

**TECH MEMO 6 – PLANT CONTROL AND INFORMATION SYSTEM**



## **Technical Memorandum No. 6 – BODR City of North Miami Winson WTP Plant Control and Information System**

To: Distribution  
From: Hazen and Sawyer, P.C.  
Date: November 2012

### **Preamble**

A total of nine Technical Memoranda (TM) comprise the Basis of Design Report (BODR) for the Winson Water Treatment Plant BP 3 WTP Rehabilitation Project. Work on these TMs was initiated with a Kick-off Meeting on May 31, 2012. However, on October 24, 2012 the City authorized Hazen and Sawyer to proceed with revisions to Technical Memoranda to include newly acquired City property located adjacent to the northeast perimeter of the Winson WTP into the BODR. This direction necessitated the relocation of proposed Administration Building from the northwest to the southwest corner of the WTP site, and that the proposed 2.5 MG Water Storage Tank, in the southwest corner of the site was replaced with two 1.25 MG Storage Tanks to be located on the new City property. In addition, the City also requested that the Administration Building conceptual floor plan be revised to further increase the size of the Emergency Operations Center (EOC), as well as provide a dedicated EOC access to the planned Observation Deck. These requests impacted six of the eight TMs, which were either nearly complete or already accepted by the City, as well as required the development of a new Bid Package 4 to address the construction of the two 1.25 MG water storage tanks and appurtenant improvements on the City acquired land.

As a result, the following TMs will be revised, with original versions of the TMs included as Appendices to the Basis of Design Report.

- ◆ TM 2 – On site Raw Water System Improvements: Revise to reflect the new Administration Building and Storage Tank location and their impacts on Well No. 2.
- ◆ TM 4 – Proposed Process Improvements – Revise to address changes to noted site layout as well as process impacts required for operation of the WTP with only the existing 0.75 MG Storage Tank until the two new 1.25 MG Storage Tanks are constructed on the newly purchased land.
- ◆ TM 5 – Proposed Administration Bldg – Revise to reflect City request for a larger EOC with dedicated access to the observation deck. Also requires site layout and additional parking revisions
- ◆ TM 6 – I/C System – Revise to address changes to noted site layout as well as impacts to proposed PLC locations.

- ◆ TM 7 – Electrical Improvements – Revise to address changes to noted site layout as well as impacts due to new location of electrical room on generator ductbank and site feed ductbanks.
- ◆ TM 8 – Site Improvements – Revise to address changes to noted site layout as well as impacts to previously proposed stormwater management plan

Note that this TM 6 represents a REVISION to the City approved TM 6 – PRE-FINAL version dated September 24, 2012.

## 1.0 Purpose

The City of North Miami owns and operates the Winson Water Treatment Plant (WTP), a conventional lime softening facility with a permitted capacity of 9.3 mgd. The WTP treats raw water from the Biscayne Aquifer and serves areas within the City limits as well as the Village of Biscayne Park, portions of Golden Glades, Westview, Pinewood, and surrounding areas of unincorporated Miami-Dade County. Potable water is supplied from the Winson Water Treatment Plant (WTP) and interconnects with the Miami-Dade County Water and Sewer Department (MDWASD), providing approximately 8.5 mgd AADF and 4.5 mgd AADF to users respectively. The WTP was constructed in the early 1960s.

In 2007 the City prepared a report titled Winson Water Treatment Plant Expansion Feasibility Study (Feasibility Study) indicating that the existing lime softening treatment system and Biscayne Aquifer wellfield infrastructure were at or near the end of their useful life. Based upon subsequent on-site observations and discussions with City staff, H&S generally concurred with the recommendations of the Feasibility Study. To this end, the City has determined that WTP facilities should be rehabilitated to ensure continued reliability through the year 2030. Due to budget constraints, expansion of the treatment capacity is currently on hold. Bid Package 3: WTP Rehabilitation Project (BP 3) proposes to rehabilitate existing WTP unit processes throughout the facility while maintaining the existing treatment capacity fixed at 9.3 mgd.

The existing WTP instrumentation and control (I/C) system was placed into operation in the early 1960's. With the exception of certain key processes and related monitored parameters, existing field instrumentation and associated panels are over 15 years old, with many components no longer operational, and generally both physically and functionally obsolete. To this end, a new open architecture, distributed Programmable Logic Controller (PLC) based system designed to service the entire WTP will be implemented under the scope of the BP 3 Project.

The purpose of this TM is to establish proposed design criteria for the Distributed Control System to be installed at the Winson WTP under the scope of the BP 3 Project. Issues to be considered include:

- ◆ Identification of necessary automation levels.
- ◆ The extent of local and remote control capabilities to be provided.
- ◆ Operator work station locations.
- ◆ Integration of existing and proposed control system components.

Note that this TM No. 6 is one of a series that addresses the scope of the BP 3 Project improvements. The reader should reference TM No. 1 – Existing Facilities, TM 3 – Structural Evaluations and Improvements, TM No. 4 – Proposed Process Improvements, TM No. 5 - New Administration Building, and TM No. 7 - Electrical System Improvements, as applicable.

## 2.0 Background

Digital monitoring and control systems are recognized as the state of the art approach to implementation of the data gathering tasks necessary for proper operation of utility facilities. A review of distributed control technology over the past two decades indicates that monitoring systems have continuously upgraded from hardwired to digital based installations. The major advantages of distributed digital systems include:

- ◆ Significantly reduced wire runs resulting from the elimination of individual wiring between remote monitoring elements and their centralized analog control panels.
- ◆ Elimination of panel mounted electromechanical recording devices.
- ◆ Automation of routine data reporting.
- ◆ Prompt access to current and historical information.
- ◆ Facilitated planning, cost control and regulatory agency reporting at the plant management and/or Public Works Administration levels.
- ◆ Replacement of large, expensive “mimic” panels that require timely modification in case of process changes with more user-friendly interactive computer display screens and touch panels.

In addition, as significant advances have occurred in the development of personal computer (PC) industry hardware and software capabilities, new control systems are based on an “open architecture” that can be easily maintained and tailored to meet specific needs of the user without dependence upon a single vendor for long term support. These modern systems typically utilize a distributed control concept in which rugged microprocessor based controllers, referred to as Programmable Logic Controllers (PLCs), are installed within remote equipment panels at key locations throughout a facility, to locally monitor and control equipment and processes. Where information needs to be exchanged between different areas of a plant, a fiber optic data highway is used to interconnect the various PLCs into a network. A main operator console at the main Control Room, consisting of one or more personal computer workstations, is provided for process coordination, status monitoring, report generation and operator intervention. These types of PLC based distributed control system installations have become a standard in the utility industry.

The principal advantage of computerized monitoring and control systems is their ability to quickly and efficiently collect information for process control, as well as long term facilities management and administrative functions. Real-time data, including flows, levels, pressures, status monitoring and alarm functions, are generally presented in graphical form to enable the operator to quickly respond to process changes and events. Historical data is maintained in an internal database to support real-time system functions. These include trending and status displays, as well as open database connectivity (ODBC) software protocols such as Microsoft Excel, Access and SQL Server for flexible internal and regulatory report generation functions.

### 3.0 Existing Facilities Overview

The existing WTP system consists of a limited number of local control and alarm annunciation panels located in the filter pipe gallery and Electrical Room No. 1. In addition, a central monitoring and annunciation panel is located on the second floor of the Filter Building, which currently serves as the main operator control room. With the exception of certain key processes and related monitored parameters, existing field instrumentation and associated panels are over 15 years old and obsolete. Exhibit 6-1 presents a tabulation of existing instruments to remain in service and be integrated into the proposed control system. Note that instruments to be installed under the BP 1 Filter Rehabilitation Project are included in this tabulation as they are assumed as existing at the time of BP 3 design. Existing instruments to be replaced under the scope of the new Project are listed based on Operations staff input.

### 4.0 Proposed Improvements

As discussed above, it is recommended that a new “open architecture” type distributed PLC based distributed control system be installed as a part of the BP 3 Project.

System Block Diagram: A block diagram of the proposed distributed control system is attached as Exhibit 6-2. Principal elements of the system are discussed below:

- ◆ Field Instrumentation – Where appropriate, non-functional field instruments will be repaired and/or replaced and new instrumentation will be provided for enhanced process monitoring and control capabilities. Intelligent sensors, motorized valves and variable speed drives with on-line diagnostics and network communications capabilities will be utilized to increase reliability and reduce conduit and wiring costs.
- ◆ Area Controllers – New termination cabinets and PLCs will be furnished as shown on Exhibit 6-3. Each PLC will serve as the interface between field instrumentation and the proposed Ethernet data highway, to provide automatic and remote control functionality. Motor control center and existing equipment control panel circuitry will be furnished, installed and/or modified as necessary to provide local HAND/OFF/AUTO and ON/OFF control capabilities at equipment starters or panels as necessary.
- ◆ Ethernet Data Highway - A redundant Ethernet fiber optic network is proposed to interconnect all Programmable Logic Controllers (PLCs). The fiber optic network will be composed of compact managed rail mounted Fast-Ethernet switches, based on the international IEC62439 standard and installed in a Parallel Redundancy Protocol Ring topology. This design ensures an uninterruptable data communication system.
- ◆ Proposed PLCs for BP 3 Project – The City directed the use of Allen Bradley PLCs on the BP 1 Filter Rehabilitation Project. Therefore, their continued use on the BP 3 Project is necessary to ensure system wide compatibility.
- ◆ Existing Lime Slaker PLC Compatibility - The existing lime slaker PLC is manufactured by Direct Logic, and is not compatible (no peer-to-peer communication) with the proposed Allen-Bradley PLC units, as each manufacturer uses its own version of industrial Ethernet protocol. Based on final direction from the City regarding the additional slaker (requested under TM 4), either one or two new slakers will be

furnished and installed under the BP 3 Project. If the City chooses to proceed with the two new slaker option, the design will be based on two new Allen-Bradley PLCs connected to the redundant Ethernet ring. If the one new slaker option is selected, the new slaker Supplier will be required to provide Allen-Bradley PLCs for both the new unit as well as to replace the existing Direct Logic PLC. This approach will allow for full integration with the redundant Ethernet network ring under any slaker supply approach.

- ◆ Plant Control Room – The second floor of the new Administration Building will house the Plant Control Room. The main console/network rack will include two redundant Supervisory Control and Data Acquisition (SCADA) servers that will continuously scan the area controllers and one network (historian) server. One SCADA server will be designated as the primary unit, with the other serving as backup. Information contained on these units will provide plant data to all operator workstations. The operator workstation will be configured to send aggregate process data and manually entered laboratory data to the network storage server (historian file server) for historical record keeping and engineering staff internal web server access. In addition, the Control Room will also house two PC based operator workstations with color graphic interface capability for process monitoring, adjustment, trending and alarming.

SCADA Software System: The City currently owns and operates an Emerson OpenEnterprise SCADA software package for telemetry monitoring twenty-seven of a total forty-six wastewater collection lift stations. The system is housed in the first floor Operations Office of the existing Filter Building. As future WTP operations will be based in the new Control Room of the proposed Administration Building, the City has requested that this existing WW Telemetry System be relocated to that facility. In addition, the City reports that it plans on adding telemetry monitoring capabilities to the six off-site raw water wells at a future date.

Compatibility of the proposed WTP distributed control system software to the planned raw water wellfield telemetry system is critical, as proper harvesting and storage of wellfield data is key to successful operational control and reporting. To this end, two alternative approaches regarding the integration of proposed WTP distributed control system software with the planned raw water wellfield SCADA system, as well as the existing WW Telemetry System, have been identified for City consideration.

- ◆ Alternative 1 Sole Source Current Software: Pre-negotiate a cost with Emerson for installation of the OpenEnterprise software package to function as the base software for the planned WTP distributed control system, and future Raw Water Wellfield SCADA System.
- ◆ Alternative 2 Open Bid to Pre-Selected Suppliers: Prepare contract documents that allow alternative SCADA software suppliers, including Emerson, Rockwell FactoryTalk, GE Proficy iFIX, Iconics Genesis64 or Schneider Electric Citec, to function as the base software for the planned WTP distributed control system, and future Raw Water Wellfield SCADA System.

All Suppliers offer proprietary software products. However, Emerson software requires proprietary Emerson hardware. In contrast, the other named Suppliers can properly operate with almost any hardware available on the market. Therefore, proceeding with Alternative 1

avoids compatibility issues between the existing WW Telemetry System and the proposed WTP distributed control and Raw Water Wellfield SCADA systems. However, it commits the City to the use of Emerson software, hardware and repair / programming services on a continuous basis. If the approach is selected, the price of the software, including installation and configuration would be pre-negotiated with Emerson and included in the contract documents to ensure a fair and equitable procurement process. If the City chooses to proceed with Alternative 2, the WTP distributed control software system would be competitively bid, furnished and configured by any of the noted system integrators. Under this approach, the same software must then be used for the Raw Water Wellfield SCADA system to ensure compatibility with the WTP distributed control system. However, the City would not be committed to the ongoing use of proprietary hardware and repair / programming services, as any number of system integrators are qualified to service both software and hardware components of such a system. The City's ultimate direction will be incorporated into the Final Design documents accordingly.

Historian and Report Generation: The SCADA software will be furnished with historian and report generation capabilities. Any data that is monitored can be used to generate operational or regulatory reports. Samples of required reports, including daily, monthly, quarterly and yearly versions of water withdrawal, production, chemical usage, water purchases, disinfection (CxT), and the Public Water Systems Practicing Fluoridation Report will be included in the contract documents for development by the system integrator. Reports shall be populated automatically, except for Laboratory data which is to be manually entered as agreed with the City.

I/C System Functionality: The physical and functional distribution of control and information system elements will be designed to parallel the needs of WTP operations and administrative staff. A summary of proposed real-time and historical database information management functions to be made available by site location is presented in Table 6-1.

**Table 6-1  
Database for I/C System  
Functionality Locations Proposed**

Functional Description	Local Touch Panels (LCD)	Administration Building Control Room	Historical File Server	
			Lab	Administration
Real Time Monitoring				
Process	X	X	X	
Alarm Acknowledgement	X	X	X	
Historical Data Management				
Alarm Logs			X	
Shifts / Daily Reports			X	X
Monthly Reports			X	X
Lab Data Management			X	
Long-term Historical Data			X	X
Facilities Management				X
Office Automation				
Word Processing			X	X
E-Mail			X	X

Operations and administrative staff access to the data maintained on the server will be tailored to meet the specific needs of the City during the detailed design phase of the BP 3 Project.

Upon completion of the instrumentation and control system installation, plant monitoring and operation functions will be centralized at the new Administration Building Control Room. PLCs will monitor the process and provide automatic and remote control capabilities. The various operator work stations will provide the operations staff with the following monitoring and control capabilities:

- ◆ Equipment Status Monitoring
- ◆ Process Status and Trending
- ◆ Alarm Management
- ◆ Remote Manual / Automatic Control Selection
- ◆ Adjustment of Process Options
- ◆ Shift / Daily Report Preparation
- ◆ Manual Data entry and Reporting

Existing Filter Controls: A new filter control system is being installed under the Bid Package 1 (BP1) Filter Rehabilitation Project. That system will include a local control panel with an Allen-Bradley PLC and a touch screen Operator Interface Terminal (OIT). The filter control logic will be modified under BP 3 to accommodate the new backwash supply pumps.

Proposed Chemical Handling Controls: The existing WTP chemical system includes Sodium Hypochlorite, Aqueous Ammonia, Fluoride and Coagulation Aid feed facilities. All chemical metering pumps are controlled manually. As discussed under TM 4 – Proposed Process Improvements, chemical handling facilities for ammonia, fluoride and coagulant aid will be relocated to the existing High Service Pump Station area, which is being abandoned and replaced by the proposed Master Pump Station. The Hypochlorite Facilities will remain at their current location. All metering pumps will be replaced and wired to a PLC for remote monitoring and control.

Existing Lime Facility: The one existing slaker unit is controlled by a Direct Logic Model 205 PLC and OIT located in existing Electrical Room 1. The system will be upgraded as discussed under TM 4 – Proposed Process Improvements. The new system will consist of two slakers with controls that will be wired to their respective PLC for remote monitoring and control.

Wellfield Pumps: The existing WTP wellfield is composed of two (2) on-site wells (Well Nos. 1 & 2), and six (6) off-site wells (Well Nos. 3 through 8). The proposed control system will interface with the existing on-site wells via hardwired connections. The six off-site wells are proposed to interface with the new WTP distributed control system as installed under a separate project.

Process Area Numbering Conventions: To facilitate proposed WTP upgrade design, a numbering system for equipment and instruments in major process areas was developed based on a 5-digit code as presented in Table 6-2.

**Table 6-2  
Proposed WTP Process Area  
Numbering Conventions**

PROCESS AREA DESCRIPTIONS	AREA NUMBER AND I/C DESIGNATIONS
<b>Raw Water</b>	<b>1</b>
Raw Water Pumping	11XXX
<b>Treatment</b>	<b>2</b>
Aerator	21XXX
Accelator	22XXX
Lime System	23XXX
<b>Filtration</b>	<b>3</b>
Backwash and Transfer Pump Systems	30XXX
Filter No. 1	31XXX
Filter No. 2	32XXX
Filter No. 3	33XXX
Filter No. 4	34XXX
Clearwell	35XXX
<b>Pumping, Storage and Distribution</b>	<b>4</b>
Storage Tanks	41XXX
High Service Pumps	42XXX
Distribution System	43XXX
<b>Chemical Process and Disinfection</b>	<b>5</b>
Hypochlorite System	51XXX
Fluoride System	52XXX
Coagulation Aid System	53XXX
Ammonia System	54XXX
<b>Residuals Handling</b>	<b>6</b>
Waste Sludge Storage and Pumping	61XXX
Decant Pumping	62XXX
<b>General Building Systems</b>	<b>7</b>
Electrical Switchgear, MCCs & Primary Power	71XXX
Backup Power Systems (generators, fuel)	72XXX
Compressed Air Systems	73XXX
Building HVAC Equipment	74XXX

Based on these numbering conventions, a preliminary listing of proposed WTP instrumentation is attached as Exhibit 6-4.

WTP Security System: Monitoring and control of the existing site security (Pelco DX 8100 Series) and access gate control (Keyscan Access Control System) systems will be relocated from the first floor Operations Office at the existing Filter Building to the Plant Supervisor Office to be located on the second floor of the new Administration Building. Existing cameras are reported to be in good condition and will be augmented with additional cameras to monitor the rehabilitated filters, and as otherwise requested by the City. Access gate keypad panels will be replaced and wired to the Control Room at the new Administration Building.

Door security readers and associated magnetic door locks will be provided to control access to select Administration Building areas.

Communication System: Plant staff reports that the existing telephone system is not reliable. Review of the system indicates that telephone demarcation is located within the filter gallery. The phone utility provider has indicated that these service issues are mainly due to poor grounding and high humidity in the filter gallery area. In addition, existing internet service is not reliable and communication with City Hall is frequently down. To address these issues, service entrances for these utilities will be relocated to the new Administration Building. As the existing WTP, SCADA and City networks are interconnected; two separate networks are proposed to separate process SCADA from the City/Internet management network, to provide a more reliable and secure network.

Lightning Protection: Lightning protection is of critical importance in South Florida. To this end, the new distributed control system will be furnished with transient voltage surge suppression devices at the following locations:

- ◆ All connections between AC power and electronic equipment, including panels, assemblies, and powered instrumentation.
- ◆ All indoor and outdoor PLC termination points including analog inputs, analog outputs, discrete inputs and discrete outputs.
- ◆ All analog or electronic instrument signal termination points local to field instruments.

Construction Sequence: Reference TM No. 9 for details regarding proposed BP 3 Project construction sequencing requirements.

## 5.0 Preliminary Opinion of Probable Project Cost

The estimated construction cost of the proposed Plant Control and Information system is \$475,000 based on an estimated PLC Input/Output (I/O) count of 500, control panels, servers, operator workstations, software, programming, instruments and fiber optic cable installation.

### *Attachments*

*Distribution:*

A. Ghany  
W. Pierre-Louis  
P. Vida  
B. Vidal  
T. Carney  
L. Amaral  
J. Broad

c: G. Brown  
File 44238-004 / 1.2



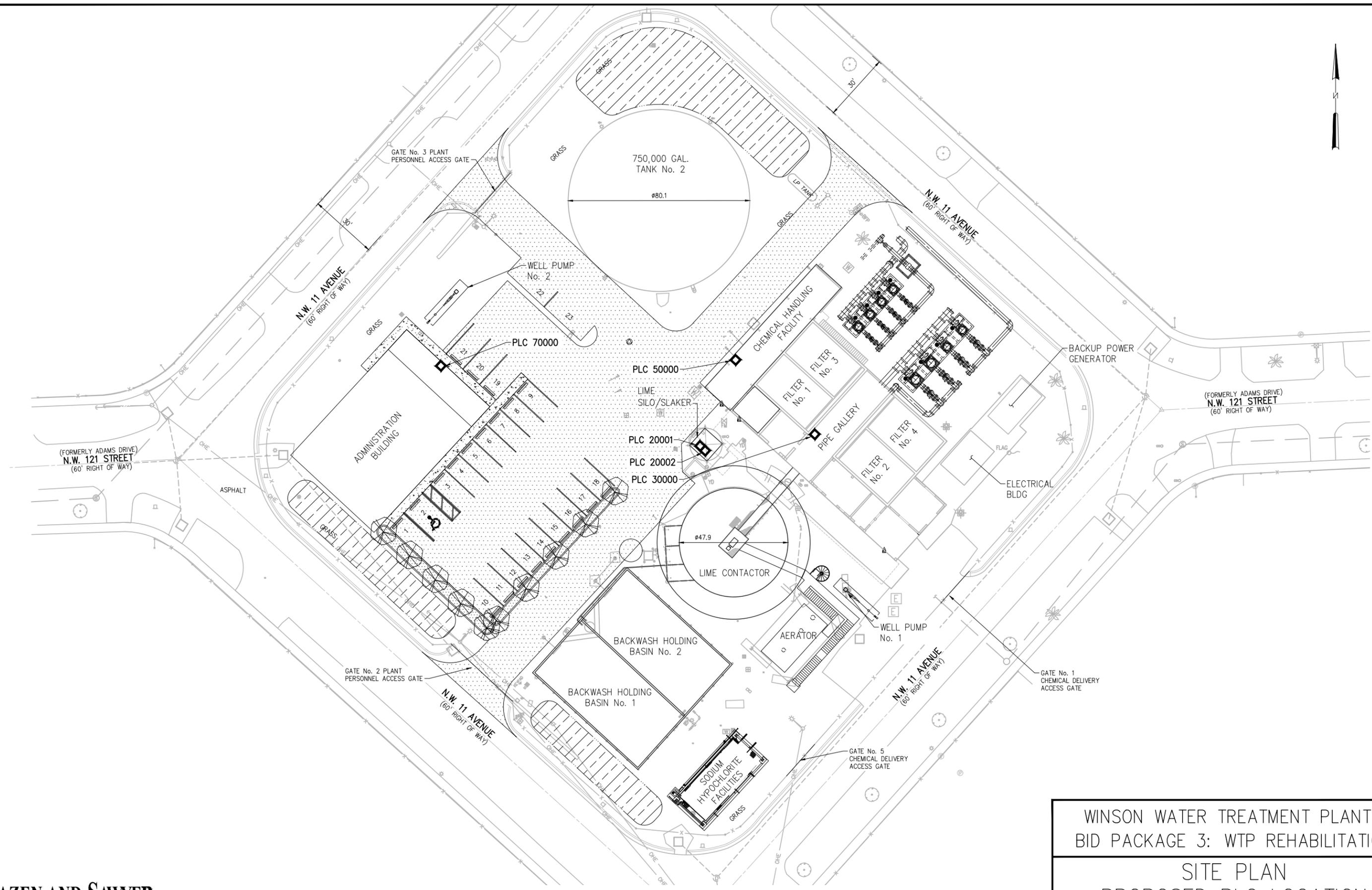
**Exhibit 6-1  
Existing Instruments to Remain in Service**

Existing Instrument Name	NOTES
Total Influent Raw Water Flowrate Indicating Transmitter	Existing to Remain
Well No. 1 Raw Water Pump Discharge Flowrate	Existing to be replaced BP3
Well No. 2 Raw Water Pump Discharge Flowrate	Existing to be replaced BP3
Lime Silo Level Indicating Transmitter	Existing to be replaced BP3
Filter Influent Level Transmitter	Furnished under BP 1
Filter No. 1 Level	Furnished under BP 1
Filter No. 2 Level	Furnished under BP 1
Filter No. 3 Level	Furnished under BP 1
Filter No. 4 Level	Furnished under BP 1
Clearwell Level	Furnished under BP 1
Filter No. 1 Effluent Flow	Furnished under BP 1
Filter No. 2 Effluent Flow	Furnished under BP 1
Filter No. 3 Effluent Flow	Furnished under BP 1
Filter No. 4 Effluent Flow	Furnished under BP 1
Filter No. 1 Product Water Turbidity	Furnished under BP 1
Filter No. 2 Product Water Turbidity	Furnished under BP 1
Filter No. 3 Product Water Turbidity	Furnished under BP 1
Filter No. 4 Product Water Turbidity	Furnished under BP 1
Filter No. 1 Headloss	Furnished under BP 1
Filter No. 2 Headloss	Furnished under BP 1
Filter No. 3 Headloss	Furnished under BP 1
Filter No. 4 Headloss	Furnished under BP 1
Storage Tank No. 1 Level Indicating Transmitter	Existing to be replaced BP3
Storage Tank No. 2 Level Indicating Transmitter	Existing tank to be demolished
Plant Distribution Pressure Indicating Transmitter	Existing to be replaced BP3
Plant Distribution Flowrate Indicating Transmitter	Existing to be replaced BP3
Finished Water Turbidity	Furnished under BP 1









WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 SITE PLAN  
 PROPOSED PLC LOCATION  
 EXHIBIT 6-3



**Exhibit 6-4  
Proposed Instrument List Preliminary**

<b>ID Number</b>	<b>Instrument Name</b>	<b>NOTES</b>
<b>1</b>	<b>Raw Water</b>	
FIT 10000	Total Influent Raw Water Flowrate Indicating Transmitter	Existing to Remain
PIT 11001	Well No. 1 Raw Water Pump Discharge Pressure Indicating Transmitter	new instrument
FIT 11001	Well No. 1 Raw Water Pump Discharge Flowrate Indicating Transmitter	new instrument
LIT 11001	Well No. 1 Level Indicating Transmitter	new instrument
PSH 1101	Well No. 1 Raw Water Pump Discharge Pressure Switch High	new instrument
PIT 11002	Well No. 2 Raw Water Pump Discharge Pressure Indicating Transmitter	new instrument
FIT 11002	Well No. 2 Raw Water Pump Discharge Flowrate Indicating Transmitter	new instrument
LIT 11002	Well No. 2 Level Indicating Transmitter	new instrument
PSH 1102	Well No. 2 Raw Water Pump Discharge Pressure Switch High	new instrument
<b>2</b>	<b>Treatment</b>	
LE/LIT 22000	Accelator Level Indicating Transmitter	new instrument
LSH 22001	Accelator Level Switch High	new instrument
AIT 22020	Accelator pH Analyzer	new instrument
AIT 22021	Accelator Residual Chlorine Analyzer	new instrument
LIT 23000	Lime Silo Level Indicating Transmitter	new instrument
LSL 23000	Lime Silo Low Level Switch	new instrument
LSH 23000	Lime Silo High Level Switch	new instrument
LF 23010	Lime Feeder	new instrument
LSK 23011	Lime Slaker No. 1	new instrument
LSP 23012	Slaked Lime Pump No. 1	new instrument
LSK 23020	Lime Slaker No. 2	new instrument
LSP 23021	Slaked Lime Pump No. 2	new instrument
<b>3</b>	<b>Filtration</b>	
PI 30001	Backwash Supply Pump No. 1 Discharge Pressure Indicating	new instrument
PSH 30001	Backwash Supply Pump No. 1 Pressure Switch High	new instrument
TT 30001A	Backwash Supply Pump No. 1 Motor Windings Temperature	new instrument
TT 30001B	Backwash Supply Pump No. 1 Motor Bearings Temperature	new instrument
VT 30001	Backwash Supply Pump No. 1 Vibration Transmitter	new instrument
PI 30002	Backwash Supply Pump No. 2 Discharge Pressure Indicating	new instrument
PSH 30002	Backwash Supply Pump No. 2 Pressure Switch High	new instrument
TT 30002A	Backwash Supply Pump No. 2 Motor Windings Temperature	new instrument
TT 30002B	Backwash Supply Pump No. 2 Motor Bearings Temperature	new instrument
VT 30002	Backwash Supply Pump No. 2 Vibration Transmitter	new instrument
PI 30003	Filtered Water Transfer Pump No. 1 Discharge Pressure Indicating	new instrument
PSH 30003	Filtered Water Transfer Pump No. 1 Pressure Switch High	new instrument
TT 30003A	Filtered Water Transfer Pump No. 1 Motor Windings Temperature	new instrument
TT 30003B	Filtered Water Transfer Pump No. 1 Motor Bearings Temperature	new instrument
VT 30003	Filtered Water Transfer Pump No. 1 Vibration Transmitter	new instrument
PI 30004	Filtered Water Transfer Pump No. 2 Discharge Pressure Indicating	new instrument
PSH 30004	Filtered Water Transfer Pump No. 2 Pressure Switch High	new instrument
TT 30004A	Filtered Water Transfer Pump No. 2 Motor Windings Temperature	new instrument
TT 30004B	Filtered Water Transfer Pump No. 2 Motor Bearings Temperature	new instrument
VT 30004	Filtered Water Transfer Pump No. 2 Vibration Transmitter	new instrument
FIT 30005	Backwash Supply Flowrate Indicating Transmitter	new instrument
FE/FIT 30000	Surface Scour Supply Flow - from High Service Distribution Manifold	new instrument
LIT 30000	Filter Influent Level Transmitter	Furnished under BP 1
LE/LT 31000	Filter No. 1 Level	Furnished under BP 1

**Exhibit 6-4  
Proposed Instrument List Preliminary**

<b>ID Number</b>	<b>Instrument Name</b>	<b>NOTES</b>
LE/LT 32000	Filter No. 2 Level	Furnished under BP 1
LE/LT 33000	Filter No. 3 Level	Furnished under BP 1
LE/LT 34000	Filter No. 4 Level	Furnished under BP 1
LE/LT 35000	Clearwell Level	Furnished under BP 1
FE/FIT 31000	Filter No. 1 Effluent Flow	Furnished under BP 1
FE/FIT 32000	Filter No. 2 Effluent Flow	Furnished under BP 1
FE/FIT 33000	Filter No. 3 Effluent Flow	Furnished under BP 1
FE/FIT 34000	Filter No. 4 Effluent Flow	Furnished under BP 1
AE/AIT 31000	Filter No. 1 Product Water Turbidity	Furnished under BP 1
AE/AIT 32000	Filter No. 2 Product Water Turbidity	Furnished under BP 1
AE/AIT 33000	Filter No. 3 Product Water Turbidity	Furnished under BP 1
AE/AIT 34000	Filter No. 4 Product Water Turbidity	Furnished under BP 1
DPIT 31000	Filter No. 1 Headloss	Furnished under BP 1
DPIT 32000	Filter No. 2 Headloss	Furnished under BP 1
DPIT 33000	Filter No. 3 Headloss	Furnished under BP 1
DPIT 34000	Filter No. 4 Headloss	Furnished under BP 1
PIT 36000	Plant Site Air Compressor Pressure Indicator Transmitter	new instrument
<b>4</b>	<b>Storage and Distribution</b>	
LE/LIT 41000	Storage Tank No. 1 (2.5 MG) Level Indicating Transmitter	new instrument
LSH 41001	Storage Tank No. 1 (2.5 MG) Level Switch High	new instrument
LSL 41002	Storage Tank No. 1 (2.5 MG) Level Switch Low	new instrument
PI 42001	High Service Pump No. 1 Discharge Pressure Indicating	new instrument
PSH 42001	High Service Pump No. 1 Discharge Pressure Switch High	new instrument
TT 42001A	High Service Pump No. 1 Motor Windings Temperature	new instrument
TT 42001B	High Service Pump No. 1 Motor Bearings Temperature	new instrument
VT 42001	High Service Pump No. 1 Vibration Transmitter	new instrument
PI 42002	High Service Pump No. 2 Discharge Pressure Indicating	new instrument
PSH 42002	High Service Pump No. 2 Discharge Pressure Switch High	new instrument
TT 42002A	High Service Pump No. 2 Motor Windings Temperature	new instrument
TT 42002B	High Service Pump No. 2 Motor Bearings Temperature	new instrument
VT 42002	High Service Pump No. 2 Vibration Transmitter	new instrument
PI 42003	High Service Pump No. 3 Discharge Pressure Indicating	new instrument
PSH 42003	High Service Pump No. 3 Discharge Pressure Switch High	new instrument
TT 42003A	High Service Pump No. 3 Motor Windings Temperature	new instrument
TT 42003B	High Service Pump No. 3 Motor Bearings Temperature	new instrument
VT 42003	High Service Pump No. 3 Vibration Transmitter	new instrument
PI 42004	High Service Pump No. 4 Discharge Pressure Indicating	new instrument
PSH 42004	High Service Pump No. 4 Discharge Pressure Switch High	new instrument
TT 42004A	High Service Pump No. 4 Motor Windings Temperature	new instrument
TT 42004B	High Service Pump No. 4 Motor Bearings Temperature	new instrument
VT 42004	High Service Pump No. 4 Vibration Transmitter	new instrument
AE/AIT 43000	Finished Water Turbidity	Furnished under BP 1
FIT 43000	Plant Distribution Flowrate Indicating Transmitter	new instrument
<b>5</b>	<b>Chemical Process and Disinfection</b>	
PSH 51001	Sodium Hypochlorite Metering Pump No. 1 Discharge Pressure High	new instrument

**Exhibit 6-4  
Proposed Instrument List Preliminary**

ID Number	Instrument Name	NOTES
PSH 51002	Sodium Hypochlorite Metering Pump No. 2 Discharge Pressure High	new instrument
PSH 51003	Sodium Hypochlorite Metering Pump No. 3 Discharge Pressure High	new instrument
PSH 51004	Sodium Hypochlorite Metering Pump No. 4 Discharge Pressure High	new instrument
PI 51005	Sodium Hypochlorite System Discharge Pressure	new instrument
LSH 51006	Containment Area High Level Alarm	new instrument
PSH 52001	Fluoride Metering Pump No. 1 Discharge Pressure High	new instrument
PSH 52002	Fluoride Metering Pump No. 2 Discharge Pressure High	new instrument
PI 52003	Fluoride System Discharge Pressure	new instrument
LSH 52004	Containment Area High Level Alarm	new instrument
PSH 53001	Coagulation Aid Metering Pump No. 1 Discharge Pressure High	new instrument
PSH 53002	Coagulation Aid Metering Pump No. 2 Discharge Pressure High	new instrument
PI 53003	Coagulation Aid System Discharge Pressure	new instrument
LSH 53004	Containment Area High Level Alarm	new instrument
PSH 54001	Ammonia Metering Pump No. 1 Discharge Pressure High	new instrument
PSH 54002	Ammonia Metering Pump No. 2 Discharge Pressure High	new instrument
PI 54003	Ammonia System Discharge Pressure	new instrument
LSH 54004	Containment Area High Level Alarm	new instrument
<b>6</b>	<b>Residuals Handling</b>	
LE/LIT 60001	Waste Sludge / Backwash Basin No. 1 Level Indicating Transmitter	new instrument
LSH 60001	Waste Sludge / Backwash Basin No. 1 Level Switch High	new instrument
LE/LIT 60002	Waste Sludge / Backwash Basin No. 2 Level Indicating Transmitter	new instrument
LSH 60002	Waste Sludge / Backwash Basin No. 2 Level Switch High	new instrument
LE/LIT 61000	Waste Lime Sludge Pump Station Level Indicating Transmitter	new instrument
LSH 61000	Waste Lime Sludge Pump Station Level Switch High	new instrument
PIT 61001	Waste Lime Sludge Pump No. 1 Discharge Pressure Indicating Transmitter	new instrument
PSH 61001	Waste Lime Sludge Pump No. 1 Discharge Pressure High	new instrument
TSH 61001	Waste Lime Sludge Pump No. 1 Thermal Protection	new instrument
PIT 61002	Waste Lime Sludge Pump No. 2 Discharge Pressure Indicating Transmitter	new instrument
PSH 61002	Waste Lime Sludge Pump No. 2 Discharge Pressure Switch High	new instrument
TSH 61002	Waste Lime Sludge Pump No. 2 Thermal Protection	new instrument
PIT 62001	Waste Basin Decant Pump No. 1 Discharge Pressure Indicating Transmitter	new instrument
PSH 62001	Waste Basin Decant Pump No. 1 Discharge Pressure High	new instrument
TSH 62001	Waste Basin Decant Pump No. 1 Thermal Protection	new instrument
PIT 62002	Waste Basin Decant Pump No. 2 Discharge Pressure Indicating Transmitter	new instrument
PSH 62002	Waste Basin Decant Pump No. 2 Discharge Pressure High	new instrument
TSH 62002	Waste Basin Decant Pump No. 2 Thermal Protection	new instrument
<b>7</b>	<b>General Building System Instruments</b>	
PIT 73001	Plant Site Air Compressor System Enclosure Pressure Indicating Transmitter	new instrument
TSH 75002	Filter Building PLC-30000 Enclosure Temperature Switch High	new instrument
TSH 75003	Chemical Handling Area PLC-50000 Enclosure Temperature Switch High	new instrument
TSH 75004	Administration Building PLC-70000 Enclosure Temperature Switch High	new instrument
TSH 75005	Slaker No. 1 PLC-20001 Enclosure Temperature Switch High	new instrument
TSH 75006	Slaker No. 2 PLC-20002 Enclosure Temperature Switch High	new instrument



**TECH MEMO 7 – ELECTRICAL SYSTEM IMPROVEMENTS**



## **Technical Memorandum No. 7 – BODR City of North Miami Winson WTP Electrical System Improvements**

To: Distribution  
From: Hazen and Sawyer, P.C.  
Date: November 2012

### **Preamble**

A total of nine Technical Memoranda (TM) comprise the Basis of Design Report (BODR) for the Winson Water Treatment Plant BP 3 WTP Rehabilitation Project. Work on these TMs was initiated with a Kick-off Meeting on May 31, 2012. However, on October 24, 2012 the City authorized Hazen and Sawyer to proceed with revisions to Technical Memoranda to include newly acquired City property located adjacent to the northeast perimeter of the Winson WTP into the BODR. This direction necessitated the relocation of proposed Administration Building from the northwest to the southwest corner of the WTP site, and that the proposed 2.5 MG Water Storage Tank, in the southwest corner of the site was replaced with two 1.25 MG Storage Tanks to be located on the new City property. In addition, the City also requested that the Administration Building conceptual floor plan be revised to further increase the size of the Emergency Operations Center (EOC), as well as provide a dedicated EOC access to the planned Observation Deck. These requests impacted six of the eight TMs, which were either nearly complete or already accepted by the City, as well as required the development of a new Bid Package 4 to address the construction of the two 1.25 MG water storage tanks and appurtenant improvements on the City acquired land.

As a result, the following TMs will be revised, with original versions of the TMs included as Appendices to the Basis of Design Report.

- ◆ TM 2 – On site Raw Water System Improvements: Revise to reflect the new Administration Building and Storage Tank location and their impacts on Well No. 2.
- ◆ TM 4 – Proposed Process Improvements – Revise to address changes to noted site layout as well as process impacts required for operation of the WTP with only the existing 0.75 MG Storage Tank until the two new 1.25 MG Storage Tanks are constructed on the newly purchased land.
- ◆ TM 5 – Proposed Administration Bldg – Revise to reflect City request for a larger EOC with dedicated access to the observation deck. Also requires site layout and additional parking revisions
- ◆ TM 6 – I/C System – Revise to address changes to noted site layout as well as impacts to proposed PLC locations.

- ◆ TM 7 – Electrical Improvements – Revise to address changes to noted site layout as well as impacts due to new location of electrical room on generator ductbank and site feed ductbanks.
- ◆ TM 8 – Site Improvements – Revise to address changes to noted site layout as well as impacts to previously proposed stormwater management plan

Note that this TM 7 represents a REVISION to the City approved TM 7 - PRE-FINAL version dated October 16, 2012.

## 1.0 Background and Purpose

The City of North Miami owns and operates the Winson Water Treatment Plant (WTP), a conventional lime softening facility with a permitted capacity of 9.3 mgd. The WTP treats raw water from the Biscayne Aquifer and serves areas within the City limits as well as the Village of Biscayne Park, portions of Golden Glades, Westview, Pinewood, and surrounding areas of unincorporated Miami-Dade County. Potable water is supplied from the Winson Water Treatment Plant (WTP) and interconnects with the Miami-Dade County Water and Sewer Department (MDWASD), providing approximately 8.5 mgd AADF and 4.5 mgd AADF to users respectively. The WTP was constructed in the early 1960s and the current Bid Package 3: WTP Rehabilitation Project (BP 3) proposed to rehabilitate processes throughout the facility while maintaining the existing treatment capacity fixed at 9.3 mgd. BP 3 includes replacement of existing WTP electrical systems, which are housed in an Electrical Room within the Filter Building, and require upgrade to comply with current Building Codes.

The purpose of this TM is to review proposed electrical loads and develop distribution system requirements and recommend improvements for the BP 3 Project. Issues addressed include identification of the electrical service source for the rehabilitated facilities, review of existing emergency generator sizing, power distribution, new Electrical Room sizing requirements, and system reliability and redundancy requirements. Recommendations presented in this memorandum are based on review of existing facility construction documents, discussions with the local electric utility company (FPL), and review of Florida Department of Environmental Protection (FDEP) reliability and redundancy guidelines. Proposed facilities will include the construction of sufficient floor space to house necessary motor control centers, switchgear and variable frequency drives, as well as the installation of cast-in-place conduits, raceways and equipment pads. Proposed electrical loads are assumed and will be finalized during the detailed design effort.

## 2.0 Existing System

General: The existing plant electrical distribution system consists of a main 480V distribution switchgear assembly fed from a single utility service point. The utility service point feeds a 1,500 kVA transformer with 13.2kV primary voltage to 480Y/277V 3 $\phi$ , 4W secondary voltage installed in an existing transformer vault located in the existing Filter Building. The existing electrical capacity of the switchgear In Electrical Room 1 (ER 1) is 1600A, 480Y / 277V, 3 $\phi$ , 4W service. This switchgear feeds an existing motor control center and panelboard DP-1 located in ER 1 as well as five existing lighting panels distributed throughout the filter structure. If utility power is lost, an 800 kW (1,000 kVA) emergency backup diesel generator is connected through an automatic transfer switch to provide electrical power to all WTP loads. The emergency generator is installed in a sound attenuated enclosure located at the east

corner of the plant. The associated automatic transfer switch is located in an auxiliary structure adjacent to the generator.

A site plan illustrating existing major electrical system components is included as Exhibit 7-1

Reliability and Redundancy: Prior to 2003, The Florida Department of Environmental Protection (FDEP) defined reliability and auxiliary power redundancy requirements under Chapter 62-555.320(5)(a)6 of the Florida Administrative Code (FAC). Reliability generally refers to the protection of a system against failure due to normal wear and tear, natural disasters and protection against possible human error. Redundancy addresses the need for backup units on critical elements of the treatment process. The FDEP criteria stipulates that communities serving more than 350 persons, or more than 150 service connections, meet Class 1 reliability requirements by providing sufficient backup power capacity to operate the source, treatment units and distribution pumps at a rate equal to one-half the maximum daily flow demand. This requirement may be met by providing any of the following:

- ◆ Connection to at least two independent power supplies
- ◆ Interconnection to another public water supply that has sufficient reserve capacity
- ◆ In-place auxiliary power source that, together with storage capacity, meets the required one-half day maximum flow rate demand. In-place auxiliary power sources must be provided with automatic start-up capabilities.

Subsequently, FAC 62-555.320 (14) deleted references to Class 1 Reliability and increased capacity requirements to be at least equal to the average day demand. With regard to the Winson WTP, the City produces on average 8.5 mgd (5,902 gpm) of water, purchasing, on average, and additional 4 mgd from Miami-Dade, totaling 13.5 mgd. The permitted capacity of the WTP is 9.3 mgd (6,458 gpm). Exhibit 7-2 indicates that the two on-site raw water pumps, lime contactor, slaker, filters, backwash pumps, transfer pumps, decant pumps, waste lime pumps and two high service distribution pumps (6,460 gpm) are provided with 100% backup power capacity by the existing emergency generator. Therefore, the proposed on-site WTP improvements indicate compliance with the referenced average day demand production criteria.

It is important to note that the two on-site raw water well pumps can deliver 1,500 gpm each, or a total of 3,000 gpm (4.32 mgd). The remaining raw water supply of 3,460 gpm (4.98 mgd) required to meet the 9.3 mgd WTP capacity rating must be supplied from off-site wells. The City has (4) emergency generators for use at these offsite wells. While the City reports that undefined limitations within the offsite raw water well supply system restrict the total amount of raw water that can be delivered to the WTP to 8.5 mgd, operating (3) or (4) wells with these emergency generators should allow for the delivery of the additional (3,460 gpm) raw water required to maintain plant production at the permitted maximum of 9.11 mgd finished water. Resolution of the issue of restriction of the existing raw water transmission lines as well as the upgrade of the wellheads to allow for more efficient use of the existing emergency generators is being addressed under a separate Project. As an aside, to verify current compliance, historic electrical usage data provided by the City from FPL records indicates that maximum demand for the two year period between July 2010 and June 2012 was approximately 600 kW. Therefore, the existing generator capacity (800 kW) has to date been sufficient to meet full backup power needs and exceeds minimum FDEP required reliability requirements.

### 3.0 Proposed Expansion

As discussed above, the BP 3 Project will maintain the Winson WTP capacity at 9.3 mgd. However, additional process equipment will be installed to enhance system redundancy. To this end, existing pumping systems will be replaced with new facilities that include backup (standby) units. A detailed discussion of proposed process equipment improvements is presented in TM 4 – Proposed Process Improvements. For the purposes of this TM, a preliminary summary of proposed equipment loads is provided as Exhibit 7-2. The corresponding Single-Line Diagram for these proposed improvements is presented as Exhibit 7-3.

Existing Generator Capacity: A comparison of existing and proposed electrical load summary for the Winson WTP is presented in Table 7-1.

**Table 7-1  
Proposed Design Criteria  
Existing / Proposed Electrical Loads <sup>1</sup>**

Item	Existing HP	Proposed HP
Total Connected	785	1,455
Total Standby	50	462
Total in Use	735	993
Total on Generator <sup>2</sup>	585	808
Generator Capacity	1,000	1,000
FPL Service Capacity	1,330	1,330

<sup>1</sup> Assumes that 1 HP = 1 KVA

<sup>2</sup> Total HP on generator with Two High Service pumps is 808 HP (See Exhibit 7-2)

Preliminary analysis indicates that the existing generator has sufficient capacity to provide 100% backup power for equipment identified by the City for required emergency operation, as shown on Exhibit 7-2, assuming that step loading onto the generator is established so that starting capacity is not exceeded. The actual step loading startup sequence design will be developed during detailed design. The conceptual design at this point does not include that level of detail since final equipment selections have not been made. The generator sizing analysis will also be addressed under detailed design once final equipment sizes are established, i.e. when yard piping is finalized and TDH can be calculated based on the actual proposed system. In addition, note that the proposed generator load is also less than the maximum capacity of the existing FPL service.

FPL Service Improvements: Relocation of the existing utility service installation is recommended for the following reasons:

- ◆ The existing FPL transformer vault and adjacent ER 1 both require structural repairs.
- ◆ ER 1 is being replaced with the planned Electrical Room at the New Administration Building, as ER 1 is too small for proposed new electrical equipment including Motor Control Centers (MCCs), switchgear, and Variable Frequency Drives.

To this end, it is proposed that a new service pad mounted FPL utility transformer be installed adjacent to the new Electric Room No. 1 at the northwest end of the site. New wiring from the existing FPL utility service point will be routed from the current southwest entry lo-

cation, to feed this new utility transformer. A new service main breaker and automatic transfer switch will be installed in the proposed electric room No. 1 located in the new administration building. From this point, power will be distributed to all parts of the existing and new facilities. Exhibit 7-4 presents a site plan layout of proposed electrical system components.

Administration Building Electrical Room: The proposed Electrical Room at the new Administration Building will house MCCs, power distribution panels for miscellaneous plant loads, area site lighting power and controls, instrumentation power and HVAC systems. Note that pumps requiring variable speed drives will have their associated VFDs installed as an integral part of the MCC. Each VFD will be of the 6 pulse, 480V, 3 phase type. Although 12 and 18 pulse VFDs reduce line side harmonic concerns, they also significantly increase Electrical Room footprint requirements, capital costs and O&M. To this end, harmonic mitigation design alternatives including in-line reactors, or if necessary active front-end filters, will be considered and implemented during the detail design phase. In addition, the proposed location of the Master Pump Station is approximately 300-ft from the Administration Building Electrical Room, increasing the possibility of high voltage spikes. To mitigate this condition, VFD output line reactors, motor in-line reactors and motor voltage insulation rated for the potential incoming voltage spikes will be specified. All wiring between VFDs and motors will be installed in rigid galvanized steel conduit or will be armored and shielded multi-conductor VFD rated cables.

To address concerns regarding load side voltage transients, surge protection devices will be included on the line side of MCCs during the detailed design phase of the project. Lightning protection is addressed under TM 8. Telephone and Data Communication surge protection devices will also be provided. Harmonic effects on bearing will be mitigated via specification of insulated bearings and armature grounding brush assemblies. Administration building lighting and general power requirements will be served by circuit breaker panelboards on the first and second floors of the Administration Building. A separate panel shall be provided for the laboratory equipment. In addition, at City request a portable generator interface (hookup) for operation of one high service pump during emergency situations will be provided. Reference attached Exhibit Nos. 7-5 for preliminary layout of Electrical Room components.

Once electrical design is complete, HVAC system sizing for the Electrical Room will be finalized. Redundancy will be included.

#### 4.0 Preliminary Opinion of Probable Project Cost

The preliminary estimated construction cost of the proposed electrical distribution system improvements is presented on Exhibit 7-6

*Attachments*

<i>Distribution:</i>	<i>c: G. Brown</i>
<i>A. Ghany</i>	<i>File 44238-004 / 1.2</i>
<i>W. Pierre-Louis</i>	
<i>P. Vida</i>	
<i>B. Vidal</i>	
<i>T. Carney</i>	

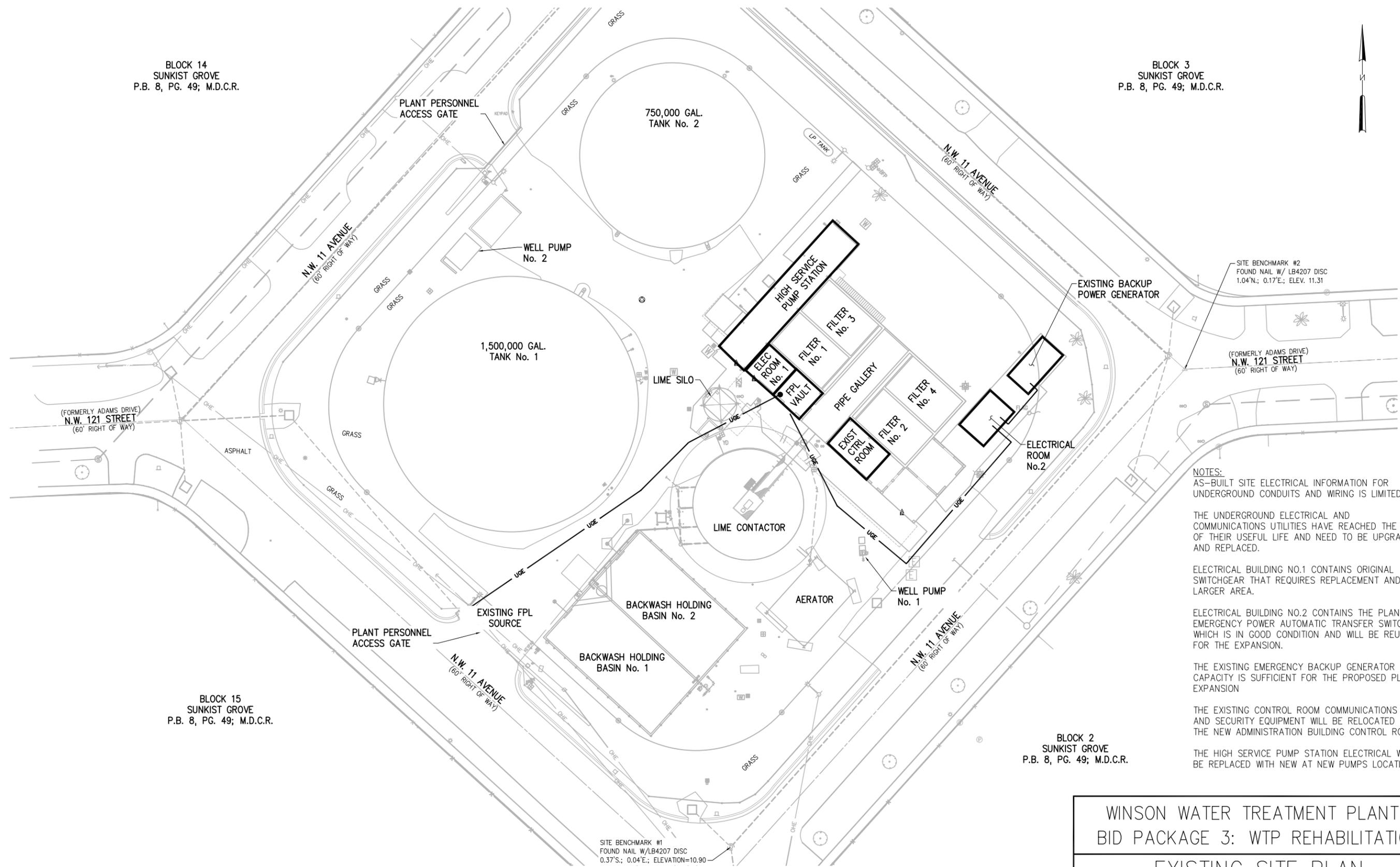


BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.



**NOTES:**  
AS-BUILT SITE ELECTRICAL INFORMATION FOR UNDERGROUND CONDUITS AND WIRING IS LIMITED.

THE UNDERGROUND ELECTRICAL AND COMMUNICATIONS UTILITIES HAVE REACHED THE END OF THEIR USEFUL LIFE AND NEED TO BE UPGRADED AND REPLACED.

ELECTRICAL BUILDING NO.1 CONTAINS ORIGINAL SWITCHGEAR THAT REQUIRES REPLACEMENT AND A LARGER AREA.

ELECTRICAL BUILDING NO.2 CONTAINS THE PLANT EMERGENCY POWER AUTOMATIC TRANSFER SWITCH WHICH IS IN GOOD CONDITION AND WILL BE REUSED FOR THE EXPANSION.

THE EXISTING EMERGENCY BACKUP GENERATOR CAPACITY IS SUFFICIENT FOR THE PROPOSED PLANT EXPANSION

THE EXISTING CONTROL ROOM COMMUNICATIONS AND SECURITY EQUIPMENT WILL BE RELOCATED TO THE NEW ADMINISTRATION BUILDING CONTROL ROOM.

THE HIGH SERVICE PUMP STATION ELECTRICAL WILL BE REPLACED WITH NEW AT NEW PUMPS LOCATION.

WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 EXISTING SITE PLAN  
 EXHIBIT 7-1



**HAZEN AND SAWYER**  
 Environmental Engineers & Scientists

PLOT DATE: 11/27/2012 3:19 PM BY: BRROAD



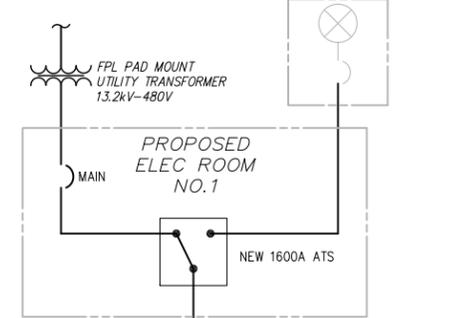
**Exhibit 7-2  
Equipment & HP List**

Equipment ID	Equipment Name	EQUIPT VOLT/PH	Existing HP	Proposed HP	Generator Loads	Standby Loads	VFD	NOTES
<b>1</b>	<b>Raw Water</b>							
RWP 11001	Well No. 1 Raw Water Pump	480/3	30	40	40			Existing pumps to be replaced
RWP 11002	Well No. 2 Raw Water Pump	480/3	30	40	40			
<b>2</b>	<b>Treatment</b>							
AER 21000	Aerator		-	-				No motorized parts
ACC 22000	Accelerator (Lime Softening Unit) Drive	480/3	20	20	20		*	Replace internals, gear box and motor drive
LSF 23001	Lime Feeder	120	0.5	1	1			Existing to remain
LSK 23002	Lime Slaker No. 1	120	0.5	1	1			Existing to remain
SLP 23003	Slaked Lime Grit Screw	120	0.5	1	1			Existing to remain
SLP 23004	Slaked Lime Pump No. 1	480/3	5	5	5			
LSK 23005	Lime Slaker No. 2	120	-	1			*	
<b>3</b>	<b>Filtration</b>							
FLT 31000	Filter No. 1							
FLT 32000	Filter No. 2							
FLT 33000	Filter No. 3							
FLT 34000	Filter No. 4							
BWS 30001	Backwash Supply Pump No. 1	480/3	75	125	125		*	Two new pumps to replace single existing
BWS 30002	Backwash Supply Pump No. 2	480/3		125			*	
FWP 30003	Filtered Water Transfer Pump No. 1	480/3	50	100	100		*	Two new pumps to replace single existing
FWP 30004	Filtered Water Transfer Pump No. 2	480/3		100			*	
<b>4</b>	<b>Storage and Distribution</b>							
WST 41000	Storage Tank No. 1 (2.5 MG)							New 2.5 MG to replace existing 1.5 MG and 0.75 MG
HSP 42001	High Service Pump No. 1	480/3	100	200	200		*	Four new pumps with VFDs to replace six existing
HSP 42002	High Service Pump No. 2	480/3	100	200	200		*	
HSP 42003	High Service Pump No. 3	480/3	100	200			*	
HSP 42004	High Service Pump No. 4	480/3	50	200			*	
-	High Service Pump No. 5	480/3	50					Existing to be demolished and not reused
-	High Service Pump No. 6	480/3	150					Existing to be demolished and not reused
<b>5</b>	<b>Chemical Process and Disinfection</b>							
SHT 51000	Hypochlorite Storage Tank		-	-				
SHP 51001	Hypochlorite Pump No. 1 (Pre-)	120	1.0	0.3	0.25			Existing pumps to be replaced
SHP 51001	Hypochlorite Pump No. 1 (Pre-)	120	-	0.3			*	
SHP 51002	Hypochlorite Pump No. 2 (Post-)	120	1.0	0.3	0.25			
SHP 51002	Hypochlorite Pump No. 2 (Post-)	120	-	0.3			*	
FLT 52000	Fluoride Storage Tank Scale	120	-	-				
FLP 52001	Fluoride Pump No. 1	120	0.25	0.25	0.25			Existing single pumps to be replaced with two units
FLP 52002	Fluoride Pump No. 2	120	-	0.25			*	
CGT 53000	Coagulation Aid Storage Tank Scale	120	-	-				
CGP 53001	Coagulation Aid Pump No. 1	120	0.25	0.25	0.25			Existing single pumps to be replaced with two units
CGP 53002	Coagulation Aid Pump No. 2	120	-	0.25			*	
AMT 54000	Ammonia Storage Tank Scale	120	-	-				
AMP 54001	Ammonia Pump No. 1	120	-	0.25	0.25			Existing single pumps to be replaced with two units
AMP 54002	Ammonia Pump No. 2	120	-	0.25			*	
ACT 55000	Anti-coagulant Storage Tank Scale	120						
ACP 55001	Anrti-coagulant Pump No. 1	120	-	TBD				unknown at this time
ACP 55002	Anrti-coagulant Pump No. 2	120	-	TBD			*	
<b>6</b>	<b>Residuals Handling</b>							
WSB 60001	Waste / Backwash Basin No. 1		-	-				
WSB 60002	Waste / Backwash Basin No. 2		-	-				
WLP 61001	Waste Lime Sludge Pump No. 1 (to MDWASD)	480/3	-	10	10			
WLP 61002	Waste Lime Sludge Pump No. 2 (to MDWASD)	480/3	-	10			*	
WBP 62001	Waste Basin Decant Pump No. 1	480/3	15	10	10			
WBP 62002	Waste Basin Decant Pump No. 2	480/3	-	10			*	
<b>7</b>	<b>General Building Systems</b>							
71XXX	Electrical Switchgear, MCCs & Primary Power							
72XXX	Backup Power Systems (generators, fuel)							
	Existing 800kW, 1000kVA Generator							
73XXX	Compressed Air Systems							
CMPR 73100	Air Compressor	480/3	5	5	5			
74001	Admin. Building HVAC Equipment (1st Floor)	480/3		10	10			
74002	Admin. Building HVAC Equipment (2nd Floor)	480/3		10	10			
74003	Admin. Building HVAC Equipment (Elec. Room)	480/3		15	15			
74004	Admin. Building HVAC Equipment (Elec. Room)	480/3		15	15		*	
FAN 74100	Exhaust Ventilator at the Filter Pipe Gallery	480/3	0.25	0.25	0.25			
	<b>TOTALS CONNECTED</b>		<b>784</b>	<b>1,455</b>				
	<b>TOTAL STANDBY</b>		<b>50</b>	<b>462</b>				
	<b>TOTAL IN USE</b>		<b>734</b>	<b>993</b>				
	<b>TOTAL GENERATOR LOAD</b>				<b>808</b>			

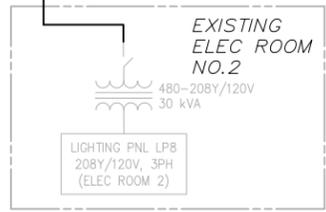
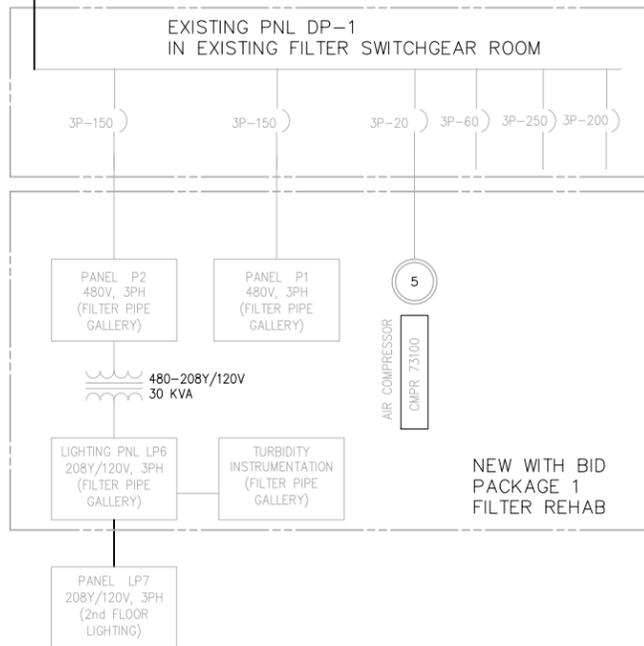
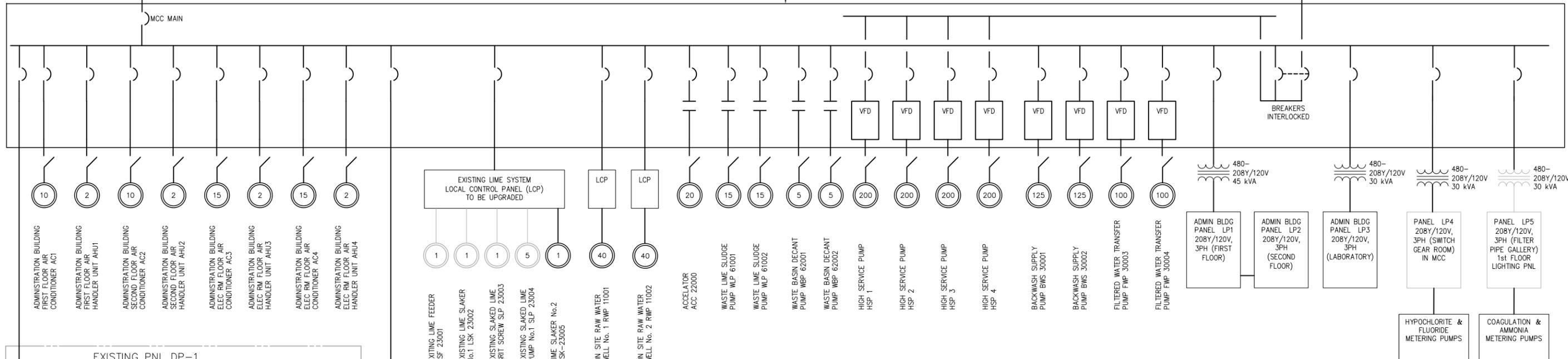
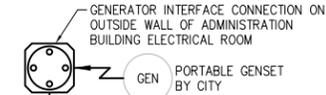


FPL POLE

EXISTING EMERGENCY GENERATOR



PROPOSED MOTOR CONTROL CENTER LOCATED IN MAIN ELECTRICAL ROOM



MOTOR CONTROL CENTER MCC-1

WINSON WTP ELECTRICAL LOADS		
	EXISTING HP	PROPOSED HP
TOTAL CONNECTED	785	1455
TOTAL STANDBY	50	462
TOTAL IN USE	735	993
TOTAL ON GENERATOR	585	808
EXISTING GENERATOR CAPACITY	1000	1000
EXISTING UTILITY ELECTRICAL CAP.	1330	1330

NUMBERS BASED ON 1HP = 1kVA

**LEGEND:**  
 ——— EXISTING  
 ——— PROPOSED

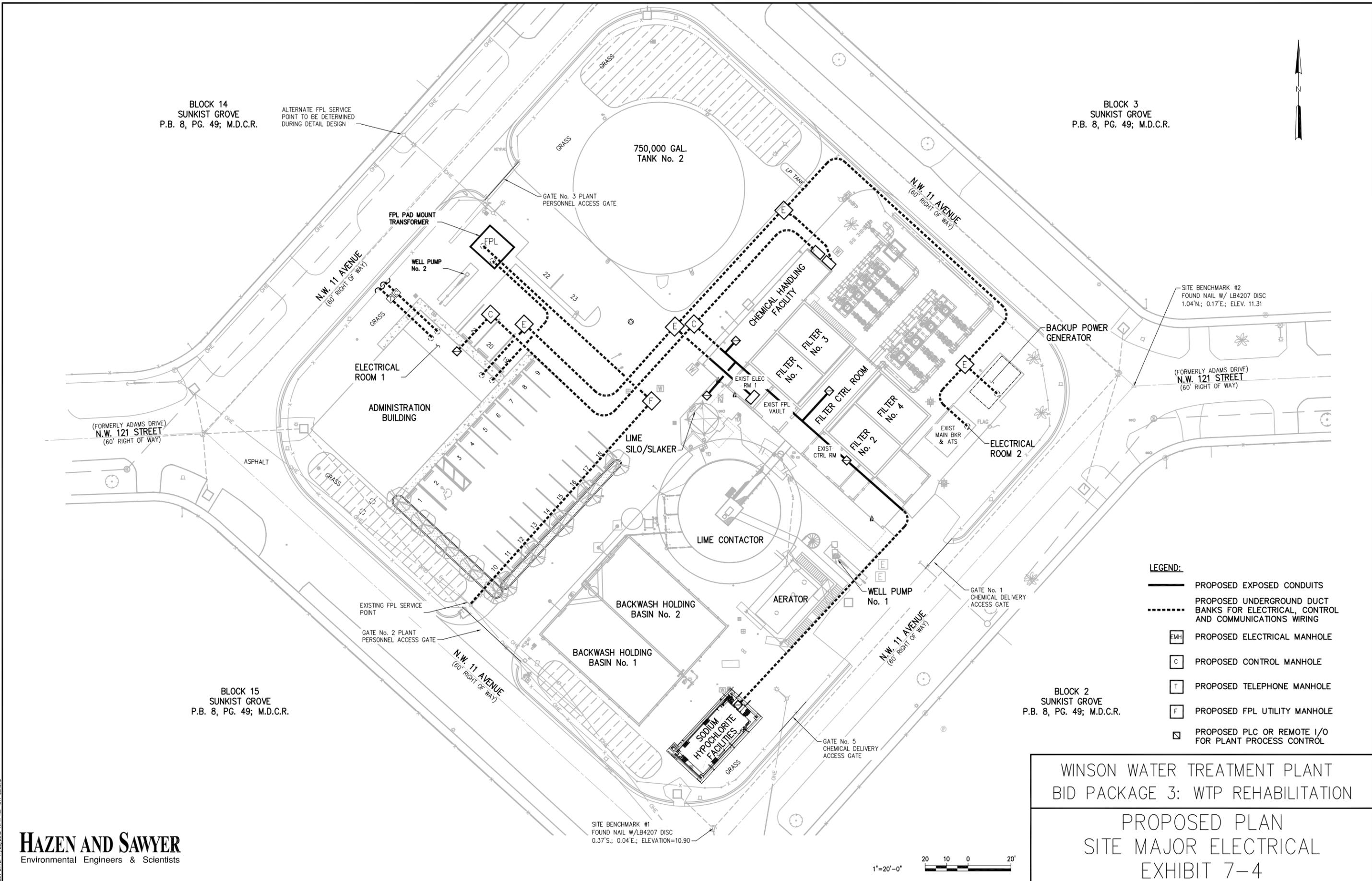
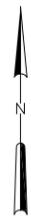
WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 PLANT  
 PROPOSED SINGLE LINE  
 EXHIBIT 7-3



BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

ALTERNATE FPL SERVICE  
POINT TO BE DETERMINED  
DURING DETAIL DESIGN

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.



- LEGEND:**
- PROPOSED EXPOSED CONDUITS
  - - - - PROPOSED UNDERGROUND DUCT BANKS FOR ELECTRICAL, CONTROL AND COMMUNICATIONS WIRING
  - EMH PROPOSED ELECTRICAL MANHOLE
  - C PROPOSED CONTROL MANHOLE
  - T PROPOSED TELEPHONE MANHOLE
  - F PROPOSED FPL UTILITY MANHOLE
  - PROPOSED PLC OR REMOTE I/O FOR PLANT PROCESS CONTROL

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 PROPOSED PLAN  
 SITE MAJOR ELECTRICAL  
 EXHIBIT 7-4



**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

PLOT DATE: 11/28/2012 11:41 AM BY: JBR/ROAD

XREFs= \\Base\C-Site-Survey-X, \\Base\44238-004-Site-Plan-Prop, \\Base\44238-004-MTank-FPlan-MProp

File = C:\BZProjects\44238-004\Bid Package 3 - WTP Rehab\Exhibits\Exhibit 7-4 Saved by Jbrood Save date = 11/28/2012 11:34 AM

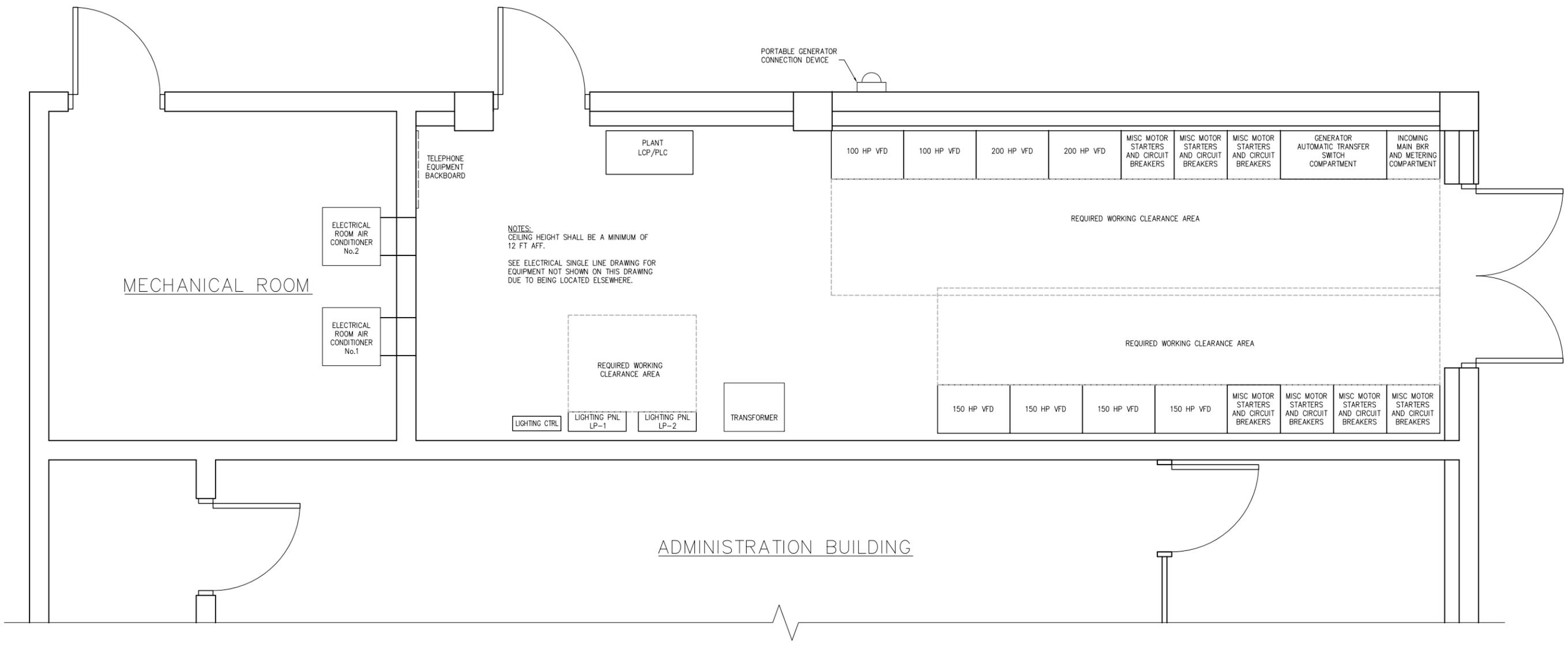


PLOT DATE: 11/27/2012 3:18 PM BY: BRDAD

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists



WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
PROPOSED PLANT  
MAIN ELECTRICAL ROOM PLAN  
EXHIBIT 7-5





**Exhibit 7-6 Preliminary**  
**North Miami BP 3 : WTP Rehabilitation**  
**Electrical Distribution Cost Estimate**

DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	INSTALLATION <sup>2</sup>	TOTAL
<b>NM_WINSON WTP - PRELIMINARY ESTIMATE</b>					<b>\$1,189,550</b>
<b>BASIC ELECTRICAL REQUIREMENTS</b>	1	LS	\$10,000	1.00	\$10,000
EXISTING ELECTRICAL DEMOLITION	1	LS	\$45,000	1.00	\$45,000
TEMPORARY CONSTRUCTION WIRING	1	LS	\$40,000	1.00	\$40,000
<b>ELECTRICAL SYSTEMS ANALYSIS</b>	1	LS	\$10,000	1.00	\$10,000
<b>BASIC ELECTRICAL MATERIALS AND METHODS</b>					
JUNCTION/PULL/OUTLET BOXES	1	LS	\$10,000	1.10	\$11,000
TELEPHONE BACKBOARD	1	LS	\$500	1.10	\$550
60A DISCONNECT SWITCHES 316 SS NF	20	EA	\$3,000	1.10	\$66,000
200A DISCONNECT SWITCHES 316 SS NF	4	EA	\$7,500	1.10	\$33,000
400A DISCONNECT SWITCHES 316 SS NF	4	EA	\$10,000	1.10	\$44,000
DISTRIBUTION PANELBOARD (PP1) MODIFICATIONS	1	EA	\$6,600	1.10	\$7,260
LIGHTING PANELS	5	EA	\$5,000	1.10	\$27,500
LIGHTING TRANSFORMERS	3	EA	\$3,600	1.10	\$11,880
MISCELLANEOUS ELECTRICAL	1	LS	\$30,000	1.10	\$33,000
TVSS	1	LS	\$14,400	1.10	\$15,840
<b>LIGHTNING PROTECTION</b>					
LIGHTNING PROTECTION	1	LS	\$50,000	1.10	\$55,000
GROUNDING	1	LS	\$10,000	1.10	\$11,000
<b>CONDUIT AND WIRING</b>					
ADMIN BUILDING	1,500	LF	\$11	1.10	\$18,150
PLANT PROCESS	8,000	LF	\$13	1.10	\$114,400
LOW VOLTAGE DUCTBANK-SITE	450	LF	\$55	1.10	\$27,225
FPL DUCTBANK (INSTALLATION ONLY)	100	LF	\$36	1.10	\$3,960
MANHOLES/HANDHOLES	6	EA	\$7,200	1.10	\$47,520
FIBER OPTIC CABLE	250	LF	\$2	1.10	\$660
TELEPHONE WIRE	250	LF	\$1	1.10	\$165
INSTRUMENTATION CABLE	1,000	LF	\$3.60	1.10	\$3,960
<b>LOW VOLTAGE SWITCHGEAR</b>					
LOW VOLTAGE SWITCHGEAR (MAIN BREAKER)	1	LS	\$9,000	1.10	\$9,900
<b>LIGHTING</b>					
SITE LIGHTING	10	EA	\$2,000	1.10	\$22,000
EXTERIOR ADMIN	5	LS	\$500	1.10	\$2,750
INTERIOR ADMIN	65	EA	\$175	1.10	\$12,513
INTERIOR PLANT	25	EA	\$125	1.10	\$3,438
<b>LOW VOLTAGE MOTOR CONTROL</b>					
MCC-1 (14 VERT. SECTIONS INCLUDING VFDs)	1	LS	\$140,000	1.10	\$154,000
MOTOR RATED SWITCHES (MOVs)	24	EA	\$192	1.10	\$5,069
MISCELLANEOUS STARTERS	2	EA	\$1,800	1.10	\$3,960
<b>FIRE-ALARM SYSTEM -ADDRESSABLE</b>	1	LS	\$20,400	1.10	\$22,440
<b>SECURITY</b>					
VIDEO CAMERAS	10	EA	\$2,500	1.10	\$27,500
GATE ACCESS	2	EA	\$2,000	1.10	\$4,400
<b>ELECTRICAL TESTING</b>	1	LS	\$10,000	1.00	\$10,000
				<b>SUBTOTAL</b>	<b>\$915,039</b>
<b>CONTINGENCY</b>	30%				<b>\$274,512</b>
					<b>\$1,189,550</b>



**TECH MEMO 8 – SITE DEVELOPMENT REQUIREMENTS**



## **Technical Memorandum No. 8 – BODR City of North Miami Winson WTP Site Development Requirements**

To: Distribution  
From: Hazen and Sawyer, P.C.  
Date: November 2012

### **Preamble**

A total of nine Technical Memoranda (TM) comprise the Basis of Design Report (BODR) for the Winson Water Treatment Plant BP 3 WTP Rehabilitation Project. Work on these TMs was initiated with a Kick-off Meeting on May 31, 2012. However, on October 24, 2012 the City authorized Hazen and Sawyer to proceed with revisions to Technical Memoranda to include newly acquired City property located adjacent to the northeast perimeter of the Winson WTP into the BODR. This direction necessitated the relocation of proposed Administration Building from the northwest to the southwest corner of the WTP site, and that the proposed 2.5 MG Water Storage Tank, in the southwest corner of the site was replaced with two 1.25 MG Storage Tanks to be located on the new City property. In addition, the City also requested that the Administration Building conceptual floor plan be revised to further increase the size of the Emergency Operations Center (EOC), as well as provide a dedicated EOC access to the planned Observation Deck. These requests impacted six of the eight TMs, which were either nearly complete or already accepted by the City, as well as required the development of a new Bid Package 4 to address the construction of the two 1.25 MG water storage tanks and appurtenant improvements on the City acquired land.

As a result, the following TMs will be revised, with original versions of the TMs included as Appendices to the Basis of Design Report.

- ◆ TM 2 – On site Raw Water System Improvements: Revise to reflect the new Administration Building and Storage Tank location and their impacts on Well No. 2.
- ◆ TM 4 – Proposed Process Improvements – Revise to address changes to noted site layout as well as process impacts required for operation of the WTP with only the existing 0.75 MG Storage Tank until the two new 1.25 MG Storage Tanks are constructed on the newly purchased land.
- ◆ TM 5 – Proposed Administration Bldg – Revise to reflect City request for a larger EOC with dedicated access to the observation deck. Also requires site layout and additional parking revisions
- ◆ TM 6 – I/C System – Revise to address changes to noted site layout as well as impacts to proposed PLC locations.

- ◆ TM 7 – Electrical Improvements – Revise to address changes to noted site layout as well as impacts due to new location of electrical room on generator ductbank and site feed ductbanks.
- ◆ TM 8 – Site Improvements – Revise to address changes to noted site layout as well as impacts to previously proposed stormwater management plan

Note that this TM 8 represents a REVISION to the City approved TM 8 - PRE-FINAL version dated October 30, 2012.

## 1.0 Background and Purpose

The City of North Miami owns and operates the Winson Water Treatment Plant (WTP), a conventional lime softening facility with a permitted capacity of 9.3 mgd. The WTP treats raw water from the Biscayne Aquifer and serves areas within the City limits as well as the Village of Biscayne Park, portions of Golden Glades, Westview, Pinewood, and surrounding areas of unincorporated Miami-Dade County. Potable water is supplied from the Winson Water Treatment Plant (WTP) and interconnects with the Miami-Dade County Water and Sewer Department (MDWASD), providing approximately 8.5 mgd Annual Average Daily Flow (AADF) and 4.5 mgd AADF to users respectively. The WTP was constructed in the early 1960s.

In 2007 the City prepared a report titled Winson Water Treatment Plant Expansion Feasibility Study (Feasibility Study) indicating that the existing lime softening treatment system and Biscayne Aquifer wellfield infrastructure were at or near the end of their useful life. Based upon subsequent on-site observations and discussions with City staff, H&S generally concurred with the recommendations of the Feasibility Study. To this end, the City has determined that WTP facilities should be rehabilitated to ensure continued reliability through the year 2030. Due to budget constraints, expansion of the treatment capacity is currently on hold. Bid Package 3: WTP Rehabilitation Project (BP 3) proposes to rehabilitate existing WTP unit processes throughout the facility while maintaining the existing treatment capacity fixed at 9.3 mgd.

This technical memorandum (TM) presents a review of site development requirements for the proposed BP 3 Project. As the existing process is being rehabilitated but capacity is not expanded, the footprint of existing WTP structures will generally remain as-is with the exception of:

- ◆ A new Administration Building and appurtenant parking facilities where Storage Tank No. 1 is currently located.
- ◆ A new Master Pump Station, to include new Transfer, Backwash and Distribution Pumps, to the north of the existing Filter / OPS Building.
- ◆ A new Waste Lime Sludge Pump Station located between the Lime Contactor and Backwash Holding Basin No. 2.
- ◆ A new sodium hypochlorite building located southeast of the existing backwash holding basins.

In addition, the City has advised that it is in the process of acquiring properties to the north of the site for future expansion of the WTP footprint. To this end, a brief discussion on provisions for a utility corridor within the boundary of the BP 3 Project area, to connect the existing and potential future site, is included. Review of existing site roadways and accessibility, improvements to the existing stormwater management system, replacement of aged yard piping and electrical infrastructure, potential conflicts with buried infrastructure during construction, replacement and addition of site access gates, general landscaping enhancements, lightning protection system and wellfield protection are also addressed.

## 2.0 Review of Existing Conditions

The existing WTP consists of one 9.3-mgd capacity lime softening treatment unit (Accelerator) with associated filtration and ancillary systems. The facility receives raw water from six off-site and two on-site wells via a 20-inch diameter main that enters the site at the southeast corner and discharges to the elevated aerator structure. The original WTP layout includes limited provisions for capacity expansion, as the site is fairly compact and installation of additional facilities generally requires that existing structures be demolished or adjacent properties be procured by the City. For the purposes of the BP 3 Basis of Design Report effort, it was agreed with the City that proposed rehabilitation and improvements would be limited to the existing site boundary. The existing WTP site is illustrated in Exhibit 8-1.

## 3.0 Proposed Improvements

The following paragraphs present an overview of the criteria used to evaluate and select siting of new facilities, on-site roadways, site access, wellfield protection, stormwater management, yard piping replacements, existing buried infrastructure, landscaping and irrigation, lightning protection and additional City land purchases.

New Administration Building Siting: As noted in TM 5, the proposed Administration Building will be constructed on the southwest corner of the WTP site, in an area to be made available by the demolition of the existing 1.5MG Water Storage Tank. As agreed during the BODR kickoff meeting, this proposed layout will not impact potential future uses of any additional property the City may procure to the north of the facility.

The Administration Building will have an approximate gross area footprint of 3766 square feet and 7533 total square feet of gross floor area in two stories as defined in Section 7-101 of the City of North Miami Code of Ordinances. Section 5-1402 of the Code of Ordinances requires that buildings for government use be provided with one (1) parking space for every 300 square feet of gross floor area. Therefore it is estimated that the building will require a total of twenty three (23) parking spaces. Each space will have dimensions of 9-foot width by 18-ft length with a minimum 22-foot aisle (one-way), per Section 5-1401 of the Code of Ordinances. Per discussion with City staff, this standard parking stall dimension is suitable for City utility vehicles. In addition, Section 11-4.1.2 (5) of the Florida Building Code requires that one (1) handicap accessible space be provided for parking facilities with 1 to 25 parking spaces, sized 12-ft in width by 20-ft in length per Section 7-101 of the Code of Ordinances. Attached Exhibit 8-2 illustrates the general location and parking layout for the proposed Administration Building.

On-site Roadways: In general, utility site access should comply with National Fire Protection Association (NFPA) 241 5-4.3 requirements, which mandate that onsite roadways have a minimum 20-foot width with 50-foot outer and 25-foot inner turning radii. Dead ends should be avoided to the extent possible. A preliminary review of existing on-site roadway dimensions and turning radii is presented in Exhibit 8-2. In general, the primary access road running from Gate 3 to Gate 2 will be widened and reoriented as shown in the red outline, so that the resulting 20-ft wide roadway with 25/50-ft turning radii complies with referenced standards. Proposed orientations will be presented to the Design Review Committee early in the detailed design process (~50% completion stage) to reach agreement on this concept.

Site Access Gates: The existing site layout includes three access locations (Gate Nos. 1 through 3), with Gate No. 4 being added along the northeast perimeter under the BP 1 Filter Rehabilitation Project. Gate No. 5 will be added under the BP 3 Project to allow access for chemical delivery to the proposed sodium hypochlorite facility. All existing site access gate motors will be replaced. In addition, communication access keypads from each gate to the new Control Room will also be installed / upgraded as discussed in TM 6 – Plant Control and Information System.

Wellfield Protection: The WTP is located within the Westside Wellfield protection area as defined by Miami-Dade County. Therefore, the contract documents will require that the Contractor be fully responsible for precautionary measures, remediation, cleanup, disinfection, regulatory agency fines and all labor, materials, and costs associated with any contamination of the potable water supply caused directly or indirectly by its activities. In this effort the Contractor shall comply with the following:

- ◆ Requirements of Chapter 24-43, Wellfield Protection Ordinance of the Miami-Dade County Code and Chapter 62-521, Wellhead Protection Rule of the Florida Administrative Code.
- ◆ Chapter 24-43(5) of the Miami-Dade County Code of Ordinances regarding prohibition of hazardous materials within wellfield protection areas.
- ◆ Complete an affidavit on their letterhead, signed by an authorized officer of the firm which itemizes the regulated chemicals that the Contractor proposes to use at the City of North Miami wellfield during construction.
- ◆ Notify the Miami-Dade County Department of Permitting, Environment and Regulatory Affairs to acquire permission to initiate construction within the wellfield.
- ◆ Contact Miami-Dade County Department of Permitting, Environment and Regulatory Affairs for additional assistance regarding compliance with the Wellfield Protection ordinance.

Existing Stormwater Management Facilities at the WTP: A recent topographic survey of the WTP identified various stormwater catch basins along the perimeter of the site. These catch basins appear to connect to multiple off-site stormwater manholes as indicated by the City furnished stormwater atlases. However, the available record drawings for the WTP (from the original 1960s Project) do not show these improvements, and the City reports that no other record documents are available. Exhibit 8-3 illustrates the known on-site stormwater infrastructure components as interpreted from the site survey and City stormwater atlas.

Table 8-1 presents a summary of rim elevations and assumed discharge locations for these catch basins as interpreted from the available record data.

**Table 8-1  
Existing Stormwater Catch Basin <sup>1</sup>  
Available Record Data Summary**

<b>Item</b>	<b>Rim Elevation</b>	<b>Discharge Location</b>
Catch Basin No. 1	10.28	Off-Site SW Manhole
Catch Basin No. 2	10.47	Catch Basin No. 3
Catch Basin No. 3	11.09	Off-Site SW Manhole
Catch Basin No. 4	11.01	Off-Site SW Manhole
Catch Basin No. 5	10.41	None

<sup>1</sup> Based on Boundary and Topographic Survey by CTA, Inc. Dated 3-1-10 and City Stormwater Atlas

Proposed Stormwater Management Improvements – Permitting: Since 1972 the South Florida Water Management District (SFWMD) has regulated stormwater management systems at utility sites through the Environmental Resources Permitting (ERP) process. In 1998 the “Operating Agreement Concerning Regulation under Part IV, Chapter 373 of the Florida Statutes (FS) and Aquaculture General Permits Under Section 403.814 FS between the SFWMD and the Florida Department of Environmental Protection (FDEP), assigned ERP processing responsibilities for utility sites to the FDEP. As the Winson WTP was constructed prior to establishment of the ERP Process, no stormwater permit exists for the facility. Historically, regulatory agencies have “grandfathered” utility facilities, pending subsequent projects to trigger the stormwater permitting process. With planned improvements proposing the replacement of the existing 1.5 MG Water Storage Tank with a new Administration Building and parking area, the BP 3 Project proposed will require procurement of a new ERP license for the facility.

On July 1, 2012, FS 403.814(12) was approved, allowing for a new ERP General Permit for Small Projects, also referred to as “Self-Certification” for 10-2 permits. Under this new rule, facilities having an area of less than 10 acres, with less than 2 acres of impervious area, may electronically self-certify the Project within 30 days of construction commencement. As noted on Table 8-2, the Winson WTP has a total area of 79,102 square feet (1.81 acres), including 41,323 square feet (0.95 acres) of impervious area. The BP 3 Project proposes to construct facilities that will increase the impervious area to 45,992 square feet (1.05 acres).

**Table 8-2  
Proposed Improvements <sup>1</sup>  
Pervious / Impervious Area Summary (all values sq ft)**

<b>Item</b>	<b>Pervious Area</b>	<b>Impervious Area</b>	<b>Total Area</b>	<b>Ratio <sup>2</sup></b>
Existing Facility	37,779	41,323	79,102	47.7%
Proposed Facility	33,110	45,992	79,102	41.8%

<sup>1</sup> New Administration Building and Parking Facilities, Master Pump Station, sodium hypochlorite facility and Waste Lime Pump Station

<sup>2</sup> Ratio of Pervious to Total Area as percentage

As area totals within the “10-2” requirements of the Self Certification Program, BP 3 Project ERP permitting will be processed as a small Project. This approach has been verified with discussions with the FDEP.

In addition to ERP compliance, the U.S. Environmental Protection Agency (EPA) oversees the Federal National Pollutant Discharge Elimination System (NPDES) stormwater permitting program. The NPDES stormwater program regulates point source discharges of stormwater into surface waters of the State of Florida from certain municipal, industrial and construction activities. FDEP has been assigned responsibility for NPDES stormwater permitting in Florida. The Program is generally implemented under one of two phases.

- ◆ Phase I was promulgated in 1990 and addresses "Large" and "Medium" municipal storm sewer systems (MS4s) located in incorporated municipalities with populations of more than 100,000.
- ◆ Phase II was promulgated in 1999 and addresses small construction activity disturbing between 1 and 5 acres.

As the total area being disturbed by the project is less than 1 acre, the BP 3 Project will not require an NPDES permit. This approach has been verified in discussion with the FDEP to comply with FAC 62-621.300(4).

Finally, discussions with Miami-Dade Department of Permitting, Environment and Regulatory Affairs indicate that it will not claim jurisdiction with regard to stormwater management on the Project. However, compliance of any proposed improvements with applicable well field protection codes (discussed later in this TM) will be subject to Department review and acceptance.

Proposed Stormwater Management Improvements – Design: Principal considerations for the design of BP 3 Project stormwater improvements are as follows:

- ◆ Finished Floor Elevation of the New Administration Building - As the WTP site is located in FEMA Zone X (above the 100-year flood elevation), the minimum finished floor elevation of the proposed Administration Building will be established during detailed design via preparation of a “glass wall analysis” based on a 100-year, 3-day storm event with net zero off-site discharge.
- ◆ Existing Facility Finished Elevations - As discussed earlier, it is important to note that the finished floor elevations of pre-existing structures and grading at the WTP were constructed prior to the promulgation of stormwater permitting requirements. As such, based on discussions with jurisdictional agencies, these will remain as is and “grandfathered” in to the new facility permit.
- ◆ Implementation of “Net-Zero” Offsite Discharge” – As the existing facility will be “grandfathered”, only new improvements that impact impervious area at the WTP will required stormwater management infrastructure. Therefore, the design of the proposed Administration Building and Parking Area will include new stormwater collection, transmission, treatment and on-site disposal facilities. These proposed improvements generally consist of new catch basins in the parking area, with transmission to perimeter swales for treatment. As the WTP houses two Production

Wells, a 100-ft setback is required for on-site holding / percolation swales. Potential areas for proposed improvements are illustrated on Exhibit 8-4.

- ◆ On-Site Roadway Grading – In general, existing on-site roadways will be milled and resurfaced to establish a positive drainage pattern onto adjacent sodded areas. The City has advised that no flood prone areas exist on site.
- ◆ As the new Administration Building requires a “Silver” LEED Certification level, stormwater management of runoff from the new structure will be considered during the detail design stages of the project.

Yard Piping Improvements: It is the intent of the BP 3 Project that all existing yard piping within the WTP boundary be replaced, as it is anticipated that the majority of this piping is over 50 years in age and either reached or is close to the end of its useful life. In addition, some yard piping re-orientations will be required to interconnect proposed and existing facilities. Also, as agreed with City staff, existing interconnections that bypass treatment and allow direct discharge of raw water to the distribution system, installed in the 1960s under the scope of the original project, will be demolished and capped. Note that utility services to the new Administration Building will be addressed during the detailed design phase of the project.

Existing Buried Infrastructure: Available record drawings of the WTP are aged and provide limited detail regarding existing buried infrastructure at the site. In addition, based on discussions with City staff, various improvements that have been made to the facility over the years were implemented internally and record drawings for those facilities are not available. To this end, it was agreed with the City that efforts will be to consult with plant staff and attempt to identify potential conflicts with proposed yard piping replacements early on in the detailed design process, including performance of “soft-dig” utility locations by City forces to the extent possible. Even with such efforts, it is anticipated that unforeseen conflicts requiring correction during the construction phase will result due to this limited record drawing availability. In particular, the following proposed improvements may require construction phase resolutions.

- ◆ The majority of existing electrical switchgear currently installed at the Electrical Room No. 1 is being replaced with new equipment at the proposed Administration Building Electrical Room. This work requires construction of new ductbanks and conduit to field equipment and the emergency generator. Records of existing buried ductbanks and ancillary electrical improvements basically are non-existent.
- ◆ As noted above buried process and sanitary sewer piping (yard piping) is over 50 years in age and the City has requested that it be replaced under the scope of the BP 3 Project. As the WTP needs to remain in service to the extent possible to minimize water purchases by the City, the design concept for this effort will generally consist of the installation of new parallel lines, with subsequent tie-in and abandonment and/or demolition of the existing lines once new yard piping installations are completed. Records of existing yard piping are from the original 1960 contract documents, with no updates for new installations available.
- ◆ As agreed with the City, to avoid impacts to existing structures that are to remain in service, piping which is located below existing these structures will not be replaced.

This will require that existing piping be excavated during construction and a pipe joint, or other reasonable interface point between replacement pipe runs and the existing below structure pipe to remain, be identified. In cases where the existing line(s) are determined to be in unacceptable condition when exposed during construction, field adjustments will be made as may be agreed with the City.

To supplement the existing condition identification efforts proposed during the design phase, the contract documents will also require that the Contractor perform its own exploratory excavations prior to shop drawing submittals, so that tie-in locations, conditions of existing mains, and its proposed methods and locations for tie-ins can be agreed to between the Engineer, City and Contractor, prior to the ordering of materials.

Landscaping and Irrigation: The existing facility has limited landscaping with the exception of sod. As discussed with the City, the proposed landscaping design will comply with City of North Miami Development Review Committee and City Administration requirements. Alternative conceptual landscape treatment examples (minimal, average, dense) will be developed and reviewed with the City during the detailed design phase of the Project to facilitate agreement on the final landscape concept. In addition, although record drawings indicate the existence of a WTP irrigation system, WTP staff has advised that the system is not functional and will be replaced in its entirety.

Lightning Protection: A new plant-wide lightning protection system consisting of air terminals, grounding conductors, connectors, fasteners and ground rods shall be installed. The system will comply with LPI 175 and 176, UL 96 and 96A, and NFPA 780.

Existing WTP and City Purchased Land to North: As previously noted, the City has purchased additional land to the North of the WTP and directed that the originally proposed 2.5 MG Tank be replaced with two 1.25 MG Tanks on that new site under a separate BP 4. The BP 3 Project will be based on operations with only the existing 750,000 gallon tank until the new BP 4 is completed. Development of design criteria for BP 4 is not in the scope of the BP 3 Project, and is therefore not addressed herein. However, a design memorandum will be developed once the City finalizes purchase(s) and subsequent survey and Environmental Impact Study (EIS) work on the newly purchased land to establish the basis of the required BP 4 design. From a general perspective, the 1.25 MG tanks will be designed with an 80-ft diameter to maintain the maximum height under 30-ft as requested by the City. Based on review of the North Miami Code of Ordinances – Height restriction within the Public Use (PU) designation is 55 ft. Reference Exhibit 8-5 accordingly.

*Attachments*

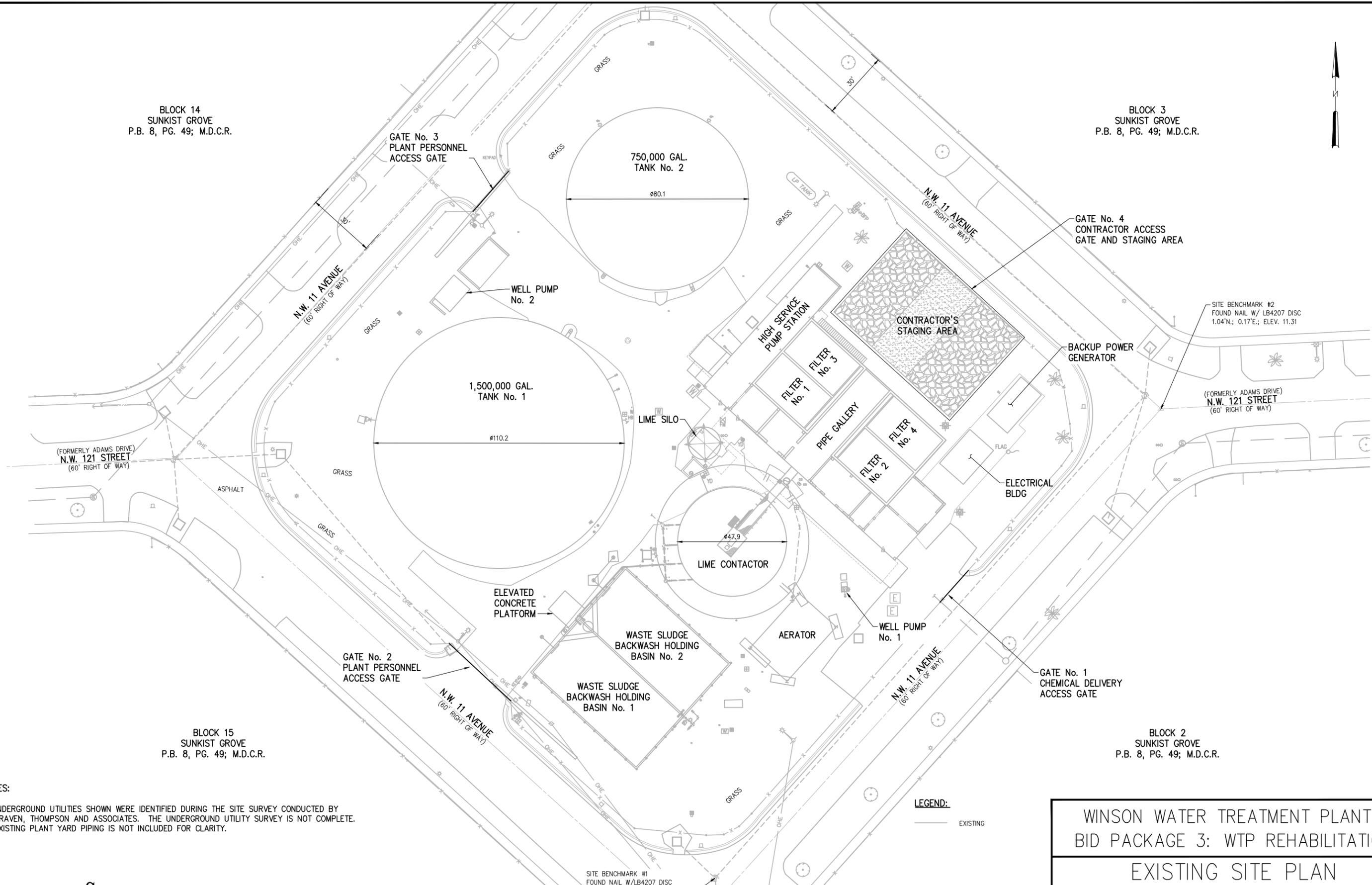
*Distribution:*

*A. Ghany  
W. Pierre-Louis  
P. Vida  
B. Vidal  
T. Carney  
J. Atoche*

*c: G. Brown  
File 44238-004 / 1.2*

BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.



NOTES:  
1. UNDERGROUND UTILITIES SHOWN WERE IDENTIFIED DURING THE SITE SURVEY CONDUCTED BY CRAVEN, THOMPSON AND ASSOCIATES. THE UNDERGROUND UTILITY SURVEY IS NOT COMPLETE. EXISTING PLANT YARD PIPING IS NOT INCLUDED FOR CLARITY.

LEGEND:  
— EXISTING



**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
EXISTING SITE PLAN

EXHIBIT 8-1

PLOT DATE: 11/29/2012 4:31 PM BY: TBCCAS

XREF= \\Base\C-Site-Survey-X

File = C:\Users\tbocas\AppData\Roaming\projectpoint-2011\work\projectpoint.t.buzzsaw.com\hazenandsawyer\north miami wtp improvements (44238-004)\Drawings\bid package 3 - Addendum 1 - RFP No. 45-08-15



BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

NOTE:  
THE CONTRACTOR STAGING AREA WILL BE SEQUENCED  
WITH THE DEMOLITION OF THE EXISTING HSPS AND  
CONSTRUCTION OF NEW HSPS.

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

**LEGEND:**  
--- 50-FT OUTER & 25-FT INNER TURNING RADI  
--- TYPICAL FIRE TRUCK TURNING RADI

SITE BENCHMARK #1  
FOUND NAIL W/ LB4207 DISC  
0.37'S.; 0.04'E.; ELEVATION=10.90

1"=20'-0"



**LEGEND:**

— WORK COMPLETED IN PHASE-I,  
II, III AND IV  
— EXISTING

WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
PROPOSED SITE PLAN

EXHIBIT 8-2



BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

**NOTES:**

1. UNDERGROUND UTILITIES SHOWN WERE IDENTIFIED DURING THE SITE SURVEY CONDUCTED BY CRAVEN, THOMPSON AND ASSOCIATES. THE UNDERGROUND UTILITY SURVEY IS NOT COMPLETE. EXISTING PLANT YARD PIPING IS NOT INCLUDED FOR CLARITY. CATCH BASIN INFORMATION WAS OBTAINED FROM SITE SURVEY.

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

CB No. 1  
RIM EL. 10.28  
10" PVC NW INV. EL. 7.95  
15" RCP SE INV. EL. 7.33  
BOTTOM EL. 6.10

CB No. 2  
RIM EL. 10.47  
6" PVC NW INV. EL. 9.62  
BOTTOM EL. 8.78

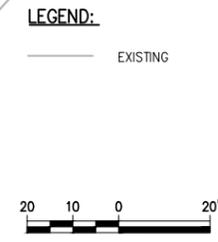
CB No. 4  
RIM EL. 11.01  
15" RCP N INV. EL. 7.40  
BOTTOM EL. 6.40

CB No. 3  
RIM EL. 11.09  
6" PVC SE INV. EL. 9.34  
15" RCP W INV. EL. 7.32  
BOTTOM EL. 5.94

CB No. 5  
RIM EL. 10.41  
BOTTOM 15" HDPE  
(PERFORATED)  
INV. EL. 4.33

SITE BENCHMARK #1  
FOUND NAIL W/LB4207 DISC  
0.37"S.; 0.04"E.; ELEVATION=10.90

SITE BENCHMARK #2  
FOUND NAIL W/ LB4207 DISC  
1.04"N.; 0.17"E.; ELEV. 11.31



WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
EXISTING STORMWATER  
MANAGEMENT PLAN  
EXHIBIT 8-3

PLOT DATE: 11/29/2012 4:30 PM BY: TBCCAS

XREF= \\Base\C-Site-Survey-X

File = C:\Users\tbocas\AppData\Roaming\projectpoint-2011\Work\projectpoint\luzsaw.com\hazenandsawyer\north miami wtp improvements (44238-004)\Drawings\bid package 3 - wtp improvements\11-29-2012\10:30 AM\Attachment 3 - RFP No. 45-08-15



BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

NOTES:  
1. POTENTIAL AREAS FOR LOCATION OF STORMWATER MANAGEMENT SYSTEMS HAVE REQUIRED SEPARATION FROM POTABLE WATER SUPPLY WELLS (MINIMUM 100').

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

SITE BENCHMARK #1  
FOUND NAIL W/ LB4207 DISC  
0.37'S.; 0.04'E.; ELEVATION=10.90

SITE BENCHMARK #2  
FOUND NAIL W/ LB4207 DISC  
1.04'N.; 0.17'E.; ELEV. 11.31

**LEGEND:**

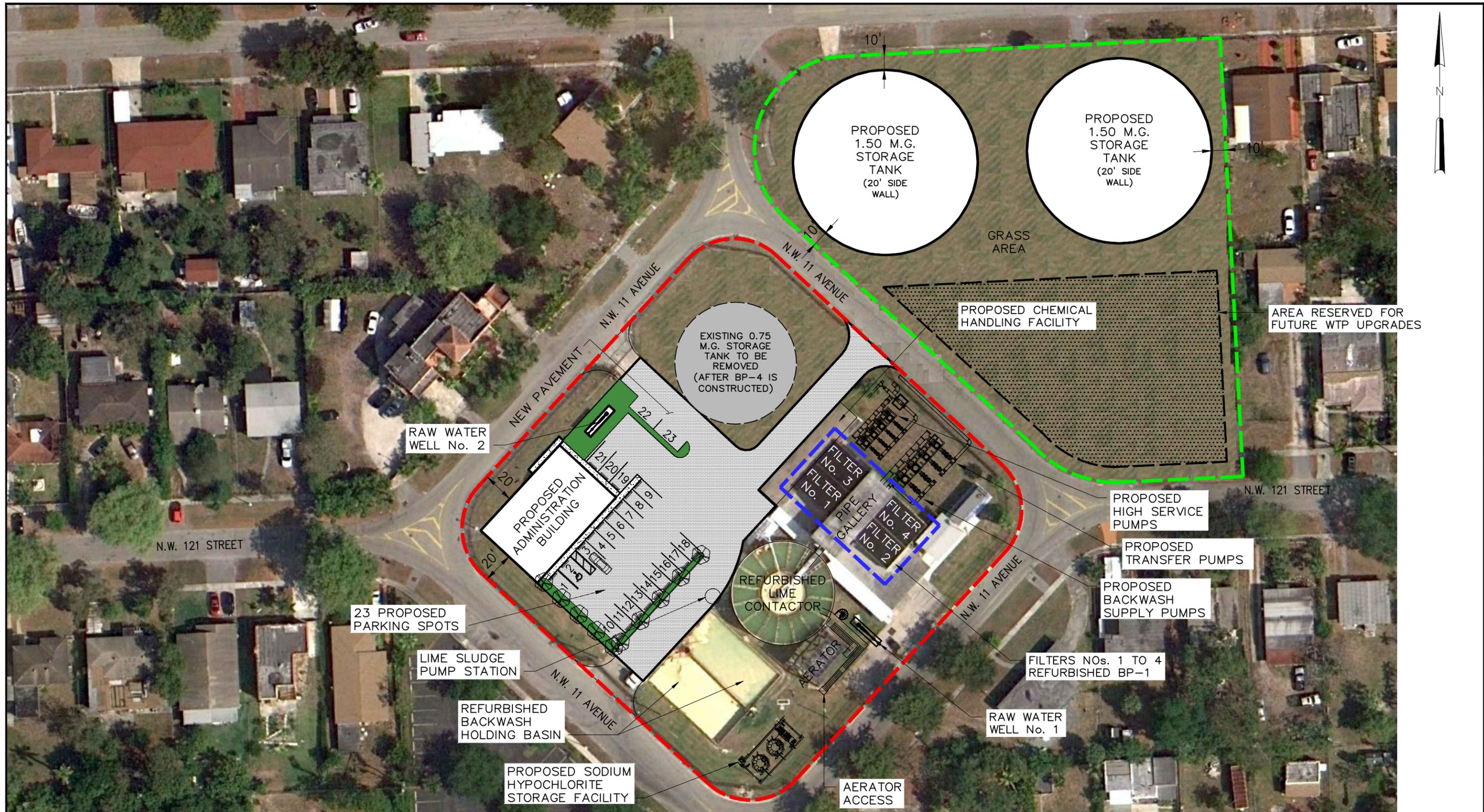
- WORK COMPLETED IN PHASE—I, II, III AND IV
- EXISTING
- POTENTIAL AREAS TO LOCATE STORMWATER MANAGEMENT SYSTEMS.

1"=20'-0"



WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 POTENTIAL STORMWATER  
 MANAGEMENT AREAS  
 EXHIBIT 8-4

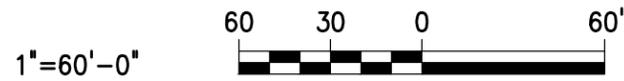




**LEGEND:**

- BP-1: FILTER REHABILITATION PROJECT.
- BP-3: WTP REHABILITATION PROJECT (INCLUDES BP-2: ON-SITE RAW WATER SYSTEM IMPROVEMENTS).
- BP-4: WATER STORAGE TANKS PROJECT.

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists



WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION

PROPOSED WTP SITE  
WITH ADDITIONAL LAND (BP-4)  
EXHIBIT 8-5

PLOT DATE: 12/3/2012 2:32 PM BY: TBOCAS



**TECH MEMO 9 – CONSTRUCTION SEQUENCING AND PRELIMINARY COST**



## **Technical Memorandum No. 9 - BODR City of North Miami Winson WTP Construction Sequencing and Preliminary Cost**

To: Distribution  
From: Hazen and Sawyer, P.C.  
Date: February 2013

### **Preamble**

A total of nine Technical Memoranda (TM) comprise the Basis of Design Report (BODR) for the Winson Water Treatment Plant BP 3 WTP Rehabilitation Project. Work on these TMs was initiated with a Kick-off Meeting on May 31, 2012. However, on October 24, 2012 the City authorized Hazen and Sawyer to proceed with revisions to Technical Memoranda to include newly acquired City property located adjacent to the northeast perimeter of the Winson WTP into the BODR. This direction necessitated the relocation of proposed Administration Building from the northwest to the southwest corner of the WTP site, and that the proposed 2.5 MG Water Storage Tank, in the southwest corner of the site was replaced with two 1.25 MG Storage Tanks to be located on the new City property. In addition, the City also requested that the Administration Building conceptual floor plan be revised to further increase the size of the Emergency Operations Center (EOC), as well as provide a dedicated EOC access to the planned Observation Deck. These requests impacted six of the eight TMs, which were either nearly complete or already accepted by the City, as well as required the development of a new Bid Package 4 to address the construction of the two 1.25 MG water storage tanks and appurtenant improvements on the City acquired land.

As a result, the following TMs will be revised, with original versions of the TMs included as Appendices to the Basis of Design Report.

- ◆ TM 2 – On site Raw Water System Improvements: Revise to reflect the new Administration Building and Storage Tank location and their impacts on Well No. 2.
- ◆ TM 4 – Proposed Process Improvements – Revise to address changes to noted site layout as well as process impacts required for operation of the WTP with only the existing 0.75 MG Storage Tank until the two new 1.25 MG Storage Tanks are constructed on the newly purchased land.
- ◆ TM 5 – Proposed Administration Bldg – Revise to reflect City request for a larger EOC with dedicated access to the observation deck. Also requires site layout and additional parking revisions
- ◆ TM 6 – I/C System – Revise to address changes to noted site layout as well as im-

pacts to proposed PLC locations.

- ◆ TM 7 – Electrical Improvements – Revise to address changes to noted site layout as well as impacts due to new location of electrical room on generator ductbank and site feed ductbanks.
- ◆ TM 8 – Site Improvements – Revise to address changes to noted site layout as well as impacts to previously proposed stormwater management plan

Note that this TM 9 represents the initial DRAFT of this TM and has been developed after REVISED TM 1 through TM 8 were approved by the City.

## 1.0 Background and Purpose

The City of North Miami owns and operates the Winson Water Treatment Plant (WTP), a conventional lime softening facility with a permitted capacity of 9.3 mgd. The WTP treats raw water from the Biscayne Aquifer and serves areas within the City limits as well as the Village of Biscayne Park, portions of Golden Glades, Westview, Pinewood, and surrounding areas of unincorporated Miami-Dade County. Potable water is supplied from the Winson Water Treatment Plant (WTP) and interconnects with the Miami-Dade County Water and Sewer Department (MDWASD), providing approximately 8.5 mgd AADF and 4.5 mgd AADF to users respectively. The WTP was constructed in the early 1960s.

In 2007 the City prepared a report titled Winson Water Treatment Plant Expansion Feasibility Study (Feasibility Study) indicating that the existing lime softening treatment system and Biscayne Aquifer wellfield infrastructure were at or near the end of their useful life. Based upon subsequent on-site observations and discussions with City staff, H&S generally concurred with the recommendations of the Feasibility Study. To this end, the City has determined that WTP facilities should be rehabilitated to ensure continued reliability through the year 2030. Due to budget constraints, expansion of the treatment capacity is currently on hold. Bid Package 3: WTP Rehabilitation Project (BP 3) proposes to rehabilitate existing WTP unit processes throughout the facility while maintaining the existing treatment capacity fixed at 9.3 mgd.

This TM presents a review of the following:

- ◆ Preliminary Construction Sequencing Requirements
- ◆ Preliminary Project Construction Schedule
- ◆ Preliminary Opinion of Probable Cost
- ◆ Overview of Anticipated Regulatory Permitting Requirements

In addition, as the City has acquired properties to the north of the site for the implementation of BP 4 Water Storage Tanks, required sequencing and coordination between the BP 3 and BP 4 projects is also addressed under applicable headings accordingly.

## 2.0 Preliminary Construction Sequencing Requirements

The intent of the BP 3 WTP Rehabilitation Project is to implement construction improvements with minimal impact to routine plant operations. However, as various unit processes

being upgraded have no backup capacity, some project activities will require that treatment be either bypassed and/or completely shut down for specified periods of time. In addition, due to the limited site footprint (<2 acres total), staging areas for Contractor materials, equipment and personnel are limited and must be specifically controlled.

The following discussion and accompanying Exhibits 9-1 through 9-10 present sequencing for implementation of the BP 3 Project in four (4) distinct phases. It is anticipated that the suggested phasing will allow for construction of requisite facilities with only pre-planned interruptions to routine operations. Although some aspects of the Work require extended individual process shutdowns, in such cases concurrently shutdowns of facilities requiring upgrade are proposed to maximize project progress and minimize impacts. Of course, suggested phasing and sequencing can only address general progress and plant operability; and ongoing coordination and cooperation between the Contractor, City, WTP Staff and Engineer will be necessary to ensure that process isolation, tie-ins, interconnects, and similar work are implemented in an efficient manner. To this end, the contract specifications will require that all parties prepare for and attend weekly meetings where look-ahead schedules and operation impacting activities are reviewed and agreed to prior to implementation.

## 2.1 PHASE 1 Sequence Summary

Exhibit 9-1: Proposed Staging Plan – Phase I: The Contractor shall mobilize and stage at the pre-existing staging area left in place by the BP 1 Filter Rehab Project. Gates 1, 2 and 3 may be used by the Contractor for entrance / egress at the WTP based on compliance with WTP staff, security, parking and chemical delivery requirements to be included in the contract specifications. In all cases, the Contractor will be precluded from impacting WTP operations.

Exhibit 9-2: Demolition Plan - Phase I: Yard piping revisions shall be implemented to allow the existing High Service Pump Station to take suction directly from the existing 750,000 Gallon Storage Tank, as it is currently plumbed to take suction from the existing 1.5 MG Storage Tank. The chemical injection point for Ammonia will also be relocated under with this effort. Once these yard piping revisions are completed, the 1.5 MG Storage Tank and Backwash Holding Basin Truck Loading Structure shall be demolished. The area cleared by the demolitions will be used by the Contractor for construction of the proposed Administration Building. Note that the WTP will operate with only the 750,000 Gallon Storage Tank in service until BP 4 constructs two new 1.25 MG Storage Tanks on the newly procured City Property adjacent to the northeast perimeter of the Winson WTP. CxT calculations using a 0.3 baffling factor, as is currently practiced by the City, were reviewed with MD-DERM and it was agreed that the 750,000 Gallon Storage Tank has sufficient capacity to meet disinfection requirements. In addition, City Administration has agreed that WTP staff will operate the facility to ensure that the 750,000 Gallon Storage Tank is at maximum level every morning before peak demand period commences. During this Phase the Contractor may use the area cleared by the 1.5 MG Storage Tank demolition for staging / storage / construction as it deems necessary.

CxT calculations utilizing a 0.1 baffling factor will be developed once the yard piping drawings are developed and proposed contact times can be determined. At that time, the results will be reviewed with Miami-Dade DOH to verify what baffling factor will be acceptable

to the agency, and the design will be adjusted if deemed necessary. As noted under TM 4, H&S met with Mr. Paul Andre of the Miami Dade Department of Health on 10/04/12 to discuss the concept of interim WTP operation with only the existing 0.75 MG tank. Discussion regarding the use of a 0.3 baffling factor and calculated compliance with CxT requirements were presented during this meeting. Mr. Andre did not reflect any opposition to this idea; however, a written approval will not be available until the project is officially submitted for permitting. Barring approval, due to the limited size of the existing WTP footprint, BP 3 Project construction would need to be deferred until the new Storage Tanks (two 1.25 MG capacity) are installed as a part of a future Bid Package 4.

Exhibit 9-3: Construction Plan – Phase I: The following structures / improvements may commence construction under this Phase:

- ◆ Administration Building with new Electrical Room
- ◆ Raw Water Well Pump No. 1 and No. 2 Improvements. Note that only one well may be out of service at any time.
- ◆ Aerator Access Stairwell
- ◆ Accelerator Rehabilitation including new walkway to the Aerator Access Stairwell. This will require the bypass of raw water lime softening for up to 100 calendar days. As agreed with MD DERM, the aerator must remain in service during this entire bypass period.
- ◆ Lime Slaker Improvements. This work will be performed concurrently to and completed during the 100 calendar day raw water lime softening bypass period.
- ◆ Waste Lime Blow off Improvements. This work will be performed concurrently to and completed during the 100 calendar day raw water lime softening bypass period.
- ◆ New Waste Lime Sludge Pump Station. This work will be performed concurrently to and completed during the 100 calendar day raw water lime softening bypass period.
- ◆ Backwash Holding Basin Improvements. This work will be performed concurrently to and completed during the 100 calendar day raw water lime softening bypass period.
- ◆ Repairs to Electrical Room No. 1. This work will be performed concurrently to and completed during the 100 calendar day raw water lime softening bypass period.

It is important to note that new Electrical and Instrumentation Work will be implemented throughout the duration of the entire Project, subject to individual Phase restrictions and as allowable by the WTP operation. Once Phase I Work is completed, including start-up and placement into successful operation of process structures, not including the Administration Building and Electrical Room, Phase II Work may commence.

## 2.2 PHASE 2 Sequence Summary

Exhibit 9-4: Proposed Demolition and Staging Plan – Phase II: The Contractor shall demobilize from the Phase I staging area and restage adjacent to the new Administration Building & Parking Lot. This area will represent the only staging area available to the Contractor for the remainder of the BP 3 Project. Gates 1, 2 and 3 may continue to be used by the Contractor for entrance / egress at the WTP subject to continued compliance with WTP

staff, security, parking and chemical delivery requirements to be included in the contract specifications. In all cases, the Contractor will be precluded from impacting WTP operations. Once restaging is completed, the Contractor shall demolish the Phase I staging area to make room for the construction of the new Master Pump Station.

Exhibit 9-5: Construction Plan – Phase II: The following structures / improvements may commence construction under this Phase:

- ◆ Master Pump Station – This will require the shutdown of the Filter Facilities, and corresponding production capacity of the WTP for up to 7 calendar days to allow for tie-in of the Master Pump Station to the existing Filter Clearwell. During this period the City will be required to purchase potable water for its entire production capacity from the MD WASD. Payment for such water purchases will be included in the BP 3 Project as it is required as a result of construction activities.
- ◆ The clearwell will be inspected during this shutdown and the 6-inch layer of “precipitate” layer reported to exist uniformly throughout the clearwell (by the Underwater Solutions Inc. report of March 2005) will be removed.
- ◆ Aerator Support Structure Rehabilitation and Mist Panels. A maximum 3 calendar day bypass of the aerator will be allowed for this work, unless the work is scheduled during the noted Filter Facility shutdown.

As in Phase I, new Electrical and Instrumentation Work will be implemented throughout the duration of the entire Project, subject to individual Phase restrictions and as allowable by the WTP operation. Once Phase II Work is completed, including start-up and placement into successful operation of process structures, not including the Administration Building, Phase 3 Work may commence.

It is important to note that conceptual approval is being requested from the North Miami Building Department regarding agreement to issue a Temporary Certificate of Occupancy for the Electrical Room portion of the proposed Administration Building Complex, as a separate entity from the Administration Structure. This agreement is required so that the Master Pump Station can be placed into operation with requisite VFDs and support electrical / instrumentation items that are proposed to be housed in the new Electrical Room. If the Building Department does not agree to this approach, then construction progress, based on the proposed sequence presented in this TM, will require stoppage after the “Construction Plan – Phase II) stage, until the entire Administration Building complex achieves TCO, at which time the Master Pump Station can be placed into service, and “Demolition Plan – Phase III” can then proceed.

It is anticipated that the BP 3 construction duration would be extended from 425 days to a total of 730 days, if this were the case.

**2.3 PHASE 3 Sequence Summary**

Exhibit 9-6: Demolition Plan - Phase III: The proposed Chemical Handling Facility will be constructed in the location currently occupied by the High Service Pump Station. To this end, once the new Master Pump Station is placed into satisfactory service, the existing High Service Pump Station will be taken out of service. As the existing Ammonia and Fluoride Feed Systems are housed in the High Service Pump Station area, the Contractor will

be required to furnish and install relocated interim facilities for these two chemicals. Once these interim systems are placed into successful operation, interior improvements in the existing High Service Pump Station (pumps, piping etc) shall be demolished, but the existing structure envelope, slab and filter clearwell will remain.

Exhibit 9-7: Construction Plan – Phase III: The following structures / improvements may commence construction under this Phase:

- ◆ New Chemical Handling Facility including new Ammonia, Fluoride and Coagulant Aid Storage and Feed Systems. Space will be designated for a new Anti-Coagulant Feed System.
- ◆ Structural improvements to the existing High Service Pump Station structure base slab, including new topping slab with chemical containment areas, along with targeted building enclosure upgrades and HVAC improvements will also be implemented. Note that as agreed with the North Miami Building Department, this is only portion of pre-existing Filter/OPS Structure being upgraded
- ◆ A new Hypochlorite Storage and Feed Facility locate adjacent to the existing Aerator structure accessible from Gate 1.

As in Phases I and II, new Electrical and Instrumentation Work will be implemented throughout the duration of the entire Project, subject to individual Phase restrictions and as allowable by the WTP operation. Once Phase III Work is completed, including start-up and placement into successful operation of process structures, not including the Administration Building, Phase IV Work may commence.

## 2.4 PHASE 4 Sequence Summary

Exhibit 9-8: Demolition Plan - Phase IV: The Contractor shall demolish the existing Hypochlorite and Coagulant Aid systems, but the existing Filter/ OPS/ Building structure will remain

Exhibit 9-9: Construction Plan – Phase IV: The following structures / improvements must be completed by the end of this Phase:

- ◆ Administration Building
- ◆ Remaining Electrical and Instrumentation Work
- ◆ Paving, Grading and Drainage Improvements
- ◆ Landscaping and Irrigation
- ◆ Security Gate and Video Improvements

Once Phase IV Work is completed, including start-up and placement into successful operation of all improvements, the Contractor may request Final Completion.

Exhibit 9-10: Proposed Plan – Project Complete: The final project layout as designed. Note that the existing 750,000 gallon storage tank will remain as the single storage tank available in service until the new BP 4: Water Storage Tank Project is completed.

### 3.0 Probable Project and Program Cost Opinion

Exhibit 9-11 presents the proposed Project and Program Cost Opinions for implementation of the Winson WTP Improvement Program, inclusive of a 25% estimating contingency as follows:

- ◆ BP 1: Filter Rehabilitation Project – Bid Cost \$3,676,000
- ◆ BP 2: On-Site Raw Water System Improvements - Combined with BP 3
- ◆ BP 3 WTP Rehabilitation Project - \$11,237,000
- ◆ BP 4: Water Storage Tanks - \$1,950,000
- ◆ Total Estimated Construction Cost (BP 1, BP 3 and BP 4) - \$16,863,000

The Exhibit also includes design and construction management engineering costs of 20% or \$3,373,000, for a total estimated Program Cost of \$20,236,000. This includes additions to the original scope including a larger Administration Building (upsized from 4,000 to 7,000 square feet), as well as the addition of two 1.5 MG Water Storage Tanks and ancillary site and interconnection improvements on a new WTP adjacent site acquired by the City, as compared to one 2.5 MG Storage Tank originally proposed on the existing WTP site.

Costs carried for BP 4 are for the installation of two prestressed concrete storage tanks and appurtenant piping and controls. As agreed with the City during the meeting of February 5, 2013, the City will contact for and implement demolition, environmental assessments/ remediation, zoning and platting revisions, and subsequent delivery of a final prepared site and survey to be used as the baseline document for development of the BP 4 Storage Tank contract documents. The target timeline agreed by the City to develop the noted site documents is the end of 2013, to allow timely development of BP 4 and minimize the amount of time the WTP operates with only the 750,000 gallon tank. The total Program estimate of \$16,863,000 presented in Exhibit 9-11 is \$424,000 lower than the estimate provided to the City in March 2012 (Exhibit 9-11A). However, only the portion of costs associated with Biscayne Well Nos. 1 and 2, or \$524,000 as noted in Exhibit 9-11B, is included in the BP 3 Project. Therefore, it is possible that at this BODR stage, estimated costs exceed original targets for the four bid packages by approximately \$1,500,000, (i.e. Line Item 7 \$2,530,000 - \$424,000 - \$524,000).

As more detailed opinions of probable construction costs are prepared at the 50%, 90% and 100% design completion stages, the accuracy of the estimates will increase. The 50% cost opinion will be +30% to -15% "Budget" Level as generally suggested by AACE International. The accuracy of the 90% and 100% cost opinions will be a +15% to -5% "Definitive" Level estimate also as suggested by AACE International. Therefore, total Program cost will be tracked to monitor general compliance with target budgets and reviewed with the City accordingly.

### 4.0 Project and Program Delivery Schedule

Exhibit 9-12 presents the proposed Program Delivery Schedule for implementation of the Winson WTP Improvement Program, inclusive of:

- ◆ BP 1: Filter Rehabilitation Project

- ◆ WTP Rehabilitation Basis of Design Report (BODR)
- ◆ BP 3 WTP Rehabilitation Project, and,
- ◆ BP 4: Water Storage Tanks.

This schedule represents a revision to the original Scope of Work authorized on March 9, 2012, as the BP 2 On-Site Raw Water System Improvements Project was combined with the BP 3 WTP Rehabilitation Project, and the level of effort for BP 2 reassigned to development of the referenced BP 4. As noted in the Preamble to this TM, BP 4 was made necessary due to the October 24, 2012 direction from the City to proceed with revisions to as needed to include the newly acquired City property located adjacent to the northeast perimeter of the Winson WTP into the BODR.

It is important to note that the scope of services allows for 20 and 10 day turnaround periods for City review comments on the 50% and 90% design completion stage submittals respectively. During these review periods, Consultant design progress will not include items that may be in flux, but rather focus on components that have a clear scope direction, thereby preserving the City's ability to comment on the submittal documents, while precluding potential redesign impacts.

Major milestones indicated by the attached schedule include the following:

- ◆ The City / H&S Team complied with State Revolving Fund guidelines for development and Bid of the BP 1 Filter Rehabilitation Project by May 31, 2012, within a total of 83 calendar days.
- ◆ The Basis of Design Report for the remainder of the Program will be completed in February 2012, and extended past the original target date of December 2012 to address revisions to six of the eight TMs resulting from the referenced additional land purchase and resulting impacts on the planned BP 3 Project.
- ◆ Barring unforeseen issues, the BP 3 WTP Rehabilitation Project should be ready to advertise for Bids on or about July 2013.

It is important to note that this schedule does not include "float time" for unforeseen conditions beyond the control of the City and/or Engineer, including bid protests and uncertainties related to permit acquisition. Consequently, the schedule presented herein is dynamic and is presented as a best case scenario.

## 5.0 Permitting

The BP 3 WTP Rehabilitation falls within the jurisdiction of the following regulatory entities:

- Miami-Dade Department of Health (for the Florida Department of Environmental Protection– Application for a Public Drinking Water Facility Construction Permit)
- City of North Miami Building Department

A combined duration of 60 days to achieve BP 3 permitting with regulatory agencies (50% and 90% reviews) has been established to match the scope of services. As referenced through the body of the Basis of Design Report, meetings have been ongoing with these agencies to identify potential permitting issues of concern and preview proposed sequenc-

ing and modified WTP operational scenarios. The contract documents will reflect the results of these reviews accordingly.

*Attachments*

*Distribution:*

*A. Ghany*

*W. Pierre-Louis*

*P. Vida*

*B. Vidal*

*T. Carney*

*J. Atoche*

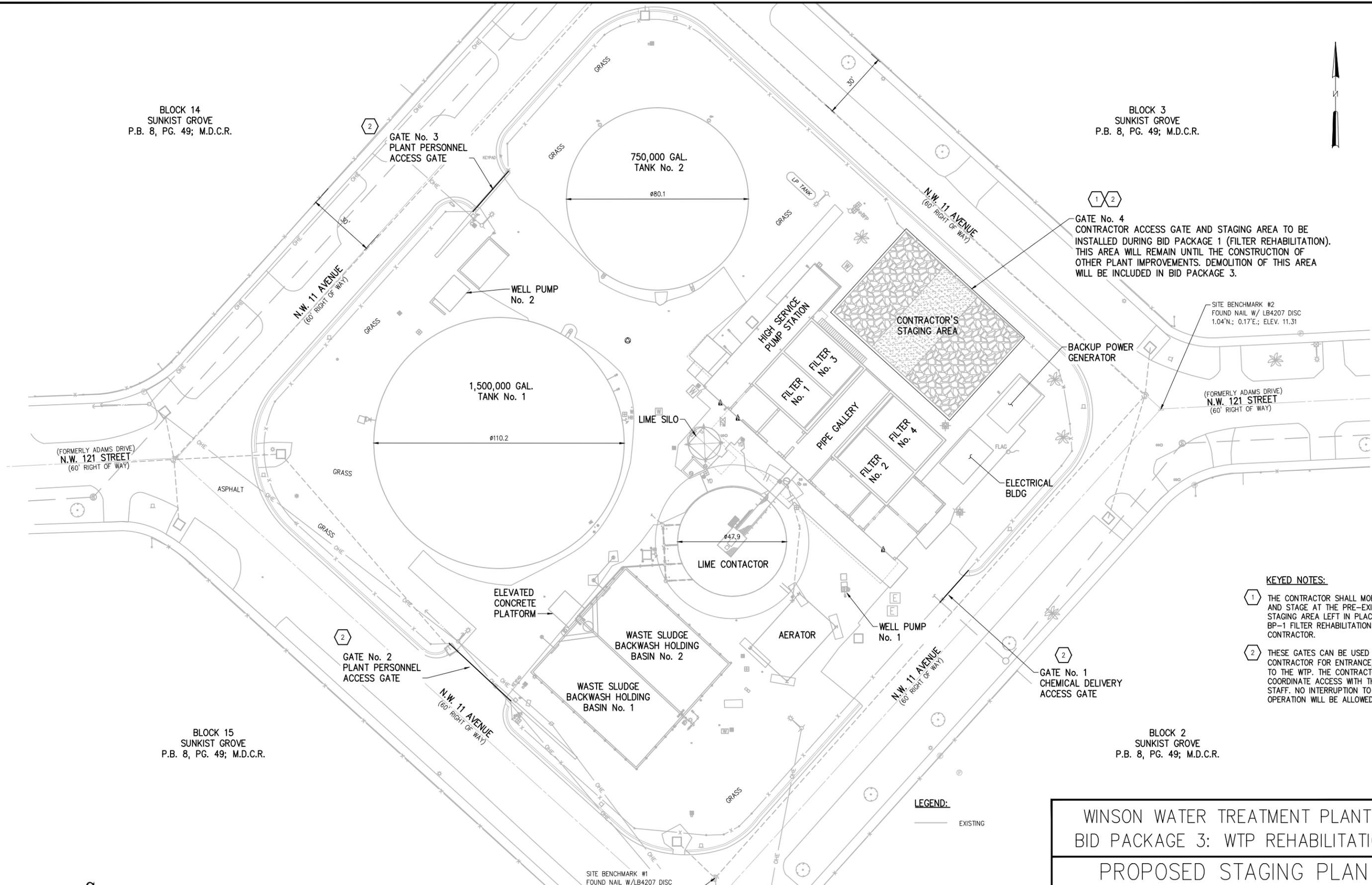
*c: G. Brown*

*File 44238-004 / 1.2*



BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.



GATE No. 4  
CONTRACTOR ACCESS GATE AND STAGING AREA TO BE  
INSTALLED DURING BID PACKAGE 1 (FILTER REHABILITATION).  
THIS AREA WILL REMAIN UNTIL THE CONSTRUCTION OF  
OTHER PLANT IMPROVEMENTS. DEMOLITION OF THIS AREA  
WILL BE INCLUDED IN BID PACKAGE 3.

SITE BENCHMARK #2  
FOUND NAIL W/ LB4207 DISC  
1.04'N.; 0.17'E.; ELEV. 11.31

(FORMERLY ADAMS DRIVE)  
N.W. 121 STREET  
(60' RIGHT OF WAY)

**KEYED NOTES:**

- 1 THE CONTRACTOR SHALL MOBILIZE AND STAGE AT THE PRE-EXISTING STAGING AREA LEFT IN PLACE BY THE BP-1 FILTER REHABILITATION PROJECT CONTRACTOR.
- 2 THESE GATES CAN BE USED BY THE CONTRACTOR FOR ENTRANCE/EGRESS TO THE WTP. THE CONTRACTOR SHALL COORDINATE ACCESS WITH THE CITY STAFF. NO INTERRUPTION TO THE WTP OPERATION WILL BE ALLOWED.

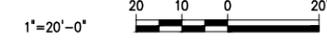
BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

SITE BENCHMARK #1  
FOUND NAIL W/ LB4207 DISC  
0.37'S.; 0.04'E.; ELEVATION=10.90

**LEGEND:**

— EXISTING



WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
PROPOSED STAGING PLAN  
PHASE - I  
EXHIBIT 9-1

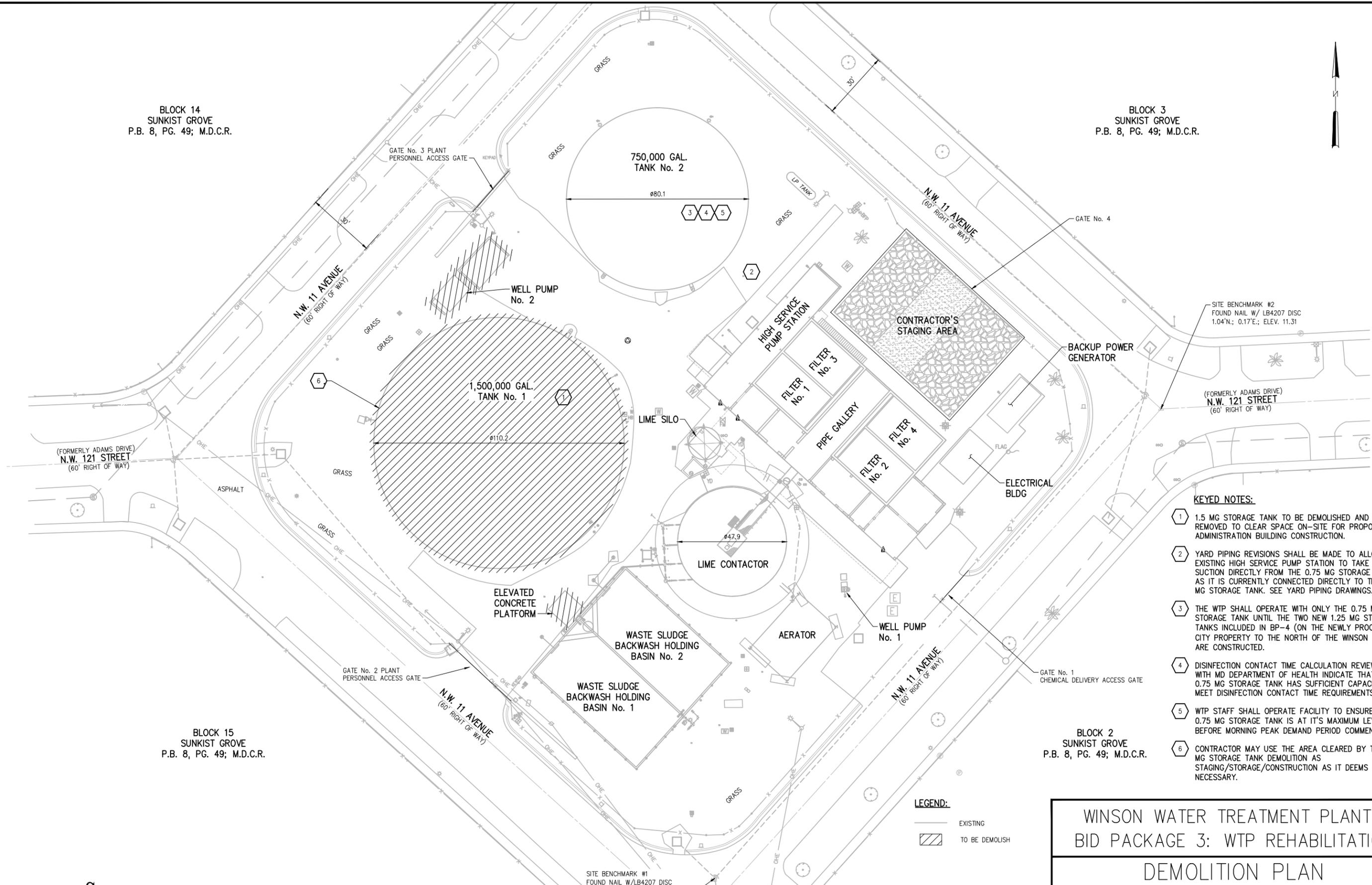


BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.



- KEYED NOTES:**
- 1 1.5 MG STORAGE TANK TO BE DEMOLISHED AND REMOVED TO CLEAR SPACE ON-SITE FOR PROPOSED ADMINISTRATION BUILDING CONSTRUCTION.
  - 2 YARD PIPING REVISIONS SHALL BE MADE TO ALLOW THE EXISTING HIGH SERVICE PUMP STATION TO TAKE SUCTION DIRECTLY FROM THE 0.75 MG STORAGE TANK, AS IT IS CURRENTLY CONNECTED DIRECTLY TO THE 1.5 MG STORAGE TANK. SEE YARD PIPING DRAWINGS.
  - 3 THE WTP SHALL OPERATE WITH ONLY THE 0.75 MG STORAGE TANK UNTIL THE TWO NEW 1.25 MG STORAGE TANKS INCLUDED IN BP-4 (ON THE NEWLY PROCURED CITY PROPERTY TO THE NORTH OF THE WINSON WTP) ARE CONSTRUCTED.
  - 4 DISINFECTION CONTACT TIME CALCULATION REVIEWED WITH MD DEPARTMENT OF HEALTH INDICATE THAT THE 0.75 MG STORAGE TANK HAS SUFFICIENT CAPACITY TO MEET DISINFECTION CONTACT TIME REQUIREMENTS.
  - 5 WTP STAFF SHALL OPERATE FACILITY TO ENSURE THAT 0.75 MG STORAGE TANK IS AT IT'S MAXIMUM LEVEL BEFORE MORNING PEAK DEMAND PERIOD COMMENCES.
  - 6 CONTRACTOR MAY USE THE AREA CLEARED BY THE 1.5 MG STORAGE TANK DEMOLITION AS STAGING/STORAGE/CONSTRUCTION AS IT DEEMS NECESSARY.

**LEGEND:**  
 ——— EXISTING  
 [Hatched Box] TO BE DEMOLISH

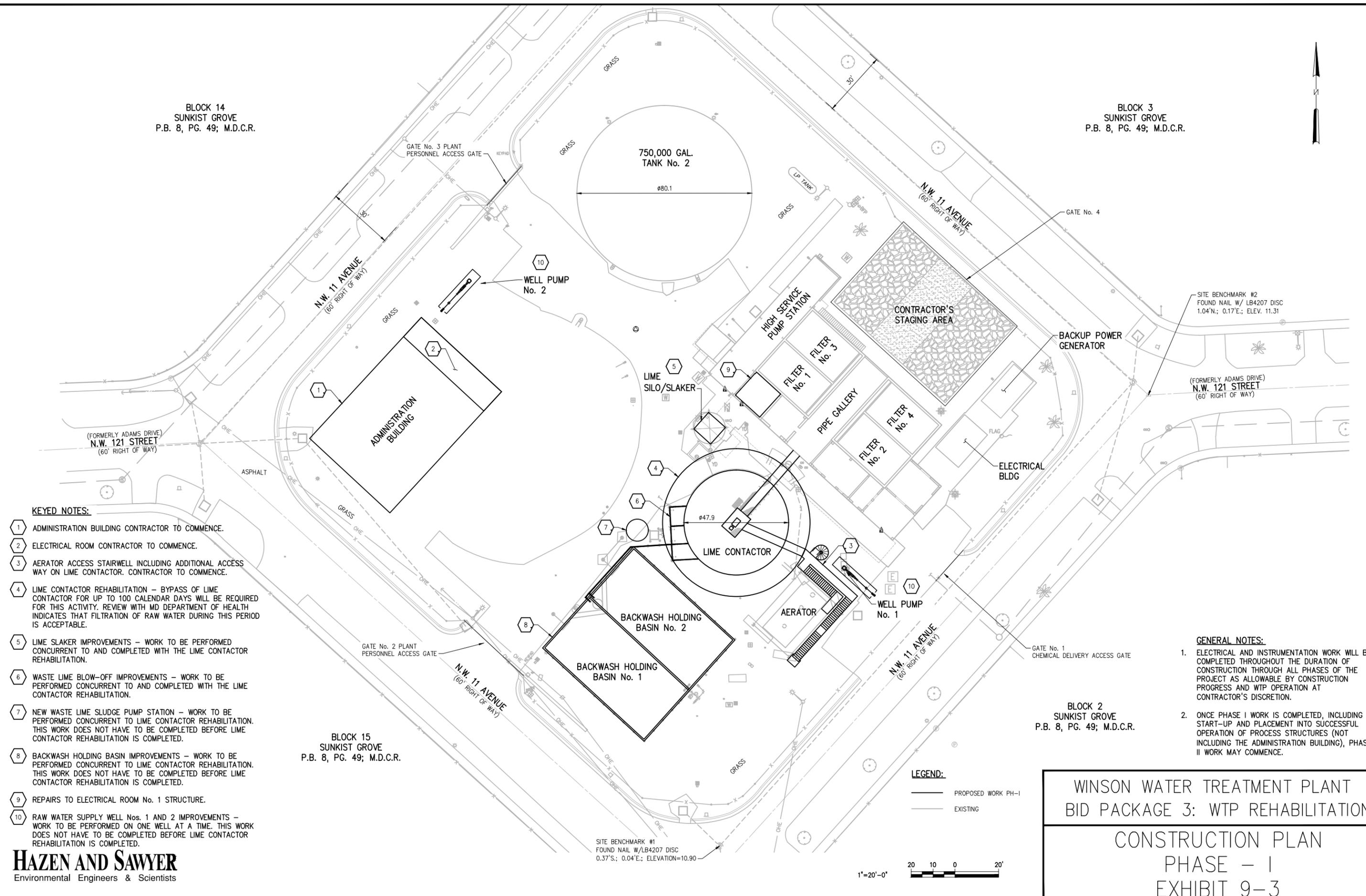


WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 DEMOLITION PLAN  
 PHASE - I  
 EXHIBIT 9-2



BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.



**KEYED NOTES:**

- 1 ADMINISTRATION BUILDING CONTRACTOR TO COMMENCE.
- 2 ELECTRICAL ROOM CONTRACTOR TO COMMENCE.
- 3 AERATOR ACCESS STAIRWELL INCLUDING ADDITIONAL ACCESS WAY ON LIME CONTACTOR. CONTRACTOR TO COMMENCE.
- 4 LIME CONTACTOR REHABILITATION - BYPASS OF LIME CONTACTOR FOR UP TO 100 CALENDAR DAYS WILL BE REQUIRED FOR THIS ACTIVITY. REVIEW WITH MD DEPARTMENT OF HEALTH INDICATES THAT FILTRATION OF RAW WATER DURING THIS PERIOD IS ACCEPTABLE.
- 5 LIME SLAKER IMPROVEMENTS - WORK TO BE PERFORMED CONCURRENT TO AND COMPLETED WITH THE LIME CONTACTOR REHABILITATION.
- 6 WASTE LIME BLOW-OFF IMPROVEMENTS - WORK TO BE PERFORMED CONCURRENT TO AND COMPLETED WITH THE LIME CONTACTOR REHABILITATION.
- 7 NEW WASTE LIME SLUDGE PUMP STATION - WORK TO BE PERFORMED CONCURRENT TO LIME CONTACTOR REHABILITATION. THIS WORK DOES NOT HAVE TO BE COMPLETED BEFORE LIME CONTACTOR REHABILITATION IS COMPLETED.
- 8 BACKWASH HOLDING BASIN IMPROVEMENTS - WORK TO BE PERFORMED CONCURRENT TO LIME CONTACTOR REHABILITATION. THIS WORK DOES NOT HAVE TO BE COMPLETED BEFORE LIME CONTACTOR REHABILITATION IS COMPLETED.
- 9 REPAIRS TO ELECTRICAL ROOM No. 1 STRUCTURE.
- 10 RAW WATER SUPPLY WELL Nos. 1 AND 2 IMPROVEMENTS - WORK TO BE PERFORMED ON ONE WELL AT A TIME. THIS WORK DOES NOT HAVE TO BE COMPLETED BEFORE LIME CONTACTOR REHABILITATION IS COMPLETED.

**GENERAL NOTES:**

- 1. ELECTRICAL AND INSTRUMENTATION WORK WILL BE COMPLETED THROUGHOUT THE DURATION OF CONSTRUCTION THROUGH ALL PHASES OF THE PROJECT AS ALLOWABLE BY CONSTRUCTION PROGRESS AND WTP OPERATION AT CONTRACTOR'S DISCRETION.
- 2. ONCE PHASE I WORK IS COMPLETED, INCLUDING START-UP AND PLACEMENT INTO SUCCESSFUL OPERATION OF PROCESS STRUCTURES (NOT INCLUDING THE ADMINISTRATION BUILDING), PHASE II WORK MAY COMMENCE.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

**LEGEND:**

- PROPOSED WORK PH-I
- EXISTING



SITE BENCHMARK #1  
FOUND NAIL W/LB4207 DISC  
0.37'S.; 0.04'E.; ELEVATION=10.90

SITE BENCHMARK #2  
FOUND NAIL W/ LB4207 DISC  
1.04'N.; 0.17'E.; ELEV. 11.31

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
CONSTRUCTION PLAN  
PHASE - I  
EXHIBIT 9-3

PLOT DATE: 11/21/2012 3:24 PM BY: TBCCAS

XREF= \\Base\C-Site-Survey-X

File = C:\Users\ibocas\AppData\Roaming\ProjectPoint-2011\Work\projectpoint\buzzsaw.com\hazensawyer\North Miami WTP Improvements (44238-004)\Drawings\Bid Package 3 - WTP Rehab\Exhibits\9-3\Winson WTP Rehabilitation - RFP No. 4508-15

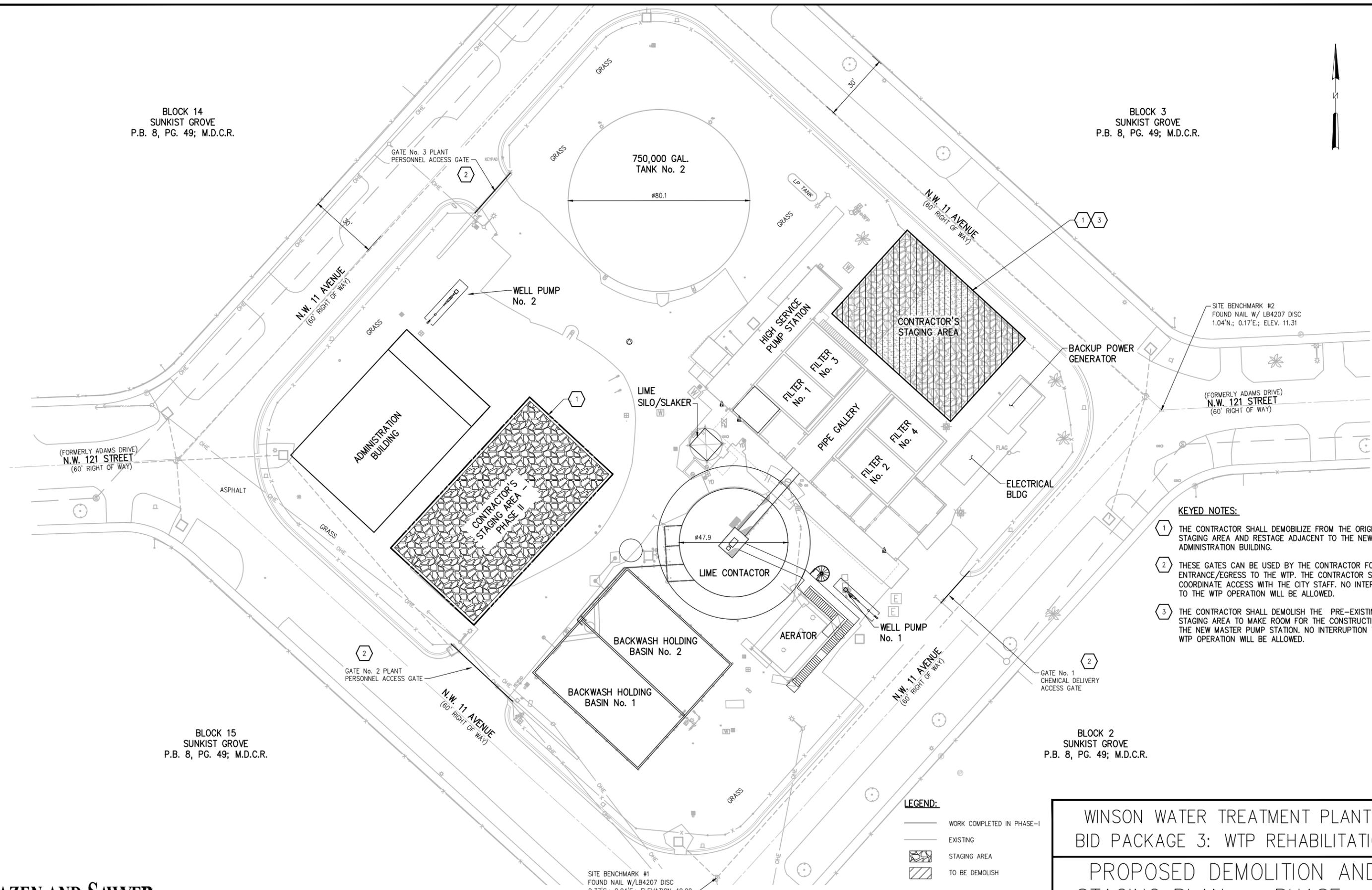


BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.



**KEYED NOTES:**

- 1 THE CONTRACTOR SHALL DEMOBILIZE FROM THE ORIGINAL STAGING AREA AND RESTAGE ADJACENT TO THE NEW ADMINISTRATION BUILDING.
- 2 THESE GATES CAN BE USED BY THE CONTRACTOR FOR ENTRANCE/EGRESS TO THE WTP. THE CONTRACTOR SHALL COORDINATE ACCESS WITH THE CITY STAFF. NO INTERRUPTION TO THE WTP OPERATION WILL BE ALLOWED.
- 3 THE CONTRACTOR SHALL DEMOLISH THE PRE-EXISTING STAGING AREA TO MAKE ROOM FOR THE CONSTRUCTION OF THE NEW MASTER PUMP STATION. NO INTERRUPTION TO THE WTP OPERATION WILL BE ALLOWED.

**LEGEND:**

- WORK COMPLETED IN PHASE-I
- EXISTING
- ▨ STAGING AREA
- ▩ TO BE DEMOLISH



SITE BENCHMARK #1  
FOUND NAIL W/LB4207 DISC  
0.37'S.; 0.04'E.; ELEVATION=10.90

SITE BENCHMARK #2  
FOUND NAIL W/ LB4207 DISC  
1.04'N.; 0.17'E.; ELEV. 11.31

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
PROPOSED DEMOLITION AND  
STAGING PLAN PHASE - II  
EXHIBIT 9-4

PLOT DATE: 11/21/2012 3:25 PM BY: TBCCAS

XREF= \\Base\C-Site-Survey-X

File = C:\Users\ibocas\AppData\Roaming\ProjectPoint-2011\Work\projectpoint\luzzsaw.com\hazenandsawyer\North Miami WTP Improvements (44238-004)\Drawings\Bid Package 3 - WTP Rehab\Exhibits\11-21-2012\11-21-2012 3:25 PM Addendum 1 - RFP No. 4508-19



BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

**GENERAL NOTES:**

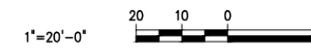
- ELECTRICAL AND INSTRUMENTATION WORK WILL BE COMPLETED THROUGHOUT THE DURATION OF CONSTRUCTION THROUGH ALL PHASES OF THE PROJECT AS ALLOWABLE BY CONSTRUCTION PROGRESS AND WTP OPERATION AT CONTRACTOR'S DISCRETION.
- ONCE PHASE II WORK IS COMPLETED, INCLUDING START-UP AND PLACEMENT INTO SUCCESSFUL OPERATION OF THE MASTER PUMP STATION (NOT INCLUDING THE ADMINISTRATION BUILDING), PHASE-III WORK MAY COMMENCE.

**KEYED NOTES:**

- MASTER PUMP STATION - TIE-IN OF THE MASTER PUMP STATION TO THE EXISTING FILTER CLEARWELL WILL REQUIRE A PLANNED SHUTDOWN OF THE FILTERS AND THE WTP FOR 3 CALENDAR DAYS.
- ADDITIONAL WATER WILL BE PURCHASED BY THE CITY FROM MD-WASD DURING THE PLANNED WTP SHUTDOWN.
- AN INSPECTION OF THE CLEARWELL WILL BE PERFORMED DURING THE PLANNED WTP SHUTDOWN.
- CONTRACTOR TO REMOVE THE LAYER OF PRECIPITATE REPORTED TO EXIST UNIFORMLY THROUGHOUT THE CLEARWELL (BY UNDERWATER SOLUTIONS, INC. REPORT OF MARCH 2005) DURING THE PLANNED WTP SHUTDOWN.
- ADMINISTRATION BUILDING CONSTRUCTION CONTINUES.
- ELECTRICAL ROOM CONSTRUCTION CONTINUES.

**LEGEND:**

- PROPOSED WORK PHASE-II
- WORK COMPLETED IN PHASE-I
- EXISTING
- ▨ STAGING AREA



**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
CONSTRUCTION PLAN  
PHASE - II  
EXHIBIT 9-5

PLOT DATE: 11/21/2012 3:22 PM BY: TBCCAS

XREF= \\Base\C-Site-Survey-X

File = C:\Users\tbocas\AppData\Roaming\ProjectPoint-2011\Work\projectpoint\buzzsaw.com\hazenandsawyer\North Miami WTP Improvements (44238-004)\Drawings\Bid Package 3 - WTP Rehab\Exhibits\11-21-2012\11-21-2012 3:10 PM Addendum 1 - RFP No. 45-08-15







BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

**GENERAL NOTES:**

- ELECTRICAL AND INSTRUMENTATION WORK WILL BE COMPLETED THROUGHOUT THE DURATION OF CONSTRUCTION THROUGH ALL PHASES OF THE PROJECT AS ALLOWABLE BY CONSTRUCTION PROGRESS AND WTP OPERATION AT CONTRACTOR'S DISCRETION.
- ONCE PHASE III WORK IS COMPLETED, INCLUDING START-UP AND PLACEMENT INTO SUCCESSFUL OPERATION OF THE CHEMICAL HANDLING FACILITIES AND SODIUM HYPOCHLORITE STORAGE AND FEED FACILITIES (NOT INCLUDING THE ADMINISTRATION BUILDING), PHASE IV WORK MAY COMMENCE.

**KEYED NOTES:**

- NEW CHEMICAL HANDLING FACILITIES INCLUDING AMMONIA, FLUORIDE, COAGULANT AND ANTI COAGULANT WILL BE LOCATED IN FORMER HIGH SERVICE PUMP STATION, RENAMED TO CHEMICAL HANDLING FACILITY.
- CONTRACTOR TO PERFORM STRUCTURAL IMPROVEMENTS TO FORMER HSPS ROOM SLAB, BUILDING ENCLOSURE AND HVAC, AS NEEDED. AS AGREED WITH THE CITY OF NORTH MIAMI BUILDING DEPARTMENT, THIS WORK REPRESENTS LIMITED UPGRADES TO A PORTION OF THE PRE-EXISTING FILTER/OPERATIONS BUILDING STRUCTURE.
- NEW SODIUM HYPOCHLORITE STORAGE/FEED FACILITY AND ACCESS GATE No. 5 SHALL BE PROVIDED FOR CHEMICAL DELIVERY.
- ADMINISTRATION BUILDING CONSTRUCTION CONTINUES.
- ELECTRICAL ROOM CONSTRUCTION CONTINUES.

**LEGEND:**

- PROPOSED WORK PHASE-III
- WORK COMPLETED IN PHASE-I AND II
- EXISTING
- ▨ STAGING AREA

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
CONSTRUCTION PLAN  
PHASE - III  
EXHIBIT 9-7

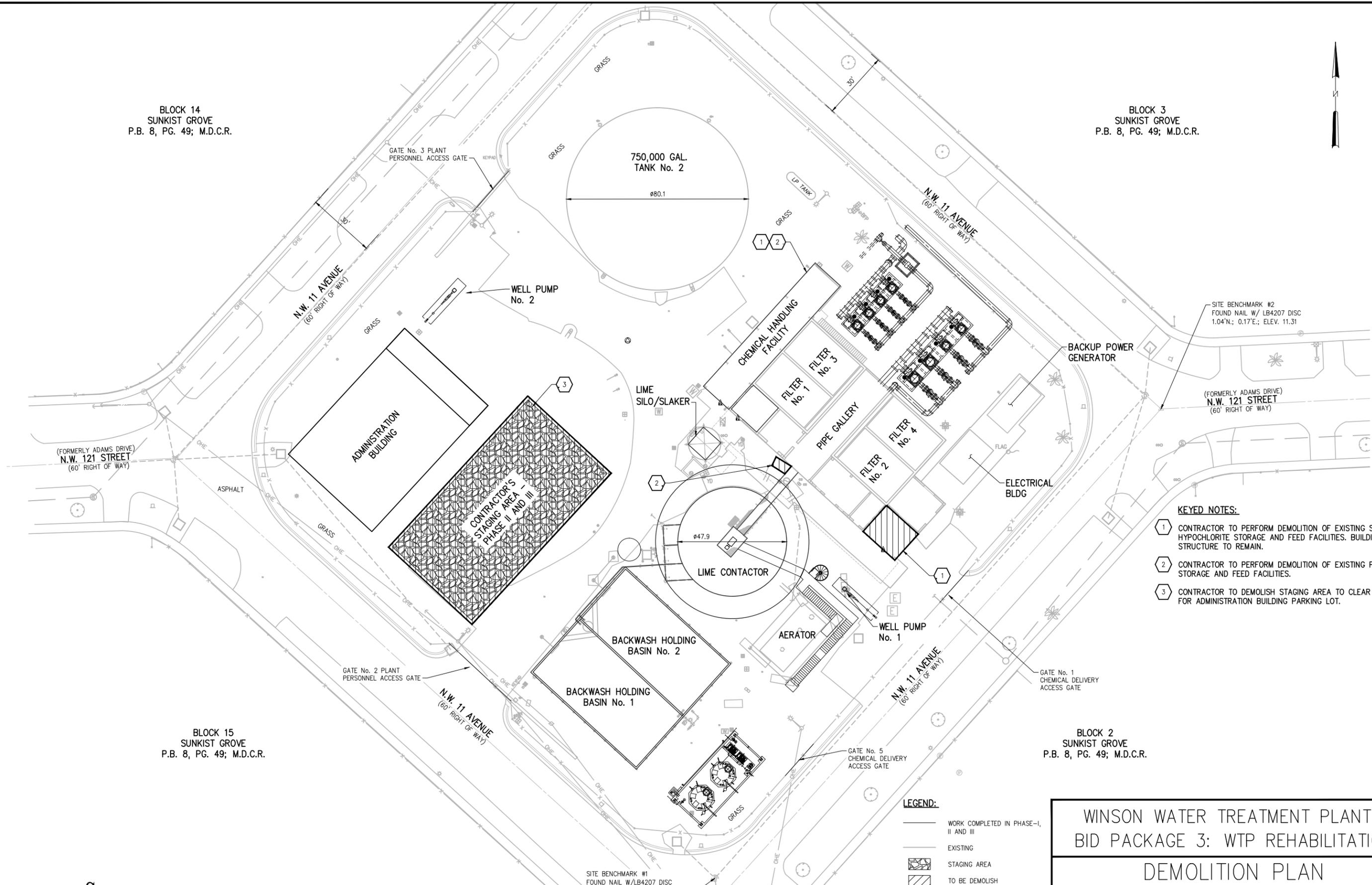


BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.



- KEYED NOTES:**
- 1 CONTRACTOR TO PERFORM DEMOLITION OF EXISTING SODIUM HYPOCHLORITE STORAGE AND FEED FACILITIES. BUILDING STRUCTURE TO REMAIN.
  - 2 CONTRACTOR TO PERFORM DEMOLITION OF EXISTING POLYMER STORAGE AND FEED FACILITIES.
  - 3 CONTRACTOR TO DEMOLISH STAGING AREA TO CLEAR SPACE FOR ADMINISTRATION BUILDING PARKING LOT.

- LEGEND:**
- WORK COMPLETED IN PHASE-I, II AND III
  - EXISTING
  - ▨ STAGING AREA
  - ▩ TO BE DEMOLISH

SITE BENCHMARK #1  
FOUND NAIL W/LB4207 DISC  
0.37'S.; 0.04'E.; ELEVATION=10.90



WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
DEMOLITION PLAN  
PHASE - IV  
EXHIBIT 9-8



BLOCK 14  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 3  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 15  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

BLOCK 2  
SUNKIST GROVE  
P.B. 8, PG. 49; M.D.C.R.

**GENERAL NOTES:**

1. ALL NEW ELECTRICAL AND INSTRUMENTATION WORK HAS BEEN COMPLETED.
2. ONCE PHASE-IV WORK IS COMPLETED, THE PROJECT IS COMPLETED.

**KEYED NOTES:**

- 1 NEW PROPOSED PAVING.
- 2 STORMWATER SWALES.
- 3 LANDSCAPING AND IRRIGATION.
- 4 SITE ACCESS SECURITY GATES AND VIDEO SURVEILLANCE.
- 5 ADMINISTRATION BUILDING COMPLETE.
- 6 ELECTRICAL ROOM COMPLETE.

**LEGEND:**

- PROPOSED WORK PHASE-IV
- WORK COMPLETED IN PHASE-I, II AND III
- EXISTING
- ▨ STORM WATER SWALE
- ▨ PAVEMENT

**HAZEN AND SAWYER**  
Environmental Engineers & Scientists

WINSON WATER TREATMENT PLANT  
BID PACKAGE 3: WTP REHABILITATION  
CONSTRUCTION PLAN  
PHASE - IV  
EXHIBIT 9-9







**Exhibit 9-11  
Preliminary Project Cost Estimate and Program Summary**

DESCRIPTION	VALUE		PROGRAM SUMMARY			
ITEM 1 - GENERAL	\$1,403,000	12.49%	BP 1: FILTER REHABILITATION		\$3,676,000	
ITEM 2 - SITEWORK	\$495,000	4.41%	BP 3: WTP REHABILITATION PROJECT		\$11,237,000	
ITEM 3 - PIPING AND VALVES	\$440,000	3.92%	BP 4: NEW WATER STORAGE TANKS <sup>4</sup>		\$1,950,000	
ITEM 4 - CONCRETE AND STRUCTURAL	\$2,479,000	22.06%	CONSTRUCTION COST		\$16,863,000	
ITEM 5 - ARCHITECTURAL	\$110,000	0.98%	ENGINEERING AND MANAGEMENT (20%)		\$3,373,000	
ITEM 6 - EQUIPMENT	\$2,384,000	21.22%	TOTAL PROGRAM COST		\$20,236,000	
ITEM 7 - ELECTRICAL	\$1,155,000	10.28%	ESTIMATE MARCH 2012 (20% ENG) <sup>5</sup>		\$18,562,950	
ITEM 8 - INSTRUMENTATION	\$523,000	4.65%	NET		(\$1,673,050)	
ITEM 9 - HVAC AND PLUMBING	\$0	0.00%				
<b>SUBTOTAL</b>	<b>\$8,989,000</b>	<b>79.99%</b>				
<b>ESTIMATING CONTINGENCY</b>	<b>\$2,248,000</b>	<b>25%</b>				
<b>TOTAL ESTIMATED BP 3 PROJECT COST <sup>1</sup></b>	<b>\$11,237,000</b>					
<b>BP 3 WTP REHABILITATION PROJECT</b>						
ITEM NO.	DESCRIPTION <sup>3</sup>	QUANTITY	UNIT	UNIT PRICE	INSTALLATION <sup>2</sup>	TOTAL
<b>ITEM 1 - GENERAL</b>						
	BONDS AND INSURANCE	1.5%	%	\$7,586,000	-	\$114,000
	MOBILIZATION	1	LS	\$50,000	-	\$50,000
	GENERAL CONDITIONS - SEQUENCING	12	MO	\$7,500	-	\$90,000
	SURVEY AND LAYOUT	1	LS	\$10,000	-	\$10,000
	CITY OF NORTH MIAMI PERMIT FEES	1	LS	WAIVED	-	\$0
	INDEMNIFICATION	1	LS	\$100	-	\$100
	UNFORESEEN CONDITIONS (ALLOWANCE -NIC)	0.0%	%	\$7,586,000	-	\$0
	CONTRACTOR OVERHEAD AND PROFIT	15.0%	%	\$7,586,000	-	\$1,138,000
				<b>SUBTOTAL</b>		<b>\$1,402,100</b>
<b>ITEM 2 - SITEWORK</b>						
	GENERAL SITE WORK (SW, LANDSCAPE, IRRIGATION SECURITY)	1	LS	\$400,000	1.10	\$440,000
	1.5 MG STORAGE TANK DEMO	1	LS	\$50,000	1.10	\$55,000
					<b>SUBTOTAL</b>	<b>\$495,000</b>
<b>ITEM 3 - PIPING AND VALVES</b>						
	YARD PIPING (NEW & REPLACEMENTS)	1	LS	\$200,000	1.10	\$220,000
	PROCESS PIPING ABOVE GROUND (NEW & REPLACEMENTS)	1	LS	\$200,000	1.10	\$220,000
					<b>SUBTOTAL</b>	<b>\$440,000</b>
<b>ITEM 4 - CONCRETE AND STRUCTURAL</b>						
	ADMINISTRATION BUILDING (AII INCLUSIVE - LEED SILVER)	6,932	SF	\$325	1.00	\$2,252,900
	MASTER PUMP STATION	1	LS	\$30,000	1.10	\$33,000
	NEW COVERED WALKWAY	1	LS	\$25,000	1.10	\$27,500
	WASTE BACKWASH BASIN AN HIGH SERVICE PUMP STATION REHAB	1	LS	\$75,000	1.10	\$82,500
	WASTE LIME SLUDGE PUMP STATION	1	LS	\$50,000	1.10	\$55,000
	AERATOR ACCESS STAIRWAY AND STRUCTURE REPAIRS	1	LS	\$25,000	1.10	\$27,500
					<b>SUBTOTAL</b>	<b>\$2,478,400</b>
<b>ITEM 5 - ARCHITECTURAL</b>						
	ADMIN BLDG INCLUDED ITEM 3	1	LS	\$0	1.10	\$0
	EXISTING FACILITY PAINT - EXTERIOR	1	LS	\$100,000	1.10	\$110,000
					<b>SUBTOTAL</b>	<b>\$110,000</b>
<b>ITEM 6 - EQUIPMENT</b>						
	RAW WATER WELL PUMPS 1 & 2	2	EA	\$15,000	1.20	\$36,000
	ACCELATOR AND BLOW-OFF VALVE REHABILITATION	1	LS	\$600,000	1.20	\$720,000
	LIME SLAKER AND SILO REHAB ADDITIONAL UNIT	1	LS	\$150,000	1.20	\$180,000
	MASTER PUMP STATION - HIGH SERVICE PUMPS	4	EA	\$115,000	1.10	\$506,000
	MASTER PUMP STATION - TRANSFER PUMPS	2	EA	\$100,000	1.10	\$220,000
	MASTER PUMP STATION - BACKWASH PUMPS	2	EA	\$110,000	1.10	\$242,000
	AMMONIA FEED PUMPS	2	EA	\$12,000	1.20	\$28,800
	FLUORIDE FEED PUMPS	2	EA	\$12,000	1.20	\$28,800
	COAGULANT AID FEED PUMPS	2	EA	\$12,000	1.20	\$28,800
	ANTI-COAGULANT FEED PUMPS	2	EA	\$12,000	1.20	\$28,800
	AMMONIA STORAGE TANK	1	EA	\$10,000	1.20	\$12,000
	FLUORIDE STORAGE TANK	1	EA	\$10,000	1.20	\$12,000
	ANTI-COAGULANT STORAGE TANK	1	EA	\$10,000	1.20	\$12,000
	COAGULANT AID DILUTION SYSTEM	1	EA	\$76,000	1.20	\$91,200
	SODIUM HYPOCHLORITE FEED FACILITY	1	LS	\$150,000	1.10	\$165,000
	MIST ELIMINATOR PANELS FOR AERATOR	1	LS	\$5,000	1.10	\$5,500
	WASTE LIME SLUDGE PUMPS	2	EA	\$15,000	1.10	\$33,000
	DECANT RETURN PUMPS	2	EA	\$10,000	1.20	\$24,000
	MOTORIZED VALVE OPERATORS	3	EA	\$3,000	1.10	\$9,900
					<b>SUBTOTAL</b>	<b>\$2,383,800</b>
<b>ITEM 7 - ELECTRICAL</b>						
	ELECTRICAL MATERIALS AND METHODS	1	LS	\$1,050,000	1.10	\$1,155,000
					<b>SUBTOTAL</b>	<b>\$1,155,000</b>
<b>ITEM 8 - INSTRUMENTATION</b>						
	WTP DCS SYSTEM MATERIALS AND METHODS (500 I/O POINTS)	1	LS	\$475,000	1.10	\$522,500
					<b>SUBTOTAL</b>	<b>\$522,500</b>
<b>ITEM 9 - HVAC AND PLUMBING</b>						
	ADMIN BLDG INCLUDED ITEM 3	1	LS	\$0	1.10	\$0
					<b>SUBTOTAL</b>	<b>\$0</b>
<sup>1</sup> INCLUDES 25% ESTIMATING CONTINGENCY						
<sup>2</sup> NEW = 1.10, FOR REHABILITATION WORK = 1.2. (EXCEPT FOR ADMIN BLDG UNIT PRICE = 1.0)						
<sup>3</sup> TBD = PRELIMINARY ESTIMATES NEEDS TO BE DEFINED / FINALIZED DURING DETAILED DESIGN						
<sup>4</sup> ASSUMES TWO NEW 1.25 MG PRESTRESSED CONCRETE TANKS @ \$0.60 PER GALLON PLUS 30% FOR TANK IMPROVEMENTS, SITE PREPARATION BY CITY, COSTS NOT INCLUDED HERE						
<sup>5</sup> ESTIMATE FROM MAR 2012 (\$20,660,000) REDUCED BY \$2,097,050 FOR WELL NOS. 3 THROUGH 8 FUNDING NOT INCLUDED IN THIS SCOPE						

City of North Miami Winson WTP Upgrade Planning Level Cost Estimate

3/19/2012

Generally Based on Feasibility Study - OHP @20% + 30% Contingency + March 2012 ENRCCI + 15% Rehab factor

8805

9268

Item	Feasibility Study Phase	Description	QTY	Unit	H&S Estimate		July-10		Subtotal	Engineering and CM Range		Engineering and CM Fee Submitted
					Unit Cost with OHP & Cont.	Value	Subtotal	Subtotal		15%	20%	
1	1	Accelerator -Structural & Mechanical repair	1	LS	\$ 624,000	\$ 800,000	\$ 800,000	\$ 850,000	\$ 850,000	\$ 120,000	\$ 160,000	
2	1	Sludge Basin (assume Alt. 2b)	1	LS	\$ 250,000	\$ 250,000	\$ 250,000	\$ 270,000	\$ 270,000	\$ 37,500	\$ 50,000	
3	1	Filter Gallery and Filters	1	LS	\$ 2,049,000	\$ 3,000,000	\$ 3,000,000	\$ 3,160,000	\$ 3,160,000	\$ 450,000	\$ 600,000	\$ 537,264
4	1	Backwash System	1	LS	\$ 601,169	\$ 600,000	\$ 600,000	\$ 640,000	\$ 640,000	\$ 90,000	\$ 120,000	
5	1	Clearwell	1		\$ 150,000	\$ 150,000	\$ 150,000	\$ 160,000	\$ 160,000			
6	1	Ancillary Systems (slaker replacement)	1	LS	\$ -	\$ -	\$ -	\$ -	\$ -			
7	1	Biscayne Wells	1	LS	\$ 2,400,000	\$ 2,400,000	\$ 2,400,000	\$ 2,530,000	\$ 2,530,000	\$ 360,000	\$ 480,000	\$ 452,000 18.8%
8	1	Electrical and I&C	1	LS	\$ 3,005,847	\$ 3,000,000	\$ 3,000,000	\$ 3,160,000	\$ 3,160,000	\$ 450,000	\$ 600,000	
9	1	Main Building Rooms (assume new 5000 sf building (2 st.))	1	LS	\$ 1,250,000	\$ 1,250,000	\$ 1,250,000	\$ 1,320,000	\$ 1,320,000	\$ 187,500	\$ 250,000	
10	1	Facility Structure (assume repairs only)	1	LS	\$ 200,000	\$ 200,000	\$ 200,000	\$ 220,000	\$ 220,000	\$ 30,000	\$ 40,000	
11	1	Startup	1	LS	\$ 100,195	\$ 100,000	\$ 100,000	\$ 110,000	\$ 110,000	\$ 15,000	\$ 20,000	
12	2	General Civil/Sitework	1	LS	\$ 601,169	\$ 600,000	\$ 600,000	\$ 640,000	\$ 640,000	\$ 90,000	\$ 120,000	
13	2	Transfer Pumps (assume 3/5 of FAS+LS)	1	LS	\$ 541,052	\$ 550,000	\$ 550,000	\$ 580,000	\$ 580,000	\$ 82,500	\$ 110,000	
14	2	High Service Pump (assume 50% of FAS+LS)	1	LS	\$ 2,003,898	\$ 2,000,000	\$ 2,000,000	\$ 2,110,000	\$ 2,110,000	\$ 300,000	\$ 400,000	
15	2	Chemicals (assume 25% of FAS+LS)	1	LS	\$ 300,585	\$ 300,000	\$ 300,000	\$ 320,000	\$ 320,000	\$ 45,000	\$ 60,000	
16	1	Storage Tank Rehabilitation	1	LS	\$ -	\$ 1,500,000	\$ 1,500,000	\$ 1,580,000	\$ 1,580,000	\$ 225,000	\$ 300,000	
							\$ 16,700,000	\$ 16,700,000	\$ 17,650,000	\$ 2,257,500	\$ 3,010,000	

Exhibit 9-11B  
Line Item 7 Biscayne Wellfield Cost Estimates

Bid	Activity	Description				Scheduled	
Item	ID		QTY	Unit	Unit Cost	Value	
<b>1</b>		<b>Mobilization</b>					
	1010	Mobilization	2400000	LS	3%	\$72,000	0.05
	2120	Demobilization	2400000	LS	1%	\$24,000	0.02
<b>3</b>		<b>Well Rehab</b>					
	1015	Shallow Aquifer well field development and rehabilitation	8	EA	\$ 15,000.00	\$120,000	FGUA Quote 11500
		New Pumps	8	EA	80000	\$640,000	
Piping							
		24" Piping	84	LF	\$255.00	\$21,420	
		20" Piping	271	LF	\$204.00	\$55,284	
		12" Piping	2200	LF	\$171.00	\$376,200	
		10" Piping	1385	LF	\$122.25	\$169,316	
		8" Piping	992	LF	\$90.00	\$89,280	
		<i>Sum of Piping</i>	<i>4932</i>				<i>711,500.25</i>
		Valves	15	each	10000	\$150,000	
Electrical							
		Electrical	8	each	5000	\$40,000	
Instrumentation							
		Instrumentation per site	8	each	15000	\$120,000	
		Intergrate with Existing system	1	LS	25000	\$25,000	
		Subtotal				\$1,902,500	
		<b>Contingency</b>	<b>1</b>		<b>30%</b>	<b>\$2,473,250</b>	
						<b>\$376,200</b>	
		<b>2 of 8 wells plus ancillary improvements (minus 2200 LF of 12-inch Pipe)</b>				<b>\$2,097,050</b>	
				<b>Portion of Costs in TM 9 and BP 3</b>		<b>\$524,263</b>	



EXHIBIT 9-12  
 Proposed North Miami Winson WTP Rehabilitation  
 Program Schedule (BP 1 through BP 4)  
 REVISED - February 2013

ID	Task Name	Duration	Start	2012												2013												2014												2015		
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1	<b>NM WTP Improvements</b>	<b>829 days</b>	<b>Fri 3/9/12</b>	3/9																																				<b>5/13</b>		
2	<b>Notice To Proceed</b>	0 days	Fri 3/9/12	3/9																																						
3																																										
4	<b>Bid Package 1 - Filter Rehabilitation</b>	<b>574 days</b>	<b>Fri 3/9/12</b>	3/9																																				<b>5/21</b>		
5	<b>60% Design Completion Stage</b>	<b>23 days</b>	<b>Fri 3/9/12</b>	3/9																																				<b>4/11</b>		
6	Task 1 - Design	10 days	Fri 3/9/12																																							
7	QC	11 days	Fri 3/23/12																																							
8	Submittal	0 days	Wed 4/11/12	4/11																																						
9	<b>Preliminary Permitting</b>	11 days	Wed 4/11/12																																							
10	<b>90% Design Completion Stage</b>	<b>31 days</b>	<b>Mon 3/12/12</b>	3/12																																				<b>4/23</b>		
11	Design	19 days	Mon 3/12/12																																							
12	QC	12 days	Fri 4/6/12																																							
13	Submittal	0 days	Mon 4/23/12	4/23																																						
14	<b>Permitting</b>	10 days	Fri 5/11/12																																							
15	<b>100% Bid Set</b>	<b>26 days</b>	<b>Tue 4/24/12</b>	4/24																																				<b>5/29</b>		
16	Design	22 days	Tue 4/24/12																																							
17	QC	4 days	Thu 5/24/12																																							
18	Submittal	0 days	Tue 5/29/12	5/29																																						
19	<b>Bidding</b>	142 days	Thu 5/31/12																																							
20	<b>NTP From City to Contractor - ASSUMED</b>	0 days	Thu 2/28/13	2/28																																						
21	<b>Construction</b>	320 days	Thu 2/28/13																																							
22																																										
23	<b>BODR</b>	<b>197 days</b>	<b>Thu 5/31/12</b>																																							
24	Draft BODR	105 days	Thu 5/31/12																																							
25	Revised BODR for Additional City Land	48 days	Wed 10/24/12																																							
26	City Review	136 days	Fri 8/24/12																																							
27	Final BODR	0 days	Fri 3/1/13	3/1																																						
28																																										
29	<b>Bid Package 2 - On-Site Raw Water - (Included in BP 3)</b>	0 days	Mon 3/12/12	3/12																																						
30																																										
31	<b>Bid Package 3 - WTP Rehabilitation</b>	<b>725 days</b>	<b>Wed 8/1/12</b>	8/1																																				<b>5/12</b>		
32	<b>60% Design Completion Stage</b>	<b>193 days</b>	<b>Wed 8/1/12</b>	8/1																																				<b>4/26</b>		
33	Task 1 - Design	163 days	Wed 8/1/12																																							
34	QC	10 days	Mon 3/18/13																																							
35	Submittal	0 days	Fri 3/29/13	3/29																																						
36	Review by City	20 days	Mon 4/1/13																																							
37	<b>Preliminary Permitting</b>	60 days	Mon 3/18/13																																							
38	<b>90% Design Completion Stage</b>	<b>60 days</b>	<b>Mon 3/18/13</b>																																							
39	Design	40 days	Mon 3/18/13																																							
40	QC	10 days	Mon 5/13/13																																							
41	Submittal	0 days	Fri 5/24/13	5/24																																						
42	Review by City	10 days	Mon 5/27/13																																							

Task Milestone Rolled Up Task Rolled Up Progress External Tasks Group By Summary   
 Progress Summary Rolled Up Milestone Split Project Summary Deadline







## **APPENDICES**



**APPENDIX – ORIGINAL TM 2**



## **Technical Memorandum No. 2 – PRE-FINAL**

### **City of North Miami Winson WTP**

### **On-Site Raw Water System Improvements**

To: Distribution  
From: Hazen and Sawyer, P.C.  
Date: September 28, 2012

#### **1.0 Background and Purpose**

The City of North Miami (City) owns and operates the Winson Water Treatment Plant (WTP), a conventional lime softening facility with a permitted capacity of 9.3 mgd. The WTP treats raw water from the Biscayne Aquifer and serves areas within the City limits as well as the Village of Biscayne Park, portions of Golden Glades, Westview, Pinewood, and surrounding areas of unincorporated Miami-Dade County. Potable water is supplied from the Winson Water Treatment Plant (WTP) and interconnects with the Miami-Dade County Water and Sewer Department (MDWASD), providing approximately 8.5 mgd AADF and 4.5 mgd AADF to users respectively. The WTP was constructed in the early 1960s and the current Bid Package 3: WTP Rehabilitation Project (BP 3) proposed to rehabilitate processes throughout the facility while maintaining the existing treatment capacity fixed at 9.3 mgd.

Raw water supply to the treatment facility is obtained from eight existing Biscayne Aquifer production wells. Two of these wells (Nos. 1 and 2) are located on the WTP site and were put into service in 1962. The remaining six wells (Nos. 3 through 8) are located off-site and being addressed under separate contract(s). Well Nos. 1 and 2 have never been rehabilitated and it is reported by City staff that the specific capacity performance of these wells has degraded over time. Moreover, based on field observations and discussion with the City, existing pumps, well heads and associated structural, electrical and transmission piping are all at the end of their useful lives.

The purpose of this technical memorandum is to address the redevelopment and replacement of the two on-site wells and pumps. Well related instrumentation upgrades are addressed in Technical Memorandum (TM) No. 6 – Plant Control and Information System. Electrical upgrades are addressed in TM No. 7 – Electrical System Improvements. Replacement of on-site raw water transmission piping is addressed in TM No. 8 – General Site and Facility Improvements. This technical memorandum reviews alternative improvement concepts, summarizes recommended upgrades, and provides a preliminary implementation strategy and opinion of probable project cost.

## 2.0 Review of Existing Conditions

Well No. 1 is located adjacent to the aerator tower and the existing WTP operations building. Well No. 2 is located on the northeast side of the WTP site next to a 1.5 MGD finished water above-ground storage tank. The location of Well Nos. 1 and 2 is illustrated in Exhibit 2-1. Each well is permitted for a production capacity of 1,500 gpm under SFWMD Water Use Permit No. 13-00059-W.

The two wells are reported to have 12-inch diameter steel production casings; with Well No. 1 constructed to a cased depth of 100 feet and a total borehole depth of 124 feet, and Well No. 2 constructed to a cased depth of 90 feet and a total borehole depth of 104 feet. Neither of the wells is reported to be furnished with screens. Both wells are serviced by vertical turbine line shaft pumps with nameplate capacities of 1,500 gpm and 8-inch column piping. The Well No. 1 pump intake is located at an estimated depth of 30 feet below land surface (bls). The Well No. 2 pump intake is located at an estimated depth of 25 feet bls. Pump head, motor and wellhead components are located above ground on concrete bases. Well No. 2 is also housed within a CMU structure.

Each well discharges to a 10-inch diameter transmission line that interconnects with the WTP main feed line originating at the off-site wellfield. All raw water piping is reported to be ductile iron. Existing yard piping connections could allow raw water to bypass the treatment process. However plant staff has reported that this bypass piping has never been used and is unnecessary for plant operation and it will be removed as discussed in TM 8. The wells are not equipped with pressure or level instruments. As such, they are operated manually (ON-OFF) and are not equipped with either remote or local monitoring capabilities.

Although maintenance and replacement of some pumping equipment and wellhead components have been performed during the life of the wells, WTP staff reports a variety of concerns including frequent needed repairs of pump motors, columns, valves and flow meters. In addition, a potential physical restriction in the raw water transmission system has been reported that will be addressed under a separate contract.

## 3.0 Proposed Improvements

Redevelopment of Well Nos. 1 and 2 is proposed to reestablish yield characteristics and evaluate / confirm the integrity of the well construction and casing. Work efforts include initial capacity testing, evaluation of the existing well structure, redevelopment activities, and final capacity testing. In addition, all pumping equipment, column piping, wellhead components and base slab are recommended for replacement. The CMU structure on Well No. 2 will not be replaced. New instrumentation and electrical improvements, along with transmission line replacements are also proposed. Pump replacement capacity will equal existing to match the current WTP permitted production capacity. Since the City currently uses two types of pumps (submersible for off-site and vertical turbine for on-site) for wellfield service, an evaluation and recommendation regarding the type of replacement pumps that should be used is also presented.

The following summarizes proposed design criteria and layouts of the recommended effort.

Well Rehabilitation: Redevelopment work will consist of the following activities:

- ◆ Initial pump capacity testing on the wells to determine existing specific capacity and draw-down levels prior to performing the rehabilitation activities.
- ◆ Geophysical logging including x-y caliper logs to evaluate the condition of the well construction and well casing.
- ◆ A video survey of the entire well formation and casing.
- ◆ Potential brushing of the casing from top to bottom followed by development of the well by air-lifting to remove dislodged corrosion particles.
- ◆ Complete development of the well by air-lifting and pumping until water is proven to be clear and contain less than 1 ppm of sand.
- ◆ Additional geophysical logging of the well including x-y caliper logs, after well development.
- ◆ A specific capacity test in the rehabilitated well to evaluate the effectiveness of the development process.
- ◆ Potential acidulation of the well, if further development is needed.
- ◆ A post-rehabilitation video survey of the entire well to document the final condition
- ◆ Disinfection of the well after installation of pumping equipment and prior to returning the production well to service.

Review of available record documents and discussion with City staff indicates that existing well pump operating curves are not available. However, hydraulic calculations for the proposed well pump Nos. 1 and 2 were prepared as part of the preliminary pump selection process presented in this TM, and information collected during specific capacity testing and well redevelopment will be used to verify these preliminary hydraulic calculations.

Note that improvements to off-site well Nos. 3 through 8 and associated raw transmission system modeling and improvements are to be addressed under a separate contract.

Well Pump Discharge Piping: The proposed scope for replacement of associated well pumping and conveyance facilities includes the following:

- ◆ Proposed on-site well locations are illustrated in Exhibit 2-2.
- ◆ A plan view of recommended above ground well pump and discharge piping components for either vertical shaft or submersible pump configurations are illustrated in Exhibit 2-3. Cross sectional views of the alternatives are illustrated in Exhibit 2-4. In either case, a new reinforced concrete slab will be provided for piping support. The pump head or base plate concrete support base may either be at grade, or built-up to provide better clearance and access for the wellhead piping and instrumentation. Depending on the type of pump configuration selected, the corresponding pump head or base plate will be installed to secure the pump column. Regardless of the type of configuration selected, a casing air release valve/vent and access for the level instrument cable will be provided. Discharge piping will include an air/vacuum valve, a pressure sustaining valve (check valve), a combination valve, a magnetic type flow meter (magmeter), a gate type isolation valve, and requisite pressure and level monitoring instruments. In addition, a tee downstream of the meter will be furnished for

“blow-off” of water during well maintenance. Pipe and fittings shall be ductile iron. As standard design practice dictates, transition pieces will be provided to separate the dissimilar metals of the pump column and head. Associated electrical and instrumentation components will be housed in an adjacent Local Control Panel (LCP). As the wells are located on-site, no fencing or enclosure of the wells is proposed.

Pump Type Evaluation: The City currently uses submersible pumps with Certa-Lok PVC columns at off-site wells, and vertical turbine line shaft pumps with stainless steel columns at on-site Well Nos. 1 and 2. A review of estimated capital and operating costs, including consideration of relative advantages and disadvantages of each pump type in well service, and consideration of construction materials is presented below.

**Submersible Pump Configuration:**

Construction Cost = \$76,000 (pump, motor, base plate, column, installation)

Operating Cost = \$18,920/yr - 1,500 gpm @ 60 ft TDH, 20 hrs/day, 80% pump efficiency, 90% motor efficiency, \$0.11 kW-hr.

Advantages

- Does not generate ambient noise
- Self-enclosed unit
- Minimal alignment requirements
- Matches existing off-site pumps

Disadvantages

- Column removal required for maintenance access
- Submersible motors are more expensive to repair
- Lower efficiency motor

**Vertical Turbine Line Shaft Pump Configuration:**

Construction Cost = \$59,000 (pump, motor, pump head, column, installation)

Operating Cost = \$18,310/yr - 1,500 gpm @ 60 ft TDH, 20 hrs/day, 80% pump efficiency, 93% motor efficiency, \$0.11 kW-hr.

Advantages

- Simplified access for maintenance
- Higher efficiency motor
- Lower maintenance per City staff

Disadvantages

- Can generate ambient noise
- More components (pump., head, column, bowls)
- Shaft alignment is critical and labor intensive
- Differs from off-site pumps (uniformity)

Typically, Biscayne aquifer vertical turbine type well pumps are constructed of cast iron bodies and bowl assemblies, with bronze impellers and coated carbon steel or stainless steel columns. The City has reported shortened life cycles and maintenance issues with carbon steel columns. As such, stainless steel columns are recommended. However, as the existing well casing diameter is too small for utilization of standard flanged ends, threaded ends are proposed with special coatings to prevent galling.

By contrast, submersible pumps for Biscayne aquifer service may use PVC or coated carbon steel columns. However, the largest diameter available for Certa-Lok PVC columns in submersible service is 8-

inch, which is not recommended by the manufacturer for flow rates higher than 1400 gpm. Therefore, for comparisons purposes in this evaluation, 8-inch stainless steel columns are assumed.

The analysis indicates that operating costs for the two alternative pump types are similar, but capital costs are approximately 30% higher for submersible units. Based on discussions with plant staff it is recommended that the existing Well No. 1 and 2 pumps be replaced with vertical turbine line shaft types units with stainless steel columns as agreed with the City during the Technical Memorandum No. 2 review meeting on September 26, 2012.

A summary of the proposed design criteria for the replacement well pumps is presented in Table 2-1.

**Table 2-1  
Proposed Design Criteria  
Replacement Well Pumps Nos. 1 and 2**

<b>Item</b>	<b>Unit</b>	<b>Value</b>
Number of Pumps	#	2 (one per well)
Pump Type	-	Vertical Turbine Line Shaft
Design Point		
• Capacity*	gpm	1,500
• TDH	feet	60
No of Stages	-	3
Bowl Assembly Material	-	Cast iron
Impeller Material	-	Bronze
Motor Horsepower	hp	40
Motor Speed	rpm	1,800
Column Length	feet	30
Column Material	-	Type 316 Stainless Steel (threaded)

\*The flow rate listed is the permitted well flow rate. The specific capacity of the well will be established during the well redevelopment process.

**Electrical:** Each pump will be provided with a Local Control Panel (LCP) will contain a disconnect switch, the well pump motor starter, a mini-power center (for 120V convenience power and lighting), surge protective devices, and local HAND-OFF-REMOTE and ON-OFF switches. LCPs will be powered from the upgraded WTP electrical system. Note that WTP electrical system upgrades are described in greater detail in TM No. 7 – Electrical System Improvements.

**Instrumentation and Controls (I/C):** Proposed improvements include the addition of requisite equipment to allow for both local and remote monitoring and control of the two on-site wells and pumps. New level transducers/transmitters will be installed for measuring the water level in each well casing. These level transducers will access the well casing through an opening/connection on the pump base or through an opening/connection on the concrete base above the casing termination. Details of installation will be established during detail design. However, for clarity notes have been added to the attached exhibit to indicate the intended installation. The submersible

type transducers are less than ¾-inch in diameter, so adequate clearance is expected between the 12-inch well casing and the 8-inch stainless steel column piping. Pressure indicating transmitters will be used to monitor pump discharge pressure. Pressure switch will be provided for safety shutdown on high pressure. Full tube magmeter type flow meters will be installed on each pump discharge line. Motor winding temperature monitors will also be provided. A communications module within the new pump Local Control Panel will allow for integration of the on-site well with the WTP SCADA system being implemented under separate contract. Note that proposed I/C upgrades are described in greater detail in TM No. 6 – Plant Control and Information System.

## 5.0 Project Implementation

As discussed and agreed with the City, the redevelopment of Well Nos. 1 and 2 will be implemented as a change order to the Well Nos. 3 through 8 Project which is currently under procurement. It is estimated that an additional contract time of approximately 6 weeks will be required to complete the work under that Project. Once the wells are redeveloped, the existing pumping equipment and wellhead facilities will be reinstalled and remain in service pending the implementation of Bid Package 3 WTP Rehabilitation Project, scheduled for bids in the summer of 2013.

Based on this implementation strategy, work associated with replacement of the existing on-site well pumping, wellhead and conveyance facilities that was to be implemented as a stand-alone Bid Package 2, will instead be included in the referenced Bid Package 3. As a result, design fees currently appropriated to Bid Package 2 will be reallocated to Bid Package 3 to cover the costs of including well pump replacement in that effort. Accordingly, permitting and bid assistance fees currently appropriated to Bid Package 2 will be expended to cover the costs of associated with permitting and negotiating a change order with the Off-Site Well Rehabilitation Contractor.

It is expected that permitting required for the rehabilitation and redevelopment of Well Nos. 1 and 2 will include the following:

- Miami Dade Department of Health (FDEP Application for a Public Drinking Water Facility Construction Permit)

It is expected that permitting required for the replacement of the well pump and wellhead facilities for Well Nos. 1 and 2 will include the following:

- Miami Dade Department of Health (FDEP Application for a Public Drinking Water Facility Construction Permit)
- City of North Miami Building Department

## 6.0 Preliminary Construction Cost

The estimated preliminary construction cost for well redevelopment, and well pump and associated wellhead replacement is presented in Table 2-2. The accuracy of this cost opinion is +50% to -15% "Class 2 Preliminary" Level as generally suggested by AACE International. The preliminary project construction cost is estimated to be approximately \$350,000. Table 3 summarizes the costs.

**Table 2-2  
Preliminary Project Construction Cost  
Well and Pump Nos. 1 and 2 Rehabilitation**

<b>Item</b>	<b>Quantity</b>	<b>Installed Unit Cost</b>	<b>Total</b>
Well Rehabilitation and Redevelopment	2	\$25,000	\$50,000
Demolition of existing facilities	2	\$5,000	\$10,000
Pumps and column piping <sup>1</sup>	2	\$59,000	\$118,000
Wellhead Mechanical (i.e., pipe, valves, fittings, flow meter)	2	\$30,000	\$60,000
Wellhead Structural	2	\$5,000	\$10,000
General Conditions	8%		\$19,840
Construction Cost Subtotal (July, 2012)			\$267,840
Contingency (30%)			\$80,352
<b>Preliminary Project Construction Cost</b>			<b>\$348,192</b>

*Notes: For planning purposes assumes utilization of threaded stainless steel column piping.*

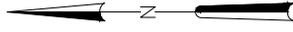
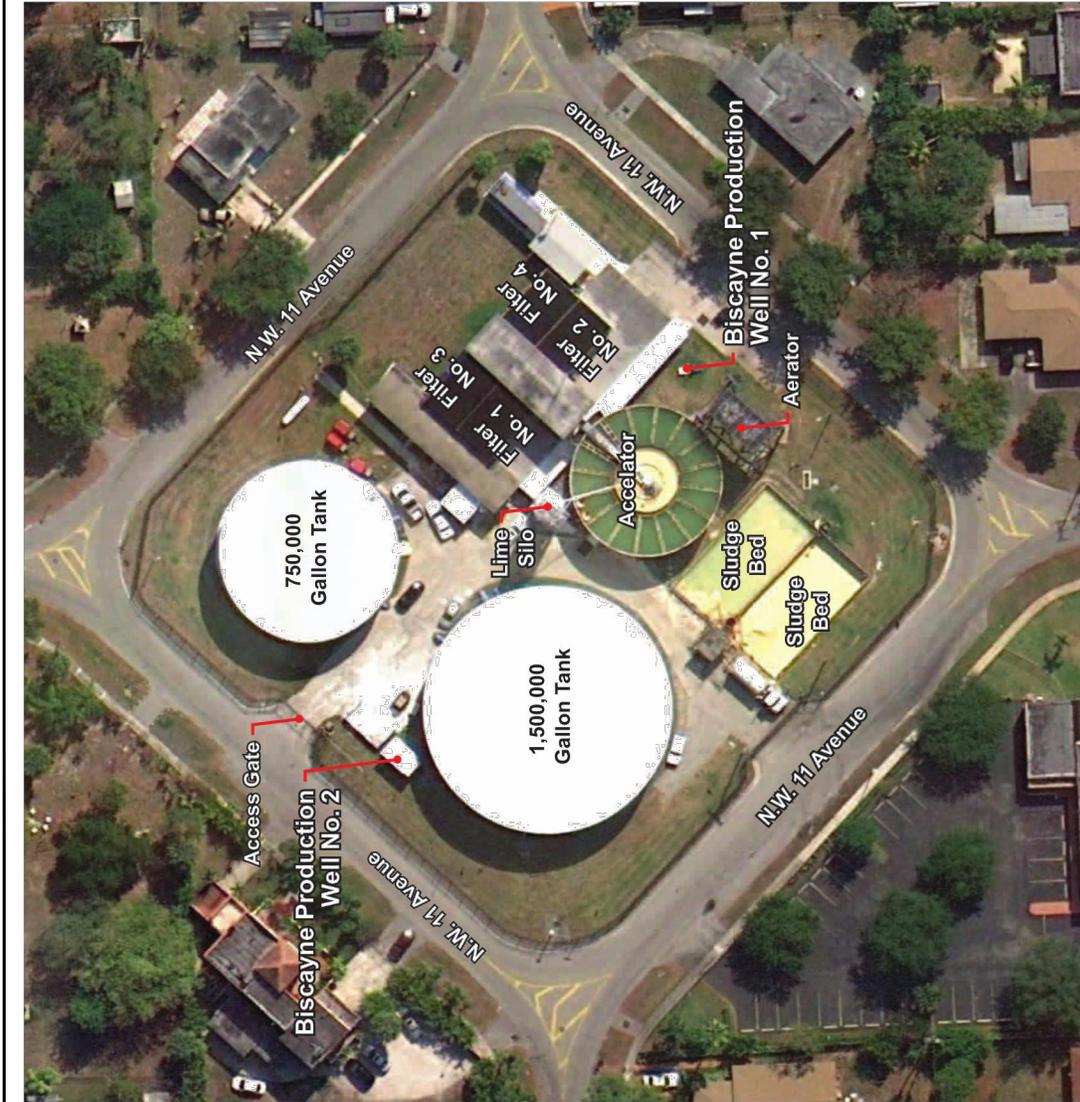
**Attachments**

*Distribution:*

- A. Ghany
- W. Pierre-Louis
- P. Vida
- B. Vidal
- T. Carney
- J. Atoche

c: G. Brown  
File 44238-004 / 1.2

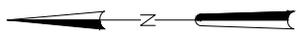
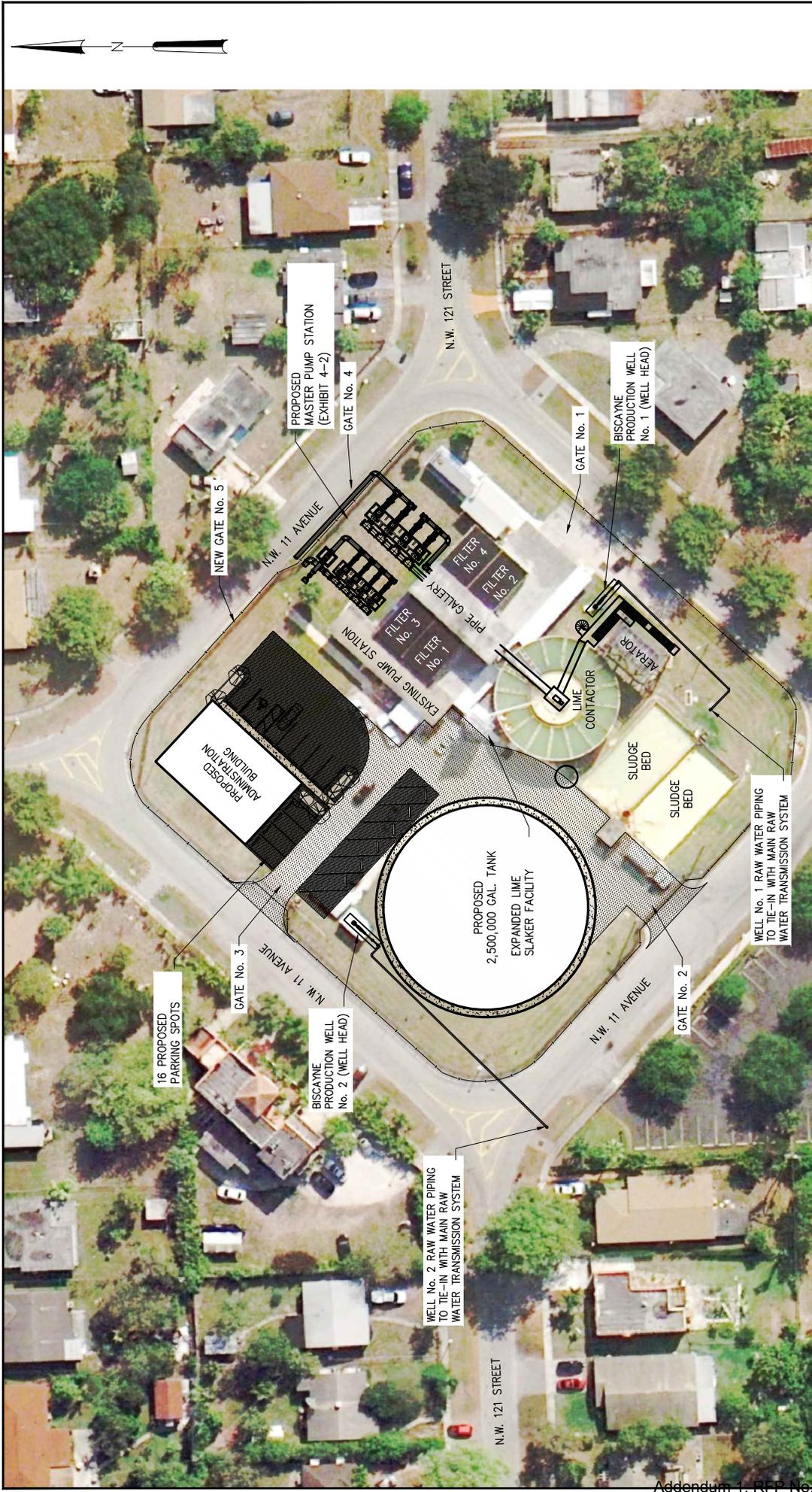




WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION

LOCATION OF EXISTING  
 BISCAZYNE PRODUCTION WELL NOS. 1 & 2  
 EXHIBIT 2-1



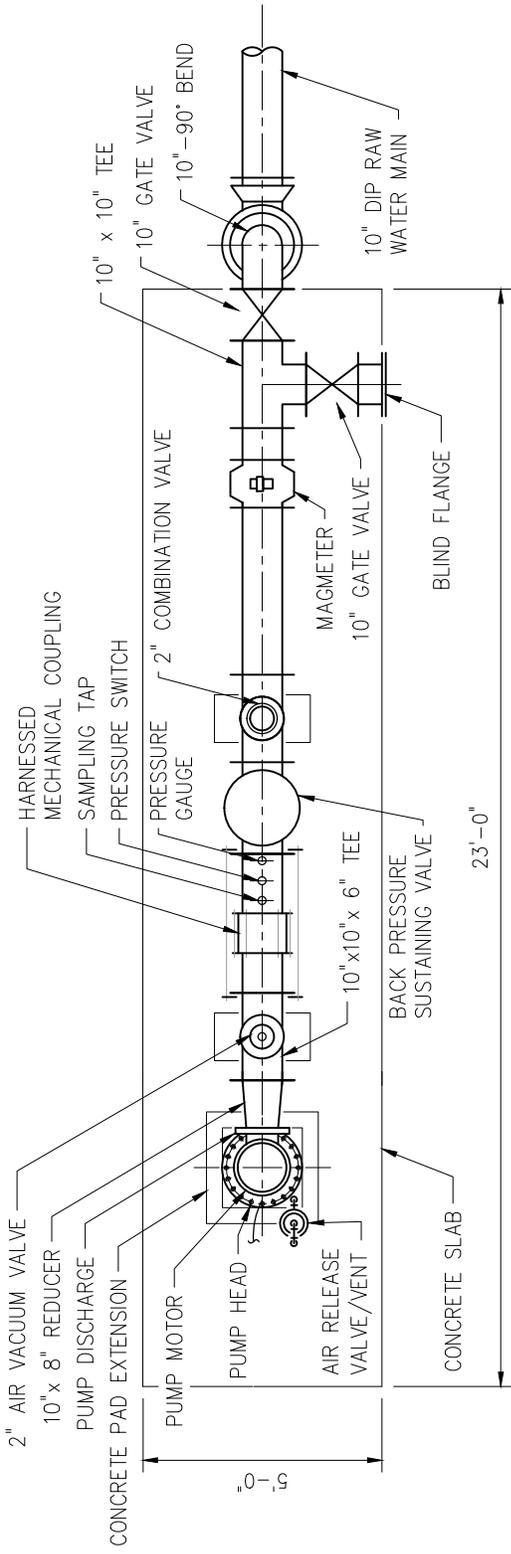


WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 LOCATION OF PROPOSED WELLHEADS  
 FOR BISCAZYNE PRODUCTION WELL Nos. 1 & 2  
 EXHIBIT 2-2

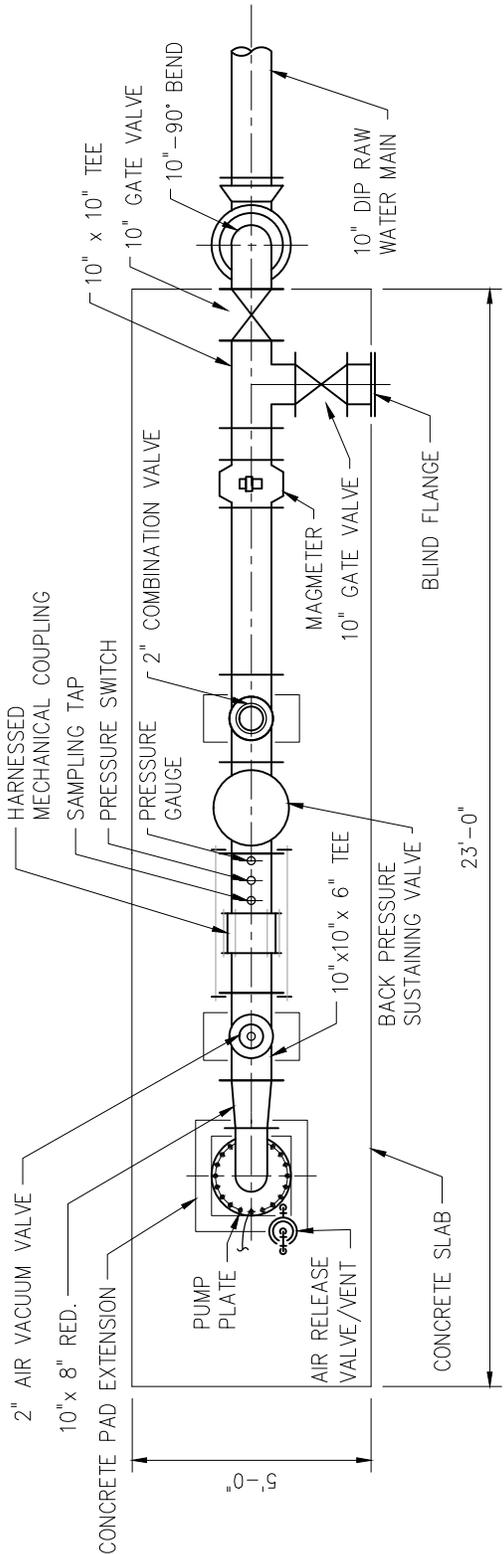


**HAZEN AND SAWYER**  
 Environmental Engineers & Scientists





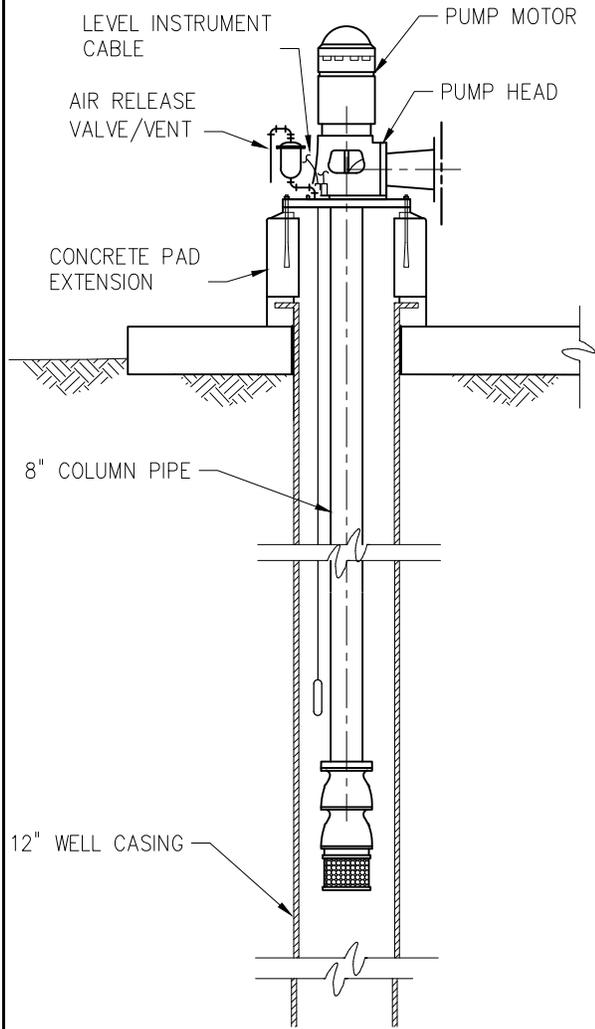
**WELLHEAD PLAN – VERTICAL TURBINE  
LINE SHAFT**  
NTS



**WELLHEAD PLAN – VERTICAL TURBINE  
SUBMERSIBLE**  
NTS

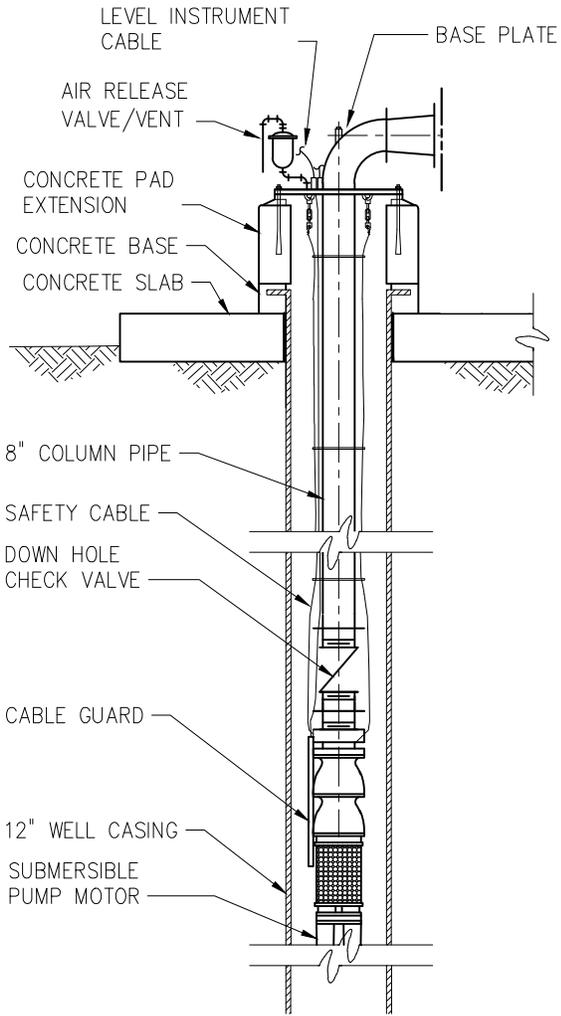
WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 BISCAYNE PRODUCTION WELL NOS. 1 AND 2  
 TYPICAL WELLHEAD PLAN  
 EXHIBIT 2-3





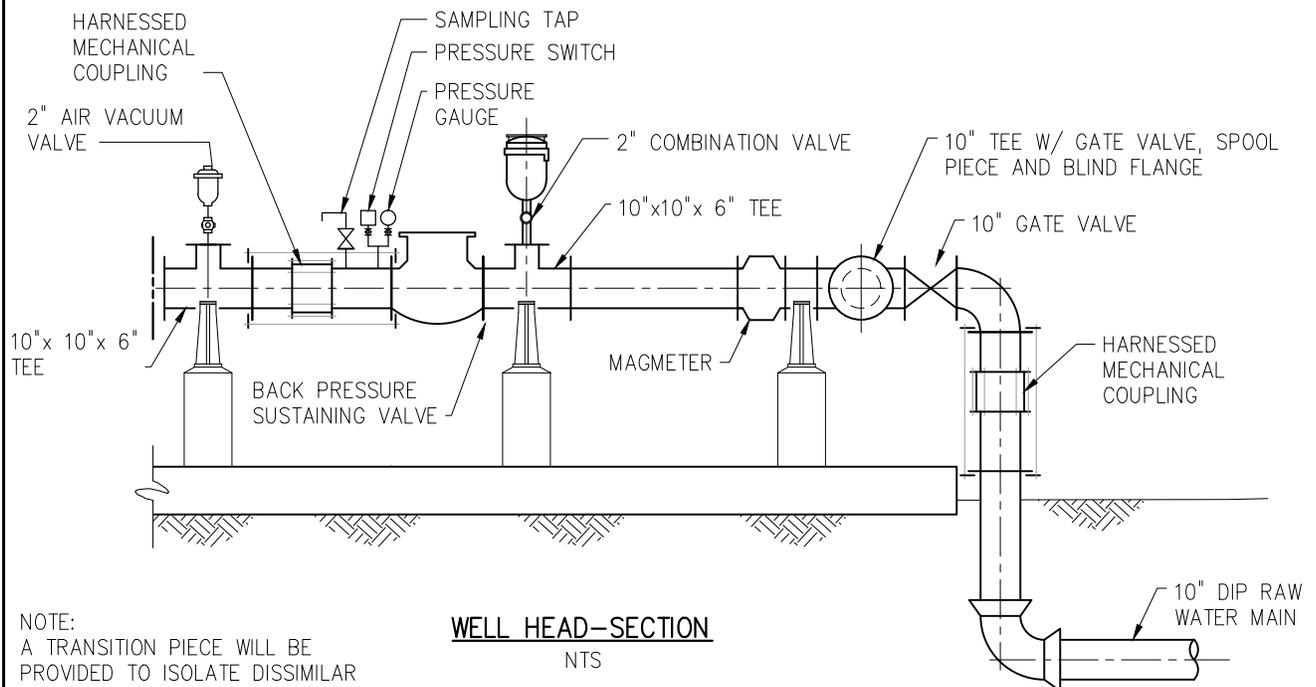
**WELL SECTION—VERTICAL TURBINE  
LINE SHAFT**

NTS



**WELL SECTION—VERTICAL TURBINE  
SUBMERSIBLE**

NTS



**WELL HEAD—SECTION**

NTS

NOTE:  
A TRANSITION PIECE WILL BE  
PROVIDED TO ISOLATE DISSIMILAR  
METALS IF NEEDED.

WINSON WATER TREATMENT PLANT  
 BID PACKAGE 3: WTP REHABILITATION  
 BISCAYNE PRODUCTION WELL Nos. 1 AND 2  
 TYPICAL WELLHEAD SECTION  
 EXHIBIT 2-4

**Hazen and Sawyer**  
 Environmental Engineers & Scientists



**APPENDIX – ORIGINAL TM 4**



**APPENDIX – ORIGINAL TM 5**



## **Technical Memorandum No. 5 – 2<sup>nd</sup> DRAFT**

### **City of North Miami Winson WTP**

### **Proposed Administration Building**

To: Distribution  
From: Hazen and Sawyer, P.C.  
Date: August 20, 2012

#### **1.0 Background and Purpose**

The City of North Miami owns and operates the Winson Water Treatment Plant (WTP), a conventional lime softening facility with a permitted capacity of 9.3 mgd. The WTP treats raw water from the Biscayne Aquifer and serves areas within the City limits as well as the Village of Biscayne Park, portions of Golden Glades, Westview, Pinewood, and surrounding areas of unincorporated Miami-Dade County. Potable water is supplied from the Winson Water Treatment Plant (WTP) and interconnects with the Miami-Dade County Water and Sewer Department (MDWASD), providing approximately 8.5 mgd AADF and 4.5 mgd AADF to users respectively. The WTP was constructed in the early 1960s and the current Bid Package 3: WTP Rehabilitation Project (BP 3) proposed to rehabilitate processes throughout the facility while maintaining the existing treatment capacity fixed at 9.3 mgd.

The WTP existing control room housed on the top floor of the filter facility no longer meets City needs. To this end, a new Administration Building will be constructed as a part of BP 3. The purpose of this technical memorandum is to establish floor space allocations and general layout requirements for the first and second floor levels of the proposed Administration Building.

Based on discussions with City Public Works staff, specific uses for the lower level of the proposed building will include an Emergency Operations Center (EOC) and Training Room, janitorial and storage areas, men's and women's lockers, mechanical room for HVAC equipment, and elevator machine room, lobby and entry vestibule, and the new Electrical Room to house MCC and Switchgear for all rehabilitated WTP facilities. The upper level will house a new Plant Control Room, a laboratory, operation staff offices, break room facilities, restrooms and additional storage areas. In addition, the Plant Control Room will also have access to an Observation Deck, located atop the single story Electrical Room.

It is important to note that the WTP is located in Zone X of the Federal Emergency Management Agency (FEMA) Flood Maps and is outside the 100-year flood elevation. Therefore, during the detailed design phase, the appropriate minimum finished floor elevation will be defined by executing a local glass wall analysis of the WTP site (i.e. 100-year, 3-day storm event with zero discharge). However, as the facility is above the 100 year floor elevation, the location of the EOC on the first floor of the proposed building allows for the location

of the Operations Control Room and Offices on the second floor, providing a better monitoring location for the day to day facility status.

**2.0 Proposed Building Construction**

Hazen and Sawyer typically designs structures at publicly owned treatment works located in Miami-Dade to meet one of the three “Protection Levels” as defined in Table 5-1 below. The design wind speeds used for design of structures within each level depends on the Risk Category established by the Florida Building Code and by FEMA guidelines for Safe Rooms.

**Table 5-1  
“Protection Level” Design Categories For Utility Applications**

<b>Protection Level</b>	<b>Design Wind Speed</b>	<b>Description</b>
A	175 MPH	Non-Essential Buildings
B	186 MPH	Process Buildings
C	200 MPH	Safe Room

The Level A design category is intended to meet Florida Building Code (FBC) requirements of structures classified in Risk Category II. These structures are unmanned facilities, non-essential structures that do not represent a substantial hazard to human life in the event of failure and/or are not designated as essential. This type of structure, as contemplated herein, would consist of a standard pre-engineered-type metal building with a rigid, structural steel frame with steel panel walls, factory applied paint and a galvanized steel panel roofing system or a tilt-up concrete panel structure with metal joist and steel deck roofing system. Either system is installed on a reinforced concrete slab. All building envelope components, including doors, windows and skylights, would be designed to meet basic FBC requirements for the wind speed noted in Table 5-1. Construction costs for this type of structure including interior partitions are approximately \$150 per square foot. It is important to note that these types of structural systems do not have redundant wind resisting systems; therefore, there is an increased risk of failure at wind speeds in excess of the minimum FBC-specified 175 mph requirements. In addition, construction economy for these types of installations is achieved by using modular dimensions; therefore, facility equipment layouts may require adjustment to fit standard available framing systems. Custom designs will increase building costs from the noted \$125 per square foot value.

The Level B design category is intended to meet FBC requirements of structures classified in Risk Categories III and IV. These structures are typically occupied except during a hurricane, and are used when the structure is required to prevent a substantial hazard to human life and/or designated as essential to remain functional both during and after storm events. Structures designed under this category are also occasionally used as emergency shelters but are not as resistant to impact from debris during a hurricane. This construction approach consists of reinforced CMU structure or reinforced concrete frames with reinforced

CMU infill walls installed on a reinforced concrete slab. The roof consists of precast concrete elements such as hollowcore planks or double tees. Construction costs for these types of structures with wind resistant doors, windows and skylights typically cost approximately \$200 per square foot. This construction approach is suitable for winds of up to 186 mph and has been utilized to protect key process areas at other south Florida utility plants. In addition, the CMU considered under this design approach offer more architectural treatment flexibility than the standard, factory-painted, prefabricated metal panels installed in Level A designed structures. A majority of the existing Pompano Beach WTP buildings were constructed in this manner.

The Level C design category exceeds minimum FBC standards and meets recommended design criteria for Safe Rooms as defined by FEMA. Unlike Level B protection that was established to minimize property damage and improve building performance, Level C protection is intended to provide a near-absolute protection of occupants against wind forces and impact of wind-borne debris. These structures consist of a concrete-framed structure with stucco-finished fully grouted CMU walls or cast-in-place concrete walls and a cast-in-place concrete roofing system, designed for up to 200 mph wind speeds. These types of structures offer improved wind resistance, significantly exceeding FBC requirements and cost approximately \$250 per square foot. This construction approach has been utilized in the design of essential occupied buildings at various south Florida utility facilities.

A Level C design for the new Administration Building will be implemented as agreed with the City.

LEED Certification: The Administration Building must also comply with Section 5-805 of the North Miami Code of Ordinances entitled "Sustainable Building Program". This Code requires that a "Silver" designation (LEED) or higher be complied with for new buildings. Achieving full "Silver" designation encompasses requirements that escalate the cost of the Building. Therefore, it was proposed that design proceed with the general intent of complying with "Basic" LEED Certification and requesting that the City's Design Review Committee exempt the building due to "special" circumstances, as allowed for under Section 5-805, Article I of the Code. However, the City subsequently advised that a "Silver" designation would remain the target goal, as the Design Review Committee would not issue an opinion on conceptual plans.

For the purposes of estimating budget level costs, it is anticipated that "Basic" LEED compliance adds approximately 20% to the square foot cost of the building (\$300 per square foot for the purposes of this TM). In addition, architectural elevations will be developed during the detailed design phase of the Project but will generally match existing facility finishes, subject to Development Review Committee approval.

Additional Construction Considerations: The proposed building is classified as "Business" occupancy. The construction type will be Type IIB with a concrete structural frame, concrete floor and roof slabs and masonry infill walls. Interior walls will be furred out with metal furring, insulation as required, and gypsum drywall. The ceiling will include mineral fiber acoustical ceiling tiles and a metal "T" suspension system. Wall surfaces will be painted and the floor systems shall be vinyl tile or carpet.

Energy Code Compliance: The current energy code in Florida requires up to an R-30 for walls. As it may be impractical to install the requisite amount of insulation to achieve R-30 within the interior walls of the planned building, the exterior of the structure will include a high impact exterior insulation finish system (EIFS) creating a stucco appearance. This EIFS will allow for continuous insulation on the exterior of the building to supplement interior insulation and meet code requirements.

Fire Suppression System: A fire suppression system is not required by the 2010 Florida Building Code (Chapter 9) or 2010 Florida Fire Prevention Code. It is to be noted that the City of North Miami adopted the fire code used by Miami-Dade County which is the 2010 Florida Fire Prevention Code.

### 3.0 Building Layout

Attached Exhibit 5-1 provides conceptual layouts of the first and second floors of the proposed Administration Building. The building has an occupancy classification of "Business" per the Florida Building Code – Building, Section 304.1. Occupant load is calculated per Table 1004.1.1 of the Florida Building Code – Building depending upon the function of each space within the building. The proposed building has an approximate gross area of 5,406 square feet. Table 3.1 shows occupant loads for each area of the building.

The first floor has a total approximate gross area of 2,974 sf with a total of 60 occupants including the occupants identified below. The first floor will house the following:

- ◆ Electrical Room - Houses Motor Control Center (MCC) and Switchgear equipment for all WTP facilities. Reference Technical Memorandum No. 7 for further details regarding the proposed electrical and distribution system.
- ◆ Men's Locker Room – Furnished with requisite shower, toilets, urinal, lockers and handicap accessible to meet applicable Americans with Disabilities Act (ADA) requirements. With a gross area of approximately 357 square feet, this space can house up to seven occupants at a maximum density of 50 square feet per occupant, as defined in the Florida Building Code - Building Table 1004.1.1 Locker Rooms. Based on a male occupant load of 30 for the first floor (half of the total occupancy), a total of two (2) water closets are required per the Florida Building Code – Plumbing Table 403.1 (1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50). Section 419 of the Florida Building Code – Plumbing allows substitution of up to 50% of the water closets for urinals. A total of 2 water closets and 1 urinal are provided in the Men's Locker Room.
- ◆ Women's Locker Room - Furnished with requisite shower, toilets, lockers and handicap accessible to meet applicable ADA requirements. With a gross area of approximately 319 square feet, this space can house up to six occupants at a maximum density of 50 square feet per occupant, as defined in the Florida Building Code – Building Table 1004.1.1 Locker Rooms. Based on a female occupant load of 30 for the first floor (half of the total occupancy), a total of two (2) water closets are required per the Florida Building Code – Plumbing Table 403.1 (1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50). A total of 2 water closets are provided in the Women's Locker Room.

- ◆ Emergency Operation Center / Training Room - With a total area of approximately 460 square feet, this space can house up to 30 occupants at a density of 15 square feet per occupant, as defined in the Florida Building Code - Building Table 1004.1.1 Assembly Areas without fixed seats, un-concentrated with tables and chairs. This area will be equipped with a minimum of five telephone lines and computer Local Area Network connections to facilitate emergency operations.
- ◆ EOC Office – Provides an additional 180 sq ft of isolated space for EOC and/or Storage functions.
- ◆ Secured storage.
- ◆ Elevator mechanical room.
- ◆ Janitorial closet.
- ◆ Reception area.
- ◆ HVAC / Mechanical Room with exterior access to facilitate maintenance.

The second floor has a total approximate gross area of 2,432 sf with a total of 24 occupants and will house the following:

- ◆ The Plant Control Room will house the new distributed control system console and have windows along the south east and southwest perimeter to allow observation of the WTP.
- ◆ A historian (record keeping and report generating computer) will be maintained in a separate location across from the Plant Control Room.
- ◆ One Chief Operator and two General Operations and Staff offices are also provided.
- ◆ Separate Men's and Women's restroom facilities. A total of 1 water closet is provided for each restroom based on Table 403.1 of the Florida Building Code – Plumbing and dividing the total floor occupant load in half to determine the requirements for each.
- ◆ Break Room Area. The City has requested that this area be upgraded to a full Kitchen Facility. However, the Building Department has advised that inclusion of a full kitchen with cook-top range on the second floor of the Administration Building would require the need for specialty ventilation and a fire suppression system. To this end, the Break Room will be provided with built-in cabinets, microwave, sink and refrigerator.
- ◆ Laboratory and Laboratory Office with access to outdoor Observation Deck - constructed atop the single story Electrical Room.
- ◆ Multiple egress stairwells to meet applicable fire code requirements.

All Building interior finishes will be coordinated with Public Works administrative staff. In addition, the design effort will include a tabulation of recommended furnishings for the new Administration Building. The City will use this tabulation to procure furnishings directly and thus realize benefit of their sales tax exemption status.

#### 4.0 Parking Requirements

The Administration Building will have an approximate gross area of 4,864 square feet (not including the Electrical and Mechanical Rooms). Section 5-1402 of the City of North Miami Code of Ordinances requires that buildings for government use be provided with one (1) parking space for every 300 square feet of gross floor area. Therefore it is estimated that building will require a total of sixteen (16) parking spaces, with dimensions per Section 5-1401 of the Code of Ordinances. In addition, Section 11-4.1.2 (5) of the Florida Building Code requires that one (1) handicap accessible space be provided for parking facilities with 1 to 25 parking spaces, sized 12-ft in width by 20-ft in length per Section 7-101 of the Code of Ordinances. The traffic pattern for the new Administration Building parking lot is addressed in Tech Memo No. 8 entitled "General Site and Facility Improvements".

#### 5.0 Finished Floor Elevation

As the WTP site is located in FEMA Zone X (above the 100-year flood elevation), the minimum finished floor elevation of the proposed new Administration Building will be established during detailed design through a "glass wall analysis" (100-year, 3-day storm event with zero discharge). Note that Section 8.5-52 of the North Miami Code of Ordinances does not apply as the WTP is located outside of any flood hazard areas.

#### 6.0 Site Layout

The proposed Administration Building will be constructed on the northwest corner of the WTP site, in an area to be made available by the demolition of the existing 750,000 gallon water storage tank. Attached Exhibit 5-2 illustrates the general location of the proposed Administration Building and parking layout. As agreed during the BODR kickoff meeting, this proposed layout will not impact potential future uses of any additional property the City may procure to the north of the facility. Stormwater impacts of the new structure are addressed in Tech Memo No. 8 entitled "General Site and Facility Improvements"

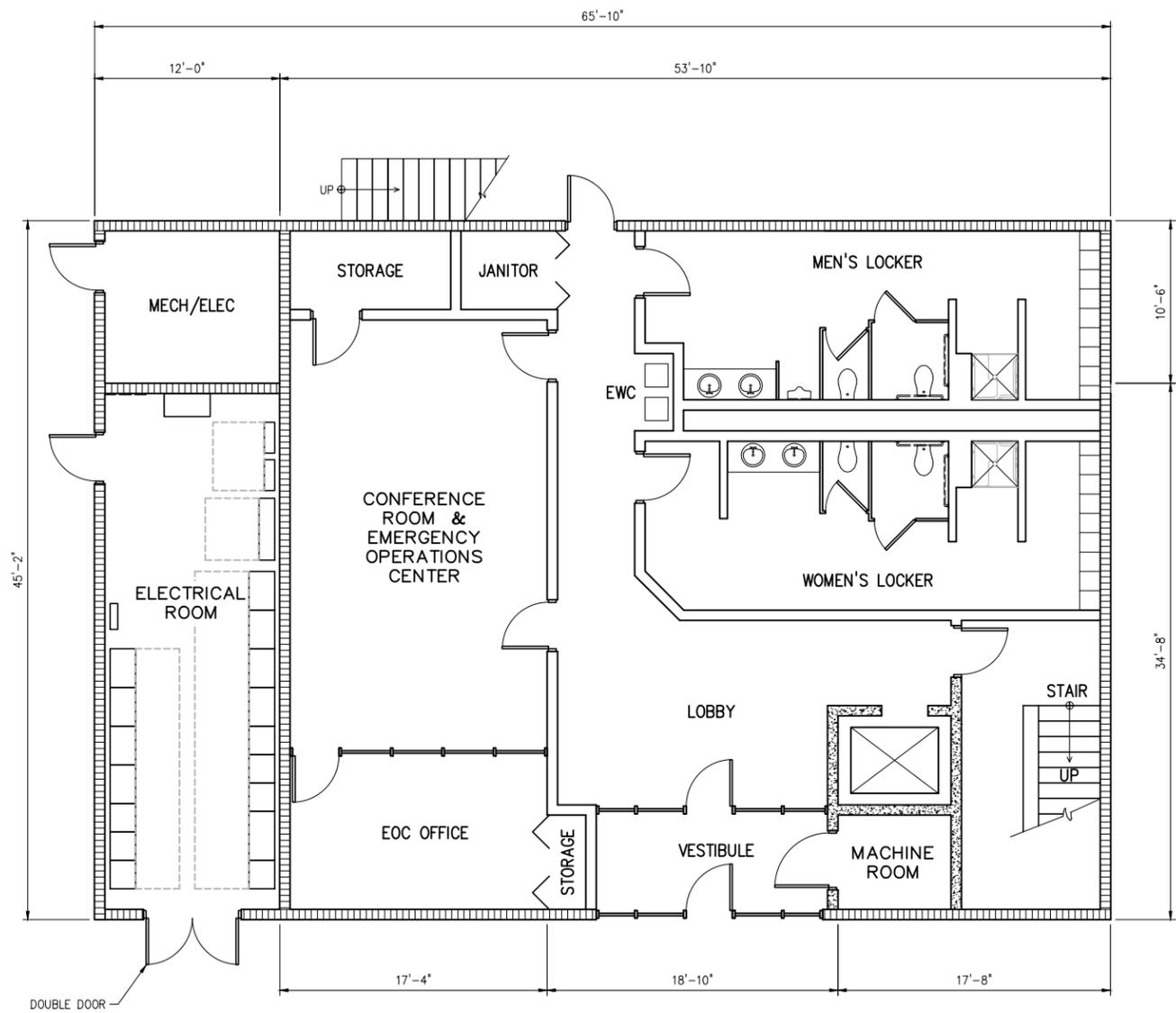
#### 5.0 Preliminary Opinion of Probable Project Cost

The estimated construction cost of the proposed Administration Building, excluding related site improvements is \$1,650,000.

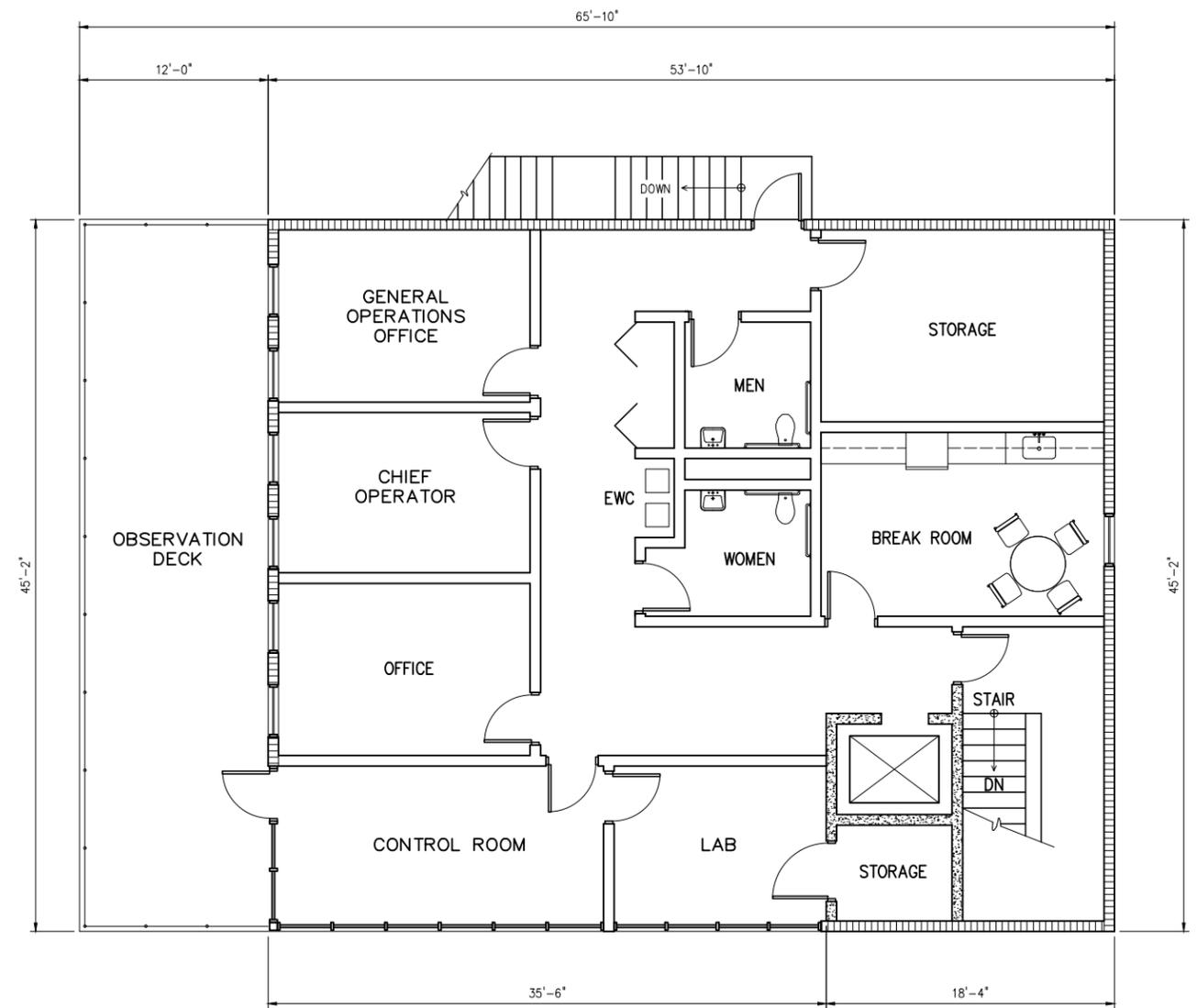
##### *Attachments*

*Distribution:*  
A. Ghany  
W. Pierre-Louis  
P. Vida  
B. Vidal  
T. Carney  
JP Silva

*c: G. Brown*  
*File 44238-004 / 1.2*



FIRST FLOOR PLAN  
3/16"=1'-0"



SECOND FLOOR PLAN  
3/16"=1'-0"





