Tapping Resources...
Delivering Promises

Sourcing, Processing, Managing and Sustaining...

WATER
Industry Leader in Water Management

Water is essential for socio-economic development and for maintaining a healthy ecosystem. Properly managed water resources are a critical component of growth, poverty reduction and equity. The livelihoods of people are critically associated with access to water services.

With higher rates of urbanization and changing environmental conditions, water remains the greatest developmental challenge all over the globe. Feeding a planet of 8 billion by 2030 will require producing more food and water through efficient management of our depleting natural resources.

To mitigate the impending water crisis, Larsen & Toubro (L&T) - a US$14 billion, technology, engineering, construction and manufacturing company set up an exclusive Water & Renewable Energy Independent Company as a Total Solution Provider in Water Infrastructure and Renewable Energy sources.

L&T Construction, the construction arm of Larsen & Toubro is the largest construction organisation in India and is ranked 27th among the world’s 225 top contractors (as per ENR, USA - August 2012). L&T Construction’s leading edge capabilities cover every discipline of construction: civil, mechanical, electrical and instrumentation engineering. The services extend to all core sector industries and infrastructure projects with single source responsibility.

L&T Construction’s Water & Effluent Treatment Business Unit (WET BU) provides state-of-the-art design, detailed engineering, procurement, project management, project execution, commissioning and operation & maintenance for

- Water Transmission, Treatment, Distribution and Management
- Municipal used Water Collection, Treatment and Reuse
- Industrial Water Treatment to achieve Ultra Pure Water
- Industrial Effluent Treatment and Zero Liquid Discharge / Recycle
- Desalination Plants – Sea Water / Brackish Water
- “Unaccounted for Water” Projects to Monitor the Water Loss
- Lift Irrigation Projects
- Refurbishments of Treatment Plants

With a fiscally sound approach to projects, proven project management skills, country-wide operational presence and an experience and expertise that spans over 40 years, L&T is recognized as the leader in developing and providing water infrastructure in the country.
L&T’s Engineering Design & Research Centre (EDRC) provides a broad spectrum of engineering, design and consultancy services, ranging from concept to commissioning of all types of water projects - water supply, treatment, distribution, waste water/effluent collection, treatment etc. The capabilities comprise of core expertise in the field of hydraulics, fluid mechanics, process technologies and structural design for water works and irrigation engineering.

EDRC provides time bound and cost effective basic and detailed engineering of process, hydraulics, civil, structural, geotechnical, mechanical, electrical and instrumentation, foundation disciplines, under a single roof for water, effluent and sewage systems using latest codes, standards, practices and information technology in this field. L&T’s team of architects provide innovative engineering solutions for cross country water, effluent and sewage transmission systems covering pipelines, underground and above ground, open channels, pumping systems inclusive of optimization studies.
Pump house for 41.9 ml underground reservoir at Nangloi, Delhi

Overhead water storage reservoir at Ramnagaram for Bangalore Water Supply and Sewage Board

Intake well with pipeline for Rishivandhiyan Raw Water Supply Scheme (RWSS) covering 91 habitations in Villupuram District, Tamil Nadu

Intake well and cast iron water lines across hilly terrain for Tamil Nadu Water Supply and Drainage Board project in Nagercoil, Tamil Nadu

Bisalpur - Jaipur Water Supply Project (WSP), the largest integrated WSP project in the country that pumps over 100 km through horizontal split casting pumps with no booster stations between the pipeline spreads
Urban & Rural Water Supply and Distribution Network

The Water Supply & Distribution Segment of WET BU is a one stop solution provider with a single point responsibility covering design, engineering, procurement, project management, project execution, commissioning and operation & maintenance of various urban and rural Water Supply Projects.

In association with many Government Authorities and private organizations, L&T has been planning and executing major water supply projects in the country.

Every single aspect of the water network – right from tapping water from the source through intake well, water treatment, installation of pump house and transmitting it through pipelines and distributing to the end users – L&T does it all with precision.
Treated water reservoir
Water Treatment Plant for Nalgonda
Rural Water Supply Scheme in Andhra Pradesh

View of an above the ground pipeline network

Ground level storage reservoirs at Hogenakkal Water Supply in Krishnagiri District, Tamil Nadu

Aerial view of the 91 MLD Water Treatment Plant for Narmada Canal Distribution Project (NCD-5) in Gujarat

Typical Motor controller center panels
L&T has extensive experience in fabrication, supply and laying of critical pipeline networks with complete protection arrangements. Irrespective of above ground, underground or laying of pipelines on rugged hilly terrains extending to long distances, L&T's cutting edge technology ensures a safe and reliable network.

Various types of pipelines in different sizes up to 3000mm dia have been executed by L&T, covering large geographical areas. Supervisory Control and Data Acquisition Systems (SCADA) has also been installed in some of the major projects to ensure efficient monitoring and control of water distribution networks.
16 MGD Water Treatment plant at Haiderpur for Delhi Jal Board

Clariflocculators at 25 MLD water treatment plant for Tamil Nadu Water Supply and Drainage Board, Pollachi

Cascade Aerator at PABR head works

Filter house with aeration tank for a water supply project in Karnataka

Sai Ganga approach canal for water supply to Chennai city
Water Treatment

Over the years, L&T has gained the expertise and mastered the processing technology for removing all types of contaminants and harmful microorganism from raw water sources and provide potable quality drinking water. L&T’s efforts in providing an array of end-to-end customized solutions for water treatment have been consistently superior. The quality of water and the work executed by L&T at every project has been widely accepted by all organisations and has won the hearts of people and community at large.

Water Treatment - Technology

<table>
<thead>
<tr>
<th>Technology</th>
<th>Capacity</th>
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<tr>
<td>Pulsator technology</td>
<td>400 MLD</td>
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<tr>
<td>Plant for Bisalpur - Jaipur</td>
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<tr>
<td>WSS</td>
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<tr>
<td>Tube Settler</td>
<td>16 MGD</td>
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<tr>
<td>Plant at Haiderpur, Delhi</td>
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<tr>
<td>Rapid Gravity Filter</td>
<td>20 MGD</td>
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<td>Plant at Okhla, Delhi</td>
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Water cistern installed at various villages for water distribution

Treatment plant at Bisalpur

Reactivator clarifier for 120 MLD Raw Water Treatment for IOCL's Panipat Refinery

Water treatment plant at Maddur Water Supply Project near Bangalore
Industrial Water Supply Projects

As the leader in developing and providing water infrastructure in the country, L&T has played a significant role in industrial water supply by executing many reliable industrial water supply projects and meeting customer requirements.

The potential and growth of major industrial centers including Special Economic Zones (SEZ), are dependent on industrial water supply schemes delivered in a commercial format.

The Industrial Large Water Systems segment of Water Treatment & Effluent Business Unit offers varied construction services from concept to commissioning with single point responsibility in the following areas:

- Raw water transmission by constructing intakes in major rivers
- Pre & Post treatment for various industries like power, steel, petrochemical refineries, textile/dying industries leather industries etc.
- Process Water Distribution
- Effluent Treatment and Reuse

Specialized Technologies:
- Conventional Pre Treatment of Raw water
- De-Mineralization
- Ultrafiltration / Micro Filtration
- Reverse Osmosis / Desalination
- Circulating Water Treatment
- Wastewater/Effluent Treatment
- Sewage Treatment

The segment has executed landmark lift irrigation projects schemes comprising of the following components:
- Bulk Water Transmission through Pipeline & Canals
- Lift irrigation schemes on EPC basis
- Related Electro-mechanical & instrumentation works including SCADA system

Industrial Water Treatment - Technology

Deminerlization : 5.7 MLDDM Plant for Sagardighi Plant Water System and 5 MLDDM Plant for Mejia Plant Water System

Reactor Clarifier : 120 MLD Water Treatment Plant at Panipat
Sewage Treatment & Network

Sewage treatment is yet another specialised area of operation in which L&T has a major presence. Several complex projects have been executed using conventional to the latest UASB technology to remove inorganic and organic constituents from influent sewage.

Also, L&T has the capability to execute the most complex underground drainage network for large towns and cities. As a total solution provider, L&T has adopted latest technologies like Micro Tunnelling for waste water network and water treatment facilities with least footprint and energy consumption.

**Water Treatment - Technology**

<table>
<thead>
<tr>
<th>Treatment Type</th>
<th>Details</th>
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<tbody>
<tr>
<td>Upflow Anaerobic Sludge Blanket (UASB)</td>
<td>43.5 MLD Sewage Treatment Plant at Mangalore</td>
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<tr>
<td>Extended Aeration</td>
<td>15 MLD Sewage Treatment Plant at Tirupur and 2 MLD Sewage Treatment Plant for Bangalore International Airport</td>
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<tr>
<td>Aeration</td>
<td>75 MLD Sewage Treatment Plant at Bangalore</td>
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Aerial view of two stage biological treatment in an Sewage Treatment Plant

40 MLD Final Effluent Treatment Plant at Ankleshwar for Bharuch Eco Aqua Infrastructure Limited
Effluent Treatment

L&T undertakes turnkey construction of effluent treatment plants for various industries and ensures effective treatment through state-of-the-art technology, conforming to the standards set by the Pollution Control Boards.

Disposal of treated effluent is another area where L&T has a significant presence. It has not only designed and commissioned the longest effluent disposal pipeline in the country, but also created unique technological breakthroughs in the area of marine pipe installation.

### Effluent Treatment

<table>
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<th>Physico Chemical Process</th>
<th>Common Effluent Treatment Plants at Delhi</th>
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<tr>
<td>Aeration Process</td>
<td>40 MLD Final Effluent Treatment Plant at Ankleswar</td>
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Pipeline on the carriageway in the intertidal zone ready for the final off-shore pull for disposing treated effluent from Vilayut to Gulf of Khambat for Gujarat Industrial Development Corporation (GIDC)

Typical surface aerator

Waste water treatment plant at Mahul for Bharat Petroleum Corporation Limited
L&T has executed many hallmark Lift irrigation project schemes and in the sphere of engineering, procurement and construction of lift irrigation projects, WET BU’s services are on the rise in tune with India’s plans to boost the agricultural output.

Services offered include design and construction of intake wells, overhead tanks, pumping stations, distribution channels and delivery cisterns covering civil, mechanical, electrical and instrumentation works.
Leak Detection & Rectification

In order to decrease the UFW (Unaccounted For Water) and increase the flow in service mains and number of connections in the major towns and cities, several Leak Detection and Rectification works are undertaken by L&T. This unique technique has several advantages vide minimizing loss of precious drinking water, avoiding contamination, maintaining stable pressure and improving tail-end supply.

The Leak Detection and Rectification project in Chennai involved testing of 1400 km of distribution mains, replacement of 500 km of pipelines and 1,70,000 house service connections.

Operation & Maintenance

Operation, control and maintenance is indispensable for a continuous and safe operation of any water infrastructure. L&T’s team favourably responds to this vital need following growing demand from clients and undertakes the operation & maintenance of all types of water supply projects as well as treatment plants.

For the last 15 years, L&T has been taking care of every single aspect of O&M for Sri Sathya Sai Drinking Water Supply Scheme and continues to provide uninterrupted supply of water.
L&T has the end-to-end capability to design and install Supervisory Control And Data Acquisition (SCADA) for different Municipal Corporations of the States and helps them monitor and improve the water supply distribution system through detecting, arresting and reducing the leakages.

The SCADA systems installed by L&T helps the Municipal Authorities to have full information of water parameters like flow, pressure of pipeline laid throughout network from the main control centre. Geographical Information System (GIS), which are extensively used to map the distribution system, enable the pictorial views and also finds the shortest route to manage the disasters.

L&T has the comprehensive capability and experience in executing residential engineering, supply, delivery, erection, testing and commissioning of instrumentation, telemetry and SCADA systems including construction of all associated infrastructure and operations & maintenance. The track record of successful projects implemented in different states reaffirms L&T’s commitment in preserving and managing the precious water resource.
International Projects

The Water and Effluent Treatment Business Unit (WET BU) of L&T Construction has executed water management projects in Gulf countries and Mauritius. Landmark projects executed by WET BU include Sewage Treatment Plant at Wadi Bani Khalid; Water Supply Distribution System in Saham and Khaburah towns; Sewage Treatment Plant and Sewage Network at Willayat Nizwa; Design, supply, construction, testing and commissioning of Waste Water Treatment Plant at Qatar and turnkey construction of 10.8 MLD Water Treatment Plant at Mont Blanc, Mauritius.