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A. Terms and Abbreviations used in this Report

Along with standard abbreviations the following is a list of local/uncommon abbreviations and terms for the readers' reference.

PLANT TERMS

U.S.EPA - United States Environmental Protection Agency.
NPDES - National Pollutant Discharge Elimination System.
WWTP - Wastewater Treatment Plant.
WRP - Water Reclamation Plant.
PLWWTP - Pt. Loma Wastewater Treatment Plant
PLR - Point Loma Raw (influent to the plant).
PLE - Point Loma Effluent (effluent from the plant).
N-1-P - North Digester Number 1, Primary, Pt. Loma
N-2-P - North Digester Number 2, Primary, Pt. Loma
C-1-P - Central Digester Number 1, Primary, Pt. Loma
C-2-P - Central Digester Number 2, Primary, Pt. Loma
S-1-P - South Digester Number 1, Primary, Pt. Loma
S-2-P - South Digester Number 2, Primary, Pt. Loma
Dig 7 - Digester Number 7, Primary, Pt. Loma
Dig 8 - Digester Number 8, Primary, Pt. Loma
DIG COMP - Digested Biosolids Composite; a composite of grabs taken from each of the in-service digesters.
RAW COMP - A Composite of Raw Sludge taken over the preceding 24 hrs.
NCWRP - North City Water Reclamation Plant
N01-PS_INF - The plant primary Influent from Pump Station 64
N01-PEN - The plant primary Influent from the Penasquitos pump station.
N30-DFE - Disinfected Final Effluent
N34-REC WATER - Reclaimed Water.
N10-PSP COMB - raw sludge
N15-WAS LCP - Waste Activated Sludge – low capacity pumps
MBC - Metro Biosolids Center
MBCDEWCN - Metro Biosolids Center Dewatering Centrifuges; typically the dewatered biosolids from these.
MBC_COMBCN - MBC Combined Centrate; the centrate from all the dewatering centrifuges. (The return stream from MBC to the sewer system.)
MBC_NC_DSL - North City to Metropolitan Biosolids Center (MBC) Digested Sludge Line.
Dig 1 - MBC Digester number 1.
Dig 2 - MBC Digester number 2.
Dig 3 - MBC Digester number 3.
Biosolids - In most cases Biosolids and digested (a processed) Sludge is synonymous.

UNITS

mg/L ..... milligrams per liter
ug/L .....micrograms per liter = 0.001 mg/L
ng/L ..... nanograms per liter = 0.001 ug/L
mg/Kg..... milligrams per kilogram
ug/Kg..... micrograms per kilogram
ng/Kg..... nanograms per kilogram
pg/L ..... picograms per liter
pg/Kg.....picograms per kilogram
pc/L or pCi/L ..... pico curies per liter
TU..... toxicity units
ntu..... nephelometric turbidity units
^{o}C ..... degrees Celsius = degrees centigrade
MGD..... million gallons per day
umhos/cm. . ..... micromhos per centimeter
uS.....microsiemens = umhos
mils/100 mL..... millions per 100 milliliters
nd.....not detected
NA .....not analyzed (when in a data column)
NR .....not required
NS.....not sampled

CHEMICAL TERMS & ABBREVIATIONS:

AA .....Atomic Absorption Spectroscopy
BOD.....Biochemical Oxygen Demand
CN^-.....Cyanide
COD.....Chemical Oxygen Demand
Cr^{6+} .....Hexavalent Chromium
D.O. .....Dissolved Oxygen
DDD .....Dichlorodiphenyldichloroethane
.....(a.k.a. TDE-tetrachlorodiphenylethane)
DDE.....Dichlorodiphenyldichloroethylene
DDT.....Dichlorodiphenyltrichloroethane
$FeCl_3$.....Ferric Chloride
G&O .....Grease and Oil
GC .....Gas chromatography.
GC-ECD .....-Electron Capture Detector.
GC-FID.....-Flame Ionization Detector.
GC-FPD.....-Flame Photometric Detector.
GC-MS .....-Mass Spectroscopy.
H_2S.....Hydrogen Sulfide
Hg .....Mercury
IC.....Ion Chromatography
ICP-AES .....Inductively Coupled Plasma-Atomic Emission Spectroscopy
MDL .....Method Detection Limit
MSD .....Mass Spectroscopy Detector
NH_3.....Ammonia
NH_3-N.....Ammonia Nitrogen
NH_4^+ .....Ammonium ion
NO_3^- .....Nitrate
PAD.....Pulsed Amperometric Detector
PCB .....Polychlorinated Biphenyls
PO_4^{3-} .....Phosphate
SO_4^{2-} .....Sulfate
SS.....Suspended Solids
TBT .....Tributyl tin
TCH.....Total Chlorinated Hydrocarbons (i.e. chlorinated pesticides & PCB's)
TCLP .....Toxicity Characteristic Leaching Procedure
TDS .....Total Dissolved Solids
TS .....Total Solids
TVS .....Total Volatile Solids
VSS.....Volatile Suspended Solids

B. Methods of Analysis

WASTEWATER INFLUENT and EFFLUENT (General)

Analyte	Description	Instrumentation	Reference[1]
Alkalinity	Selected Endpoint Titration	Mettler DL-21 & 25 Titrator Orion 950	(i) 2320 B
Ammonia Nitrogen	Distillation and Titration	Buchi Distillation Unit K-314, B-324, K-350 Orion 950 pH Meter	(i) 4500-NH3 B & C
Biochemical Oxygen Demand (BOD-5 Day)	Dissolved Oxygen Meter with Dissolved Oxygen Probe	YSI-5000 DO Meter YSI-5100 DO Meter YSI 59 DO Meter (5905 Probe)	(i) 5210 B
Biochemical Oxygen Demand (BOD-Soluble)	Dissolved Oxygen Probe	YSI-5000 DO Meter YSI-5100 DO Meter YSI 59 DO Meter (5905 Probe)	(i) 5210 B
Chemical Oxygen Demand (COD)	Closed Reflux / Colorimetric	Hach DR-2010 UV/Vis spectrophotometer	HACH 8000
Conductivity	Conductivity Meter with Wheatstone Bridge probe	YSI-3100, YSI-3200, Orion 115A,Orion 250, Accumet Model 150	(g) 2510 B
Cyanide	Acid Digest/Distil./Colorimetric	Hach DR-4000/Vis	(i) 4500-CN E
Floating Particulates	Flotation Funnel	Mettler AX-105 Mettler AG 204 Balance	(g) 2530 B
Flow	Continuous Meter	Gould (pressure sensor), ADS (sonic sensor), or Venturi (velocity sensor)	
Hardness; Ca, Mg, Total	ICP-AES / Calculation	TJA IRIS	(a) 200.7 (h) 2340 B
Kjeldahl Nitrogen (TKN)	Macro-Digestion / Titration	Labconco digestion block Buchi B-324 distiller & Mettler DL25 titrator	(i)Digestion= 4500-Norg B
Oil and Grease	Hexane Extraction / Gravimetric	Mettler AX-105 Balance	(a) 1664A
Organic Carbon (TOC)	Catalytic Oxidation / IR Water Production Laboratory)	Shimadzu ASI-5000	(f) 5310 B
pH	Hydrogen+Reference Electrode	Various models of pH meters.	(i) 4500-H+ B
Radiation (alpha & beta)	Alpha Spectroscopy Gamma Spectroscopy	Canberra 7401 (alpha) Canberra GC25185 (beta)	(h) 7110 B
Solids, Dissolved-Total	Gravimetric @ 180°C using analytical balance	Mettler AG204,AX105,AB204	(i) 2540 C
Solids, Settleable	Volumetric	Imhoff Cone	(i) 2540 F
Solids, Suspended-Total	Gravimetric @ 103-105°C	Mettler AG204,AX105,AB204	(i) 2540 D
Solids, Suspended-Volatile	Gravimetric @ 500°C	Mettler AG204,AX105,AB204	(i) 2540 E
Solids, Total	Gravimetric @ 103-105°C	Mettler AG204,AX105,AB204	(a) 160.3
Solids, Total-Volatile	Gravimetric @ 500°C	Mettler AG204,AX105,AB204	(a) 160.4
Temperature	Direct Reading	Fisher Digital Thermometer	(g) 2550 B
Turbidity	Nephelometer Turbidimeter	Hach 2100-N Meter Hach 2100-AN Meter	(g) 2130 B
Bromide, Chloride, Fluoride, Nitrate, Phosphate, Sulfate	Ion Chromatography	Dionex DX-500	(d) 300.0

[1] Reference listing is found following this listing of analytical methods.

WASTEWATER INFLUENT and EFFLUENT (Metals)

Analyte	Description	Instrumentation	Reference[1]
Aluminum	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Antimony	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Arsenic	Hydride Generation / AA	TJA Solaar M6	(h) 3114 C
Barium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Beryllium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Boron	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Cadmium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Calcium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Chromium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Cobalt	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Copper	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Iron	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Lead	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Lithium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Magnesium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Manganese	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Mercury	Cold Vapor Generation / AA	Leeman PS 200II	(g) 3112 B
Molybdenum	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Nickel	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Potassium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Selenium	Hydride Generation / AA	TJA Solaar M6	(h) 3114 C
Silver	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Sodium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Thallium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Vanadium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7
Zinc	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.7

[1] Reference listing is found following this listing of analytical methods.

WASTEWATER INFLUENT and EFFLUENT (Organics)

Analyte	Description	Instrumentation	Reference[1]
Acrolein and Acrylonitrile	Purge & Trap, GC-MSD	O-I Analytical Eclipse 4660/4552 HP-6890N GC / 5973N MSD Capillary J&W DB-624	(c) 8260 B
Base/Neutral Extractables	Basic / CH2Cl2 continuous extraction, GC-MSD	HP-6890GC / 5973MSD Agilent-7890GC / 5975MSD Capillary DB-5.625	(a) 625 (b)
Benzidines	Basic / CH2Cl2 continuous extraction, GC-MSD	HP-6890GC / 5973MSD Agilent-7890GC / 5975MSD Capillary DB-5.625	(a) 625
Chlorinated Compounds	CH2Cl2 extraction, GC-ECD	Varian 3800 GC-ECD RTX-5/60m : RTX-1701/60m Varian 3800-Saturn 2000 DB-XLB	(a) 608
Dioxin	CH2Cl2 extraction, GC/MS/MS	Varian Saturn -MS-MS Varian 3800 GC	(a) 8280A
Organophosphorus Pesticides	CH2Cl2 extraction, hexane exchange, GC-PFPD	Varian 3800 GC-PFPD RTX-1 :RTX-50	(a) 622
Phenolic Compounds	Acidic / CH2Cl2 continuous extraction, GC-MSD	HP-6890GC / 5973MSD Agilent-7890GC / 5975MSD Capillary DB-5.625	(a) 625 (b)
Purgeables (VOCs)	Purge & Trap, GC-MSD	O-I Analytical Eclipse 4660/4552 HP-6890N GC / 5973N MSD Capillary J&W DB-624	(a) 8260B (b)
Tri, Di, and Monobutyl Tin	CH2Cl2 extraction, derivatization, hexane exchange, GC-FPD	Varian 3400 GC-FPD DB-1/30m : RTX-50	(l)

[1] Reference listing is found following this listing of analytical methods.

LIQUID SLUDGE: Raw, Digested, and Filtrate (General)

Analyte	Description	Instrumentation	Reference[1]
Alkalinity	Selected Endpoint Titration	Mettler DL-25 Titrator Orion 950	(g) 2320 B
Cyanide	Acid Digest-Distil / Colorimetric	Hach DR/4000V	(h) 4500-CN E
pH	Hydrogen+Reference Electrode	Various models of pH meters.	(c) 9010 B
Radiation (alpha & beta)	Alpha Spectroscopy Gamma Spectroscopy	Canberra 7401 (alpha) Canberra GC25185 (beta)	(h) 7110 B
Sulfides	Acid Digest-Distil / Titration	Class A Manual Buret	(c) 9030 B
Sulfides, reactive	Distillation / Titration	Class A Manual Buret	(c) 7.3.4.2
Solids, Total	Gravimetric @ 103-105°C	Mettler PB 4002-S Mettler PG 5002-S Mettler AB204	(i) 2540 B
Solids, Total-Volatile	Gravimetric @ 500°C	Mettler PB 4002-S Mettler PG 5002-S Mettler AB204	(i) 2540 E

LIQUID SLUDGE: Raw, Digested, and Filtrate (Metals)

Analyte	Description	Instrumentation	Reference[1]
Aluminum	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Antimony	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Arsenic	Hydride Generation / AA	TJA Solaar M6	(c) 7062
Beryllium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Barium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Boron	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Cadmium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Chromium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Cobalt	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Copper	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Iron	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Lead	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Manganese	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Mercury	Cold Vapor Generation / AA	Leeman PS 200II	(c) 7471 A
Molybdenum	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Nickel	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Selenium	Hydride Generation / AA	TJA Solaar M6	(c) 7742
Silver	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Thallium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Vanadium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Zinc	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B

[1] Reference listing is found following this listing of analytical methods.

LIQUID SLUDGE: Raw, Digested, and Decant (Organics)

Analyte	Description	Instrumentation	Reference[1]
Acrolein and Acrylonitrile	Purge & Trap, GC-MSD	O-I Analytical Eclipse 4660/4552 HP-6890N GC / 5973N MSD Capillary J&W DB-624	(c) 8260 B (b)
Base/Neutral Extractables	Basic / CH2Cl2 continuous extraction, GC-MSD	HP-6890GC / 5973MSD Agilent-7890GC / 5975MSD Capillary DB-5.625	(a) 625 (b)
Benzidines	Basic / CH2Cl2 continuous extraction, GC-MSD	HP-6890GC / 5973MSD Agilent-7890GC / 5975MSD Capillary DB-5.625	(a) 625
Chlorinated Compounds	CH2Cl2 extraction, GC-ECD	Varian 3800 GC-ECD RTX-5/60m : RTX-1701/60m Varian 3800-Saturn 2000 DB-XLB	(c) 8081 A
PCBs	CH2Cl2 extraction, GC-ECD	Varian 3800 GC-ECD RTX-5/60m : RTX-1701/60m Varian 3800-Saturn 2000 DB-XLB	(c) 8082
Dioxin	CH2Cl2 extraction	Varian GC-MS/MS	(c) 8280A
Organophosphorus Pesticides	CH2Cl2 extraction, hexane exchange, GC-PFPD	Varian 3800 GC-PFPD RTX-1 : RTX-50	(a) 622
Phenolic Compounds	Acidic / CH2Cl2 continuous extraction, GC-MSD	HP-6890GC / 5973MSD Agilent-78906GC / 5975MSD Capillary DB-5.625	(a) 625 (b)
Purgeables (VOCs)	Purge & Trap, GC-MSD	O-I Analytical Eclipse 4660/4552 HP-6890N GC / 5973N MSD Capillary J&W DB-624	(c) 8260 B (b)
Tri, Di, and Monobutyl Tin	CH2Cl2 extraction, derivatization, hexane exchange, GC-FPD	Varian 3400 GC-FPD DB-1/30m : RTX-50	(l)

LIQUID SLUDGE: Raw, Digested, and Decant (Digester Gases)

Analyte	Description	Instrumentation	Reference[1]
Methane	Gas Chromatography	SRI 8610C GC EG&G 100AGC	(i) 2720 C
Carbon Dioxide	Gas Chromatography	SRI 8610C GC EG&G 100AGC	(i) 2720 C
Hydrogen Sulfide	Colorimetric	Draeger H2S 2/a	

[1] Reference listing is found following this listing of analytical methods.

DRIED SLUDGE: Metro Biosolids Center (General)

Analyte	Description	Instrumentation	Reference[1]
Cyanide	Acid Digest-Distillation Colorimetric	Hach DR/4000V UV/Vis	(c) 9010 A
Cyanide Reactive	Distillation / Colorimetric	Hach DR/4000V UV/Vis	(c) 7.3.3.2
pH	Hydrogen+Reference Electrode	Various models of pH meters.	(c) 9045 C
Radiation (alpha & beta)	Alpha Spectroscopy Gamma Spectroscopy	Canberra 7401 (alpha) Canberra GC25185 (beta)	(h) 7110 B
Sulfides	Acid Digest-Distil / Titration	Class A Manual Buret	(c) 9030 B
Sulfides, reactive	Distillation / Titration	Class A Manual Buret	(c) 7.3.4.2
Solids, Total	Gravimetric @ 103-105 Cº	Denver PI-314, Mettler AB204	(i) 2540 B
Solids, Total-Volatile	Gravimetric @ 500 Cº	Denver PI-314, Mettler AB204	(i) 2540 E

DRIED SLUDGE: Metro Biosolids Center (Metals)

Analyte	Description	Instrumentation	Reference[1]
Aluminum	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Antimony	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Arsenic	Hydride Generation / AA	TJA Solaar M6	(c) 7062
Barium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Beryllium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Boron	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Cadmium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Chromium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Cobalt	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Copper	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Iron	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Lead	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Manganese	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Mercury	Cold Vapor Generation / AA	Leeman PS 200II	(c) 7471 A
Molybdenum	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Nickel	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Selenium	Hydride Generation / AA	TJA Solaar M6	(c) 7742
Silver	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Thallium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Vanadium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Zinc	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B

Waste Extraction Test (WET)	Extraction with Sodium Citrate ICP-AES	Burrel wrist action shaker TJA IRIS	(j) Section 66261.100

[1] Reference listing is found following this listing of analytical methods.

DRIED SLUDGE: Metro Biosolids Center (Organics)

Analyte	Description	Instrumentation	Reference[1]
Acrolein and Acrylonitrile	Purge & Trap, GC-MSD	O-I Analytical Eclipse 4660/4552 HP-6890N GC / 5973N MSD Capillary J&W DB-624	(c) 8260 B (b)
Base/Neutral Extractables	CH2Cl2 /Acetone sonication extraction, GC-MSD	Agilent-7890GC / 5975MSD Capillary DB-5.625	(c) 8270 C (c) 3550 A (b)
Chlorinated Compounds	CH2Cl2 extraction, GC-ECD	Varian 3800 GC-ECD RTX-5/60m : RTX-1701/60m Varian 3800-Saturn 2000 DB-XLB	(c) 8081 A
PCBs	CH2Cl2 extraction, GC-ECD	Varian 3800 GC-ECD RTX-5/60m : RTX-1701/60m Varian 3800-Saturn 2000 DB-XLB	(c) 8082
Dioxin	Outside Contact (Test America)	GC-MS	(a) 8290
Organophosphorus Pesticides	CH2Cl2 extraction, hexane exchange, GC-PFPD	Varian 3800 GC-PFPD DB-1/30m DB-608/30m	(c) 8141 A
Phenolic Compounds	CH2Cl2 / Acetone sonication extraction, GC-MSD	HP-5890GC / 5972MSD Agilent-78906GC / 5975MSD Capillary DB-5.625	(c) 8270 C (c) 3550 A (b)
Purgeables (VOCs)	Purge & Trap, GC-MSD	O-I Analytical Eclipse 4660/4552 HP-6890N GC / 5973N MSD Capillary J&W DB-624	(c) 8260 B
Tri, Di, and Monobutyl Tin	CH2Cl2 extraction, derivatization, hexane exchange, GC-FPD	Varian 3400 GC-FPD DB-1/30m DB-608/30m	(l)
Total Nitrogen (TN)	Combustion / GC-TCD	Carlo-Erba NC-2500 Porapak QS	(m) 9060

[1] Reference listing is found following this listing of analytical methods.

OCEAN SEDIMENT (General)

Analyte	Description	Instrumentation	Reference[1]
Biochemical Oxygen Demand (BOD-5 Day)	Dissolved Oxygen Probe	YSI-5000 DO Meter	(g) 5210 B
Particle Size	Coarse fraction by sieve; fine fraction by laser scatter	Horiba LA-920	(q) 3-380
Sulfides	Acid Digest-Distil / IC-PAD	Dionex IC-PAD(Ag)	(k)
Solids, Total	Gravimetric @ 103-105 Cº	AND HM-120	(g) 2540 B
Solids, Total-Volatile	Gravimetric @ 500 Cº	AND HM-120	(g) 2540 E
Total Organic Carbon (TOC) and Total Nitrogen (TN)	Combustion / GC-TCD	Carlo-Erba NC-2500 Porapak QS	(c) 9060 (m)

OCEAN SEDIMENT (Metals)

Analyte	Description	Instrumentation	Reference[1]
Aluminum	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Antimony	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Arsenic	Hydride Generation / AA	TJA Solaar M6	(c) 7062
Beryllium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Cadmium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Chromium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Copper	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Iron	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Lead	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Manganese	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Mercury	Cold Vapor Generation / AA	Leeman PS 200II	(c) 7471 A
Nickel	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Selenium	Hydride Generation / AA	TJA Solaar M6	(c) 7742
Silver	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Thallium	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Tin	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B
Zinc	Acid Digestion / ICP-AES	TJA IRIS	(c) 6010 B

OCEAN SEDIMENT (Organics)

Analyte	Description	Instrumentation	Reference[1]
Base/Neutral Extractables	CH2Cl2 / Acetone ASE GC-MSD	Agilent-78906GC / 5975MSD HP-5890GC / 5972MSD Capillary DB-5.625	(c) 8270 C (b) 3545A
Chlorinated Compounds	CH2Cl2 extraction, GC-ECD/MS/MS	Varian Saturn GC-ECD/MS/MS DBXLB/60m	(c) 8081 A 3545A
PCBs as Congeners	CH2Cl2 extraction, GC-ECD/MS/MS	Varian Saturn GC-ECD/MS/MS DBXLB/60m	(c) 8082 3545A
Organophosphorus Pesticides	CH2Cl2 extraction, hexane exchange, GC-PFPD	Varian 3800 GC-PFPD RTX-1 : RTX-50	(c) 8141 A
Tri, Di, and Monobutyl Tin	CH2Cl2 extraction, derivatization, hexane exchange, GC-FPD	Varian 3400 GC-FPD DB-1/30m : RTX_50	(l)

[1] Reference listing is found following this listing of analytical methods.

FISH TISSUE: Liver, Muscle, and Whole (General)

Analyte	Description	Instrumentation	Reference[1]
Solids, Total	Freeze Drying Gravimetric	Labconco Freezone 6 Mettler AG-104 Balance	(n)
Lipids	Hexane/Acetone Extraction Gravimetric	Dionex ASE-200 Mettler AG-104 Balance	(o)

FISH TISSUE: Liver, Muscle, and Whole (Metals)

Analyte	Description	Instrumentation	Reference[1]
Aluminum	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Antimony	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Arsenic	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Beryllium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Cadmium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Chromium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Copper	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Iron	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Lead	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Manganese	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Mercury	Cold Vapor Generation / AA	Leeman PS 200II	(e) 245.6
Nickel	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Selenium	Hydride Generation / AA	TJA Solaar M6	(c) 7742
Silver	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Thallium	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Tin	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7
Zinc	Acid Digestion / ICP-AES	TJA IRIS	(e) 200.3 / 200.7

FISH TISSUE: Liver, Muscle, and Whole (Organics)

Analyte	Description	Instrumentation	Reference[1]
Base/Neutral Extractables	Basic / CH2Cl2 ASE extraction, GC-MSD	Dionex ASE-200 HP-5890GC / 5971MSD Capillary DB-XLB/30m	(c) 3545 / 8270 C
Chlorinated Compounds	CH2Cl2 extraction, GC-ECD/MS/MS	Varian 3800 GC Saturn 2000 MS-Ion Trap DB-XLB/60m	(c) 3545 / 8081 A
PCBs	CH2Cl2 extraction, hexane exchange, GC-ECD/MS/MS	Varian 3800 GC Saturn 2000 MS-Ion Trap DB-XLB/60m	(c) 3545 / 8082

1 Reference listing is found following this listing of analytical methods.

Method References: Methods of Analysis Used to Produce the Data Presented in this Report.

a) Methods for Chemical Analysis of Water and Wastes,
EPA, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio,
March 1979 (EPA-600/4-79-020), 1983 Revision, and March 1984 (EPA-600/4-84-017).

b) U.S. EPA Contract Laboratory Program, Statement of Work for Organic Analysis,
Multi-Media, Multi-Concentration, 7/85 revision and 1/91 revision.

c) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,
U.S. EPA Office of Solid Waste and emergency Response,
Washington, D.C. 20460, November 1986, SW-846, Third Edition.
Revision 0 September 1994, December 1996, Revision 2

d) The Determination of Inorganic Anions in Water by Ion Chromatography,
Revision 2.1, August 1993

e) The Determination of Metals and Trace Elements in Water and Waste
Revision 4.4, EMMC Version, EMMC Methods Work Group, 1994

f) Standard Methods for the Examination of Water and Wastewater,
APHA, AWWA, WPCF, 17th Edition, 1989.

g) Standard Methods for the Examination of Water and Wastewater,
APHA, AWWA, WPCF, 18th Edition, 1992.

h) Standard Methods for the Examination of Water and Wastewater,
APHA, AWWA, WPCF, 19th Edition, 1995.

i) Standard Methods for the Examination of Water and Wastewater,
APHA, AWWA, WPCF, 20th Edition, 1998.

j) Criteria for Identification of Hazardous and Extremely Hazardous Wastes,
California Code of Regulations (CCR), Title 22.

k) DIONEX AU 107, R.D.Rocklin and E.L.Johnson, ANAL. CHEM., 1986, 55, 4

l) Adaptation of method by the Naval Ocean Systems Center, San Diego, Marine Environment Branch, San Diego, CA 92152-5000

m) ”TOC/TN in Marine Sediments...”, SCCWRP Annual Report, 1990-1991, and 1991-1992.

n) ”A Guide to Freeze Drying for the Laboratory...”, LABCONCO, 3-53-5/94-Rosse-5M-R3, 1994.

o) ”Lipids Content in Fish Tissues via Accelerated Solvent Extraction...”,WWChem, EMTS/MWWD, 1998

v) Procedures for Handling and Chemical Analysis of Sediment and Water Samples,
Russel H. Plumb, Jr., May 1981, EPA/Corp of Engineers Technical Committee on
Criteria for Dredged and Fill Material, EPA Contract 4805572010.

C. Frequency of analysis and Type of Sample - 2009

CONSTITUENT	Frequency	Sample Type	Permit Required		Comments
			Influent	Effluent	
Process Control					
Biochemical Oxygen Demand -Total	Daily	Composite	X	X	
Biochemical Oxygen Demand -Soluble	Daily	Composite			Monday-Friday
Chemical Oxygen Demand	Weekly	Composite			
Conductivity	Weekly	Composite			
Floating Particulates	Daily	Composite	X	X	
Flow	Daily		X	X	Same meter used
Oil and Grease	Daily	Grab	X	X	
pH	Daily	Grab	X	X	
Settleable Solids	Daily	Grab	X	X	
Temperature	Daily	Grab	X	X	
Total Dissolved Solids	Daily	Composite	X	X	
Total Solids	Weekly	Composite			
Total Suspended Solids	Daily	Composite	X	X	
Total Volatile Solids	Weekly	Composite			
Turbidity	Daily	Composite	X	X	
Volatile Suspended Solids	Daily	Composite	X	X	
Metals					
As,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Zn	Weekly	Composite	X	X	
Sb, Be, Tl	Weekly	Composite	X	X	Req. Frequency=Monthly
Fe	Weekly	Composite			
Ions					
Alkalinity	Weekly	Composite			
Ammonia-Nitrogen	Weekly	Composite	X	X	
Anions (F-,Cl-,Br-,SO42-,NO3-,PO43-)	Weekly	Composite			
Cations (Ca2+, Mg2+, Li+,Na+,K+)	Weekly	Composite			
Cyanide	Weekly	Composite	X	X	
Hardness (Total, Ca, Mg)	Weekly	Composite			By calculation
Organic Priority Pollutants					
Acrolein and Acrylonitrile	Monthly	Grab	X	X	Method 8260
Base/Neutral Compounds	Monthly	Composite	X	X	Method 625
Benzidines	Monthly	Composite	X	X	Method 625
Dioxin	Monthly	Composite	X	X	Method 8280A
Pesticides, chlorinated	Monthly	Composite	X	X	
Pesticides, organophosphorus	Semi-Annual	Composite			
Phenols, non-chlorinated	Weekly	Composite	X	X	Method 625
Phenols, chlorinated	Weekly	Composite	X	X	Method 625
Polychlorinated Biphenyls	Weekly	Composite	X	X	
Purgeable (Volatile) Compounds	Monthly	Grab	X	X	Method 8260
Tri, Di, & monobutyl tins	Monthly	Composite	X	X	
Miscellaneous					
Radiation	Monthly	Composite	X	X	Performed by a contract lab.
Toxicity (Acute & Chronic)	Monthly	Composite	X		Reported in the monthly Toxicity Testing Report by the Biology Section

D. Laboratories Contributing Results used in this report.

i. Metropolitan Wastewater Chemistry Laboratory (EPA Lab Code: CA00380, ELAP Certificate: 1609)
5530 Kiowa Drive
La Mesa, CA 91942
(619)668-3212
All results except those listed below.

ii. Point Loma Wastewater Chemistry Laboratory (EPA Lab Code: CA01435, ELAP Certificate: 2474)
1902 Gatchell Road
San Diego, CA 92106
(619)221-8765
Process control analyses and wet methods for the plant.

iii. North City Wastewater Chemistry Laboratory (EPA Lab Code: CA01436, ELAP Certificate: 2477)
4949 Eastgate Mall
San Diego, CA 92121
(858)824-6009
Process control analyses and wet methods for the plant.

iv. Metro Biosolids Center Chemistry Laboratory (EPA Lab Code: CA01437, ELAP Certificate: 2478)
5240 Convoy Street
San Diego, CA 92111
(858)614-5834
Process control analyses and wet methods for the plant.

v. South Bay Water Reclamation Plant (EPA Lab Code: CA01460, ELAP Certificate: 2539)
2411 Dairy Mart Road
San Diego, CA 92173
619.428.7349
Process control analyses and wet methods for the plant.

vi. City of San Diego - Water Quality Laboratory (EPA Lab Code: CA00080, ELAP Certificate: 1058)
5530 Kiowa Drive
La Mesa, CA 91942
(619)668-3237
Total Organic Carbon in Wastewater

vii. City of San Diego - Marine Microbiology and Vector Management (EPA LabCode: CA01393, ELAP Certificate: 2185)
4918 Harbor Drive, Suite 101
San Diego, CA 92106
(619) 758-2311
Microbiology

viii. City of San Diego - Toxicity Bioassay Laboratory (EPA Lab Code: CA01302, ELAP Certificate: 1989)
4918 Harbor Drive, Suite 101
San Diego, CA 92106
(619) 758-2347
Bioassays

ix. Test America
880 Riverside Parkway
Sacramento, CA 95605
NELAP Certification: 01119CA
Telephone# (916) 373-5600
Dioxins/Furans in solids only.

x. Test America
2800 George Washington Way
Richland, WA 99354-1613
CA ELAP Certification: 2425
Telephone# (509) 375-3131
Gross Alpha/Beta Radioactivity

xi. CRG Laboratories
2020 Del Amo BLVD.
Suite # 200
Torrance, CA 90501
ELAP Certification: 2261
Telephone# (714) 755-3263
Herbicides in solids only.

E. QA Report Summary

(excerpt from our Quality Assurance/Quality Control Report for Calendar Year 2009, March 30, 2010)

Overview:

The Wastewater Chemistry Services Section, Metropolitan Wastewater Department, City of San Diego performs most of the NPDES and other permit and process control chemical and physical testing for the City of San Diego E.W. Blom, Pt. Loma Wastewater Treatment Plant (PLWWTP), North City Water Reclamation Plant (NCWRP), South Bay Water Reclamation Plant (SBWRP), and the Metro Biosolids Center (MBC). We also performs the chemical/physical testing of ocean sediment and fish tissue samples for the Ocean monitoring program for the City of San Diego (PLWWTP Ocean Outfall and SBWRP Ocean Outfall) and the International Boundary and Water Commission, International Treatment Plant outfall. We also perform environmental testing for various customers, both internal to the City of San Diego and for other agencies.

The QA/QC activities of the Laboratory are comprehensive and extensive. Of the 38,470 samples received in the Laboratory in 2009, approximately 33% were Quality Control (QC) samples, such as blanks, check samples, standard reference materials, etc. 108 different analyses were performed throughout the year resulting in 264,297 analytical determinations. Of the determinations, 113,352(~43%) were QC determinations (e.g. blanks, lab. replicates, matrix spikes, surrogates, etc.) used to determine the accuracy, precision, and performance of each analysis and batch.

We have 5 separate laboratory facility locations, each with its own California ELAP (Environmental Laboratory Accreditation Program) certification for the fields of testing required under California regulations. This is a rigorous program involving continuing independent blind performance testing, biannual comprehensive audits, and extensive documentation requirements. Each of the 5 laboratory facilities in the Metropolitan Wastewater (Metro) Department are independently certified and copies of those certifications are included at Attachment 1. California ELAP certifies fields of testing (methods/analytes) only for Water, Wastewater, and Hazardous materials for which methods are published in the Federal Register or specifically approved in regulation by U.S.EPA. Additionally, the Laboratory performs analyses using methods for which certification does not exist, such as ocean sediment and sea water determinations. Those methods have been developed in-house, derived from or in collaboration with other scientific laboratories (e.g. Scripps Institute of Oceanography, Southern California Coastal Water Research Project, et. al.) and have been used extensively in multi-agency EPA and State sponsored studies over the past several years. Many methods of analysis developed for matrices and applications not within ELAP jurisdiction have been adapted from ELAP listed methods. In all cases, we apply generally accepted standards of performance and quality control to methods.

Additionally, the operating division and all Metro Department Laboratories maintained International Standards Organization (ISO) 14001 Environmental Management Systems certification.

Contract laboratories are also required to use only approved methods for which they hold certification for, and/or are approved by the appropriate regulatory agency (e.g. SDRWQCB). Copies of their certifications are included as Attachment 2.

The following report summarizes the QA/QC activities during 2009 and documents the laboratory information and certifications for those laboratories which provided data used in NPDES and other permit monitoring or environmental testing during the year.

Laboratories Contributing Results used in this report.

Laboratory Name	EPA Lab Code	ELAP Cert. #	Address	Phone #	Contribution
Alvarado Wastewater Chemistry Laboratory	CA00380	1609	5530 Kiowa Drive La Mesa, Ca 91942	(619)668-3212	All results except those listed below.
Pt. Loma Wastewater Chemistry Laboratory	CA01435	2474	1902 Gatchell Road San Diego, CA 92106	(619)221-8765	Process Control analyses and wet methods for the treatment plant.
North City Wastewater Chemistry Laboratory	CA01436	2477	4949 Eastgate Mall San Diego, CA 92121	(858)824-6009	Process Control analyses and wet methods for the treatment plant.
Metro Biosolids Center Chemistry Laboratory	CA01437	2478	5240 Convoy Street San Diego, CA 92111	(858)614-5834	Process Control analyses and wet methods for the treatment plant.
South Bay Wastewater Chemistry Laboratory	CA01460	2539	2411 Dairy Mart Road San Diego, CA 92173	(619)428-7349	Process Control analyses and wet methods for the treatment plant.
City of San Diego Water Quality Laboratory	CA00080	1058	5530 Kiowa Drive, La Mesa, Ca 91942	(619)668-3237	Total Organic Carbon in Wastewater
City of San Diego-Marine Microbiology	CA01393	2185	2392 Kincaid Road San Diego, CA 92101	(619)758-2312	Microbiology
City of San Diego Toxicology Laboratory	CA01302	1989	2392 Kincaid Road San Diego, CA 92101	(619)758-2341	Bioassays
Test America Laboratories, Inc.		2425	2800 George Washington Way, Richland WA 99354	(509)375-3131	Gross Alpha/Beta Radioactivity
TestAmerica West Sacramento		01119CA	880 Riverside Parkway West Sacramento, Ca 95605		Dioxins/Furans in Solids.
CRG Marine Laboratories, Inc.		2261	2020 Del Amo Blvd., Suite 200, Torrance, CA 90501		Dissolved Metals for Convention Center Monitoring

Facilities & Scope:

The Wastewater Chemistry Services Section(WCS) comprises five geographically separated laboratories. The Section's main laboratory facilities and headquarters located at the Alvarado Joint Laboratory building in La Mesa and the four satellite wastewater chemistry laboratories located at MWWD treatment plants maintain individual California Department of Health Service, Environmental Laboratory Accreditation Program (ELAP) certification in their respective Fields of Testing (FoT). Each laboratory has its own U.S.EPA Lab Code as shown in the following table.

Laboratory Facility	Laboratory	Address	Phone	EPA Lab. Code	ELAP Cert. No.
Alvarado Laboratory	Wastewater Chemistry Laboratory	5530 Kiowa Drive, La Mesa CA 91942	619.668.3215	CA00380	1609
Point Loma Satellite Lab	Pt. Loma Wastewater Chemistry Laboratory	1902 Gatchell Rd., San Diego, CA 92106	619.221.8765	CA01435	2474
North City Water Reclamation Plant Satellite Lab	North City Wastewater Chemistry Laboratory	4949 Eastgate Mall, San Diego, CA 92121	858.824.6009	CA01436	2477
Metro Biosolids Center Satellite Lab	Metro Biosolids Center Wastewater Chemistry Lab	5240 Convoy Street, San Diego, CA 92111	858.614.5834	CA01437	2478
South Bay Water Reclamation Plant Satellite Lab	South Bay Wastewater Chemistry Laboratory	2411Dairy Mart Rd., San Diego CA 92154	619.428.7349	CA01460	2539

The information presented in this report applies to the Wastewater Chemistry Services Section, including all of the laboratories listed above, unless specified otherwise. The main laboratory at Alvarado is the main office for the WCS and contains the most extensive laboratory facilities of the several laboratories. Along with a variety of process control and wet chemistry analyses, this facility also handles all of the trace metals, pesticides/organics determinations, and other analyses. The satellite laboratories are primarily dedicated to process control, wet chemistry, and other analyses directly related to the support of the operations of the co-located wastewater treatment plant.

The Wastewater Chemistry Services Section performs most of the NPDES and other permit and process control chemical and physical testing for the:

- E.W. Blom, Pt. Loma Wastewater Treatment Plant (PLWWTP), NPDES Permit No. CA0107409/ Order No. R9-2002-0025, including the ocean monitoring program.
- North City Water Reclamation Plant (NCWRP), Order No. 97-03.
- Metro Biosolids Center (MBC), no permit, but monitoring requirements contained in Permit No. R9-2002-0025.
- South Bay Water Reclamation Plant (SBWRP), NPDES Permit No.CA0109045/ Order No. 2006-067.
- Ocean monitoring program for the International Boundary and Water Commission, International Treatment Plant.
- Other environmental testing for various customers, both internal to the City of San Diego and other public agencies.

A small portion of the required monitoring testing is sub-contracted out to laboratories certified by ELAP for those analyses, specifically;

- Gross alpha- and Beta radiations are analyzed by Test America Laboratories, Inc.
- Total organic carbon (TOC) in water are analyzed by the Water Quality Laboratory, City of San Diego, Water Department.
- Dioxin and Furans in solids are analyzed by TestAmerica West Sacramento.

Copies of these laboratories' ELAP certifications are included as attachment 2. The City of San Diego pays for additional QC samples (replicates, blanks, spikes) as a routine quality check on sub-contracted laboratory work. This is beyond the usual and customary practices with contract laboratory work.

Ocean monitoring:

While there are no recognized State certifications for laboratory analyses of marine environmental samples (e.g. seawater, sediments, various tissues, etc.), the City of San Diego has been a leader in the development and standardization of analytical methods for determinations in these areas.

Many of the methods are novel approaches developed after extensive research and development from other published work (e.g. organo-tin analyses, sediment grain size, etc.) or adaptations of exiting EPA methods (e.g. SW 846 Method 8082 for PCB congeners in sediments, etc.). In all of these cases we participate in extensive inter-laboratory calibration studies. Some of the most extensive studies have involved the participation of several public, academic/research, and private laboratories under the umbrella of the Southern California Coastal Water Research Project (SCCWRP). These programs are repeated periodically as part of the Southern California Bight Regional Monitoring/Survey Project. This is a massive sampling and monitoring program participated in by all of the major Publicly Owned Treatment Works (POTWs), California Water Resource Control Boards, and research organizations.

Our laboratory is a reference (referee) laboratory for the NRCC (National Research Council of Canada) CARP-2 Certified Reference Material (CRM) for fish tissue. This was adopted as the standard reference material for QC QA for the Southern California Bight Regional Project. This sample is also used world-wide as a standard reference material. We have worked with NIST to develop a West Coast marine sediment and fish tissue standard reference material (SRM).

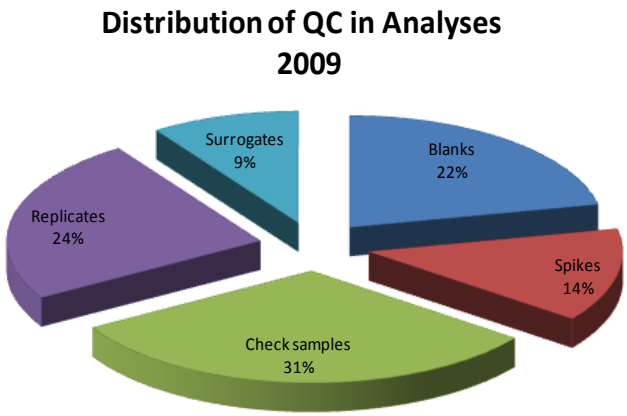
QA/QC Activities Summary:

Report for January 1, 2009 - December 31, 2009.15

The sample distribution for 2009 is not significantly changed from 2008. 264,297 analytical determinations were made on 38,470 samples received by the Laboratory in 2009(see table A.). Of these 12,518 or 33% were Quality Control (QC) samples. Approximately 11.2% were blanks and 21.3% check or reference samples.

Table A. Samples	2009 Number of Samples	Percent of total samples
Customer/Environmental samples	**25,952**	**67.46%**
Quality Control (QC) samples	**12,518**	**32.54%**
Total Samples	**38,470**	**100.00%**
QC Samples:		
Blanks:		
FIELD_BLANK	**94**	**0.24%**
REAGENT_BLANK	**10**	**0.03%**
TRIP BLANK	**0**	**0.00%**
METHOD_BLANK	**4,220**	**10.97%**
Total Blanks:	**4,324**	**11.24%**
Check samples:		
External Check samples	**4,898**	**12.73%**
Internal Check samples	**3,284**	**8.54%**
SRMs (Standard Reference Material)	**12**	**0.03%**
Total Check Samples:	**8,194**	**21.30%**
Total QC Samples:	**12,518**	**32.54%**

High levels of QC are used for laboratory determinations. 43% of the 264,297 determinations were QC (e.g. blanks, lab replicates, matrix spikes, surrogates, etc.). If calculated for the 252,169 customer samples only the percentage increases to 45%.



4.75% of total analytical determinations or 0.1% of analytical batches did not meet internal QA review due to a variety of criteria, e.g. unsuccessful calibration, unacceptable QC performance, etc. Samples having analytical determinations that were rejected are reanalyzed, or, if that is not possible, the

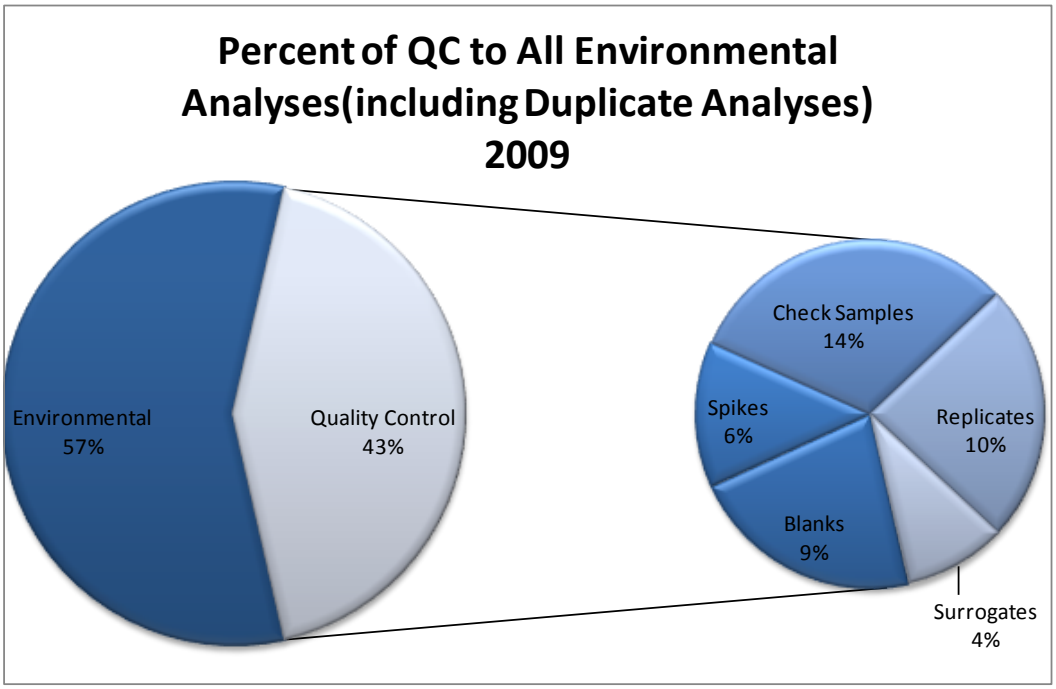
data is either not reported or reported but flagged as having not met data quality objectives and may not be

15 Data counts (metrics) were obtained on March 24, 2009 and do not include analyses that were underway, but incomplete as of that time. All table data is based on samples collected between January 1, 2009 and December 31, 2009. This data summary is comprehensive; includes all laboratory analyses work for all customers, projects, and programs unless otherwise indicated.

suitable for compliance determination.

Table A.2. Analyses (results) - 2009

	Number	Percent of total
Total number of analytes/results determined:	**264,297**	NA
Total results not complete [2]:	8,216	3.1%
No. of results for Customer/ Environmental Samples [1,3]:	**252,169**	**95.4%**
Total number of rejected results:	12,128	4.75%
No. of results for blanks [3]:	24,620	9.3%
No. of results for matrix spikes [3]:	15,324	5.8%
No. of results for Check samples [3]:	35,483	13.4%
No. of results for Replicates [3]:	27,192	10.3%
No. of results for surrogates [3]:	10,733	4.1%
Total QC analyses run [3] :	**113,352**	**42.9%**
Total in-house analyses completed [2]:	**255,124**	



[1]- matrix spikes, replicates, surrogates are also part of the total for Customer/ Environmental samples.

[2] - as of March 19, 2009.

[3] percent of QC samples calculated from grand total (264,297 analyses).

NOTE: Analysis, for the purposes of the metrics used in this report generally refer to each analyte determined in each sample in a batch. For example, an analysis(determination) of several metals in a sample (e.g. iron, nickel, lead) would total as 3 analyses in the expression of totals such as those in the Analyses table on the preceding page. This method of calculation has been used for many years and, with batch and method, is useful comparative measure of laboratory performance and is one of the fundamental constants in applying quality control measures.

	No. of Batches	Percent of total
Total number of analytical batches:	**14,051**	
Total number of rejected analytical batches:	**14**	**0.10%**
Incomplete batches (as of Mar 22, 2010):	**22**	**0.16%**

Outside laboratories

A small number of permit required analyses are sub-contracted out, including gross alpha- & Beta- radiation, and Total Organic Carbon in wastewater as summarized below. Herbicides analysis previously performed in-house were subcontracted to Cal Science Environmental Laboratories via CRG Marine.

Outside Laboratory		Number of analyses
Test America	gross alpha- and Beta-radiations , Dioxins	552
CRG Marine Laboratories	Herbicides	28
Water Quality, City of San Diego	Total Organic Carbon and Nutrients	313
Severn Trent Laboratories, Inc	gross alpha- and Beta-radiations	10
	total:	**903**

QA Plan:

A copy of our Laboratory's current Quality Assurance Plan is included as Attachment 3. The Quality Assurance Plan was updated in July 2008.

Performance Testing (PT) Studies for 2009:

The Wastewater Chemistry Laboratory participates in required ELAP and U.S.EPA PT studies throughout the year. We participated in 16 PT studies in 2009. **Each of our geographically separated laboratory facilities participated individually (as required by ELAP). All PT studies were purchased from ERA and were successfully completed. When results submitted were determined to be outside of study acceptance limits the laboratory reviewed internal** protocols, modified procedures were necessary and **participated in a subsequent study for the analytes in question. A PT study was completed with satisfactory results for all analytes by in-house chemistry laboratories.**

The results of the Laboratory PT studies for 2009 are summarized in the following tables.

DMRQA (Discharge Monitoring Report – Quality Assurance)

We also participate as dischargers in the EPA DMRQA16 Studies required by the NPDES permit monitoring for the following two WWTP:

- **Pt. Loma Wastewater Treatment Plant (PLWWTP), NPDES Permit No. R9-2002-0025**
- **South Bay Water Reclamation Plant (SBWRP), NPDES Permit No.CA0109045/ Order No. 2006-067.**

In both cases, we participated in DMRQA Study 29 as issued by Environmental Resource Associates (See attachment 4 for copy of full report). All methods and analytes were within acceptance limits with the exception of Test Code 42 (Mysid 48-h acute non-renewal FSW) Toxicity Bioassay**. A** preliminary review of all pertinent laboratory practices and records pointed to a reporting artifact as the most probable cause of the anomalous result, where the City's findings (LC_{50} 66.105%) exceeded the upper acceptable limit of 66.1% by five one-thousandth of a percentage point. A remedial action sample and a new batch of test organisms were ordered, and the remedial action test was initiated on October 14, 2009. The test met the acceptability criterion of >90% control survival, and the sample exhibited a median lethal concentration of 55.6%, which fell within the QC Performance Acceptable Limits of 14.8 to 61.9%.

ERA Study	Number of Analytes	Number of Acceptable results	Success Rate (%)
DMRQA-29, PLWWTP	27	26	96.3%
DMRQA-29, SBWRP	30	29	96.7%
Total analytes:	57	**Overall:**	96.5%

16 DMRQA = Discharge Monitoring Reporting Quality Assurance; an EPA program of performance testing for discharge monitoring laboratories for NPDES permit analytes.

F. Staff contributing to this Report

Initials	ID	First Name	Last Name	Signature
BOA	BOA	Ben	Andoh	
TB	TSB	Tan	Bao	
VB	VFB	Virginia	Basilan	
EB	BTX	Enrique	Blanco	
BGB	N8B	Brent	Bowman	
TB	TMB	Tom	Burger	
DC	DVC	Doug	Campbell	
JC	G3C	Jose	Castro	
JCM	U8C	Jacqueline	Cazares-Medina	
EC	CYU	Eric	Clark	
NC	NLC	Nancy	Coglan	
MC	M5C	Maricela	Coronel	
JCM	G8C	Jerry	Czajkowski	
KD	KOD	Ken	Dang	
HHD	HZD	Heather	Duckett	
ACD	AD4	Angelica	Duran	
JTF	JRF	Jeff	Findley	
KG	KG3	Kenneth	Genz	
RJ	RCJ	Ron	Jardine	
LK	LNK	Lee	King	
VK	VK4	Vesselka	Kozarev	
EL	EVL	Estela	Lanez	
WL	WL7	Wendy	Lucero	
FAM	FMN	Farid	Malof	
AM	M5U	Armando	Martinez	
FM	YBM	Fernando	Martinez	
CGM	M4M	Connie	Mata	
SWM	SWM	Steve	Meyer	
FML	IZM	Francisco	Meza	
JM	G7M	Jeff	McAnally	
AM	AM9	Alejandra	Molloy	
JN	IEN	Jesus	Nieto	
MN	MGZ	Maria	Noller	
LP	LJP	Lorena	Pantoja	
LP	LXP	Leonard	Przybylo	
CAQ	CQ5	Corinna	Quinata	
KR	KRV	Keith	Ruehrwein	
VS	VS7	Victoria	Santibanez	
RS	NDS	Robert	Sandoval	
DWS	DXS	David	Schlickman	
GS	GTS	Greg	Schlimme	
GLS	HIR	Gloria	Siqueiros	
MRS	MWS	Michael	Stewart	
MIS	S49	Margot	Szeterlak	
SV	SCV	Sandra	Valenzuela	
JW	AIW	Julie	Webb	
KLW	KLW	Kristof	Witczak	

Figure 1. Chemistry Laboratory Organization Chart.

Public Utilities Department
Environmental Monitoring and Technical Services Division
Wastewater Chemistry Services

Deputy Director
Steve Meyer

Senior Chemist *1.00*
Vacant

Pesticides/ Wet Chemistry Group *Associate Chemist 1.00* JEFF MCANALLY	***QA/DM Group*** *Associate Chemist 1.00* BRENT BOWMAN	***Metals Group*** *Associate Chemist 1.00* DAVID SCHLICKMAN	***Pt. Loma WWTP Group*** *Associate Chemist 1.00* ROBERT SANDOVAL	***South Bay WRP Group*** *Associate Chemist 1.00* Vacant	***North Services Group*** *Associate Chemist 1.00* NANCY COGLAN	***GC/MS Group*** *Associate Chemist 1.00* DOUG CAMPBELL
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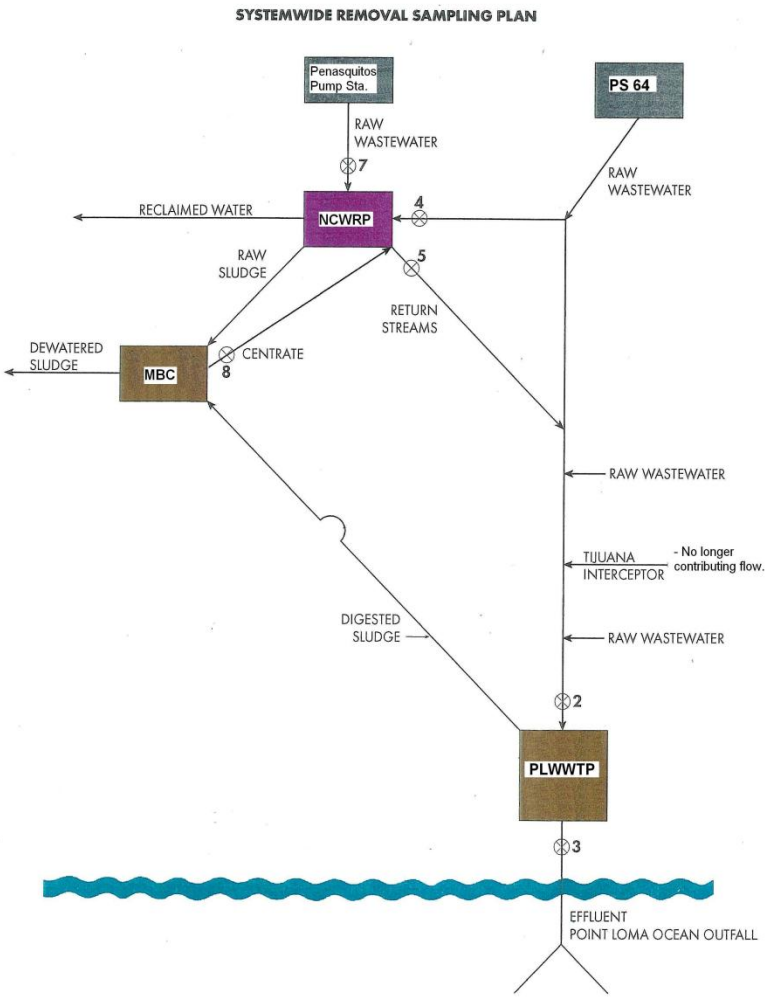
G. System-wide calculation definition

System-wide removals are a practical extension of the "Adjusted Removals" previously reported. Adjusted removals were used to determine removal efficiency of TSS and BOD, during the period when biosolids dewatering occurred at Fiesta Island. The wastewater removed by dewatering (e.g. belt filter press or drying bed decant) was returned to the Point Loma WWTP headworks and contained a certain amount of solids. In order to account for the removal and return of TSS and BOD, on a complete mass-balance basis, the Adjusted Removals were determined. That calculation was relatively straight forward and included removing the contribution to the Pt. Loma WWTP influent of the returned stream. The calculation was done on a mass balance basis to fully account for the solids and BOD contributions returned back to the system.

With the replacement of Fiesta Island biosolids processing by the Metro Biosolids Center (MBC) and the addition of the NCWRP (North City Water Reclamation Plant) in the Metro System, the removal and return of solids to Pt. Loma WWTP was complicated by the addition of multiple inputs and outputs to the system. To calculate the system-wide removals, the net total inputs and outputs were determined and included in the updated calculation17. The determination of System-wide removals is represented by Equation 1 on the next page. This simplified diagram graphically shows the relationships of the input and output streams. The Tijuana interceptor (emergency connection) has not contributed flows since September 2003. The South Bay Water Reclamation Plant (SBWRP) is not shown since it currently has no net contribution or solids removal.



17 Calculations are performed by a computer database application working with Metro System flow and concentration data.

Equation 1.

$$\text{System-wide \%Removal} = \frac{(\Sigma\text{System Influents})-(\Sigma\text{Return Streams}) - (\Sigma\text{Outfall Discharge})}{\Sigma\text{System Influents} - \Sigma\text{Return Streams}} \times 100\%$$

Where,

System Influents = Point Loma Wastewater Treatment Plant Influents,
NCWRP Influent Pump Station (i.e. Pump station 64),
NCWRP Influent from Penasquitos Pump Station

Return Streams = NCWRP Filter Backwash,
NCWRP Plant Drain,
NCWRP Secondary Effluent,
NCWRP Un-disinfected Filtered Effluent Bypass,
NCWRP Final Effluent
Metro Biosolids Center Centrate

The TSS and BOD_5 concentrations, together with the flow rate, of each stream are measured daily and mass emissions (pounds a day) for each stream determined. The above formula is applied on the resultant mass balances and the system-wide removals calculated for each day. In the event that a data value (e.g. flow rate measurement, TSS concentration or BOD_5 concentration) is not available for a stream, the median value for the previous calendar year for that stream is used as a surrogate number to allow completion of the calculation. The annual averages and summaries in the system-wide data tables are derived (arithmetic mean) from the monthly averages of the daily calculated mass emissions values and removal rates.

H. Annual Flow Calibration Report

The firm of MWH completed the annual Gould Flow Metering System Certification in March 2010.

A copy of their findings, without appendices, follows.

City of San Diego, California
Metropolitan Wastewater Department

Certification of the Gould Flow Metering System at the Point Loma Wastewater Treatment Plant

Prepared For:

BROWN AND CALDWELL
9665 Chesapeake Drive, Suite 201
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Prepared By:

V&A
8291 Aero Place, Suite 110
San Diego, CA 92123
March 2010
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Appendix D. Field Notes

1 INTRODUCTION

1.1 Background

The Point Loma Wastewater Treatment Plant (Pt. Loma WWTP) is located in San Diego, California, on the Point Loma peninsula, near the Cabrillo National Monument. The design capacity of this plant is approximately 240 million gallons of wastewater per day (mgd). The average daily flow (ADF) for calendar year 2009 was approximately 153 mgd. There are currently three independent flow measurement systems in place:

1. Gould Flow Metering System at Pt. Loma WWTP
2. Controlotron Ultrasonic Flow Meters at Pump Station 2 (PS-2)
3. ADS Ultrasonic Flow Metering System at Pt. Loma WWTP

The influent flow at the Pt. Loma WWTP is measured by four Parshall flumes at the Headworks of the Pt. Loma WWTP. There are two 6-foot long flumes designated as C-1, and C-2 and two 8-foot long flumes designated as N-1 and N-2. Water depth in each flume is measured by two independent meters.

Gould flow meters measure flow depth directly via hydrostatic pressure measurement. The Gould flow metering system consists of pressure transducers housed in stilling wells located adjacent to each of the Parshall flumes. The Gould flow meters measure depth of flow in the flumes, which are then converted to flow values by computer software.

At PS-2, Controlotron ultrasonic flow meters are located on each of the eight pump discharge pipes. The flows from each pump are totaled to calculate the average daily flow to the Pt. Loma WWTP.

Meters provided by ADS measure flow depth indirectly via ultrasonic measurement of the distance to the flow surface below the meter sensor (transducer) subtracted from the measured and known distance from the sensor face to the flume channel invert. The ADS flow metering system uses ultrasonic depth sensors located over each of the Parshall flumes. The ADS Quadredundant Ultrasonic Level Sensors incorporate ultrasonic technology to measure the distance from the sensors to the liquid surface being measured. The ADS software then calculates depth of flow, and ultimately daily flow, from the depth versus discharge rating curves for each flume.

Although there are three independent sources that record flow data, only flow data recorded by the Gould flow metering system are officially reported to the Regional Water Quality Control Board (RWQCB).

1.2 Purpose of Study

Every year, the City of San Diego (City) is required to provide a report of total plant flow to the RWQCB and to the United States Environmental Protection Agency (USEPA). As part of this review for calendar year 2009, V&A was retained by Brown and Caldwell to evaluate the measurement of ADF influent to the Pt. Loma WWTP and evaluate any discrepancies that may exist among the Gould, ADS,and PS-2 flow metering systems.

2 SCOPE OF WORK

2.1 Scope of Work by V&A

V&A was retained by Brown and Caldwell for certification of the four Gould Flow Metering devices located at the Pt. Loma WWTP. This certification includes verifying that the Gould devices are accurately recording flow, within acceptable tolerances (+/- 5% from theoretical values), through the Parshall flumes by performing the following tasks:

1) Data Review and Analysis – Examine existing flow data for the Gould, ADS and PS-2 metering systems. Update and analyze the flow data for the Gould, ADS and PS-2 metering systems for reporting discrepancies between the systems and report on the findings.

2) Field Review and Witness Inspection – Perform a field review of the Gould metering system with regards to the appropriateness of the instrumentation configuration, data collection and reporting systems. Provide witness inspection and assist City personnel in performing static confirmation testing of the calibration of each Gould transducer and electronic data recording system over the full depth range of the flume, using the City's test cylinder. Collect simulated flow data reported through the flow recording system located in the Engineering Building with assistance from City staff. Compare the simulated data to the theoretically calculated data of depth of flow through the Parshall flume.

3) Draft Report(s) – Prepare a Preliminary Draft Report for Brown and Caldwell's review regarding the results of the inspections together with conclusions and recommendations. The Preliminary Draft will be provided in electronic (Word) format only (i.e., no hardcopies). Brown and Caldwell will provide V&A with comments to the Preliminary Draft Report through Track Changes. V&A will address Brown and Caldwell's comments in developing the Draft Report to be delivered to the City. V&A will provide three (3) hardcopies of the Draft Report to Brown and Caldwell, two for the City and one for Brown and Caldwell's files, along with one electronic copy in PDF format.

2.2 Scope of Work by City of San Diego

The City provided the following items to assist in the completion of this work:

1) Daily flow data from the Gould, ADS and PS-2 flow measurement systems from January 1, 2009 through December 31, 2009.

2) All labor necessary to remove, test and reinstall each of the Gould transducers and suspension brackets for each of the four flumes examined.

3 REVIEW OF EXISTING DATA

3.1 Data Sources

Flow data from the City's Gould, ADS, and PS-2 flow metering systems for the 2009 calendar year are attached in Appendix A. Each monthly summary table includes the average daily flow (ADF), along with the maximum daily flow rate, minimum daily flow rate and standard deviation of all the daily flow rates. A summary of the yearly data that is included in Appendix B is summarized in Table 3-1. Note that the minimum and maximum values did not necessarily occur on the same day. Therefore, the percent differences for the dates on which the minimum and maximum Gould flow metering system ADF occurred are included as well.

Table 3-1
2009 Average Daily Flow

Item	Average Daily Flow (ADF) (mgd)			Percent Difference (%)	
	Gould	PS-2	ADS	PS-2 vs. Gould	ADS vs. Gould
Days Available	346	365	357	346	338
Average	153.37	155.56	149.05	1.71%	-2.52%
Minimum	132.86	120.07	132.79	-14.74%	-9.77%
Maximum	209.52	214.42	203.65	9.68%	4.58%
Standard Deviation	10.46	11.88	9.73	3.24%	2.14%
Minimum and Maximum Day Percent Difference					
Minimum- 11/27/09	132.86	133.46	132.79	0.45%	-0.06%
Maximum- 2/07/09	209.52	214.42	201.03	2.34%	-4.05%

3.2 Data Analysis

Using the information in Appendix A, V&A performed a graphical analysis of the daily flow data and generated Figure 3-1 through 3-5 below. Data analysis was conducted using visual and statistical procedures. The Gould flow data was used as the prime measurement for all statistical comparisons. The percent difference of any data type between systems was calculated as follows:

PS-2 system: (PS-2 – Gould)/Gould x 100
ADS system: (ADS – Gould)/Gould x 100

Figure 3-1: 2009 Flow Hydrograph - Plot of the ADF for each of the three measuring systems for the 2009 calendar year. The average daily flow recorded by the Gould flow meter varied from 209 mgd in February to 133 mgd in November. This figure shows that the variance between the Gould and PS-2 flow meters was fairly constant throughout the year.

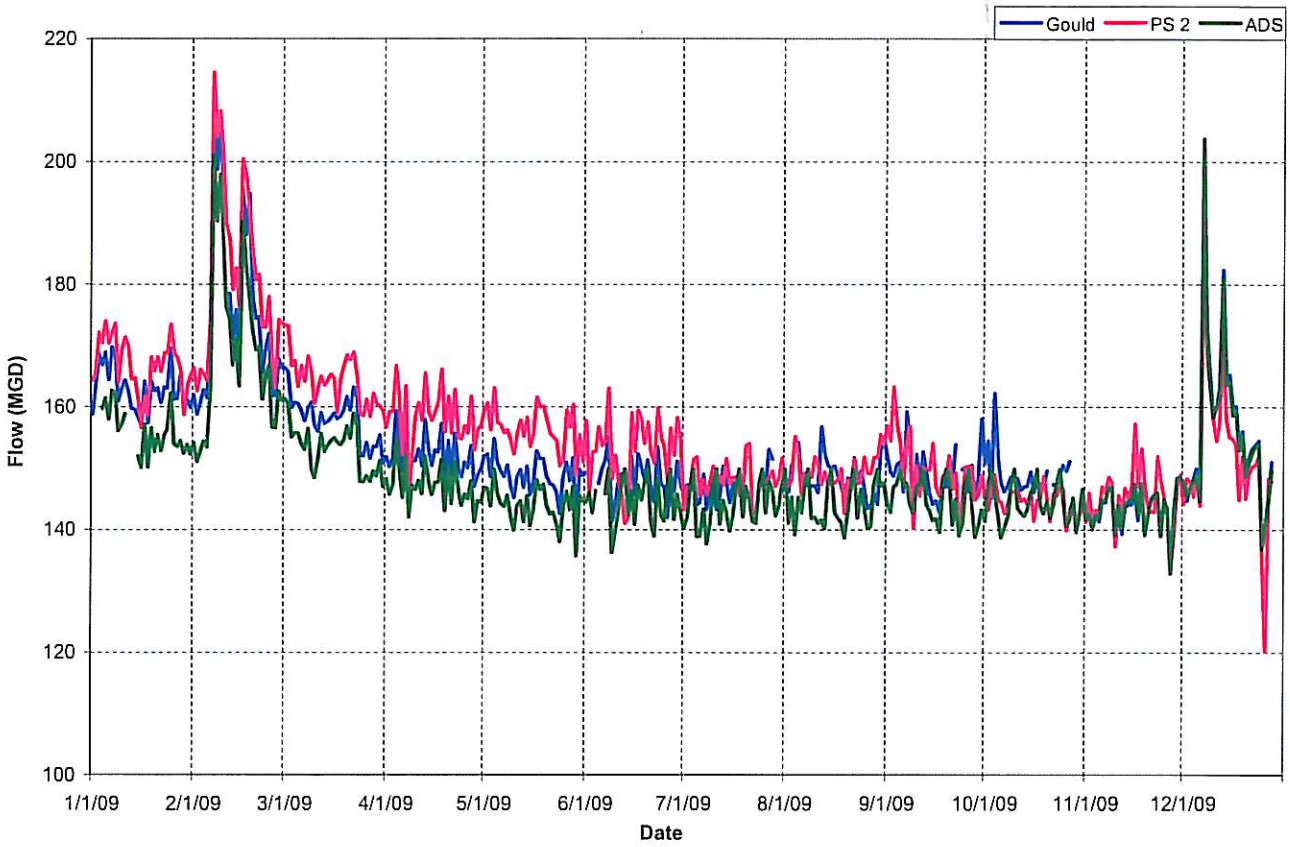

Figure 3-1. 2009 Flow Hydrograph

Figure 3-2: Percent Difference in Recorded Flow vs. Time (PS-2/Gould Flow Meters) – Plot of the percent difference for the PS-2 and Gould measuring system for the 2009 calendar year. The difference between the average daily flow recorded by the PS-2 and Gould flow meters varied from 9.68% in September to -14.7% in December.

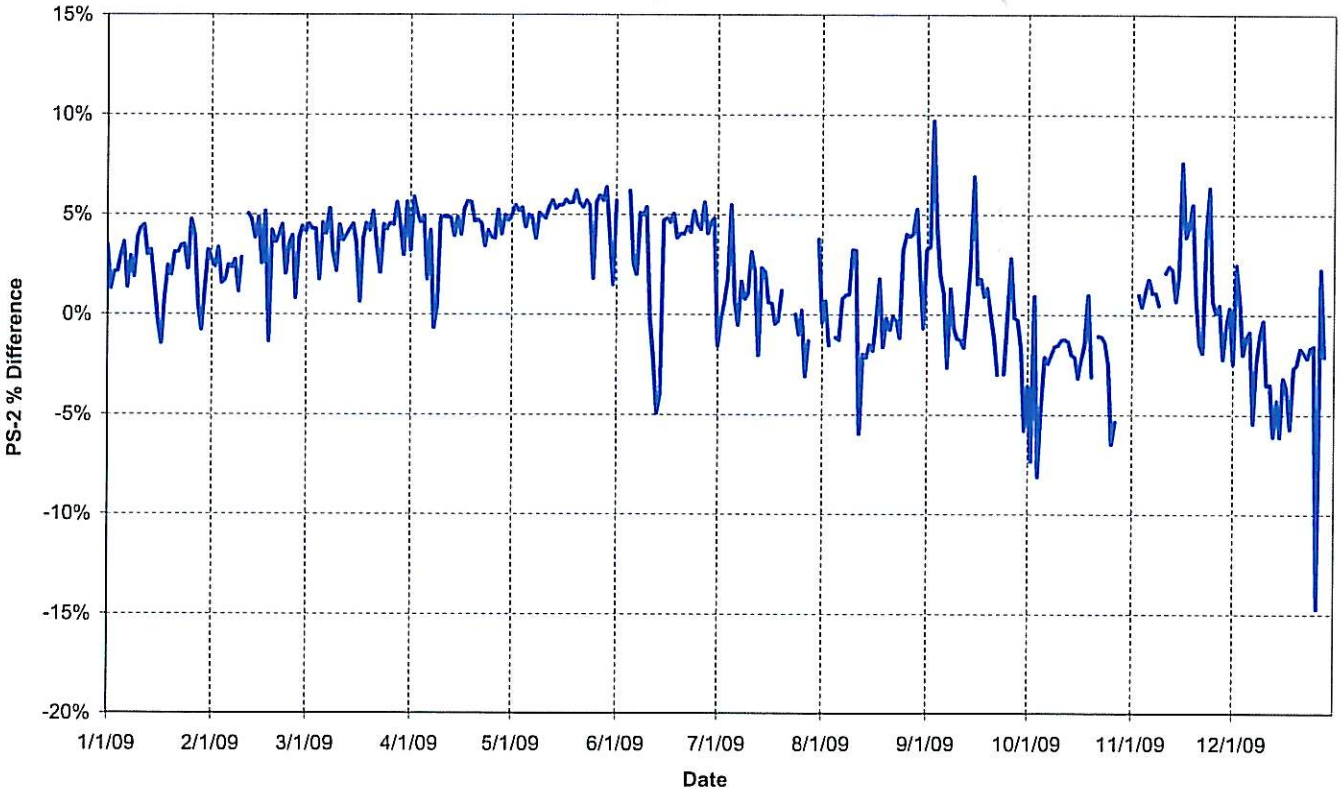

Figure 3-2. Percent Difference in Recorded Flow vs. Time (PS-2/Gould Flow Meters)

Figure 3-3: Scatter Plot of % Difference Between PS-2 and Gould Influent Flow Meters– Scatter plot of the percent difference between the PS-2 and Gould meters relative to the ADF reported by the Gould meter. This figure shows that the percent difference between the two meters is fairly constant at around +/- 5% even when the flow varies between 140 mgd and 200 mgd.

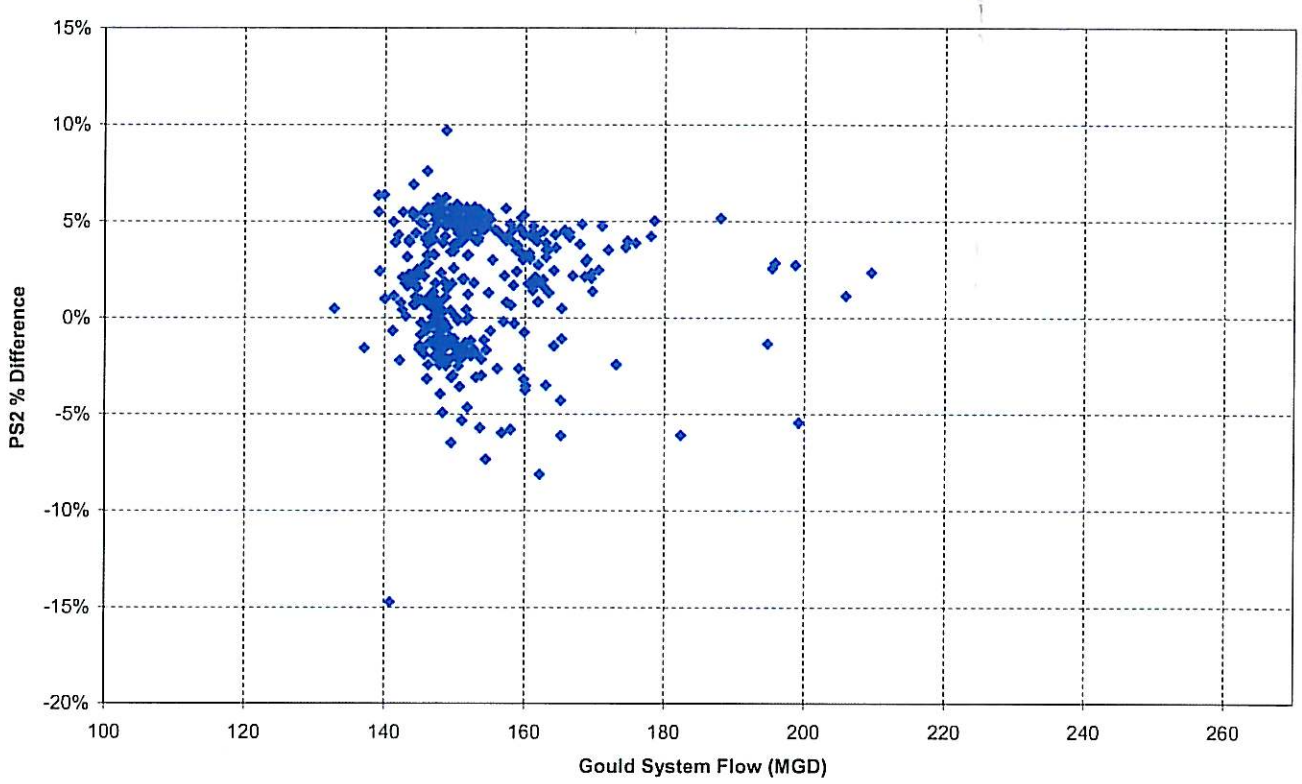

Figure 3-3. Scatter Plot of % Difference Between PS-2 and Gould Influent Flow Meters

Figure 3-4: Percent Difference in Recorded Flow vs. Time (ADS/Gould Flow Meters) – Plot of the percent difference for the ADS measuring system for the 2009 calendar year. The difference between the average daily flow recorded by the ADS and Gould flow meters varied from 4.58 % in July to -9.77% in October. Notice that the line representing the ADS percent difference is discontinuous due to the 27 days of the year in which no ADS data was available. It appears that the discrepancy between the ADS and Gould measurements increased significantly in June 2009, and decreased in November 2009.

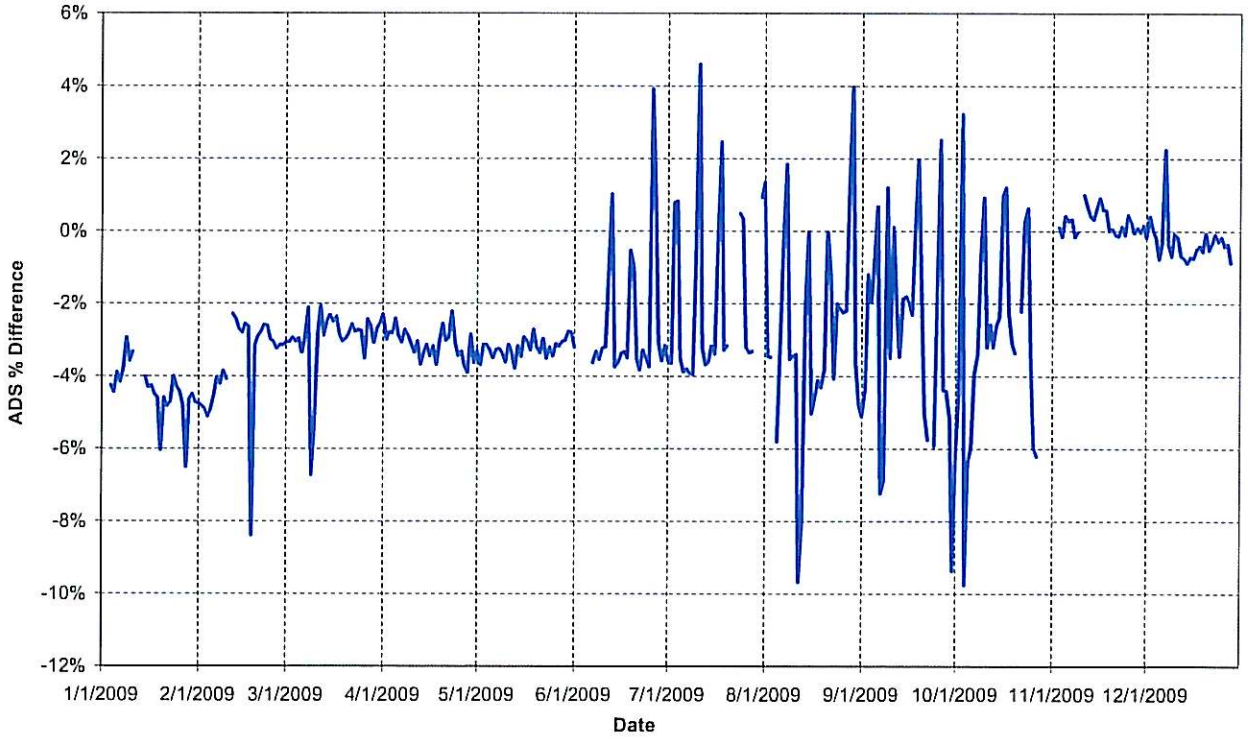

Figure 3-4. Percent Difference in Recorded Flow vs. Time (ADS/Gould Flow Meters)

Figure 3-5: Scatter Plot of % Difference Between ADS and Gould Influent Flow Meters - Scatter plot of the percent difference between the ADS and Gould meters relative to the ADF reported by the Gould meter. This figure shows that the percent difference between the two meters was between roughly 2% and -5% for flows between 135 mgd and 200 mgd.

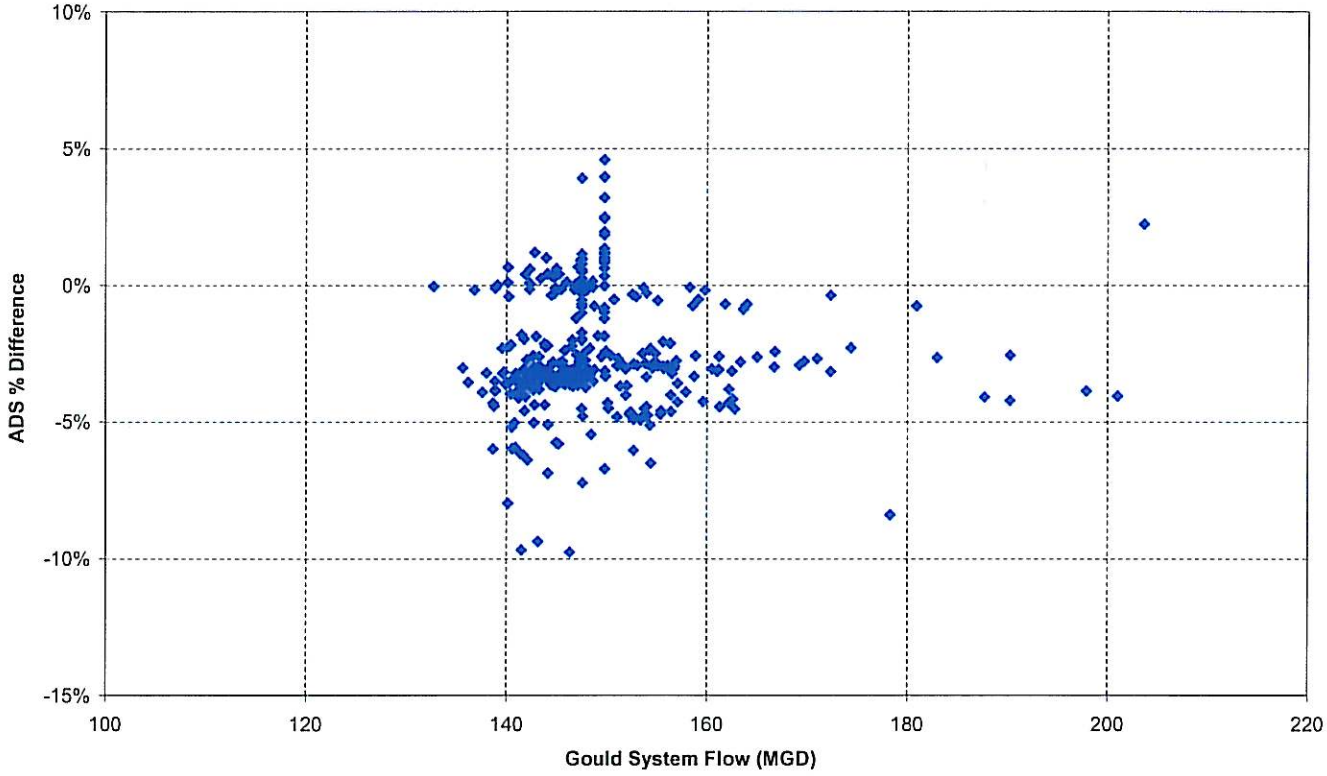

Figure 3-5. Scatter Plot of % Difference Between ADS and Gould Influent Flow Meters

4 FIELD TEST AND FLOW ANALYSIS

4.1 Test Set up

A static test and calibration of the four Parshall flumes and transmitting systems was performed by Pt. Loma WWTP personnel and witnessed by V&A representatives on February 9, 2010. The following instruments, test equipment and reports were used during the test:

- Static water well
- Gould Transducers (4 units)
- Fluke Multi-Meter (Model 45)
- Operator Station (Computer)
- Gould Transducers calibration reports
- Fluke Multi-Meter calibration reports

The following procedures were performed for each of the four flumes:

1. The Gould transducer was removed, cleaned and inserted into the static water well.
2. The transducer was connected to the Fluke Multi-Meter which measured the depth in converted milliamperes (mA).
3. The transducer was connected to the operating station for actual flow data.

4.2 Test and Calibration

The Gould transducers were tested and calibrated using the Fluke Model 45 Multi-Meter described above. Measured transducer accuracy was based on the Multi-Meter accuracy. The Multi-Meter was calibrated so that a reading of 5.33 mA would correspond to 0 inches of water depth and a reading of 20 mA would correspond to 36 inches of water depth.

The transducers were linked to the Operator Station computers, located in the Pt. Loma WWTP Engineering Building. The computers calculated flow values from the mA current measurements. At the beginning of each of the four tests, the water well depth was 0 inches. The water depth was increased in 9-inch increments until it reached a full depth of 36 inches. At each interval, a measurement of both the flow value and the multi-meter reading was obtained. The water depth was then reduced in 9-inch increments until the water depth was returned to 0 inches.

During the testing of the transducer for flume C-2, it was noted that the difference between the measured voltage and the expected voltage was inconsistent with the transducers in the other flumes. As a result, the C-2 transducer was replaced at the conclusion of the test.

4.3 Flow Analysis

The discharge relationship for the Parshall flumes is given by the following equation:

$$Q = Kb(H)^n \qquad (1)$$

Where $n = 1.522(b)^{0.026}$
b = width, feet (ft)
$K = 4$ for $b > 4$
H = height of water flume floor, feet (ft)
Q = Flow, cubic feet per second (cfs)
(1 cfs = 0.646 mgd)

The computer program receiving the Gould transducer readings uses the above equation to produce the output flow values. To compare the computer-generated values with the theoretical values, the dimensional widths of the Parshall flumes were obtained from design drawings provided by City personnel. The design values of 6 feet and 8 feet were used in the equation to obtain the theoretical flow values.

For C-1 and C-2, the following calculation was used to calculate the flow in mgd:

$$Q = (4)(6)(0.646)(H)^{1.594}$$
$$= 15.504(H)^{1.594}$$

For N-1 and N-2, the following calculation was used to calculate the flow in mgd:

$$Q = (4)(8)(0.646)(H)^{1.607}$$
$$= 20.672(H)^{1.607}$$

To perform an analysis of system accuracy, average flow and measurement values were then obtained for each transducer. Table C-1 in Appendix C compares the data collected in the field to the theoretical values.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

1) No major discrepancies were found between the Gould, ADS and PS-2 metering devices for the 2009 calendar year.
2) Instrumentation test set-up, data collection and reporting systems meet the requirements.
3) Based on the existing data, it is certified that the Gould meters are recording flow accurately and within 5% of the calculated theoretical value.
4) The percentage difference between the theoretical and practical flow for each of the flows are close to one another and show no distinctive variance above or below the average daily flow.
5) The three flow monitoring systems generally provide comparable results, considering the limits of the technology used. Comparison of flow rates reported by the flow monitoring systems occurred only at average daily flow levels. Verification of the flume rating tables was not performed as part of the test and calibration process. Due to backwater effects and flume submergence problems at flume depths below 3.0 inches, the Gould system was programmed to report zero at that minimum depth.

5.2 Recommendations

1) V&A recommends that the City continue to use Gould transducers as their primary flow measuring devices.

References

(1) Lin, Shundar. (2001) Water and Wastewater Calculations Manual, Pg. 302-306

Appendix A

Monthly Average Daily Flow Tables

Table A-1
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
January 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
01-01-2009	158.70	164.20	
01-02-2009	163.36	165.45	
01-03-2009	168.50	172.05	
01-04-2009	166.76	170.35	159.65
01-05-2009	168.83	173.90	161.32
01-06-2009	164.36	170.29	157.94
01-07-2009	169.68	171.96	162.61
01-08-2009	168.64	173.52	162.22
01-09-2009	160.85	163.86	156.11
01-10-2009	162.94	169.20	157.10
01-11-2009	164.24	171.27	158.76
01-12-2009	162.57	169.81	
01-13-2009	159.69	164.46	
01-14-2009	159.51	164.64	
01-15-2009	158.31	160.93	151.93
01-16-2009	156.88	156.53	150.12
01-17-2009	164.11	161.69	157.09
01-18-2009	157.30	158.53	150.21
01-19-2009	164.07	168.05	156.48
01-20-2009	162.55	165.73	152.71
01-21-2009	162.96	168.01	155.45
01-22-2009	160.66	165.65	152.89
01-23-2009	163.11	168.71	155.40
01-24-2009	162.97	168.64	156.42
01-25-2009	169.49	173.35	162.20
01-26-2009	161.16	168.75	154.00
01-27-2009	161.33	167.82	153.55
01-28-2009	165.21	165.97	154.44
01-29-2009	159.87	158.61	152.43
01-30-2009	161.07	163.30	153.80
01-31-2009	159.82	164.95	152.27
Total	**5049.49**	**5170.18**	**3897.10**
Average	**162.89**	**166.78**	**155.88**
Daily Low	**156.88**	**156.53**	**150.12**
Daily High	**169.68**	**173.90**	**162.61**
Std Dev	**3.56**	**4.53**	**3.69**

Table A-2
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
February 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
02-01-2009	161.85	166.25	154.14
02-02-2009	158.74	162.52	151.08
02-03-2009	160.60	165.94	152.70
02-04-2009	162.69	165.23	154.35
02-05-2009	161.39	164.17	153.41
02-06-2009	170.56	174.75	162.82
02-07-2009	209.52	214.42	201.03
02-08-2009	198.65	204.04	190.26
02-09-2009	205.86	208.18	197.89
02-10-2009	195.73	201.26	187.72
02-11-2009		189.53	176.22
02-12-2009	178.48	187.40	174.39
02-13-2009	170.98	179.05	166.83
02-14-2009	175.79	182.54	171.06
02-15-2009	168.11	176.22	163.39
02-16-2009	195.31	200.30	190.29
02-17-2009	187.94	197.58	182.96
02-18-2009	194.67	192.01	178.32
02-19-2009	178.02	185.47	172.39
02-20-2009	174.37	180.68	169.28
02-21-2009	174.64	181.55	169.78
02-22-2009	165.54	172.95	161.23
02-23-2009	169.50	172.95	165.05
02-24-2009	171.90	177.88	166.76
02-25-2009	161.70	168.05	156.74
02-26-2009	161.81	163.11	156.56
02-27-2009	167.80	174.14	162.52
02-28-2009	166.28	173.57	161.04
Total	**4748.43**	**5081.74**	**4750.21**
Average	**175.87**	**181.49**	**169.65**
Daily Low	**158.74**	**162.52**	**151.08**
Daily High	**209.52**	**214.42**	**201.03**
Std Dev	**14.90**	**14.67**	**14.03**

Table A-3
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
March 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
03-01-2009	166.33	173.23	161.21
03-02-2009	165.60	173.07	160.53
03-03-2009	159.82	166.66	155.11
03-04-2009	160.63	167.43	155.73
03-05-2009	160.42	163.22	155.65
03-06-2009	159.33	166.60	153.99
03-07-2009	157.71	164.09	153.08
03-08-2009	159.77	168.21	156.37
03-09-2009	160.65	165.51	149.85
03-10-2009	157.03	160.42	148.45
03-11-2009	156.01	162.95	151.53
03-12-2009	158.95	164.83	155.65
03-13-2009	157.24	163.48	152.71
03-14-2009	157.50	164.18	153.58
03-15-2009	158.10	165.19	154.42
03-16-2009	158.89	164.49	154.91
03-17-2009	157.99	158.98	154.24
03-18-2009	158.39	164.41	153.86
03-19-2009	159.41	166.63	154.56
03-20-2009	161.57	168.36	156.78
03-21-2009	159.42	167.62	154.93
03-22-2009	163.09	168.81	158.88
03-23-2009	161.44	164.82	156.97
03-24-2009	152.01	158.81	147.85
03-25-2009	151.99	158.47	147.79
03-26-2009	154.11	161.09	148.69
03-27-2009	151.56	158.34	147.85
03-28-2009	153.51	162.07	149.50
03-29-2009	153.49	160.38	148.75
03-30-2009	155.36	159.98	151.18
03-31-2009	150.82	159.26	146.97
Total	**4898.15**	**5091.60**	**4751.54**
Average	**158.00**	**164.25**	**153.28**
Daily Low	**150.82**	**158.34**	**146.97**
Daily High	**166.33**	**173.23**	**161.21**
Std Dev	**3.85**	**3.96**	**3.83**

Table A-4
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
April 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
04-01-2009	151.78	156.64	148.27
04-02-2009	150.25	159.05	145.75
04-03-2009	151.46	159.13	147.22
04-04-2009	159.26	166.61	154.76
04-05-2009	153.67	161.17	149.95
04-06-2009	149.55	152.17	145.24
04-07-2009	156.73	163.29	151.91
04-08-2009	145.99	144.98	142.00
04-09-2009	151.59	152.19	147.22
04-10-2009	151.17	158.42	146.49
04-11-2009	153.08	160.55	147.95
04-12-2009	150.41	157.71	145.82
04-13-2009	157.84	165.44	152.03
04-14-2009	153.24	159.27	148.12
04-15-2009	150.43	157.72	145.69
04-16-2009	152.92	159.03	147.64
04-17-2009	152.59	160.66	147.73
04-18-2009	157.18	166.04	151.37
04-19-2009	147.62	155.85	143.07
04-20-2009	154.42	161.61	150.45
04-21-2009	148.70	155.68	144.20
04-22-2009	155.66	162.70	151.07
04-23-2009	149.84	154.97	146.50
04-24-2009	148.56	154.77	143.95
04-25-2009	150.91	156.79	145.72
04-26-2009	150.01	155.71	145.01
04-27-2009	153.64	161.64	147.88
04-28-2009	146.98	152.90	141.24
04-29-2009	148.91	156.28	144.65
04-30-2009	149.85	156.86	144.40
Total	**4554.23**	**4745.83**	**4413.28**
Average	**151.81**	**158.19**	**147.11**
Daily Low	**145.99**	**144.98**	**141.24**
Daily High	**159.26**	**166.61**	**154.76**
Std Dev	**3.25**	**4.56**	**3.15**

Table A-5
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
May 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
05-01-2009	151.85	159.35	146.80
05-02-2009	152.26	160.55	146.62
05-03-2009	148.54	156.22	143.86
05-04-2009	154.71	162.94	149.84
05-05-2009	150.81	157.39	145.87
05-06-2009	149.55	156.98	144.30
05-07-2009	148.64	155.75	143.74
05-08-2009	150.43	156.15	145.52
05-09-2009	147.15	154.59	142.20
05-10-2009	145.14	152.27	139.88
05-11-2009	148.59	155.70	143.92
05-12-2009	149.68	157.68	144.58
05-13-2009	146.84	155.17	141.27
05-14-2009	150.26	158.20	145.48
05-15-2009	145.60	153.52	140.55
05-16-2009	147.61	155.66	143.27
05-17-2009	152.75	161.47	148.10
05-18-2009	151.49	159.91	146.51
05-19-2009	151.47	159.95	147.34
05-20-2009	148.59	157.79	143.83
05-21-2009	147.44	155.62	142.49
05-22-2009	147.11	154.99	142.73
05-23-2009	146.12	154.42	140.98
05-24-2009	142.61	150.37	138.03
05-25-2009	148.66	151.31	143.53
05-26-2009	150.92	159.37	146.19
05-27-2009	147.94	156.71	143.24
05-28-2009	151.65	160.28	146.99
05-29-2009	139.90	148.77	135.67
05-30-2009	149.73	155.37	145.56
05-31-2009	148.80	150.98	144.61
Total	**4612.83**	**4845.43**	**4463.47**
Average	**148.80**	**156.30**	**143.98**
Daily Low	**139.90**	**148.77**	**135.67**
Daily High	**154.71**	**162.94**	**149.84**
Std Dev	**3.01**	**3.37**	**2.98**

Table A-6
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
June 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
06-01-2009	149.19	157.63	144.40
06-02-2009		146.12	145.91
06-03-2009		152.61	142.70
06-04-2009		152.62	146.27
06-05-2009	147.48	156.57	
06-06-2009	149.79	153.62	
06-07-2009	151.31	154.33	145.81
06-08-2009	155.09	162.93	149.92
06-09-2009	141.24	148.23	136.22
06-10-2009	144.31	152.02	139.63
06-11-2009	147.89	147.55	143.16
06-12-2009	149.00	145.73	147.48
06-13-2009	148.29	140.95	149.79
06-14-2009	147.95	142.06	142.40
06-15-2009	151.82	158.90	146.30
06-16-2009	145.71	152.69	140.77
06-17-2009	152.28	159.28	147.19
06-18-2009	150.06	157.61	144.80
06-19-2009	148.29	154.00	147.48
06-20-2009	151.30	157.40	149.79
06-21-2009	146.53	152.41	141.33
06-22-2009	144.45	150.75	138.91
06-23-2009	153.37	159.66	148.30
06-24-2009	147.48	155.09	142.31
06-25-2009	146.87	153.44	141.37
06-26-2009	141.94	147.99	147.48
06-27-2009	148.09	156.36	149.79
06-28-2009	146.17	152.10	141.67
06-29-2009	151.08	158.10	145.66
06-30-2009	147.49	154.57	142.82
Total	**4004.48**	**4593.31**	**4049.65**
Average	**148.31**	**153.11**	**144.63**
Daily Low	**141.24**	**140.95**	**136.22**
Daily High	**155.09**	**162.93**	**149.92**
Std Dev	**3.24**	**5.22**	**3.63**

Table A-7
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
July 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
07-01-2009	145.46	143.15	140.26
07-02-2009	147.19	146.82	141.82
07-03-2009	146.36	147.30	147.48
07-04-2009	148.58	151.29	149.79
07-05-2009	143.93	151.78	138.87
07-06-2009	144.51	145.50	138.90
07-07-2009	148.93	148.14	143.25
07-08-2009	143.25	145.59	137.63
07-09-2009	146.68	147.80	140.88
07-10-2009	148.68	150.22	147.48
07-11-2009	143.23	147.71	149.79
07-12-2009	145.62	148.74	140.91
07-13-2009	150.23	147.13	144.69
07-14-2009	148.03	151.45	142.68
07-15-2009	144.34	147.38	139.75
07-16-2009	147.49	148.37	142.48
07-17-2009	147.71	148.49	147.48
07-18-2009	146.23	145.52	149.79
07-19-2009	146.87	146.39	142.04
07-20-2009	151.84	153.64	147.03
07-21-2009		153.97	144.98
07-22-2009		142.69	141.33
07-23-2009		142.73	141.03
07-24-2009	146.78	146.77	147.48
07-25-2009	149.30	147.78	149.79
07-26-2009	147.42	147.70	142.70
07-27-2009	153.04	148.27	147.90
07-28-2009	151.45	149.43	146.41
07-29-2009		146.96	142.19
07-30-2009		148.19	143.85
07-31-2009	146.13	151.62	147.48
Total	**3829.27**	**4588.52**	**4468.12**
Average	**147.28**	**148.02**	**144.13**
Daily Low	**143.23**	**142.69**	**137.63**
Daily High	**153.04**	**153.97**	**149.79**
Std Dev	**2.54**	**2.78**	**3.67**

Table A-8
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
August 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
08-01-2009	147.81	147.17	149.79
08-02-2009	146.12	147.08	141.08
08-03-2009	150.46	148.12	145.22
08-04-2009		155.12	139.17
08-05-2009	154.14	152.33	145.18
08-06-2009	147.52	145.63	142.70
08-07-2009	147.96	149.12	147.48
08-08-2009	147.10	148.50	149.79
08-09-2009	147.04	148.52	141.84
08-10-2009	147.07	151.80	141.97
08-11-2009	146.03	150.71	141.06
08-12-2009	156.68	147.31	141.50
08-13-2009	152.32	149.28	140.16
08-14-2009	150.53	147.25	147.48
08-15-2009	149.84	147.55	149.79
08-16-2009	150.30	147.54	142.73
08-17-2009	148.63	148.06	141.80
08-18-2009	147.25	149.86	141.18
08-19-2009	144.93	142.55	138.68
08-20-2009	148.36	148.07	142.66
08-21-2009	147.55	146.40	147.48
08-22-2009	151.65	151.45	149.79
08-23-2009	147.93	147.43	141.89
08-24-2009	149.57	147.81	146.55
08-25-2009	146.94	151.74	143.78
08-26-2009	143.41	149.16	140.19
08-27-2009	143.57	149.15	140.42
08-28-2009	145.81	151.68	147.48
08-29-2009	144.09	151.67	149.79
08-30-2009	152.70	155.43	147.10
08-31-2009	155.04	153.94	147.59
Total	**4458.35**	**4627.43**	**4473.29**
Average	**148.61**	**149.27**	**144.30**
Daily Low	**143.41**	**142.55**	**138.68**
Daily High	**156.68**	**155.43**	**149.79**
Std Dev	**3.28**	**2.80**	**3.62**

Table A-9
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
September 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
09-01-2009	151.89	156.78	144.12
09-02-2009	149.36	154.43	142.81
09-03-2009	148.73	163.13	146.92
09-04-2009	150.44	156.98	147.48
09-05-2009	151.05	154.04	149.79
09-06-2009	146.13	147.61	147.10
09-07-2009	159.11	154.86	147.59
09-08-2009	154.77	156.75	144.12
09-09-2009	141.13	140.15	142.81
09-10-2009	152.26	150.42	146.92
09-11-2009	147.35	145.45	147.48
09-12-2009	152.65	150.12	149.79
09-13-2009	149.34	149.88	144.16
09-14-2009	145.70	149.67	142.95
09-15-2009	144.11	154.03	141.48
09-16-2009	144.61	146.82	141.75
09-17-2009	142.88	145.41	139.58
09-18-2009	147.36	148.69	147.48
09-19-2009	146.93	148.87	149.79
09-20-2009	151.96	151.91	149.13
09-21-2009	148.25	146.59	140.78
09-22-2009	153.83	149.18	144.96
09-23-2009		140.36	139.00
09-24-2009	149.77	145.27	140.88
09-25-2009	150.10	150.14	147.48
09-26-2009	146.15	150.23	149.79
09-27-2009	150.42	150.18	143.82
09-28-2009	145.22	144.81	138.79
09-29-2009	148.23	145.64	140.52
09-30-2009	157.96	148.78	143.15
Total	**4327.69**	**4497.18**	**4342.42**
Average	**149.23**	**149.91**	**144.75**
Daily Low	**141.13**	**140.15**	**138.79**
Daily High	**159.11**	**163.13**	**149.79**
Std Dev	**4.16**	**5.00**	**3.49**

Table A-10
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
October 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
10-01-2009	150.67	145.25	141.38
10-02-2009	154.46	143.10	147.48
10-03-2009	145.13	146.46	149.79
10-04-2009	162.13	148.95	146.30
10-05-2009	151.82	144.71	142.11
10-06-2009	147.54	144.36	138.69
10-07-2009	146.20	142.61	140.39
10-08-2009	147.10	144.10	142.10
10-09-2009	148.53	146.10	147.48
10-10-2009	148.44	146.12	149.79
10-11-2009	148.29	146.36	143.54
10-12-2009	146.44	144.59	142.66
10-13-2009	146.94	144.94	142.23
10-14-2009	147.08	144.11	143.23
10-15-2009	149.35	146.10	145.79
10-16-2009	146.06	141.39	147.48
10-17-2009	148.03	144.68	149.79
10-18-2009	147.23	144.96	143.89
10-19-2009	147.19	148.59	142.62
10-20-2009	149.53	144.85	144.49
10-21-2009		141.34	141.93
10-22-2009	147.34	145.73	144.07
10-23-2009	147.13	145.47	147.48
10-24-2009	148.88	146.81	149.79
10-25-2009	150.47	146.66	144.87
10-26-2009	149.53	139.81	140.57
10-27-2009	151.07	142.98	141.67
10-28-2009		144.60	145.12
10-29-2009		141.03	139.58
10-30-2009		141.96	142.20
10-31-2009		144.26	146.58
Total	**3872.58**	**4482.97**	**4475.10**
Average	**148.95**	**144.61**	**144.36**
Daily Low	**145.13**	**139.81**	**138.69**
Daily High	**162.13**	**148.95**	**149.79**
Std Dev	**3.38**	**2.11**	**3.18**

Table A-11
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
November 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
11-01-2009		141.17	141.62
11-02-2009		145.88	142.47
11-03-2009	140.01	141.37	140.14
11-04-2009	142.52	143.08	142.28
11-05-2009	141.31	142.91	141.87
11-06-2009	144.35	146.88	144.74
11-07-2009	144.40	145.96	144.85
11-08-2009	146.96	148.52	146.72
11-09-2009	146.88	147.56	146.81
11-10-2009		137.17	139.12
11-11-2009	142.52	145.49	143.93
11-12-2009	139.25	142.59	140.16
11-13-2009	143.49	146.69	144.08
11-14-2009	144.10	145.06	144.56
11-15-2009	144.10	146.91	144.98
11-16-2009	146.06	157.13	147.37
11-17-2009	141.49	146.98	142.31
11-18-2009	146.68	153.11	147.49
11-19-2009	139.10	146.71	139.10
11-20-2009	142.30	143.40	142.36
11-21-2009	144.98	142.85	144.82
11-22-2009	145.63	142.82	145.41
11-23-2009	145.80	151.84	145.96
11-24-2009	139.07	147.86	138.90
11-25-2009	144.17	145.12	144.79
11-26-2009	143.05	143.14	143.38
11-27-2009	132.86	133.46	132.79
11-28-2009	142.17	138.99	142.27
11-29-2009	148.38	147.50	148.31
11-30-2009	148.38	148.84	148.59
Total	**3869.99**	**4356.98**	**4302.15**
Average	**143.33**	**145.23**	**143.40**
Daily Low	**132.86**	**133.46**	**132.79**
Daily High	**148.38**	**157.13**	**148.59**
Std Dev	**3.39**	**4.60**	**3.38**

Table A-12
City of San Diego
Point Loma Wastewater Treatment Plant
Average Daily Flow
December 2009

Date	Gould (mgd)	PS-2 (mgd)	ADS (mgd)
12-01-2009	147.82	144.17	147.54
12-02-2009	144.66	148.24	145.23
12-03-2009	146.76	147.73	146.80
12-04-2009	148.28	145.30	147.99
12-05-2009	149.89	148.21	148.72
12-06-2009	145.17	143.87	144.70
12-07-2009	199.20	188.32	203.65
12-08-2009	173.06	168.83	172.40
12-09-2009	165.19	163.34	164.03
12-10-2009	158.47	157.95	158.33
12-11-2009	160.13	154.44	159.82
12-12-2009	162.97	157.21	161.84
12-13-2009	182.30	171.17	180.90
12-14-2009	165.11	157.99	163.64
12-15-2009	165.14	155.02	163.92
12-16-2009	159.80	154.67	158.59
12-17-2009	160.02	153.96	159.18
12-18-2009	153.60	144.80	152.94
12-19-2009	156.02	151.85	155.13
12-20-2009	148.74	145.00	148.62
12-21-2009	151.56	148.95	150.75
12-22-2009	153.09	150.17	152.56
12-23-2009	153.83	150.47	153.67
12-24-2009	154.46	151.84	153.99
12-25-2009	137.07	134.88	136.82
12-26-2009	140.83	120.07	140.22
12-27-2009	145.01	148.25	144.47
12-28-2009	150.99	147.81	149.67
12-29-2009	152.55	147.82	151.56
12-30-2009	149.84	143.92	148.42
12-31-2009	158.04	153.10	157.47
Total	**4839.58**	**4699.35**	**4823.55**
Average	**156.12**	**151.59**	**155.60**
Daily Low	**137.07**	**120.07**	**136.82**
Daily High	**199.20**	**188.32**	**203.65**
Std Dev	**12.35**	**11.52**	**12.79**

Appendix B

Annual Average Daily Flow Tables: Summary

Table B-1
City of San Diego
Point Loma Wastewater Treatment Plant
Annual Average Daily Flow
2009

Month	Gould (mgd)	PS-2 (mgd)	ADS (mgd)	Percent Difference: PS2 vs. Gould	Percent Difference: ADS vs. Gould
January	162.89	166.78	155.88	2.39%	-4.30%
February	175.87	181.49	169.65	3.20%	-3.54%
March	158.00	164.25	153.28	3.95%	-2.99%
April	151.81	158.19	147.11	4.21%	-3.10%
May	148.80	156.30	143.98	5.04%	-3.24%
June	148.31	153.11	144.63	3.23%	-2.48%
July	147.28	148.02	144.13	0.50%	-2.14%
August	148.61	149.27	144.30	0.44%	-2.90%
September	149.23	149.91	144.75	0.45%	-3.00%
October	148.95	144.61	144.36	-2.91%	-3.08%
November	143.33	145.23	143.40	1.33%	0.05%
December	156.12	151.59	155.60	-2.90%	-0.33%
Average	**153.37**	**155.56**	**149.05**	**1.71%**	**-2.52%**
Maximum	**132.86**	**120.07**	**132.79**	**-14.74%**	**-9.77%**
Minimum	**209.52**	**214.42**	**203.65**	**9.68%**	**4.58%**
Std. Dev.	**10.46**	**11.88**	**9.73**	**3.24%**	**2.14%**

Appendix C

Flow Meter Calibration Data

Table C-1
City of San Diego
Point Loma Wastewater Treatment Plant
Calibration Test Data: February 9, 2010

Flume ID	Level (in)	Measured Current (mA)	Theoretical Current (mA)	Percent Difference: Measured vs. Theoretical	Measured Flow (mgd)	Theoretical Flow (mgd)	Percent Difference: Measured vs. Theoretical
C-1	0	5.387	5.33	1.07%	-0.2	0.00	NA
	9	8.034	8.00	0.43%	10.0	9.80	2.04%
	18	12.032	12.00	0.27%	30.0	29.59	1.39%
	27	16.083	16.00	0.52%	57.5	56.47	1.82%
	36	20.010	20.00	0.05%	90.3	89.33	1.09%
	27	16.017	16.00	0.11%	56.9	56.47	0.76%
	18	12.016	12.00	0.13%	29.8	29.59	0.71%
	9	8.025	8.00	0.31%	10.0	9.80	2.04%
	0	5.389	5.33	1.11%	-0.2	0.00	NA
C-2	0	4.850	5.33	-9.01%	0.0	0.00	NA
	9	7.671	8.00	-4.11%	8.5	9.80	-13.27%
	18	11.647	12.00	-2.94%	27.5	29.59	-7.06%
	27	15.685	16.00	-1.97%	54.2	56.47	-4.02%
	36	19.606	20.00	-1.97%	86.2	89.33	-3.50%
	27	15.578	16.00	-2.64%	53.4	56.47	-5.44%
	18	11.570	12.00	-3.58%	27.2	29.59	-8.08%
	9	7.566	8.00	-5.43%	8.2	9.80	-16.33%
	0	4.897	5.33	-8.12%	0.0	0.00	NA
N-1	0	5.456	5.33	2.36%	-0.3	0.00	NA
	9	7.632	8.00	-4.60%	11.2	13.02	-13.98%
	18	11.866	12.00	-1.12%	38.8	39.66	-2.17%
	27	15.898	16.00	-0.64%	75.2	76.09	-1.17%
	36	19.941	20.00	-0.30%	119.0	120.81	-1.50%
	27	15.916	16.00	-0.52%	75.2	76.09	-1.17%
	18	11.925	12.00	-0.62%	39.4	39.66	-0.66%
	9	7.937	8.00	-0.79%	12.8	13.02	-1.69%
	0	5.345	5.33	0.28%	-0.4	0.00	NA
N-2	0	5.228	5.33	-1.91%	0.1	0.00	NA
	9	7.977	8.00	-0.29%	13.0	13.02	-0.15%
	18	11.950	12.00	-0.42%	39.2	39.66	-1.16%
	27	15.915	16.00	-0.53%	74.9	76.09	-1.56%
	36	19.938	20.00	-0.31%	119.0	120.81	-1.50%
	27	15.895	16.00	-0.66%	74.7	76.09	-1.83%
	18	11.894	12.00	-0.88%	38.7	39.66	-2.42%
	9	7.908	8.00	-1.15%	12.6	13.02	-3.23%
	0	5.228	5.33	-1.91%	0.1	0.00	NA

Appendix D

Field Notes

Sylvia Goebel

Pt Loma WWTP
Gould Flow Metering Certification 2/09/2010

Sensor ID	Level	Measured Voltage (MADC)	Measured Flow (MGD) (Plant Influent)
N-1	0"	5.456	-0.3
	9"	7.632	11.2
	18"	11.866	38.8
	27"	15.898	75.2
	36"	19.941	119
	27"	15.916	75.2
	18"	11.925	39.4
	9"	7.937	12.8
	0"	5.345	-0.4
C-1	0"	5.387	-0.2
	9"	8.034	10.0
	18"	12.032	30.0
	27"	16.083	57.5
	36"	20.010	90.3
	27"	16.017	56.9
	18"	12.016	29.8
	9"	8.025	10.0
	0"	5.389	-0.2

Sylvia Debel 2/09/2010

Sensor ID	Level	Measured Voltage	Measured Flow (MGD)
C-2	0"	4.85	-0.0
	9"	7.671	8.5
	18"	11.647	27.5
	27"	15.685	54.2
	36"	19.606	86.2
	27"	15.578	53.4
	18"	11.570	27.2
	9"	7.566	8.2
	0"	4.897	-0.0
N-2	0"	5.228	0.1
	9"	7.977	13.0
	18"	11.950	39.2
	27"	15.915	74.9
	36"	19.938	119
	27"	15.895	74.7
	18"	11.894	38.7
	9"	7.908	12.6
	0"	5.228	0.1