

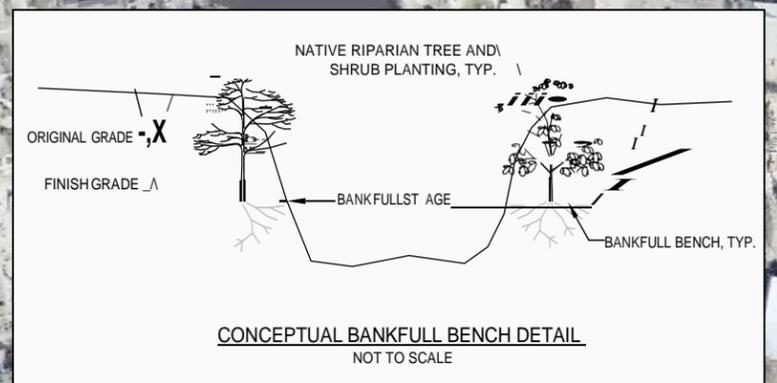
EXHIBIT 28



STREAM MORPHOLOGY RESTORATION AND HABITAT IMPROVEMENT RECOMMENDATIONS

- (D) STABILIZE BANK SEGMENT R5 BY CONSTRUCTING A BANKFULL BENCH AND VEGETATING THE BENCH WITH NATIVE TREES, SHRUBS, AND HERBS. CONSIDER INSTALLATION OF BANK REVETMENT AND/OR FLOW DEFLECTION STRUCTURES USING LOGS, ROOT FANS, AND LARGE STONE.
- (I) STABILIZE BANK SEGMENT R1 BY CONSTRUCTING A BANKFULL BENCH AND VEGETATING THE BENCH WITH NATIVE TREES, SHRUBS, AND HERBS. CONSIDER INSTALLATION OF BANK REVETMENT AND/OR FLOW DEFLECTION STRUCTURES USING LOGS, ROOT FANS, AND LARGE STONE.
- @ STABILIZE BANK SEGMENT L2 BY GRADING THE BANK, APPLYING TOPSOIL, SEED, AND EROSION CONTROL BLANKETS, AND INSTALLING DOGWOOD AND WILLOW LIVESTAKES OR CONTAINERIZED PLANTINGS.
- @ WHEN THE TWIN CULVERTS BENEATH ROUTE 12 (MAIN STREET) REQUIRE REPLACEMENT, A SINGLE SPAN, OPEN BOTTOM BRIDGE WIDE ENOUGH TO ACCOMMODATE THE BANKFULL CHANNEL AND ACTIVE FLOODPLAINS ALONG BOTH BANKS IS RECOMMENDED.
- @ WHEN THE CONCRETE BRIDGE BENEATH ROUTE 101 REQUIRES REPLACEMENT, A LARGER SINGLE SPAN, OPEN BOTTOM BRIDGE WIDE ENOUGH TO ACCOMMODATE THE BANKFULL CHANNEL AND ACTIVE FLOODPLAINS ALONG BOTH BANKS IS RECOMMENDED.
- (R) REMOVE DREDGE SPOIL BERM AND INSTALL NATIVE RIPARIAN TREE AND SHRUB PLANTINGS ALONG BANKS. EVALUATE FLOOD PROTECTION PROVIDED BY EXISTING BERM AND CONSTRUCT AN OFFSET BERM IF REMOVAL OF THE EXISTING BERM WOULD INCREASE FLOOD HAZARDS FOR NEARBY PROPERTIES. FLOW DEFLECTION STRUCTURES WHICH ADD IN-STREAM STRUCTURE AND PROMOTE THE FORMATION OF SCOUR POOLS SHOULD ALSO BE CONSIDERED. A MORE AGGRESSIVE PLAN WHICH INVOLVES THE RESTORATION OF A MEANDERING CHANNEL ALIGNMENT, INSTALLATION OF BANK REVETMENTS AND/OR FLOW DEFLECTORS, AND CONVERTING ABANDONED PORTIONS OF THE EXISTING CHANNEL TO OXBOW PONDS SHOULD ALSO BE EVALUATED.
- (j) WHEN THE CONCRETE BRIDGE AT BAKER STREET REQUIRES REPLACEMENT, A SINGLE SPAN, OPEN BOTTOM BRIDGE WIDE ENOUGH TO ACCOMMODATE THE BANKFULL CHANNEL AND ACTIVE FLOODPLAINS ALONG BOTH BANKS IS RECOMMENDED.
- @ REMOVE DREDGE SPOIL BERM ALONG BANK SEGMENT L1. CONSTRUCT BANKFULL BENCHES ALONG BANK SEGMENTS L1 AND R1 AND VEGETATE BOTH BENCHES WITH NATIVE TREES, SHRUBS, AND HERBS. EVALUATE FLOOD PROTECTION PROVIDED BY EXISTING BERM PRIOR TO REMOVAL. CONSTRUCT AN OFFSET BERM IF REMOVAL OF THE EXISTING BERM WOULD INCREASE FLOOD HAZARDS FOR NEARBY PROPERTIES.
- (R) WHEN THE CONCRETE BRIDGE AT MARLBOROUGH STREET REQUIRES REPLACEMENT, A SINGLE SPAN, OPEN BOTTOM BRIDGE WIDE ENOUGH TO ACCOMMODATE THE BANKFULL CHANNEL AND ACTIVE FLOODPLAINS ALONG BOTH BANKS IS RECOMMENDED.
- (j) CONSTRUCT A BANKFULL BENCH ALONG BANK SEGMENT R6 AND THE UPPER PORTION OF BANK SEGMENT R4. VEGETATE THE BENCHES WITH NATIVE TREES, SHRUBS, AND HERBS. ARMY CORPS APPROVAL WOULD BE NEEDED FOR THESE ALTERATIONS.

- (f) CEASE MOWING OF BANK AND INSTALL NATIVE TREE AND SHRUB PLANTINGS.
- (g) FOR THE PORTION OF SEGMENT R1S6 BORDERING CARPENTER FIELD: CREATE AN ACTIVE FLOODPLAIN AND RESTORE A MEANDERING CHANNEL. ALL CONSTRUCTED FLOODPLAIN SURFACES, STREAM BANKS, AND SLOPES SHOULD BE VEGETATED WITH NATIVE TREES, SHRUBS, AND HERBS AND BANK REVETMENTS AND/OR FLOW DEFLECTORS SHOULD BE INSTALLED TO ADD IN-STREAM STRUCTURE AND STABILIZE THE BANKS WHILE VEGETATION BECOMES ESTABLISHED. IF CHANNEL RELOCATION IS NOT FEASIBLE, CONSTRUCTION OF BANKFULL BENCHES ALONG BOTH SIDES OF THE BROOK AND INSTALLATION OF LOG AND ROCK FLOW DEFLECTORS FOR IN-STREAM STRUCTURE IS RECOMMENDED.
- @ FOR THE PORTION OF SEGMENT R1S6 BETWEEN HARRISON STREET AND CARPENTER FIELD: CONSTRUCT BANKFULL BENCHES ALONG BOTH SIDES OF THE BROOK (SPACE PERMITTING). THE BENCHES SHOULD BE VEGETATED WITH NATIVE TREES, SHRUBS, AND HERBS AND BANK REVETMENTS AND/OR FLOW DEFLECTORS ARE RECOMMENDED TO PROTECT THE BANKS WHILE VEGETATION BECOMES ESTABLISHED AND PROVIDE IN-STREAM STRUCTURE.
- @ CONSTRUCT GRADE CONTROL STRUCTURE A SHORT DISTANCE DOWNSTREAM FROM THE CONCRETE SILL WHICH CREATES THE FISH PASSAGE BARRIER ON THE DOWNSTREAM SIDE OF HARRISON STREET. THE INVERT OF THIS STRUCTURE, WHICH WOULD BE CONSTRUCTED OF LARGE STONE, SHOULD BE SET SUCH THAT THE HEIGHT OF THE EXISTING DROP IS CUT IN HALF. TO ABOUT FOUR INCHES. A SECOND FOUR INCH (+) DROP WOULD OCCUR OVER THE CONSTRUCTED GRADE CONTROL STRUCTURE. DETAILED HYDRAULIC ANALYSES MUST BE PERFORMED TO EVALUATE THE EFFECTS OF THE GRADE CONTROL STRUCTURE ON FLOOD STAGES AND IT SHOULD ONLY BE CONSTRUCTED IF IT COMPLIES WITH THE MINIMUM STANDARDS OF THE NATIONAL FLOOD INSURANCE PROGRAM.
- @ WHEN THE CONCRETE BRIDGE AT HARRISON STREET REQUIRES REPLACEMENT, A SINGLE SPAN, OPEN BOTTOM BRIDGE WIDE ENOUGH TO ACCOMMODATE THE BANKFULL CHANNEL AND ACTIVE FLOODPLAINS ALONG BOTH BANKS IS RECOMMENDED.
- @ SAWCUT A SMALL PILOT CHANNEL INTO THE CONCRETE CHANNEL BOTTOM BETWEEN SPRING STREET AND HARRISON STREET. INSTALL REMOVABLE BAFFLES OR WEIRS TO CREATE AREAS OF STILL WATER WITHIN THE PILOT CHANNEL.
- @ WHEN THE CONCRETE BRIDGE AT CHURCH STREET REQUIRES REPLACEMENT, THE NEW BRIDGE SHOULD HAVE VERTICAL ABUTMENTS, RATHER THAN THE EXISTING SLOPING ABUTMENTS.
- (j) IF POSSIBLE, THE CONCRETE ENCASED UTILITY LINE BENEATH THE ROXBURY STREET BRIDGE SHOULD BE LOWERED SUCH THAT IT IS BELOW THE CHANNEL BOTTOM. THIS WOULD ELIMINATE THE FISH PASSAGE BARRIER, INCREASE THE FLOW CAPACITY OF THE BRIDGE OPENING, AND POSSIBLY REDUCE FLOOD STAGES ABOVE THE BRIDGE.



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**CITY OF KEENE, NH
 BEAVER BROOK HABITAT ASSESSMENT
 CONCEPTUAL STREAM RESTORATION AND HABITAT IMPROVEMENT RECOMMENDATIONS**

NO.	REVISION

DATE: NOV 2008
 PROJECT: 0801
 DRAWN BY: SPS

SHEET 1 OF 2

2002 AERIAL PHOTOGRAPHY