

CELEBRATING 50 YEARS

SAN DIEGO

METROPOLITAN

SEWERAGE SYSTEM

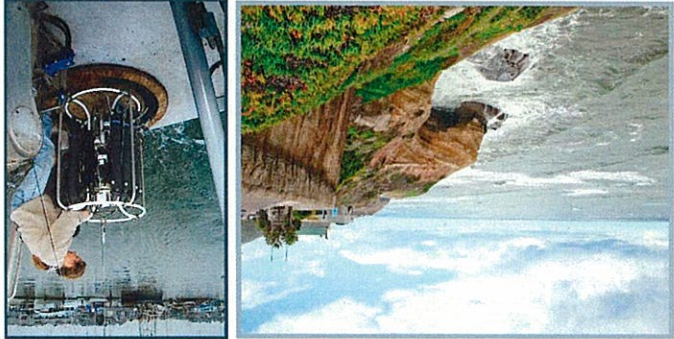
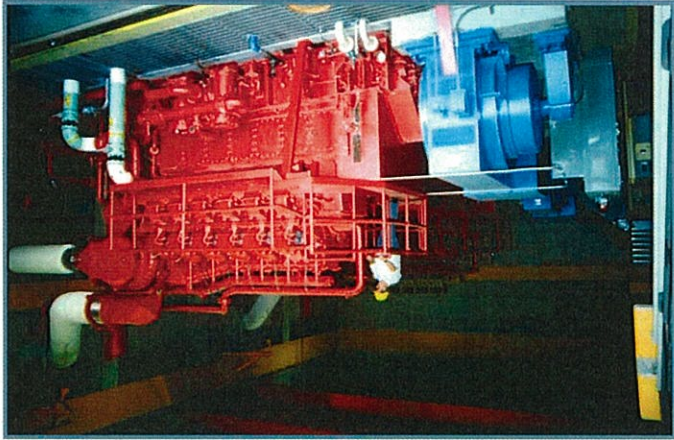


Point Loma Wastewater Treatment Plant 1963

1963 - 2013

Protecting our Marine Environment

<http://www.sandiego.gov/mwwd>



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WE ARE MORE THAN JUST WASTEWATER TREATMENT

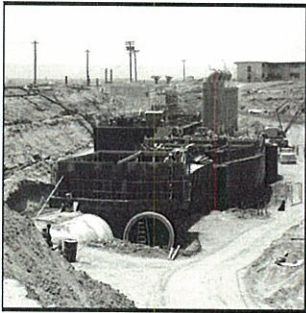
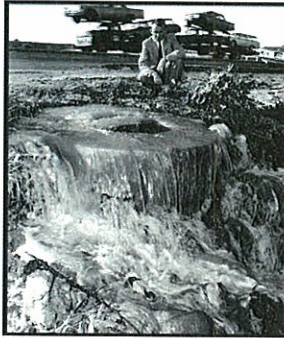
METROPOLITAN SEWERAGE SYSTEM HISTORY

PUBLIC UTILITIES DEPARTMENT, CITY OF SAN DIEGO

WAY BACK WHEN....

The City became responsible for public sewers in 1885, building the first pipelines under Broadway St. The City had no sewage "treatment" prior to 1943. Raw sewage was discharged into San Diego Bay and the Pacific Ocean through some 20 outfall pipes.

In 1943, a 14 million gallon per day (MGD) treatment plant was built on East Harbor Drive which discharged into San Diego Bay and was enlarged to 40 million gallons per day in 1950. The San Diego area kept growing and the Harbor Drive plant became overloaded. Sewer spills were a frequent occurrence and restrictions were placed on residents to minimize flows to the plant.



THE SOLUTION...

In January 1961, the City and surrounding communities joined to build the Point Loma Treatment Plant and a sophisticated collection system. The system was designed to serve an expected 2,500,000 population in the year 2000 for the San Diego metropolitan area.

On August 15, 1963, the first flows went through the Metropolitan Sewerage System. The new system collected, pumped, treated, and disposed of the sewage from the cities of Chula Vista, Coronado, El Cajon, Imperial Beach, La Mesa, National City and San Diego, and the Sanitation Districts of Lemon Grove, Montgomery, Rolando and Spring Valley.



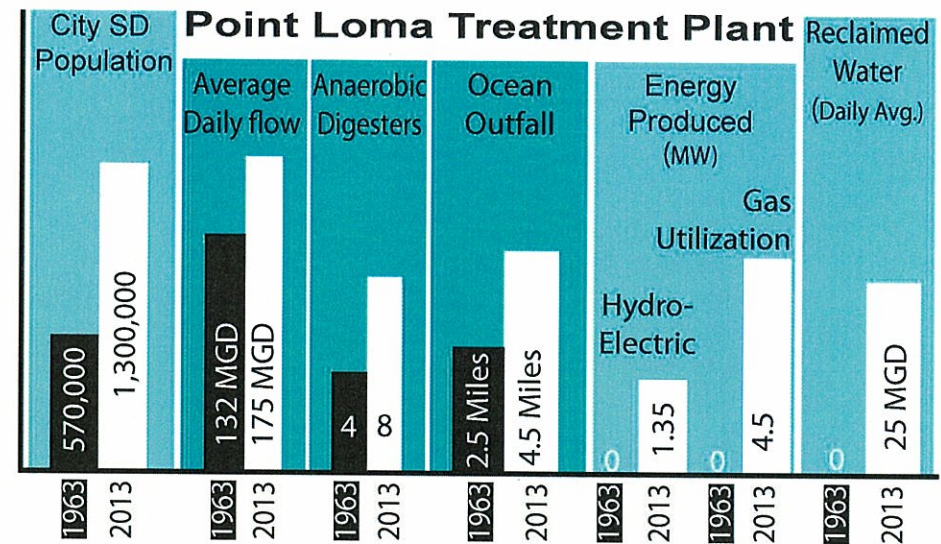
The 1963 Metropolitan Sewerage System had about 22 miles of pipe, a pumping station on both East and North Harbor Drive, the Point Loma Treatment Plant, and a 2.5 mile ocean outfall which discharged into the Pacific Ocean at a depth of over 200 feet below sea level (BSL).

OUR SYSTEM TODAY....

Since 1963, the Metropolitan Sewerage System has grown to meet the needs of the region. The Point Loma Sewage Treatment Plant operations are more sustainable because we make greater use of process by-products such as recycled water for irrigation and biosolids for fertilization of non-edible crops. We generate electricity (enough to power more than 4,300 homes) from the digester methane gas, and hydroelectric power from the ocean outfall. Our facilities have received industry excellence awards recognizing these efforts.

Check out all the interesting ways we are maximizing this waste water resource:
www.sandiego.gov/mwwd

Compare Our System Performance: 1963 to 2013

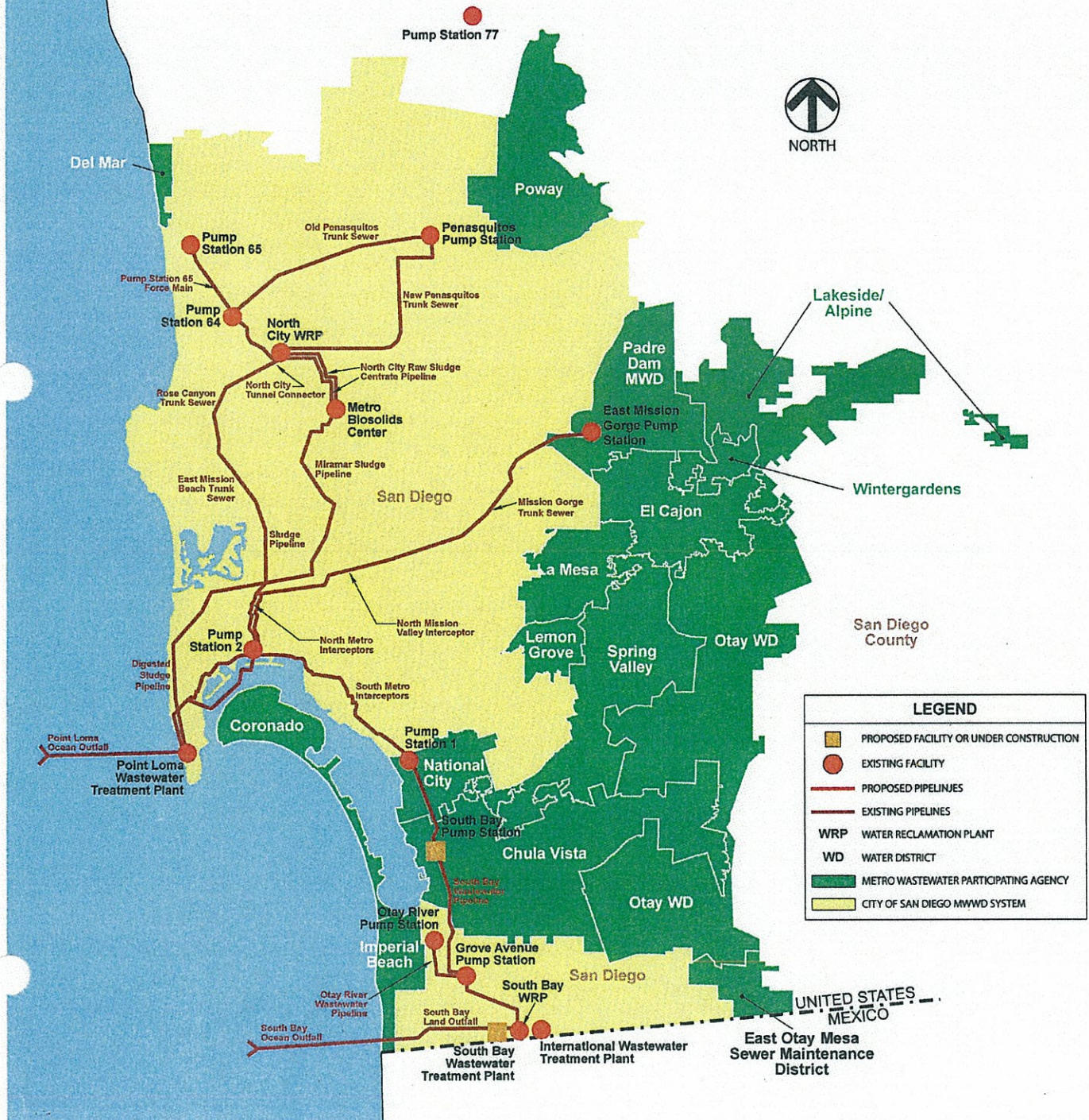


Point Loma Wastewater Treatment Plant 2013



The City of San Diego

Metropolitan Wastewater System Existing and Planned Facilities



CITY OF SAN DIEGO METROPOLITAN SEWERAGE SYSTEM HISTORY AND BACKGROUND

Treatment of wastewater is a relatively modern practice. It was not until the late 19th century that large cities realized that they had to reduce the amount of pollutants they were discharging into the environment. San Diego itself had no wastewater treatment prior to 1943. Raw sewage was discharged directly into San Diego Bay and the Pacific Ocean through 22 sewage outfalls.

In 1943, a 14 million-gallon-per-day treatment plant went into operation on East Harbor Drive just south of 32nd Street. Although the plant was enlarged in 1950 to handle 40 million gallons of wastewater per day, San Diego's growing population soon overwhelmed the plant's capabilities. This led to the construction in the early 1960s of the Point Loma Wastewater Treatment Plant (PLWTP), on a bluff facing the ocean at Point Loma.

The Point Loma facility remains the mainstay of the Metropolitan Wastewater Department, processing approximately 175 million gallons a day of wastewater generated by 2.2 million residents in a 450 square mile service area. The plant has a treatment capacity of 240 million gallons per day.

In the late 1980s, the City of San Diego and the Environmental Protection Agency (EPA) were involved in a legal dispute over the requirement to treat sewage at the Point Loma Wastewater Treatment Plant to secondary standards. The City prevailed, saving ratepayers an estimated \$3 billion. As a result of the ensuing court order, the City embarked upon a \$1.4 billion Capital Improvement Program. The Point Loma Wastewater Treatment Plant underwent expansion and rehabilitation. The Department's first new treatment plant under the program, designed to turn wastewater into a recyclable asset, was the North City Water Reclamation Plant. It went online in 1997. In 1998, the Metro Biosolids Center, which processes the solid waste from wastewater, started operations. The final major construction element of the Capital Improvement Program, the South Bay Water Reclamation Plant, opened in 2002.

Since the Point Loma Wastewater Treatment Plant's advanced primary process had proved so successful in maintaining a healthy ocean environment, the requirement to perform secondary treatment on wastewater before ocean discharge was waived by the passage of the Ocean Pollution Reduction Act (OPRA) in 1994. With the full support of the EPA, the City received a renewal of this Modified Permit in September 2002.

The Metropolitan Wastewater Department is staffed by more than 1000 employees. The Department has a total budget of \$413.9 million for FY 2007.

Metropolitan Sewerage System

The Metro System treats the wastewater from the City of San Diego and 15 other cities and districts (called Participating Agencies) from a 450 square mile area with a population of over 2.2 million. An average of 180 million gallons of wastewater is treated every day of the year.

The Participating Agencies are the Cities of Chula Vista, Coronado, Del Mar, El Cajon, Imperial Beach, La Mesa, National City, Poway, the Lemon Grove Sanitation District, the Otay Water District, the Padre Dam Municipal Water District, the County of San Diego (including Lakeside/Alpine, Spring Valley, Wintergardens, and East Otay Mesa).

Facilities



The Metropolitan Operations Center

The Metropolitan Operations Center (MOC) is a complex of buildings in Kearny Mesa that houses most of the divisions of the Metropolitan Wastewater Department (MWWD), including Administrative Services, Wastewater Collection, Wastewater Treatment and Disposal, and Engineering and Project Management. MOC is also the home of MWWD's Central Operations and Management Center (COMC) and the Communications Network (COMNET) computer system that monitors all of the department's treatment facilities and major pump stations. In fact, at night, the North City and South Bay Water Reclamation Plants are remotely operated from COMC. COMC also houses the dedicated computer system tied to MWWD's Flow Monitoring Alarm System. In times of natural disaster or city or county-wide emergency, a room adjacent to COMC houses the Department Operations Center (DOC), which is linked to the City of San Diego Emergency Operations Center (EOC) by landlines, radio and computer. Additionally, one of the buildings in the MOC Complex is equipped with a state-of-the-art roof-top photovoltaic array that supplies more than 20 percent of the building's electrical needs.

Service Area Map



- A. Point Loma Wastewater Treatment Plant
- B. North City Water Reclamation Plant
- C. South Bay Water Reclamation Plant
- D. Metro Biosolids Center (MBC)

- E. Environmental Monitoring & Technical Services Laboratory
- F. Metro Pump Stations
- G. South Bay Ocean Outfall

The Metropolitan Sewerage System serves the Greater San Diego population of 2.2 million from 16 cities and districts generating approximately 180 million gallons of wastewater per day. Planned improvements will increase wastewater treatment capacity to serve an estimated population of 2.9 million through the year 2050. Nearly 340 million gallons of wastewater will be generated each day by that year.

The Metropolitan Wastewater Department treats the wastewater generated in a 450-square-mile area stretching from Del Mar and Poway to the north, Alpine and Lakeside to the east, and south to the Mexican border. In addition, wastewater collection services are provided to the City of San Diego.

City of San Diego
Metropolitan Sewerage System

Metro Facilities

III. Other Metro Facilities (continued)

- South Bay Raw Sludge Pipeline
- South Bay Land/Ocean Outfall²
- Environmental Monitoring & Technical Services Laboratory
- Centrate Treatment Facility at Metropolitan Biosolids Center
- Sludge & Biosolids Management Facility (Monofill)
- Metro Operations Center (MOC) Complex
- Additional 8 mgd Water Reclamation Treatment Capacity

IV. Additional Metro Facilities

- A. Note: The below listed facilities will be required as part of the Metro System for hydraulic capacity, good engineering practices and/or compliance with applicable law, rules or regulations, including OPRA, and the continuation of the City's waiver of applicable treatment standards at the Point Loma Wastewater Treatment Plant ("Waiver").
- South Bay Sludge Processing Facility
 - South Bay Secondary Treatment Plant, Phase I (21 MGD)
 - South Bay Secondary Sewers, Phase I
- B. Note: These facilities will be required as part of the Metro System for hydraulic capacity, good engineering practices, compliance with OPRA, and to maintain the City's Waiver. In the event that hydraulic capacity demands, or the obligations of OPRA (or its successor) or the terms of the City's Waiver change, these facilities may not be required or may be modified or supplemented, as appropriate, pursuant to the terms of this Agreement.
- South Bay Secondary Treatment Plant, Phase II (28 MGD)
 - South Bay Secondary Sewers, Phase II

² The South Bay Land/Ocean Outfall is jointly owned by the International Boundary and Water Commission, U.S. Section (60.06%) and the City of San Diego (39.94%). The capacity of the City's portion of the outfall as of the date of this Agreement is 74 MGD average dry weather flow, of which the Metro System has a capacity right to 69.2 MGD and the City has an exclusive right to 4.8 MGD.

City of San Diego
Metropolitan Sewerage System

Metro Facilities

I. Original Facilities

- Pt. Loma Wastewater Treatment Plant
- Pt. Loma Ocean Outfall
- Pump Station #1
- Pump Station #2
- South Metro Interceptor
- North Metro Interceptor
- Metro Force Mains 1 & 2
- Digested Sludge Pipeline
- Fiesta Island Sludge Processing Facility
- Fiesta Island Centrate Pipeline.

II. Fiesta Island Replacement Project (FIRP) And State Ocean Plan (SOP) Compliance Facilities

- Pt. Loma Outfall Extension
- Fiesta Island Replacement Project Digested Sludge Pipeline
- Fiesta Island Replacement Project Pump Station
- Metro Biosolids Center (FIRP Facilities)

III. Other Metro Facilities

- North City Water Reclamation Plant
- Metro Biosolids Center (NCWR Plant Related Facilities)
- North City Tunnel Connector
- North City Raw Sludge Pipeline
- Centrate Pipeline
- Rose Canyon Parallel Trunk Sewer
- Second Rose Canyon Trunk Sewer
- East Mission Bay Trunk Sewer
- Morena Blvd. Interceptor
- South Bay Water Reclamation Plant
- Dairy Mart Road & Bridge Rehab¹
- Grove Avenue Pump Station
- Grove Avenue Pump Station Sewer Pipeline

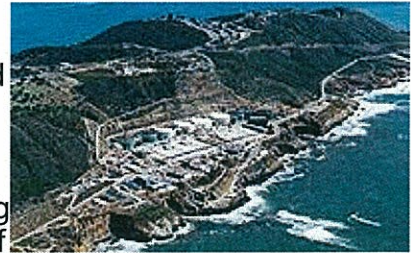
¹ The City and the Participating Agencies shall continue their joint effort to seek federal funding for the Dairy Mart Road and Bridge Rehabilitation Project with a goal of requiring 60% federal participation.

Point Loma Wastewater Treatment Plant

Future Treatment Options at Point Loma

Historical Background

The Point Loma Wastewater Treatment Plant (PLWTP) treats approximately 175 million gallons of wastewater each day for the City of San Diego and 15 other cities and districts in the region. The plant uses an Advanced Primary Treatment process to remove suspended solids and biological oxygen demand from the wastewater before its discharge into the ocean through a 4.5 mile-long outfall pipe into 320 feet of water. The plant's discharge of treated wastewater (effluent) is monitored by an extensive ocean monitoring program.



FAQs:

What are the different types of wastewater treatment?

- Preliminary Treatment: screening process during which larger pieces of inorganic material (wood, plastics, cloth, along with sand, gravel and grit) are removed from the wastewater.
- Primary Treatment: Process in which suspended organic solids in the wastewater settle out in sedimentation basins as sludge.
- Advanced Primary Treatment: Addition of chemicals (such as ferric chloride and/or anionic polymers) to sedimentation basins to promote settling of small organic particles.
- Secondary Treatment: Use of bacteria to break down organic solids in the wastewater (such as "activated sludge" process).
- Tertiary Treatment: removal of additional suspended solids after primary and secondary treatment, usually accomplished by filtration through a medium such as sand or anthracite coal.

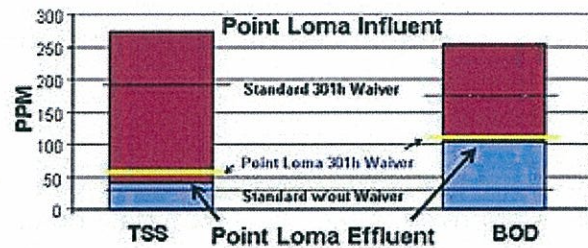
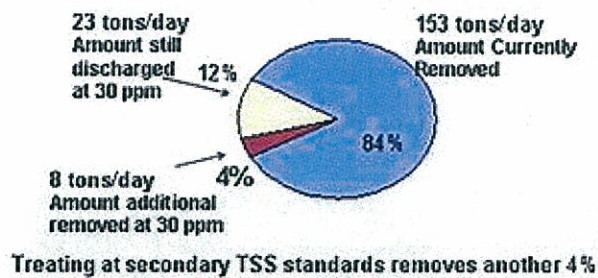
What are the federal or state regulations a wastewater treatment operator/discharger must obey?

There is guiding legislation from the Federal Clean Water Act, the California Ocean Plan and the California Coastal Zone Management Act. The Environmental Protection Agency (EPA) and the Regional Water Quality Control Board (RWQCB) regulate the discharge and treatment of wastewater under the Clean Water Act.

What are the basic regulations of the Clean Water Act?

A standard permit requires wastewater treatment plants discharging into any body of water treat to a Secondary level, which removes a minimum 85% of the Total Suspended Solids (TSS) and 85% of all Biological Oxygen Demand (BOD) material. This reduces TSS and BOD from as much as 250 Parts per Million (ppm) coming into the plant to 30 ppm in the treated wastewater. San Diego operates under a modified permit for the PLWTP which requires an 80 percent removal of TSS and a 58 percent removal rate for BOD. Current Point Loma discharge to the ocean is about 45 ppm TSS and 105 ppm BOD.





What is BOD?

Biochemical Oxygen Demand (BOD) is a measure of the concentration of biodegradable organic matter present in water. Consider it as 'food' for small marine organisms. If too much 'food' is put in a given environment, the organisms that grow to consume this 'food' use oxygen from the water as part of the process. If too many marine organisms grow, the local oxygen level can be reduced affecting the entire marine environment. The BOD test specifically measures the demand for oxygen that wastewater effluent imposes on the water body to which it is discharged, checking that discharged waste does not exceed the capacity of the receiving water. This prevents conditions where the entire marine environment can become oxygen-starved.

The National Research Council (1993) reported "Biochemical Oxygen Demand (BOD) is of concern in bays, estuaries, and semi-enclosed water bodies but is generally not important in the open ocean."

How does the City of San Diego comply with the Clean Water Act?

The City of San Diego is in compliance with the Clean Water Act, operating under a modified permit. The five-year modified permit, also known as a 'waiver,' is a provision of the Clean Water Act that allows the PLWTP to treat wastewater at the Advanced Primary level before discharging into the ocean, only as long as it continues to show that there is no harm to the environment. The modified permit requires the City to perform additional monitoring to ensure compliance. The permit must be renewed every five years by the EPA and the Regional Water Quality Control Board.

Why was the modified permit granted to the City?

The City demonstrated that the amount of Total Suspended Solids (TSS) and Biological Oxygen Demand (BOD) in the discharged treated wastewater was not harming the ocean environment. This is due, in part, to the City's aggressive Industrial Pre-treatment Program, advanced primary treatment at Pt. Loma, and the length and depth of the Point Loma Ocean Outfall, and a comprehensive ocean monitoring program. At one point in the 1990s, when a plan to upgrade the Point Loma plant to a Secondary Treatment level was developed, Federal court intervention stopped the planned upgrade because it was not in the public interest since no harm to the environment could be found.



Does the treated wastewater discharged from the Point Loma Wastewater Treatment Plant cause beach closures?

No. The wastewater outfall, four and a half miles off shore and 320 feet below the ocean surface, does not cause beach pollution. Beach closures are caused by urban runoff, sewage spills, Tijuana River discharge and pollution from animals and birds.

What is the measured impact of the discharge to the ocean?

The City's Ocean Monitoring Program has shown and continues to show that the discharge of effluent from the Point Loma Wastewater Treatment Plant has no negative impact on the ocean waters, its environs, the Point Loma kelp beds, or commercial and game fish taken in the area. There is no indication of any elevated levels of TSS or BOD (the regulated components) in the surface waters at any point; elevated levels in sea floor sediments have only been detected within a very short distance from the ocean outfall.



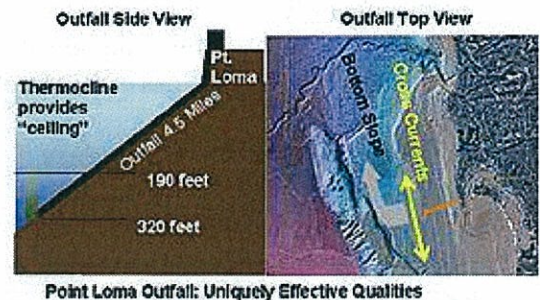
Is the City trying to avoid proper treatment of wastewater if it defers Secondary Treatment?

Application for the modified permit is a provision of the Clean Water Act. The Mayor, City Council and the Metropolitan Wastewater Department are committed to protecting our ocean environment.

Previous waiver approvals have been granted based on evidence of no environmental impact. Ocean monitoring data during this last waiver period is consistent with previous years. However, this information is being reviewed by a Scientific Technical Review Committee comprised of scientists from the University of California at San Diego, including Scripps Institution of Oceanography, and San Diego State University who will provide an independent assessment. This report will contribute to the discussion as to whether it is necessary for the City to upgrade the Point Loma Wastewater Treatment Plant to a Secondary Treatment Level.

How is Point Loma's outfall different from other treatment plant outfalls?

Point Loma's Outfall is unique; it is the deepest and one of the longest outfalls in the United States. Also, the ocean environment makes the Point Loma outfall very effective; a thermocline (temperature gradient) means that the released sediment stays deep and cross currents and bottom slope features mean that there is no build up of sediment.



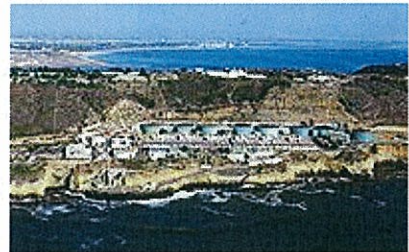
What options are available to the City as far as Secondary Treatment is concerned?

There are two options available to the City:

1. The City could commit to construct Secondary Treatment at Point Loma. This would require the City of San Diego to implement future rate increases to fund the improvements. The financial costs to upgrade to a Secondary Treatment level would be paid primarily by the ratepayers in San Diego and the residents of the 15 other participating agencies that make up the Metropolitan Wastewater System.
2. The City could continue the existing process of renewing its modified permit every five years. This would avoid the cost of secondary treatment and require continued ocean monitoring/evaluation. The City would need to remain ready to upgrade should the modified permit be denied.

What is involved if the Point Loma plant upgrades to a Secondary Treatment level?

Additional land would be necessary for the most cost effective design of Secondary Treatment facilities; this means either on the adjacent Navy or National Park Service lands at a cost of about \$1 billion and the loss of 30 acres of natural coastal habitat;



Or

The City would have to build the Secondary Treatment plant on the current plant site as a "second story". That cost would be about \$1.5 billion due to added complexity of the construction and the fact that the current plant must stay in operation during any construction.

In either case, once constructed, the Secondary Treatment plant will cost an additional \$40 million per year to operate.

What will the cost mean to me?

There are approximately 375,000 ratepayers in the Metropolitan Wastewater System. (2/3 in the City of San Diego, 1/3 in surrounding cities and districts)

Construction Costs for Secondary Treatment at Point Loma are expected to be approximately:

\$1 billion = \$2,600 per ratepayer

\$1.5 billion = \$4,000 per ratepayer

Operating Costs for Secondary Treatment at Point Loma: More than \$105/year per ratepayer.

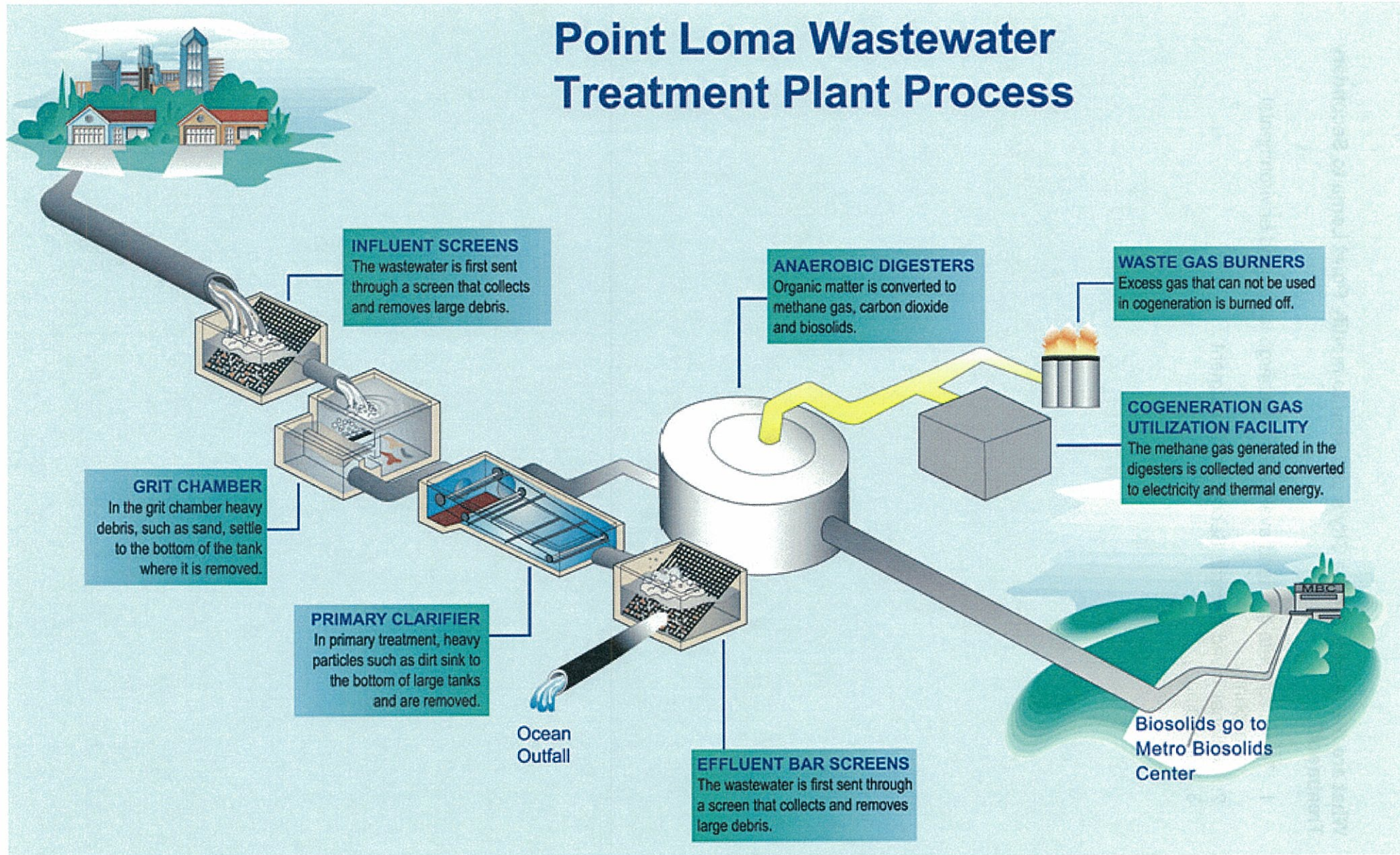
If the City moves to Secondary Treatment can that treated wastewater (effluent) be used in any beneficial way?

No. Secondary Treatment does not meet the requirements for Title 22 reclaimed water – water that can be used for irrigation or industrial purposes. That requires Tertiary Treatment using micro filtration and disinfection. In San Diego such reclaimed water can currently only be produced at the North City Water Reclamation Plant and the South Bay Water Reclamation Plant.

What are the factors for the City's decision to modify Point Loma to Secondary Treatment?

1. Technical Data (i.e. land availability, discharge levels and environmental monitoring)
2. National Trend towards Secondary Treatment
3. Financing

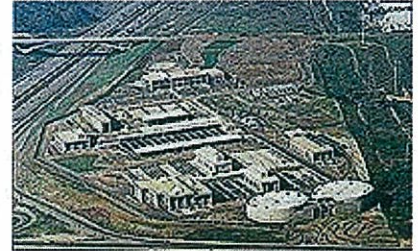
Point Loma Wastewater Treatment Plant Process





North City Water Reclamation Plant

4949 Eastgate Mall, San Diego, CA. 92121



The City of San Diego imports approximately 90% of its water supply. To meet the future potable water demands while decreasing our dependence on imported water, the City has developed and implemented innovative water management strategies.

The North City Water Reclamation Plant (NCWRP) is the first large-scale water reclamation plant in San Diego's history and part of the single largest sewerage system expansion in the area in more than 35 years. This state-of-the-art facility can treat up to 30 million gallons of wastewater per day which is generated by northern San Diego communities. Wastewater entering the plant undergoes a series of treatment and purifying steps using the latest technologies to supplement the water supply of the region.

Reclaimed water produced at the NCWRP is distributed throughout the northern region of San Diego via an extensive reclaimed water pipeline. More than 79 miles of distribution pipelines are installed in Mira Mesa, Miramar Ranch North, Scripps Ranch, University City, Torrey Pines, Santaluz and Black Mountain Ranch to provide reclaimed water to our customers for irrigation, landscaping and industrial use. NCWRP also provides reclaimed water for the City of Poway. Reclaimed pipelines, sprinkler heads, meter boxes and other irrigation equipment are color-coded purple to distinguish reclaimed water pipes from drinking water systems.

The NCWRP Operations Building includes the plant operations staff which monitors and controls every phase of the treatment process through a central control room. The Operations Building also includes process laboratories where samples of wastewater from every stage of treatment are analyzed. From 12:30 a.m. to 5:30 a.m. control of the North City plant is transferred to Metropolitan Wastewater's Communications Center in Kearny Mesa and an operator from NCWRP is on call in the event of an emergency.

Untreated wastewater (influent) enters the plant through an 84 inch pipeline beneath the I-805 and flows into North City's Influent Pump Station. Four pumps at the influent pump station pump the wastewater up a 90 feet rise to the Headworks. From the Headworks, through the remaining treatment process, the majority operates through gravity flow.

At the **Headworks** wastewater passes through large rake-like bar screens to remove solid debris and floating material called rags. Rags are comprised of cloth, wood, plastic and vegetable matter. Once the rags have been removed from the wastewater they are dewatered and trucked to the landfill. The screened wastewater then passes through aerated grit chambers where heavier solids such as sand, gravel, coffee grounds and eggshells are settled out and removed. The grit is then dewatered and taken to the landfill.

Primary Sedimentation occurs when solids sink to the bottom of the tanks and "scum" (grease and cooking oil) float to the surface. "Raw Sludge" that has settled to the bottom of the basins is collected by a chain and flight system then pumped to the Blended Sludge Pump Station. Similarly, the scum is removed from the surface of the sedimentation tanks, dewatered and taken offsite for disposal. Primary Sedimentation takes approximately 90 minutes removing 99% of the settleable solids, 50% of the suspended solids and 25% of the Biological Oxygen Demand (BOD).



Aeration is found in two different zones: anoxic zones where oxygen is depleted and aerobic zones where oxygen is consumed. Both zones have bacteria that eat soluble BOD. The anoxic zone is designed to control filaments while the aerobic zone is designed for the organisms to ingest and digest the organic solids while increasing in number and density. The organisms are called mixed liquor.

Odor Control is an important part of the influent, headworks and primary wastewater treatment process. Odor is caused primarily by hydrogen sulfide gas. Throughout the plant, Odor Control "Scrubbers" draw the foul air (and odors) off the flow of wastewater. The foul air is drawn into the "scrubbers" where it passes through a bleach solution spray at a pH of 9.0 which neutralizes odor-causing sulfide compounds. The "scrubbed" air then passes through carbon filters which removes any additional foul air before being released into the atmosphere.

Secondary Clarification occurs when the mixed liquid settles to the bottom of the basins and is collected by a chain and flight system. The solids (return activated sludge) are then pumped to the aeration basin influent channel. A small portion of the RAS is also sent to the blended sludge pump station thru the low capacity waste pumps. The water has now been treated to Secondary effluent quality. The secondary effluent can either be returned to the sewer system, Point Loma Wastewater Treatment Plant or to Tertiary Treatment for reclaimed water applications.

Blended Sludge Pump Station sends the combined primary sludge, secondary scum and low capacity waste to the Metro Biosolids Center for further processing.

In **Tertiary Treatment** secondary effluent flows into anthracite coal beds where it is filtered of remaining solids.

Chlorine Contact/Final Effluent: Filtered Effluent is then chlorinated in chlorine contact tanks for a minimum of 90 minutes for proper disinfection. At this stage the utility water is ready to use for plant irrigation and equipment operations.

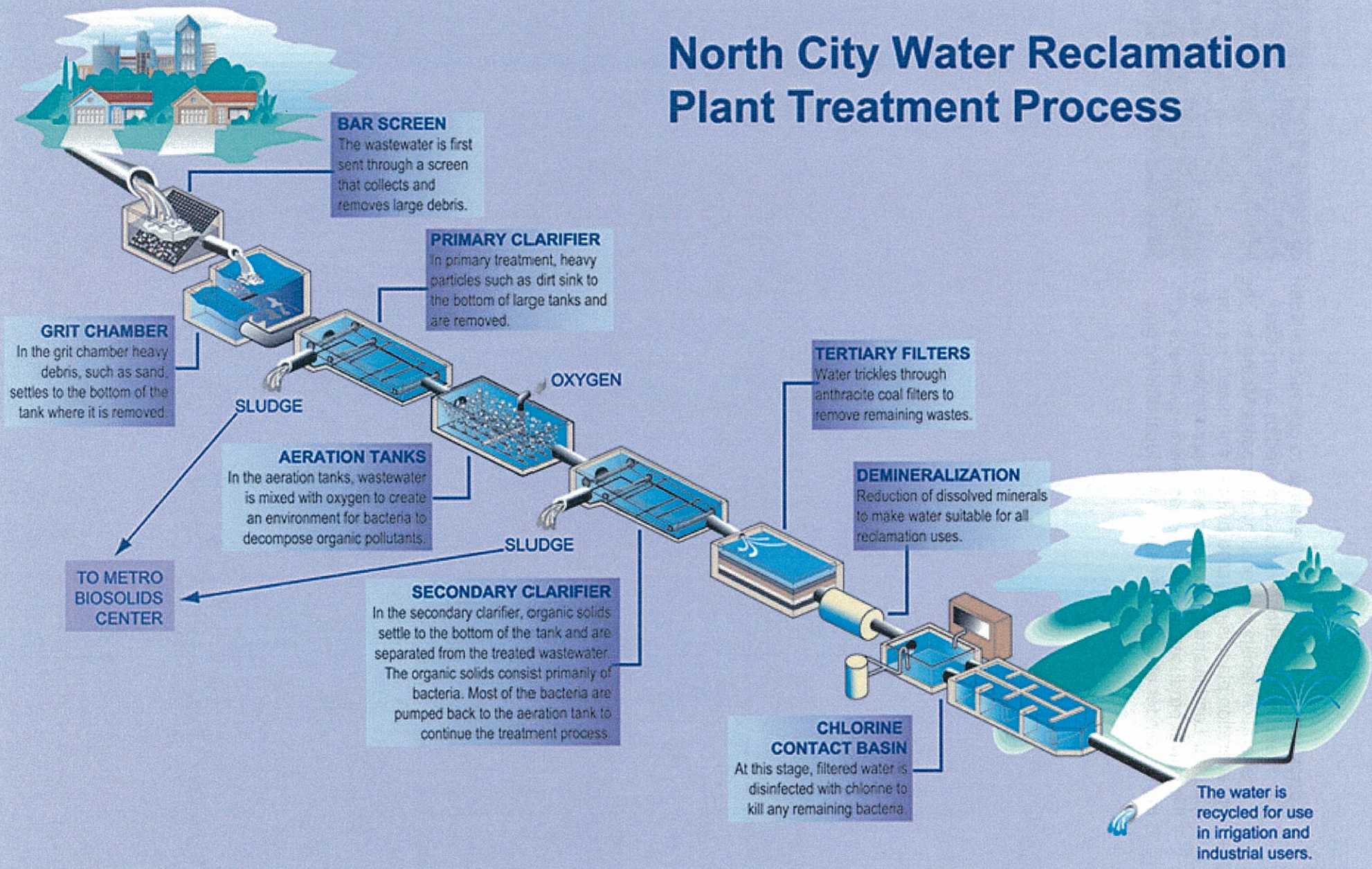
Demineralization: A portion of the filtered effluent is sent to the Demineralization Facility which uses an electro-dialysis reversal (EDR) process to reduce the salinity of the reclaimed water.

Chlorine Contact/Reclaimed Water: Filtered Effluent is blended with demineralized water then chlorinated in chlorine contact tanks for a minimum of 90 minutes for proper disinfection. The demineralized water is now available for industrial purposes for irrigation or agricultural purposes that require low salinity.

Cogeneration: All the power required to operate the North City Water Reclamation Plant is provided by an on-site Cogeneration facility operated by Minnesota Methane. The cogeneration plant is powered by methane piped from the Miramar Landfill and MBC digesters. Approximately 75% of the power produced is used for plant electrical needs with the remainder of the power sold to the local electric grid.



North City Water Reclamation Plant Treatment Process





South Bay Water Reclamation Plant

2411 Dairy Mart Road, San Diego, CA 92154

The South Bay Water Reclamation Plant (SBWRP) is located at the intersection of Dairy Mart and Monument Roads in the Tijuana River Valley. The plant relieves the South Metro Sewer Interceptor System and provides local wastewater treatment services and reclaimed water to the South Bay. The plant opened in May 2002 and has a wastewater treatment capacity of 15 million gallons a day. The plant design incorporates the newest technologies and meets strict odor control standards.



The Wastewater Treatment Process

The SBWRP Operations Building houses the Control Center which monitors and controls every phase of the treatment process. The facility is staffed from 6:00am to 4:00pm Monday through Friday. Outside these hours, control of the South Bay plant is transferred to Metropolitan Wastewater's Communications Center in Kearny Mesa. The SBWRP Operations Building also houses Process Control Laboratories where samples of wastewater from every stage of treatment are analyzed.

Untreated wastewater (Influent) enters the plant's Headworks from the South Bay region. In the Headworks, the wastewater passes through large, rake-like Bar Screens to remove solid debris and floating material (called "Rags") such as cloth, wood, and plastic material. These "rags" are dewatered and trucked to a landfill.

Odor Control is an important part of the overall wastewater treatment process. Odor is caused primarily by hydrogen sulfide gas. Throughout the plant, fans draw the foul air off the flow of wastewater and deliver it to Odor Control "Scrubbers." The foul air passes through a bleach solution spray which neutralizes odor-causing sulfide compounds. The "scrubbed" air then passes through carbon filters which remove any additional foul air before being released into the atmosphere.



Following the headworks, the screened wastewater then passes through aerated Grit Chambers where heavier solids such as sand, gravel, coffee grounds and eggshells settle out and are removed. The grit is then dewatered and taken to landfills.

Wastewater then flows into the Primary Sedimentation Basins where the sedimentation process starts. Solids sink to the bottom of the tanks and "scum" (grease and cooking oil) float to the surface. "Raw Sludge" which has settled to the bottom of the basins is returned to the sewer system and sent to the Point Loma Wastewater Treatment Plant.



Similarly, the scum is skimmed from the surface and returned to the sewer system.

The wastewater then enters Anoxic Zone Chambers that are oxygen depleted. The wastewater mixes with bacteria ("Bugs") that eat soluble organic material. The wastewater then flows into Aeration Basins where diffused air is pumped into the water. Here, the bugs begin to ingest and digest the organic solids while increasing in number and density.

Wastewater flows from the Aeration Basin into the Secondary Clarifiers where the bacteria and digested solids settle to the bottom as "Secondary Sludge." Some of this Sludge and any remaining scum are removed and returned to the sewer system for treatment at the Point Loma Wastewater Treatment Plant. The remaining sludge is returned to the Anoxic Basins and again mixed with the wastewater.

The water, now treated to a Secondary Treatment level, can either be discharged into the ocean through the [South Bay Ocean Outfall](#) or moved on to Tertiary Treatment for reclaimed water applications.

In Tertiary Treatment, the treated wastewater (effluent) flows into Anthracite Coal Beds where it is filtered of remaining solids as it passes through the coal medium. The filtered water then passes through chambers where it is disinfected through exposure to ultraviolet light. At this stage the "reclaimed" water meets State Title 22 full body contact requirements.



South Bay Water Reclamation Plant Treatment Process



Sewer drains carry wastewater from our homes and businesses to the treatment plant.

BAR SCREEN

The wastewater is first sent through a screen that collects and removes large debris.

GRIT CHAMBER

In the grit chamber heavy debris, such as sand, settle to the bottom of the tank where it is removed.

DEBRIS

PRIMARY CLARIFIER

In primary treatment, heavy particles such as dirt sink to the bottom of large tanks and are removed.

OXYGEN

AERATION TANKS

In the aeration tanks, wastewater is mixed with oxygen to create an environment for bacteria to decompose organic pollutants.

TO SEWERS

SECONDARY CLARIFIER

During the secondary treatment phase, bacteria is added to organically rid the water of harmful pollutants. The remaining waste is removed as sludge for reuse as fertilizer.

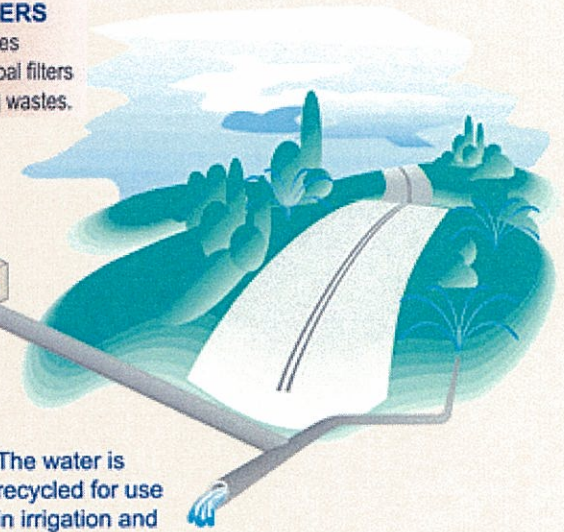
TERTIARY FILTERS

Then the water trickles through anthracite coal filters to remove remaining wastes.

UV DISINFECTION

At this stage, filtered water is disinfected with ultraviolet light to kill any remaining bacteria.

The water is recycled for use in irrigation and industrial uses.



Facilities



Metro Biosolids Center

5240 Convoy, San Diego, CA 92111

Located on 39 acres adjacent to the Miramar Landfill, the Metro Biosolids Center (MBC) is the City of San Diego's state-of-the-art regional biosolids treatment facility. Biosolids are the nutrient-rich, processed organic material produced by the wastewater treatment process. The plant, which began operation in 1998, is an essential component of the region's wastewater treatment system. Up until 1998 digested solids (sludge) from the Point Loma Wastewater Treatment Plant's (PLWTP) digesters were dried in open fields or through belt and filter presses on Fiesta Island in Mission Bay and then trucked to landfills.



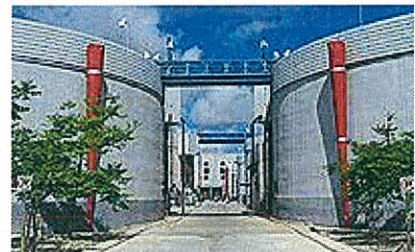
The location of the Biosolids Center required construction of two pipelines to feed the facility; the 17-mile Miramar Pipeline from the [Point Loma Wastewater Treatment Plant](#) and a five-mile pipeline from the [North City Water Reclamation Plant \(NCWRP\)](#).

The process systems of the Metro Biosolids Center are fully automated and can be operated from any work station in the plant. The plant can also be operated remotely from MWWDD's Operations Center in Kearny Mesa, four miles from the MBC. The on-site Process Control Lab collects and monitors chemical and biological data from each stage of the treatment process.

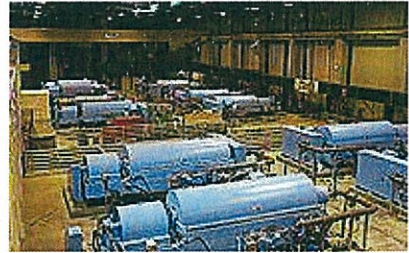
MBC provides two treatment operations: thickening and digestion of the raw solids (raw sludge) generated at the North City Water Reclamation Plant (NCWRP); and the dewatering of the wet biosolids from both the PLWTP and the NCWRP. Biosolids are a nutrient-rich, organic material produced from material collected in the wastewater treatment process. The facility produces dewatered biosolids that are approximately 30 percent solids and 70 percent water, the consistency of wet plaster.

The North City Water Reclamation Plant does not have digesters on site. Raw solids from the primary and secondary treatment processes at NCWRP are pumped to receiving tanks at MBC. Then they pass through degritters to remove any abrasive material that could damage the processing equipment. The grit is removed, dried and disposed of off-site.

The raw solids are thickened in five centrifuges before being pumped into one of three anaerobic digesters. There, the volume of organic matter is reduced in a process similar to human digestion. After digestion the organic solids are referred to as biosolids. From the anaerobic digesters, the biosolids are sent to a Digested Biosolids Storage Tank where they are mixed with biosolids from the Point Loma Wastewater Treatment Plant.



The mixed biosolids are piped to eight dewatering centrifuges that use centrifugal force to remove water from the biosolids. The liquid separated out of the biosolids("centrate") is returned to the sewer system for treatment at Point Loma. The dewatered biosolids are pumped into storage silos before being trucked off-site.



Biosolids may be used to promote growth of agricultural crops, to fertilize gardens and parks and to reclaim and replenish worn and nutrient-depleted land. Currently, biosolids are used as soil amendments, landfill, and landfill cover.

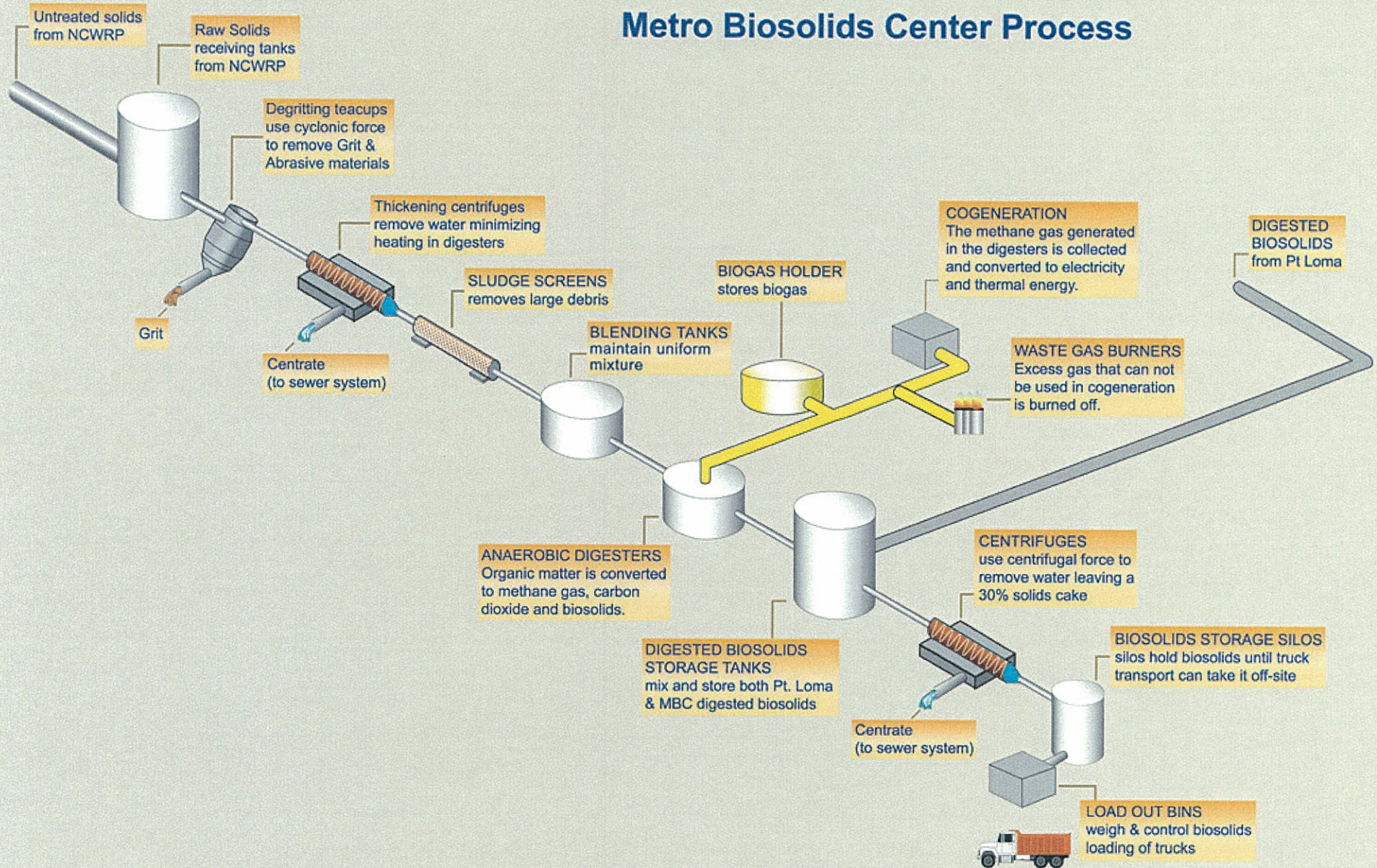
Odor Control is an important part of the overall wastewater treatment process. Odor is caused primarily by hydrogen sulfide gas. Throughout the plant, Odor Control "Scrubbers" draw the foul air (and odors) off the flow of wastewater. The foul air is drawn into the "scrubbers" where it passes through a bleach solution spray which neutralizes odor-causing sulfide compounds. The "scrubbed" air then passes through carbon filters which remove any additional foul air before being released into the atmosphere.



MWWD was one of the first City Departments to complete a comprehensive energy conservation plan. One of the key elements in the plan is Cogeneration, the utilization of methane gas to power the largest MWWD facilities. MWWD has a long-term agreement with a private firm that uses methane generated by MBC digesters and the Miramar landfill to power both the MBC and the North City Water Reclamation Plant.

The Metro Biosolids Center has received a number of awards including the 1998 *Fiscal Watchdog Award* from the San Diego County Taxpayers Association for its cogeneration and landfill gas facility and the San Diego *Grand Orchid - People's Choice of Design Award* for architecture, environmental solutions, fine arts, graphic design, signage, interior and lighting design.

Metro Biosolids Center Process





Environmental Monitoring & Technical Services Laboratory

2392 Kincaid Road, San Diego, CA 92101



Opened in 2003, the new Environmental Monitoring & Technical Services Building supports the City's [Ocean Monitoring Program](#), the largest and most comprehensive program of its kind in the world. The 37,000 square foot facility, built on the site of the former Naval Training Center off Harbor Drive, replaced the leased space at Driscoll's Wharf and relocated several lab sections from the City's Alvarado Labs. The building houses 52 scientists and support staff who perform a variety of functions.

The **Administration and Permitting & Compliance Sections** oversee all regulatory permits. They obtain them, insure that all provisions in them are complied with, and they renew them as necessary. This includes the City's Modified Permit for the [Point Loma Wastewater Treatment Plant](#) (PLWTP).

The **Marine Biology and Ocean Operations Sections** take samples of the ocean bottom, fish and water near the South Bay and Point Loma Outfalls. The bottom sediments are analyzed for pollutants (heavy metals, pesticides, etc.) and the small organisms that live there examined. The purpose is to insure that wastewater discharge is not affecting them. The fish are also examined and analyzed for the toxins, again to insure no accumulation of toxins is occurring and that the general population is healthy. The water is tested for bacteria and other parameters such as light transmittance and dissolved oxygen to insure compliance with regulatory requirements. It also gives a general idea of where the discharge plume is in the ocean.

All of this is done to put the discharges from the Point Loma and South Bay Ocean Outfalls in perspective with other inputs and sources of change to the ocean environment. Overall, it is to ensure compliance with the discharge permits of both plants and the modified permit for the PLWTP. In a broader sense, the work helps to answer the three basic questions: 1) Is it safe to swim? 2) Can you eat the fish? and 3) Are the resources and ecology of the ocean being protected?

The Chemistry and Industrial Waste Sections are based at Alvarado Labs. Samples collected from the ocean monitoring that need chemical analysis (fish tissue, sediments, etc.) are sent to Alvarado as well.

The Micro Biology/Bacteriology Lab, relocated from the Alvarado Labs, does a lot of work for the Storm Water Program and sampling results can help point the finger at illegal discharges. The result of its monitoring can result in further investigations.

Alvarado Labs

This facility houses laboratory staff for both the Metropolitan Wastewater Department (MWWWD) and the Water Department. Although belonging to separate departments, their co-location allows a sharing of resources including common prep rooms, storerooms and physical facilities. This results in cost savings to both departments. MWWWD staff in the facility total 82 chemists, microbiologists and sub-professionals. Samples are brought to this central location from the wastewater treatment plants and the ocean monitoring boats for chemical and biological analysis as necessary to insure proper operation of the treatment plants, compliance with federal and state permits and environmental protection.

Facilities



Pump Stations

Most of the wastewater collection in San Diego relies on gravity for the flow of wastewater through sewers to a treatment plant. In some instances, it is necessary to pump this wastewater uphill before it can return to a gravity flow. There are nine major pump stations in the Metropolitan Sewerage System and 84 smaller pump stations throughout the Municipal Sewerage System.



The largest Pump Stations are Pump Stations #1 and #2. Pump Station #1, located on East Harbor Drive, collects all of South San Diego's wastewater and has an average daily flow of 75 million gallons. It sends the wastewater flow north via the 8-mile South Metro Interceptor to Pump Station #2 which is located on North Harbor Drive. The average daily flow into Pump Station #2 is approximately 180 million gallons. This station pumps the wastewater to the Point Loma Wastewater Treatment Plant through two 87" force mains. The two pump stations have 24-hour staffing.



Facilities



South Bay Ocean Outfall (SBOO)

Located near Imperial Beach, the SBOO discharges treated wastewater from the International Wastewater Treatment Plant to the Pacific Ocean. It also discharges effluent from the [South Bay Water Reclamation Plant](#).



The Metropolitan Wastewater Department has worked closely with a number of governmental agencies to meet wastewater treatment upgrade and expansion goals in the South Bay. As a border community, San Diego interacts with many agencies that specialize in facilitating and regulating border issues, such as the Environmental Protection Agency, the State Water Resources Control Board, the Regional Water Quality Control Board, the International Boundary and Water Commission, the Border Environment Cooperation Commission, the U.S. Border Patrol and the government of Mexico. Each has a key role in the shape and future of our border environment, and is an integral part in the expansion and upgrades of our facilities.

The South Bay Ocean Outfall extends approximately 3.5 miles offshore and discharges effluent in approximately 100 feet of water. A tunnel boring machine was used to excavate the tunnel for this project. The tunnel has an 11 foot diameter and is 19,000 feet long. Barges were used as platforms to trench the ocean floor, install pipe, and then cover the 1.5 miles of exposed pipeline with more than 400,000 tons of rock to protect the outfall from ocean waves and ship anchors.