Looking Ahead: Planning For An Expansion At Your Wastewater Treatment Plant

North Carolina Department of Environment and Natural Resources

Division of Water Resources

Water Quality Permitting

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Purpose

The Division has developed this guidance to provide local governments with information describing the process involved in obtaining approval for a capacity expansion. As a general rule, **2 ½ years** should be allowed to complete the permitting process. By helping municipal utility managers and other readers understand the process more clearly, this document will:

- Help Permittees to prepare approvable submittals, submit those at the proper time, and avoid requests from the DWR and other regulators for additional information,
- Speed up the review and approval processes for the project, and
- Reduce the time and money they must spend on project planning and regulatory approvals.

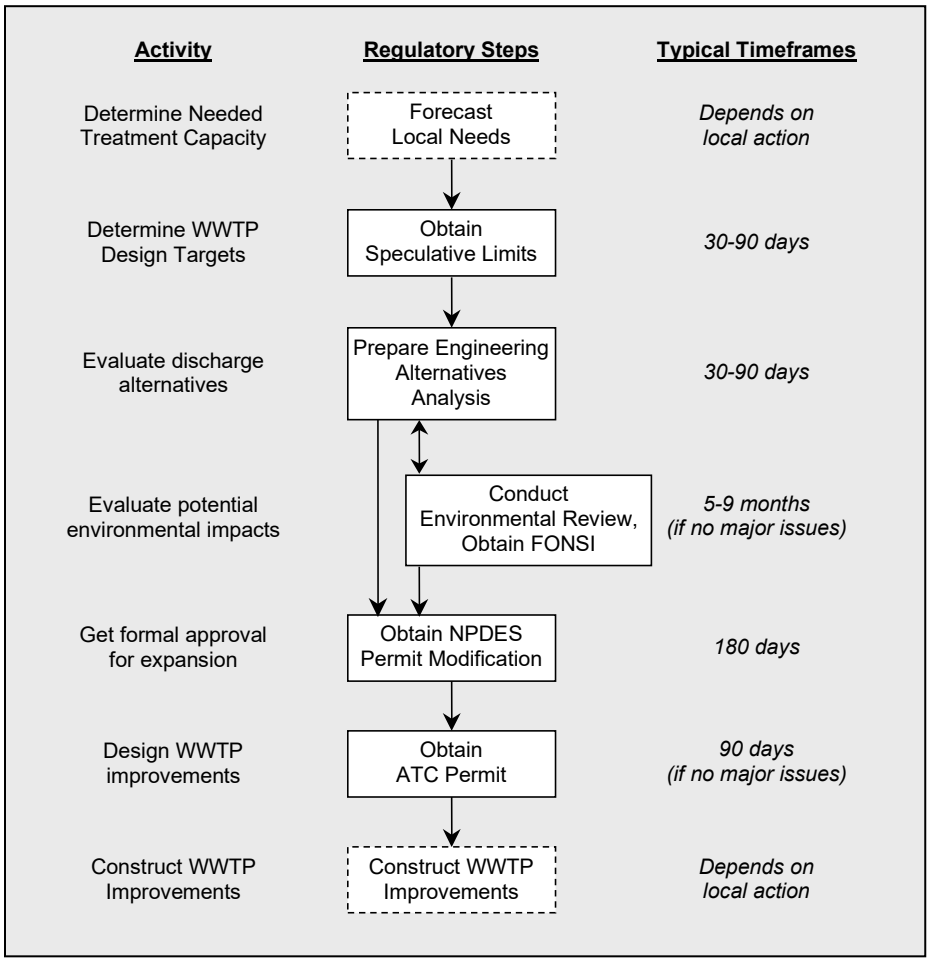
The document is divided into three parts. Section I describes the key steps required for a treatment plant expansion. Section II describes some of the potential obstacles the utility manager may face that are outside the "normal" approval processes. Section III contains the Appendices that provide additional information on sources of funding and contacts.

Section I. Expansion Process

A. Key Steps

Certain steps must be completed when planning a treatment plant expansion. Figure 1 shows the key steps in this process in general terms, the usual sequence of the steps, and typical timeframes for completing each one. As projects will vary, so will the process and timing.

Figure 1. Key Steps for WWTP Expansion



B. Needs Assessment

Utility managers must anticipate when wastewater flows will exceed the capacity of their treatment system and recognize the need to complete an expansion before increasing flows result in permit violations. An attentive manager monitors indicators such as:

- Long-term increases in wastewater flow
- Expansion of service area
- New phases of development
- Connection of new customers

When a utility does not act proactively to address flow increases, the State may prompt it to take action. The Division tracks yearly average flow for all permitted facilities. Based on these average flows the Division can impose sewer moratoriums as per regulation 15A NCAC 02H .0223, known as the "80/90" rule. When the average flow of any calendar year is above 80 % of the permitted hydraulic capacity of the treatment system, the permittee must complete "an approvable engineering evaluation of its treatment needs". This report must address either the expansion of the treatment system, the elimination of extraneous flow or reduction of flow by water conservation. Prior to exceeding 90 % the permittee must obtain all permits needed for expansion of the treatment system and submit plans and specifications for the expansion.

80/90 Rule (2H .0223)

80%: Evaluation of needs and planning completed

90%: Permitting and design completed

The Division encourages any Permittee operating at 65% or more of its treatment capacity to familiarize itself with the information presented here and prepare itself for expansion as soon as realistically possible.

It is also possible that new permit limits or other conditions will require major facility improvements. While these improvements may not include expansion per se, much of the process described here may apply to them as well.

When the utility determines that an expansion is necessary, it must develop estimates of the following factors before proceeding to the next step:

- Future flows
- Rate of growth (time frame for expansion)
- Probable nature of improvements

C. Speculative Limits

Speculative limits are provided to publicly owned facilities to establish performance criteria for the design of the wastewater treatment plant improvements. Limits are developed based on the established uses of the receiving water body, the capacity of the water body to accept the additional wastewater loads or current management strategies at the time the speculative limits are developed. Many issues can influence these permit limits conditions: impairment of the stream, over allocation of loads, or stream classification restrictions (i.e. High Quality Waters). These and other issues that could affect the development of speculative limits are discussed in Section II.

Modeling is generally required to develop limits for BOD and ammonia. Different modeling tools are used depending on the complexity of the situation. The NPDES Unit will perform Level B models, which are simple models. The Modeling and Assessment Branch is asked to review or perform complex models. A permittee may opt to perform the modeling of the stream. The DWR must grant approval of such modeling propositions.

To obtain speculative limits submit a letter to DWR's NPDES Unit describing the proposed flow, proposed discharge location and low flow statistics obtained from the USGS. DWR will provide speculative limits to publicly owned treatment works for up to two flows scenarios per year. Allow **30 to 60 days** for issuance of speculative limits. If complex modeling is required an additional **60 to 180 days** may be required.

D. Engineering Alternatives Analysis (EAA)

North Carolina regulations require permit holders to complete an Engineering Alternatives Analysis (EAA) for expansions of a wastewater treatment system. The EAA shall include a justification and demonstration of need for the expected flow volume (15A NCAC 2H.105 (c)(1)). It should also include a summary of waste treatment and disposal alternatives options that were considered and why the proposed system and proposed alternative were selected (15A NCAC 2H.105 (c)(2)). The NPDES Unit developed a detailed guidance for the preparation of EAAs. The document can be found at http://portal.ncdenr.org/web/wq/swp/ps/npdes/guidance.

If the project is subject to the State Environmental Policy Act (SEPA) review, the requirements of the EAA must be folded into the Environmental Assessment (EA) or Environmental Impact Statement (EIS). SEPA applicability and requirements are discussed in the following section. If the project is funded by the Division of Water Infrastructure (DWI), the EAA requirements shall be incorporated in the Engineering Report. Guidance for the preparation of the Engineering report can be found athttp://portal.ncdenr.org/web/wi/cleanwater/er.

The EAA for a proposed NPDES expansion must provide complete justification for a direct discharge to surface water and demonstrate that the direct discharge is the most environmentally sound cost effective alternative.

For projects not subject to SEPA, the EAA shall be submitted to the NPDES Unit with the permit modification request. The NPDES Units will review the EAA for completeness. A document that doesn't include all required elements will be returned to the applicant. The review process takes **90 to 180 days**. Only after the NPDES Units concurs with the EAA can the permitting process proceed. See Part F. NPDES Permit Modification for more information on the permit modification process.

E. State Environmental Policy Act (SEPA) Review

Prior to submitting a permit application to DWR's NPDES Unit to expand a wastewater discharge facility, the applicant must determine if the project will require a North Carolina Environmental Policy Act review. SEPA, as it is commonly referred, requires the State's agencies, such as DENR, to review and report on the environmental effects of certain activities for which it issues permits.

SEPA is implemented through a comprehensive written description of a project and its impacts in either an environmental assessment (EA) or environmental impact statement (EIS). These documents are meant to disclose the project's direct, secondary and cumulative impacts to the environment and natural resources, provide an analysis of project alternatives considered, and describe mitigation for any impacts noted. Both documents must report on the effects of the project on surface and groundwater, floodplains, wetlands, air quality, land use, wildlife resources, noise, scenic and recreational areas, shellfish and finfish, forestland, cultural and historical resources, and toxic substances.

Which document to proceed with depends on the magnitude of a project's potential environmental impacts, but public interest could be a factor as well. An EA is generally prepared if the project is not anticipated to produce significant adverse environmental impacts, if impacts can be mitigated to level of insignificance, or if the magnitude of impacts is

Environmental documentation under SEPA is generally required for:

- New discharge facilities with a proposed permitted flow of 500,000 gallons or more per day or producing an instream waste concentration equal or exceeding 33 percent during the 7-day 10-year low flow conditions
- Expansion of an existing discharge facility of 500,000 gallons or more per day additional flow

uncertain. A determination to require an EIS can be made from the onset of project planning or at any time during review of an EA.

To be subject to a SEPA review, a project or activity must meet each of the following conditions or triggers:

1. Require an action by a state agency (issuance of permits);
2. Involve an expenditure of public money or private use of public land; and
3. Have a potential detrimental environmental effect upon natural resources, public health and safety, natural beauty, or historical or cultural elements of the State's common heritage [NC General Statute 113A, sections 1 to 13].

Due to the difficulty of determining a project's potential effect on the environment, DENR has developed rules (15A NCAC 01C .0408) to identify those projects requiring a SEPA document. According to these rules, the expansion of an existing discharge facility of 500,000 or more gallons per day additional flow will require preparation of a SEPA document. For a description of the SEPA program and requirements please refer to DWR's SEPA website: http://portal.ncdenr.org/web/wq/ps/sepa.

Document Review

DENR has delegated management of SEPA to its agencies according to their permitting authority. Thus, for wastewater discharge expansion projects, because it has the primary responsibility, DWR will serve as the lead agency. In this role, DWR is responsible for the scope, objectivity, content and accuracy of the environmental document. SEPA documents are submitted to DWR's Planning Section, who coordinates DENR agencies review.

The review time for a SEPA document will vary depending on the magnitude of the project, sensitivity of natural resources it may impact, the document's overall quality and legal compliance, and public interest. EA reviews average **five months but could take a year or longer**. EIS reviews will generally require a **minimum of a year**.

If subject to SEPA, permits for the proposed expansion cannot be submitted to DWR's NPDES Unit until the EA or EIS review process is deemed completed by the North Carolina Department of Administration's Environmental Clearinghouse (SCH). To proceed to the SCH, the EA or EIS must first receive a satisfactory review by DENR agencies and applicable DWR staff.

DENR is currently preparing guidance to assist environmental document preparers. Until this material is finalized, please refer to DWR SEPA website for additional information(http://portal.ncdenr.org/web/wq/ps/sepa).

F. NPDES Permit Modification

A facility's NPDES permit contains the approval for expansion, in the form of a new effluent page, which authorizes and sets discharge limits for the increased design flow. Thus, an expansion request requires a major permit modification.

DWR can modify an NPDES permit only after the State Clearinghouse approves a FONSI for the project. The request for modification can be in the form of a letter, signed by the same official who would normally sign the permit renewal application. The letter can refer back to previous documents – the speculative limits letter, the Environmental Assessment, etc. – for the specifics of the proposal.

In some cases, DWR will require the Permittee to complete the usual permit application form (Form 2A for large or complex municipal plants). For example, if the permit is within a year of its expiration date, DWR may choose to renew and modify the permit at the same time and so must have the application to proceed.

When DWR receives a satisfactory request, the NPDES staff reviews the project proposal and past documents and prepares a draft permit with the new effluent page. The new permit may also include special conditions, such as to require mitigative measures indentified in the project's SEPA document. The Division publishes notice of the draft permit, as with permit renewals, and invites public comments for 30 days. At the end of the comment period, DWR considers any comments received, and issues the permit, if appropriate. The process of modifying a permit usually takes **180 days**.

G. Authorization to Construct Permit

An Authorization to Construct (ATC) permit is required prior to constructing or substantially modifying a wastewater treatment plant. This includes the addition, deletion, or modification of equipment, components, or processes at an existing discharging facility that has the potential to affect the treatment process and also the upgrading or replacing of equipment with a different capacity. ATC are not required for manufacturing facilities, power generation operations, compost facilities, mine dewatering activities, groundwater remediation discharges, or drinking water treatment facilities.

After obtaining an NPDES permit for a capacity expansion an ATC permit must be obtained before beginning construction. To request an ATC submit an application, plans and specifications and all applicable information to the NPDES Complex Permitting Unit. Once a complete submittal package is received the review process can begin. Depending on the time it takes for the receipt of additional information, ATCs are typically issued within **90 calendar days from receipt of a complete submittal**. The ATC permit does not undergo public review. As soon as the Permittee receives the ATC permit, it can advertise for bids on the construction project. Requesting bids before receiving the permit is a violation of state regulations. Further, the Permittee runs the risk that it may have to change its design to get its ATC permit – after it has requested bids on the unapproved design.

After an NPDES permit has been issued, construction of wastewater treatment facilities or additions thereto shall not begin until final plans and specifications have been submitted and an ATC has been issued to the permittee.

Detailed information about the Authorization To Construct process can be obtained at http://portal.ncdenr.org/web/wq/swp/ps/npdes/atc.

Section II. Factors That Could Affect Expansions

A. Zero Flow Stream

Flow design criteria are used by the DWR to develop water quality based effluent limitations. The summer 7Q10 (s7Q10) flow and 30Q2 flow are two flow criteria used to determine effluent limitations. No expansions or new discharges of oxygen consuming wastes are allowed when the summer 7Q10 and 30Q2 flows are below 0.05 cfs. If the summer 7Q10 flow is below 0.05 cfs and the 30Q2 flow is greater than 0.05 cfs the expansion may be allowed if limitations of BOD_5 = 5 mg/l, NH_3-N = 2 mg/l and DO = 6 mg/l protect water quality standards. Flow characteristics are usually estimated by the US Geological Survey.

B. Stream classification

Surface Water Classifications are designations applied to surface water bodies, such as streams, rivers and lakes, which define the best uses to be protected within these waters (for example swimming, fishing, drinking water supply) and carry with them an associated set of water quality standards to protect those uses. Surface water classifications are one tool that state and federal agencies use to manage and protect all streams, rivers, lakes, and other surface waters in North Carolina.

Many of the classifications, especially those designed to protect drinking water supplies and certain high quality waters, have protection rules which regulate activities, such as wastewaters discharges that may impact surface water quality. No expansions of domestic wastes are allowed on waters classified as SA, WS I & II, or ORW to preserve the uses of these waters. Other classifications may require the discharger to meet stringent limits. More information on stream classification can be found at http://portal.ncdenr.org/web/wq/ps/csu.

C. Basin Plan Restrictions

Basinwide water quality plans are prepared by the DWR for each of the 17 major river basins in the state. Preparation of a basinwide water quality plan is a ten-year process. Basinwide planning is a tool to identify water quality problems and restore full use to impaired waters, identify and protect high value resource waters, and protect unimpaired waters, yet allow for reasonable economic growth.

A basin plan presents water quality initiatives and recommendations for each subbasin in a river basin. The recommendations presented in the basin plan will be implemented when developing a permit or evaluating a permit expansion request. More information on the Basinwide Planning Program can be found at http://portal.ncdenr.org/web/wq/ps/bpu.

D. Assimilative Capacity

The DWR utilizes analytical models to determine the maximum amount of wastewater that can be discharged into a body of water and still meet the water quality standards. If such study shows that the receiving stream can't assimilate additional oxygen consuming wastes, expansion of an existing discharge is not allowed.

E. Impaired Waters – 303(d) List and TMDLs

Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or which have impaired uses. Listed waters must be prioritized, and a management strategy or total maximum daily load (TMDL) must subsequently be developed for all listed waters.

The DWR evaluates waters for multiple uses in each basinwide management plan. These uses include aquatic life support, primary and secondary recreation, fish consumption, water supply, and for coastal waters, shellfish harvesting. If data indicate that any one of these is impaired, the water body is included in the Section 303(d) list. Waters on the 303(d) list are scheduled for additional study and/or development of a TMDL.

A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. An implementation plan outlines the steps necessary to reduce pollutant loads in a certain body of water to restore and maintain designated uses. The development of TMDLs and implementation plans are often the best method to improve water quality. Federal regulations prohibit the addition of certain new sources and new discharges of pollutants to waters listed on the North Carolina 303(d) List until a TMDL is established. The terms and conditions of the TMDL will be followed at the time a request for speculative limits is made. More information on the TMDL Program can be found at http://portal.ncdenr.org/web/wq/ps/mtu.

Section III. Appendices

A. Potential Sources of Outside Funding

Division of Water Infrastructure

The DWI has funds available for the construction of wastewater treatment and transmission facilities. The Clean Water State Revolving Fund is a low interest federally funded program. The Wastewater Reserve Account has several low interest loan and/or grant accounts available to fund wastewater collection, treatment works, and emergency situations. Currently only loan funds are available through the various programs.
In order to receive funding through the Clean Water State Revolving Fund an owner must be on the State's priority list. To get on the list a letter of request should be submitted prior to March 31st each year. To receive funding through the Wastewater Reserve account an application and all supporting information should be submitted on or before March 31st and September 30th of each year. More information can be found at: http://portal.ncdenr.org/web/wi/cleanwater/srf.

USDA Rural Development in NC

Rural Development announces availability of money for its programs in the Federal Register, through a Notice of Funds Availability (NOFA). Each NOFA lists the application deadlines, eligibility requirements and places you can get help applying. More information can be found at: http://www.rurdev.usda.gov/nc/.

NC Department of Commerce - Community Development Block Grant

NC Department of Commerce through the Division of Community Assistance administers the NC Small Cities Community Development Block Grant. All NC small cities are eligible except entitlement cities that get funds directly form HUD. There are 7 Program Categories: Community Revitalization, Scattered Site Housing, Infrastructure, Economic Development, Housing Development, Urgent Needs, Capacity Building. More information can be found at their website: http://www.nccommerce.com/rd.

Clean Water Management Trust Fund (CWMTF)

CWMTF makes grants to local governments, state agencies and conservation non-profits for projects that specifically address water pollution problems. CWMTF accepts grant applications during 2 cycles. The cycles close June 1 and December 1. More information can be found at the website: http://www.cwmtf.net/.

Appalachian Regional Commission

ARC awards grants and contracts from funds appropriated to the Commission annually by Congress to nonprofit organizations for projects that further the four goals identified by the Commission:

1. Increase job opportunities and per capita income to reach parity with rest of nation.
2. Strengthen the capacity of the people of Appalachia to compete in the Global economy.
3. Develop and improve the Appalachia's infrastructure to make the region economically competitive.
4. Build the Appalachian Development Highway System to reduce Appalachia's isolation.

Local development district serving the county the project is located in may be able to provide guidance on a project's eligibility for funding and assistance in preparing the grant application.

North Carolina Rural Economic Development Center

The Rural Economic Development Center offers the following water and sewer grant programs: North Carolina Economic Infrastructure Program, Supplemental Grants Program, Capacity Building Grants Program, and Unsewered Communities Grant Program. Local governments is rural counties are eligible.

Applications are taken on a rolling basis, first-come, first-serve. An applicant must first submit a pre-application.. More information can be found at the website: http://www.ncruralcenter.org/.

B. Contacts

Division of Water Resources

NPDES Program (NPDES Complex and Expedited Permitting Units)
1617 Mail Service Center, Raleigh, NC 27699-1617
919-807-6300
Website: http://portal.ncdenr.org/web/wq/swp/ps/npdes

Basinwide Planning Unit
State Environmental Policy Act (SEPA) Program
DWR Basinwide Planning Unit
1617 Mail Service Center, Raleigh, NC 27699-1617
919-807-6300
Website: http://portal.ncdenr.org/web/wq/ps/bpu

Modeling and Assessment Branch
1617 Mail Service Center, Raleigh, NC 27699-1617
919-807-6300
Website: http://portal.ncdenr.org/web/wq/ps/mtu

Division of Water Infrastructure
1633 Mail Service Center, Raleigh, NC 27699-1633
919-707-9160
Website: http://portal.ncdenr.org/web/wi/home

Other Agencies

Community Development Block Grant
Main Switchboard: (919) 733-4151
Website: http://www.nccommerce.com/en/CommunityServices/CommunityDevelopmentGrants/

Clean Water Management Trust Fund
1651 Mail Service Center, Raleigh, NC, 27699-1651.
(919) 571-6767
Website: http://www.cwmtf.net/

North Carolina Rural Economic Development Center
Thomas W. Lambeth, Chairman
Billy Ray Hall, President
4021 Carya Drive
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USDA Rural Development in NC
Community Programs Division, Roger B. Davis, Director
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919-873-2061
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