BHM

Constructing Infrastructure Since 1984

Water and Sewer Capability Document

www.bhmgroup.com

Our Offering

Our Offering

We understand the important role infrastructure has in helping develop sustainable economies in the Bahamas, across the Caribbean and selected African countries.

We have very much focused on ensuring the products and services we provide for our Infrastructure works are to the highest standard incorporating independent quality and compliance testing.

We also recognise the important role education has and we have a long standing record of recruiting local staff and supporting them through a structured training and education programme. This includes strong links with regional universities and local college, to develop joint partnership in helping train and develop young engineers.

Our offering is to provide a high quality, responsive and customer focused service with a primary goal of providing a safe working environment where safety of the general public, the clients staff and our staff is always first on our agenda.

We specialise in heavy civil engineering projects including major highways, airports and landside marine works. We also have a long term offering to undertake utility works with our earthworks and infrastructure projects.

We are able to demonstrate our quality through independent third party certifications and accreditations. We are ISO 9001 (Quality), ISO14001 (Environment), ISO17025 (Laboratory testing), and ISO 45001 (Safety) accredited.

An essential element of the BHM core business being utility infrastructure works, incorporating both Water & Sewerage Works and the design, build and operate, reverse osmosis plants both seawater and brackish.

Water and Sewer

Reverse Osmosis and Water Distribution

Reverse Osmos - With the ever-increasing requirement for fresh quality drinking water, and the importance of climate resilient measures, BHM has established expertise in the design, construction, maintenance and operation for the installation of both salt water and brackish water Reverse Osmosis Plants, and has carried out a number of projects on both New Providence and the Bahamian Family Islands.

Reverse osmosis, in its basic form, being a membrane treatment process, primarily used to separate dissolved solutes from water (salt or brackish), and is most commonly known for its use in drinking water purification

Water Distribution - BHM provides efficient, effective and environmentally friendly water treatment facilities (RO Plants) and for the distribution of water supply networks in both New Providence and the Family Islands.

We have expertise in the design and construction of water distribution networks, where our experienced teams manage the delivery of complete projects, including procurement, installation, rehabilitating existing utilities and services, testing, commissioning and reinstatement. Our expertise in watermain installation and distribution is built upon a reputation for successfully delivering clean water and having a strong background in providing both cost effective and timely solutions to the benefit and positive experience of Clients and end users.

Water and Sewerage Treatment

BHM Provides efficient, effective and environmentally friendly water and wastewater treatment facilities for the distribution of clean and collection of dirty water supplies.

We have expertise in the design and construction of water distribution and collection systems where our trained teams procure and manage the delivery of complete projects, including procurement, layout, dealing with existing utilities, connecting to existing services, testing, commissioning and reinstatement.

Our experience in the water and sewer industry is built upon a reputation for successfully delivering clean water and wastewater treatment projects and have a strong background in providing the most reliable and cost effective solutions to benefit customers and end users.

Drilling
Teams and Experience

We understand drilling BHM has extensive experience of drilling Drainage, Deep Cooling and Injection Well Construction, and encompass the recirculation drilling method which is particularly advantageous in controlling the flow of water in urban areas. Drilling works are essential with many Water and Sewage Projects.

Drilling Teams and Equipment

Four drilling teams have experience of constructing wells in many types of strata ranging from cohesive to igneous formations, at all times aware of the importance of safety and responsible working methods to respect the local environment and communities.

Our fleet of Atlas-Copco TW2 & TW4 model drill rigs are capable of being used for direct drilling and re-circulation method to depths in excess of 1560ft, with the additional capability to obtain core specimens using rotary drilling.

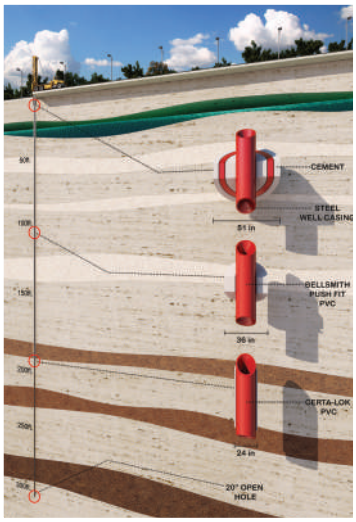
Typical drainage wells construction:
10 inch diameter, 215 ft deep, with PVC liners installed and grouted into place at specified depths, depending of site conditions and client requirements.

All key materials are required to be transported by sea to the island however the laboratory and plant maintains suitable stocks for routine and emergency works.

Drilling Experience

BHM also has widespread experience of deep wells exceeding 660 ft deep and 4 ft. in diameter. These deep wells have strict specification on plumb and alignment, along with other requirements such as:

- Keeping contractual relevant drilling records
- Obtaining and storing samples of strata encountered
- Obtaining and storing ground-water samples
- Obtaining core samples by rotary drilling
- Development of wells to acceptable levels of turbidity
- Water quality analysis
- Commissioning and assisting in the geophysical and flow capacity testing and video surveys.



Recent Successful **Projects**
SWRO Plant and Water Distribution

2.0mgd Salt Water Reverse Osmosis Water Plant

With increased requirement for potable quality drinking water, New Providence Water Development and BHM, commissioned a new Reverse Osmosis and water storage and distribution facility to serve West, New Providence. Designed for continuous operation 24 hours per day, 365 days per year.

The Project included:

- Bulk Earthworks & Site preparation
- Construction of Steel Framed Operations building including administration, maintenance and stores
- RO system including cartridge filters, high pressure pumps, energy recovery equipment and 3# 650mgd trains with clean in place/ flush system
- Carbon Dioxide feed and calcite contactors post treatment
- 1.5mg Glass Fused Storage Tank and pumping facility
- Back Wash facility
- Distribution Pumps
- Primary electrical supply and Back up Generator
- 12 miles of Water Distribution.

Services Provided

- Design, Build and Commission
- Maintenance of Service to Customers
- Fully Automated Plant
- 24 hour, 7 day week operation

Benefits to Customer

- Potable Drinkable Water Quality
- Enhanced customer and client experience
- Single point of contact for client team

South Andros RO Plant

The contract for the design, build, own and operate a containerized 30,000 imperial gallon per day (igpd) Seawater Reverse Osmosis Plant at Kemp's Bay, on the family island of South Andros, Bahamas

The contract was inclusive of a guaranteed delivery of 147,000 imperial gallons per week (21,000igpd), the requirement to meet World Health Organization (WHO) guidelines for potable water, distribution watermains and pumps, multi-stage VFD's), a full stand-by generator, a glass infused 100,000 imperial gallon storage tank, two number feed wells, one disposal well and associated pipework and electrical distribution.

Grand Bahama RO Plant

A Contract for the design, supply and installation of six (6) number Containerized Brackish 500kUSgpd Each Reverse Osmosis Systems with Accessory Equipment at Well Field 6, Distribution Station on the Grand Bahama Highway

Works included for:

- Design Engineering and Preparation of Contract Documents.
- Site Preparation.
- Supply and Installation of Six (6) Containerization. S00KGPD BWRO Systems, designed for S,000mg/1
- TDS Design Point with upgraded HP Pumps and VFDs, (6) Feed Booster Pumps and Starters, Six (6) LV Transformers for power distribution within the BWRO containers and Six (6) Automatic Valve inlets.
- One (1) CIP System and Storage Area
- Pipework infrastructure from Feedwater location to BWRO units, to disposal well and to storage tank.
- Earthing for BWRO plant.
- Brine well with associated pipework.
- 100,000G Feedwater buffer tank with pump.
- Water blending system inclusive of Control valves, Conductivity indicating transmitters, to Master control.
- Level indicators at existing Storage tanks wired to Master Controls.
- Master control including instrumentation for conductivity (blending) regulation and RO on/off management.
- Three (3) Standby Generators (200,350, and SOOKW) with ATS and 24HR UL 142 Base tank for the Well fields.

Recent Successful **Projects**

Water Distribution Mains

- funded by Caribbean Development Bank, on family islands of the Bahamas


BHM were appointed to design, construct and commission, water potable water distribution systems on several family islands in the Bahamas, including booster pumping stations, approximately 48 miles of water main (HDPE & PVC), over 855 laterals and roadway reinstatement.

- 48 miles of new water main
- Laterals and meter boxes
- Pumping & Booster Stations
- Traffic Management
- Associated WSC specified details and appurtenances
- Roadway Reinstatement
- Compliance with Environmental and Climate Control Requirements

MAIN WORKS BEING:

Long Island Lots 1&2 – Design & Install Lot 1

- Design Engineering
- 6” C 900 PVC pressure pipe 36,800 ft
- 4” C 900 PVC pressure pipe 11,260 ft
- 2” C 900 PVC pressure pipe 8,900 ft
- 74# Junction connections
- 240 service laterals & meter boxes
- 43,000 ft on roadway reinstatement
- New Booster Station
- Testing & commissioning



Lot 2

- 4” C 900 PVC pressure pipe 26,000 ft
- 2” C 900 PVC pressure pipe 14,700 ft
- 60# Junction connections
- 120 service laterals & meter boxes
- 30,000 ft on roadway reinstatement
- Testing & commissioning

San Salvador lot 1 - Install

- 4” C 900 PVC pressure pipe 36,500 ft
- 2” C 900 PVC pressure pipe 14,600 ft
- 46# Junction connections
- 220 service laterals & meter boxes
- 80,000 ft on roadway reinstatement
- Testing & commissioning

Long Island Lots 3&4 – Install Lot 3

- 4” C 900 PVC pressure pipe 22,000 ft
- 2” C 900 PVC pressure pipe 5,500 ft
- 29# Junction connections
- 80 service laterals & meter boxes
- 5,000 ft on roadway reinstatement
- New Booster Station
- Climate Resilient measures - Anchor blocks and increased excavation & backfilling in high risk areas
- Infrastructure works for new Ro plant
- Testing & commissioning

Crooked Island Lot 1 - Install

- 4” C 900 PVC pressure pipe 18,500 ft
- 2” C 900 PVC pressure pipe 5,800 ft
- 326# Junction connections
- 75 service laterals & meter boxes
- 5,475 ft on roadway reinstatement
- Climate Resilient measures – Anchor blocks and increased excavation & backfilling in high risk areas
- Infrastructure works for new Ro plant
- Testing & commissioning


Long Island Lots 3&4 – Install Lot 4

- 4” C 900 PVC pressure pipe 15,000 ft
- 2” C 900 PVC pressure pipe 25,000 ft
- 30# Junction connections
- 100 service laterals & meter boxes
- 3,150 ft on roadway reinstatement
- Climate Resilient measures – Anchor blocks and increased excavation & backfilling in high risk areas
- Testing & commissioning



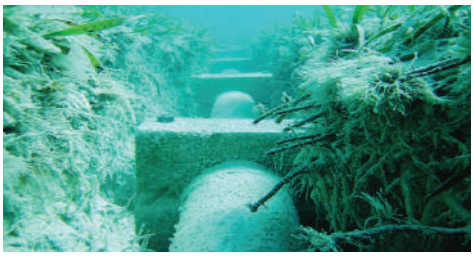
Recent Successful **Projects**

Green Turtle Cay – Subaqueous Pipe

The Water and Sewerage Corporation (WSC) awarded BHM the Contract for the implementation of water supply improvements in Great Abaco Island and Green Turtle Cay in The Bahamas.

The Works included: Approximately 15,000 linear feet of water transmission main, of which approximately 13,000 linear feet are subaqueous 6" HDPE and 2,000 lf of 6" PVC, along with all associated valves and appurtenances, a Pumping station, including two 250 US Gallon per Minute, 15 Horsepower Peerless (Sterling) pumps, an Access Road and drainage culvert, Tank Drain for existing 100,000 Imperial Gallon storage tank, Fuel Storage, Piping, pump station facility/office building and storage tank.

Services Provided:



- Value Engineering
- Experience of Construction of deep wells in all strata
- Liaison with stakeholders, users and local residents
- Consideration of local environment and relocation of existing facilities
- Recirculating Drilling Operation

Site Civil and Entry Lake

The Installation of utility services, potable water, storm water, drainage, sanitary sewer, reclaim water, gas, electrical distribution, external lighting. New car parking areas and roadways, Hard landscaping, decorative sidewalks, including the construction and drilling of 54 Standard W&S drainage wells.

Services Provided:

- Risk management
- Value engineering
- Asphalt and concrete Design
- Consideration of local environment

Recent Successful **Projects**

National Sporting Complex

The construction of infrastructure works for the National Stadium including, 4 Major roadways, 4 Major junction improvements, Stadium parking areas with ancillary works, Water, Sewer and drainage installation, including the construction and drilling of 29 Standard W&S drainage wells, landscaping, & the Upgrade of the existing waste water treatment plant

Services Provided

- Risk management
- Value engineering
- Special design of surfacing materials for Sporting Association compliance
- Asphalt and concrete design
- Liaison with stakeholders, users and approved associations
- Consideration of local environment and relocation of existing facilities

Benefits to client (MOW&T):

- Single point of contact for stakeholders and Client
- Impact of the works on existing users addressed
- Integrated team working collaboratively with the Client and Stakeholders
- Ability to react promptly to the requirements of the specialist associations
- Innovative solutions proposed and agreed with specialists

Sea Water Test Wells

Contract to Construct, develop and test, Production wells to a drilled depth of 810 ft, and a cased depth of 580ft, and Injection Wells to a drilled depth of 400 ft and a cased depth of 200ft. The design capacity for the Production and injection wells being 11,500 gpm. to AWWA, ASTM, ANSI and API Standards.

Services Provided:

- Full Construction, Development, Testing and construction

Benefits to client (CCA Ltd):

- Environmental solution for the production and operation of chilled water cooling system.

Water Main Upgrade

The Contract for the Replacement of the existing Galvanized & Cast Iron Water main with approx. 55,000 lf of HDPE, fittings and laterals within the luxury community of Lyford Cay.

Services Provided:

- Replacement of existing Galvanized and Cast Iron Pipework

Benefits to client (NPWDCo):

- HDPE Pipework
- Improved Water Drinking Quality

Recent Successful **Projects**

Injection and Cooling Wells

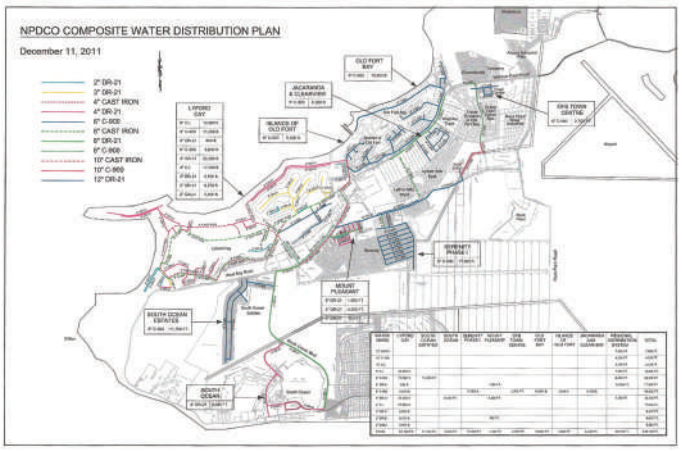
Contract to Construct, develop and test, Production wells to a drilled depth of 700 ft, and a cased depth of 500ft, and Injection Wells to a drilled depth of 400 ft and a cased depth of 200ft. The design capacity for the Production and injection wells being 8,000 gpm. To AWWA, ASTM, ANSI and API Standards, for new Chilled Water Plant.

Services Provided:

- Full Construction, Development, Testing and construction.

Benefits to client (Bahamar & DTEC):

- Environmental solution for the production and operation of chilled water cooling system.



Western New Providence - Water Production, Distribution & Waste Collection

BHM are co-owners of NPWDCO which has the Water & Sewer franchise for western New Providence. Our standard, to improve water quality production and distribution.

- Owning and operating a 25 year franchise for the production and distribution of water, including the construction of a 1.3m GPD Salt Water Reverse Osmosis Plant and the replacement of an aging Galvanized and Cast iron distribution system, with 55,000 lf of new HDPE pipe to ensure water quality and consistency, together with the construction of a new 375,000 GDP Waste Water Treatment Collection Plant.

Fire Main Upgrade

The Contract for the Installation of 3,460lf of 16”HDPE & associated fitting, within a live Oil Refining Facility.

Services Provided:

- Demolition of 3,500 feet of existing steel pipeline
- Installation of new 16’’ HDPE buried pipe line without disrupting the functionality of the fire system and the entire facility
- Installation of stub outs for 17 foam fire suppression hydrants

Benefits to client (BORCO):

- Replacement of above ground pipe line with more protected below ground pipes.
- Bigger diameter of new pipes ensures higher capacity of the fire suppression system
- Project was phased in order to maintain the operation of the fire suppression system, minimizing at each step the section taken off the line.

AIP WWTP

Construction of a new 375,000 GPD Waste Water Treatment Plant, including Sludge Drying Beds, Leachate Pumping Station, Laboratory Building, Site Work, Grading and Accesses, Disposal Wells, Yard Piping, Valves and appurtenances for WWTP operation, Gravity Sewer, Water mains, Electrical Installation, Lift Station & Standby Generators.

Services Provided: • Experience of Construction of deep wells in all strata • Liaison with existing local businesses and utility Companies • Recirculating Drilling Operation

Recent Successful **Projects**

Nassau Road Improvement

The Rehabilitation of 11.6 miles of existing & new roads, Kerbs and drainage,

including the drilling and construction of 38 Standard W&S drainage wells and 11,320 lf of 24" C900 diameter water main in live traffic and urban environment.

Services Provided:

- Risk management
- Value engineering
- Design management of surfacing materials
- Paving and concrete works
- Watermain and chamber Installation
- Working in urban corridors
- Asphalt and concrete design
- Liaison with existing local businesses, homeowners and motorists
- Consideration of local environment and traffic management

Recent Successful **Projects**

West Bay Street and C7 Realignment

The Realignment of Existing West Bay Street and the construction of the new C7 corridor.

The Works included: 10,350 lf of 20" & 24" C900 diameter water main, 5,350 lf of 20" & 24" C900 diameter Sewer force main and 5,690 lf of 15" and 30" C900 diameter Drainage, Electrical Installation, and the construction and drilling of 10 Standard W&S drainage wells.

Services Provided:

- Coordination with utility companies to manage risk to existing utilities
- Value engineering options in choice of utility materials
- Minimizing disruption to road users, residential communities, and existing hotels & Patrons
- Integrated team working closely with Client team
- Bulk Earthworks
- Infrastructure Utility works, Water, Sewer & Sewer Lift Stations, Drainage & Drainage Wells, Electrical Installations
- Paving & Concrete works

Quality and **Product Testing**

We are committed to being an industry leader in material and product testing and providing value engineering options.

With our in house quality management system and independent quality testing our clients can be confident of receiving the highest standards of material testing and product specification at all times.

We are able to demonstrate our quality through independent third party certifications and accreditations. We are certified in ISO9001, 14001, 17025 and 45001

Our People
and Local Staff Recruitment

Over the years we have developed a highly professional team of very experienced project managers, engineers, material engineers, commercial managers and quantity surveyors. Most of our team is long serving members of the Company who are willing to travel with the company and train local recruits in the skills needed.

At BHM we value our commitment to staff development, training and graduate sponsorship; we recognize that training and development is essential for all our staff and new recruits to:

- supporting them in their job roles;
- improve performance and client satisfaction;
- develop the skills necessary for the future of the business;
- provide promotional opportunities and succession planning.

We believe that learning and development is essential. This is supported by numerous internal training courses.

Local Community
Involvement

Wherever BHM is working we are always proud to work with the local communities.

We look to support charitable projects within the areas we work. This support is not just by financial donations but by utilizing or experienced workforce and machinery. This gives BHM the opportunity to train local volunteers with new skill that they can use after we have left their local area

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Quality is Assured

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providing infrastructure and construction solutions since 1984