Avoidance and Minimization Tracking for Projects going through Merger (Projects Requiring a 404/401 Individual Permit, Nationwide Permit, or General Permit)

Avoidance and Minimization (A&M) measures to reduce impacts to the natural and human environment regularly occur throughout the planning and design stages of a project. If A&M design measures considered throughout these preconstruction stages are captured on a list, this will greatly benefit the process at Concurrence Point 4A as well as permit acquisition for the project.

Each measure or question listed below is not applicable for all projects and the measures listed below are not an all-inclusive list, but a guideline for designers and planners to consider when a project moves through Merger or during any project's key planning and design activities. The 404/401 impact considerations are separated from all other types of measures so these can be listed separately at Concurrence Point 4A.

These measures (where applicable) shall be discussed with the merger team at each merger point for concurrence on projects. In addition, discussion on these measures could generate additional avoidance and minimization to be included for the project. No signatures are required for these measures.

Project Feasibility, Internal and External Scoping, CP1

404 & 401 A&M	**Non-404 A&M**
1. Did we choose a certain alignment for the project based on avoiding streams, buffers and wetlands?	1. Where/Why did we decide to focus on a certain alignment for the project?
2. Are there any red flags concerning protected streams, conservation easements or mitigation property?	2. Are there any red flags due to utilities, rail, or human environment resources?
3. Does the study area suit the purpose and need and has it been minimized, reducing impacts to streams and wetlands, and keeping with the Purpose of the project?	3. Are there any Red flags due to known threatened and endangered (T&E) species locations?
4. Is it feasible to expand existing transportation facilities, reducing impacts to all resources rather than new location?	4. Are there parks, recreational areas, refuges, or historic properties that qualify for Section 4(f) or Section 106 consideration?
	5. Are FEMA Hazard Mitigation Grant Program (HMGP) properties, aka, FEMA Buy-out properties, avoided?
	6. Are there any red flags associated with encroachment into 100-year floodplain including potential longitudinal encroachment into the FEMA regulated floodplain?

For all Merger Concurrence Points and key design meetings, the following should be documented

404 & 401 A&M	Non-404 A&M
1. Do the proposed alternatives promote the sensitive crossing of streams as described by the NCDOT's NPDES Post Construction Stormwater Program (PCSP) including: crossing streams or wetlands at the narrowest point and crossing streams or wetlands perpendicularly?	1. Control of access – minimizing impacts to the human environment
2. Do the proposed alternative typical sections promote stormwater runoff contact with vegetation as described in the PCSP including: • Maximizing shoulder section • Flattening roadway side slopes if impacts to environmental resources can be avoided • Maximizing vegetative conveyance	2. Avoid or minimize impacts to the human environment – relocations, noise and community cohesiveness
3. Has ditching in wetlands been avoided? (If ditching is proposed, use existing modeling necessary to assess drainage effects.)	3. Avoid or minimize impacts to historic properties per section 4(f) or 106, schools, cemeteries, parks, greenways, etc.
4. Has fill through wetlands, streams and buffers been avoided or minimized?	4. Avoid or minimize fragmentation for the human and natural environment.
5. Have parallel impacts to streams and wetlands been avoided?	5. Avoiding large cut and fill – minimizing borrow and cut sites or balancing sites
	6. Avoid and minimize potential impacts to known T&E species

Specific for CP2 – Functional Design Stage – slope stakes +40

404 & 401 A&M	Non-404 A&M
1. During this Functional Design stage, were alternatives considered that avoided or minimized impacts to streams, buffers and wetlands?	1. Were alternatives considered that upgraded facilities to avoid or minimize impacts to the human environment?
2. Corridor re-alignment to avoid or minimize impacts	2. Avoid or minimize natural and human fragmentation
3. Were water body classifications considered in determining alternatives to carry forward?	3. Is longitudinal encroachment into any regulated floodplain avoided?
4. Are there any impaired waterbodies that would benefit from enhancement and inclusion in the ROW?	4. Was consideration given to potential impacts to structures in the floodplain?
	5. Are there any identified areas of geo-environmental concern?

Specific for CP2A – Preliminary Design Stage – slope stakes +25

404 & 401 A&M	Non-404 A&M
1. Is bridging decided vs culvert? – Document the advantages for spanning structures – include spanning of streams, wetlands and buffers	1. Design alternatives to achieve minimum impact to the human environment
2. Estimate preliminary structure sizes and document when additional avoidance and minimization measures have been recommended – including bottomless culverts (where bedrock is found) and utilizing box culverts with sills instead of pipe culverts	2. Develop adequate hydraulic structure to maintain integrity of the floodplain
3. Are we maintaining perpendicular crossing to achieve minimum impact?	3. On-site or off-site detours
4. Bridge spanning jurisdictional resources or buffers	4. Have Wildlife crossings been considered?
5. Are we removing an old causeway?	
6. Maintain existing drainage patterns – avoiding impacts to both natural and human environment	
7. Have we shown anywhere that we can lessen direct discharge vs non-discharge of stormwater to streams? Has an analysis been done for this?	

Specific for CP3

1. Select a Least Environmentally Damaging Practicable Alternative (LEDPA) (preferred alternative) based upon a review of the alternatives considered, associated impacts to the human and natural environment, and public comments received at this point in the project development process. Non 404/401 impacts that could possibly weigh into the LEDPA decision are:

   - a significant amount of relocatees,
   - environmental justice impacts,
   - mitigation site impacts,
   - significant cost differences
   - Impacts to parks, greenways, refuges, historic properties, and archaeological sites, especially Section 4(f) properties, if FHWA involvement
   - Use of or impacts to federal lands/properties

   These impacts are important, although it will be up to the Merger Team to determine the significance of the above verses the 404/401 impacts. However, Section 4(f) may override 404/401 consideration.

2. Discuss possible on-site mitigation locations
3. Discuss relocated streams using natural stream design

Specific for CP4A

Review all previous avoidance and minimization captured through the functional and preliminary design stages and list for the 4A meeting. Include the following:

404 & 401 A&M	Non-404 A&M
1. Horizontal and vertical alignment adjustments – where minimizing impacts to streams	1. Possible construction moratoriums
2. Slope adjustments where impacts to streams and wetlands can be minimized	2. Further minimize relocations and impacts to the human and natural environment
3. Retaining walls where impacts are avoided (if necessary) although, retaining walls should be considered as a last option for stream protection	3. Input from public coordination
4. Onsite mitigation locations, or potential stream relocations	
5. Begin to evaluate bridge and culvert construction methods to minimize impacts	

Specific for CP4B – Include greensheet commitments here

404 & 401 A&M	Non-404 A&M
1. Were bottomless culverts recommended?	1. Fill slope design
2. Bridge pier layouts, box culvert design, and stream channel integrity	2. Are we avoiding impacts to any known T&E?
3. Work bridges, top down construction, diversion channels, pile installation	3. Does the drainage design avoid areas of geo-environmental concern to the maximum extent possible?
4. Equalizer pipes	
5. Utility relocation to avoid impacts	
6. Discuss 2:1 slopes for minimization to streams and wetlands	
7. Consider where we are incorporating the appropriate design measures per the PCSP such as • Adequate ground cover • Stabilizing banks and ditches • Adequate energy dissipation and diffuse flow • Maximizing vegetative conveyance	
8. Have we evaluated the potential need for stormwater control measures per the NCDOT Guidelines for Drainage Studies and Hydraulic Design, PCSP and BMP toolbox?	

404/401 A&M at CP4B (cont.)	
9. When partially filling in a wetland, will hydrology remain the same?	
10. If needed, will dissipater pads be installed at the stream bed level?	
11. What type of bank stabilization methods are proposed? Vegetative or other than rock?	
12. Is bank stabilization minimized based on velocities and sinuosity of stream?	

Specific for Final Design Field Inspection

404 & 401 A&M	**Non- 404 A&M**
1. Removal of existing causeway?	1. Determine diversion channels for culvert construction
2. Construction techniques to minimize temporary impacts	2. Construction moratoriums
3. Erosion and sediment control devices to minimize impacts	3. Discuss equalizer pipe locations
4. Determine bridge demolition – including retaining bridge elements such as concrete footers/abutments if removing them disturbs channel and/or channel banks	
5. Discuss clearing and grubbing methods	
6. Proposed stormwater controls per the PCSP and BMP toolbox	

Specific for 4B to 4C

1. Incorporate all feasible avoidance and minimization techniques that were discussed at the 4B and Final Design Field Inspection (FDFI) meetings into the plans.
2. Review and present the A&M with the final design permit drawing to the agencies.