L. Infrastructure

The City's "infrastructure" comprises the physical systems that support its population—water supply; wastewater; sanitation; energy; even roadways, bridges, tunnels, and public transportation. Many of these topics are discussed elsewhere in this Manual (Chapters 3M, "Solid Waste and Sanitation Services; 3N, "Energy;" 3O, "Traffic and Parking;" and 3P, "Transit and Pedestrians"). This chapter discusses water supply, sewage treatment, and stormwater management.

100. Definitions

110. WATER SUPPLY

111. New York City Water Supply System

Most of New York City obtains water from three surface water supply systems, operated by the Department of Environmental Protection, that form a network of reservoirs, aqueducts, and tunnels extending as far as 125 miles north of the City. The watersheds of the three systems cover almost 2,000 square miles, with 19 reservoirs and three controlled lakes, which have a storage capacity of 550 billion gallons. The water flows to the City through aqueducts, reaching most consumers by gravity alone; some four percent of the City's water must be pumped to its final destination.

Two of the three surface water systems, the Delaware and Catskill systems, collect water from watershed areas in the Catskill Mountains and deliver it to the Hillview Reservoir in Yonkers. From there, it is distributed to the City through three tunnels, City Tunnel No. 1, which goes through the Bronx and Manhattan to Brooklyn, and City Tunnel No. 2, which goes through the Bronx, Queens, and Brooklyn (and from there through the Richmond Tunnel to Staten Island), and City Tunnel No. 3 (Stage 1), which goes through the Bronx, Manhattan, and terminates in Queens. The extension of City Tunnel No. 3 is under construction in Queens and Brooklyn.

The third watershed, the Croton system, collects water from watershed areas in Westchester and Putnam Counties and delivers it to the Jerome Park Reservoir in the Bronx. From there, it is distributed to the Bronx and Manhattan through the New Croton Aqueduct, which goes through the Bronx and Manhattan.

In addition to the surface water supply system, customers in southeastern Queens also receive water from the underground aquifers beneath Queens (the Jameco and Magothy Aquifers).

Within the City, a grid of underground distribution mains distribute water to consumers. Large mains—up to 96 inches in diameter—feed smaller mains, such as 12, 20 and 8-inch mains, that distribute water to individual locations. These mains also provide water to fire hydrants along many of the City's streets. Water pressure throughout the City water supply system is controlled by pressure regulators.

New York City consumes some 1.2 billion gallons of water per day through this water supply system. To reduce this consumption, the City has instituted a number of water conservation programs, including installation of or incentives to install low-flow fixtures, water metering, hydrant locking, and public education.

120. SANITARY SEWAGE AND STORMWATER DISPOSAL

New York City's sewer system consists of a grid of sewers beneath the streets that send wastewater flows to 14 different treatment plants, known as "water pollution control plants," or "WPCPs." The areas served by each of these plants are called "drainage basins." Most of this system is a "combined" sewer system—it carries both sanitary sewage from buildings and stormwater collected in catch basins and storm drains. However, some areas of the City, primarily in Queens and Staten Island, operate with separate systems for sanitary sewage and stormwater. In addition, small areas of Staten Island, Brooklyn, and Queens use septic systems to dispose of sanitary sewage. Also, some developments in Staten Island also use small privately owned and operated sewage treatment plants to treat sanitary sewage.

121. City Sewer System

Sewers beneath the City's streets collect sewage from the buildings along the streets. Collection sewers can be one to two feet in diameter on side streets, and three or four feet in diameter under larger roadways. They connect to trunk sewers, generally five to seven feet in diameter, which bring the sewage to interceptor sewers. These large interceptor sewers (often 11 or 12 feet in diameter) bring the wastewater collected from the

various smaller mains to the water pollution control plants for treatment.

121.1. Combined Sewer Systems

About 85 percent of the City's sewer system collects both "dry-weather" wastewater (primarily sanitary sewage as well as wastewater from industries) and stormwater. During dry weather, combined sewers function as sanitary sewers, conveying all flows to the WPCPs for treatment. During wet weather, however, large volumes of rainfall runoff (10 to 50 times the dry-weather flow) can enter the system through catch basins along the City's streets. If this water were conveyed to the treatment plants, it would exceed their design capacity; the plants are designed to handle only twice their average design dry-weather flow for limited periods. To avoid flooding the plants, "regulators" are built into the combined sewers to act as relief valves. These are chambers set to allow two times the average design dry-weather flow into the interceptor (WPCPs have capacity to treat twice the average design dry weather flow); during storms, if a greater amount of wastewater reaches the regulator, the excess is directed to outfalls into the nearest waterway (e.g., the Hudson River, East River, etc.). During such overflow periods, a portion of the sanitary sewage entering or already in the combined sewers discharges into the waterway along with the stormwater and debris washed from the streets. This untreated overflow is known as "combined sewer overflow," or "CSO."

Combined sewer overflow is a concern because it contains oil and gasoline from street traffic, floating debris (also called "floatables," and usually consisting primarily of street litter), various pollutants from industrial facilities (both pollutants discharged into the sewer system and pollutants in the runoff from these facilities), and untreated sewage. To reduce the amount of pollution currently reaching the City's waters because of these overflows, the City has initiated a Combined Sewer Overflow Abatement Program. This program includes assessment of CSO problem areas, and measures to reduce problems such as infiltration and inflow control, to address and eliminate extraneous flows into the sewer system, which can result from conditions such as groundwater infiltration into broken or leaky pipes; placement of containment booms at some CSO outfall locations which capture floatables that are discharged into the receiving water during wet weather; and CSO retention (the use of storage areas for CSO, from which the overflow can be pumped back to the WPCP for treatment during dry-weather periods of lower flows).

121.2. Separate Systems

Certain areas of the City are served by separate storm and sanitary sewers. In these areas, sanitary sewage is sent to the water pollution control plants, but stormwater is sent through separate pipes into the nearest waterway. Areas served by separate sewers include certain areas in Queens and Staten Island.

122. City Water Pollution Control System

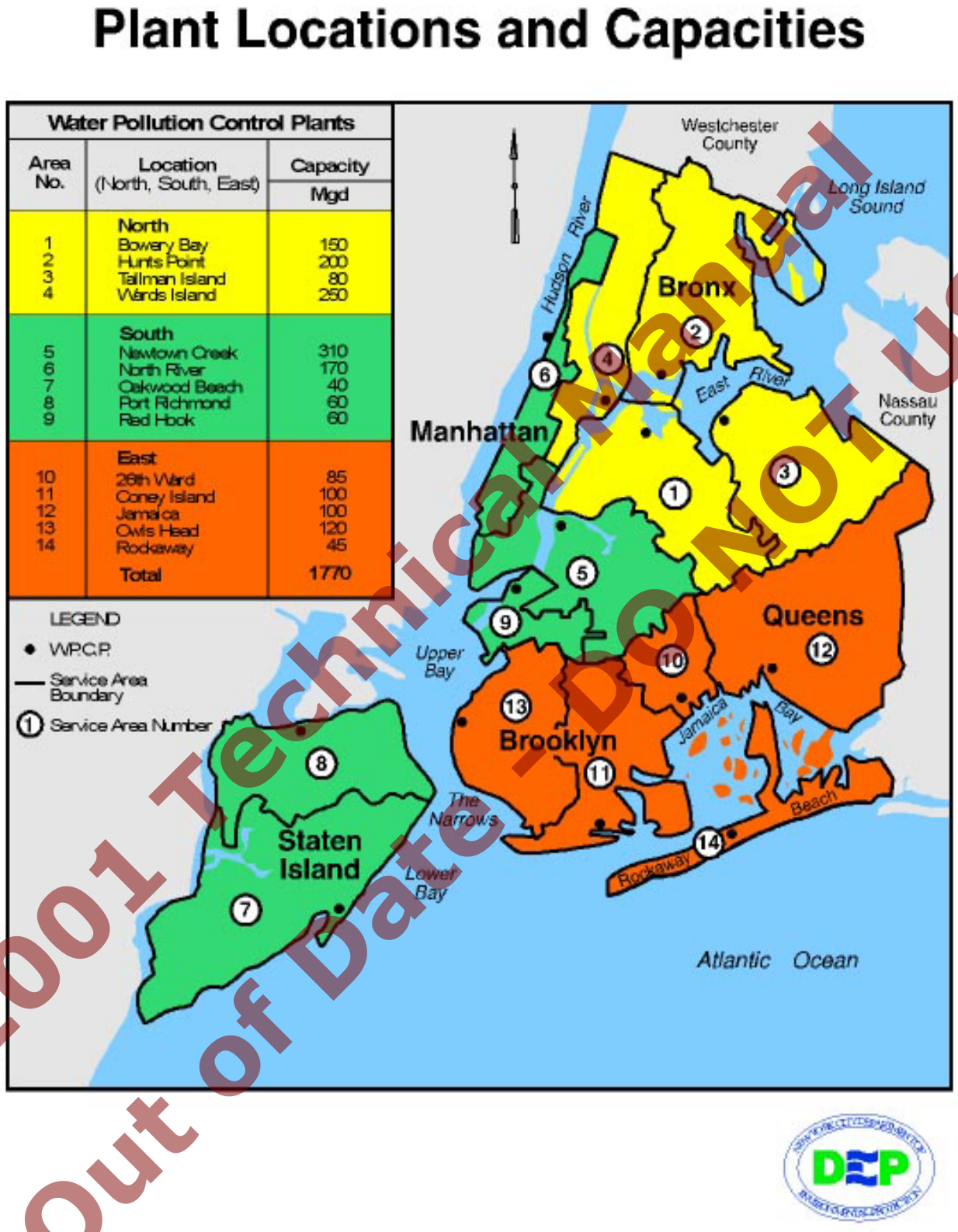
122.1. Sanitary Sewage Treatment

New York City's sewage is treated at 14 water pollution control plants: Coney Island, Newtown Creek, Owls Head, Red Hook, and 26th Ward in Brooklyn; Hunts Point in the Bronx; North River and Wards Island in Manhattan; Bowery Bay, Jamaica, Rockaway, and Tallman Island in Queens; and Oakwood Beach and Port Richmond on Staten Island. Together, these plants treat some 1.7 billion gallons of sewage per day. The drainage basins of each of these plants are shown in Figure 3L-1.

The City's water pollution control plants treat the wastewater through a variety of physical and biological processes that remove solids so that, when treatment is complete, the water can be discharged into one of the City's waterways without adversely affecting water quality. This treated wastewater to be discharged is called "effluent." The major processes used in the City's treatment plants are as follows:

- Mechanical and physical removal of trash, grit, scum, and sludge (this is "preliminary" or "primary" treatment);
- Biological treatment of remaining sewage ("secondary" treatment);
- Concentration, biological decomposition through anaerobic digestion, with energy recovery, and disposal of sludge; and
- Disinfection of liquid effluent.

Figure 3L-1
NEW YORK CITY WATER POLLUTION CONTROL DRAINAGE AREAS



Each of the City's 14 WPCPs is regulated through a State Pollutant Discharge Elimination System (SPDES) permit issued by the New York State Department of Environmental Conservation (DEC) to ensure that water quality in the receiving water body is not adversely affected by WPCP effluent. The permits specify the maximum average monthly dry-weather flow in millions of gallons per day, or mgd (based on the quantity of wastewater that the plants can adequately treat), and such effluent parameters as the minimum percent (85 percent) of biological oxygen demand (BOD) that must be removed (BOD, a measure of the amount of oxygen consumed in decomposition of organic matter, is an indicator of the quantity of organic pollution in wastewater); the minimum percent of suspended solid loading that must be removed (also 85 percent); the maximum concentrations of suspended solids, fecal coliform, settleable solids, and other pollutants; and the range of acceptable pH levels. The permits also stipulate monitoring requirements for the regulated parameters, as well as for odor control, and require infiltration/inflow assessments and correction programs if the plants reach a certain percent of their permitted capacity. The permitted capacity of each of the City's water pollution control plants is shown in Table 3L-1.

Table 3L-1
Permitted Capacity at New York City Water Pollution Control Plants

Plant	Rated Capacity (mgd)
Brooklyn	
Coney Island	100
Newtown Creek	310
Owls Head	120
Red Hook	60
26th Ward	85
Bronx	
Hunts Point	200
Manhattan	
North River	170
Wards Island	250
Queens	
Bowery Bay	150
Jamaica	100
Rockaway	45
Tallman Island	80
Staten Island	
Oakwood Beach	40
Port Richmond	60

SPDES flow and effluent parameters must be used as the basis for assessing impacts on water pollution control plants.

122.2. Industrial Pretreatment

In addition to the parameters described above, the City accepts industrial effluent into the sewer system if it complies, or has been treated to comply, with certain standards. This additional treatment is required to protect human health, the environment, and the sewers and WPCPs from toxic and hazardous discharges. The City's Industrial Pretreatment Program identifies and monitors industrial users that discharge pollutants of concern into the sewer system. This program is administered by the Department of Environmental Protection, Bureau of Wastewater Treatment. The Division of Pollution Prevention and Monitoring uses permits and directives, which are similar to discharge permits, to notify each industrial user of its effluent requirements. The directives summarize the Industrial Pretreatment Program's legal authority (see Section 710) and monitoring and inspection requirements, and list discharge limits that each of the identified industries must meet.

123. Septic Systems

The southwestern part of Staten Island and parts of Queens use septic systems to dispose of sanitary sewage, until a time when the City's sanitary sewer system can be extended. Septic systems consist of underground tanks that retain sewage for decomposition, and surrounding soils that filter the wastewater once it is released from the tank. In the septic tank, the solids in the sewage settle to the bottom, and the liquid undergoes some anaerobic decomposition before being discharged through perforations into the surrounding soils. These are specially prepared, absorbent soils, generally termed " filter fields." Here, the effluent undergoes additional treatment: it is strained and absorbed by the soils, and microbial organisms in the soil convert it into minerals, gases, and nutrients. Septic systems are subject to approval by the Department of Buildings (DOB), and those that process more than 1,000 gallons of wastewater per day, or are industrial or commercial sites, require SPDES permits from DEC.

124. Privately Operated Treatment Plants

Small privately owned and operated sewage treatment plants serve only a local area. Some of these are in use on Staten Island. These are sewage treatment plants that operate in much the same way as larger, municipal water pollution control plants, but with a smaller capacity. They can be on- or off-site, and may be constructed as "package treatment plants." As at municipal plants, the effluent from these plants is discharged to a nearby waterway, subject to the regulations of a SPDES permit. Privately owned and operated treatment plants are used in areas where City sewers and treatment by a municipal WPCP are not available.

125. Stormwater Management

On undeveloped sites, rainfall is normally absorbed into the ground through permeable surfaces. In urban settings, however, where permeable surfaces are less common, it typically flows across land ("sheet flows") toward low points—most often, water bodies or storm sewers. The storm sewers direct this stormwater through underground pipes to an outfall that discharges into a waterway. As described above, in New York City, these can be either combined or separate systems. Generally, in either system, stormwater flows to the waterway without treatment.

200. Determining Whether an Infrastructure Assessment is Appropriate

210. WATER SUPPLY

211. New York City Water Supply System

As described in Section 320, because of the size of the City's water supply system and because the City is committed to maintaining adequate water supply and pressure for all users, few actions would have the potential to result in significant adverse impacts on that system. Certain actions that would not increase water demand would not affect the system and therefore would not require an assessment of water supply. Actions that could affect water pressure, and that therefore need assessment, are as follows:

- Actions that would have exceptionally large demand for water, such as power plants, very large cooling systems, or large developments (e.g., those that use more than one million gallons per day). For these actions, a detailed assessment of effects on water pressure and supply may be needed.

- Actions in the Rockaway Peninsula and Coney Island, which are at the end of the water system, where water pressure can be low.

In addition to these specified areas, the following guidelines may help to indicate whether an area may experience weak water pressure and therefore require assessment. The following types of locations may have weaknesses in their local water supply distribution systems:

1. Locations at the extremities of the water distribution system.
2. Locations at extremely high elevations.
3. Locations near pressure boundaries.
4. Locations with a one-way flow of water.
5. Locations far away from the nearest pressure regulator.
6. Locations far away from the nearest trunk main.
7. Locations which contain a large number of six inch (or smaller) water mains.

Where the strength of the water supply distribution system is in question, a hydrant flow test may be needed in conjunction with an assessment of the impact on water pressure and supply. Review of the engineer's assessment by the Division of System Operations may be helpful in determining the strength of the water supply distribution system.

220. WASTEWATER TREATMENT

221. City WPCPs

The City is committed to adequately treating all wastewater generated in the City and to maintaining its wastewater treatment plants at or below the capacity permitted by applicable state and federal permits, orders, and decrees. To achieve this goal, Citywide programs and policies have been and will continue to be developed to accommodate expected flows through the City's plants and ensure that they fall within authorized capacities. Therefore, only unusual actions with very large flows could have the potential for significant impacts on sewage treatment. Actions that would be consistent with the Consent Orders and other programs enacted for the WPCP that would serve the action would not result in signifi-

cant adverse impacts.

The availability of capacity within a collection sewer may need to be assessed. In certain cases, the allowable discharge flows from a particular site may need to be detained or retained on site. A draft sewer hook up permit application or a conceptual drainage plan should be filed with the DEP's Office of Environmental Planning and Assessment to determine the appropriateness of a proposed or conceptual drainage plan. For CEQR review, it may be appropriate to disclose the increase in expected sewage generated by the action. This would allow the lead agency to confirm that the proposed action would be consistent with flow limits or pollutant controls or other applicable programs. The methods for this disclosure are presented in Section 322.1 below.

222. Industrial Pretreatment Program

For industrial facilities, the following criteria indicate that the facility would be subject to the City's Industrial Pretreatment Program as a significant industrial user:

- The facility would discharge an average of 25,000 gallons per day or more of process wastewater other than sanitary, noncontact cooling, and boiler blowdown wastewaters.
- The facility would contribute industrial flows—including contact flows (those that come into contact with a manufacturing process or product) and noncontact flows (including, but not limited to, cooling water for equipment and boiler blowdown wastewaters)—that make up 5 percent or more of the average dry-weather hydraulic or organic capacity of the water pollution control plant to which flows would be directed.
- The facility would be subject to Federal categorical pretreatment standards (the industry categories for such facilities are included in a table at the end of this chapter).
- The facility has reasonable potential for adversely affecting water pollution control plant operation, or for violating any pretreatment standard.
- The facility's Standard Industrial Code (SIC) is listed in the table at the end of this chapter.

Generally, if such facilities comply with the City's Industrial Pretreatment Program, no significant impacts would occur. For disclosure purposes, however, it is often appropriate to provide a description of the facility's effluent and how it would comply with the Industrial Pretreatment Program. This allows the lead agency to confirm that the industrial facility would be in compliance.

223. Septic Systems

Similarly, actions that would use new or existing private septic systems rather than the City's water pollution control plants would not be expected to have significant adverse impacts if all applicable regulations are followed. However, for these actions it may also be appropriate to disclose details about sanitary sewage treatment and compliance with applicable regulations.

224. Privately Operated Treatment Plants

Actions that would use existing privately owned and operated treatment plants, rather than the City's WPCPs, would not be expected to have significant adverse impacts if these plants are operated properly and within their SPDES permit levels. For actions that involve construction of a new privately owned treatment plant, a water quality assessment would be appropriate. For those plants currently operating under a valid SPDES permit, it would be appropriate to disclose whether the permit condition for flow would be met with implementation of the proposed action.

230. STORMWATER MANAGEMENT

An assessment of stormwater may be appropriate for the following actions:

- Any of the industrial activities listed in the table at the end of this chapter, including manufacturing, processing, or raw materials storage areas at those sites. These activities must obtain a SPDES permit for any stormwater discharges to a storm sewer outfall in a separate sewer system. More information on SPDES permits is available from DEC. Discharges to a separate or combined sewer system may require on-site pretreatment in sediment traps, oil and water separators or other control measures requiring DEP approval.

- Actions that would be served by separate sewers, if the action would greatly increase the amount of paved area on the site (such as could occur if an undeveloped site were developed into a parking lot or paved area). Stormwater from paved areas can carry oils and other pollutants and may require the installation of pretreatment systems such as oil and water separators. In certain cases where the stormwater would outlet to a stream or wetland, the use of stormwater attenuation structures such as outlet stilling basins or detention basins are necessary. Various types of stormwater control techniques or Best Management Practices reduce the impact of velocity pollutant loads created by the capture and conveyance of stormwater.

- Actions that would be served by a separate storm system and that would involve construction activities including clearing, grading, and excavation. Such construction activities involving more than five acres also require a SPDES permit from DEC.

- Construction of a new stormwater outfall. For more information on this type of action, see Chapter 3I, "Natural Resources."

300. Assessment Methods

310. STUDY AREA

311. Water Supply

The study area for analysis of water supply is the project site itself and the system it could affect—usually, the area served by the water pressure regulator that serves the site.

312. Wastewater Treatment

312.1. City WPCPs

The analysis of sewage typically focuses on the effects of increased flows to the water pollution control plant(s) that would serve the site. Therefore, the study area includes that plant, and may also consider its drainage basin.

312.2. Septic Systems

The study area for septic systems is that area that could be adversely affected by the systems. This is usually an area immediately surrounding the system, unless wetlands or water bodies are located within and extending past that radius. If so, the effects on those resources are also assessed.

312.3. Privately Operated Treatment Plants

Analysis of new privately operated treatment plants focuses on the effect of effluent from those plants on the receiving water unless a SDPES permit has already been issued. In flowing water, such as rivers or streams, and in tidally affected areas, those effects may occur near the discharge point; the analysis is generally restricted to the area close to the outfall. In still water bodies, such as ponds, the whole water body may be analyzed. More information about water quality and natural resources impacts is provided in Chapter 3I, "Natural Resources." Analysis of existing privately operated treatment plants would typically focus on whether those plants had adequate capacity to handle additional wastewater flows resulting from the proposed action and effluent pollutant discharges based on the existing SPDES permit limits for flow.

313. Stormwater Management

Analysis of stormwater also focuses on the effects of that stormwater on the water body to which it is released. As described above in Section 100, stormwater can be released to the City's water bodies during combined sewer overflows for areas served by a combined sewer system; or during each storm event for areas served by a separate system. More information about this analysis is also provided in Chapter 3I, "Natural Resources."

320. ANALYSIS TECHNIQUES

321. Water Supply

321.1. New York City Water Supply System

The assessment of effects on water supply and water pressure can be performed as follows:

1. Assess existing water use on the project site.

2. Assess the likely water usage on the project site for future no action conditions, and characterize the effects on the existing system. This projection should take into consideration any water conservation measures that would be implemented by the build year.

3. Predictions of an action's average and peak daily water demand are made based on the uses expected with the action. The rates provided in Table 3L-2 can be used for this assessment for most actions. Water usage for industries depends on the manufacturing processes involved, and should be documented.

4. Describe the existing water distribution system serving the project area, based on information obtained from DEP.

5. Assess the effects of the proposed action's incremental demand on the system and determine if there would be sufficient capacity to maintain adequate supply and pressure. This analysis, which considers the pipe sizes and grid of the water system to determine water pressure loss, is usually performed by an engineer. The engineer may contact DEP for assistance.

321.2 Groundwater Input

Issues related to an action's potential effects on water quality of the groundwater are discussed in Chapter 3I, "Natural Resources."

322. Wastewater Treatment

322.1. City WPCPs

An assessment of sanitary sewage typically consists of identifying the water pollution control plant to which the flows would be sent, and estimating expected flows that the action would generate. Figure 3L-1 shows each water pollution control plant's drainage basin. For sites near the boundaries of several drainage basins, DEP's Office of Environmental Planning and Assessment can assist in determining which plant would serve the action. In certain areas near such boundaries, sewage could be routed to either of the WPCPs; DEP would make the determination as to which WPCP should be used. For assessment purposes, the rates provided in Table 3L-2 (excluding air conditioning rates) can be used to estimate an action's daily sanitary sewage generation. As part of this assessment, the lead agency may also choose to obtain the actual average annual dry-weather flows to the WPCP that would serve the action, and consider the effect of the flows from the action on the total flows to the plant. This information, which is typically examined for the latest 12-month period, is available from DEP's

Table 3L-2
Water Usage and Sewage Generation Rates for Use in Impact Assessment

Use	Rate (Gallons Per Day)
Residential	112 gpd/person
Retail/Public Use	
Domestic	0.17 gpd/sf
Air Conditioning	0.17 gpd/sf
Health Club	
Domestic	65 gpd/patron
Air Conditioning	0.17 gpd/sf
Commercial/Office	
Domestic	25 gpd/person
Air Conditioning	0.10 gpd/sf
Movie/Theater	
Domestic	5 gpd/seat
Air Conditioning	0.17 gpd/sf
Fast Food Restaurant	
Domestic	2 gpd/meal
Air Conditioning	0.17 gpd/sf
Restaurant	
Domestic	10 gpd/meal
Air Conditioning	0.17 gpd/sf
Hotel	
Domestic	150 gpd/rm/occupant
Function Space	0.17 gpd/sf
Air Conditioning	0.10 gpd/sf
Schools	
Domestic	30 gpd/seat
Air Conditioning	0.10 gpd/sf
Hospitals	
Domestic	300 gpd/bed
Air Conditioning	0.17 gpd/sf

Note: These rates are for new uses incorporating low-flow fixtures, as required by law.

Office of Environmental Planning and Assessment. DEP's Office of Environmental Planning and Assessment can also be contacted for assistance in determining whether the action would be consistent with a plant's SPDES flow and effluent limits.

To estimate total annual average flows in the build year, the analysis separates background growth in population and employment from new development in the drainage basin. To calculate sewage from no action developments, the rates listed in Table 3L-2 would be applicable. For background growth, multiply the number of new residents by 137 gallons per day and the number of new employees by 85 gallons per day. (DEP's Office of Environmental Planning and Assessment can provide population and employment projections for each treatment plant drainage area.) Add the background flows and known no action development flows to the plant's latest 12-month annual average to obtain the total no action flows in the drainage basin.

322.2. Industrial Pretreatment

The assessment of effluent from a proposed industrial facility identifies the pollutants in that effluent, and considers whether the effluent would comply with the discharge limits set by the City's Industrial Pretreatment Program. The concentrations of various pollutants in the process wastewater, before any treatment, should be determined. Then, the short- and long-term effective removal rates of the proposed treatment measures should be evaluated to calculate the expected concentrations in the wastewater. The Division of Pollution Prevention and Monitoring of DEP's Bureau of Wastewater Treatment can provide more information about methods of compliance with the Industrial Pretreatment Program.

322.3. Septic Systems

The assessment of septic systems focuses on whether those systems can function properly, given their proposed setting and design. It considers the systems' compliance with ordinances, requirements, and good engineering practice. As part of this assessment, percolation tests are performed to determine the rate at which effluent would percolate through the site's soils. Information on the depth of groundwater and bedrock is also important; the bottom of the septic leaching field must be a specified distance from groundwater and rock for the system to function properly. All available information related to those septic systems, including the results of the percolation tests, is submitted to the DOB for review.

322.4. Privately Operated Treatment Plants

The assessment of potential environmental impacts from new privately operated treatment plants without a SPDES permit focuses on the water body to which the plant's effluent would be discharged, and whether the plant would affect its water quality. Adverse effects on water quality from sewage treatment plants can occur, principally because of reductions in dissolved oxygen from the addition of organic pollution to the receiving water. Sewage plants can also contribute to the levels of fecal and total coliforms and other pollutants, if they are not functioning properly. The methodology for assessing effects on water quality is described in 3I, "Natural Resources," and summarized below.

The first step in the assessment of a new plant's effects on dissolved oxygen levels is collecting data on available water quality in the receiving water, or, when these data are not available, water quality sampling. Then, the loads of BOD, suspended solids, and other pollutants expected from the plant are calculated. In some cases, the total pollutant loading from the action is so small compared with the size of the water body that there would only be the need to analyze the effect within a mixing zone and not in the entire water body. To determine the potential effect on water quality, computer-simulated models can be used to determine the effects of the various pollutants in sewage effluent on the water quality.

For actions that would affect existing private treatment plants with valid SPDES permits, the analysis typically focuses on whether the plant would have adequate capacity to treat the additional wastewater generated by the action.

323. Stormwater Management

Stormwater can be of concern if it transmits new or increased levels of pollutants to the City's water bodies. This is an issue for industrial facilities, development sites that would be covered with large areas of impervious surfaces and for project activities or construction that would increase the potential for soil erosion and sedimentation of water bodies. An assessment of these potential

impacts can be conducted as follows:

1. Describe the way stormwater currently drains from the site. This description can include an estimate of the amount of stormwater that currently enters the City sewer system, based on the amount of area covered by impervious materials.

2. Describe any changes to that drainage that would result in the future if the action is not implemented.

3. Describe any changes that would result because of the action (paving, development, etc.). Also include a discussion of how stormwater would be managed on the site (i.e., retention, detention, etc.). Determine the volume (in gallons) and peak discharge rates (in cubic feet per second) of stormwater expected from the site with the action. A number of methods can be used to estimate these rates, including TR-20 and TR-55 computerized models developed by the U.S. Department of Agriculture, Soil Conservation Service; the "rational method;" the U.S. Environmental Protection Agency's Stormwater Management Model (SWMM); and others.

   Estimate the types and loadings of pollutants that could be in the stormwater. Techniques for this assessment range from simple calculations to sophisticated models. One model is the U.S. Environmental Protection Agency's SWMM, which has four different levels of evaluation for urban water management analysis. The simplest, Level I, is useful for assessment of environmental impacts. If a serious problem is identified, other more sophisticated levels of analysis can be used to determine the extent of the problem.

   Pollutant loadings from industrial sites will depend on the processes involved. Note that the SPDES permits for industrial sites (SPDES permits are required for certain industrial sites served by separate sewers; see Section 230, above) will require development and use of a stormwater pollution prevention plan. This plan must identify potential sources of pollution and describe and ensure the implementation of practices to reduce those pollutants. More information on the applicability and requirements of such SPDES permits is available from DEC.

   Given the quantity and quality of the stormwater that would be discharged, the effects on the receiving water body are then assessed. This assessment considers overall flow, circulation, elevation, salinity, and water quality. More information about water quality is provided in Chapter 3I, "Natural Resources."

400. Determining Impact Significance

410. WATER SUPPLY

Because of the large volume of the City's water supply system, any given action's water consumption would not be likely to be significant relative to the total Citywide demand. Significant impacts on water supply could occur, however, if an action demanded enough water to reduce water pressure in a localized area to below acceptable levels. Generally, this would occur if the action resulted in water pressure of less than 20 pounds per square inch. Significant impacts could also occur for actions that would demand very large quantities of water, which could overburden the existing system and require a change in the system. This is unlikely, however, except for projects that draw extremely large volumes of water.

420. WASTEWATER TREATMENT

421. City WPCPs

Because of the large volumes of wastewater treated at the City's water pollution control plants relative to the incremental flows contributed by an action, and because the City is committed to maintaining adequate wastewater treatment, any given action would not likely have a significant impact on any of those plants, unless the action would not be consistent with the provisions of a Consent Order or other applicable program.

422. Industrial Pretreatment

Actions that facilitate industrial development that sends effluent to the City's sewer system can result in significant adverse impacts on the operations of the WPCP or sewer system if that effluent does not meet the standards of the City's Industrial Pretreatment Program.