DRAFT DESIGN PACKAGE (DP) #2

Onondaga Lake Remedial Design
SCA Water Treatment Plant

Prepared for:

Honeywell

May 2010

1163/45613

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Onondaga Lake Remedial Design
SCA Water Treatment Plant

Prepared for:

Honeywell

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May 2010

O'BRIEN & GERE

TABLE OF CONTENTS

DESIGN DOCUMENTS

Wet Weather Operating Plan
Process Basis of Design (BOD) Memorandum

DRAWINGS

Civil
SP-1 Overall Site & Key Plan
G-1 Grading Plan
G-2 Road Profiles
U-1 Site & Utility Plan
U-2 Effluent Pipeline Plan
U-3 Effluent Pipeline Plan
U-4 Effluent Pipeline Plan
U-5 Effluent Pipeline Profile
U-6 Effluent Pipeline Profile
MD-1 Miscellaneous Details
MD-2 Miscellaneous Details
MD-3 Pumping Station Section, Plan & Details
MD-4 Miscellaneous Details

General
GA-01 General Arrangement

Architectural
A-1 Floor Plan
A-2 Roof Plan
A-3 Elevations

Mechanical

PFD-1 Process Flow Diagram
PFD-2 Mass Balance – Dredge Season
PFD-3 Mass Balance – Winter Season
M-0 WTP Isometric
M-1 Plan
M-1A Equipment Location Plan
M-2 Partial Plan
M-3 Partial Plan
M-4 pH Adjustment Tanks Isometric
M-5 IPC's Isometric
M-6 IPC's Isometric
M-7 Filter Feed Isometric
M-8 LGAC Isometric
M-9 Effluent Monitoring Tanks Isometric
M-10 Sections

TABLE OF CONTENTS
(Continued)

Mechanical (Continued)

M-11 Sections
M-12 Flash Mix Tank #1 Nozzle Schedule
M-13 Not Used
M-14 pH Adjust Tank #1 Nozzle Schedule
M-15 Filter Feed Tank Nozzle Schedule
M-16 Effluent Monitoring Tank #1 Nozzle Schedule
M-17 Effluent Monitoring Tank #2 Nozzle Schedule
M-18 Details
M-19 Details
M-20 Details

P&IDs
I-A Legend & Symbols
I-B Legend & Symbols
I-C Interlocks
I-01 pH Adjustment Tank #1
I-02 pH Adjustment Tank #2
I-03 Flash Mix Tank #1
I-04 Flash Mix Tank #2
I-05 Distribution Header
I-06 Inclined Plate Clarifier
I-07 Filter Feed Tank
I-08 Multimedia Filter
I-09 Carbon Filters
I-10 Effluent Monitoring Tank #1
I-10B Effluent Monitoring Tank #2
I-11 Backwash/Sludge Pumping Station
I-12 Chemical Storage – H2SO4/Unloading
I-13 Chemical Storage – NAOH/Alum
I-14 Chemical Feed Systems – NAOH
I-15 Chemical Feed Systems – H2SO4
I-16 Chemical Feed Systems – Alum
I-17 Air Compressor
I-18 Tank Vent Header
I-19 Vapor Phase Carbon Filter

Electrical

E-1 MCC One-Line
E-2 MCC One-Line
E-3 MCC One-Line
E-4 Grounding Plan
CS-1 Control System Overview

TABLE OF CONTENTS
(Continued)

TECHNICAL SPECIFICATIONS (NOT INCLUDED WITH THIS SUBMITTAL)

Site/Civil

01160 Spill and Discharge Control
01170 Materials Handling and Disposal
02111 Clearing and Grubbing
02141 Construction Water Management
02220 Earthwork
02222 Embankment
02226 Trenching, Backfilling and Compacting
02230 Select Fill
02270 Erosion and Sediment Control
02503 Restoration of Surfaces
02510 Bituminous Concrete Pavement
02600 Pipeline Installation
02602 Leakage Tests
02623 High Density Polyethylene (HDPE) Pressure Pipe
02625 Smooth Interior Corrugated Polyethylene Pipe
02720 Vaults and Inlets
02730 Precast Concrete Manholes
03306 Concrete for Site Work
11300 Packaged Submersible Backwash Pumping Station
11390 Tests on Pumping Equipment
15116 Coplastix Sluice Gates

Process/Mechanical

SP Special Provisions
01300 Shop Drawings and Submittals
02602 Leakage Tests
02675 Chlorination
09900 Field Painting
11390 Tests on Pumping Equipment
15001 Mechanical Completion and Commissioning
15003 Equipment (discusses installation of equipment)
15004 Mechanical Installation
15060 Hangers, Supports, and Restraints
15075 Mechanical Identification
15202 Compressed Air Piping Systems
15225 Pipe, Pipe Fittings, and Valves
15250 Mechanical Insulation
15992 Pipe Pressure Tests

TABLE OF CONTENTS
(Continued)

Major Equipment

44 42 23.07 Water Treatment Clarifiers - Inclined Plate
44 43 13.26 Multimedia Filtration
44 43 13.29 Granular Activated Carbon System
44 42 73 Frac Tanks

Design Documents –

Wet Weather Operating Plan

Process Basis of Design (BOD) Memorandum

Document Review Tracking	
Representative Of:	**Reviewer's Initials and Date**
O'Brien & Gere	
Honeywell	
OCDWEP	

Wet Weather Operating Plan

The Onondaga County Department of Water Environment Protection (OCDWEP) Metropolitan Wastewater Treatment Plant (Metro) is designed to accept combined sanitary and storm water flows from the public sewer system. Metro's current SPDES permit includes a 12-month rolling average daily flow of 84.2 MGD and a maximum design flow for the secondary treatment system of 126.3 MGD. During dry weather periods the flows are typically well below the permitted average. The major treatment operations at Metro are designed to effectively treat wastewater flows well in excess of the permitted average daily flow and limited-duration high flows. This additional design capacity is used so that Metro has the capability to manage the "first flush" from storm events.

During periods of rain, snow, and/or snowmelt, the influent flows will significantly increase and may, at times, exceed the design capacities of the various treatment operations. Under these conditions, wastewater can be by-passed with varying degrees of treatment. Metro's SPDES permit requires that the OCDWEP implement Best Management Practices (BMPs), which are intended to maximize pollutant capture and minimize water quality impacts from combined sewer overflows. To this end, the OCDWEP has developed a draft Wet Weather Operating Plan (WWOP) that describes operational adjustments to be made to individual unit operations to maximize treatment during wet weather events. In addition, the OCDWEP currently implements flow restrictions on some of the permitted industrial dischargers to maximize capture during wet weather conditions.

Current Industrial Discharge Management Practices
Approximately ten percent of the incoming flow to Metro is County-permitted industrial sources. Some of the permitted industrial sources are characterized as "batch" discharges. As a condition of the Industrial Waste Discharge (IWD) permit, the OCDWEP requires some industrial users to submit a WWOP that will provide for coordination and contact information to discontinue discharges to the County sewer system during Metro WWTP by-pass events.

SCA WTP Discharge: Wet Weather Operating Strategy
During wet weather events, the pretreated effluent from the Sediment Consolidation Area (SCA) Water Treatment Plant (WTP) will be conveyed to the public sewer system using Honeywell's existing

Wastebed Leachate Overflow pumping station and forcemain. Pretreated SCA WTP effluent can be directed to an effluent holding basin for temporary storage during periods when discharge to the County has been suspended. Upon notice from Metro to receive additional flows, the effluent holding basin will then discharge to Metro. Normally, the effluent holding basin will be bypassed. Honeywell will provide for effluent monitoring at the SCA WTP.

During the period of active dredging, the SCA WTP will be operated on a seven-day per week, 24-hour per day basis. Flow rates will vary seasonally, with the highest flows being generated during the active dredging season (i.e., April through November).

The general configuration of the pretreated SCA WTP discharge with respect to the County sewer system and Metro WWTP is presented in Figure 1-1 below.

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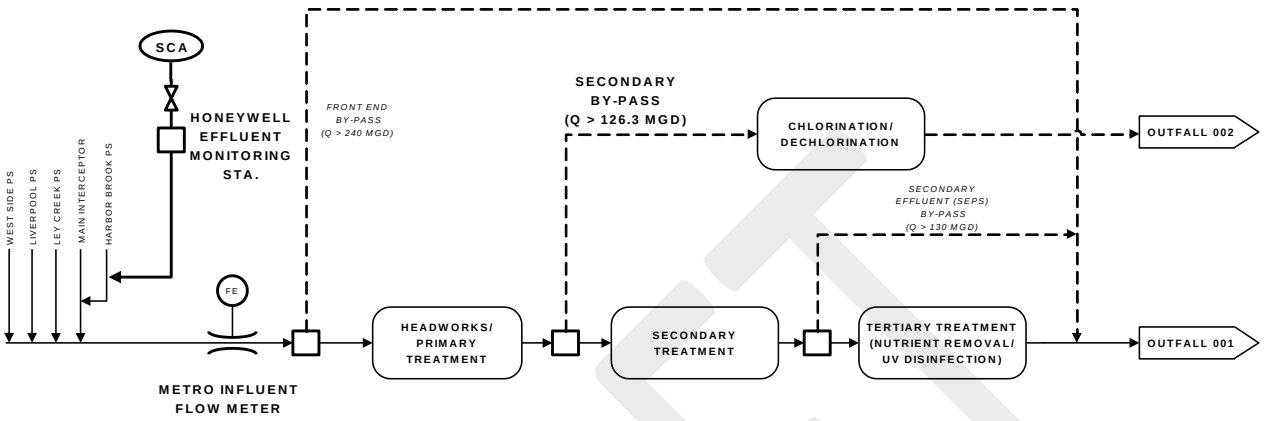
Figure 1-1. *Pretreated SCA WTP Discharge Configuration*



Honeywell's proposed WWOP will consist of establishing progressive thresholds aimed at curtailing the pretreated SCA WTP discharge during periods when Metro is experiencing high flows that could trigger a by-pass of the Secondary Treatment System. The secondary by-pass occurs when Metro flows exceed approximately 126.3 MGD. Under these conditions, influent flows to the Secondary Treatment System in excess of 126.3 MGD spill over a weir and are disinfected (on a seasonal basis) and discharged through Metro's Outfall 002.

To provide a framework for communication, operational flexibility, and "reaction time" to implement flow control measures, Honeywell is proposing to establish multiple wet weather operating conditions that will include:

- Normal Operation
- Metro High Flow Alert
- SCA WTP Discharge Shutdown
- SCA WTP Discharge Re-Start
- SCA WTP Flow Recovery

Proposed wet weather operating guidelines for each of the pretreated SCA WTP discharge operating conditions are outlined in Table 1-1 below. These guidelines have been developed to provide a high-level outline of the WWOP.

It is understood that this is a living document, which will be modified to reflect future changes as the IWD permit is finalized and as new design and operational issues are identified. Honeywell recognizes this guidance document is intended to align expectations and promote effective communication between Honeywell and OCDWEP staff during periods of dredging operations.

Table 1-1. *SCA WTP Discharge: Wet Weather Operating Guidelines*

	OPERATION MODE	FLOW (MGD) Metro (1)	FLOW (MGD) SCA (2)	ACTIONS
1	**NORMAL OPERATION**	≤ 110	± 6.5	• Metro influent flow stable. Flow not trending upward for more than 30 minutes. • Metro operations staff monitoring local weather. No indications of pending Wet Weather event. • Pretreated SCA WTP effluent discharged in accordance with IWD permit
2	**METRO HIGH FLOW ALERT**	± 110 *(Trending Up)*	≤ 6.5	• Metro influent flow at, or about 110 MGD and trending up over a 30 minute period. • Metro operations staff monitoring local weather and comparing conditions to previous operating experience. • Metro contacts Honeywell to communicate "Alert" condition. • Honeywell mobilizes pretreatment system operations staff and implements measures to prepare for system shutdown. - *Ready for shutdown within a 1 hour period*
3	**SCA WTP SHUTDOWN**	± 125	0	• Metro influent flow at, or about 125 MGD for 30 minute period *-OR-* • Metro monitors water levels in the Secondary By-Pass overflow box. - *Target SCA WTP shutdown when water level is within XX inches of the by-pass overflow weir* • Metro operations staff monitoring local weather and comparing conditions to previous operating experience. • Metro contacts Honeywell to confirm immediate shutdown of the pretreated SCA WTP effluent (within 1 hour response time).
4	**SCA DISCHARGE RE-START**	≤ 120 *(Trending Dn)*	≤ 5.0	• Following shutdown, Metro influent flow at or below 120 MGD and trending down for 30 minute period. • Metro operations staff monitoring local weather and comparing conditions to previous operating experience. • Metro contacts Honeywell to re-start pretreated SCA WTP discharge. • Discharge is a combination of SCA WTP and the Effluent Holding Basin, not to exceed 5.0 MGD. • Honeywell ramps flow up to 5 MGD for first 2 hours, then return to Normal Operation.
5	**SCA FLOW RECOVERY**	≤ 100	±10.0	Typical guideline for post-shutdown events:

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OPERATION MODE		FLOW (MGD)		ACTIONS
	(Post Shutdown)			• Metro influent flow at or below 100 MGD. • Metro operations staff monitoring local weather. No indications of pending Wet Weather event. • Honeywell requests permission to increase pretreated SCA WTP discharge to maximum level (10.0 MGD). • Discharge is a combination of SCA WTP and the Effluent Holding Basin.

NOTES:

1. Combined influent as measured by the influent flow meters (includes SCA WTP effluent discharge to Harbor Brook Interceptor).
2. SCA WTP discharge flow rate as measured at Honeywell's Effluent Monitoring station location.

Contact Information:

Honeywell

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SCA WTP Operations (O'Brien & Gere)

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OCDWEP Operations

TBD	Office Telephone:	Cell:	Email:

DRAFT

TO: File

FROM: LY Duff, GB Ebersbach

RE: SCA WTP - Process Basis of Design

FILE: 1163/45613

DATE: April 29, 2010, Rev. 1.0

cc: PD Schultz
T Tong-Ngork
NT Zacharek
TR Komar

Draft

This memo documents the basis of design for each treatment process of the Sediment Consolidation Area (SCA) Water Treatment Plant (WTP).

The WTP will provide pretreatment of the SCA effluent prior to discharge to the Onondaga County Department of Water Environment Protection Metropolitan Wastewater Treatment Plant (Metro). Pretreatment of the SCA effluent will include removal of metals, solids, and volatile and semi-volatile organic compounds (VOCs and SVOCs). The pretreated water will receive enhanced ammonia removal at Metro. The WTP will include facilities for pH adjustment, chemical addition of a coagulant, clarification, multimedia filtration, carbon adsorption, and effluent monitoring. The WTP process flow diagram is attached as PFD-1, Rev. D, dated 4/9/10. The mass balances for the dredge season and winter operation are included as PFD-2, Rev. D, dated 4/9/10 and PFD-3, Rev. A, dated 4/9/10, respectively.

Procurement of the treatment system equipment may change some parameters but each unit process will need to substantially meet the requirements identified in the treatability testing.

SYSTEM CAPACITY – DREDGE SEASON

The WTP is designed to treat a maximum flow of 8.15 MGD (= 5663 gpm).

CHEMICAL BULK STORAGE

Chemical bulk storage is required for storage of chemicals used in the treatment process. Chemical dosage rates were established based on the treatability testing. Tank volumes were designed to provide approximately 5 days of chemical storage at the peak flow of 8.15 MGD.

The influent water will generally have a pH of approximately 9 to 12 s.u. As such, sulfuric acid will typically be used for pH reduction. Caustic (sodium hydroxide) feed is available for "over shoots" resulting from excessive acid feed and for the few months dredging occurs in the SMUs requiring pH adjustment to 10.5 s.u. for nickel precipitation. The caustic usage presented below is based on nickel precipitation and is a worst case scenario in terms of feed rate.

The estimated feed rates shown below correspond to dredge season operations and include the water portion of the chemical solution. Supporting calculations are included as Attachment A. The chemical usage shown on the mass balance reflects the neat chemical only and does not include the water portion. The neat chemical calculations are included as Attachment B.

20% Alum

Design Criteria Used

Dosage	20 mg/L
Estimated Feed Rate	665 gpd

Unit Details

Number of Tanks	1
Volume	6,000 gal 9 days

50% Sodium Hydroxide

Design Criteria Used

Dosage	160 mg/L
Estimated Feed Rate	1,705 gpd

Unit Details

Number of Tanks	1
Volume	8,000 gal
	4.7 days

93% Sulfuric Acid

Design Criteria Used

Dosage	350 mg/L
Estimated Feed Rate	1,670 gpd

Unit Details

Number of Tanks	1
Volume	8,000 gal
	4.8 days

PH ADJUSTMENT

Adjustment of pH is necessary for precipitation of metals and to provide adequate and optimum conditions for downstream treatment. Two-stage chemical addition will be required to (normally) lower the pH of the SCA effluent to the required levels. Design criteria are based on the treatability testing.

1st Stage (rough):

Design Criteria Used

Hydraulic Retention Time (HRT)	10 - 15 minutes
pH adjust	12+ to 11 s.u.

Unit Details (based on Adler MX4-452 Mix Tank)

Number of units	4
Type	Frac Tank
Working volume (min, each)	16,745 gal
HRT (at max flow 5663 gpm)	11.8 min

2nd Stage (fine):

Design Criteria Used

Hydraulic Retention Time (HRT)	10 - 15 minutes
pH adjust	11 to 8.5 s.u.

Unit Details (based on Adler MX4-452 Mix Tank)

Number of Units	4
Type	Frac Tank
Working volume (min, each)	14,890 gal
HRT (at max flow 5663 gpm)	10.5 min

FLASH MIX

Rapid mixing is required to provide contact time and dispersion of the added coagulant to create insoluble metal salts for metal removal. Design criteria are based on the treatability study.

Design Criteria Used

Hydraulic Retention Time (HRT)	1 - 5 min

Unit Details (based on Adler MX4-452 Mix Tank)

Number of units	1
Type	Frac Tank
Working volume (min)	12,660 gal
HRT (at max flow 5668 gpm)	2.2 min

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FLOCCULATION

Flocculation is required to form insoluble floc particles to cluster together and form larger flocs to be settled and removed from the water in the clarifiers. Design criteria are based on the treatability testing.

Design Criteria Used	
Hydraulic Retention Time (HRT)	5 - 15 min
Unit Details (based on Unipure 1000-G2 Drop-In)	
Number of units	16
Type	Integral to clarifier
Volume (each)	5,000 gal
HRT (at max flow 5668 gpm)	14 min

CLARIFIERS

The clarifiers will remove metals and solids contained in flocs created in the flash mix / floc chambers. Design criteria are based on the treatability study and literature values.

Design Criteria Used	
Surface Overflow Rate (SOR)	0.22 - 0.72 gpm/sf
Influent TSS concentration	200 mg/l
Effluent TSS concentration	10 mg/l
Unit Details ((based on Unipure 1000-G2 Drop-In)	
Number of units	16
Type	Inclined Plate
Normal Feed Rate (each)	355 gpm
Settling Area (each)	1,300 ft2
SOR (at max flow 5668 gpm, with 16 units online)	0.27 gpm/sf

FILTER FEED TANK & PUMPS

Water from the inclined plate clarifiers will flow to a filter feed tank. From the filter feed tank, water will be pumped through the multimedia filters and granular activated carbon vessels.

Unit Details (based on Adler MX4-452 Mix Tank)	
Number of tanks	1
Type	Frac Tank
Working volume (min)	17,035 gal
HRT (at max flow 4959 gpm)	3.4 min
Number of pumps	3
Type	Progressing cavity
Capacity	1,700 gpm
Drive	Variable Frequency Drive

MULTIMEDIA FILTERS

Filtration is required to remove fine particles before the carbon adsorption processes. Design criteria are based on the treatability testing.

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Design Criteria Used

Filtration Rate	4 - 6 gpm/ft2
Influent TSS concentration	10 mg/l
Particle sized removed	≥ 10 µm

Unit Details (based on Siemens Multicell HPF)

Number of filter vessels	4 (3 operating, 1 spare)
Type	Horizontal
Filter area (each)	343 ft2
Filtration Rate (at max flow 4959 gpm, with 3 vessels online)	4.8 gpm/ft2

GRANULAR ACTIVATED CARBON

Granular Activated Carbon adsorption has been selected to remove remaining volatile and semi-volatile organic compounds. Design criteria are based on the treatability testing.

Design Criteria Used

Hydraulic Loading Rate (HLR)	4 - 6 gpm/ft2
Empty Bed Contact Time (EBCT)	15 min (combined for both lead/lag vessels)
Influent TSS concentration	5 mg/l

Unit Details (based on Siemens HP1220)

Number of vessels	16 (8 pairs lead/lag)
Diameter	12 ft
Filter area (each)	113 ft2
Approximate Carbon Volume (each)	728 ft3
Carbon Weight (each)	20,000 lbs
HLR (at max flow 4959 gpm)	5.5 gpm/ft2
EBCT (pair, at max flow 4959 gpm)	17.6 min

EFFLUENT MONITORING TANKS

The effluent monitoring tanks will provide a location to monitor effluent for compliance with discharge limits, before discharging to Metro. The tanks are used to provide backwash water to the multimedia filters and granular activated carbon vessels.

Unit Details (based on Adler MX4-452 Mix Tank)

Number	2
Type	Frac Tank
Working volume (min, each)	17,035 gal
HRT (combined, at max flow 4959 gpm)	6.9 min

MMF BACKWASH PUMP

The multimedia (MMF) filters will be periodically backwashed to remove accumulated solids. Each MMF is divided into 3 cells with one cell backwashed at a time. Water from the effluent monitoring tanks will be used to backwash the MMFs using the MMF backwash pump.

Design Criteria Used

Backwash Rate	15 gpm/ft2
MMF cell area	114 ft2
Duration	15 min

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Unit Details

Number of pumps	1
Type	Centrifugal
Capacity	1715 gpm
Drive	Variable Frequency Drive

GAC BACKWASH PUMP

The granular activated carbon (GAC) vessels will be periodically backwashed to remove accumulated solids. Water from the effluent monitoring tank will be used to backwash the GAC vessels using the GAC backwash pump. Since the GAC backwash pump and the MMF backwash pump are not expected to operate at the same time, the GAC backwash pump may be the same pump as the MMF backwash pump if the hydraulics for both meet the requirements.

Design Criteria Used

Backwash Rate	12.5 gpm/ft2
GAC vessel area	113 ft2
Duration	15 min

Unit Details

Number of pumps	1
Type	Centrifugal
Capacity	1415 gpm
Drive	Variable Frequency Drive

EFFLUENT RECYCLE PUMP

Off-spec effluent will be recycled back to the SCA (from the effluent monitoring tanks) using the effluent recycle pump(s).

Unit Details

Number of pumps	1
Type	Centrifugal
Capacity	5000 gpm
Drive	Variable Frequency Drive

POLYMER MAKEDOWN WATER PUMP

Effluent from the effluent monitoring tanks will be used as polymer makedown water at the SCA for polymer pre-conditioning of the SCA sediment prior to dewatering in the geotextile tubes. Effluent will be pumped to the SCA using the polymer makedown water pump.

Unit Details

Number of pumps	1
Type	Centrifugal
Capacity	175 gpm

BACKWASH/SLUDGE PUMPING STATION

Spent backwash water from the GACs and MMFs and sludge from the clarifiers will be discharged to the Backwash/Sludge Pumping Station. The pumping station will also be used to collect drainage from the spent carbon trailers prior to transport off-site. The collected waters and sludge will be returned to the SCA via pumps in the pumping station.

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Unit Details

Number of units	1
Type	Below grade
Working Volume	2700 gal
Number of pumps	2 operating, 1 spare
Type	Submersible, centrifugal
Capacity (ea)	1600 gpm

PIPING

In general, the following materials of construction are planned for the SCA WTP. Alternate materials, which are compatible with the fluid service and provide ease of installation or are cost-effective, may be used.

Fluid	Above Grade	Buried
Process Water (WW)	Sched. 80 PVC for 8" diameter and less. HDPE for greater than 8" diameter.	HDPE DR17. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.
Caustic (NaOH or Sodium Hydroxide)	Polyethylene tubing inside PVC secondary containment piping. Stainless steel at the bulk storage tank. Heat-traced and insulated outside of the building and in the unheated area of the building.	Polyethylene tubing inside PVC or HDPE secondary containment piping. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.
Sulfuric Acid (H2SO4 or Acid)	Teflon tubing inside PVC secondary containment piping. Stainless steel at the bulk storage tank.	Teflon tubing inside PVC or HDPE secondary containment piping.
Alum (COAG)	Polyethylene tubing inside PVC secondary containment piping. Stainless steel at the bulk storage tank. Heat-traced and insulated outside of the building and in the unheated area of the building.	Polyethylene tubing inside PVC or HDPE secondary containment piping. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.
Process Vent	Galvanized duct and/or PVC	Not Applicable
Sludge and Backwash Water	Sched. 80 PVC for 8" diameter and less. HDPE for greater than 8" diameter.	HDPE DR17. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.
Treated Water (TRWW)	Sched. 80 PVC for 8" diameter and less. HDPE for greater than 8" diameter.	HDPE DR17. If buried above frost line and outside of the heated building footprint, heat-traced and insulated.

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WINTER TREATMENT SYSTEM

Influent flow during the winter is significantly reduced from the dredge season to 500 gpm or less consisting of seepage from the geotextile tubes and precipitation. With the exception of a separate flash mix tank, the winter treatment system will use a single train of equipment from the dredge season treatment system. Refer to dredge season equipment for basis of equipment selection.

SYSTEM CAPACITY

The winter treatment system is designed to treat a maximum flow of 500 gpm.

CHEMICAL BULK STORAGE

The estimated feed rates shown below include the water portion of the chemical solution. Supporting calculations are included as Attachment C. The chemical usage shown on the mass balance reflects the neat chemical only and does not include the water portion. The neat chemical calculations are included as Attachment D.

20% Alum

Design Criteria Used	
Dosage	20 mg/L
Feed Rate	60 gpd
Unit Details	
Number of Tanks	1
Volume	6,000 gal 100 days

50% Sodium Hydroxide

Design Criteria Used	
Dosage	160 mg/L
Feed Rate	150 gpd
Unit Details	
Number of Tanks	1
Volume	8,000 gal 50 days

93% Sulfuric Acid

Design Criteria Used	
Dosage	350 mg/L
Feed Rate	150 gpd
Unit Details	
Number of Tanks	1
Volume (each)	8,000 gal 50 days

PH ADJUSTMENT

1st Stage (rough):	**Design Criteria Used**	
	Hydraulic Retention Time (HRT)	10 - 15 minutes
	pH adjust	12+ to 11 s.u.

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	Unit Details	
	Number of units	1
	Type	Frac Tank
	Working volume (min)	16,745 gal
	HRT (at max flow 500 gpm)	33 min
2nd Stage (fine):	**Design Criteria Used**	
	Hydraulic Retention Time (HRT)	10 - 15 minutes
	pH adjust	11 to 8.5 s.u.
	Unit Details	
	Number of Units	1
	Type	Frac Tank
	Working volume (min)	14,890 gal
	HRT (at max flow 500 gpm)	30 min

FLASH MIX

A separate flash mix tank will be provided for the winter treatment system.

Design Criteria Used	
Hydraulic Retention Time (HRT)	1 - 5 min
Unit Details (based on Design Tanks F084DT)	
Number of units	1
Type	Vertical, cylindrical
Volume (min)	4,000 gal
HRT (at max flow 500 gpm)	8 min

FLOCCULATION

Design Criteria Used	
Hydraulic Retention Time (HRT)	5 - 15 min
Unit Details	
Number of units	2
Type	Integral to clarifier
Volume (each)	5,000 gal
HRT (at max flow 500 gpm)	20 min

CLARIFIERS

Design Criteria Used	
Surface Overflow Rate (SOR)	0.22 - 0.72 gpm/sf
Influent TSS concentration	150 mg/l
Effluent TSS concentration	10 mg/l
Unit Details	
Number of units	2
Type	Inclined Plate
Normal Feed Rate (each)	250 gpm
Settling Area (each)	1,300 ft2
SOR (at max flow 500 gpm)	0.19 gpm/sf

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FILTER FEED TANK & PUMPS

Unit Details	
Number of tanks	1
Type	Frac Tank
Working volume	17,035 gal
HRT (at max flow 438 gpm)	39 min
Number of pumps	TBD
Type	Progressing cavity
Capacity	438 gpm

MULTIMEDIA FILTER

Design Criteria Used	
Filtration Rate	4 - 6 gpm/ft2
Influent TSS concentration	10 mg/l
Particle sized removed	> 10 µm
Unit Details	
Number of filter vessels	1
Type	Horizontal
Filter area	343 ft2
Filtration Rate (at max flow 438 gpm)	1.3 gpm/ft2

GRANULAR ACTIVATED CARBONS

Design Criteria Used	
Hydraulic Loading Rate (HLR)	4 - 6 gpm/ft2
Empty Bed Contact Time (EBCT)	15 min (combined for both lead/lag vessels)
Influent TSS concentration	5 mg/l
Unit Details	
Number of vessels	2 (1 pair lead/lag)
Diameter	12 ft
Filter area (each)	113 ft2
Approximate Carbon Volume (each)	728 ft3
Carbon Weight (each)	20,000 lbs
HLR (at max flow 438 gpm)	3.9 gpm/ft2
EBCT at max flow (pair, at max flow 438 gpm)	25 min

EFFLUENT MONITORING TANKS

Unit Details	
Number	2
Type	Frac Tank
Working volume (min, each)	17,035 gal
HRT (combined, at max flow 438 gpm)	78 min

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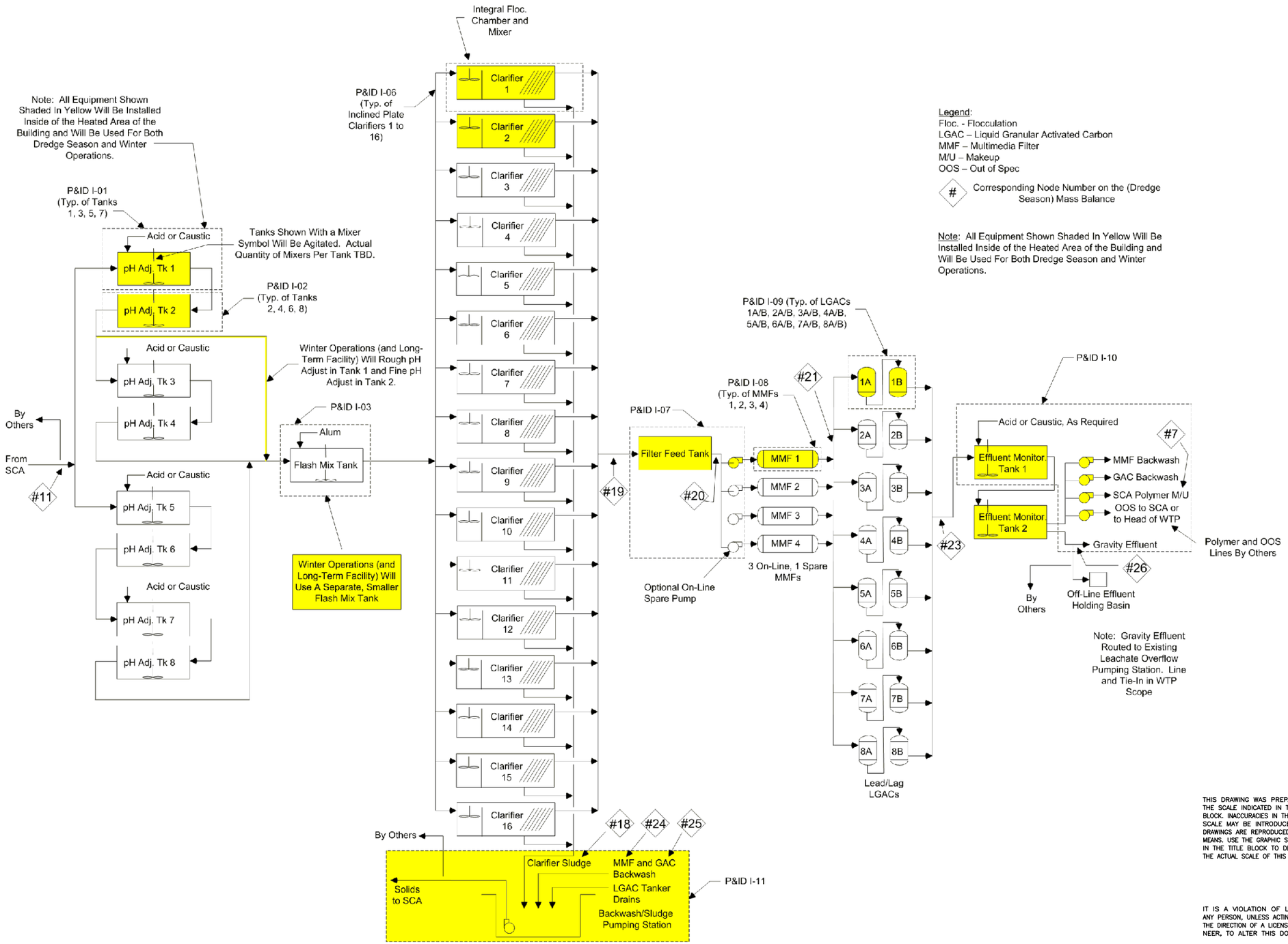

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
D	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
C	3/25/10	DP #1 FOR GAC BIDDING	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. INACCURACIES IN THE STATED SCALE MAY BE INTRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS. USE THE GRAPHIC SCALE BAR IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SCALE OF THIS DRAWING.

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O'BRIEN & GERE ENGINEERS INC.

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HONEYWELL INTERNATIONAL, INC.
DP #1
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

PROCESS FLOW DIAGRAM

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.44523–PFD1
DATE FEBRUARY 2010

PFD–1

May 11, 2010 – 7:02pm
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Draft

Honeywell SCA WTP
Mass Balance Maximum Flow - Based on Phase II Pre-Design Investigation Report - Pre Holding at Peak Flows
Review Rev. 10
3/26/2010

PARAMETER	Primary Screen Underflow		Combined Recirculation to Geotubes		Recirculation Solids Contribution to Geotubes		Non-Recirc. Liquid Stream to EQ Basin leaving Geotubes		Recirculation Liquid to EQ Basin leaving Geotubes		Total Liquid to EQ Basin		Parson Polymer Makeup		Rain Water to EQ Basin		Internal Reuse from EQ		Accumulation in EQ Basin		pH Adj Tank Influent		H2SO4 Add to pH Adj Tk		NaOH Add to pH Adj Tk		Alum Add'n to Floc	
Line Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr
GENERAL																												
Flow Rate	---	2,574,058	---	583,526	---	692	---	2,306,841	---	582,834	---	2,889,675	---	87,049	---	70,539	---	51,029	---	76,043	---	2,833,143	---	991.6	---	0.000	---	56.7
Flow Rate (GPM)	---	5,145	---	1,166	---	1.4	---	4,611	---	1,165	---	5,776.1	---	174.0	---	141.0	---	102	---	152	---	5,663	---	1.08	---	0.000	---	0.092
Flow Rate (MGD)	---	7.41	---	1.68	---	0.002	---	6.64	---	1.678	---	8.3	---	0.251	---	0.203	---	0.15	---	0.22	---	8.15	---	0.002	---	0.000	---	0.000
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.84	---	1.55	---	1.25
Design pH (S.U.)	11.5 - 12.0	---	9.0 - 10.0	---	6.5 - 7.5	---	11.5 - 12.0	---	9.0 - 10.0	---	10.0 - 11.5	---	9.0 - 10.0	---	6.5 - 7.5	---	9.0 - 10.0	---	9.0 - 10.0	---	9.0 - 10.0	---	< 1	---	> 13	---	---	---
CATIONS / ANIONS (mg/L)																												
Aluminum	---	---	8.49	4.96	3,605.8	2.50	4.900	11.312	4.222	2.462	4.763	13.77	4.217	0.367	0.0	0.0	4.650	0.24	4.650	0.35	4.774	13.54	0.0	0.0	0.0	0.0	19,930	0.9
Cadmium	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Chlorides	---	---	1,193	696.9	0.0	0.000	1,190	2,747	1,195	697	1,191	3,444	1,193	104	0.0	0.0	1,163	59.4	1,163	88.5	1,194	3,385	0.0	0.0	0.0	0.0	0.0	0.0
Chromium	---	---	0.1	0.040	53.9	0.037	0.020	0.046	0.004	0.003	0.017	0.049	0.004	0.000	0.0	0.0	0.016	0.001	0.016	0.001	0.017	0.05	0.0	0.0	0.0	0.0	0.0	0.0
Hex Chromium	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Copper	---	---	0.892	0.521	663.6	0.459	0.240	0.554	0.105	0.061	0.213	0.616	0.037	0.003	0.0	0.0	0.208	0.011	0.208	0.016	0.213	0.60	0.0	0.0	0.0	0.0	0.0	0.0
Lead	---	---	0.203	0.119	143.3	0.099	0.070	0.162	0.033	0.019	0.063	0.181	0.026	0.002	0.0	0.0	0.061	0.003	0.061	0.005	0.063	0.18	0.0	0.0	0.0	0.0	0.0	0.0
Mercury	---	---	0.005	0.024	35.1	0.024	0.011	0.025	0.000	0.000	0.009	0.026	0.000	0.000	0.0	0.0	0.009	0.000	0.009	0.001	0.009	0.03	0.0	0.0	0.0	0.0	0.0	0.0
Nickel	---	---	2.399	1.401	1941.4	1.344	0.670	1.547	0.098	0.057	0.555	1.604	0.078	0.007	0.0	0.0	0.541	0.028	0.541	0.041	0.556	1.58	0.0	0.0	0.0	0.0	0.0	0.0
Silver	---	---	0.005	0.003	0.0	0.000	0.005	0.012	0.005	0.003	0.005	0.014	0.005	0.000	0.0	0.0	0.005	0.000	0.005	0.000	0.005	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	---	---	551.1	321.9	0.0	0.00	150.0	346.3	551.8	321.9	231.0	668.2	551.1	48.01	0.0	0.0	225.5	11.52	225.5	17.16	231.6	656.6	1,674,971	903.4	0.0	0.0	70,864	3.3
Zinc	---	---	0.362	0.212	294.6	0.204	0.098	0.226	0.013	0.008	0.081	0.234	0.008	0.001	0.0	0.0	0.079	0.004	0.079	0.01	0.081	0.23	0.0	0.0	0.0	0.0	0.0	0.0
Total Tracked Cations / Anions	---	---	1,760.7	1028.2	7,699.3	5.3	1,348.7	3,113.7	1,753.6	1022.9	1,430.4	4,136.6	1,751.3	152.6	0.0	0.0	1,396.3	71.3	1,396.3	106.3	1,433.8	4,065.3	1,674,971	903.4	0.0	0.0	90,794	4.2
VOC (ug/L)																												
TIO	---	---	15.5	9.1	0.0	0.0	28.0	64.6	15.5	9.1	25.5	73.7	0.026	0.002	0.0	0.0	24.9	1.27	24.88	1.89	25.5	72.4	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL ORGANICS	---	---	15.5	9.1	0.0	0.0	28.0	64.6	15.5	9.1	25.5	73.7	0.026	0.002	0.0	0.0	24.9	1.27	24.88	1.89	25.5	72.4	0.0	0.0	0.0	0.0	0.0	0.0
OTHER																												
TBOD5 (mg/L)	---	---	334.1	195.1	142,197	98.4	170.0	392.5	165.7	96.7	169.1	489.1	131.8	11.5	0.0	0.0	165.1	8.43	165.11	12.57	169.5	480.7	0.0	0.0	0.0	0.0	0.0	0.0
TSS (mg/L)	---	---	990	578.3	666,147	461.2	200.0	461.7	200.0	116.7	200	578.4	2.0	0.2	0.0	0.0	195.2	9.97	195.23	14.86	200.5	568.4	0.0	0.0	0.0	0.0	0.0	0.0
TP (mg/L)	---	---	1.0	0.6	0.0	0.0	0.7	1.7	1.0	0.6	0.8	2.2	0.8	0.1	0.0	0.0	0.8	0.04	0.76	0.06	0.8	2.2	0.0	0.0	0.0	0.0	0.0	0.0
TKN (mg/L)	---	---	61.5	35.9	0.0	0.0	47.0	108.5	61.5	35.9	49.93	144.4	48.9	4.3	0.0	0.0	48.7	2.49	48.74	3.71	50.0	141.9	0.0	0.0	0.0	0.0	0.0	0.0

PARAMETER	Polymer Add'n to Floc		Polymer Makeup Water		I.P. Clarifier Influent		I.P. Clarifier Sludge		I.P. Clarifier Effluent		Filter Feed Tank Disch		MMF Effluent		GAC Units		GAC Effluent		Spent MMF B/Wash		Spent GAC B/Wash		Eff. Tanks Discharge		PERMIT LIMIT
Line Number	15		16		17		18		19		20		21		22		23		24		25		26		
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	
GENERAL																									
Flow Rate	---	1.42	---	1,152	---	2,835,345	---	354,418	---	2,480,927	---	2,480,927	---	2,480,927	---	---	---	2,480,927	---	83,172	---	58,887	---	2,250,667	NA
Flow Rate (GPM)	---	0.003	---	2.303	---	5,668	---	708.4	---	4,959	---	4,959	---	4,959	---	---	---	4,959	---	166.3	---	117.7	---	4,499	
Flow Rate (MGD)	---	0.000	---	0.003	---	8.16	---	1.020	---	7.14	---	7.14	---	7.14	---	---	---	7.14	---	0.239	---	0.170	---	6.5	
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	< 150
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	---	---	1.00	---	1.00	---	1.00	---	1.00	
Design pH (S.U.)	6.5 - 7.5	---	9.0 - 10.0	---	8.5-10.5	---	8.5-10.5	---	8.5	---	8.5	---	8.5	---	---	---	9.0 - 10.0	---	8.5	---	9.0 - 10.0	---	9.0 - 10.0	---	5.5-10.5
CATIONS / ANIONS (mg/L)																									
Aluminum	0.0	0.0	4.217	0.005	5.096	14.461	11.254	3.992	4.217	10.469	4.217	10.469	4.217	10.469			4.217	10.469	4.217	0.351	4.2	0.248	4.2	9.5	---
Cadmium	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	2.0
Chlorides	0.0	0.0	1,193.3	1.376	1,193.3	3,386.2	1,193.34	423.3	1,193.34	2,962.90	1,193.34	2,962.90	1,193.34	2,962.9	---	0.000	1,193.3	2962.9	1,193.3	99.33	1,193	70.3	1,193	2,688	---
Chromium	0.0	0.0	0.004	0.000	0.017	0.048	0.10	0.035	0.005	0.013	0.005	0.013	0.005	0.013	---	0.000	0.004	0.009	0.004	0.000	0.068	0.004	0.004	0.008	0.3
Hex Chromium	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	4.0
Copper	0.0	0.0	0.037	0.000	0.213	0.605	0.661	0.234	0.149	0.371	0.149	0.371	0.149	0.371	---	0.000	0.037	0.093	0.037	0.003	4.8	0.280	0.037	0.084	0.7
Lead	0.0	0.0	0.026	0.000	0.063	0.178	0.238	0.085	0.038	0.093	0.038	0.093	0.038	0.093	---	0.000	0.026	0.065	0.026	0.002	0.502	0.030	0.026	0.059	0.2
Mercury	0.0	0.0	0.000	0.000	0.009	0.025	0.069	0.024	2.651E-04	6.582E-04	2.65E-04	6.58E-04	2.65E-04	6.58E-04	---	0.00039	1.06E-04	2.63E-04	1.06E-04	8.83E-06	1.06E-04	6.25E-06	0.00011	0.00024	0.0002
Nickel	0.0	0.0	0.078	0.000	0.556	1.576	3.667	1.301	0.111	0.276	0.111	0.276	0.111	0.276	---	0.000	0.078	0.193	0.078	0.006	1.48	0.087	0.08	0.18	0.35
Silver	0.0	0.0	0.005	0.000	0.005	0.014	0.005	0.002	0.005	0.012	0.005	0.012	0.005	0.012	---	0.000	0.005	0.012	0.005	0.000	0.005	0.000	0.005	0.011	1.0
Sulfate	0.0	0.0	551.1	0.636	551.1	1563.9	551.1	195.5	551.1	1368.4	551.1	1368.4	551.1	1368.4	---	0.000	551.1	1368.4	551.1	45.9	551	32.5	551	1241	---
Zinc	0.0	0.0	0.008	0.000	0.081	0.230	0.535	0.190	0.016	0.040	0.016	0.040	0.016	0.040	---	0.000	0.008	0.020	0.008	0.001	0.349	0.021	0.008	0.018	0.4
Total Tracked Cations / Anions	0.0	0.0	1,751.3	2.0	1,753.2	4,974.9	1,763.7	625.6	1,751.7	4,349.3	1,751.7	4,349.3	1,751.7	4,349.3	---	0.000	1,751.3	4,348.2	1,751.3	145.8	1,770	104	1,751	3,945	---
VOC (ug/L)																									
TIO	0.0	0.0	0.026	0.002	25.5	72.4	25.5	9.1	25.5	63.38	25.5	63.4	25.5	63.4	---	63.3	0.026	0.063	0.026	0.002	0.026	0.002	0.026	0.057	0.1
TOTAL ORGANICS	0.0	0.0	0.026	0.002	25.5	72.4	25.5	9.1	25.5	63.38	25.5	63.4	25.5	63.4	---	63.3	0.026	0.063	0.026	0.002	0.026	0.002	0.026	0.057	---
OTHER																									
TBOD5 (mg/L)	0.0	0.0	131.8	11.5	173	492.2	416	147.7	138.8	344.5	138.8	344.5	138.8	344.5	---	0.0	131.8	327.3	131.8	11.0	424.1	25.0	132	297	NA
TSS (mg/L)	0.0	0.0	2.0	0.2	205	582.8	1571	557.3	10.3	25.5	10.3	25.5	5.0	12.4	---	0.0	2.0	5.0	159.2	13.2	128.4	7.6	2.0	4.5	NA
TP (mg/L)	0.0	0.0	0.8	0.07	0.8	2.3	0.8	0.3	0.8	2.0	0.8	2.0	0.8	2.0	---	0.0	0.8	1.9	0.76	0.06	2.4	0.1	0.76	1.7	NA
TKN (mg/L)	0.0	0.0	48.9	4.3	51.5	146.2	51.5	18.3	51.5	127.9	51.5	127.9	51.5	127.9	---	0.0	48.9	121.5	48.9	4.1	157.4	9.3	49	110	NA

Notes:
1. Cadmium, hexavalent chromium and silver were non-detect.
2. Molybdenum data and estimates are provided for informational purposes. A draft permit limit has not been established. Pre-Design Investigation (PDI) 6 will provide additional information regarding molybdenum.
3. The Geotube effluent TSS maximum anticipated value is 200 mg/L.
4. Sludge underflow from the I.P. Clarifier is 12.5% by influent volume.
5. Backwash design frequencies are: 1 time per day for each MMF unit, and 1 time per two-day period for each GAC unit.
6. Nickel removal is anticipated to occur at a pH of 10.5 S.U.
7. Parson's Mass Balance and O'Brien & Gere's Mass Balance correspond as follows: Parson's Node # 4 is equivalent to O'Brien & Gere's Node #16. Parsons Node #9 is equivalent to the sum of O'Brien & Gere Nodes # 18, 24 & 25. Parson's Node # 10 is equivalent to O'Brien & Gere's Node #9. Refer to Parsons' Mass Balance, Rev. A, 1/20/10.
8. O'Brien & Gere's in scope work for the SCA Water Treatment System begins at Node #11, the pH Adjust Tank Influent. Nodes #1 through #10 are presented for calculation purposes only, and are being addressed by Parsons.
9. Polymer is not planned to be used at the WTP. If required, usage would be as shown in Node #15.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. INACCURACIES IN THE STATED SCALE MAY BE INTRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS. USE THE GRAPHIC SCALE BAR IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SCALE OF THIS DRAWING.

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
C	4/09/10	DP #2 DRAFT FOR HONEYWELL REVIEW	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

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HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

MASS BALANCE – DREDGE SEASON

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW
FILE NO. 1163.45613-PFD2
DATE FEBRUARY 2010
PFD-2

May 11, 2010 – 7:03pm
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May 11, 2010 – 7:04pm

Honeywell SCA WTP
Winter Conditions
Mass Balance Maximum Flow - Based on Phase II Pre-Design Investigation Report - Pre Holding at Peak Flows
Review Rev. 10
5/26/2010

Draft

PARAMETER	Primary Screen Underflow		Combined Recirculation to Geotubes		Recirculation Solids Contribution to Geotubes		Non-Recirc. Liquid Stream to EQ Basin leaving Geotubes		Recirculation Liquid to EQ Basin leaving Geotubes		Total Liquid to EQ Basin		Parson Polymer Makeup		Rain Water to EQ Basin		Internal Reuse from EQ		Accumulation in EQ Basin		pH Adj Tank Influent		H2SO4 Add to pH Adj Tk		NaOH Add to pH Adj Tk		Alum Add'n to Floc	
Line Number	1		2		3		4		5		6		7		8		9		10		11		12		13		14	
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr
GENERAL																												
Flow Rate	---	130,604	---	49,041	---	40	---	130,573	---	49,001	---	179,574	---	0	---	70,539	---	0	---	0	---	250,113	---	87.5	---	0.000	---	5.0
Flow Rate (GPM)	---	261	---	98	---	0.1	---	261	---	98	---	358.9	---	0.0	---	141.0	---	0	---	0	---	500	---	0.10	---	0.000	---	0.008
Flow Rate (MGD)	---	0.38	---	0.14	---	0.000	---	0.38	---	0.141	---	0.5	---	0.000	---	0.203	---	0.00	---	0.00	---	0.72	---	0.000	---	0.000	---	0.000
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.84	---	1.53	---	1.23
Design pH (S.U.)	11.5 - 12.0	---	9.0 - 10.0	---	6.5 - 7.5	---	11.5 - 12.0	---	9.0 - 10.0	---	10.0 - 11.5	---	9.0 - 10.0	---	6.5 - 7.5	---	9.0 - 10.0	---	9.0 - 10.0	---	9.0 - 10.0	---	< 1	---	> 13	---	---	---
CATIONS / ANIONS (mg/L)																												
Aluminum	---	---	6.33	0.31	4,402.7	0.18	4.900	0.640	2.701	0.132	4.300	0.77	2.699	0.000	0.0	0.0	3.087	0.00	3.087	0.00	3.087	0.77	0.0	0.0	0.0	0.0	19,930	0.1
Cadmium	---	---	0.003	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Chlorides	---	---	772	37.9	0.0	0.000	1,190	156	773	38	1,076	193	772	0	0.0	0.0	773	0.0	773	0.0	773	193	0.0	0.0	0.0	0.0	0.0	0.0
Chromium	---	---	0.0	0.002	53.1	0.002	0.020	0.003	0.003	0.000	0.015	0.003	0.002	0.000	0.0	0.0	0.011	0.000	0.011	0.000	0.011	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Hex Chromium	---	---	0.005	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Copper	---	---	0.610	0.030	654.1	0.026	0.240	0.031	0.071	0.003	0.194	0.035	0.024	0.000	0.0	0.0	0.139	0.000	0.139	0.000	0.139	0.03	0.0	0.0	0.0	0.0	0.0	0.0
Lead	---	---	0.138	0.007	140.8	0.006	0.070	0.009	0.022	0.001	0.057	0.010	0.017	0.000	0.0	0.0	0.041	0.000	0.041	0.000	0.041	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Mercury	---	---	0.005	0.001	34.6	0.001	0.011	0.001	0.000	0.000	0.008	0.001	0.000	0.000	0.0	0.0	0.006	0.000	0.006	0.000	0.006	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Nickel	---	---	1.640	0.081	1911.8	0.077	0.670	0.088	0.065	0.003	0.505	0.091	0.051	0.000	0.0	0.0	0.362	0.000	0.362	0.000	0.362	0.09	0.0	0.0	0.0	0.0	0.0	0.0
Silver	---	---	0.003	0.000	0.0	0.000	0.005	0.001	0.003	0.000	0.005	0.001	0.003	0.000	0.0	0.0	0.003	0.000	0.003	0.000	0.003	0.00	0.0	0.0	0.0	0.0	0.0	0.0
Sulfate	---	---	494.9	24.3	0.0	0.00	150.0	19.6	495.3	24.3	244.2	43.9	494.9	0.00	0.0	0.0	175.4	0.00	175.4	0.00	175.4	43.9	1,674,971	79.8	0.0	0.0	70,864	0.3
Zinc	---	---	0.248	0.012	290.3	0.012	0.098	0.013	0.009	0.000	0.074	0.013	0.005	0.000	0.0	0.0	0.053	0.000	0.053	0.00	0.053	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Total Tracked Cations / Anions	---	---	1,278.8	62.8	8,428.5	0.3	1,348.7	176.2	1,272.9	62.4	1,328.0	238.7	1,271.7	0.0	0.0	0.0	953.5	0.0	953.5	0.0	953.5	238.7	1,674,971	79.8	0.0	0.0	90,794	0.4
VOC (ug/L)																												
TIO	---	---	10.7	0.5	0.0	0.0	28.0	3.7	10.7	0.5	23.3	4.2	0.017	0.000	0.0	0.0	16.7	0.00	16.71	0.00	16.7	4.2	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL ORGANICS	---	---	10.7	0.5	0.0	0.0	28.0	3.7	10.7	0.5	23.3	4.2	0.017	0.000	0.0	0.0	16.7	0.00	16.71	0.00	16.7	4.2	0.0	0.0	0.0	0.0	0.0	0.0
OTHER																												
TBOD5 (mg/L)	---	---	217.0	10.7	135,406	5.5	170.0	22.2	105.5	5.2	152.4	27.4	83.1	0.0	0.0	0.0	109.4	0.00	109.42	0.00	109.4	27.4	0.0	0.0	0.0	0.0	0.0	0.0
TSS (mg/L)	---	---	750	36.8	666,147	26.9	200.0	26.1	200.0	9.8	200	35.9	2.0	0.0	0.0	0.0	143.6	0.00	143.59	0.00	143.6	35.9	0.0	0.0	0.0	0.0	0.0	0.0
TP (mg/L)	---	---	0.6	0.0	0.0	0.0	0.7	0.1	0.6	0.0	0.7	0.1	0.5	0.0	0.0	0.0	0.5	0.00	0.50	0.00	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0
TKN (mg/L)	---	---	38.7	1.9	0.0	0.0	47.0	6.1	38.7	1.9	44.74	8.0	30.5	0.0	0.0	0.0	32.1	0.00	32.12	0.00	32.1	8.0	0.0	0.0	0.0	0.0	0.0	0.0

PARAMETER	Polymer Add'n to Floc		Polymer Makeup Water		I.P. Clarifier Influent		I.P. Clarifier Sludge		I.P. Clarifier Effluent		Filter Feed Tank Disch		MMF Effluent		GAC Units		GAC Effluent		Spent MMF B/Wash		Spent GAC B/Wash		Eff. Tanks Discharge		PERMIT LIMIT
Line Number	15		16		17		18		19		20		21		22		23		24		25		26		
Column Designation	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr			Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	Concent.	lb/hr	
GENERAL																									
Flow Rate	---	0.13	---	65	---	250,271	---	31,284	---	218,987	---	218,987	---	218,987	---	---	---	218,987	---	10,396	---	7,361	---	201,165	NA
Flow Rate (GPM)	---	0.000	---	0.130	---	500	---	62.5	---	438	---	438	---	438	---	---	---	438	---	20.8	---	14.7	---	402	
Flow Rate (MGD)	---	0.000	---	0.000	---	0.72	---	0.090	---	0.63	---	0.63	---	0.63	---	---	---	0.63	---	0.030	---	0.021	---	0.6	
Temp (deg F)	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	---	Ambient	< 150
Specific Gravity	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	1.00	---	---	---	1.00	---	1.00	---	1.00	---	1.00	
Design pH (S.U.)	6.5 - 7.5	---	9.0 - 10.0	---	8.5-10.5	---	8.5-10.5	---	8.5	---	8.5	---	8.5	---	---	---	9.0 - 10.0	---	8.5	---	9.0 - 10.0	---	9.0 - 10.0	---	5.5-10.5
CATIONS / ANIONS (mg/L)																									
Aluminum	0.0	0.0	2.699	0.000	3.410	0.854	8.388	0.263	2.699	0.591	2.699	0.591	2.699	0.591			2.699	0.591	2.699	0.028	2.7	0.020	2.7	0.5	---
Cadmium	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	2.0
Chlorides	0.0	0.0	772.4	0.050	772.4	193.5	772.41	24.2	772.41	169.28	772.41	169.28	772.41	169.3	---	0.000	772.4	169.3	772.4	8.04	772	5.7	772	156	---
Chromium	0.0	0.0	0.002	0.000	0.011	0.003	0.06	0.002	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.002	0.001	0.002	0.000	0.032	0.000	0.002	0.000	0.3
Hex Chromium	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	4.0
Copper	0.0	0.0	0.024	0.000	0.139	0.035	0.431	0.014	0.097	0.021	0.097	0.021	0.097	0.021	---	0.000	0.024	0.005	0.024	0.000	2.2	0.016	0.024	0.005	0.7
Lead	0.0	0.0	0.017	0.000	0.041	0.010	0.155	0.005	0.024	0.005	0.024	0.005	0.024	0.005	---	0.000	0.017	0.004	0.017	0.000	0.236	0.002	0.017	0.003	0.2
Mercury	0.0	0.0	0.000	0.000	0.006	0.001	0.045	0.001	1.750E-04	3.791E-05	1.73E-04	3.79E-05	1.73E-04	3.79E-05	---	0.00002	6.92E-05	1.52E-05	6.92E-05	7.20E-07	6.92E-05	5.10E-07	0.00007	0.00001	0.0002
Nickel	0.0	0.0	0.051	0.000	0.362	0.091	2.391	0.075	0.072	0.016	0.072	0.016	0.072	0.016	---	0.000	0.051	0.011	0.051	0.001	0.70	0.005	0.05	0.01	0.35
Silver	0.0	0.0	0.003	0.000	0.003	0.001	0.003	0.000	0.003	0.001	0.003	0.001	0.003	0.001	---	0.000	0.003	0.001	0.003	0.000	0.003	0.000	0.003	0.001	1.0
Sulfate	0.0	0.0	494.9	0.032	494.9	124.0	494.9	15.5	494.9	108.5	494.9	108.5	494.9	108.5	---	0.000	494.9	108.5	494.9	5.1	495	3.6	495	100	---
Zinc	0.0	0.0	0.005	0.000	0.053	0.013	0.349	0.011	0.011	0.002	0.011	0.002	0.011	0.002	---	0.000	0.005	0.001	0.005	0.000	0.162	0.001	0.005	0.001	0.4
Total Tracked Cations / Anions	0.0	0.0	1,271.7	0.1	1,273.1	318.9	1,280.9	40.1	1,272.0	278.8	1,272.0	278.8	1,272.0	278.8	---	0.000	1,271.7	278.7	1,271.7	13.2	1,280	9	1,272	256	---
VOC (ug/L)																									
TIO	0.0	0.0	0.017	0.000	16.7	4.2	16.7	0.5	16.7	3.66	16.7	3.7	16.7	3.7	---	3.7	0.017	0.004	0.017	0.000	0.017	0.000	0.017	0.003	0.1
TOTAL ORGANICS	0.0	0.0	0.017	0.000	16.7	4.2	16.7	0.5	16.7	3.66	16.7	3.7	16.7	3.7	---	3.7	0.017	0.004	0.017	0.000	0.017	0.000	0.017	0.003	---
OTHER																									
TBOD5 (mg/L)	0.0	0.0	83.1	0.0	109	27.4	262	8.2	87.5	19.2	87.5	19.2	87.5	19.2	---	0.0	83.1	18.2	83.1	0.9	213.2	1.6	83	17	NA
TSS (mg/L)	0.0	0.0	2.0	0.0	149	37.2	1136	35.6	7.4	1.6	7.4	1.6	5.0	1.1	---	0.0	2.0	0.4	53.1	0.6	91.3	0.7	2.0	0.4	NA
TP (mg/L)	0.0	0.0	0.5	0.00	0.5	0.1	0.5	0.0	0.5	0.1	0.5	0.1	0.5	0.1	---	0.0	0.5	0.1	0.47	0.00	1.2	0.0	0.47	0.1	NA
TKN (mg/L)	0.0	0.0	30.5	0.0	32.1	8.0	32.1	1.0	32.1	7.0	32.1	7.0	32.1	7.0	---	0.0	30.5	6.7	30.5	0.3	78.2	0.6	30	6	NA

Notes:
1. Cadmium, hexavalent chromium and silver were non-detect.
2. Molybdenum data and estimates are provided for informational purposes. A draft permit limit has not been established. Pre-Design Investigation (PDI) 6 will provide additional information regarding molybdenum.
3. The Geotube effluent TSS maximum anticipated value is 200 mg/L.
4. Sludge underflow from the I.P. Clarifier is 12.5% by influent volume.
5. Backwash design frequencies are: 1 time per day for each MMF unit, and 1 time per two-day period for each GAC unit.
6. Nickel removal is anticipated to occur at a pH of 10.5 S.U.
7. Parson's Mass Balance and O'Brien & Gere's Mass Balance correspond as follows: Parson's Node # 4 is equivalent to O'Brien & Gere's Node #16. Parsons Node #9 is equivalent to the sum of O'Brien & Gere Nodes # 18, 24 & 25. Parson's Node # 10 is equivalent to O'Brien & Gere's Node #9. Refer to Parsons' Mass Balance, Rev. A, 1/20/10.
8. O'Brien & Gere's in scope work for the SCA Water Treatment System begins at Node #11, the pH Adjust Tank Influent. Nodes #1 through #10 are presented for calculation purposes only, and are being addressed by Parsons.
9. Polymer is not planned to be used at the WTP. If required, usage would be as shown in Node #15.

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED ENGINEER, TO ALTER THIS DOCUMENT.

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED IN THE TITLE BLOCK. INACCURACIES IN THE STATED SCALE MAY BE INTRODUCED WHEN DRAWINGS ARE REPRODUCED BY ANY MEANS. USE THE GRAPHIC SCALE BAR IN THE TITLE BLOCK TO DETERMINE THE ACTUAL SCALE OF THIS DRAWING.

PRELIMINARY NOT FOR CONSTRUCTION
DATE: 5/12/10

NO.	DATE	REVISION	INIT.
E	5/12/10	DP #2 FOR NYSDEC AND COUNTY REVIEW	
C	4/09/10	DP #2 ISSUED FOR HONEYWELL REVIEW	
B	3/10/10	DP #1 ISSUED FOR NYSDEC AND COUNTY REVIEW	
A	2/12/10	DP #1 DRAFT FOR HONEYWELL REVIEW	

NOT TO SCALE

O'BRIEN & GERE ENGINEERS INC.

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HONEYWELL INTERNATIONAL, INC.
DP #2
WATER TREATMENT PLANT
TOWN OF CAMILLUS, NEW YORK

MECHANICAL

MASS BALANCE – WINTER SEASON

IN CHARGE OF JSR
DESIGNED BY GBE CHECKED BY PDS
DRAWN BY LMW

FILE NO. 1163.45613-PFD2
DATE FEBRUARY 2010

PFD-3

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DRAFT

Attachment A

Honeywell SCA WTP
Chemical Usage - Basis of Design Calculations
Dredge Season
April 9, 2010

Chemical Usage (lb/day) = **Conc (mg/L) * Q (gal/day) * 3.785 L/gal * 1 lb/454,000 mg**

Chemical Usage (gal/day) = $\frac{\text{Chem Usage (lb/day)}}{\text{Soln (\%) * S.G. * 8.34 lb/gal}}$

assume Q = 8.15 MGD

Chemical	Conc (mg/L)	Soln	S.G.	Chemical Usage	
				lb/day	gal/day
93% Sulfuric Acid	350	0.93	1.84	23,795	1,667
50% Sodium Hydroxide	160	0.50	1.53	10,878	1,705
20% Aluminum Sulfate	20	0.20	1.23	1,360	663

Notes:

1) Based on treatability testing performed on Onondaga Lake SMUs 1A and 1B, a concentration of 350 mg/L of 93% Sulfuric Acid will be required for the treatment system.

2) Based on treatability testing performed on Onondaga Lake SMUs 6 and 7, a concentration of 160 mg/L of 50% Sodium Hydroxide will be required for the treatment system. Typically, 93% Sulfuric Acid will be used to for pH Adjustment of the influent water. The 50% Sodium Hydroxide will only be used when dredging in SMUs 6 and 7 and to correct overshoots when there is excess addition of 93% Sulfuric Acid.

3) Influent flow based on Mass Balance Maximum Flow, Pre Holding at Peak Flows, Review Rev 10, 3/26/2010.

I:\Honeywell.1163\45613.Sca-Wtp-Detaile\N-D\[Chem Usage Calcs_backup for BOD 4_9_2010.xls]Neat Chemical Usage - winter

DRAFT

Attachment B

Honeywell SCA WTP
Neat Chemical Usage - Mass Balance Calculations
Dredge Season
April 9, 2010

Neat Chemical Usage (gal chem/1000 gal WW) = $\frac{\text{Conc (mg/L)}}{\text{S.G. * 1000 gal WW}}$

Neat Chemical Usage (gal/day) = **gal chem/1000 gal WW * gal WW/day / 1000 gal WW**

assume Q = 8.15 MGD

Chemical	Conc (mg/L)	S.G.	Neat Chemical Usage (gal/1000 gal WW)	Neat Chemical Usage (gal/day)	Soln	Chem Solution Usage (gal/day)
93% Sulfuric Acid	350	1.84	0.190	1,551	0.93	1,668
50% Sodium Hydroxide	160	1.53	0.105	853	0.50	1,706
20% Aluminum Sulfate	20	1.23	0.016	133	0.20	663

Notes:

1) Based on treatability testing performed on Onondaga Lake SMUs 1A and 1B, a concentration of 350 mg/L of 93% Sulfuric Acid will be required for the treatment system.

2) Based on treatability testing performed on Onondaga Lake SMUs 6 and 7, a concentration of 160 mg/L of 50% Sodium Hydroxide will be required for the treatment system. Typically, 93% Sulfuric Acid will be used to for pH Adjustment of the influent water. The 50% Sodium Hydroxide will only be used when dredging in SMUs 6 and 7 and to correct overshoots when there is excess addition of 93% Sulfuric Acid.

3) Influent flow based on Mass Balance Maximum Flow, Pre Holding at Peak Flows, Review Rev 10, 3/26/2010.

4) Chem solution Usage = Neat Chem Usage (gal/day) / Chem soln %

I:\Honeywell.1163\45613.Sca-Wtp-Detaile\N-D\[Chem Usage Calcs_backup for BOD 4_9_2010.xls]Neat Chemical Usage - winter

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Honeywell SCA WTP
Chemical Usage - Basis of Design Calculations
Winter Operation
April 9, 2010

Chemical Usage (lb/day) = **Conc (mg/L) * Q (gal/day) * 3.785 L/gal * 1 lb/454,000 mg**

Chemical Usage (gal/day) = $\frac{\text{Chem Usage (lb/day)}}{\text{Soln (\%) * S.G. * 8.34 lb/gal}}$

assume Q = 0.72 MGD

Chemical	Conc (mg/L)	Soln	S.G.	Chemical Usage lb/day	Chemical Usage gal/day
93% Sulfuric Acid	350	0.93	1.84	2,101	147
50% Sodium Hydroxide	160	0.50	1.53	960	151
20% Aluminum Sulfate	20	0.20	1.23	120	59

Notes:

1) Based on treatability testing performed on Onondaga Lake SMUs 1A and 1B, a concentration of 350 mg/L of 93% Sulfuric Acid will be required for the treatment system.

2) Based on treatability testing performed on Onondaga Lake SMUs 6 and 7, a concentration of 160 mg/L of 50% Sodium Hydroxide will be required for the treatment system. Typically, 93% Sulfuric Acid will be used to for pH Adjustment of the influent water. The 50% Sodium Hydroxide will only be used when dredging in SMUs 6 and 7 and to correct overshoots when there is excess addition of 93% Sulfuric Acid.

3) Influent flow based on Winter Conditions, Mass Balance Maximum Flow, Pre Holding at Peak Flows, Review Rev 10, 3/26/2010.

I:\Honeywell.1163\45613.Sca-Wtp-Detaile\N-D\[Chem Usage Calcs_backup for BOD 4_9_2010.xls]Neat Chemical Usage - winter

DRAFT

Attachment D

Honeywell SCA WTP
Neat Chemical Usage - Mass Balance Calculations
Winter Operation
April 9, 2010

Neat Chemical Usage (gal chem/1000 gal WW) = $\frac{\text{Conc (mg/L)}}{\text{S.G. * 1000 gal WW}}$

Neat Chemical Usage (gal/day) = **gal chem/1000 gal WW * gal WW/day / 1000 gal WW**

assume Q = 0.72 MGD

Chemical	Conc (mg/L)	S.G.	Neat Chemical Usage (gal/1000 gal WW)	Neat Chemical Usage (gal/day)	Soln	Chem Solution Usage (gal/day)
93% Sulfuric Acid	350	1.84	0.190	137	0.93	147
50% Sodium Hydroxide	160	1.53	0.105	75	0.50	151
20% Aluminum Sulfate	20	1.23	0.016	12	0.20	59

Notes:

1) Based on treatability testing performed on Onondaga Lake SMUs 1A and 1B, a concentration of 350 mg/L of 93% Sulfuric Acid will be required for the treatment system.

2) Based on treatability testing performed on Onondaga Lake SMUs 6 and 7, a concentration of 160 mg/L of 50% Sodium Hydroxide will be required for the treatment system. Typically, 93% Sulfuric Acid will be used to for pH Adjustment of the influent water. The 50% Sodium Hydroxide will only be used when dredging in SMUs 6 and 7 and to correct overshoots when there is excess addition of 93% Sulfuric Acid.

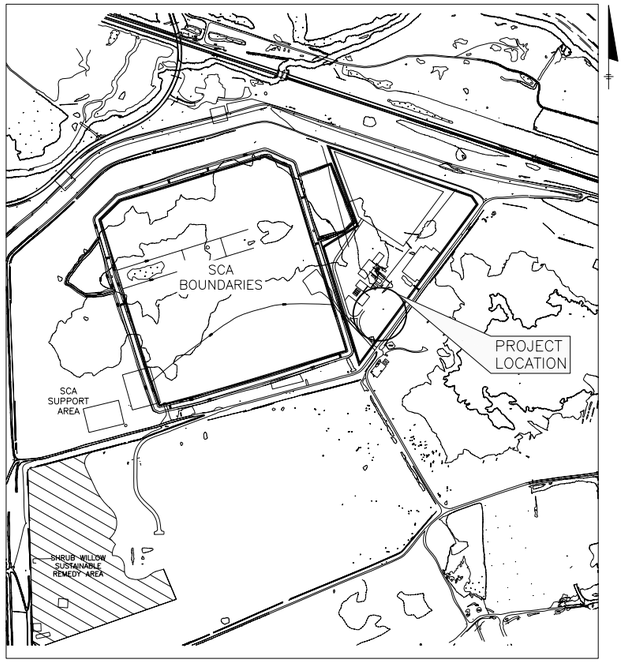
3) Influent flow based on Winter Conditions, Mass Balance Maximum Flow, Pre Holding at Peak Flows, Review Rev 10, 3/26/2010.

4) Chem solution Usage = Neat Chem Usage (gal/day) / Chem soln %

I:\Honeywell.1163\45613.Sca-Wtp-Detaile\N-D\[Chem Usage Calcs_backup for BOD 4_9_2010.xls]Neat Chemical Usage - winter

Drawings

May 12, 2010 – 1:10pm



LOCATION PLAN

NOT TO SCALE

FOR NYSDEC AND COUNTY REVIEW

DESIGN PACKAGE DP #2

SCA WATER TREATMENT PLANT (WTP)

TOWN OF CAMILLUS, NEW YORK

HONEYWELL INTERNATIONAL, INC.
MORRISTOWN, NEW JERSEY

MAY 2010

O'BRIEN & GERE
ENGINEERS INC.

5000 BRITTONFIELD PKWY
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INDEX TO DRAWINGS

COVERSHEET

CIVIL
SP-1 OVERALL SITE & KEY PLAN
G-1 GRADING PLAN
G-2 ROAD PROFILES
U-1 SITE & UTILITY PLAN
U-2 EFFLUENT PIPELINE PLAN
U-3 EFFLUENT PIPELINE PLAN
U-4 EFFLUENT PIPELINE PLAN
U-5 EFFLUENT PIPELINE PROFILE
U-6 EFFLUENT PIPELINE PROFILE
MD-1 MISCELLANEOUS DETAILS
MD-2 MISCELLANEOUS DETAILS
MD-3 PUMPING STATION SECTIONS, PLAN, & DETAILS
MD-4 MISCELLANEOUS DETAILS

GENERAL
GA-01 GENERAL ARRANGEMENT

ARCHITECTURAL
A-1 FLOOR PLAN
A-2 ROOF PLAN
A-3 ELEVATIONS

MECHANICAL
PFD-1 PROCESS FLOW DIAGRAM
PFD-2 MASS BALANCE – DREDGE SEASON
PFD-3 MASS BALANCE – WINTER SEASON
M-0 WTP ISOMETRIC
M-1 PLAN
M-1A EQUIPMENT LOCATION PLAN
M-2 PARTIAL PLAN
M-3 PARTIAL PLAN
M-4 pH ADJUSTMENT TANKS ISOMETRIC
M-5 IPC's ISOMETRIC
M-6 IPC's ISOMETRIC
M-7 FILTER FEED ISOMETRIC
M-8 LGAC ISOMETRIC
M-9 EFFLUENT MONITORING TANKS ISOMETRIC
M-10 SECTIONS
M-11 SECTIONS
M-12 FLASH MIX TANK #1 NOZZLE SCHEDULE
M-13 NOT USED
M-14 pH ADJUST TANK #1 NOZZLE SCHEDULE
M-15 FILTER FEED TANK NOZZLE SCHEDULE
M-16 EFFLUENT MONITORING TANK #1 NOZZLE SCHEDULE
M-17 EFFLUENT MONITORING TANK #2 NOZZLE SCHEDULE
M-18 DETAILS
M-19 DETAILS
M-20 DETAILS

P&ID's
I-A LEGEND & SYMBOLS
I-B LEGEND & SYMBOLS
I-C INTERLOCKS
I-01 pH ADJUSTMENT TANK #1
I-02 pH ADJUSTMENT TANK #2
I-03 FLASH MIX TANK #1
I-04 FLASH MIX TANK #2
I-05 DISTRIBUTION HEADER
I-06 INCLINED PLATE CLARIFIER
I-07 FILTER FEED TANK
I-08 MULTIMEDIA FILTER
I-09 CARBON FILTERS
I-10 EFFLUENT MONITORING TANK #1
I-10B EFFLUENT MONITORING TANK #2
I-11 BACKWASH/SLUDGE PUMPING STATION
I-12 CHEMICAL STORAGE – H2SO4/UNLOADING
I-13 CHEMICAL STORAGE – NAOH/ALUM
I-14 CHEMICAL FEED SYSTEMS – NAOH
I-15 CHEMICAL FEED SYSTEMS – H2SO4
I-16 CHEMICAL FEED SYSTEMS – ALUM
I-17 AIR COMPRESSOR
I-18 TANK VENT HEADER
I-19 VAPOR PHASE CARBON FILTER

ELECTRICAL
E-1 MCC ONE-LINE
E-2 MCC ONE-LINE
E-3 MCC ONE-LINE
E-4 GROUNDING PLAN
CS-1 CONTROL SYSTEM OVERVIEW

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