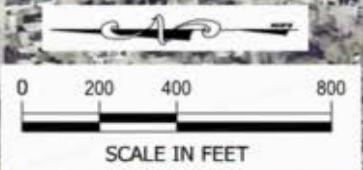


STREAM MORPHOLOGY RESTORATION AND HABITAT IMPROVEMENT RECOMMENDATIONS

- QW CONSTRUCT GRADE CONTROL STRUCTURE TO PREVENT HEADWARD ADVANCEMENT OF KNICKPOINT
- ② WHEN THE CONCRETE BRIDGE AT BEAVER STREET REQUIRES REPLACEMENT, A SINGLE SPAN, OPEN BOTTOM BRIDGE WIDE ENOUGH TO ACCOMMODATE THE BANKFULL CHANNEL AND ACTIVE FLOODPLAINS ALONG BOTH BANKS IS RECOMMENDED.
- ② THE CURRENT PRACTICE OF MOWING TO THE EDGE OF THE BROOK SHOULD BE CEASED AND A RIPARIAN BUFFER OF NATIVE TREES AND SHRUBS SHOULD BE REESTABLISHED.
- ② THE CORRIDOR OF MOWED GRASS MAINTAINED JUST BEYOND THE TOP OF BANK SHOULD BE PLANTED WITH NATIVE TREES AND SHRUBS TO PROMOTE BANK STABILITY AND SHADE THE BROOK.
- ② INSTALL ADDITIONAL NATIVE TREE AND SHRUB PLANTINGS ALONG APPROXIMATELY 130 FEET OF THE RIGHT (WEST) BANK DOWNSTREAM FROM THE CEMETERY ROAD BRIDGE.
- ② RESTORE A MEANDERING CHANNEL ALIGNMENT IN STREAM SEGMENT R1S9 UPSTREAM FROM THE CEMETERY BRIDGE. EVALUATE THE POTENTIAL TO RESTORE THE ABANDONED SECTION OF CHANNEL WEST OF THE EXISTING CHANNEL. NEWLY CREATED SECTIONS OF CHANNEL SHOULD BE LOCATED THROUGH AREAS OF NATIVE SHRUBBY VEGETATION. BANK REVETMENTS AND/OR FLOW DEFLECTORS CONSTRUCTED OF LOGS, ROOT FANS, AND LARGE STONES WOULD LIKELY BE A COMPONENT OF THIS PLAN. IT MAY BE POSSIBLE TO CONVERT ABANDONED PORTIONS OF THE EXISTING CHANNEL TO OXBOW PONDS WHICH COULD BE CONNECTED TO THE RELOCATED STREAM BY DIVERSION CHANNELS.
- ② WHEN THE GEORGE STREET BRIDGE REQUIRES REPLACEMENT, A SINGLE SPAN, OPEN BOTTOM BRIDGE WIDE ENOUGH TO ACCOMMODATE THE BANKFULL CHANNEL AND ACTIVE FLOODPLAINS ALONG BOTH BANKS IS RECOMMENDED.
- ② THE ADDITION OF LARGE WOODY DEBRIS (LWD) SHOULD BE CONSIDERED THROUGHOUT REACH 2 AS A MEANS OF ADDING IN-STREAM STRUCTURE AND CREATING BED FORM DIVERSITY. THE ADDITION OF LWD SHOULD BE DONE IN A MANNER WHICH DOES NOT INCREASE FLOOD STAGES.
- ② STABILIZE BANKS BY GRADING TO A FLATTER SLOPE, APPLYING TOPSOIL, SEED, AND EROSION CONTROL BLANKETS AND INSTALLING DOGWOOD AND WILLOW LIVESTAKES OR CONTAINERIZED PLANTINGS. FLOW DEFLECTION STRUCTURES CONSTRUCTED OF LARGESTONE AND/OR LOGS SHOULD BE INSTALLED TO PROTECT THE BANK WHILE VEGETATION BECOMES ESTABLISHED.
- ② A SERIES OF STEPS AND POOLS SHOULD BE CONSTRUCTED IMMEDIATELY DOWNSTREAM FROM THE EXPOSED CONCRETE ENCASED SEWER MAIN TO ELIMINATE THE FISH PASSAGE BARRIER. STEPS SHOULD BE CONSTRUCTED OF LARGESTONE. A SIX INCH MAXIMUM WATER LEVEL DROP IS RECOMMENDED ACROSS EACH STEP. THESE CHANNEL IMPROVEMENTS HAVE THE POTENTIAL TO RAISE FLOOD ELEVATIONS OVER A SHORT SECTION OF THE CHANNEL WHICH MAY REQUIRE FEMA APPROVAL. THEREFORE, DETAILED HYDRAULIC ANALYSES MUST BE PERFORMED TO EVALUATE THE EFFECTS OF THESE IMPROVEMENTS.
- ② CONSTRUCT A GRADE CONTROL STRUCTURE A SHORT DISTANCE DOWNSTREAM FROM THE CONCRETE SILL TO ELIMINATE THE FISH PASSAGE BARRIER. THE INVERT OF THIS STRUCTURE, WHICH WOULD BE CONSTRUCTED OF LARGESTONE, WOULD BE SUCH THAT THE HEIGHT OF THE EXISTING DROP IS CUT IN HALF TO ABOUT FOUR INCHES. CONSTRUCTION OF THE GRADE CONTROL STRUCTURE HAS THE POTENTIAL TO RAISE FLOOD ELEVATIONS, WHICH MAY REQUIRE FEMA APPROVAL. THEREFORE, DETAILED HYDRAULIC ANALYSES MUST BE PERFORMED TO EVALUATE THE EFFECTS OF THE GRADE CONTROL STRUCTURE ON FLOOD STAGES.
- ② WHEN THE CONCRETE BRIDGE AT GIFFIN STREET REQUIRES REPLACEMENT, A SINGLE SPAN, OPEN BOTTOM BRIDGE WIDE ENOUGH TO ACCOMMODATE THE BANKFULL CHANNEL AND ACTIVE FLOODPLAINS ALONG BOTH BANKS IS RECOMMENDED.
- QJ STABILIZE BANK BY GRADING TO A FLATTER SLOPE, APPLYING TOPSOIL, SEED, AND EROSION CONTROL BLANKETS AND INSTALLING DOGWOOD AND WILLOW LIVESTAKES OR CONTAINERIZED PLANTINGS. FLOW DEFLECTION STRUCTURES CONSTRUCTED OF LARGESTONE AND/OR LOGS SHOULD BE INSTALLED TO PROTECT THE BANK WHILE VEGETATION BECOMES ESTABLISHED.
- ② RESTORATION OF THE ABANDONED MEANDER ALONG THE RIGHT (WEST) BANK SHOULD BE CONSIDERED AS A METHOD OF STABILIZING THE LEFT (EAST) BANK AND CREATING A LATERAL SCOUR POOL.
- ② STABILIZE BANK BY GRADING TO A FLATTER SLOPE, APPLYING TOPSOIL, SEED, AND EROSION CONTROL BLANKETS AND INSTALLING DOGWOOD AND WILLOW LIVESTAKES OR CONTAINERIZED PLANTINGS. FLOW DEFLECTION STRUCTURES CONSTRUCTED OF LARGESTONE AND/OR LOGS SHOULD BE INSTALLED TO PROTECT THE BANK WHILE VEGETATION BECOMES ESTABLISHED.



Leadwaters hydrology
THE WATERSHED CONSULTANTS
 CITY OF KEENE, NH
 SEWER MAINS AND FLOOD ASSESSMENT
 CONCEPTUAL STREAM
 RESTORATION AND HABITAT
 IMPROVEMENT
 RECOMMENDATIONS

DATE	NOV 2006
SCALE	AS SHOWN
SHEET	2 OF 2

2002 AERIAL PHOTOGRAPHY