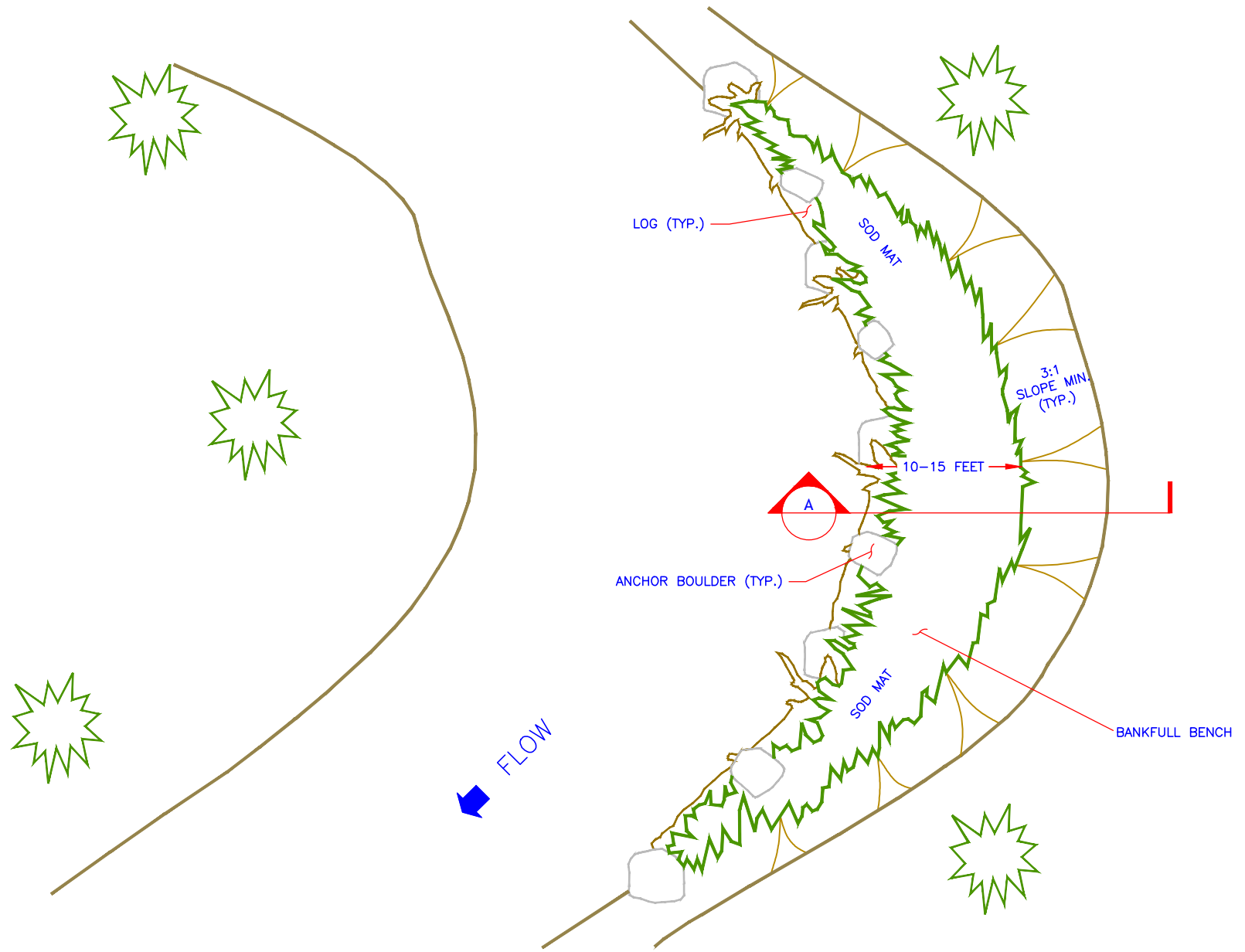
CROSS-SECTION VIEW A

BANKFULL BENCH: TOE LOG SOD MAT



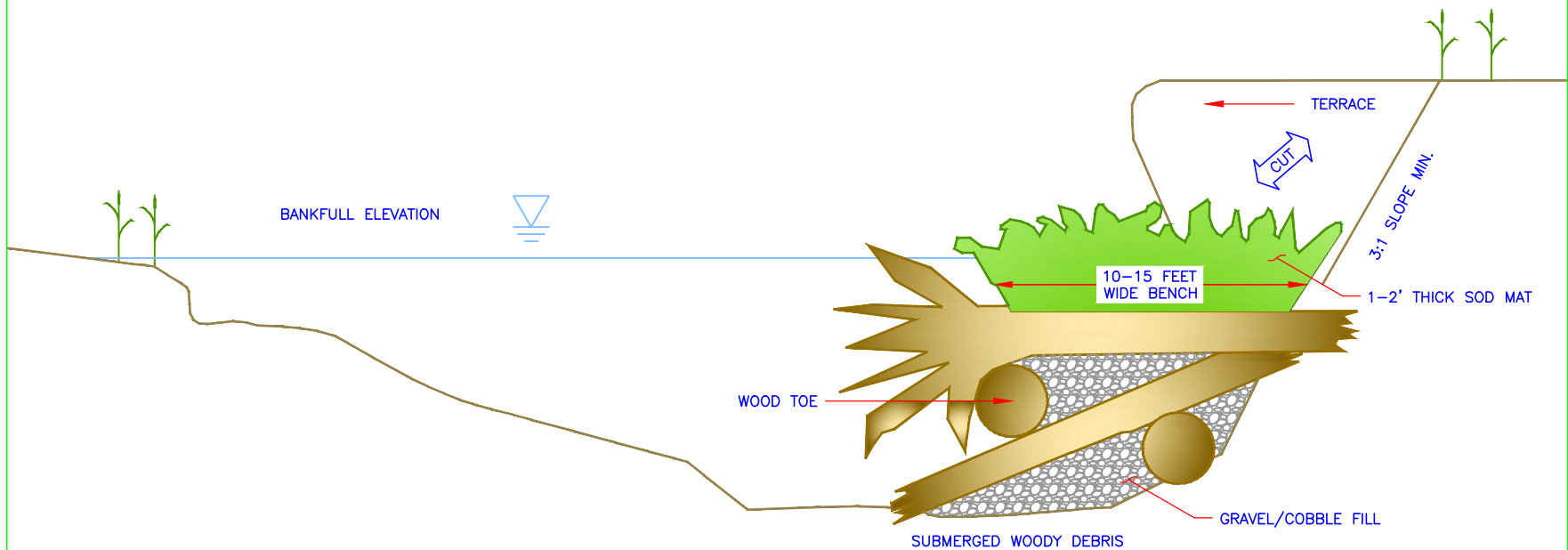
PROFILE VIEW

BANKFULL BENCH: TOE LOG SOD MAT



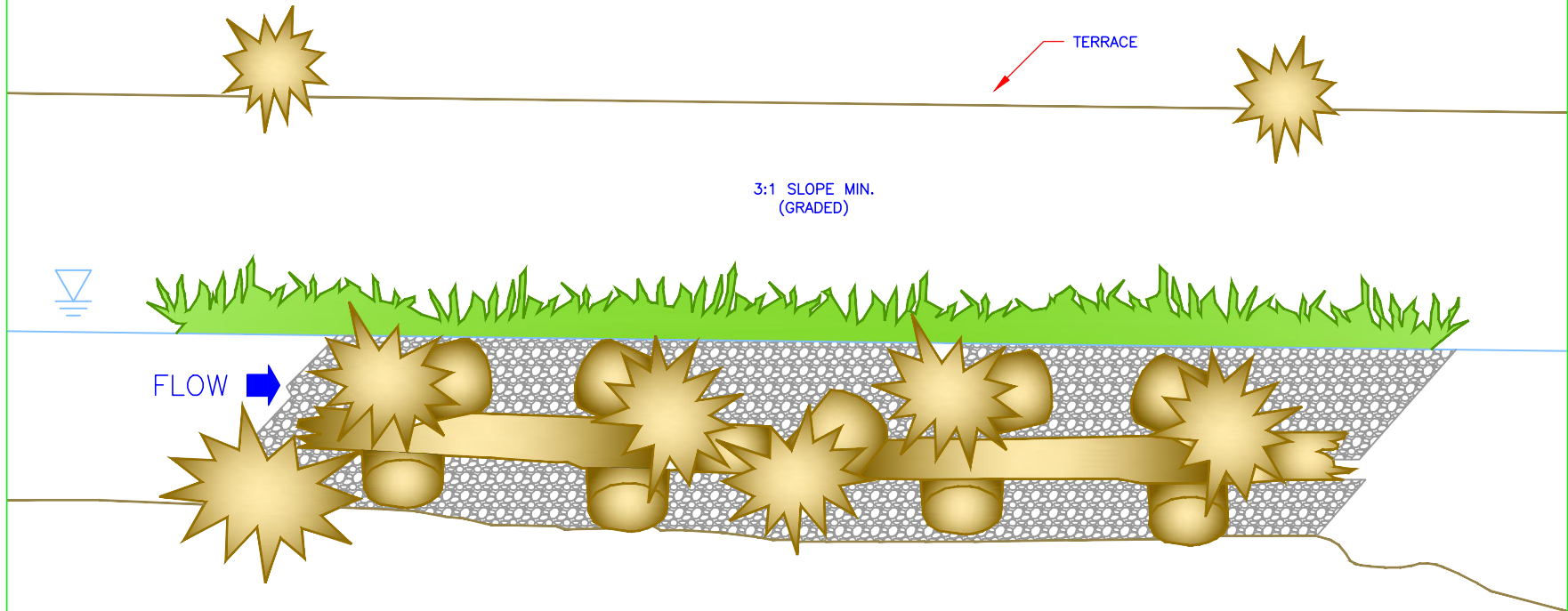
PLAN VIEW

BANKFULL BENCH: TOE WOOD SOD MAT



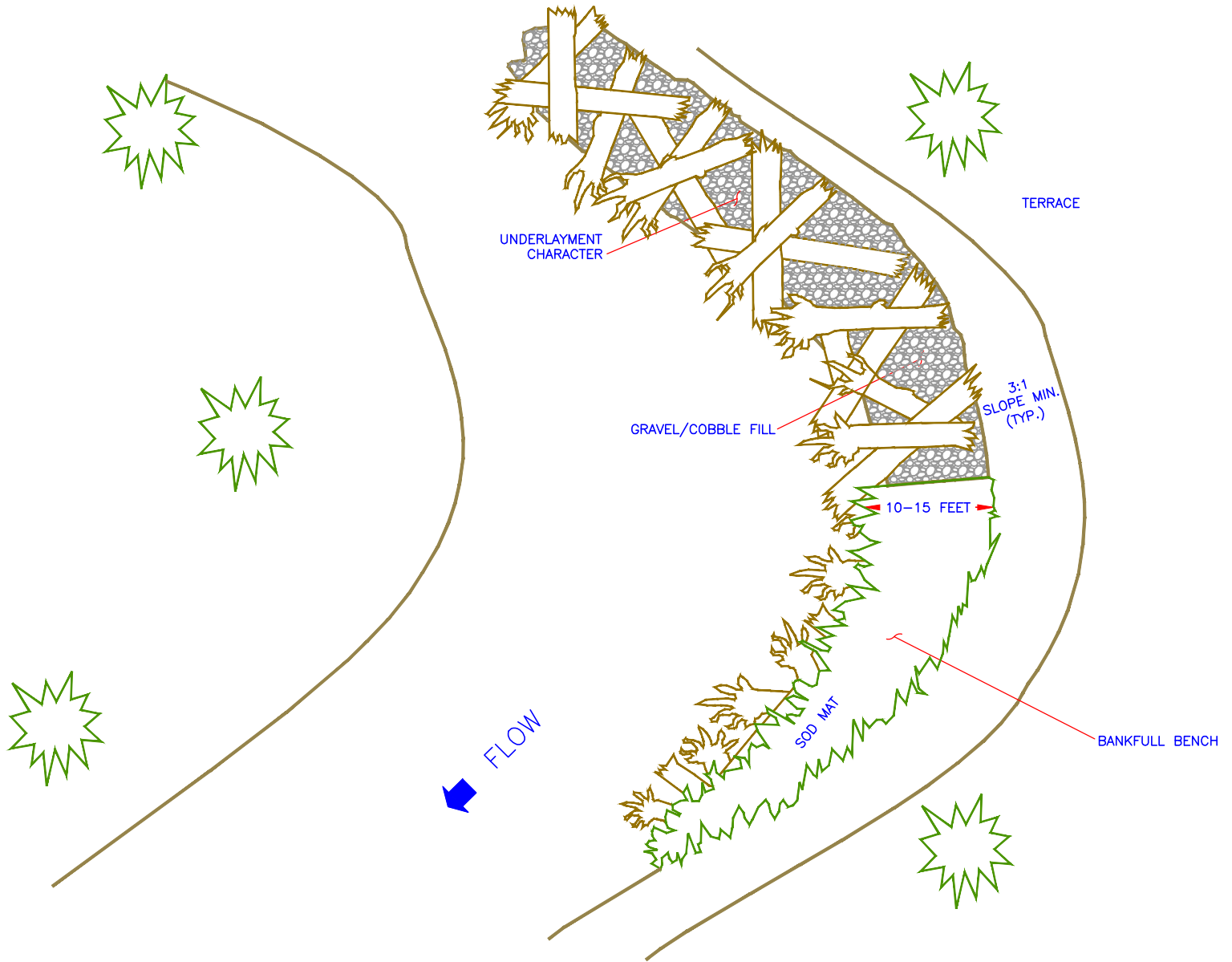
CROSS-SECTION VIEW

BANKFULL BENCH: TOE WOOD SOD MAT

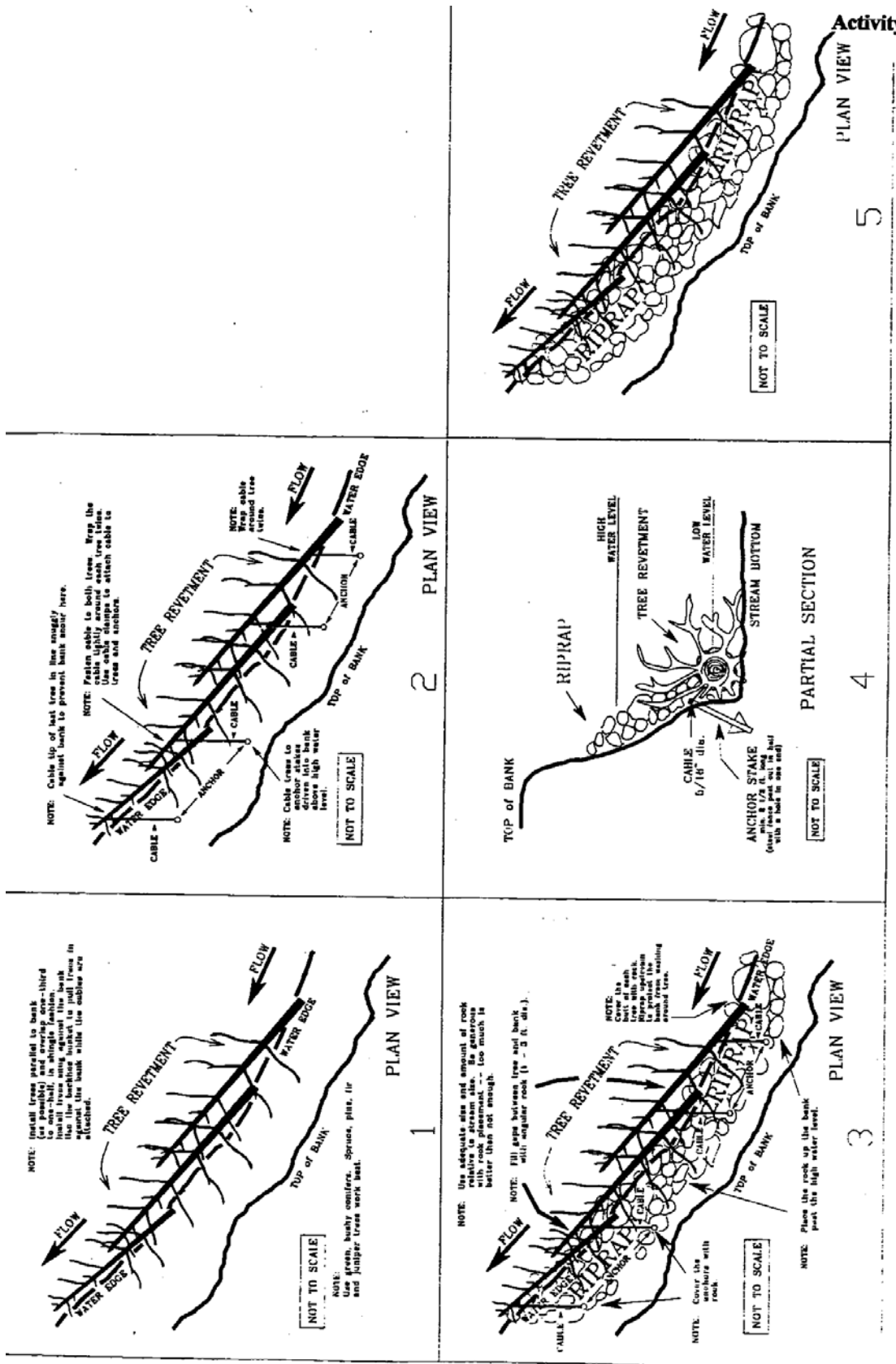


PROFILE VIEW

BANKFULL BENCH: TOE WOOD SOD MAT



PLAN VIEW

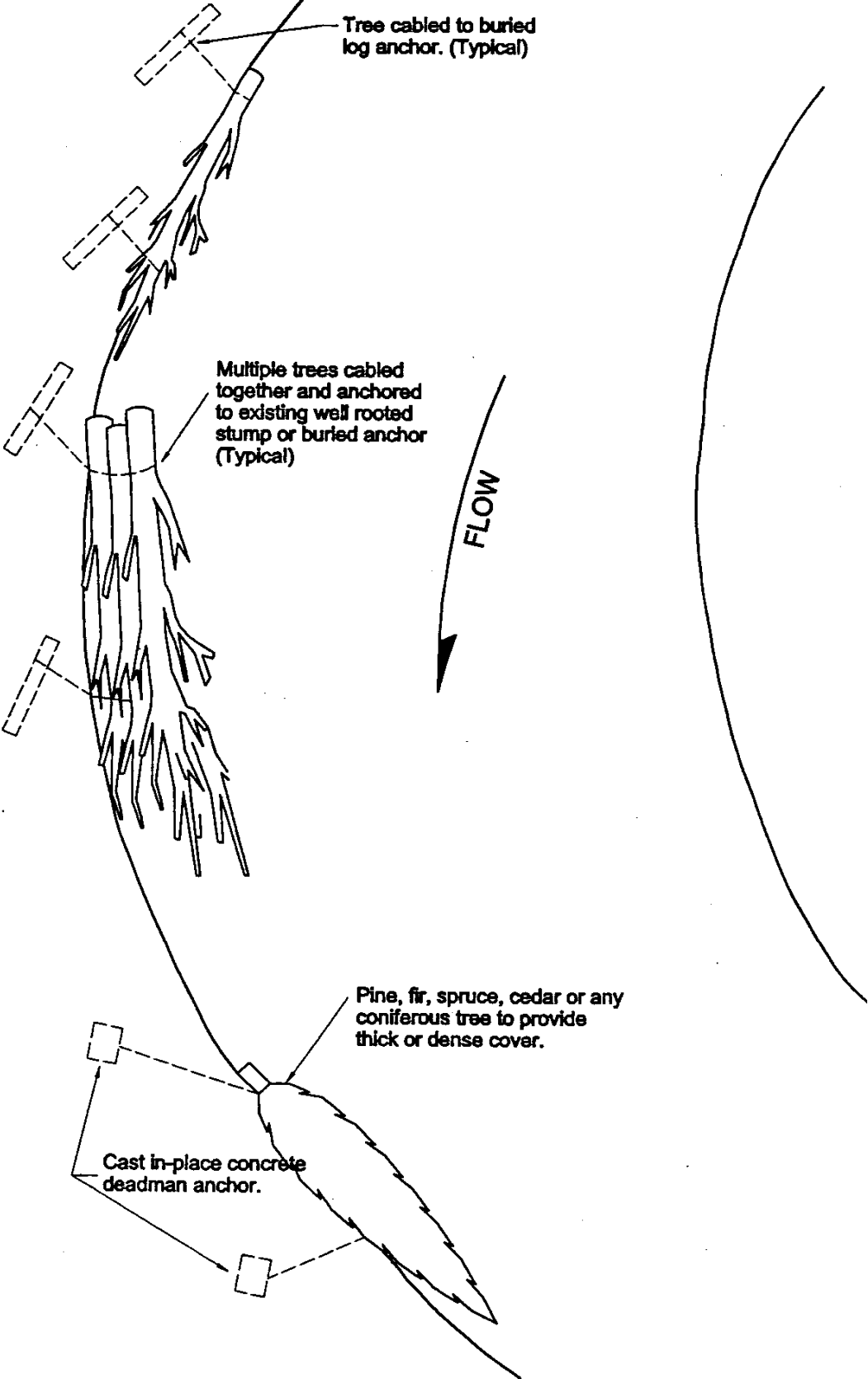


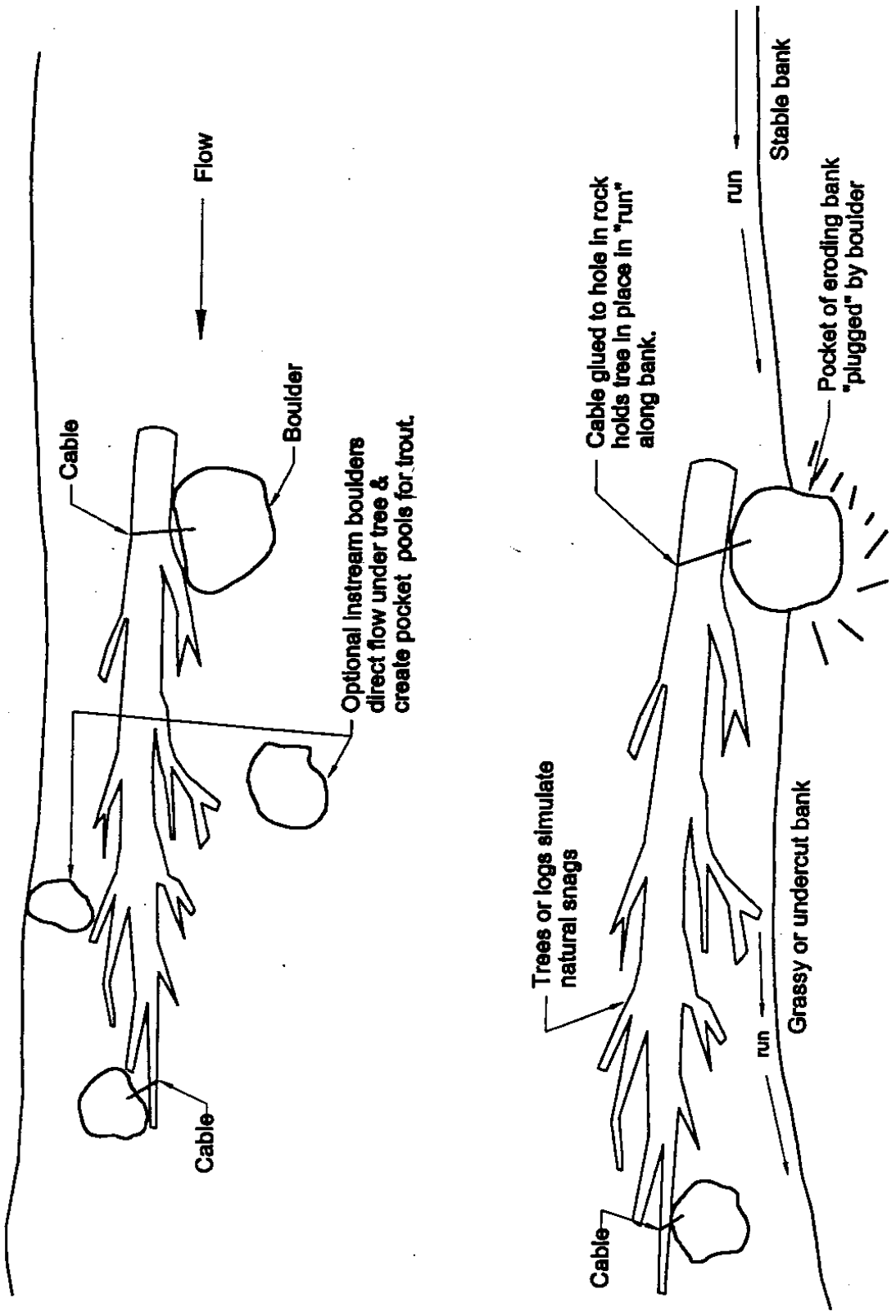
Activity

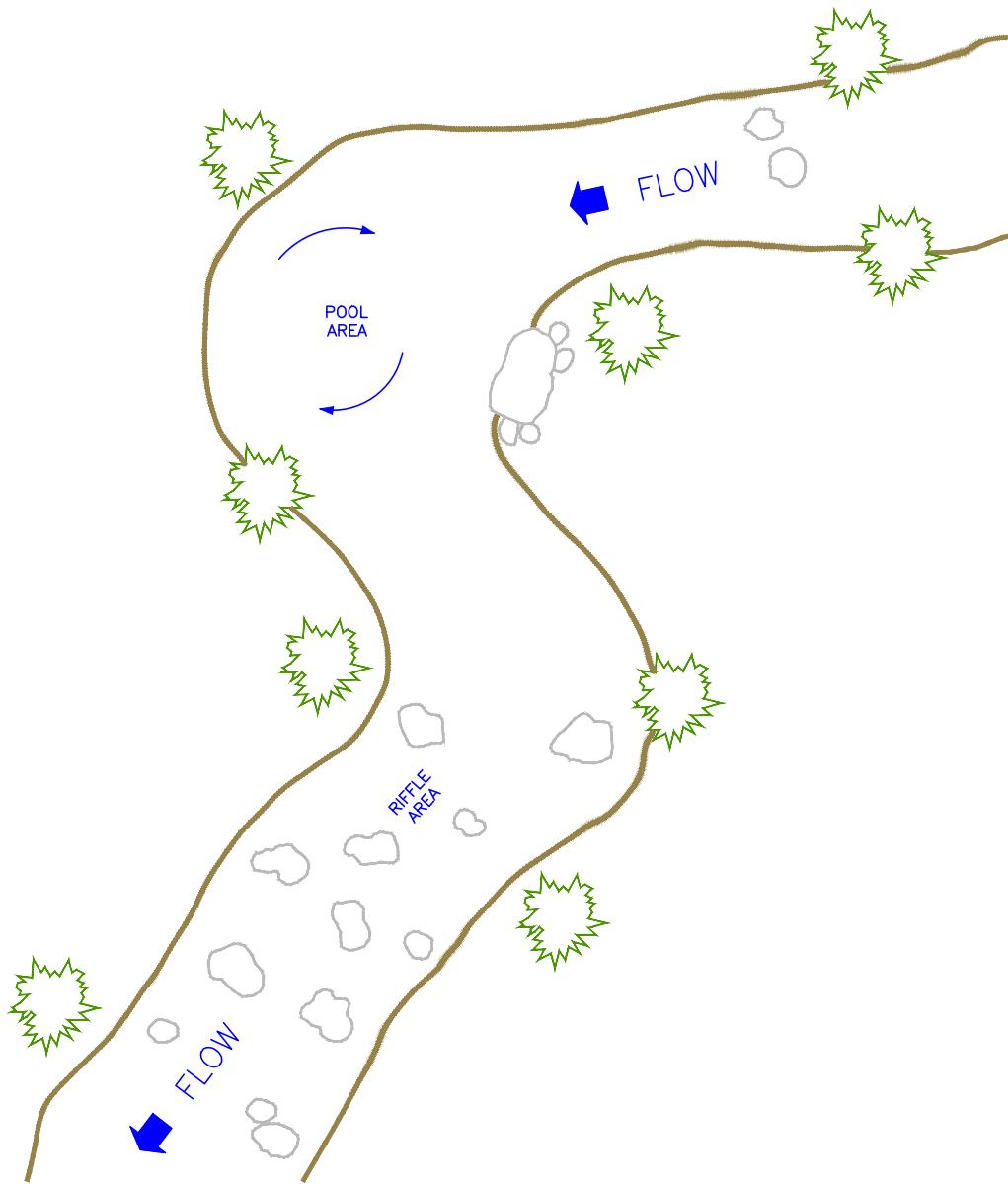
5

4

3

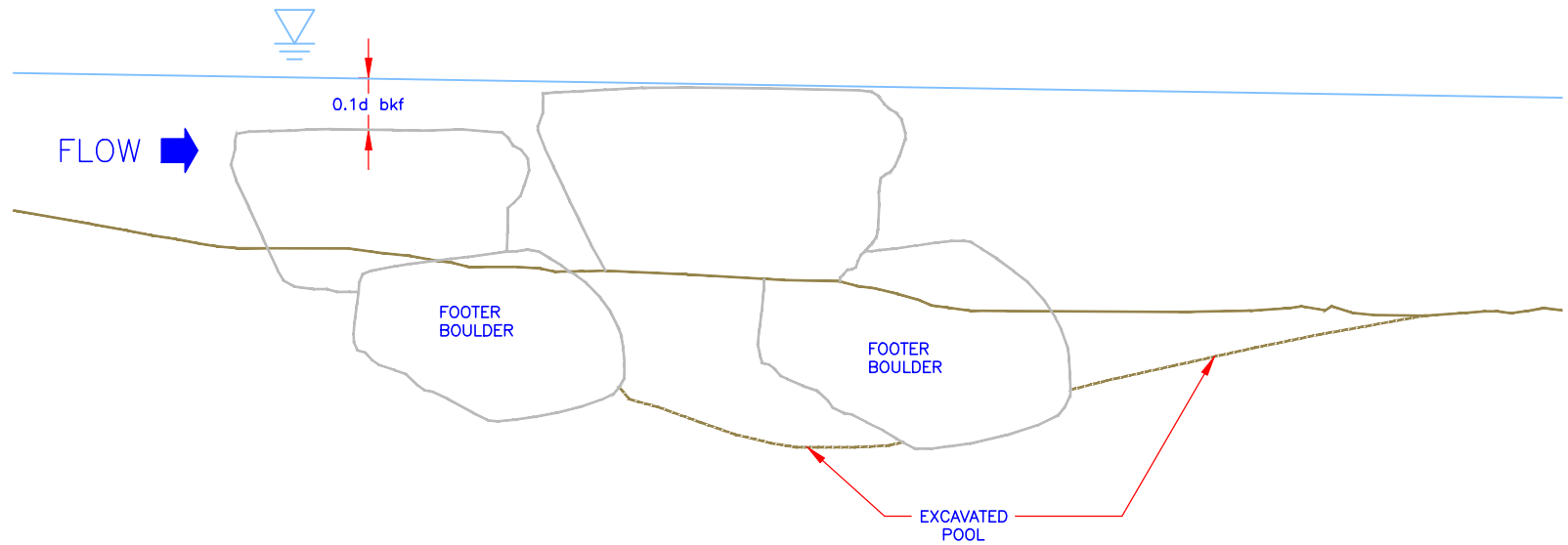






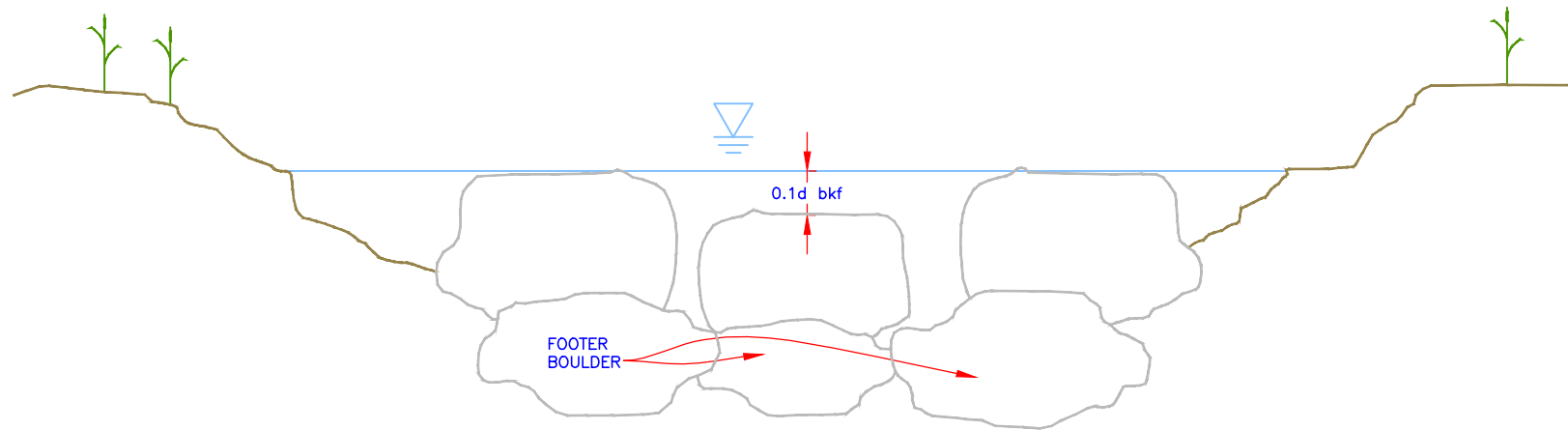
RANDOM BOULDER PLACEMENT

BOULDER CLUSTER



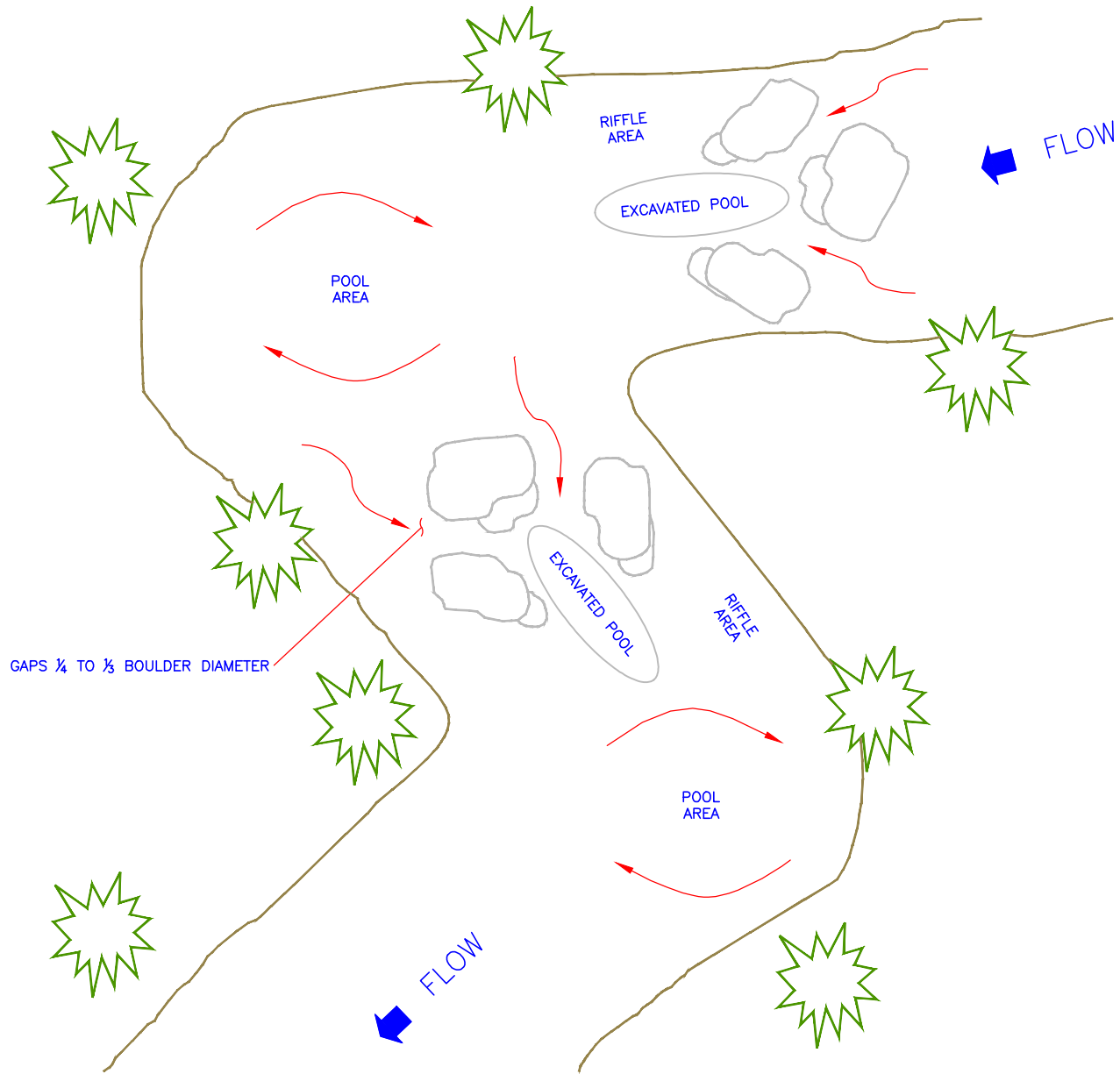
CROSS-SECTION VIEW

BOULDER CLUSTER



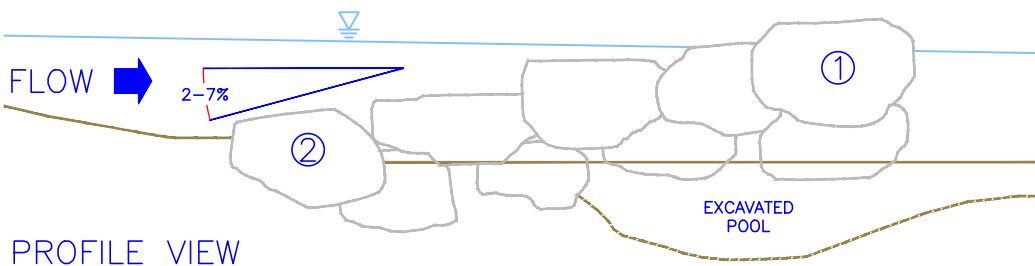
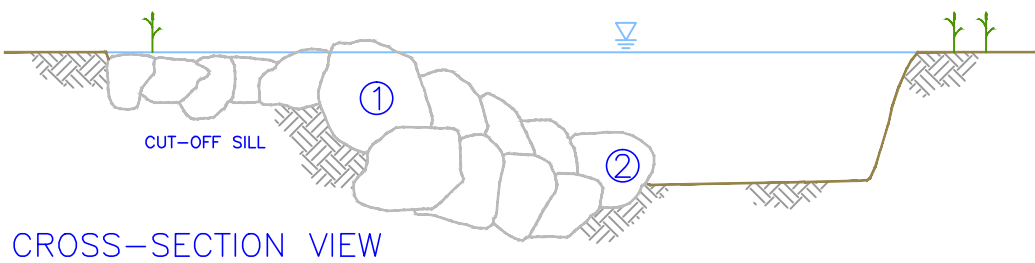
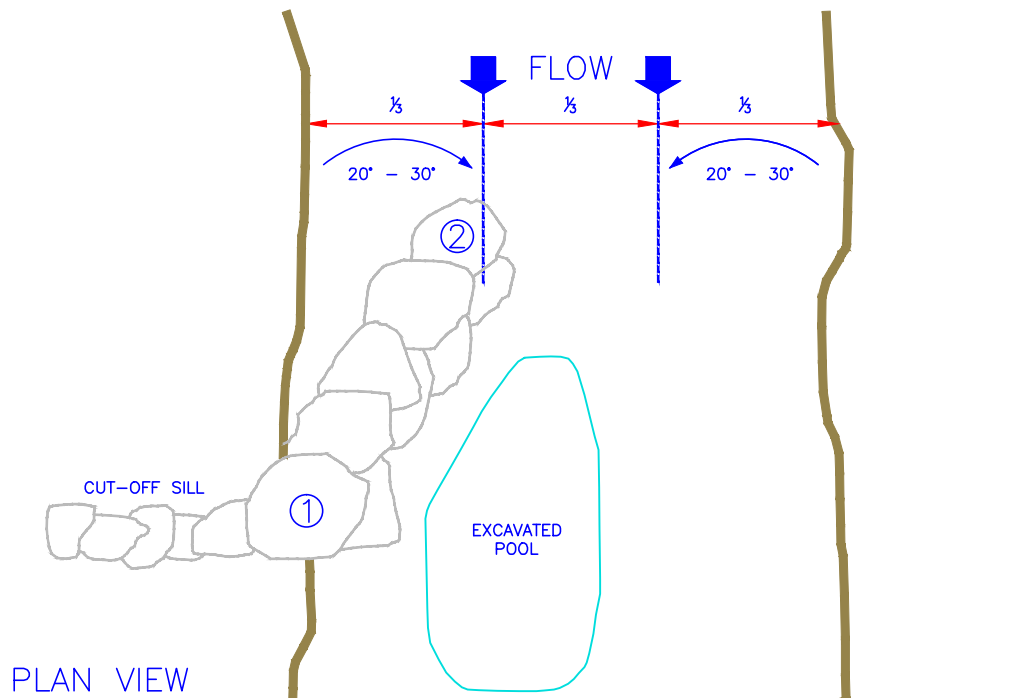
CROSS-SECTION VIEW

BOULDER CLUSTER



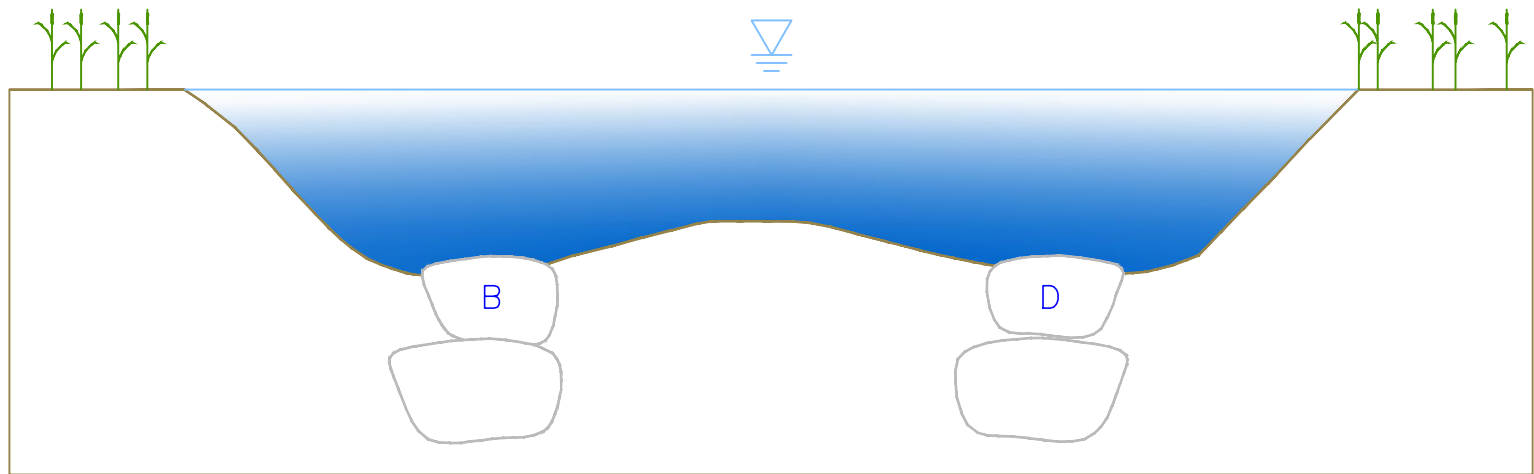
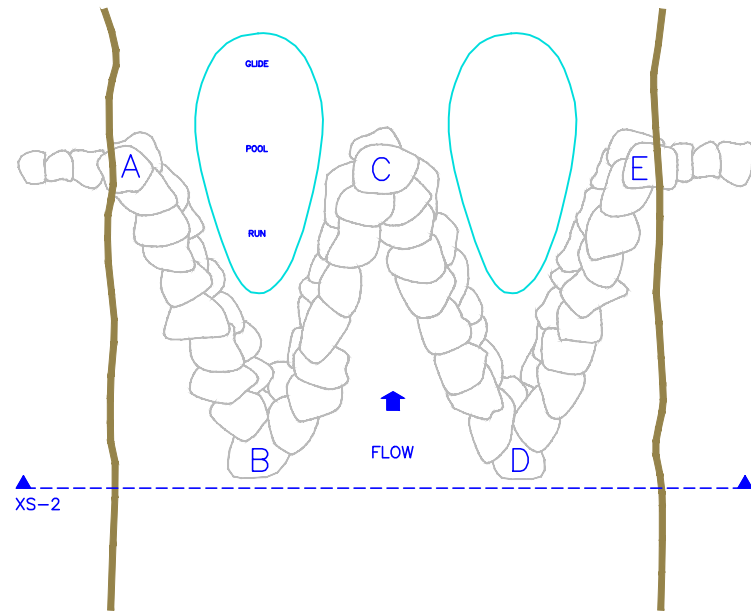
GAPS $\frac{1}{4}$ TO $\frac{1}{2}$ BOULDER DIAMETER

PLAN VIEW



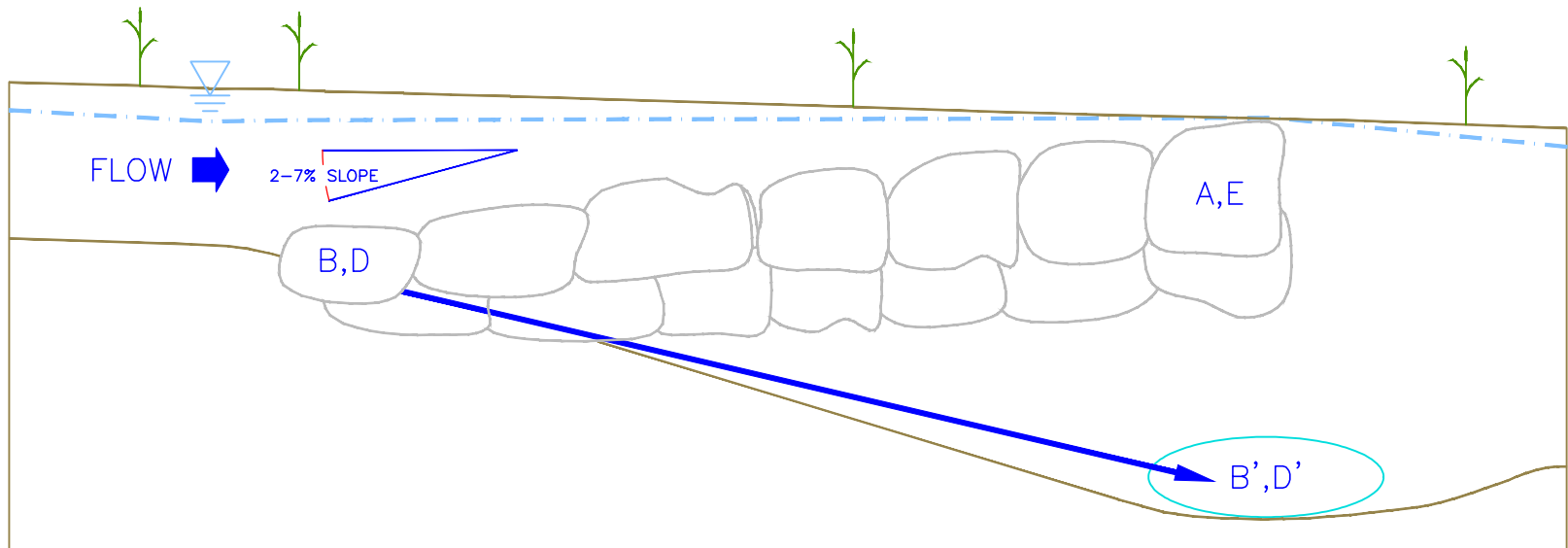
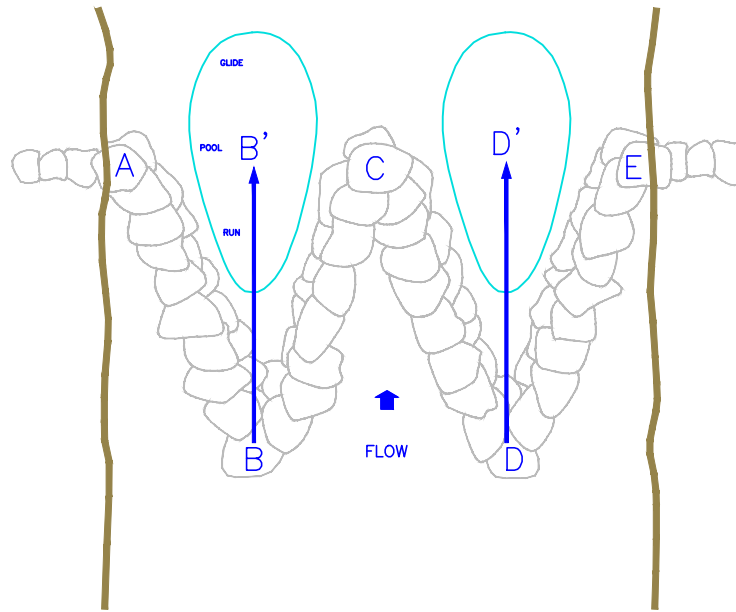
BOULDER HALF-VANE – PLAN, SECTION AND PROFILE VIEW

W-WEIR



CROSS-SECTION 2

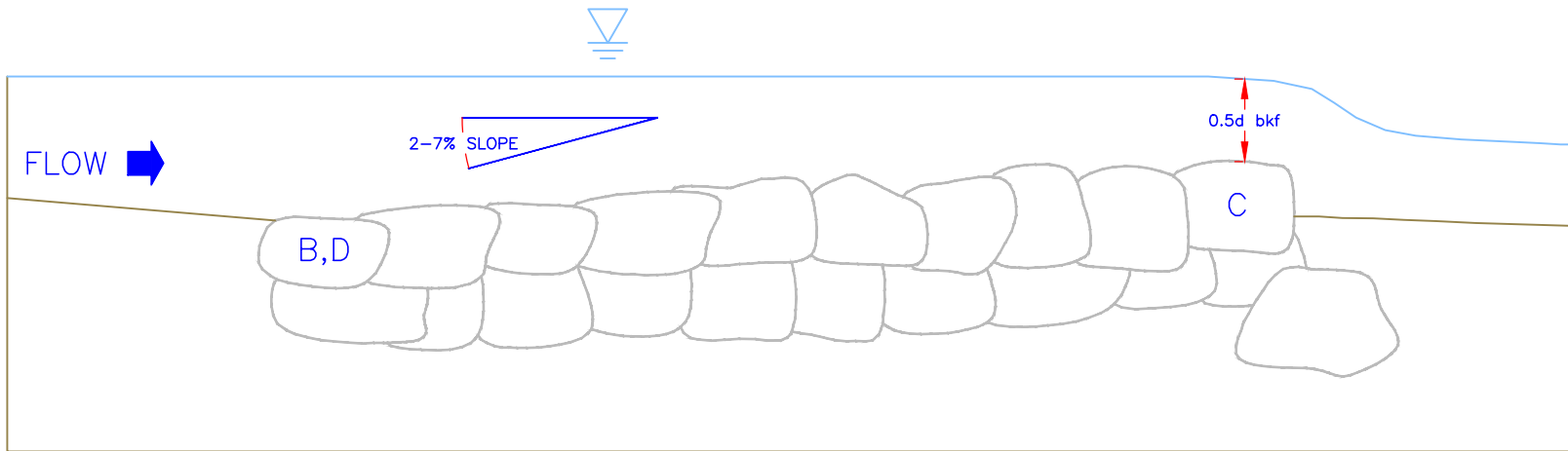
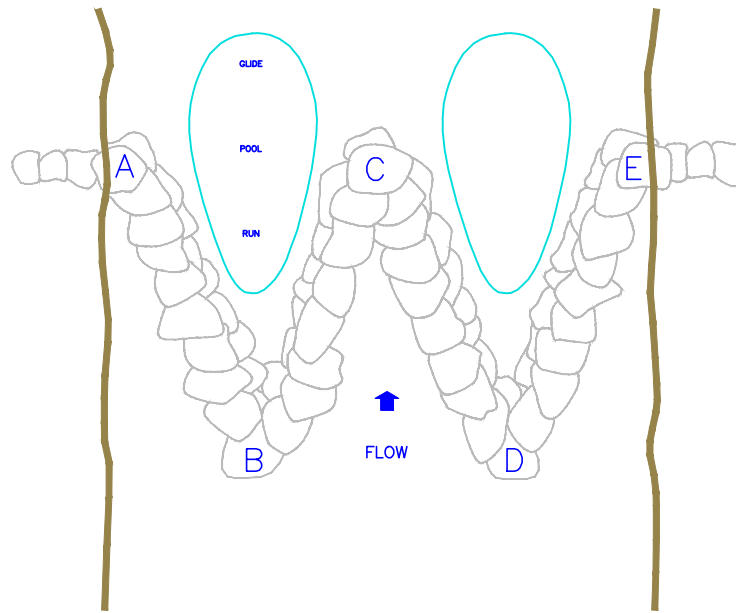
W-WEIR



TYPICAL FOR $A < > B$ & $E < > D$

PROFILE 2

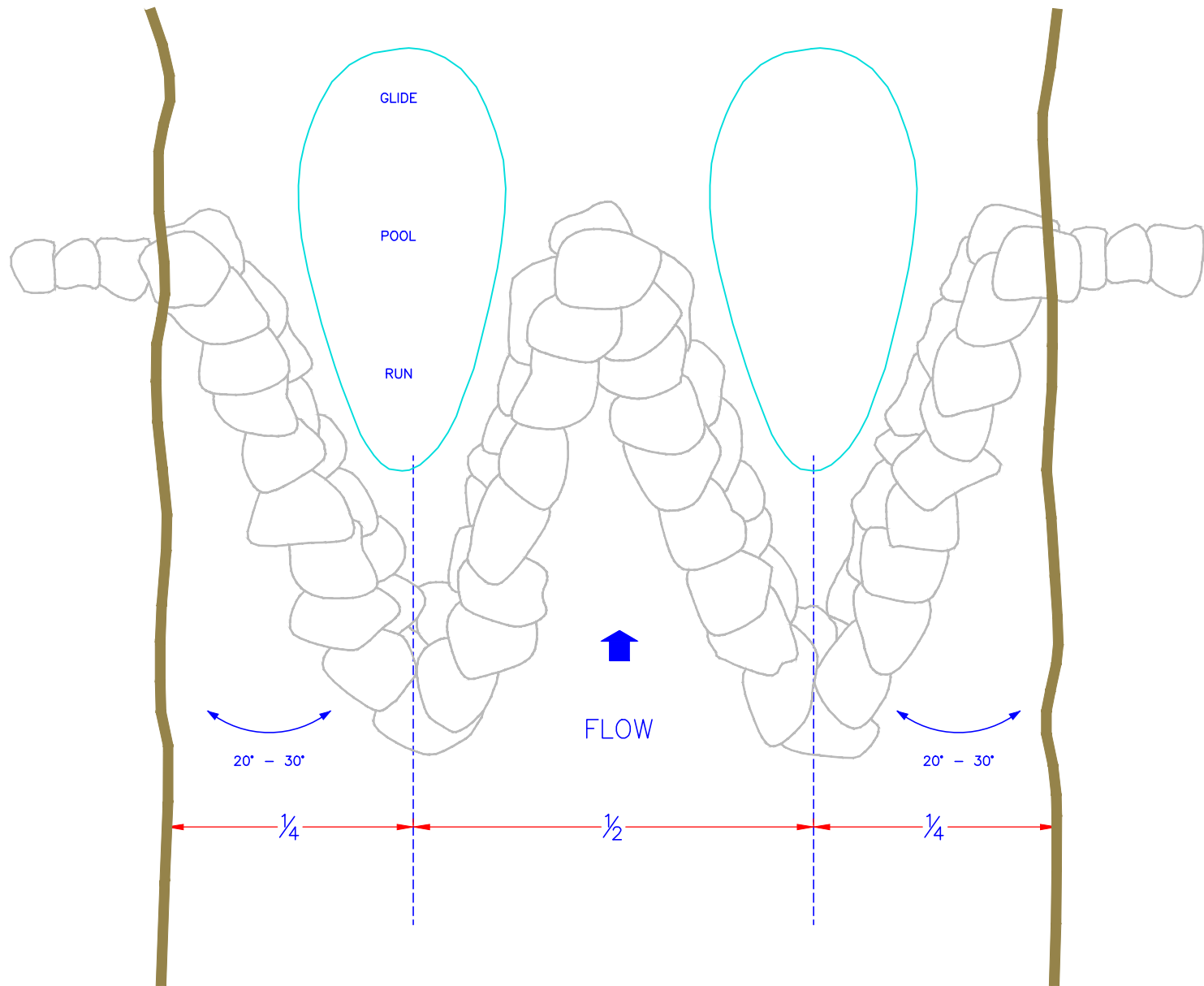
W-WEIR



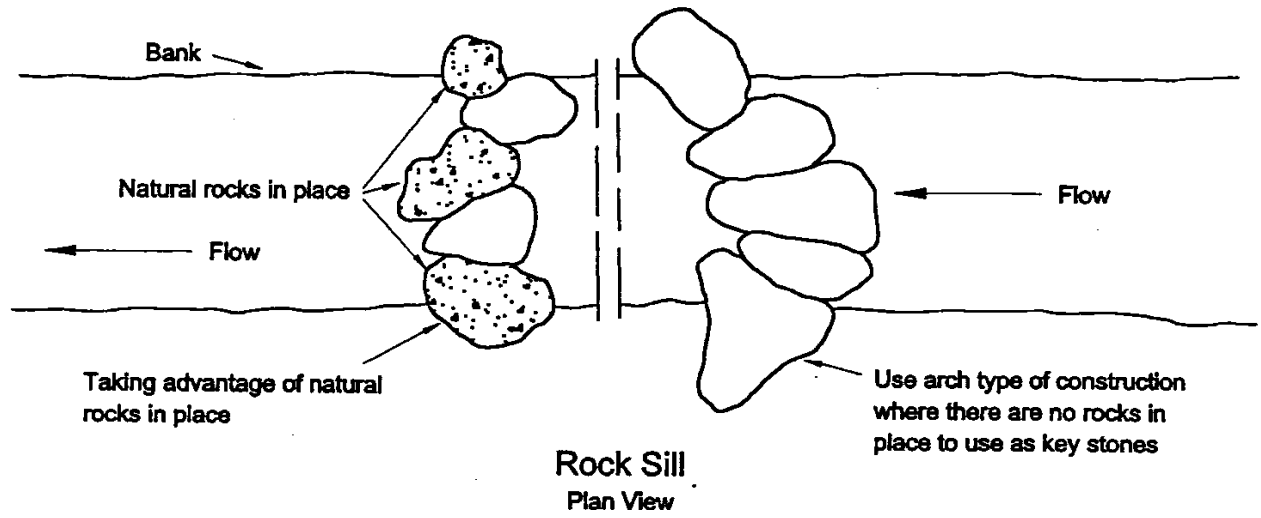
TYPICAL FOR $C < > B$ & $C < > D$

PROFILE 1

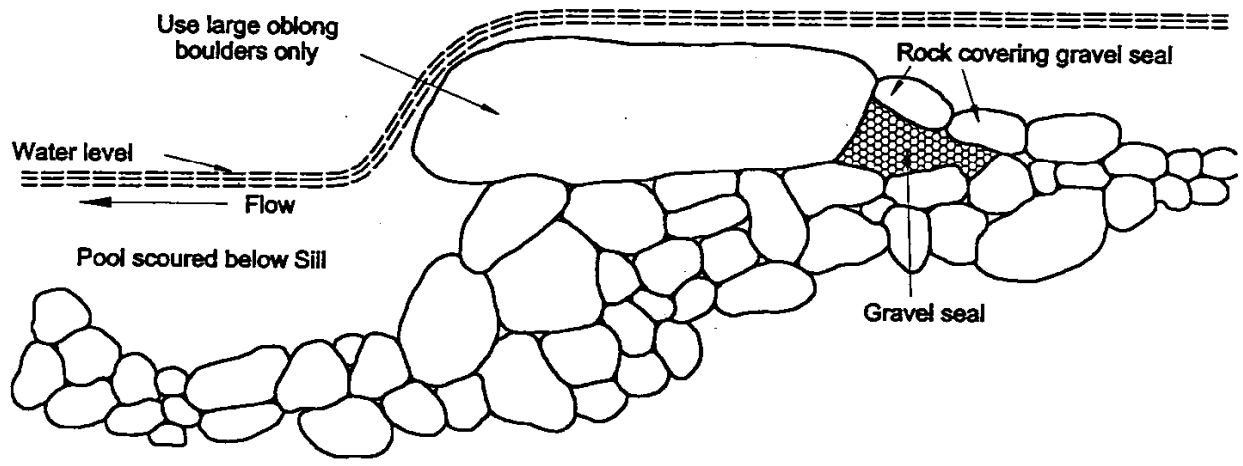
W-WEIR



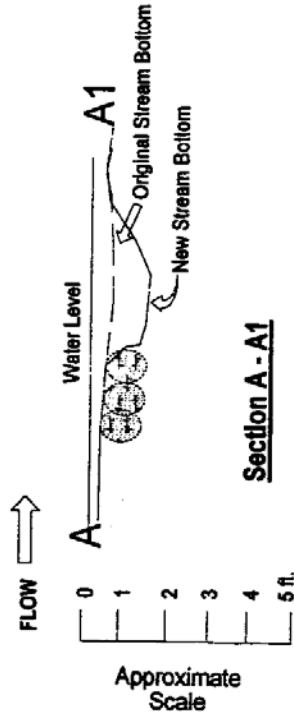
PLAN VIEW



Showing construction under different conditions



Rock Sill Cross Section

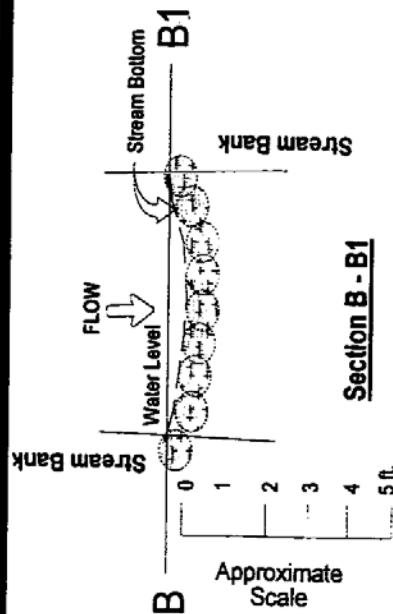
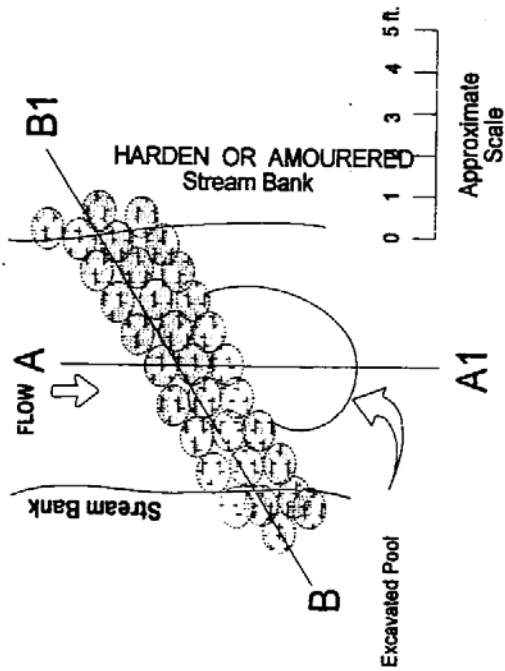


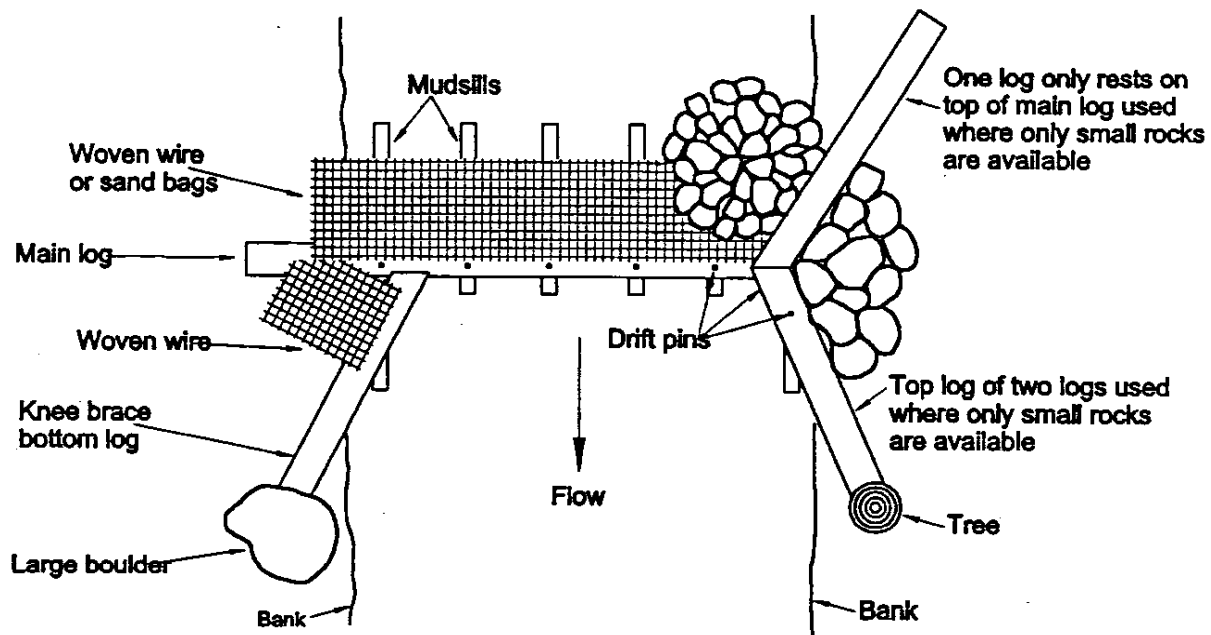
DIAGONAL SILL

1. The **DIAGONAL SILL** is always lower in the middle.
2. The rocks **MUST** slope down from the bank to the **MID** point.
3. Use the material excavated from the pool to fill the spaces between the rock.
4. Anchor the ends into the bank.
5. Try to confine the low flow to the middle 1/3 of the creek. The **LOWEST POINT** may be placed at any point to move the current from side to side.
6. Amour the banks with rip-rap where needed to protect banks.

SCALE TO SITE

Plan View

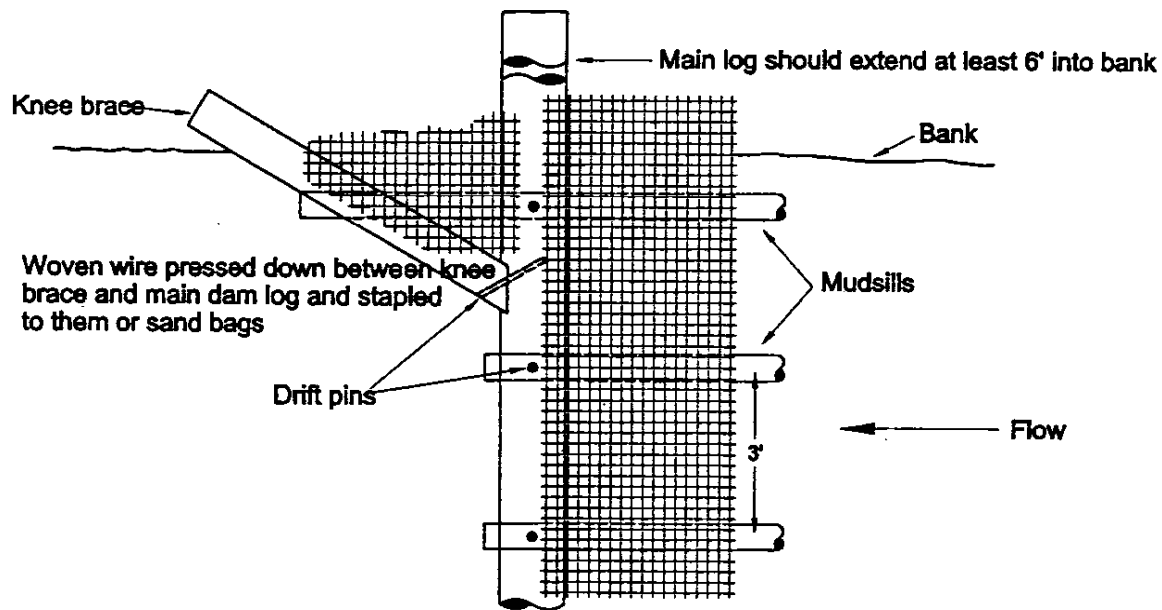




K-Sill

Plan View

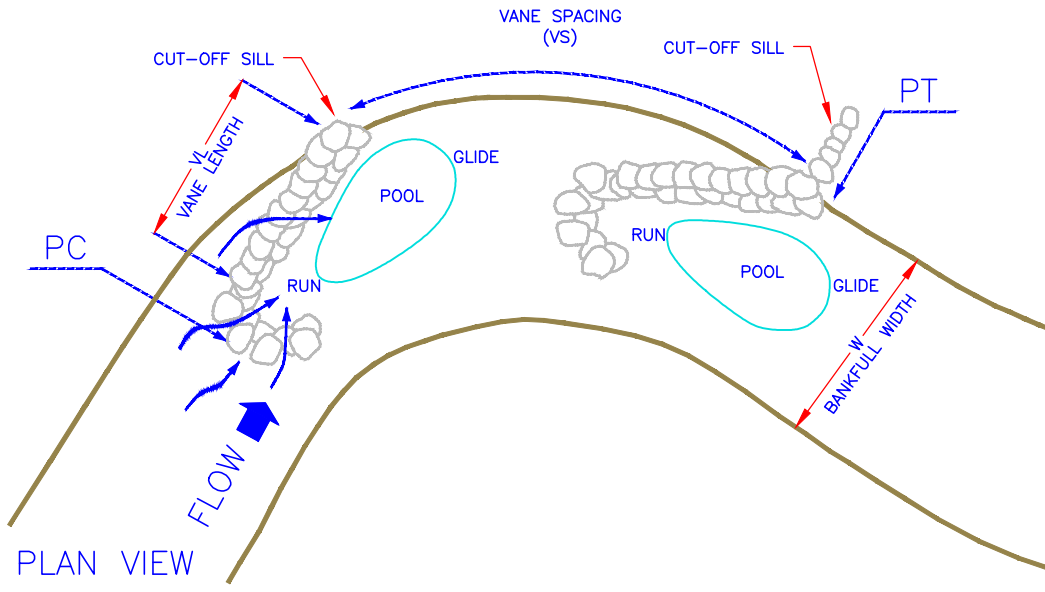
Showing one end and seal partly constructed



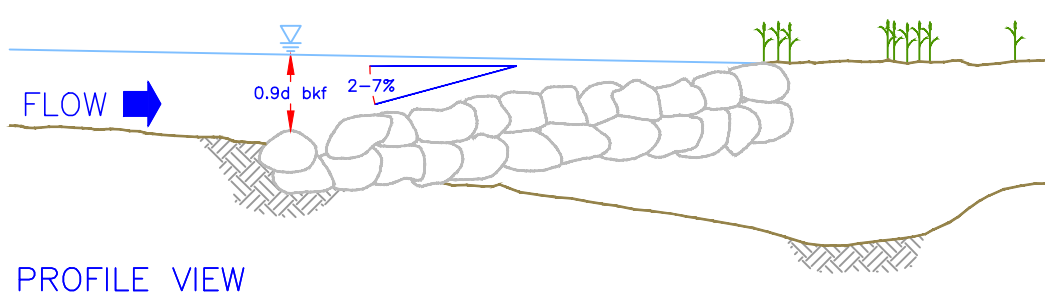
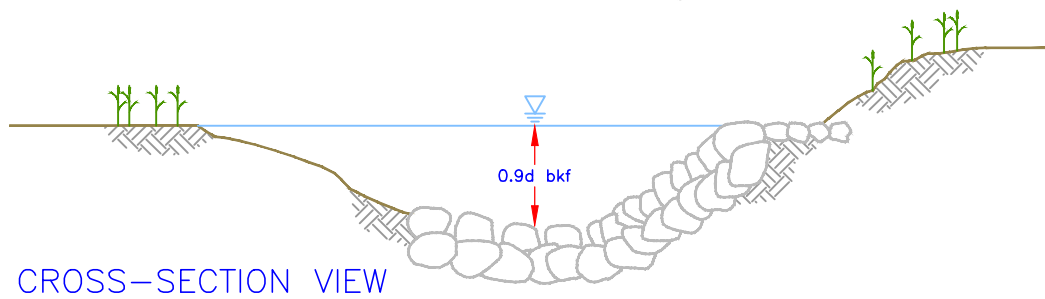
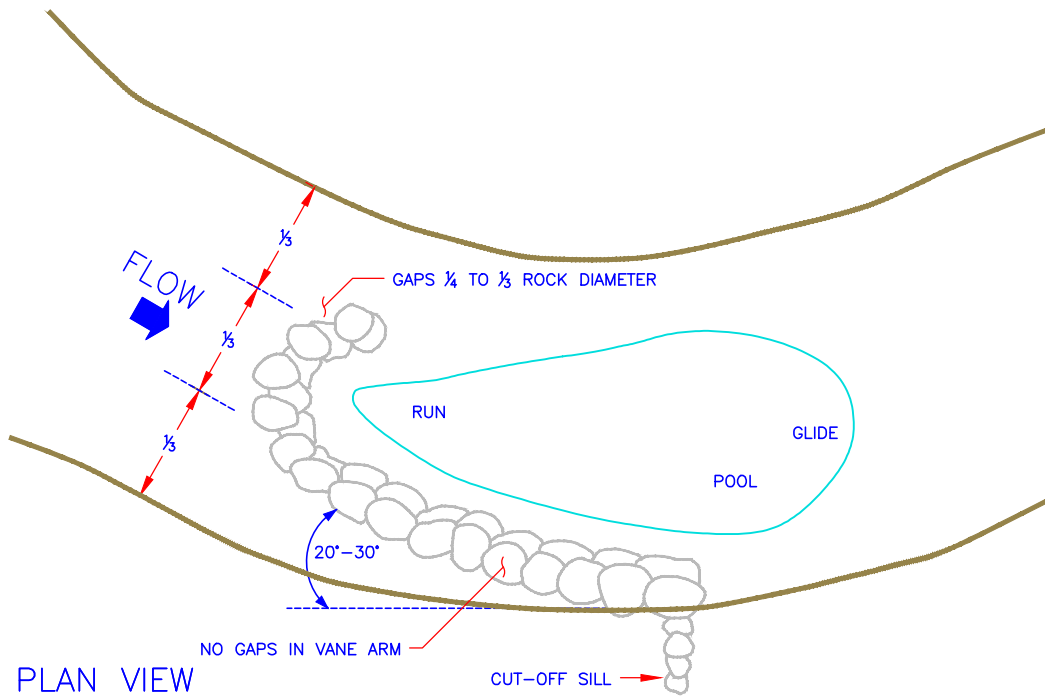
K-Sill Detail

Plan View

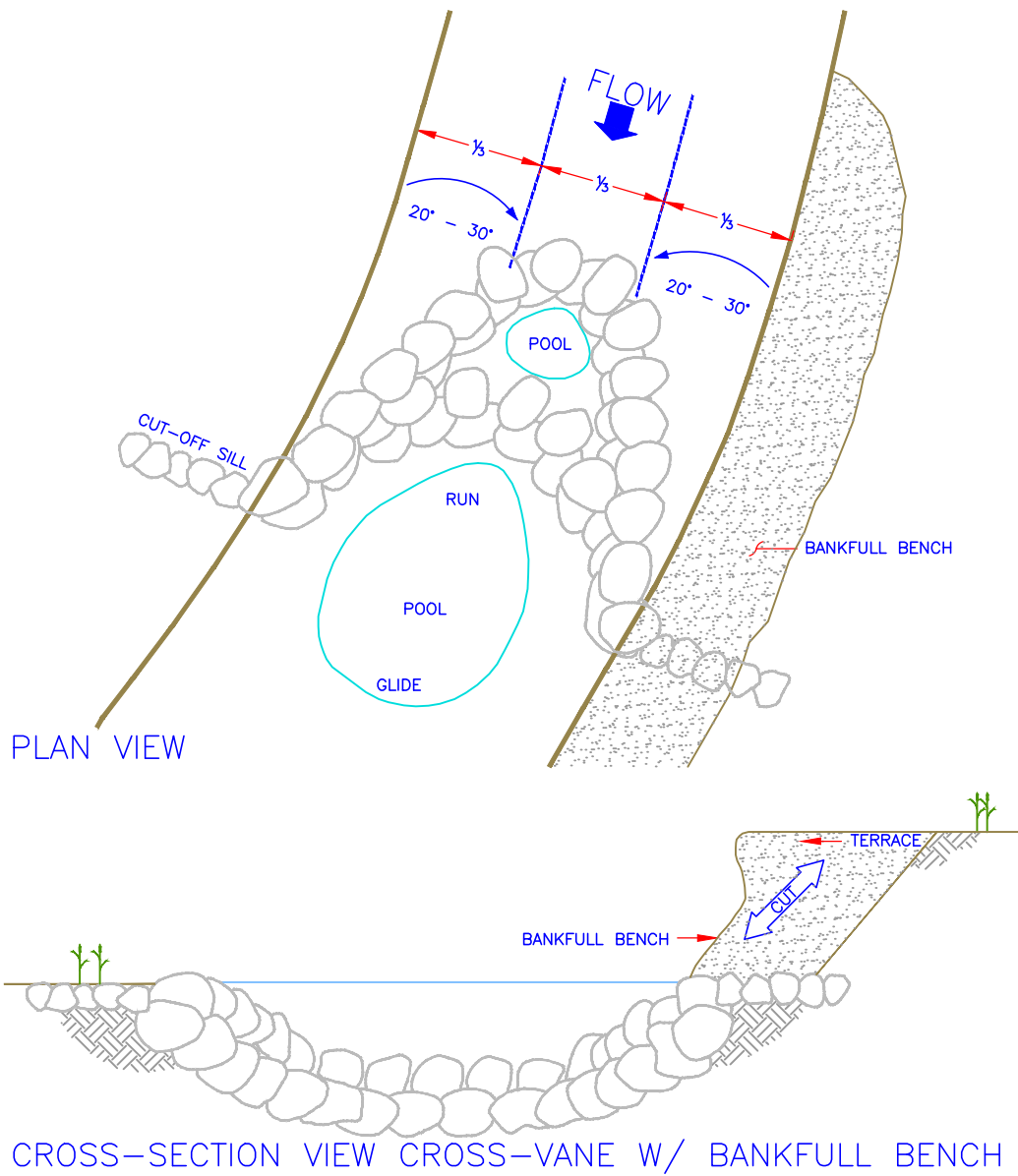
Close up of one end with wire in place



J-HOOK VANE SPACING



J-HOOK VANE – PLAN, SECTION AND PROFILE VIEW



CROSS-VANE W/ BANKFULL BENCH – PLAN AND SECTION VIEW