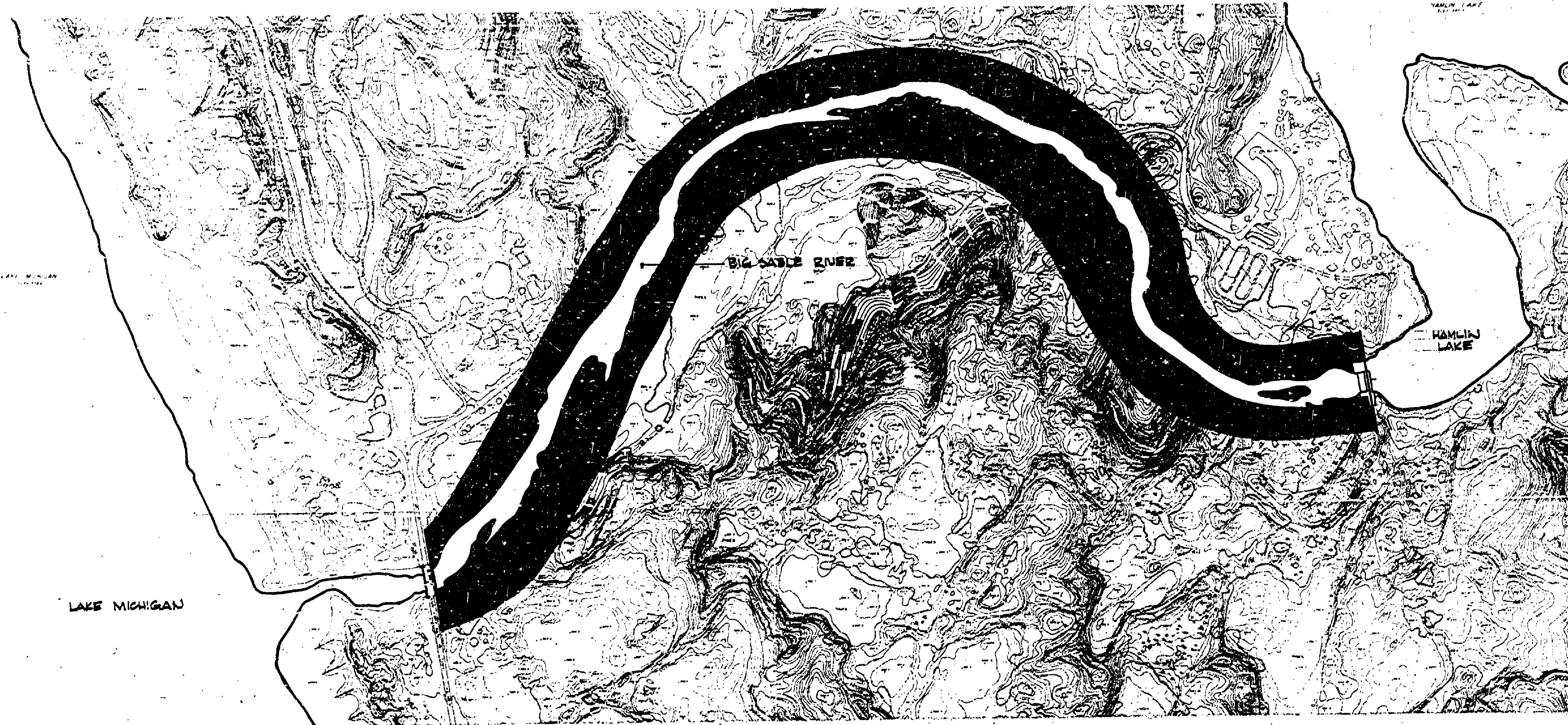
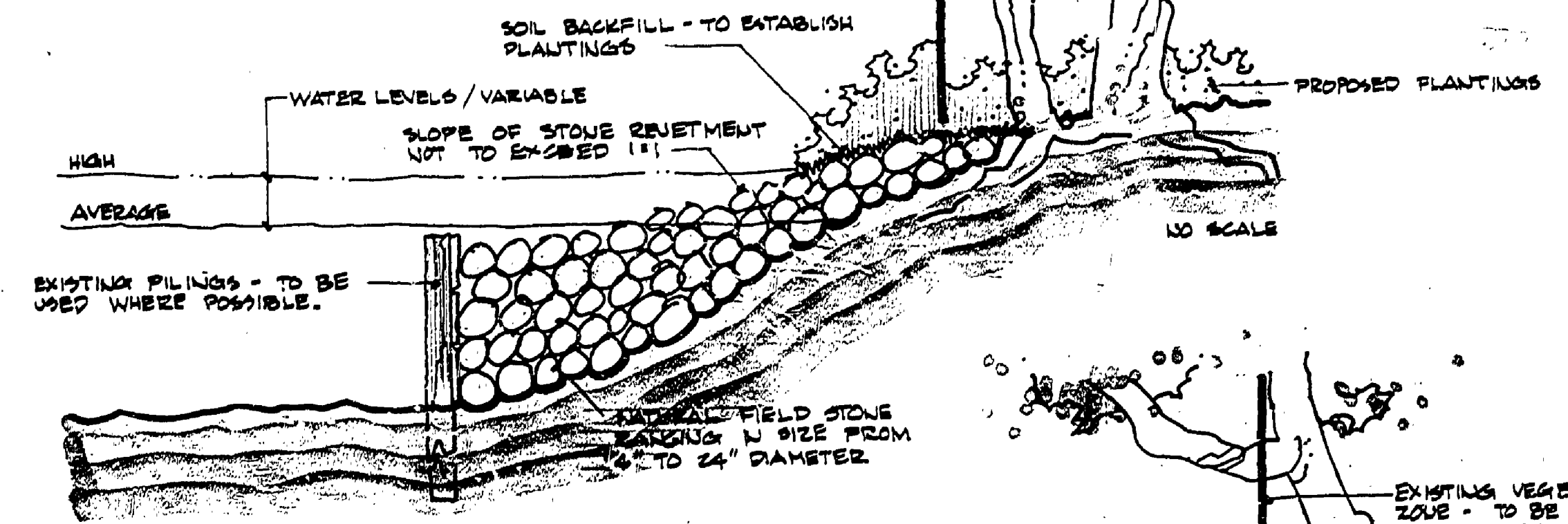


**PROJECT LIMIT:** AREA DELINEATED WITH GREY INDICATES SHORELINE OF BIG SABLE RIVER CONSIDERED FOR REVETMENT.

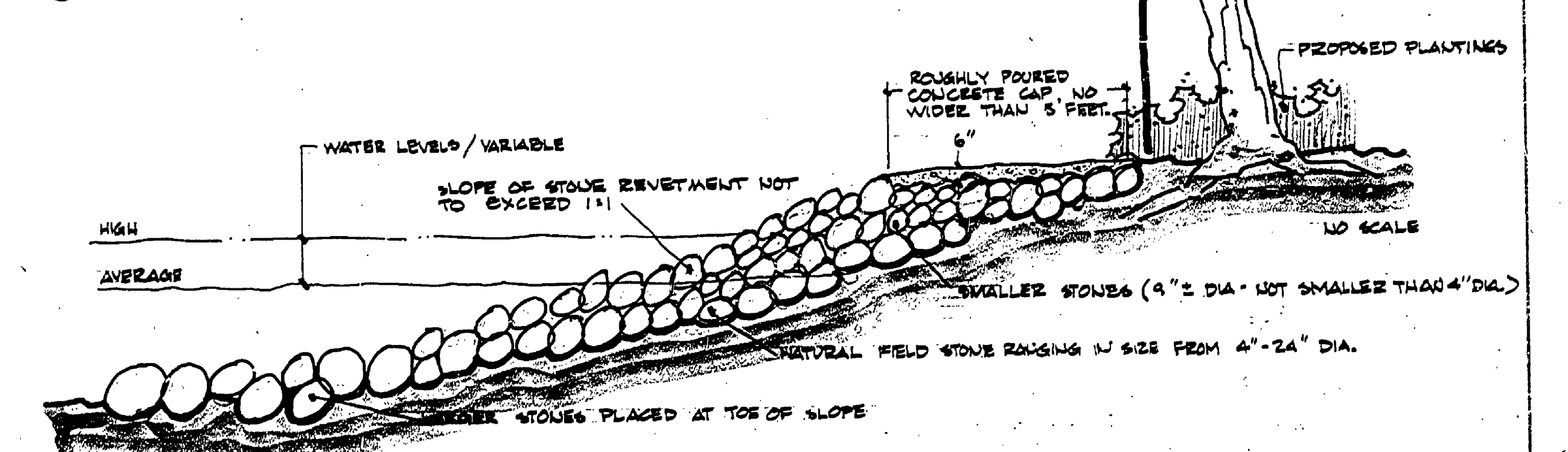


**TYPICAL DETAILS:**

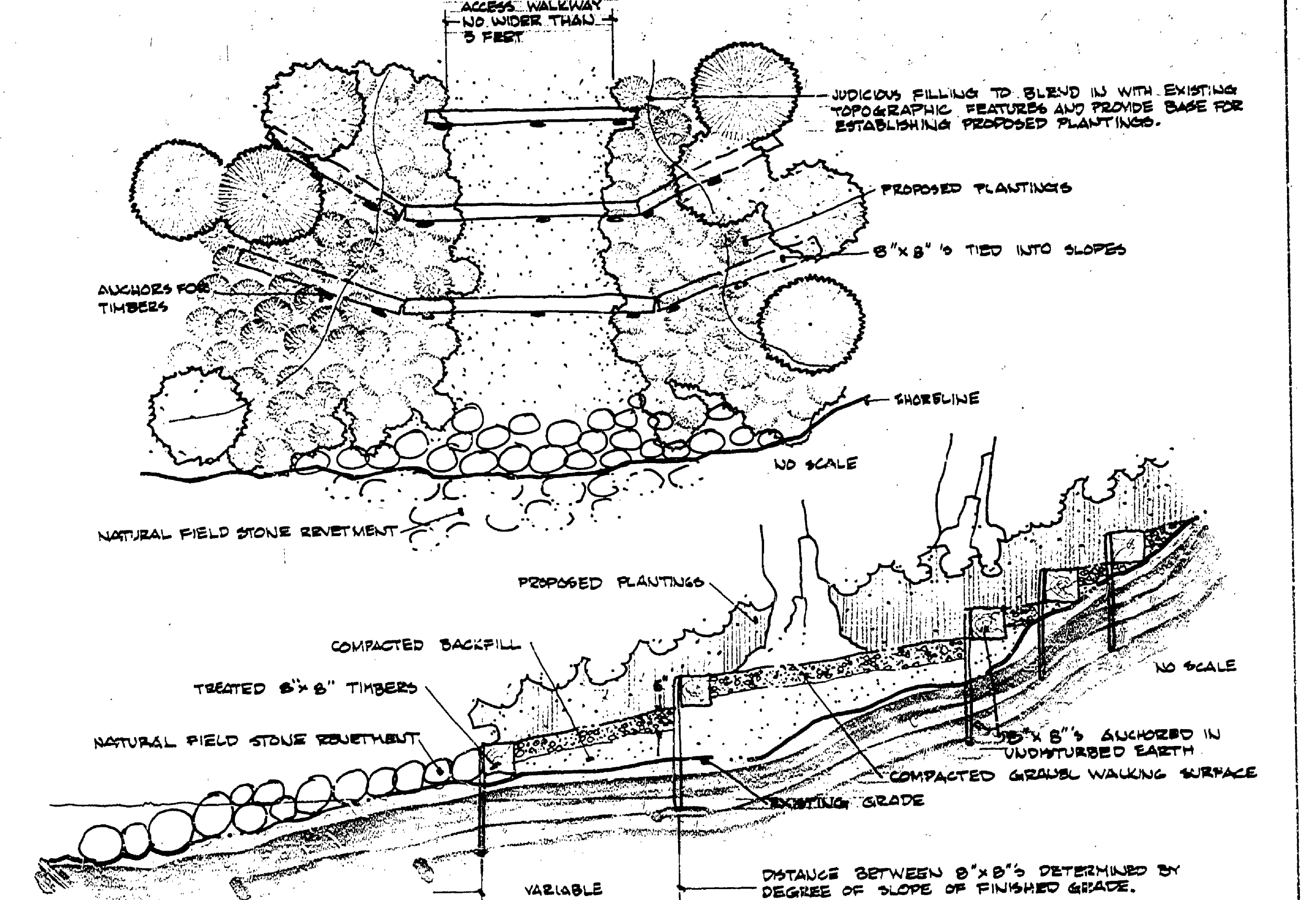
① DOWNSTREAM REVETMENT PROFILE -



② REVETMENT PROFILE / WALKWAY NEAR DAM -



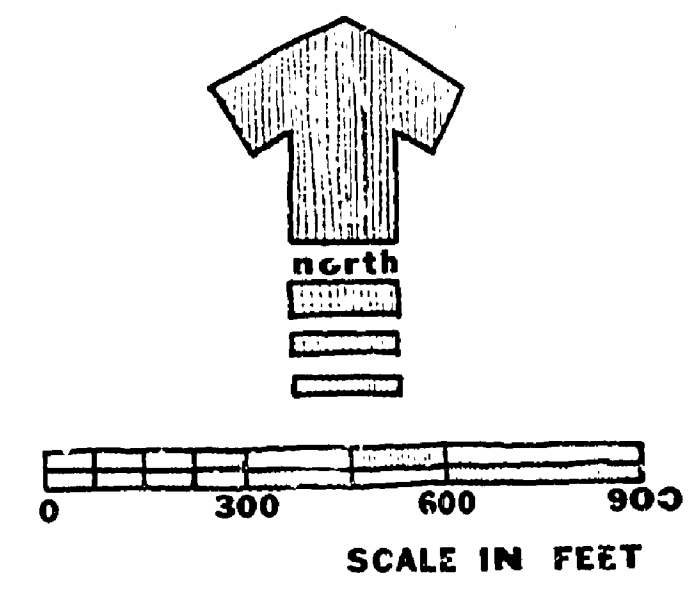
③ PEDESTRIAN ACCESS POINT TO RIVER, PLAN & PROFILE -



**NOTES:**

- The following comments are included to clarify design concepts:
  - The primary objective of this project is to correct the erosion problem that exists along the banks of the Big Sable River. The problem has been aggravated by increased use of fishermen and hikers along the banks to the extent that the natural scenic qualities of the river are endangered.
  - The erosion problem will be alleviated by hand constructing natural field stone rip-rap and introducing plantings for shoreline stabilization and pedestrian control.
  - The typical details shown on this sheet are included to serve as guidelines for revetment development. Ultimate placement of field stone and planting areas will be determined by on site conditions within the areas described on sheet #2.
  - With reference to the details:
    - Existing underwater pilings will be used where possible. If not available, stone rip-rap will conform more or less with underwater bank slopes. (Not to exceed a finished slope of 1:1)
    - Natural field stone rip-rap will be hand placed. The finished rock layer will be between 12 to 24 inches thick on the average. The rock will extend from the streambed up the bank above the maximum high water level. Where possible the stream bottom should be trenched along the toe of the bank and rock placed below the scour line or stream bottom.
    - Rip-rap should continue up stream 10 feet and down stream 10 feet from the eroding area. Rock placement will blend in with the natural surroundings. The banks above the high water line will be backfilled, if necessary, with topsoil and planted with sod and bushes.
    - Fishing access points will be constructed from treated 8" x 8" timbers (or other suitable logs), anchored, and backfilled with a gravel walking path. The timbers will blend in with existing topographic conditions, provide erosion control, and provide a reasonable stepped walkway to the river. Areas adjacent to the walkway will be heavily planted to discourage indiscriminate pedestrian use.
    - Plantings will be established primarily for shoreline stabilization, erosion control, and pedestrian control. Plantings will also be implemented to restore the natural conditions of the site. It is recommended that groundcovers and shrubs indigenous to the site be given a high priority for use in the plantings. However, suitable plant counterparts should be introduced, if available (Rosa multiflora, etc.).

REVIEWED BY: Jane, Hart 6-4-73  
 IN CHARGE, PARK DESIGN DATE  
 APPROVED BY: [Signature]  
 CHIEF, PARKS DIVISION DATE



|                         |                      |        |             |           |             |           |  |                    |                      |                |
|-------------------------|----------------------|--------|-------------|-----------|-------------|-----------|--|--------------------|----------------------|----------------|
| SURVEYED BY: Stereofoto | DRAWN BY: Rinck      | May 73 | NO. DATE BY | REVISIONS | NO. DATE BY | REVISIONS | MICHIGAN DEPARTMENT OF NATURAL RESOURCES | CONCEPTS & DETAILS | Ludington State Park | PROJECT NO.    |
| DESIGNED BY: Rinck      | CHECKED BY: R. C. H. | 6-4-73 | 1.          |           | 3.          |           |  | AREA OR PARK       | Shoreline Revetment  | SHEET 1 OF 2   |
|                         | DATE                 | DATE   | 2.          |           | 4.          |           |  | PROJECT            |                      | PLAN NO. L-193 |