Section 4 - Appendix 4

Conceptual Compensatory Mitigation Plan

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Conceptual Compensatory Mitigation Plan for the Northeast Energy Direct Project

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1.0 INTRODUCTION

This Conceptual Mitigation Plan ("Plan") describes the methods that will be implemented during construction of the Tennessee Gas Pipeline Company, L.L.C. ("Tennessee") Northeast Energy Direct ("NED Project" or "Project") to minimize, avoid, and mitigate for the temporary and permanent impacts to wetlands and other waterbodies. This Plan includes a description of impacts for each state.

The enclosed plan is conceptual in nature and the final Compensatory Wetland Mitigation Plan will be developed to follow the United States Army Corps of Engineers ("USACE") Compensatory Mitigation Guidance and Checklist Instructions contained therein. The Plan includes a description of Project impacts, objectives, and preliminary mitigation strategies. Additional information pertaining to the anticipated impacts and construction sequencing are available in the Project's permit authorization requests. This Plan includes state-specific compensatory mitigation programs to offset the resource impacts associated with the Project in each state. Tennessee intends to expand upon this conceptual Plan, as based on consultation with and comments from USACE, United States Environmental Protection Agency ("USEPA"), state and local regulatory authorities, and other stakeholders in the compensatory wetland mitigation discussions.

2.0 PROJECT DESCRIPTION

Tennessee, a subsidiary of Kinder Morgan and a major supplier of natural gas to utilities, distribution companies and power generators in the northeast, plans to construct, install, and operate the NED Project. Tennessee proposes to expand and modify its existing pipeline system in Pennsylvania, New York, Massachusetts, New Hampshire, and Connecticut. The NED Project is being developed to meet the increased demand in the Northeast United States ("U.S.") for transportation capacity of natural gas. The Project includes the following facilities:

- Approximately 41 miles of pipeline looping on Tennessee's 300 Line in Pennsylvania;
- Approximately 133 miles of new pipeline, of which 99 miles are proposed to be generally co-located with the certificated Constitution Pipeline Project ("Constitution")[1] in Pennsylvania and New York (extending from Tennessee's existing 300 Line near Auburn, Pennsylvania to Wright, New York);
- Approximately 54 miles of pipeline generally co-located with Tennessee's existing 200 Line and an existing utility corridor in New York;
- Approximately 64 miles of pipeline generally co-located with an existing utility corridor in Massachusetts;
- Approximately 70 miles of pipeline generally co-located with an existing utility corridor in New Hampshire (extending southeast to Dracut, Massachusetts);
- Approximately 58 miles of various laterals and a pipeline loop segment in Massachusetts, New Hampshire, and Connecticut to serve local markets;
- Construction of nine new compressor stations and 15 new meter stations, and modifications to an existing compressor station and 14 existing meter stations throughout the Project area; and
- Construction of appurtenant facilities, including mainline valves ("MLVs"), cathodic protection, and pig facilities through the Project area.

Right-of-way ("ROW") widths vary along the proposed Project corridor. Construction ROW widths vary from 75 to 120 feet in Massachusetts and 75 to 120 feet in New Hampshire. Construction ROW widths in Connecticut are 90 feet for the entire proposed alignment. Operational ROW width is 50 feet for the entire proposed alignment through New York, Massachusetts, New Hampshire, and Connecticut.

To the extent that it is practicable, feasible, and in compliance with existing law, Tennessee proposes to locate proposed pipeline facilities (either pipeline looping segments or co-located pipeline facilities) generally within or adjacent to its existing ROW associated with its existing 300 Line in Pennsylvania

[1] On December 2, 2014, the Commission issued an Order Issuing Certificates and Approving Abandonment, Constitution Pipeline Company, LLC, 149 FERC 61,199 (2014), for the Constitution Pipeline Project, which adopted the recommendations from the Constitution "Final Environmental Impact Statement: Constitution Pipeline and Wright Interconnect Projects," FERC Environmental Impact Statement ("EIS") No. 0249F, Docket Numbers CP13-499-000, CP13-502-000, and PF12-9-000 ("Constitution Final EIS ["FEIS"]") issued October 24, 2014. Information contained within this Application related to the Constitution Pipeline Project was based on the updated routing provided by Constitution to FERC in January 2015.

and Connecticut; its existing 200 Line in New York and Massachusetts; and existing utility (pipeline and powerline) corridors in Pennsylvania, New York, Massachusetts, and New Hampshire.

Pipeline loops are those pipeline segments which are laid parallel to another pipeline and used as a way to increase capacity along what is possible on one line. These lines are connected to move a larger flow of gas through a single pipeline segment. Tennessee is proposing to minimize impacts by looping its own existing facilities in Pennsylvania and Connecticut.

Co-located pipelines are those that are laid parallel to another existing pipeline or linear utility. The current route of Tennessee's proposed NED Project, in large part, is located parallel and adjacent to, and, in many cases, overlaps existing utility easements (either pipeline or powerlines). This paralleling/overlapping of easements is commonly referred to as co-location. Refinement to the routing, including locations of permanent easement and temporary construction workspaces, has occurred as the NED Project was developed during the pre-filing process and will continue as necessary through the certificate process, incorporating information gained from field surveys and landowner and stakeholder input, including input from power companies that have existing easements in areas where Tennessee is proposing to co-locate the Project pipelines.

For areas of the NED Project pipeline alignment that are proposed to be co-located with existing powerline easements, Tennessee is proposing that the centerline of the pipeline will be installed generally five feet outside the existing powerline easement boundary.

For all areas of co-location with powerline easements, Tennessee is proposing that the permanent easement be centered generally on the proposed pipeline and that 20 feet of the proposed 50 foot permanent easement overlap the existing powerline easement. Further, Tennessee is proposing that the temporary construction workspace for the Project for these areas of co-location will overlap the existing powerline easement between 30 to 60 feet. The amount of overlap of temporary construction easements and the existing powerline easements will depend ultimately on the location of the closest powerline towers and facilities, which will dictate the amount of available space on the powerline easement.

Tennessee is requesting issuance of a certificate order for the Project in the fourth quarter of 2016 and proposes to commence construction activities in January 2017, in anticipation of placing the Project facilities in-service by November 2018 (with the exception of the proposed pipeline looping segment in Connecticut, which would be placed in-service by November 2019), consistent with the terms and conditions of the precedent agreements executed with Project Shippers.

Tennessee's existing pipeline infrastructure consists of approximately 11,900 miles of pipeline designated as the 100, 200, 300, 400, 500, and 800 Lines, based on the region they serve. The proposed NED Project focuses on the existing 200 and 300 Lines. The 200 Line consists of multiple pipelines varying from 24 inches to 36 inches in diameter beginning on the suction side of Compressor Station 200 in Greenup County, Kentucky, and extending east through Ohio, Pennsylvania, New York, and Massachusetts. The 300 Line system consists of two pipelines (24 inches and 30 inches in diameter) beginning on the discharge side of Compressor Station 219 in Mercer County, Pennsylvania, traveling east through Pennsylvania, New Jersey, New York, Connecticut, and terminating as a 16-inch-diameter pipeline at Compressor Station 261 in Hampden County, Massachusetts.

According to USACE regulations, the fundamental objective of compensatory mitigation is to offset environmental losses resulting from unavoidable impacts to waters of the United States (33 CFR 332.3[a]). The criteria for compensatory mitigation are set forth in the USACE's mitigation regulations, the USEPA's" companion Clean Water Act ("CWA") regulations (40 CFR 230) and in the "USACE's New England District ("NE District") Compensatory Mitigation Guidance (July 2010)"; or in the CWA regulations (40 CFR 110, 112, 116, *et al.*.) and in the "USACE's New York District ("NY District") Compensatory Mitigation Guidance (January 10, 2005)". Both the USACE and the USEPA have established a national goal of no overall loss of wetland functions, as detailed in the agencies' 1990 Memorandum of Understanding and respective mitigation regulations (33 CFR Parts 325 and 332; 40 CFR 230). The USACE NE and NY District Compensatory Mitigation Guidance incorporates these mitigation requirements, as well as those contained in the "USACE's Regulatory Guidance Letter No. 08-03: Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving Restoration, Establishment, and/or Enhancement of Aquatic Resources (October 10, 2008)" (USACE 2008). In addition to these federal requirements, Connecticut and Massachusetts have each established general goals and objectives for compensatory mitigation of aquatic resource impacts that the Conceptual Wetland Mitigation Plans are intended to address.

3.0 WETLANDS

Tennessee is currently in the process of acquiring access permission and conducting field delineations along the proposed Project route. During field delineations, all wetlands crossed by the Project were field delineated in accordance with the USACE Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (USACE 2012). For those areas where field delineations have not occurred, the Project route was photointerpreted to estimate locations and area of wetlands and upland habitats using stereo imaging software. The LiDAR derived 1-foot contours were overlain on project specific orthophotos to supplement the photointerpretation. Additional resources were referenced for supporting information including National Wetland Inventory ("NWI") maps, hydric soil maps, hydrology maps, topographic maps, and additional publicly available aerial photographs as needed to confirm a feature. Due to aquatic vegetation not being visible at the time of the imagery flight, aquatic beds were mapped from publicly available orthophotos.

The United States Fish and Wildlife Service ("USFWS") wetland classification system described by Cowardin et al. (1979) was used to classify the wetlands that would be affected by the Project. The wetlands in the Project area were identified as Palustrine Forested ("PFO"), Palustrine Scrub-Shrub ("PSS"), Palustrine Emergent ("PEM"), Palustrine Open Water ("POW"), or a combination of these four cover types. Palustrine systems include all non-tidal wetlands that are dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 percent. The palustrine system was developed to group vegetated wetlands commonly referred to as marshes, swamps, bogs, and prairies. This system includes ponds and may be situated shoreward or lakes, river channels, estuaries, river floodplains, in isolated catchments or on slopes (Cowardin et al. 1979).

3.1 WETLANDS CROSSED BY THE PROJECT

Field surveys and photo interpretation were used to identify wetlands along the proposed Project route.

3.1.1 Pipeline Facilities

Pennsylvania

The proposed wetland crossings by Project facilities in Pennsylvania are listed in Section 1, Attachment 2, which includes wetlands crossed by the pipeline and/or the limits of temporary workspace. Along Loops 317-3 and 319-3 the majority of these wetlands are PEM within the existing ROW and PFO, with some areas of PSS, outside of the existing ROW. Along the Pennsylvania to Wright Segment the alignment crosses all three wetland strata types. Crossing lengths vary within Pennsylvania but range from 10 to 800 feet.

New York

The proposed wetland crossings by Project facilities in New York are listed in Section 2, which includes wetlands crossed by the pipeline and/or the limits of temporary workspace. Along the Pennsylvania/New

York border to Wright segment and the Wright to New York/Massachusetts border segment, the majority of these wetlands are PEM within the existing ROW and PFO, with some areas of PSS, outside of the existing ROW. Along these segments the alignment crosses all three wetland strata types. Crossing lengths vary within New York but range from 4 to 1,447 feet.

Massachusetts

The proposed wetland crossings by Project facilities in Massachusetts are listed in Section 3, Attachment 2, which includes wetlands crossed by the pipeline and/or the limits of temporary workspace. The majority of these wetlands are PEM within the existing ROW and PFO, with some areas of PSS. Crossing lengths vary within Massachusetts but range from one to 961 feet.

New Hampshire

The proposed wetland crossings by Project facilities in New Hampshire are listed in Section 3, Attachment 2, which includes wetlands crossed by the pipeline and/or the limits of temporary workspace. Along Segments I, J, P, and Q of the pipeline, the majority of wetlands were observed to be PEM within the existing ROW while the majority of wetlands outside the existing ROW are PFO, with some areas of PSS. Within Segments I, J, P, and Q, the alignment crosses all three wetland strata types. Crossing lengths vary within New Hampshire but range from one to 1,580 feet.

Connecticut

The proposed wetland crossings by Project facilities in Connecticut are listed in Section 3, Attachment 2, which includes wetlands crossed by the pipeline and/or the limits of temporary workspace. The majority of these wetlands are PEM within the existing ROW and PFO in the areas outside of the existing ROW. Crossing lengths vary within Connecticut but range from two to 2,424 feet.

3.2 WETLAND IMPACTS AND MITIGATION

Construction of the Project pipeline facilities will result in temporary impacts to numerous waterbodies. Tennessee is investigating the feasibility to utilize Horizontal Directional Drilling ("HDD") to avoid impacts associated with a number of locations along the Project alignment, including: the Farmington River in Connecticut, the Deerfield River, Connecticut River, Merrimack River, and Spicket River in Massachusetts, the Merrimack River in New Hampshire, the Hudson River and Schoharie Creek in New York, and the Susquehanna River in Pennsylvania.

Construction of the proposed Project pipeline facilities will result in temporary impacts to emergent and scrub-shrub wetlands as well as forested wetlands. After construction, a portion of forested wetlands will be permanently converted to and maintained as scrub-shrub and/or emergent wetlands. Woody vegetation within the new permanent ROW will be allowed to regenerate within the ROW except for a 10-foot wide area centered over the pipeline that will be maintained in an herbaceous/scrub-shrub state to allow for inspection and maintenance of the pipeline once the Project is in-service. In addition, trees with roots that could compromise the integrity of pipeline coating within 15 feet of the pipeline may be selectively cut and removed from the new permanent ROW.

3.2.1 Mitigation and Restoration Measures

Construction and mitigation activities in wetlands will be conducted in accordance with the Project-specific Plan and Procedures ("Plan and Procedures"), Tennessee management practices ("BMPs"), and the Environmental Construction Plan(s) ("ECPs") for each individual state. In addition, all applicable state documents and past project experiences were utilized in the development of the state specific ECPs.

Following construction and restoration, the temporary workspace ("TWS") areas will not be maintained during operation of the proposed facilities and will be allowed to revert back to its pre-construction land use and vegetation cover types. All wetlands will be substantially restored to their pre-construction grades, contours, and drainage patterns, and reseeded or replanted with native hydrophytic vegetation species as identified in the Final Mitigation Plan.

In accordance with USACE general guidance, compensatory mitigation will be provided at a minimum one-for-one ratio for wetland losses. Tennessee will propose mitigation that will result in no net loss of wetland area or functions. While Tennessee anticipates that there will be no permanent loss to wetlands or waterbodies as a direct result of placement of the pipeline, the potential exists that there may be permanent losses associated with new roads or other ancillary facilities. Tennessee is currently evaluating final design alternatives for the proposed access road and ancillary facilities to avoid and minimize potential losses to wetlands. Tennessee proposes to accomplish at least a 3:1 replacement ratio for permanent impact to forested wetlands, and at least 2:1 for shrub and herb-dominated wetlands. Tennessee recognizes that the ratios will depend on many factors including the type of wetlands restored or established and the mitigation approach. Unavoidable conversion from forested to scrub-shrub and emergent wetlands will also occur as a result of Project construction. While conversion does not constitute a loss of wetland area, wetland structure and function are affected and this must be addressed as part of the Mitigation Plan. Tennessee also recognizes that temporal impacts (temporary loss of wetlands during construction) need to be compensated as part of the mitigation. Tennessee will identify compensatory mitigation projects that are in the same HUC-8 watersheds as unavoidable impacts and, as much as possible, achieve in-kind replacement or better of wetland resources unless alternative locations and methods are preferred by the regulatory agencies.

Tennessee's plan for impacts to wetlands and watercourses follows the requirements of 33 CFR Part 332. As the Final Mitigation Plan and measures are developed for the Project they will be provided as supplemental information to this plan.

The goal of the Conceptual Mitigation Plan (Plan) is to restore, establish (create), and/or enhance wetland hydrology, hydrophytic vegetation, and hydric soil conditions to adequately offset the loss of function and value to the jurisdictional wetlands resulting from Project implementation. Even with the avoidance and minimization measures in place, there will be some unavoidable impacts to wetlands; however, Tennessee's multi-facetted approach will endeavor to design a mitigation package that will fully compensate for impacts to wetlands with no net loss of function or values as explained in this Plan. Revisions to this Plan will be incorporated during the course of the USACE and state-specific permitting process. This Plan will take into account the site-specific cumulative loss of biological function provided by the impacted wetlands, as well as public value.

3.3 COMPENSATORY WETLAND MITIGATION NEEDS AND OPTIONS

In developing and preparing the wetland mitigation strategy for the Project, the Tennessee relied upon the 2008 federal Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (4/10/08; 33 CFR Parts 325 and 332 [Mitigation Rule]) (USACE 2008) and the USACE Regulatory Guidance Letter 08-03; Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources (USACE 2003).

Categories of mitigation techniques available to Tennessee range from mitigation banking to preservation, each requiring different design and mandating different mitigation ratios and construction methods. The major categories of mitigation techniques in descending order of preference are:

- Avoidance and Minimization;
- Mitigation Banking;
- In-lieu fee (ILF);
- Restoration (Rehabilitation or Reestablishment);
- Establishment (Creation);
- Enhancement; and
- Preservation.

3.3.1 Pennsylvania

Tennessee will consult with the USACE – Baltimore District and Pennsylvania Department of Environmental Protection ("PADEP") Northcentral and Northeast Regional Offices for guidance during development of the proposed mitigation measures and plans, and will incorporate specific recommendations of the agencies.

3.3.2 New York

In addition to following the major categories of mitigation techniques in descending order of preference listed above, to compensate for those wetland benefits lost from the Project activities associated with impacts to NYSDEC state-regulated Freshwater Wetlands, the wetland mitigation plan will meet the following provisions as outlined in 6 NYCRR 663.5(g)(1)(i) through (iii), including:

a. The mitigation must occur on or in the immediate vicinity of the site of the proposed project;
b. The area affected by the proposed mitigation must be regulated by the Act and this Part after mitigation measures are completed; and
c. The mitigation must provide substantially the same or more benefits than will be lost through the proposed activity.

3.3.3 Massachusetts

In addition to following the major categories of mitigation techniques in descending order of preference listed above, Tennessee considered the NE District Compensatory Mitigation Guidance document (USACE 2010) as well as the In-lieu fee programs for Massachusetts. These programs/guidelines incorporate both the 2008 federal Compensatory Mitigation for Losses of Aquatic Resources; Final Rule

(4/10/08; 33 CFR Parts 325 and 332 ["Mitigation Rule"]) (USACE 2008) and the USACE Regulatory Guidance Letter 08-03; Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Restoration, Establishment, and/or Enhancement of Aquatic Resources (USACE 2003).

The USACE NE District and the Massachusetts Department of Fish and Game ("MADFG") signed an ILF program agreement in 2014 providing an alternative form of compensatory mitigation for permittees required to compensate for project impacts to aquatic resources, wetlands and waters of the U.S. in Massachusetts for eligible projects authorized under Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. The ILF option is available to the permit applicant instead of completing permittee-responsible mitigation by making a monetary payment in-lieu of or in addition to doing the required mitigation themselves. Use of the ILF program is contingent upon USACE NE District approval. The MADFG administers the ILF in Massachusetts and assumes legal responsibility for implementing required mitigation accomplished by aggregating and expending the in-lieu funds received from permittees for mitigation projects. The goal is the substantially increase the scope and quality of restoration and protection of aquatic resources and their related buffers and uplands. By aggregating the fees from multiple permit impacts, the ILF program can use the fees to develop larger compensatory projects that offer greater ecological benefits than smaller permittee-conducted mitigation contributing to watershed level conservation goals within Massachusetts. Projects in Massachusetts follow the NE District guidance described in detail in Section 3.3.1.5 for Connecticut.

3.3.4 New Hampshire

In addition to following the major categories of mitigation techniques in descending order of preference listed above, Tennessee recognizes that an inland wetland in-lieu program has been developed in New Hampshire that is closely aligned with the Federal In Lieu Fee Program ("ILFP"). NHDES and the USACE determine the credits required for authorized projects case-by-case using guidance and/or rules developed by each agency. The Federal ILFP administered by the USACE, is closely aligned with the New Hampshire in lieu fee program, and the Aquatic Resources Mitigation ("ARM") Fund. Land acquisitions are also considered by Tennessee to be viable mitigation options, provided the details and accounting process for this type of utility project can be developed in an acceptable manner. Land acquisition in the form of preservation may be used to provide compensatory mitigation for activities authorized by the USACE permits when the following criteria are met:

- The resources to be preserved provide important physical, chemical, or biological functions for the watershed;
- The resources to be preserved contribute significantly to the ecological sustainability of the watershed. In determining the contribution of those resources to the ecological sustainability of the watershed, the district engineer must use appropriate quantitative assessment tools, where available;
- Preservation is determined by the district engineer to be appropriate and practicable;
- The resources are under threat of destruction or adverse modifications; and,
- The preserved site will be permanently protected through an appropriate real estate or other legal instrument.

Tennessee recognizes that the ARM FUND has been established on a watershed basis to meet the 2008 Compensatory Mitigation Rule. The USACE ILFP is developed as a programmatic response to the historic loss of and continuing threat to aquatic resources in the region. This ILFP was designed to provide high quality mitigation and offer an alternative to USACE permittee-responsible, on-site compensatory mitigation. Historically, a portion of nationwide permittee-responsible wetland mitigation projects were unsuccessful, as they either were not completed or monitored; and/or monitoring revealed failure to meet project success criteria. The implementation of the ILFP will allow a transfer of compensatory mitigation responsibility to ensure that high-quality wetland habitats are created and successfully established. Again, this compensatory mitigation option is closely aligned with the Aquatic Resources Mitigation (ARM) Fund, administered by the Department of Environmental Services ("NHDES"). However, at the state level, engaging the local community in which wetlands impacts are incurred is the initial requirement. Local municipalities must be engaged by the project proponent to obtain information on any options for mitigation in any of several forms. The default option is the ARM fund program which then requires close coordination with the Federal ILFP. The administering agencies have a proven history of successfully completing wetland habitat restoration projects. Land acquisition at the federal level is focused on meeting specific impact ratios and translating mitigation credits to mitigate lost functions and values of wetlands by preserving similar functions and values on parcels. The ratios are based upon:

- Complexity of the system impacts;
- Likelihood of success;
- Degree to which acres/linear feet and functions are replaced; and
- Temporal losses for certain functions.

Under an ILFP, a permittee purchases mitigation credits for impacts within a specific area. These credits are paid to the administering agency that assumes the legal responsibility for compensatory mitigation implementation success and cover all costs associated with land acquisitions, engineering, permitting, construction, long term monitoring, and administrative costs for the mitigation areas, as well as a contingency amount to provide for any necessary corrective actions. In New Hampshire, Tennessee has initiated the engagement process with local communities by circulating a letter to the local boards in order to obtain information relative to mitigation opportunities. As such, Tennessee is in the process of meeting with local boards to obtain more detailed information relative to preferred mitigation options.

3.3.5 Connecticut

In addition to following the major categories of mitigation techniques in descending order of preference listed above, Tennessee considered the NE District Compensatory Mitigation Guidance document (USACE 2010) as well as the In Lieu Fee Programs for Connecticut.

Accordingly, compensation sites should be located to provide the desired water resource functions and values, taking into consideration factors such as watershed location, aquatic habitat diversity, connectivity, and, for wetlands and streams, a balance of wetlands and uplands. Options include water resource restoration, creation, enhancement, and preservation. Of these, the NE District Compensatory Mitigation Guidance states a preference for restoration but also acknowledges that "good restoration sites can be hard to find in New England".

In providing compensatory mitigation, Tennessee's overall goal for the Project is to provide no net loss of existing wetland functional values and statutory interests within the affected watersheds through the preservation, restoration, enhancement, and/or creation of wetlands. As detailed in the Compensatory Mitigation Guidance, the NE District has developed standard compensatory mitigation ratios to provide a framework for compensatory mitigation. The compensation ratios focus on direct permanent impacts, with additional mitigation required to address temporary fill impacts and secondary impacts, such as conversion of forested wetlands to scrub-shrub or emergent wetlands. While these ratios are the starting point for developing appropriate compensatory mitigation, there is flexibility on a project-by-project basis in order to achieve the most appropriate mitigation for a specific project. Tables 3.3-1 and 3.3-2 reproduce the USACE NE District guidance regarding compensatory mitigation ratios for permanent and temporary / secondary impacts, respectively. Note that these ratios do not fully account for pipeline construction that primarily impacts emergent wetlands and provides in-place restoration.

Table 3.3-1
USACE NE District Recommended Compensatory Mitigation Ratios for Direct Permanent Impacts (Table 1 in the NE District Compensatory Mitigation Guidance)

Mitigation/ Impacts	Restoration[1] (reestablishment)	Creation (establishment)	Enhancement (rehabilitation)	Preservation (protection/ management)
Emergent Wetlands (ac)	2:1	2:1 to 3:1	3:1 to 10:1[2]	15:1
Scrub-shrub Wetlands (ac)	2:1	2:1 to 3:1	3:1 to 10:1[2]	15:1
Forested Wetlands (ac)	2:1 to 3:1	3:1 to 4:1	5:1 to 10:1[2]	15:1
Open Water (ac)	1:1	1:1	project specific[3]	project specific
Submerged Aquatic Vegetation (ac)	5:1	project specific[4]	project specific[5]	N/A
Streams[6] (lf)	2:1[7]	N/A	3:1 to 5:1[8]	10:1 to 15:1[9]
Mudflat (ac)	2:1 to 3:1	2:1 to 3:1	project specific	project specific
Upland[10] (ac)	≥10:1[11]	N/A	project specific	15:1[12]

[1] Assumes no irreversible change has occurred to the hydrology. If there has been such a change, then the corresponding creation ratio should be used.

[2] Based on types of functions enhanced and/or degree of functional enhancement.

[3] Might include planting submerged and/or floating aquatics and/or removal of invasive species.

[4] Rare cases, e.g., removal of uplands, old fill, etc.

[5] E.g., remove pollutant source such as an outfall, remove moorings.

[6] Note that this assumes both banks will be restored/enhanced/protected. If only one bank will be restored/ enhanced/protected, use half the linear foot credit.

[7] E.g., daylighting stream, elimination of concrete channel.

[8] Enhancement of denuded banks and channelized streams = 3:1.

Enhancement of denuded banks when there is a natural channel = 4:1.

Enhancement when there are vegetated banks but the stream has been channelized = 5:1.

[9]Preserving buffer within the 100-foot minimum from channel = 10:1.

Preserving additional buffer 100 to 250 feet from channel = 15:1.

[10] This is when upland is used for wetland mitigation, NOT mitigation for upland impacts, which are not regulated.

[11] Only applies if existing condition is pavement or structure AND should complement aquatic functions.

[12] 100' upland buffer recommended for restoration, creation, and enhancement sites would be credited here.

Table 3.3-2
Recommended Compensatory Mitigation for Temporary and/or Secondary Impacts
(Excerpted from Table 2 in the NE District Compensatory Mitigation Guidance)

Impact	% Of Standard[1] Amount[2]
Temporary fill (swamp mats, fill over membrane) in forested wetlands; area to revegetate to forest.	10-25%
Temporary fill in emergent or scrub-shrub; area to revert to previous condition.	5-20%
Temporary fill in forest and will be permanently converted to scrub-shrub or emergent.	15-45%[3]
Permanent conversion of forested wetlands to other cover types.	15-40%
Removal of forested wetland cover for new corridor.	Project specific
Removal of forested cover of vernal pool buffer (w/in 250' of pool) when percentage of disturbance exceeds 25% of the total VP buffer area.	Project specific[4]
Streams – clearing of upland forest and/or scrub-shrub vegetation within 100' of stream bank or outermost channel of braided stream.	Project specific[5]

[1] "Standard" refers to amount of compensation that would be recommended under either the Corps' mitigation ratios for permanent fill (TABLE 1) or that required in In-lieu fee payments using the standard calculation.

[2] Percentages may be reduced if appropriate project-specific BMPs are incorporated into the project.

[3] For widening existing corridors only, not new. This does not take into account fragmentation impacts.

[4] Considerations in determining appropriate mitigation for secondary impacts to vernal pools should be on overall impact to the upland vernal pool buffer and how this affects the functions of the pool.

[5] Considerations in determining appropriate mitigation for secondary impacts to streams from loss of upland buffer should be on overall impact to the upland stream buffer and how this affects the functions of the stream.

Under the permittee-responsible mitigation option, to compensate for the Project's impacts to aquatic resource areas, Tennessee will develop a final mitigation plan that includes various measures of *in-situ*/in-kind wetland restoration, land preservation, and/or other wetland enhancement measures.

On-ROW mitigation will occur in each state and will involve the restoration of wetlands and watercourses temporarily affected by Project construction activities, such as the installation of temporary fills (e.g., timber swamp mat access roads, timber work pads). Such water resources will be restored and stabilized to pre-existing conditions to the extent practicable during the Project ROW restoration efforts.

To minimize the effects of the unavoidable impacts to state and Federally-regulated wetland resource areas during construction, Tennessee will implement BMPs as outlined in the Project's ECPs and Invasive Species Plan. The invasive species plan identifies the invasive wetland plant species that are of concern in the Project region. Although not all of the delineated wetlands proximate to the pipeline ROWs will be affected as a result of Project construction activities, those that will be disturbed could be more susceptible to colonization by invasive species. In addition, movement of construction equipment and materials through wetlands that presently contain invasive plants could promote the spread of invasive species to nearby, un-infested wetlands. The overall objective of the invasive species plan is to

define the procedures to be used during Project construction to preserve the value and functions of wetlands along the Project ROWs that presently do not contain invasive species and to minimize the further spread of invasive plants within wetlands that already contain them. Construction best management practices (BMPs) will also be employed throughout the final design and implementation of the project, consistent with the procedures documented in submittals to the USACE as part of the Section 404 application.

4.0 REFERENCES

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