

## Example Scope of Work for Stream Mitigation

North Carolina Department of Transportation  
Project Development and Environmental Analysis Branch

### R-2518A On-site Stream Mitigation Plan and Design Madison, North Carolina

#### PROJECT DESCRIPTION

This scope of work provides for documentation of the existing site conditions, design of the stream mitigation and preparation of a stream mitigation plan for the R-2518A on-site stream mitigation in Madison County, North Carolina. The project area is located along the US 19 corridor from I-26/US 23 to the Yancey County Line. There are 14 sites within the project corridor that were identified as having potential to provide on-site stream mitigation credit for R-2518A impacts. The 14 sites identified provide a variety of mitigation components including: restoration (2,297 feet (700 meters)), relocation (2,510 feet (765 meters)), enhancement (2,297 feet (700 meters)), and preservation (6,856 feet (2,090 meters)).

Mitigation Site	Station	Mitigation Type	Length (ft (m))
Site 1	20+00 to 21+00 Right/Left	Restoration	1,017 (310)
Site 2	27+00 Right	Relocation	295 (90)
Site 3	31+75 Left	Restoration	164 (50)
Site 4a	34+00 to 35+00 Left	Preservation	328 (100)
Site 4b	35+50 to 37+80 Left	Relocation	951 (290)
Site 4c	37+80 to 38+40 Left	Relocation	230 (70)
Site 5	38+00 to 41+50 Right	Preservation	1,066 (325)
Site 6	47+20 Right	Restoration	164 (50)
Site 7	47+50 to 51+60 Left	Preservation	1,345 (410)
Site 8	52+00 to 54+00 Left	Restoration	722 (220)
Site 9	56+20 to 57+70 Right	Relocation	476 (145)
Site 10a	66+00 to 77+40 Left	Preservation	3,740 (1,140)
Site 10b	70+20 to 71+00 Right	Preservation	377 (115)
Site 11	81+80 Left	Restoration	230 (70)
Site 12	82+20 right; 83+00 to 84+00 Left	Relocation	558 (170)
Site 13	85+20 to 91+20 Left	Enhancement	2,133 (650)
Site 14	88+40 Right	Enhancement	164 (50)

## **SCOPE OF WORK**

### **Task 1: Project Administration**

Consultant will provide administrative tasks including attendance at meetings, coordination with the NCDOT, resource agencies, and property owners, quality assurance/quality control, project tracking, scheduling, progress reports, and administrative services (phone calls, letters, etc.). One meeting will be required to discuss each of the following items:

- 1.) Draft review (with NCDOT)
- 2.) Agency comments (on-site with agencies and NCDOT)
- 3.) 4c Concurrence Meeting
- 4.) Pre-construction Meeting

### **Task 2: Stream Assessment**

Consultant will utilize DTM and survey data provided by the NCDOT to assess existing conditions and provide a Rosgen Level II classification. Consultant will perform a site investigation to provide a geomorphic analysis of the existing channel at each site identified for restoration or relocation. Aerial survey, topographic survey including survey of existing channel, top-of-bank, and bed elevation, along with base mapping of the site, and box culvert designs will be provided by the NCDOT. Consultant will also provide NCDOT's Locations and Surveys with the areas that may require additional surveys.

### **Task 3: Reference Reach Survey**

Consultant will identify streams in the immediate project vicinity that can be used as reference reaches. A survey of the stream morphology of three reference reaches will be conducted to serve as a guide for the design. Consultant will install a crest gauge and scour chain, as well as conduct bar samples on each reference in order to assist in the calibration of the sediment analyses.

### **Task 4: Stream Design**

The stream channel design will include analysis of the hydrology, hydraulics, shear stress, sediment transport, and appropriate channel dimensions. The hydrology and hydraulics will include analysis of the bankfull discharge along with the 10-year, 50-year and 100-year discharge. The hydraulic analysis will consist of preparing a single section analysis of the existing and proposed stream geometry. The bankfull discharge will be used to develop the proposed channel dimension and to assess performance while the larger discharges will be used assess alteration to the flood stages.

### **Task 5: Site Layout**

Consultant will develop the horizontal and vertical alignments of the proposed channels. This will include computing the horizontal and vertical location of key channel features that are necessary for construction, such as the centers of radius of curvature, head of riffles, structure locations, and grade controls. Consultant will also design and detail cross vanes where all culverts are installed for the entire length of the road project.

### **Task 6: Draft Stream Mitigation Plan**

Consultant will prepare and submit an agency packet to the NCDOT. This packet will include a one page narrative with graphics. Consultant will also prepare a mitigation plan. Within the mitigation plan document a brief description of existing site conditions will include stream morphology (Rosgen classification), degrading factors, physiography, land use, plant

communities, aquatic communities, soils, hydrology, and wetland delineation. The description of the proposed site will include proposed stream morphology, community types, special treatments such as aquatic or wildlife habitat enhancement, and recommended mitigation ratios. The planting plan will describe appropriate species and planting specifications for reforestation of the riparian and upland areas. Consultant will coordinate with NCDOT's Roadside Environmental Division with regards to the planting plan. A post-construction monitoring plan of the hydrology and vegetation will be included in the narrative as well as success criteria for the site. Three hard copies of the draft report will be provided to the NCDOT.

#### **Task 7: Construction Plan**

Consultant will prepare preliminary stream design plans based on the NCDOT roadway plans for Sites 1, 2, 3, 4, 6, 8, 9, 11, 12, 13, & 14. Consultant will include a morphological table in the detail sheets. The design plans will consist of the following items:

- Title page
- 3 detail sheet
- 13 plan sheets (1:500)
- 8 profile sheets
- 15 cross section sheets

#### **Task 8: Prepare Final Stream Mitigation Plan**

Consultant will address the comments expressed by NCDOT on the draft plan and incorporate into the final plan as required. Consultant will provide fifteen hard copies and an electronic copy of the final plan to NCDOT.

#### **Task 9: Construction Administration**

Consultant will provide limited construction administration services, which will include miscellaneous phone conferences. Consultant will provide summaries of observations made during construction. NCDOT will provide all CEI services. Consultant will make seven trips to the site and will be on-site for a total of 15 days.

#### **Assumptions**

- Aerial survey, topographic survey including survey of existing channel, top-of-bank, and bed elevation, along with base mapping of the site will be provided by the NCDOT.
- All box culvert designs for R-2518A will be provided by the NCDOT.
- Hydraulic modeling will be performed for all stream crossings by the NCDOT.
- No FEMA detail study streams are located within the project limits.
- The NCDOT will provide the location of all wetlands, structures, and utilities.
- Wetland delineations have been performed within the project limits; this includes the areas where stream mitigation is proposed.
- The mitigation document will serve as a statement of the existing and proposed conditions and will not contain multiple scenarios for mitigation.