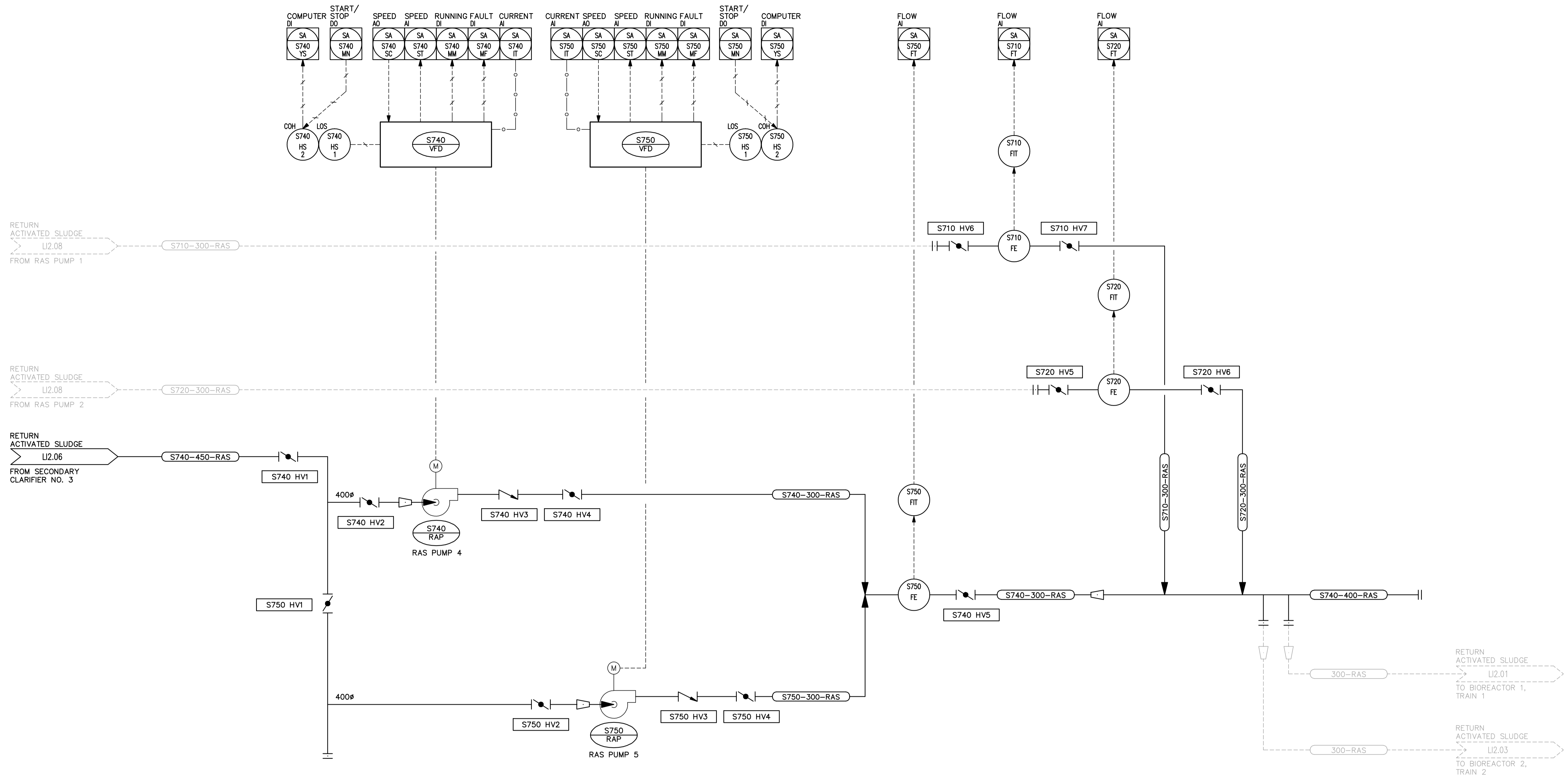


APPENDIX M – P & ID DRAWINGS

ITEM NO.	DRAWING NO.	DRAWING TITLE
1	1-0103S-A0005-001-02	Process Area S – Secondary Clarifier 3, Return Activated Sludge Pumping – P&ID
2	1-0103S-A0012-001-02	Instrumentation Area S – Secondary Clarifiers, Pump Room Location Plan
3	WEP-69	Process Piping Legend & Abbreviations
4	WEP-70	Service Piping Process Diagram
5	WEP-76	Mechanical Legend & Abbreviations
6	WEP-91	Process and Instrumentation Diagram No. 9 – Aeration/Blowers
7	WEP-92	Process and Instrumentation Diagram No. 10 – Secondary Clarifiers
8	WEP-93	Process and Instrumentation Diagram No. 11 – Final Effluent & Flushing Water Systems



RAS PUMP 4
 EQUIP. NO.: S-740-RAP
 SPEC: 11304
 TYPE: CENTRIFUGAL DRIVE VARIABLE SPEED
 CAPACITY: 120-230 L/s
 HEAD: 7.5 m
 POWER: 22.5 kW

RAS PUMP 5
 EQUIP. NO.: S-750-RAP
 SPEC: 11304
 TYPE: CENTRIFUGAL DRIVE VARIABLE SPEED
 CAPACITY: 120-230 L/s
 HEAD: 7.5 m
 POWER: 22.5 kW

AECOM
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AS-CONSTRUCTED
 AECOM WINNIPEG
 SIG..... DATE.....

APECM
 Certificate of Authorization
AECOM CANADA LTD.
 Original dated on:
 No. 4671 Date: 2009/04/28

B.M. ELEV.			
DESIGNED BY	CGL/EVS	CHECKED BY	KM/ST
DRAWN BY	LAE/PPL	APPROVED BY	JEH
NO. REVISIONS	DATE	BY	DATE
02	AS CONSTRUCTED	08/09/12	AS
01	ISSUED FOR CONSTRUCTION	06/09/22	SRP
00	ISSUED FOR TENDER	06/04/26	CD
NO.	REVISIONS	DATE	BY
		2005/07/06	
		2006/04/26	

EarthTech
 A Tyco International Ltd. Company

DESIGNED BY: CGL/EVS
 CHECKED BY: KM/ST
 DRAWN BY: LAE/PPL
 APPROVED BY: JEH

HOR. SCALE: NONE
 VERTICAL SCALE: NONE

RELEASED FOR CONSTRUCTION BY: J. VEILLEUX

DATE: 2005/07/06
 DATE: 2006/04/26

ENGINEER'S SEAL
 ORIGINAL SIGNED BY
 S.W. TORMEY
 2006/04/26
 CONSULTANT DRAWING NO.
 LI2.07

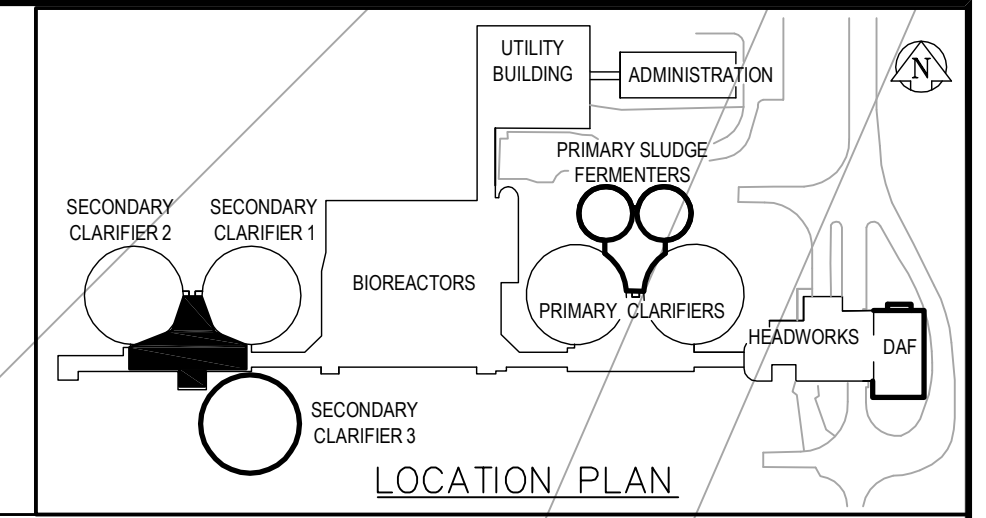
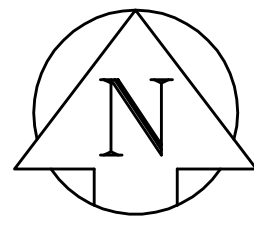
THE CITY OF WINNIPEG
 WATER AND WASTE DEPARTMENT
 ENGINEERING DIVISION

WEWPCC
 BIOLOGICAL NUTRIENT REMOVAL UPGRADE
 CONTRACT 3

CITY FILE NUMBER
 SHEET OF

CITY DRAWING NUMBER
1-0103S-A0005-001-02

PROCESS
 AREA S - SECONDARY CLARIFIER 3
 RETURN ACTIVATED SLUDGE PUMPING - P&ID

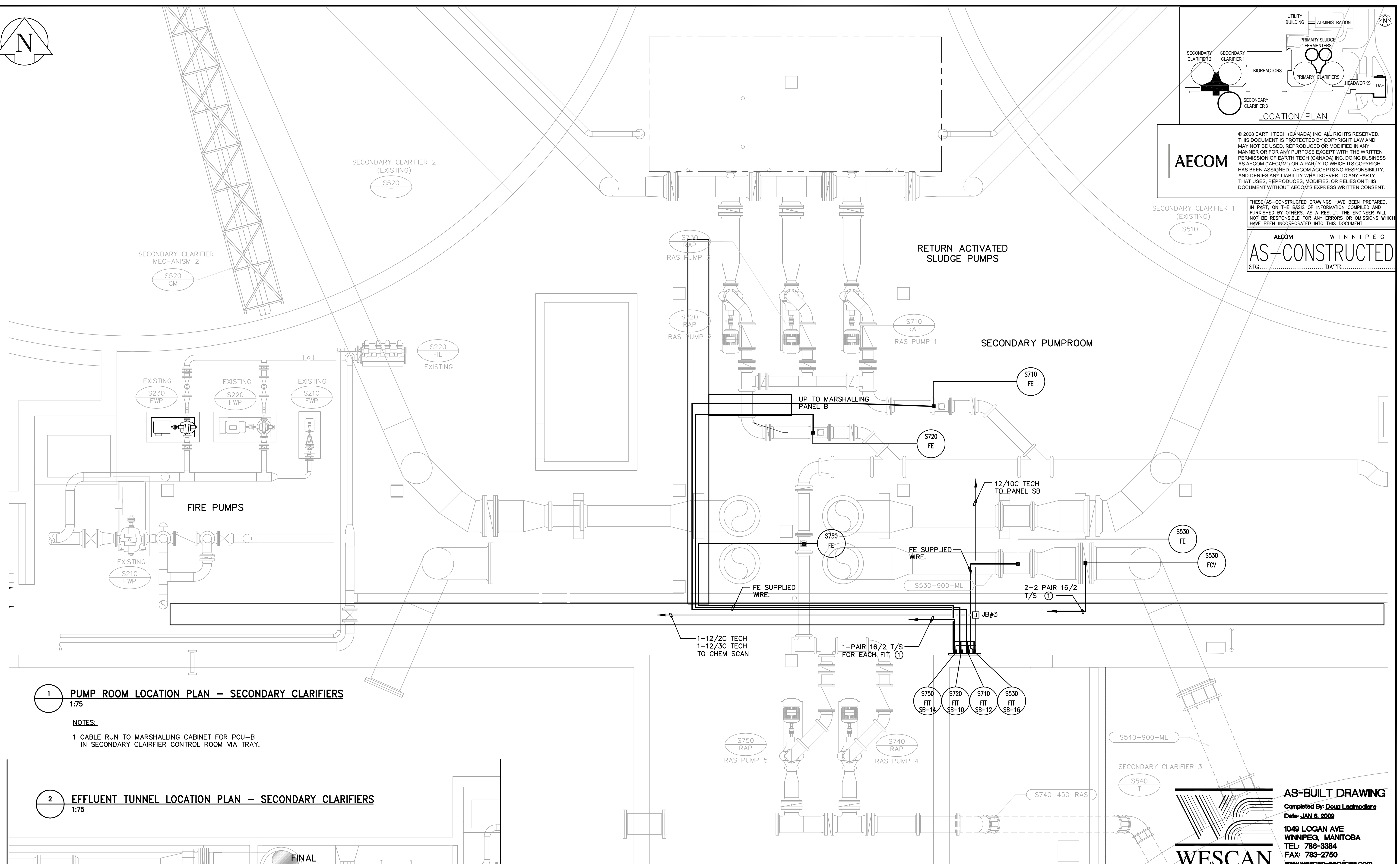


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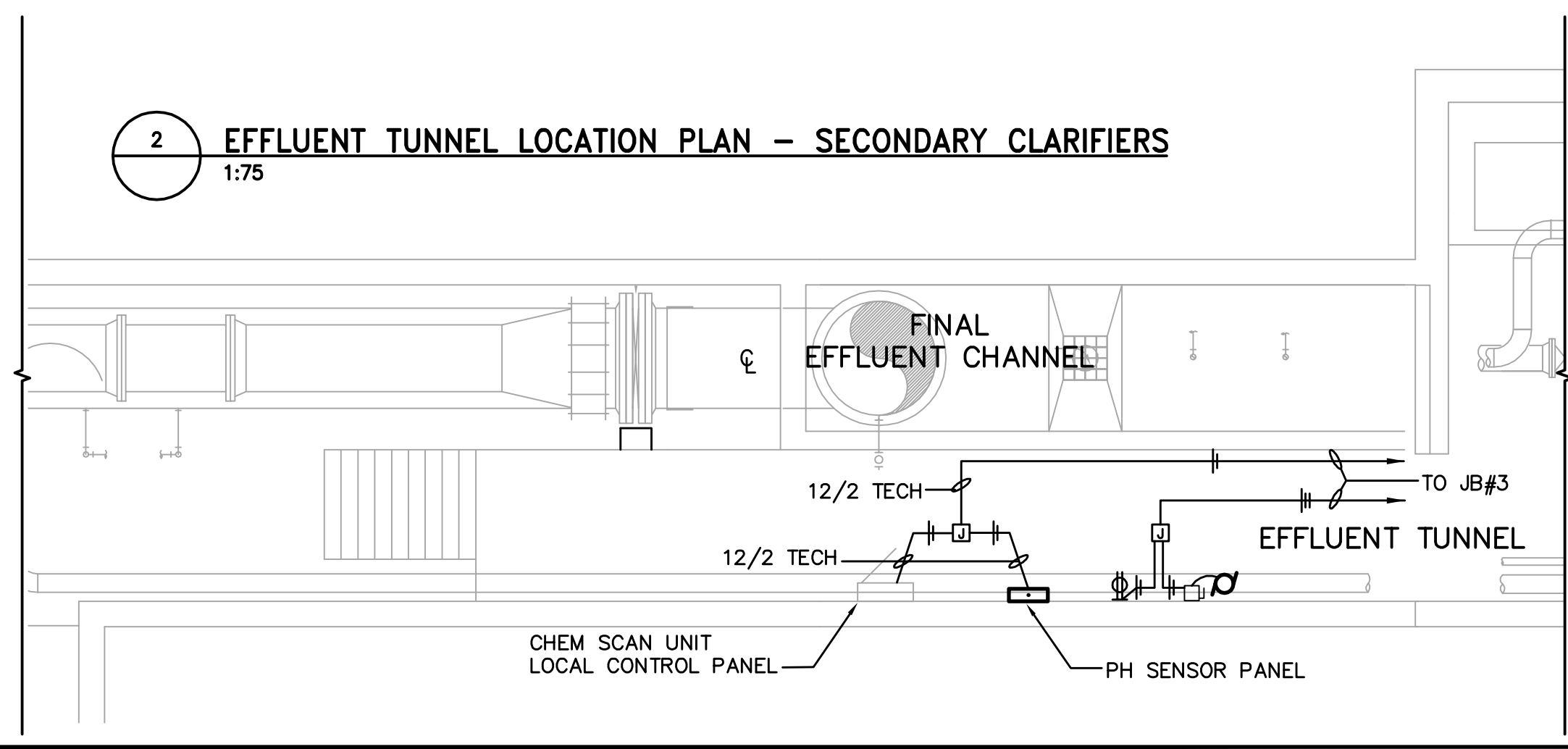
AECOM WINNIPEG
AS-CONSTRUCTED
 SIG. DATE:



1 PUMP ROOM LOCATION PLAN - SECONDARY CLARIFIERS
 1:75

NOTES:
 1 CABLE RUN TO MARSHALLING CABINET FOR PCU-B IN SECONDARY CLAIRIFIER CONTROL ROOM VIA TRAY.

2 EFFLUENT TUNNEL LOCATION PLAN - SECONDARY CLARIFIERS
 1:75



<p>A Tyco International Ltd. Company</p>		ENGINEER'S SEAL ORIGINAL SIGNED BY S.W. TORMEY 2006/04/26		<p>THE CITY OF WINNIPEG WATER AND WASTE DEPARTMENT ENGINEERING DIVISION</p>	
DESIGNED BY: CD CHECKED BY: EVS DRAWN BY: PPL APPROVED BY: JEH		S.W. TORMEY 2006/04/26		CITY FILE NUMBER SHEET OF	
HOR. SCALE: 1:50 VERTICAL SCALE:		RELEASED FOR CONSTRUCTION BY: J. VEILLEUX		CITY DRAWING NUMBER 1-0103S-A0012-001-02	
NO. REVISIONS DATE BY		DATE 2006/01/06 DATE 2006/04/26		CONSULTANT DRAWING NO. S16.04	
02 AS CONSTRUCTED 09/02/19 JBC 01 ISSUED FOR CONSTRUCTION 06/09/22 SRP 00 ISSUED FOR TENDER 06/04/26 CD		WEWPC BIOLOGICAL NUTRIENT REMOVAL UPGRADE CONTRACT 3		INSTRUMENTATION AREA S - SECONDARY CLARIFIERS PUMP ROOM LOCATION PLAN	

PIPE LEGEND

PIPE FITTING	FLANGED	SCREWED	VICTAULIC	WELDED
90° ELBOW				
45° ELBOW				
TEE				
LATERAL				
ELBOW TURNED DOWN				
ELBOW TURNED UP				
ELBOW SIDE OUTLET DOWN				
ELBOW SIDE OUTLET UP				
TEE OUTLET DOWN				
TEE OUTLET UP				
REDUCER CONCENTRIC				
REDUCER ECCENTRIC				
EXPANSION JOINT				
FLANGE				
UNION				
CAP				
ORFICE				

VALVE LEGEND

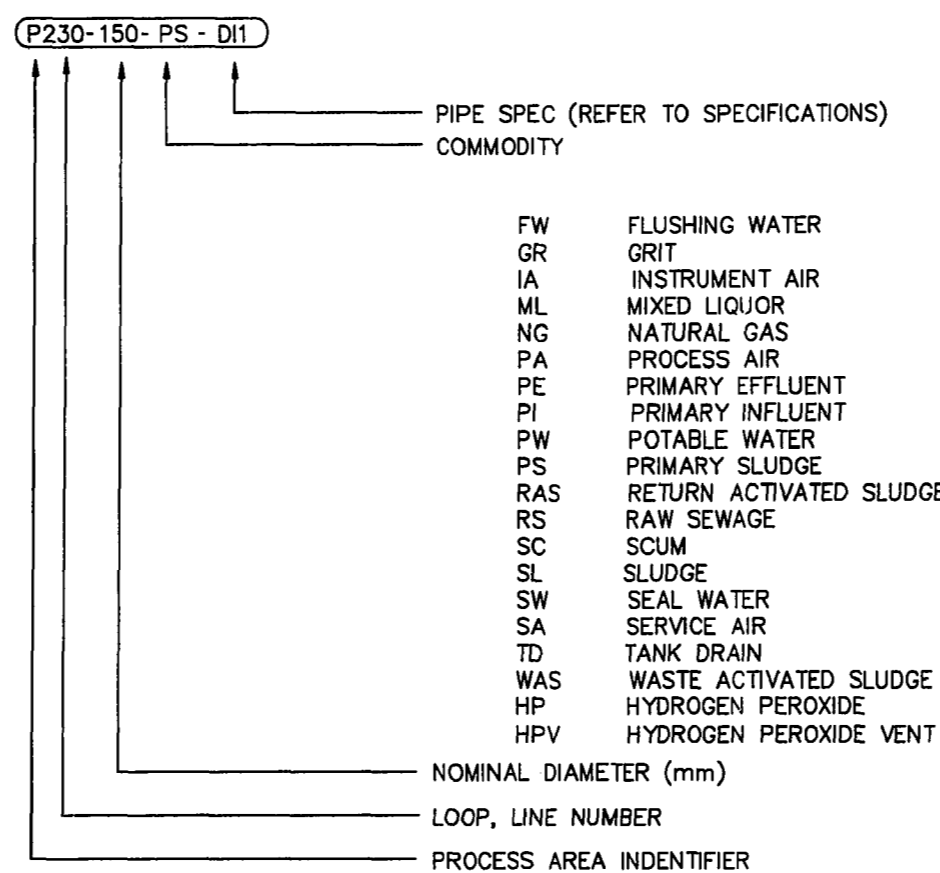
VALVE	FLANGED	SCREWED
GATE		
BALL		
PLUG		
GLOBE		
NEEDLE		
CHECK		
WAFER GATE		
BUTTERFLY		
KNIFE GATE		
PRESSURE RED		
CONTROL		

NOTE:

PROCESS PIPING 65mm DIAMETER AND SMALLER IS SHOWN SINGLE LINE.

PROCESS PIPING LARGER THAN 65mm DIAMETER IS SHOWN DOUBLE LINE.

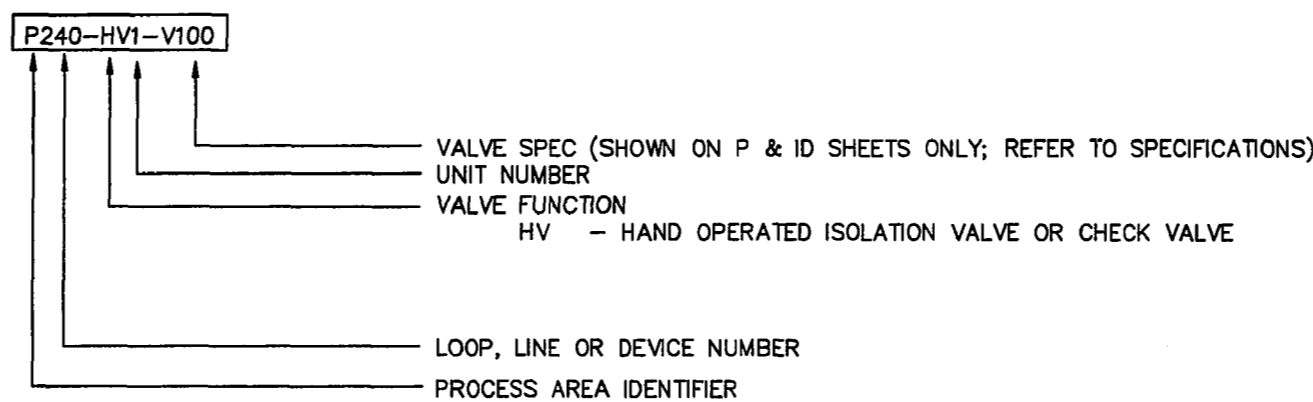
PIPE IDENTIFICATION



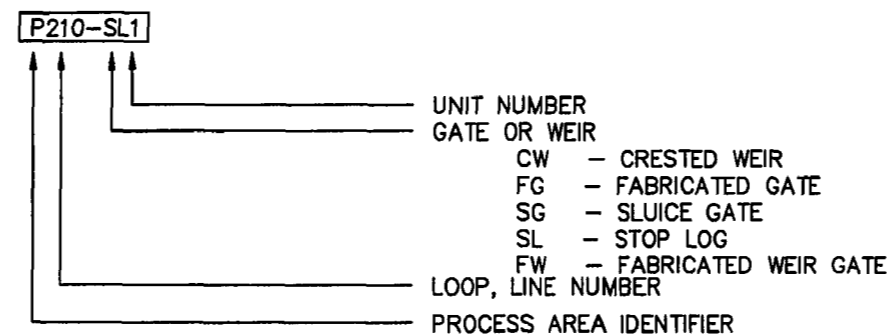
AREA IDENTIFICATION

- AREA M - PERIMETER ROAD PUMPING STATION
- AREA H - HEADWORKS AND SLUDGE STORAGE BUILDINGS
- AREA P - PRIMARY CLARIFIERS
- AREA S - SECONDARY FACILITIES, AERATION BASINS AND SECONDARY CLARIFIERS
- AREA U - UTILITY AND ADMINISTRATION BUILDINGS
- AREA L - GENERAL SITE DEVELOPMENT AREA

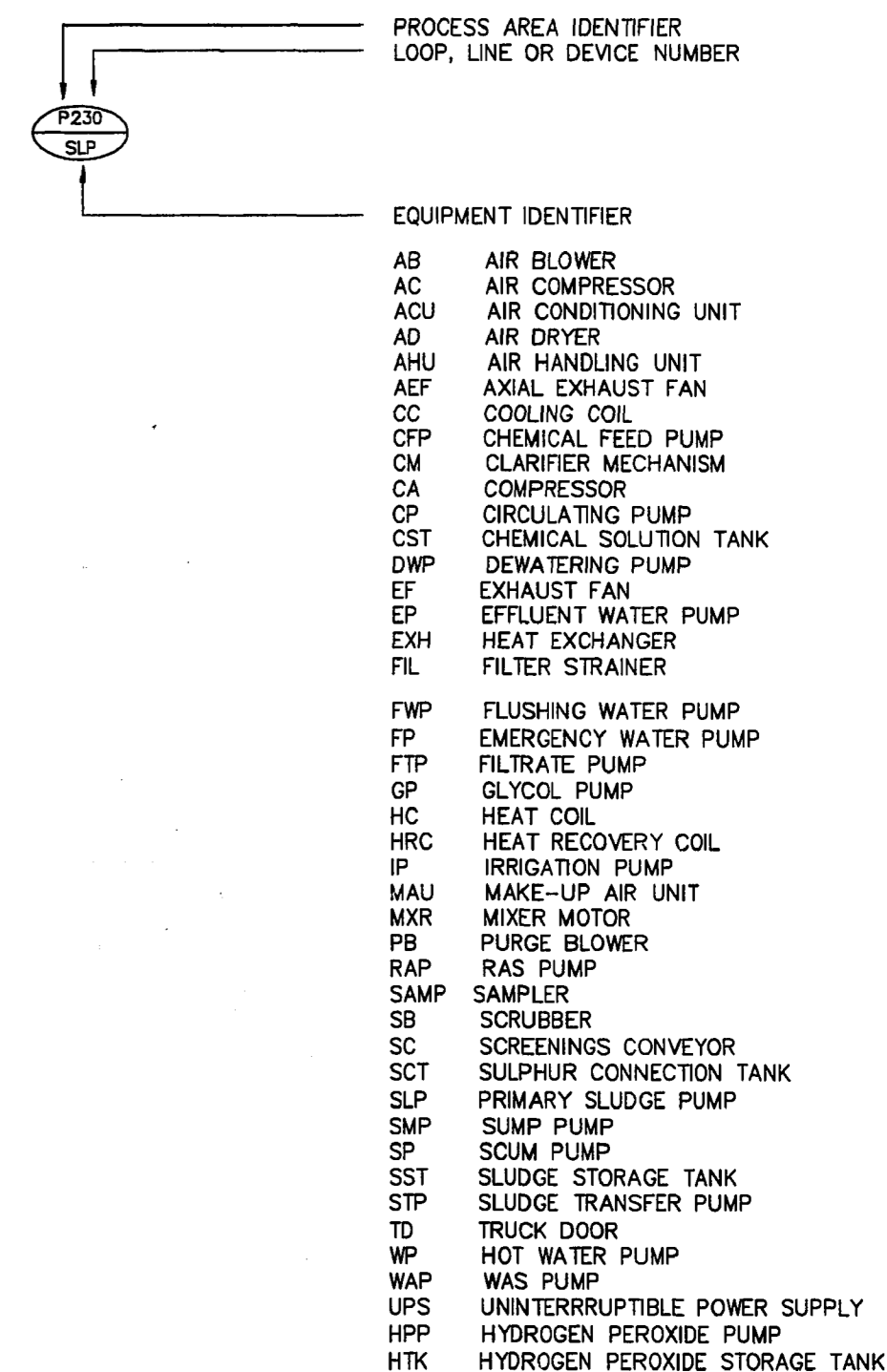
VALVE IDENTIFICATION



GATE AND WEIR IDENTIFICATION



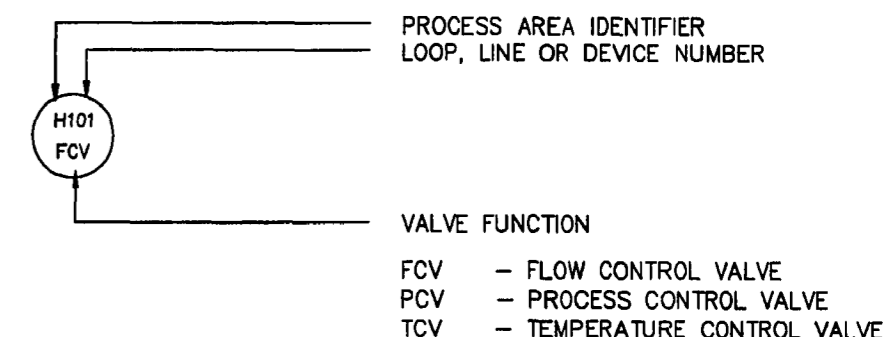
EQUIPMENT IDENTIFICATION



ABBREVIATIONS

- DR DRAIN POINT
- FC FLEXIBLE COUPLING (DRESSER STYLE)
- FP FLUSHING POINT
- GC GROOVED COUPLING (VICTAULIC STYLE)
- SP SAMPLE POINT
- FE FLOW ELEMENT
- ADWF AVERAGE DRY WEATHER FLOW
- PDWF PEAK DRY WEATHER FLOW
- PWWF PEAK WET WEATHER FLOW
- PS PIPE SUPPORT

CONTROL VALVE IDENTIFICATION

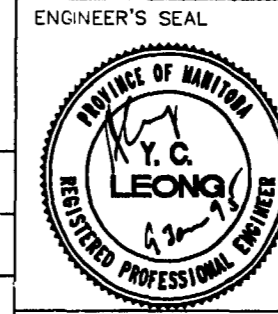


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REID, CROWTHER & PARTNERS LIMITED
WINNIPEG
AS CONSTRUCTED
SIG. *Ally* DATE Nov. 29/94

B.M. ELEV.	69-006 237.636 m
DESIGNED BY	PAL
CHECKED BY	
DRAWN BY	SC/GGB
APPROVED BY	
HOR. SCALE:	N.T.S.
VERTICAL:	
RELEASED FOR CONSTRUCTION:	
NO. REVISIONS	DATE BY
1	AS CONSTRUCTED 94,09,26 DJT
0	ISSUED FOR TENDER 91,06,17 PAL
DATE	94-09-13

Reid Crowther

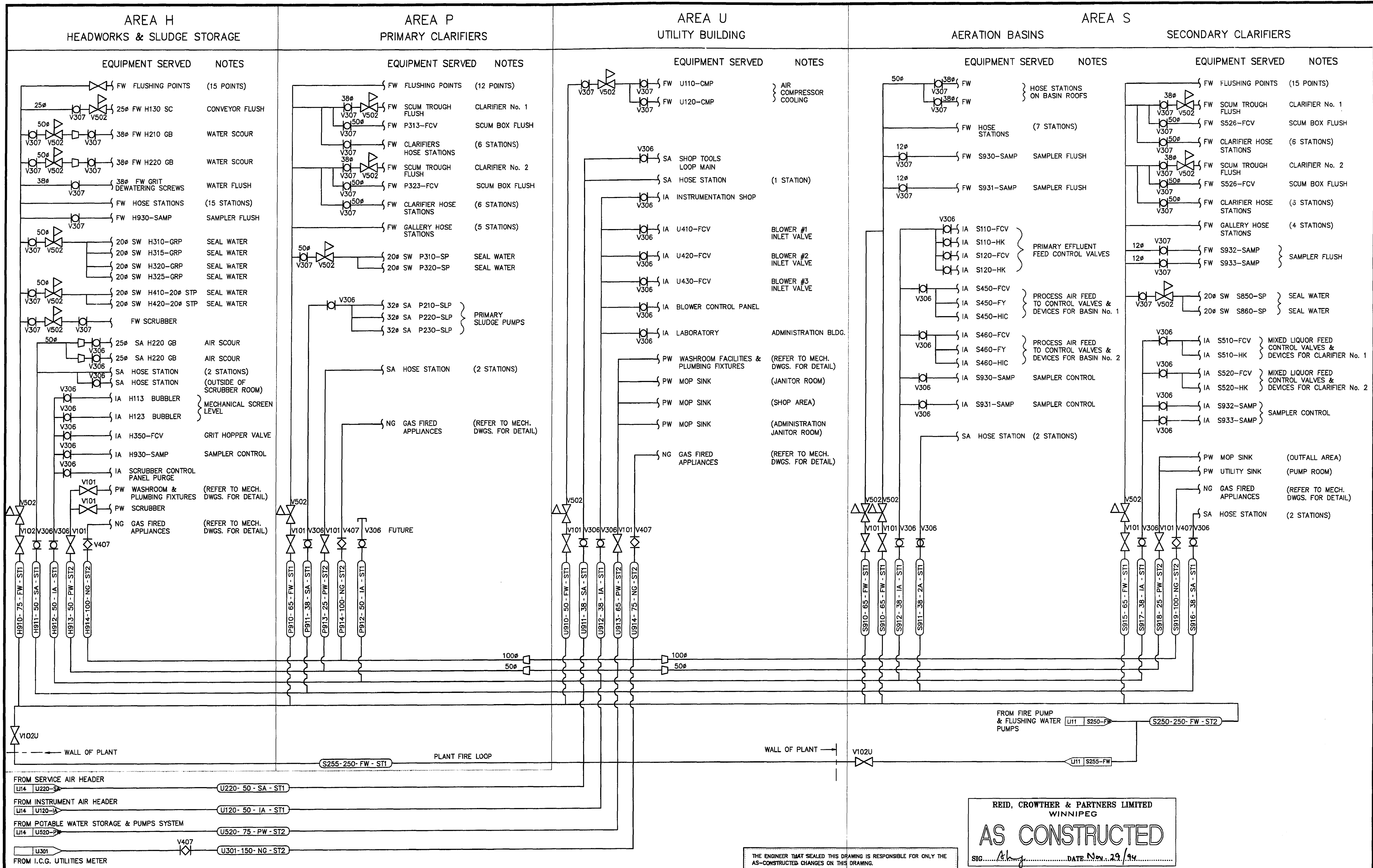


THE CITY OF WINNIPEG
WORKS AND OPERATIONS DIVISION
WATERWORKS WASTE AND DISPOSAL DEPT.

WEST END WATER POLLUTION CONTROL CENTRE
AREA L - GENERAL AND SITWORKS

PROCESS PIPING LEGEND & ABBREVIATIONS
WEP-69

File # W510119



- NOTES:**
- THIS DRAWING INDICATES SCHEMATICALLY THE SERVICE PIPING. SERVICE PIPING INCLUDES:
 - FW - FLUSHING WATER
 - IA - INSTRUMENT AIR
 - NG - NATURAL GAS
 - PW - POTABLE WATER
 - SA - SERVICE AIR
 - SW - SEAL WATER
 - SERVICE PIPING IS SHOWN ON THIS DRAWING TO THE VICINITY OF THE EQUIPMENT BEING SERVED.
 - REFER TO THE PROCESS AND INSTRUMENTATION IN DIAGRAMS FOR THE CONTINUATION OF THE SERVICE PIPING BEYOND THE POINTS SHOWN ON THIS DRAWING. PROVIDE ALL PIPING, FITTINGS, VALVING, ETC. TO PROVIDE COMPLETE AND OPERATIONAL SERVICE PIPING SYSTEMS.
 - WHEREVER POSSIBLE, SERVICE PIPING HAS BEEN INDICATED ON THE PROCESS AND MECHANICAL DRAWINGS. HOWEVER, BECAUSE SOME OF THE PIPING, FITTINGS AND VALVING IS SMALL SIZE, NO ATTEMPT HAS BEEN MADE TO INDICATE THE COMPLETE SYSTEMS ON THE PROCESS AND MECHANICAL DRAWINGS.
 - VALVES ON THE SERVICE PIPING SYSTEM SHALL BE LOCATED IN THE FIELD.

THE ENGINEER THAT SEALED THIS DRAWING IS RESPONSIBLE FOR ONLY THE AS-CONSTRUCTED CHANGES ON THIS DRAWING.
 THE ORIGINAL DESIGN WAS THE RESPONSIBILITY OF THE DESIGN ENGINEER WHO SEALED THE ISSUED FOR TENDER DRAWINGS IN 1991.

REID, CROWTHER & PARTNERS LIMITED
 WINNIPEG
AS CONSTRUCTED
 SIG: *[Signature]* DATE: Nov. 29/94

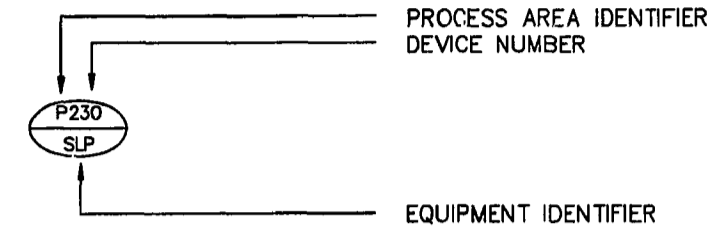
B.M. ELEV. 69-006 237.636 m	Reid Crowther	ENGINEER'S SEAL Y.C. LEONG REGISTERED PROFESSIONAL ENGINEER	THE CITY OF WINNIPEG WORKS AND OPERATIONS DIVISION WATERWORKS WASTE AND DISPOSAL DEPT.
DESIGNED BY	CHECKED BY	WEST END WATER POLLUTION CONTROL CENTRE	CITY DRAWING NUMBER
DRAWN BY GGB/SC	APPROVED BY	AREA L - GENERAL AND SITWORKS	SHEET OF
1 AS CONSTRUCTED 94.09.26 DJT	HOR. SCALE: N.T.S.	RELEASED FOR CONSTRUCTION:	CONSULTANT DRAWING NO. 60910 - LP3
0 ISSUED FOR TENDER 91.06.17 PAL	DATE 94-09-26	DATE	SERVICE PIPING PROCESS DIAGRAM
NO. REVISIONS	DATE	DATE	WEP-70

File # WS10120

LEGEND

SANITARY DRAIN BELOW SLAB	----			
SANITARY DRAIN ABOVE SLAB	_____			
ACID DRAIN	— AD —			
DOMESTIC COLD WATER	----			
DOMESTIC HOT WATER	-----			
DOMESTIC HOT WATER RECIRC.	-----			
LABORATORY VACUUM	— LV —			
LABORATORY WATER	— LW —			
INSTRUMENT AIR	— IA —			
ACID VENT	--- AV ---			
VENT	--- V ---			
HEATING GLYCOL SUPPLY	— GLS —			
HEATING GLYCOL RETURN	— GLR —			
NATURAL GAS	--- NG ---			
BALL OR GATE VALVE				
GLOBE VALVE				
PRESSURE REDUCING VALVE				
BALANCING VALVE				
GAS COCK				
CHECK VALVE				
REDUCED PRESSURE BACKFLOW PREVENTOR				
STRAINER				
CLEAN OUT	C.O.			
FLUSH MOUNT CLEANOUT	C.O. ⊕			
FLOOR DRAIN	⊕ FD-1 & FD-3			
FUNNEL FLOOR DRAIN	⊕ FD-2			
RUNNING TRAP	⊕			
PUMP				
MOTORIZED DAMPER				
FIRE DAMPER				
BACKDRAFT DAMPER				
BALANCING DAMPER				
CONTROL SWITCH				
THERMOSTAT				
DIFFUSERS AND GRILLES	<table border="1"><tr><td>TYPE</td></tr><tr><td>SIZE</td></tr><tr><td>CAPACITY</td></tr></table>	TYPE	SIZE	CAPACITY
TYPE				
SIZE				
CAPACITY				
SUPPLY AIR				
RETURN AIR				
EXHAUST AIR				

EQUIPMENT IDENTIFICATION



- ACU AIR CLEANING UNIT
- AHU AIR HANDLING UNIT
- AEF AXIAL EXHAUST FAN
- CP CIRCULATING PUMP
- CU CONDENSING UNIT
- CUH CABINET UNIT HEATER
- DWH DOMESTIC HOT WATER HEATER
- EF EXHAUST FAN
- EX EXPANSION TANK
- FAF FORCED AIR FURNACE
- HP HAND PUMP
- HPT HYDROPNEUMATIC TANK
- GH GLYCOL HEATER
- GP GLYCOL PUMP
- MUA MAKE-UP AIR UNIT
- PBP PRESSURE BOOSTER PUMP
- PWH PRESSURE WASH HEATER
- PWP POTABLE WATER PUMP
- PWT POTABLE WATER TANK
- SCU SPOT COOLING UNIT
- SMP SUMP PUMP
- UH UNIT HEATER

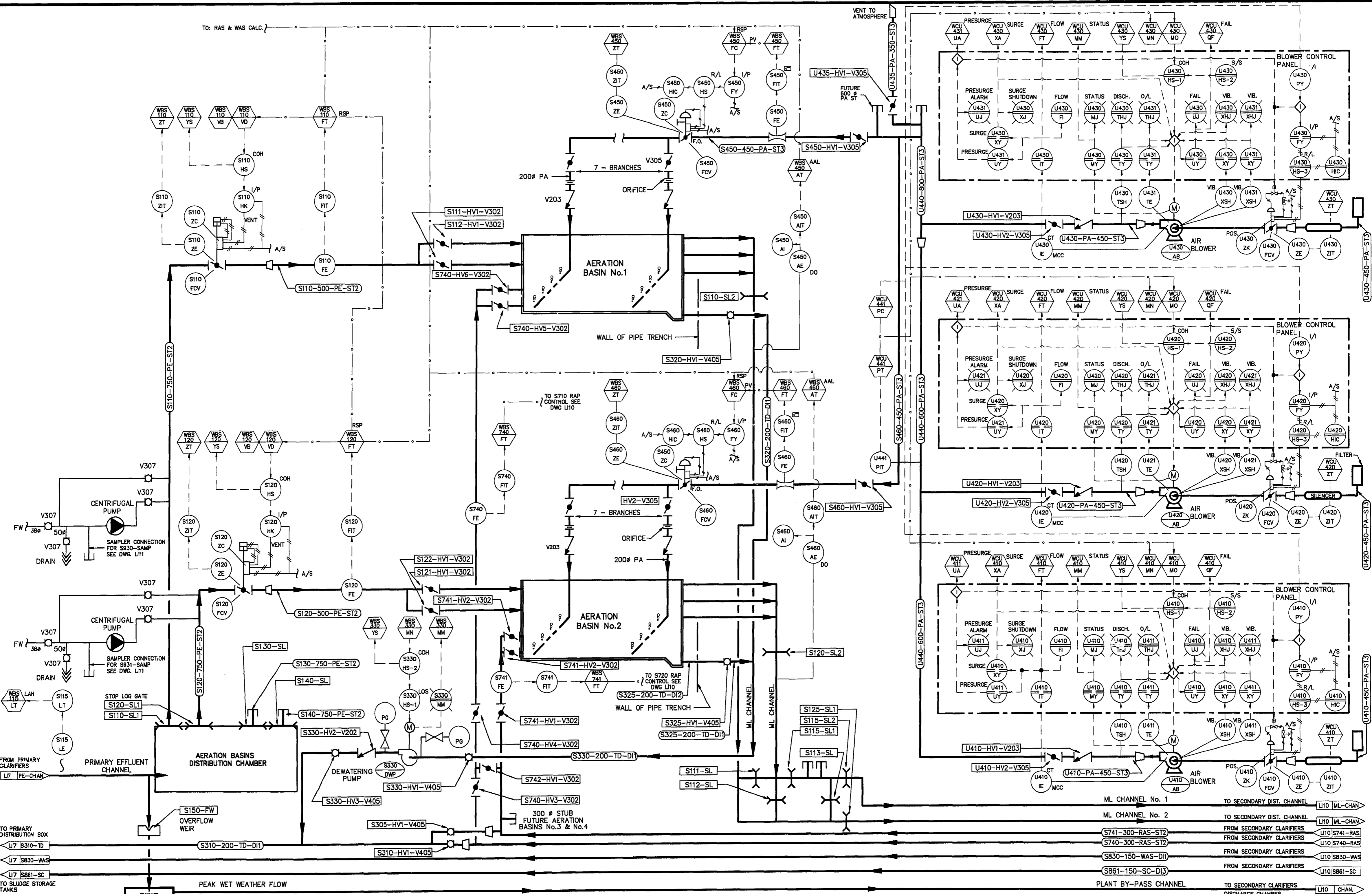
THE ENGINEER THAT SEALED THIS DRAWING IS RESPONSIBLE FOR ONLY THE AS-CONSTRUCTED CHANGES ON THIS DRAWING.
THE ORIGINAL DESIGN WAS THE RESPONSIBILITY OF THE DESIGN ENGINEER WHO SEALED THE ISSUED FOR TENDER DRAWINGS IN 1991.

REID, CROWTHER & PARTNERS LIMITED
WINNIPEG
AS CONSTRUCTED
SIG: *[Signature]* DATE: *DEC 3/99*

WEWPC-1
PAL-AT
94-11-02

B.M. 69-006 ELEV. 237.636 m		Reid Crowther		ENGINEER'S SEAL 		THE CITY OF WINNIPEG WORKS AND OPERATIONS DIVISION WATERWORKS WASTE AND DISPOSAL DEPT.	
DESIGNED BY SR		CHECKED BY		CONSULTANT DRAWING NO. 60910 - LM1		WEST END WATER POLLUTION CONTROL CENTRE	
DRAWN BY SR		APPROVED BY				AREA L - GENERAL AND SITEWORKS	
HOR. SCALE: 1:1		RELEASED FOR CONSTRUCTION:		CITY DRAWING NUMBER		SHEET OF	
VERTICAL:		DATE 94-09-13		MECHANICAL LEGEND & ABBREVIATIONS		WEP-76	
NO. REVISIONS		DATE BY		1 AS CONSTRUCTED 94,09,26 DJT			
0 ISSUED FOR TENDER 91,06,17 PAL							

File # WS 10126



DEWATERING PUMP DESIGN PARAMETERS
 TYPE: CENTRIFUGAL RECESSED IMPELLER
 No. OF UNITS: 1
 CAPACITY: 60L/sec @ 8.23 TDH
 PUMP SPEED: 1750 RPM
 MOTOR HP: 18.84 kW

AERATION SYSTEM AIR BLOWER DESIGN PARAMETERS
 TYPE: CENTRIFUGAL
 No. OF UNITS: 2 DUTY, 1 STANDBY
 CAPACITY: 150 m³/min (EACH)
 DISCH. PRES.: 82 Pa
 RATED PWR: 200 kW EACH (APPROX.)
 RATED VOLTAGE: 480VAC

AERATION BASIN DESIGN PARAMETERS
 No. OF UNITS: 2
 VOLUME: 5,125 m³ (EACH TANK)
 DIMENSIONS: LENGTH - 43.2m WIDTH - 21.6m
 SIDEWATER DEPTH - 5.5m
 SRT: 3.8 TO 8 DAYS
 MLSS: 1820 TO 3000 mg/l
 F/M RATIO: 0.29 TO 0.45

REID, CROWTHER & PARTNERS LIMITED
 WINNIPEG
AS CONSTRUCTED
 SIG. _____ DATE: _____

B.M. ELEV.	69-006	237.636 m
DESIGNED BY	KAC/BAR	CHECKED BY
DRAWN BY	BAR	APPROVED BY
HR. SCALE:	N.T.S.	RELEASED FOR CONSTRUCTION:
VERTICAL:	N.T.S.	DATE
NO. REVISIONS	DATE	BY

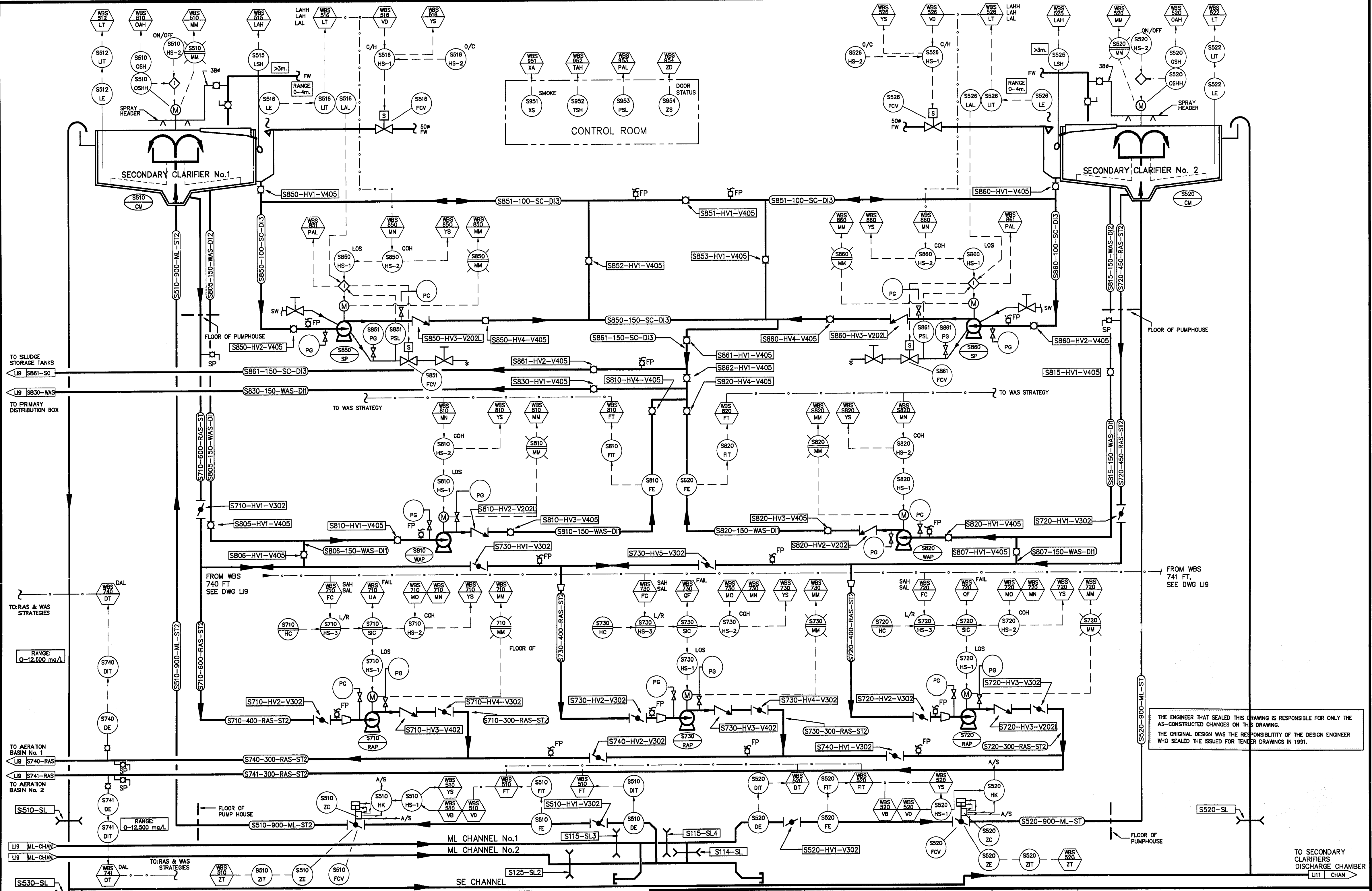
Reid Crowther
 DESIGNED BY: KAC/BAR
 CHECKED BY: _____
 DRAWN BY: BAR
 APPROVED BY: _____
 HR. SCALE: N.T.S.
 VERTICAL: N.T.S.
 RELEASED FOR CONSTRUCTION: _____
 DATE: 94-09-26

ENGINEER'S SEAL

 CONSULTANT DRAWING NO. 60910 - LI9

THE CITY OF WINNIPEG
 WORKS AND OPERATIONS DIVISION
 WATERWORKS WASTE AND DISPOSAL DEPT.
 WEST END WATER POLLUTION CONTROL CENTRE
 AREA S - SECONDARY FACILITIES
 PROCESS AND INSTRUMENTATION DIAGRAM No. 9 - AERATION/BLOWERS
 CITY DRAWING NUMBER _____
 SHEET OF _____
WEP-91

File # WS10141



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RETURN ACTIVATED SLUDGE PUMPS DESIGN PARAMETERS

TYPE: CENTRIFUGAL
No. OF UNITS: 2 DUTY, 1 STANDBY
CAP. (EACH): 25.2 L/sec @ 1.22 m TDH (MIN)
PUMP SPEED: 385 RPM
165 L/sec @ 11.70 m TDH (MAX)
PUMP SPEED: 212/870 RPM
MOTOR HP: 22.4 kW

SECONDARY SCUM PUMPS DESIGN PARAMETERS

TYPE: CENTRIFUGAL
No. OF UNITS: 2
CAP. (EACH): 28.8 L/sec @ 9.14m TDH
PUMP SPEED: 1450 RPM
MOTOR HP: 5.6 kW

WASTE ACTIVATED SLUDGE PUMPS DESIGN PARAMETERS

TYPE: CENTRIFUGAL
No. OF UNITS: 2
CAP. (EACH): 31.5 L/sec @ 10.67m TDH
PUMP SPEED: 1275 RPM
MOTOR HP: 7.46 kW

REID, CROWTHER & PARTNERS LIMITED
WINNIPEG

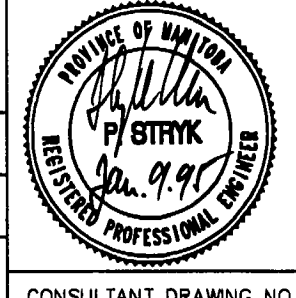
AS CONSTRUCTED

SIG: _____ DATE: APR 29 1994

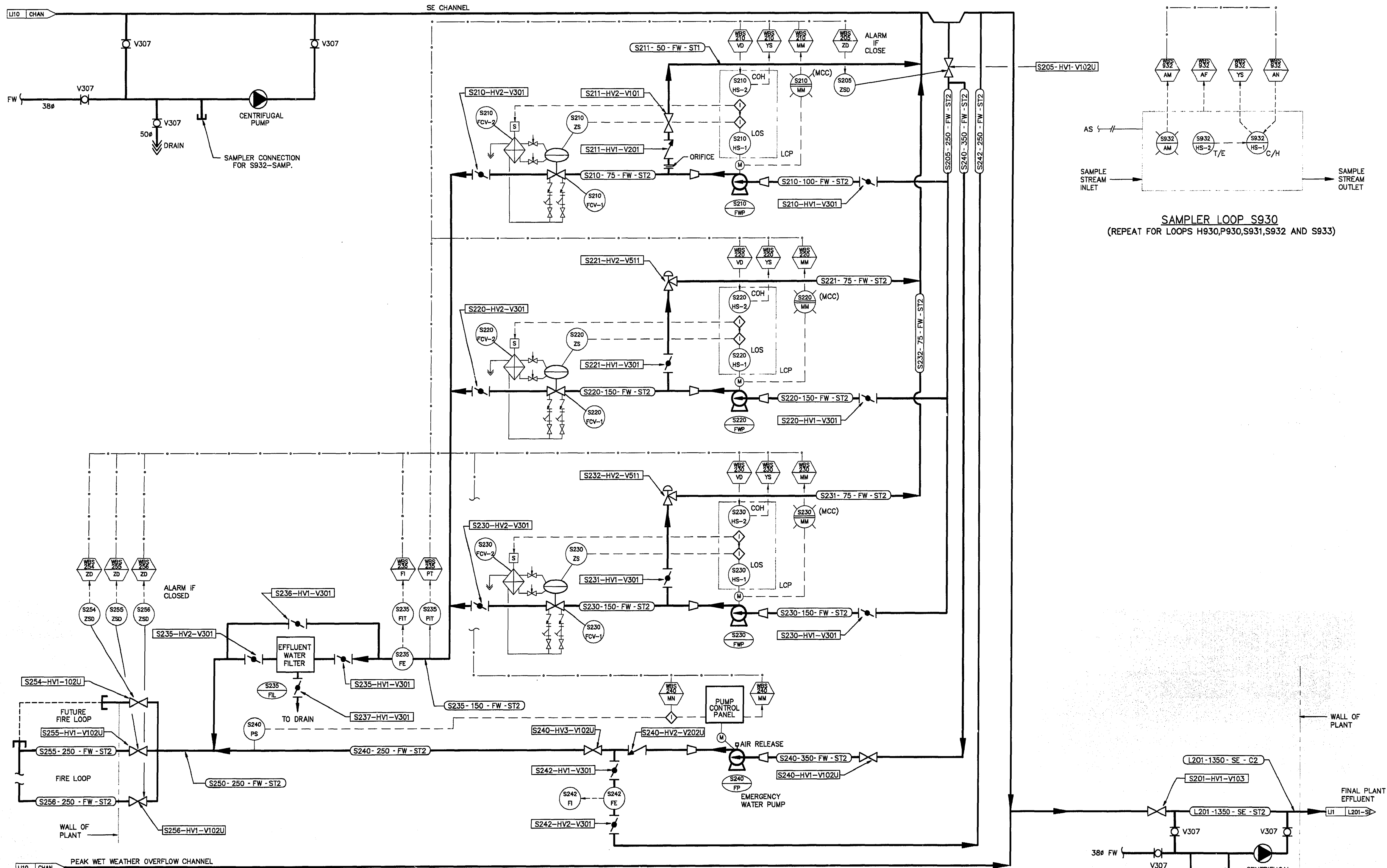
SCUM BOX PARAMETERS
VOLUME: 4m³ EACH BOX

TO SECONDARY CLARIFIERS DISCHARGE CHAMBER
LI11 CHAN

B.M. 69-006
ELEV. 237.636 m

Reid Crowther		ENGINEER'S SEAL 	THE CITY OF WINNIPEG WORKS AND OPERATIONS DIVISION WATERWORKS WASTE AND DISPOSAL DEPT.
DESIGNED BY: KAC/BAR	CHECKED BY:	CONSULTANT DRAWING NO. 60910 - LI10	WEST END WATER POLLUTION CONTROL CENTRE AREA S - SECONDARY FACILITIES
DRAWN BY: BAR	APPROVED BY:		
HOR. SCALE: N.T.S.	RELEASED FOR CONSTRUCTION:	PROCESS AND INSTRUMENTATION DIAGRAM No. 10 - SECONDARY CLARIFIERS	
VERTICAL: N.T.S.	DATE:		
NO. REVISIONS		CITY DRAWING NUMBER SHEET OF	
DATE BY		PROCESS AND INSTRUMENTATION DIAGRAM No. 10 - SECONDARY CLARIFIERS	
DATE 94-09-26		WEP-92	

File # WS 10142



SAMPLER LOOP S930
(REPEAT FOR LOOPS H930, P930, S931, S932 AND S933)

THE ENGINEER THAT SEALED THIS DRAWING IS RESPONSIBLE FOR ONLY THE AS-CONSTRUCTED CHANGES ON THIS DRAWING.
THE ORIGINAL DESIGN WAS THE RESPONSIBILITY OF THE DESIGN ENGINEER WHO SEALED THE ISSUED FOR TENDER DRAWINGS IN 1991.

EFFLUENT WATER PUMP DESIGN PARAMETERS
S240 FWP
TYPE: CENTRIFUGAL
CAPACITY: 6.3 l/s @ 39.8m TDH
PUMP RPM: 3500
MOTOR SIZE: 5.6kw

S220 FWP, S230 FWP
TYPE: CENTRIFUGAL
CAPACITY (each): 22.7 l/s @ 56.4m TDH
PUMP RPM: 3500 RPM
MOTOR SIZE: 22.4kw

EMERGENCY WATER PUMP DESIGN PARAMETERS
S240-EWP
TYPE: CENTRIFUGAL
CAPACITY: 128.1 l/sec @ 41.1m TDH
PUMP RPM: 3500
MOTOR SIZE: 75kw

EFFLUENT WATER FILTER
TYPE: CENTRIFUGAL
MAXIMUM CAPACITY: 50 l/sec
EFFICIENCY: 95% REMOVAL > 1.0mm PARTICLES

REID, CROWTHER & PARTNERS LIMITED
WINNIPEG
AS CONSTRUCTED
DATE: NOV 21/91

B.M. ELEV.	69-006	237.636 m
NO.	REVISIONS	DATE BY
2	AS CONSTRUCTED	94,09,28 DJT
1	ISSUED FOR QUOTATION	SEPT.91 PAL
0	ISSUED FOR TENDER	JUNE.91 PAL

Reid Crowther	
DESIGNED BY	JVH/KC
CHECKED BY	
DRAWN BY	GGB
APPROVED BY	
HOR. SCALE:	N.T.S.
VERTICAL:	N.T.S.
DATE	94-09-26
RELEASED FOR CONSTRUCTION:	
DATE	

ENGINEER'S SEAL
CONSULTANT DRAWING NO. 60910 - L111

THE CITY OF WINNIPEG
WORKS AND OPERATIONS DIVISION
WATERWORKS WASTE AND DISPOSAL DEPT.
WEST END WATER POLLUTION CONTROL CENTRE
AREA S - SECONDARY CLARIFIERS
PROCESS & INSTRUMENTATION DIAGRAM No. 11
FINAL EFFLUENT & FLUSHING WATER SYSTEMS

CITY DRAWING NUMBER
SHEET OF
WEP-93

WEWPC-1
DIN-L11
94-11-04

File # WS10143