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## Chapter 1 Introduction

**A. Purpose of Manual**
- Stand-alone manual or supplement / inclusion to an existing manual

**B. Project description**
- New plant or upgraded components (list individual components if upgrade)
- Plant type
- Simplified schematic drawing showing plant layout

## Chapter 2 Permits and Standards

**A. Discharge permit requirements**
- NPDES permit (effluent limitations table only)
- State groundwater discharge permit if applicable
- NPDES / State Water Discharge Permit Reporting of Non-Compliance / Spill Procedure
  (Reporting procedure can be found on website. Should be copied and inserted here)

**B. Monitoring and Record Keeping**
- For NPDES permits copy and insert pages 6 thru 9 of NPDES Part II STANDARD CONDITIONS (January 2007 or most recent version) of NPDES permit to highlight Part II.C Monitoring Requirements and Part II. D. Reporting Requirements (links can be found on page 7 of this checklist)

## Chapter 3 Detailed Design Criteria

**1. General description of influent wastewater**
- Service area
- Average daily design flow
- Maximum daily flow
- Peak hour flow
- Peak instantaneous flow
- Domestic flow
- Industrial flow
- Commercial flow
- Infiltration / inflow
- Design BOD and TSS concentrations and loadings
- Septage volumes and loads
- Wastewater characterization (for nutrient removal systems)
- Number and location of pumping stations

**2. Individual unit process design criteria and physical data**
- Each unit process shall include the following:
  - Unit process title
  - Equipment manufacturer(s)
  - Number and type of units
  - Design criteria
  - Appropriate unit specific information as outlined below

### A. Influent / intermediate / effluent pumping
- Wet well dimensions and volumes
- Level control system
- Type of pump, manufacturer & number of units
iv. Pump capacity GPM at TDH  
v. Range of flow  
vi. HP  

B. Influent and effluent flow measurement  
i. Type and manufacturer  
ii. Size  
iii. Flow range  

C. Headworks screening / comminution  
i. Type, manufacturer and number of units  
ii. Screen size  
iii. Capacity  

D. Grit removal  
i. Type, manufacturer & number of units  
ii. Tank dimensions & volumes  
iii. Type of pump, manufacturer and number of units  
iv. Pump capacity GPM at TDH, range of flow  

E. Septage handling  
i. Type, manufacturer and number of units  
ii. Tank dimensions & volumes in gallons  
iii. Pump capacity GPM at TDH, range of flow  
iv. Mixing devices  
v. Aeration system  

F. Primary clarification  
i. Type, manufacturer & number of units  
ii. Tank dimensions and volume in gallons  
iii. Weir length, each  
iv. Surface area, each  
v. Detention times @ design ADF  
vi. Surface overflow rate @ design ADF & peak hour flow  
vii. Sludge pump capacity GPM at TDH, range of flow  
viii. Scum pump capacity GPM at TDH, range of flow  
ix. Sludge/scum flow measurement  

G. Secondary or Advanced Treatment (activated sludge, IFAS, fixed film, RBC, lagoon, other)  
i. Type of process & number of units  
ii. Tank dimensions and volume in gallons  
iii. Detention time @ design ADF  
iv. BOD loading  
v. Design MLSS & MLVSS concentration  
vi. F/M ratio  
vii. SRT  
viii. Individual anaerobic / anoxic / aerobic compartment specifications  
ix. Aeration requirements  
x. Blowers - HP and capacity in SCFM  
xi. Mechanical aerators - HP, oxygen transfer rate  
 xii. Mechanical mixers - HP  
xiii. Recycle pumping - type, capacity GPM at TDH, range of flow  

H. Secondary clarification  
i. Type, manufacturer & number of units
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iv. 7Q10

v. Diffuser system

vi. Gravity / Pumping

vii. Drip dispersal

viii. Spray irrigation

ix. Rapid infiltration basins

N. Plant Water System

i. Type, manufacturer & number of units

ii. Capacity

O. Chemical feed systems for nutrient removal, solids handling, odor control, alkalinity, other

i. Chemical name and purpose

ii. Storage volumes and containment

iii. Metering pumps

iv. Number of units

v. Dose pacing

P. Odor control

i. Type, manufacturer & number of units

ii. Location of each unit

Q. Solids handling (storage, thickening, dewatering, stabilization)

i. Anticipated sludge quantities

ii. Hydraulic capacity per unit

iii. Solids loading per unit

iv. Performance criteria per unit

v. Sludge storage volumes

vi. Sludge conveyance mechanisms

vii. Sludge grinding mechanisms

viii. Sludge stabilization criteria

R. Generator / alternate power source

i. Type & manufacturer

ii. Fuel source and containment structure

iii. Fuel storage volume

iv. Fuel usage per hour

v. Run time on a full tank

vi. Fuel storage tank location(s)

vii. List of equipment on standby power

S. HVAC (Heating system, air handling & air conditioning units, supply & exhaust fans, unit heaters, etc.)

i. Fuel

ii. Capacities of each unit

iii. Air flow / exchanges per area

T. Fire protection and detection

i. Monitoring, alarms and suppression system

U. Other

Chapter 4 Detailed Unit Process Operations and Control

A. Plant layout schematic

B. Detailed process flow diagram
C. Hydraulic profile

D. For each unit process identified in Chapter 3, provide the following:
  i. Description and function of unit and relationship to adjacent or related units
  ii. Location of unit(s)
  iii. Determination of how many units to run
  iv. Normal startup and shut down procedures
  v. Normal operating conditions and control settings
  vi. Normally open/normally closed valves and gates
  vii. Unit by-pass procedure
  viii. Tank draining procedure
    a. Anti-flotation protection for empty tanks
    b. Winterization and cold weather operation
  ix. Unit controls
    a. H/O/A functions and switch locations
    b. SCADA controls
    c. Operator adjustable / non-adjustable set points
    b. Power supply
  x. Alternate or emergency operation for equipment malfunction, process upset and loss of power
  xi. Laboratory monitoring and sampling requirements and locations
  xii. Process control strategy
  xiii. Expected unit performance
  xiv. Operational problems and troubleshooting guides
  xv. High flow procedures
  xvi. Operable / non-operable on generator power
  xvii. Alarm conditions
  xviii. Unit specific safety concerns and procedures (confined space?)
  xix. Unit diagrams
  xx. Unit process related formulas and example calculations
  xxi. Recommended spare parts
  xxii. On-line monitoring systems
  xxiii. Digital pictures where appropriate (black & white or color)

Chapter 5 Maintenance
A. List of all manufacturer's O&M manuals supplied as part of this project

Chapter 6 Safety
A. Health hazards
B. Recommended immunizations
C. Sewer gas dangers & confined space entry procedure
D. General mechanical safety
E. General electrical safety
F. Fire extinguishers / usage, locations and maintenance
G. Emergency shower/eyewash stations
H. Recommended safety equipment
I. MSDS sheets for bulk chemicals used in plant
J. Chemical safety
K. Lockout / tag out procedures
L. Hot Work permit program
M. Electrical arc-flash program
N. AED supplied equipment / location if any
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### Chapter 11 Utilities

A. Contact information for all utility suppliers  
B. Location of emergency shutoff valves for natural gas, propane and water supplies  
C. Location of main disconnect for electrical feed  
D. Location and size of propane tanks  
E. Location and size of fuel oil storage tanks  
F. Communications systems (telephone, cable, radio, etc.)  
G. Location of potable water backflow devices

### Chapter 12 Emergency Response

A. Site specific emergency response plan, **OR**  
B. DES Emergency Response Planning Guide

### Appendix

A. Major equipment suppliers and contact information  
B. Valve and gate schedule  
C. Sample forms  
   i. Laboratory  
   ii. Daily rounds  
   III. Process control  
   iv. Solids handling  
   v. Maintenance  
   vi. State Monthly Operations Report (MOR)  
D. Other forms as required

DES webpages for more information  

- **NPDES / State Water Discharge Permit Reporting of Non-Compliance / Spill Procedure:**  
- **Standard Engineering Construction Phase Contract:**  
- **Pump Station O&M Manual Review Checklist:**  
- **ENV-Wq 700 STANDARDS OF DESIGN FOR CONSTRUCTION OF WWTFs:**  
- **DES Generic Emergency Response Planning Guide:**  
- **NPDES Permit Part II Standard Conditions, January 2007:**  
- **WWTF O&M Manual Review Checklist:**  
Directions for the Preparation of TREATMENT PLANT O&M Manuals

Any upgrades or new facility construction require that an Operation and Maintenance manual be provided as part of the project and approved by the New Hampshire Department of Environmental Services according to the following rules. This checklist is specific to wastewater treatment facilities only. There is a separate checklist for pump station work.

The New Hampshire Code of Administrative rules, Chapter Env-Wq 700 STANDARDS OF DESIGN AND CONSTRUCTION FOR SEWERAGE AND WASTEWATER TREATMENT FACILITIES, Part Env-Wq 708.08(a), requires that “Operation and Maintenance Manuals providing information and guidance for day-to-day operation of the WWTP shall be submitted within 60 days following substantial completion of the construction of the WWTP”. Part Env-Wq 708.08(b) lists, at a minimum, what should be included in an O&M manual. These rules apply to all projects, regardless of funding source.

The standard ENGINEERING CONSTRUCTION PHASE CONTRACT for Professional Services for Treatment Works, Part I.A.2.c, requires the “Preparation of an Operation and Maintenance Manual for approval by the DIVISION. After DIVISION approval, the Engineer agrees to supply five (5) sets of the completed manual, one (1) of which will be for the DIVISION”. More information can be found at www.des.nh.gov.

Manual Format

The attached Treatment Plant checklist provides a preferred format in terms of chapter arrangement and structure. Consultants are encouraged to follow this format as much as possible and are directed to contact DES to suggest an alternative format, if needed, to accommodate unique treatment plant requirements. Consultants should provide draft copies to the owner as well as DES for review.

The following items address the preferred format for both draft manuals and final copies:

- The manual should be assembled using a three ring binder for ease of updating
- Chapters should be separated with numbered tabs for ease of identification
- Double sided pages where feasible
- Manuals on CD will not be accepted for review.

The following conditions can be used to determine how extensive the manual must be:

- For new treatment plants, the manual must address all pertinent items in the checklist.
- For a significant upgrade involving an increase in capacity or multiple new major pieces of equipment, a complete new manual may be required. Contact DES Wastewater Operations for help in determining the extent of the manual.
- For minor upgrades consisting of a limited amount of equipment, such as a new sludge dewatering system, new disinfection, new screening, etc. that have a minimal effect on the overall plant, the manual may be developed as a stand-alone manual or may be incorporated as an addendum into the existing O&M manual. At a minimum, the manual or addendum must include the project description, design criteria of the upgraded equipment, system operation and control as it relates to the upgraded equipment, drawings or schematics, alarm and notification system, SCADA controls, safety as it relates to the upgraded equipment, references to manufacturers O&M manuals supplied as part of the project, and references to the existing O&M manual where appropriate.
- For any upgrades to a treatment plant that does not already have an approved O&M manual on file, regardless of the significance of the upgrades, a new O&M manual will need to be developed incorporating all of the pertinent elements listed in this checklist.
- In all cases, an up-to-date Emergency Response Plan, as outlined in Chapter 12 of the checklist, must be included in its entirety. If a site specific plan is not available, the generic DES Emergency Response Planning Guide shall be included.