DESIGN AND CONSTRUCTION STANDARDS

“SD SERIES” STANDARD DRAWINGS

AMENDMENT 1

ISSUED FOR USE

ISSUE DATE: 30 AUGUST 2019

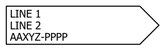
DRAWING No.	REVISION	DRAWING TITLE
1100 SERIES - DRAFTING SYMBOLS AND NOMENCLATURE		
SD-1100-D	A	PIPING AND INSTRUMENTATION DIAGRAM (P&ID) DRAWING SYMBOLS SHEET 1 OF 2
SD-1101-D	A	PIPING AND INSTRUMENTATION DIAGRAM (P&ID) DRAWING SYMBOLS SHEET 2 OF 2
SD-1102-D	B	BULK WATER, WATER & SEWERAGE DESIGN SYMBOLS FOR PLANS AND TIE BOOKS
SD-1103-D	B	BULK WATER, WATER & SEWERAGE LINETYPES AND NOTATION FOR PLANS AND TIE BOOKS
SD-1104-C	A	WATER AND SEWER NETWORK HYDRAULIC CONNECTIONS DRAWING DRAWING EXAMPLE AND REQUIREMENTS
1200 SERIES - PROCESS		
SD-1200-C	B	SEWAGE PUMP STATIONS TYPICAL PIPING AND INSTRUMENTATION DIAGRAM
SD-1203-C	B	ODOUR CONTROL UNIT TYPICAL PROCESS AND INSTRUMENTATION DIAGRAM
1300 SERIES - SIGNAGE, LABELS, PLACARDS, MARKERS		
SD-1300-D	A	SITE SIGNAGE AND SIGNPOSTS NOTES
SD-1301-D	B	SIGNS WITH TWIN POSTS TYPICAL ARRANGEMENTS AND DETAILS
SD-1302-D	A	SIGNS WITH SINGLE POST TYPICAL ARRANGEMENT AND DETAILS
SD-1304-D	B	PROJECT SIGNS - LARGE AND SMALL
SD-1305-D	B	RESTRICTED ACCESS, SURVEILLANCE AND EMERGENCY SIGNS
SD-1306-D	A	WARNING SIGNS
SD-1307-D	A	METERING SIGN
SD-1330-D	B	PIPELINE AND NETWORKS MARKER POSTS, KERB MARKINGS AND LABELS SHEET 1 OF 2
SD-1331-D	B	PIPELINE AND NETWORKS MARKER POSTS, KERB MARKINGS AND LABELS SHEET 2 OF 2
SD-1332-D	B	WATER NETWORK FIRE HYDRANT MARKERS ON ROADS
SD-1380-D	B	WATER NETWORK VALVE DIRECTION OF ROTATION INDICATOR PLATES
2000 SERIES - SEWERAGE NETWORK - PIPELINE LAYOUT		
SD-2005-D	C	SEWERAGE NETWORK PROPERTY CONNECTION DETAILS SEWER TIES SHEET 1 OF 2
SD-2006-D	A	SEWERAGE NETWORK PROPERTY CONNECTION DETAILS SEWER TIES SHEET 2 OF 2
SD-2010-D	A	SEWERAGE NETWORK TYPICAL MAINS CONSTRUCTION TYPICAL MAINS RENEWAL - PIPEBURSTING
SD-2011-D	A	SEWERAGE NETWORK TYPICAL MAINS CONSTRUCTION TYPICAL MAINS RENEWAL - PIPE LINING
2100 SERIES - SEWERAGE AND WATER NETWORK - EMBEDMENT AND TRENCH FILL		
SD-2100-C	B	SEWERAGE AND WATER NETWORKS PIPE EMBEDMENT AND TRENCH FILL MATERIALS
SD-2101-C	B	SEWERAGE AND WATER NETWORKS PIPE EMBEDMENT AND TRENCH FILL TYPICAL ARRANGEMENT
SD-2102-D	B	SEWERAGE AND WATER NETWORKS PIPE EMBEDMENT AND TRENCH FILL GRANULAR AND CEMENT STABILISED EMBEDMENT DETAILS
SD-2103-D	B	SEWERAGE AND WATER NETWORKS PIPE EMBEDMENT AND TRENCH FILL CONCRETE BEDDING AND EMBEDMENT DETAILS
SD-2104-D	B	SEWERAGE AND WATER NETWORKS PIPE EMBEDMENT AND TRENCH FILL BULKHEADS AND TRENCH STOPS DETAILS
SD-2105-D	B	SEWERAGE AND WATER NETWORKS PIPE EMBEDMENT AND TRENCH FILL TRENCH DRAINAGE TYPICAL DETALS
SD-2106-D	A	SEWERAGE AND WATER NETWORKS MINIMUM PIPE COVER AND CLEARANCES STANDARD CONDITIONS AND APPLICATIONS
SD-2107-D	A	SEWERAGE AND WATER NETWORKS WATER MAINS-TO-METER AND SEWER TIE APPLICATIONS TRENCH EMBEDMENT AND BACKFILL DETAILS
2200 SERIES - SEWERAGE NETWORK - BELOW GROUND MAINTENANCE POINTS & STRUCTURES		
SD-2201-D	B	SEWERAGE NETWORK CAST IN SITU MAINTENANCE HOLE 1050 DIA. WITH BRANCHES ARRANGEMENT AND DETAILS
SD-2202-D	B	SEWERAGE NETWORK CAST IN SITU MAINTENANCE HOLE 1050 DIA. WITH EXTERNAL DROP ARRANGEMENT AND DETAILS
SD-2203-D	B	SEWERAGE NETWORK CAST IN SITU MAINTENANCE HOLES 1200 DIA. TO 1500 DIA. ARRANGEMENT AND DETAILS
SD-2204-D	C	SEWERAGE NETWORK PRECAST AND CAST IN SITU MAINTENANCE HOLES 1050, 1200 AND 1500 DIA. COVERS AND SURROUNDS ARRANGEMENT AND FIXING DETAILS
SD-2205-D	B	SEWERAGE NETWORK PRECAST MAINTENANCE HOLES FOR DEPTHS LESS THAN 6000 mm TYPICAL ARRANGEMENT AND BASE DETAILS
SD-2206-D	B	SEWERAGE NETWORK PRECAST MAINTENANCE HOLES FOR DEPTHS LESS THAN 1200 mm TYPICAL ARRANGEMENT
SD-2207-D	B	SEWERAGE NETWORK 1050 DIA. PRECAST MAINTENANCE HOLES TYPICAL COMPONENTS DETAILS
SD-2208-D	B	SEWERAGE NETWORK PRECAST AND CAST IN SITU MAINTENANCE HOLES STANDARD OFFSETS AND BENCHING DETAILS
SD-2209-D	B	SEWERAGE NETWORK SEWER MAINTENANCE SHAFTS (SMS) AND RODDING POINTS TYPICAL ARRANGEMENTS
SD-2210-D	B	SEWERAGE NETWORK PRECAST AND CAST IN SITU MAINTENANCE HOLES PIPE CONNECTION DETAILS
3000 SERIES - WATER NETWORK - PIPELINE LAYOUT		
SD-3010-C	B	WATER NETWORK TYPICAL NEW MAINS CONSTRUCTION POLYETHYLENE MAINS
SD-3011-C	B	WATER NETWORK TYPICAL MAINS RENEWALS - PIPEBURSTING POLYETHYLENE MAINS
SD-3012-C	B	WATER NETWORK TYPICAL NEW MAINS CONSTRUCTION DUCTILE IRON MAINS
SD-3013-C	B	WATER NETWORK TYPICAL NEW MAINS CONSTRUCTION PVC MAINS
SD-3014-C	A	WATER NETWORK TYPICAL NEW MAINS CONSTRUCTION PRESSURE ZONE BOUNDARY ZONE VALVE ARRANGEMENT AND DETAILS
3200 - WATER NETWORK - INSTALLATION PRACTICES AND STRUCTURES		
SD-3201-D	A	WATER NETWORK HIGH CAPACITY HYDRANTS REPLACEMENT OPTIONS TYPICAL ARRANGEMENTS
SD-3202-D	B	WATER NETWORK INGROUND SLUICE VALVE AND HYDRANT INSTALLATIONS TYPICAL DETAILS
SD-3203-C	A	"PASSIVE" PRESSURE REDUCING VALVES VALVE CHAMBER GENERAL ARRANGEMENT AND DETAILS
SD-3204-C	B	"ACTIVE" PRESSURE REDUCING VALVES ABOVE GROUND INSTALLATIONS GENERAL ARRANGEMENT
SD-3205-C	B	"ACTIVE" PRESSURE REDUCING VALVES ABOVE GROUND INSTALLATIONS DETAILS AND NOTES
SD-3206-D	B	WATER NETWORK POTABLE AND NON-POTABLE WATER SAMPLING POINT ARRANGEMENT AND DETAILS
SD-3207-C	B	VALVE CHAMBER TYPICAL REFLUX VALVE INSTALLATION ARRANGEMENT
SD-3208-C	B	VALVE CHAMBER TYPICAL STOP VALVE INSTALLATION ARRANGEMENT
SD-3209-C	B	WATER NETWORK SCOUR INSTALLATIONS GENERAL ARRANGEMENTS AND DETAILS
SD-3210-D	B	WATER NETWORK AIR VALVES AND CONNECTION TO MAINS GENERAL ARRANGEMENT AND DETAILS
3300 SERIES - WATER NETWORK - WATER SERVICE CONNECTIONS		
SD-3306-D	B	WATER SERVICE CONNECTIONS DN20 TO DN40 METERS BELOW GROUND INSTALLATIONS ARRANGEMENT AND CONNECTION DETAILS
SD-3307-C	B	WATER SERVICE CONNECTIONS DN20 TO DN40 METERS ABOVE GROUND INSTALLATIONS ARRANGEMENT AND DETAILS
SD-3308-C	B	WATER SERVICE CONNECTIONS WATER METERS DN50 AND LARGER BELOW GROUND INSTALLATIONS ARRANGEMENT AND CONNECTION DETAILS
SD-3310-C	B	WATER SERVICE CONNECTIONS SINGLE FIRE SERVICE WITH METERED SERVICE BELOW GROUND INSTALLATION ARRANGEMENT AND CONNECTION DETAILS
SD-3312-C	B	WATER SERVICE CONNECTIONS DUAL FIRE SERVICE WITH METERED SERVICE BELOW GROUND INSTALLATION ARRANGEMENT AND CONNECTION DETAILS
SD-3313-C	B	WATER SERVICE CONNECTIONS DUAL FIRE SERVICE WITH METERED SERVICE ABOVE GROUND INSTALLATION ARRANGEMENT AND DETAILS
SD-3314-C	A	WATER SERVICE CONNECTIONS EXAMPLE BELOW GROUND INSTALLATION SINGLE FIRE SERVICE WITH METERED SERVICE
4100 SERIES - SEWAGE PUMPING STATIONS AND PRESSURE MAINS		
SD-4100-C	A	SEWAGE PUMPING STATIONS TYPICAL SITE LAYOUT
SD-4101-C	A	SEWAGE PUMPING STATIONS TYPICAL HYDRAULIC PROFILE
SD-4102-C	A	SEWAGE PUMPING STATIONS TYPICAL SITE PLAN
SD-4103-C	A	SEWAGE PUMPING STATIONS COLLECTION MAINTENANCE HOLE GENERAL ARRANGEMENT AND DETAILS
SD-4104-C	A	SEWAGE PUMPING STATIONS WET WELL AND VALVE PIT GENERAL ARRANGEMENT AND DETAILS
SD-4106-C	A	SEWAGE PUMPING STATIONS FLOWMETER PIT GENERAL ARRANGEMENT AND DETAILS
SD-4108-C	A	SEWAGE PUMPING STATIONS EMERGENCY STORAGE TANK GENERAL ARRANGEMENT AND DETAILS
SD-4110-C	A	SEWAGE PUMPING STATIONS EMERGENCY RELIEF STRUCTURES SECTION AND DETAILS
SD-4111-C	A	SEWAGE PUMPING STATIONS VENTILATION SYSTEM GENERAL ARRANGEMENT AND DETAILS
SD-4112-D	A	SEWAGE PUMPING STATIONS VENTILATION EDUCT VENT STACK AND INDUCT VENT COVER DETAILS
SD-4113-C	A	SEWAGE PUMPING STATIONS TYPICAL PUMP & PRESSURE MAIN CURVES
SD-4114-C	A	SEWAGE PRESSURE MAIN TYPICAL LONGITUDINAL SECTION
SD-4115-D	A	SEWAGE PRESSURE MAIN AIR VALVE ARRANGEMENT AND DETAILS
SD-4116-C	A	SEWAGE PRESSURE MAIN SCOUR INSTALLATIONS GENERAL ARRANGEMENT, PLAN SECTION AND DETAILS
SD-4117-C	A	SEWAGE PRESSURE MAINS DISCHARGE MAINTENANCE HOLE ARRANGEMENT AND DETAILS MAINS DN375 AND SMALLER
5000 SERIES - BURIED AND ABOVE-GROUND PIPELINES - TYPICAL DETAILS		
SD-5001-D	A	PIPELINES THRUST BLOCKS AND ANCHORS GATE VALVE THRUST RESTRAINT TYPICAL DETAILS
SD-5002-D	B	PIPELINES THRUST BLOCKS AND ANCHORS (DN100 - DN750) DETAILS SHEET 1 OF 2
SD-5003-D	B	PIPELINES THRUST BLOCKS AND ANCHORS (DN100 - DN750) DETAILS SHEET 2 OF 2
SD-5004-D	A	PIPELINES RESTRAINED JOINT SYSTEM DUCTILE IRON PIPELINES, DN100 TO DN300
SD-5010-D	A	PIPELINES FLANGED JOINTS CORROSION PROTECTION AND BOLTING DETAILS
SD-5011-D	A	PIPELINES STEEL PIPELINE BUTT WELDED JOINTS DETAILS
SD-5012-D	A	PIPELINES STEEL PIPELINE SPIGOT BANDS FOR RUBBER RING JOINTS DETAILS
SD-5013-D	A	PIPELINES STEEL PIPELINE COLLARS DETAILS
SD-5014-C	A	PIPELINES STEEL PIPELINE ACCESS OPENINGS FOR PIPES DN750 AND ABOVE DETAILS
SD-5015-C	A	PIPELINES STEEL PIPELINES DISMANTLING JOINTS DETAILS

DRAWING No.	REVISION	DRAWING TITLE
SD-5016-D	A	PIPELINES STEEL PIPELINE JOINT CORROSION PROTECTION DETAILS
SD-5017-D	A	PIPELINES PIPE PENETRATION DETAILS TYPE 1 & TYPE 2
SD-5018-D	A	PIPELINES PIPE PENETRATION DETAILS TYPE 3 & TYPE 4
SD-5019-D	A	PIPELINES PIPE PENETRATION DETAILS TYPE 5 & TYPE 6
5300 SERIES - PIPING DETAILS - PIPE SUPPORTS AND OTHER STANDARD PIPING DETAILS		
SD-5301-D	A	PIPE SUPPORTS HOT DIP GALVANISED VERTICAL PIPE SUPPORT - TYPE 1 DETAILS
SD-5302-D	A	PIPE SUPPORTS HOT DIP GALVANISED VERTICAL PIPE SUPPORT - TYPE 2 DETAILS
SD-5303-D	A	PIPE SUPPORTS HOT DIP GALVANISED VERTICAL PIPE SUPPORT - TYPE 3 DETAILS
SD-5304-D	A	PIPE SUPPORTS HOT DIP GALVANISED VERTICAL PIPE SUPPORT - TYPE 4 DETAILS
SD-5305-D	A	PIPE SUPPORTS HOT DIP GALVANISED BRACED CANTILEVER PIPE SUPPORT DETAILS
SD-5306-D	A	PIPE SUPPORTS HOT DIP GALVANISED LIGHT DUTY TYPE DETAILS
5500 SERIES - VALVE & FLOWMETER INSTALLATIONS - ABOVE GROUND		
SD-5500-C	B	RPZD STATION GENERAL ARRANGEMENT AND NOTES
6100 SERIES - RADAR LEVEL SENSORS AND SUPPORTS		
SD-6100-D	B	RESERVOIRS LEVEL SENSOR SUPPORT COLUMN GENERAL ARRANGEMENT AND INSTALLATION DETAILS
SD-6101-D	B	RESERVOIRS LEVEL SENSOR SUPPORT COLUMN COLUMN, LID AND BRACKET DETAILS
8000 SERIES - LADDERS, STAIRS & ASSOCIATED COVERS - TYPICAL ARRANGEMENTS		
SD-8001-C	A	ACCESS COVERS - HOT DIP GALVANISED STEEL FIXED FRAME (FOLD FLAT) COVERS EXAMPLE INSTALLATIONS
SD-8002-C	A	ACCESS COVERS - DROP IN TYPE VERTICAL AND INCLINE RUNG LADDER WITH EXTENDABLE STANCHIONS EXAMPLE INSTALLATIONS
SD-8004-C	A	PORTABLE EDGE PROTECTION AND DAVITS SETUP AROUND HATCHES AND COVERS EXAMPLE INSTALLATIONS SHEET 1 OF 2
SD-8005-C	A	PORTABLE EDGE PROTECTION AND DAVITS SETUP AROUND HATCHES AND COVERS EXAMPLE INSTALLATIONS SHEET 2 OF 2
SD-8006-C	A	GAS TIGHT COVERS EXAMPLE INSTALLATIONS
8100 SERIES - LADDERS, STAIRS & STEP IRONS		
SD-8101-D	A	HOT DIP GALVANISED STEEL LADDERS FIXED VERTICAL RUNG LADDER WITH FIXED STANCHIONS ASSEMBLY AND DETAILS
SD-8102-D	A	HOT DIP GALVANISED STEEL LADDERS FIXED VERTICAL RUNG LADDER WITH PULL-UP STANCHIONS ASSEMBLY AND DETAILS
SD-8103-D	A	HOT DIP GALVANISED STEEL LADDERS FIXED INCLINED RUNG LADDER WITH FIXED STANCHIONS ASSEMBLY AND DETAILS
SD-8104-D	A	HOT DIP GALVANISED STEEL LADDERS FIXED INCLINED RUNG LADDER WITH PULL-UP STANCHIONS ARRANGEMENT AND DETAILS
SD-8105-D	A	HOT DIP GALVANISED STEEL LADDERS FIXED INCLINED STEP LADDER FIXED STANCHIONS ARRANGEMENTS AND DETAILS
SD-8106-D	A	HOT DIP GALVANISED STEEL LADDERS FIXED INCLINED STEP LADDER - EXTENDABLE STANCHIONS ARRANGEMENT AND DETAILS
SD-8107-D	A	HOT DIP GALVANISED STEEL LADDERS FIXED INCLINED RUNG LADDER WITH FIXED STANCHIONS ARRANGEMENT AND DETAILS
SD-8108-D	B	ACCESS LADDERS (FIXED VERTICAL) AND STAGGERED STEP-IRONS FOR MAINTENANCE HOLES DETAILS
SD-8151-D	A	LADDER LOCKS FOR PORTABLE LADDERS RETAINING PLATE - CONCRETE STRUCTURE MOUNTED ASSEMBLY AND DETAILS
SD-8152-D	A	LADDER LOCKS FOR PORTABLE LADDERS RETAINING PLATE - STEEL STRUCTURE MOUNTED ASSEMBLY AND DETAILS
SD-8153-D	A	HOT DIP GALVANISED STEEL LADDERS BRACKETS, RUNGS, TREADS AND FITTINGS DETAILS
SD-8154-D	A	HOT DIP GALVANISED STEEL LADDERS STANCHIONS - EXTENDABLE DETAILS SHEET 1 OF 2
SD-8155-D	A	HOT DIP GALVANISED STEEL LADDERS STANCHIONS - EXTENDABLE DETAILS SHEET 2 OF 2
8200 SERIES - ACCESS HATCHES AND COVERS		
SD-8201-D	A	FLUSH FIT ACCESS COVERS ALUMINIUM, HINGED GENERAL ARRANGEMENT
SD-8203-D	A	FLUSH FIT ACCESS COVERS ALUMINIUM, HINGED BOLT-IN FRAME DETAILS
SD-8204-D	A	FLUSH FIT ACCESS COVERS ALUMINIUM, HINGED COVER DETAILS
SD-8211-D	A	GAS-TIGHT ACCESS COVERS ALUMINIUM, HINGED GENERAL ARRANGEMENT
SD-8212-D	A	GAS-TIGHT ACCESS COVERS ALUMINIUM, HINGED ASSEMBLY AND DETAILS
SD-8213-D	B	GAS-TIGHT ACCESS COVERS ALUMINIUM, HINGED GRATE INSERT DETAILS
SD-8214-D	B	GAS-TIGHT ACCESS COVERS ALUMINIUM, HINGED TYPICAL INSTALLATION
SD-8215-D	A	ACCESS COVERS ALUMINIUM, HINGED SEWAGE PUMPING STATIONS, WET WELL ACCESS ARRANGEMENT
SD-8216-D	A	ACCESS COVERS ALUMINIUM, HINGED SEWAGE PUMPING STATIONS, WET WELL ACCESS FRAME DETAILS
SD-8217-D	A	ACCESS COVERS ALUMINIUM, HINGED SEWAGE PUMPING STATIONS, WET WELL ACCESS SAFETY GRATE DETAILS
SD-8218-D	A	GAS-TIGHT ACCESS COVERS ALUMINIUM, HINGED INSTRUMENTATION HATCH ARRANGEMENT AND DETAILS
SD-8231-D	A	FLUSH FIT ACCESS COVERS - HOT DIP GALVANISED STEEL HINGED FOR VERTICAL RUNG LADDERS ARRANGEMENT
SD-8232-D	A	FLUSH FIT ACCESS COVERS - HOT DIP GALVANISED STEEL HINGED FOR VERTICAL RUNG LADDERS FRAME DETAILS
SD-8233-D	A	FLUSH FIT ACCESS COVERS - HOT DIP GALVANISED STEEL HINGED FOR VERTICAL RUNG LADDERS COVER DETAILS
SD-8234-D	A	FLUSH FIT ACCESS COVERS - HDG AND ALUMINIUM HINGED FOR INCLINED RUNG AND STEP LADDERS ARRANGEMENT
SD-8235-D	A	FLUSH FIT ACCESS COVERS - HDG AND ALUMINIUM HINGED FOR INCLINED RUNG AND STEP LADDERS FRAME DETAILS
SD-8236-D	A	FLUSH FIT ACCESS COVERS - HDG AND ALUMINIUM HINGED FOR INCLINED RUNG AND STEP LADDERS COVER DETAILS
SD-8240-D	A	ROUND VALVE CHAMBER COVER ARRANGEMENT
SD-8241-D	B	ACCESS COVERS RURAL/SEMI-RURAL ROUND VALVE CHAMBERS COVER DETAILS
SD-8251-D	A	ACCESS COVERS - ALUMINIUM, HINGED HANDLE DETAILS
SD-8253-D	A	ACCESS COVERS - ALUMINIUM, HINGED HINGE AND STAY DETAILS
SD-8255-D	A	ACCESS COVERS - ALUMINIUM, HINGED LOCK BOX - SLIDE BOLT STYLE DETAILS
SD-8256-D	A	ACCESS COVERS - ALUMINIUM, HINGED LOCK BOX - LOCKING PLATE STYLE DETALS
SD-8257-D	A	ACCESS COVERS - ALUMINIUM, HINGED LOCK BOX - STANCHION LOCKING BAR TYPE DETAILS
SD-8261-D	A	ACCESS COVERS - HDG AND ALUMINIUM, HINGED LIFTING HANDLES DETAILS
SD-8263-D	A	ACCESS COVERS - HOT DIP GALVANISED STEEL, HINGED HINGE AND STAY DETAILS
SD-8265-D	A	ACCESS COVERS - HOT DIP GALVANISED STEEL, HINGED LOCK BOX SLIDE BOLT TYPE DETAILS
SD-8266-D	A	ACCESS COVERS - HOT DIP GALVANISED STEEL, HINGED LOCK BOX LOCKING PLATE TYPE DETAILS
SD-8267-D	A	ACCESS COVERS - HOT DIP GALVANISED STEEL, HINGED LOCK BOX - STANCHION LOCKING BAR TYPE DETAILS
SD-8270-C	B	ACCESS COVERS - HOT DIP GALVANISED STEEL DROP IN FRAME TYPICAL ARRANGEMENT
SD-8271-C	A	ACCESS COVERS - HOT DIP GALVANISED STEEL DROP IN FRAME DETAILS
SD-8273-C	A	ACCESS COVERS - HOT DIP GALVANISED STEEL FIXED FRAME (FOLD FLAT) COVER TYPICAL ARRANGEMENTS
SD-8274-C	A	ACCESS COVERS - HOT DIP GALVANISED STEEL FIXED FRAME (FOLD FLAT) COVER FRAME DETAILS
SD-8275-C	B	ACCESS COVERS - HOT DIP GALVANISED STEEL FIXED FRAME (FOLD FLAT) COVER HINGED HATCH - GRATED DETAILS
SD-8276-C	B	ACCESS COVERS - HOT DIP GALVANISED STEEL FIXED FRAME (FOLD FLAT) COVER HINGED HATCH - PLATE DETAILS
SD-8281-D	A	ACCESS COVERS - HOT DIP GALVANISED STEEL DROP IN AND FIXED FRAME STANDARD PARTS DETAILS
8400 SERIES - FALL PREVENTION - DAVITS, ANCHOR POINTS AND GUARDRAILING		
SD-8400-C	A	PERMANENT DAVIT BASES (DBI SALA) INSTALLATION INTO / ON UNREINFORCED CONCRETE GENERAL NOTES
SD-8401-C	A	PERMANENT DAVIT BASES (DBI SALA) 12 kN INSTALLATION INTO / ON UNREINFORCED CONCRETE DETAILS SHEET 1 OF 2
SD-8402-C	A	PERMANENT DAVIT BASES (DBI SALA) 12 kN INSTALLATION INTO / ON UNREINFORCED CONCRETE DETAILS SHEET 2 OF 2
SD-8403-D	B	PERMANENT DAVIT BASES (DBI SALA) CERTIFICATION PLATE
SD-8404-C	A	PERMANENT DAVIT BASES (DBI SALA) 15 kN INSTALLATION INTO / ON UNREINFORCED CONCRETE DETAILS SHEET 1 OF 2
SD-8405-C	A	PERMANENT DAVIT BASES (DBI SALA) 15 kN INSTALLATION INTO / ON UNREINFORCED CONCRETE DETAILS SHEET 2 OF 2
SD-8406-C	A	PERMANENT DAVIT BASES (DBI SALA) PREFERRED LOCATIONS AT HATCHES AND COVERS
9000 SERIES - SITE SECURITY AND ACCESS - FENCING, GATES, BOLLARDS AND BARRIERS		
SD-9000-D	A	SITE SECURITY AND PROTECTION CHAINLINK FENCE GENERAL ARRANGEMENT AND NOTES
SD-9001-D	A	SITE SECURITY AND PROTECTION CHAINLINK FENCE DETAILS
SD-9010-D	A	SITE SECURITY AND PROTECTION BOLLARDS TYPICAL INSTALLATION
SD-9011-D	A	SITE SECURITY AND PROTECTION BOLLARDS HEAVY DUTY BOLLARDS GALVANISED MILD STEEL
SD-9012-D	A	SITE SECURITY AND PROTECTION BOLLARDS STANDARD DUTY BOLLARDS GALVANISED MILD STEEL
SD-9013-D	A	SITE SECURITY AND PROTECTION BOLLARDS REMOVABLE BOLLARDS GALVANISED MILD STEEL
9100 SERIES - STEELWORK & ALUMINIUM WORK - MISCELLANEOUS		
SD-9100-D	A	STEELWORK NOTES
SD-9103-D	A	ALUMINIUM WORK NOTES
9300 SERIES - EARTH & CONCRETE WORKS - MISCELLANEOUS		
SD-9300-D	A	CONCRETE WORK NOTES
SD-9302-C	A	CIVIL WORKS SOIL CLASSIFICATION GUIDELINES
9400 SERIES - MECHANICAL & PIPING - MISCELLANEOUS		
SD-9410-D	A	PIPEWORK NOTES

00. LINE TYPES LEGEND

- MAIN PROCESS LINE
- SECONDARY PROCESS LINE
- INSULATED / LAGGED PROCESS LINE
- PROCESS LINE DOUBLE CONTAINED
- FLEXIBLE HOSE LINE
- OPEN OR COVERED CONCRETE CHANNEL
- INSTRUMENT SUPPLY OR CONNECTION TO PROCESS
- UNDEFINED SIGNAL
- PNEUMATIC SIGNAL
- ELECTRICAL SIGNAL
- ELECTRICAL BINARY SIGNAL - DIGITAL
- ELECTROMAGNETIC OR SONIC SIGNAL
- CAPILLARY TUBING
- HYDRAULIC SIGNAL

01. LABELLING



- PROCESS FLOW CONTINUATION FLAG - 3 LINES IN LEFT / OUT RIGHT
- 8301PU — EQUIPMENT NUMBER DISPLAY
- DIRECTION OF FLOW / ARROW
- CONNECTION (OF LINES)
- PROCESS LINE CROSSOVER

- PIPE SPECIFICATION CHANGE POINT

- TERMINATION POINT

- LIMIT OF CONTRACT

- PIPE TO INSTRUMENTATION SPECIFICATION CHANGE POINT

- INTERFACE POINT ABOVE GROUND & UNDERGROUND BURIED

02. PIPELINE FITTINGS

- REDUCER
- HOSE CONNECTION FEMALE
- HOSE CONNECTION MALE
- END CAP
- BLANKED FLANGE
- FLANGED JOINT
- PLUGGED SOCKET
- HOSE COUPLING
- BELLOWS OR EXPANSION JOINT
- FLANGED VALVE
- TRAP
- WATER TRAP
- STRAINER, Y-TYPE (FLANGED)
- TRAPPED VENT

02. PIPELINE FITTINGS CONT.

- OPEN VENT (GIVE NOTE IF RUN TO GRADE)
- OPEN DRAIN
- OVERFLOW (EG. TANK)
- SYPHON DRAIN
- TUNDISH / DRAIN
- STRAINER, GENERAL SYMBOL
- BURSTING DISC
- SPECTACLE BLIND, NORMALLY CLOSED
- SPECTACLE BLIND, NORMALLY OPEN
- SPADE BLIND (OR SLIP BLIND)
- SPACER
- SPRAY HEADER OR DIFFUSER
- SPRAY NOZZLE

- RUPTURE DISK (OR BURSTING DISC) PRESSURE RELIEF

- RUPTURE DISK (OR BURSTING DISC) VACUUM RELIEF

03. VALVES

- VALVE SIZE INDICATED ABOVE VALVE (GENERAL SYMBOL) TAG No. INDICATED BELOW
- GATE VALVE
- BALL VALVE
- GLOBE VALVE
- NEEDLE VALVE
- REDUCING VALVE
- DIAPHRAGM VALVE
- REDUCED PRESSURE ZONE DEVICE
- PENSTOCK
- BUTTERFLY VALVE
- PLUG VALVE
- ANGLE VALVE
- ANGLE FLOAT VALVE
- IN-LINE FLOAT VALVE
- KNIFE GATE VALVE
- SLIDE GATE VALVE
- THREE WAY VALVE
- FOUR WAY VALVE

03. VALVES CONT.

- CYLINDER VALVE
- PINCH VALVE
- AIR PURGING DEVICE
- NON-RETURN / CHECK VALVE / REFLUX VALVE
- DOUBLE NON-RETURN CHECK VALVE
- IN-LINE PRESSURE RELIEF VALVE
- PRESSURE VACUUM VALVE
- CIRCULAR GUIDE VANE VALVE
- GAS RELIEF VALVE
- ROTARY VALVE
- CONE VALVE

04. ACTUATORS

- AUTOMATIC ACTUATOR
- AUTOMATIC ACTUATOR WITH POSITIONER
- PISTON ACTUATOR
- PISTON ACTUATOR WITH POSITIONER
- DIAPHRAGM ACTUATOR
- AUTOMATIC DIAPHRAGM ACTUATOR
- PNEUMATIC DIAPHRAGM ACTUATOR
- PRESSURE BALANCED DIAPHRAGM ACTUATOR
- SPRING ACTUATOR - FOR PRESSURE RELIEF OR SAFETY VALVE ONLY
- HANDWHEEL
- SOLENOID
- WEIGHT
- FLOAT

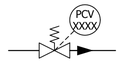
- MOTORISED

- PNEUMATIC ACTUATOR

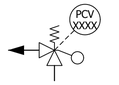
- HYDRAULIC ACTUATOR

- GEARBOX

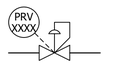
05. SELF ACTUATED REGULATORS AND VALVES



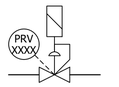
- IN-LINE PRESSURE RELIEF OR SAFETY VALVE SHOWING PRESSURE SETTING



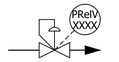
- PRESSURE RELIEF OR SAFETY VALVE SHOWING PRESSURE SETTING



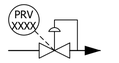
- PRESSURE REGULATING



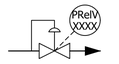
- PUMP CONTROL



- BACK PRESSURE REGULATING



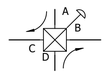
- PRESSURE REGULATING (EXTERNAL TAPPING)



- BACK PRESSURE REGULATING (EXTERNAL TAPPING)

06. ACTUATOR FAIL POSITIONS

- TWO WAY VALVE, FAIL CLOSED
- TWO WAY VALVE, FAIL OPEN



- THREE WAY VALVE, FAIL OPEN TO PATH A-C

- FOUR WAY VALVE, FAIL OPEN TO PATHS A-C & D-B
- ANY VALVE, FAIL LOCKED
- ANY VALVE, FAIL INTERMEDIATE

THE FAILURE MODES INDICATED ARE THOSE COMMONLY DEFINED BY THE TERM "SHELF POSITION".

AS AN ALTERNATIVE TO THE ARROWS AND BARS, THE FOLLOWING ABBREVIATIONS MAY BE EMPLOYED:

FO - FAIL OPEN

FC - FAIL CLOSED

FL - FAIL LOCKED (LAST POSITION)

FI - FAIL INTERMEDIATE

LO - LOCKED OPEN

LC - LOCKED CLOSED

NO - NORMALLY OPEN

NC - NORMALLY CLOSED

07. PUMPS

- PUMP, GENERAL SYMBOL
- PUMP, CENTRIFUGAL
- PUMP, RECIPROCATING
- PUMP, HELICAL ROTOR
- PUMP, ROTARY VANE
- PUMP, DOSING
- PERISTALTIC PUMP
- SUBMERSIBLE PUMP

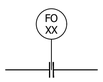
08. MOTORS AND DRIVES

- MOTOR

- TURBINE
- MINI HYDRO

09. FLOW CONTROL DEVICES

- V-NOTCH WEIR
- RECTANGULAR WEIR
- STOPLOG OR BOARD
- SCREEN
- VENTURI



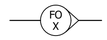
- FLOW ELEMENT, ORIFICE TYPE
- BELLMOUTH

10. MIXING AND FLOCCULATION

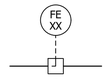
- SUBMERSIBLE MIXER
- AGITATOR, FAN, PROPELLER
- EDUCTOR/INJECTOR/EJECTOR
- AXIAL FLOW MIXER OR FLOCCULATOR
- STATIC IN-LINE MIXER

- AERATOR

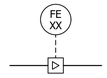
11. INSTRUMENT AND CONTROLS



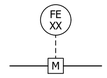
- GENERAL SYMBOL (UNSPECIFIED)



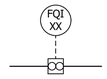
- PITOT TUBE OR ANNUBAR



- VORTEX METER

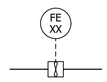


- MAGNETIC FLOWMETER

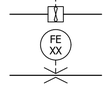


- POSITIVE DISPLACEMENT TYPE FLOWMETER C/W FLOW TOTALIZING INDICATOR

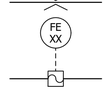
- VARIABLE AREA FLOW INDICATOR



- TURBINE OR PROPELLER METER



- FLUME



- ULTRASONIC FLOWMETER
- DIAPHRAGM SEAL

- I TO P CONVERTER

- INTERLOCK OR LOGIC FUNCTION

- PURGE OR FLUSHING DEVICE

- SELECTOR SWITCH

- RESET OR LATCH TYPE ACTUATOR
- CONTROL SWITCH AND/OR PUSHBUTTON STATION
- FLOAT SWITCH
- AIR SUPPLY FITTING WALL TYPE
- AIR EXHAUST FITTING WALL TYPE
- AIR SUPPLY FITTING CEILING TYPE
- AIR EXHAUST FITTING CEILING TYPE
- FLASHING LIGHT OR SIGNAL LAMP
- ULTRASONIC LEVEL PROBE
- LEVEL SWITCH PADDLE

12. SCREENING

- INCLINED SCREEN (MECH RAKED)

- INCLINED SCREEN (MOTOR RAKED)

- ROTARY FINE SCREEN

- BAND SCREEN

- BASKET STRAINER

- BAR SCREEN

- MECHANICAL VIBRATOR

13. BLOWERS AND COMPRESSORS

- FAN

- BLOWER

- GENERATOR

- ATTENUATOR / SILENCER

- AIR DRYER

- DRYER

- AFTER COOLER
- LUBRICATOR

- FILTER

- DISPOSABLE FILTER

- WASHABLE FILTER

- AIR FILTER

- COMPRESSOR

- DAMPER, SINGLE BLADE

- DAMPER, MULTI BLADE OPPOSED

- DAMPER, MULTI BLADE PARALLEL

- DAMPER, FIRE

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
PIPING AND INSTRUMENTATION DIAGRAM (P&ID)
DRAWING SYMBOLS
SHEET 1 OF 2

DRAWING STATUS: Current

SD-1100-D

A1

ISSUE: A

14. FILTRATION

- SAND FILTER (SHEET MEDIA)
- RAPID GRAVITY SAND FILTER
- MEMBRANE FILTER MODULE

15. SEDIMENTATION TANKS, THICKENERS AND CLARIFIERS

- CIRCULAR THICKENER FLAT BOTTOM
- CIRCULAR THICKENER CONICAL BOTTOM
- RECTANGULAR THICKENER/SEDIMENTATION TANK
- RECTANGULAR GRIT SEPARATION TANK
- CLARIFIER WITH PERIPHERAL LAUNDER
- CLARIFIER WITH RADIAL LAUNDER
- SCUM DRAW OFF
- RAKE SCRAPER
- SURFACE SKIMMER
- SLUDGE ROLLER
- FLIGHT SCRAPER
- SCRAPER (GENERAL)
- SCRAPER (CHAIN & FLIGHT)
- LAGOON

16. SLUDGE TREATMENT

- FILTER PLATE PRESS
- FILTER BELT PRESS
- CENTRIFUGE (HORIZONTAL)
- CENTRIFUGE (BOWL TYPE)

17. SOLIDS HANDLING

- CYCLONE SEPARATOR
- CONVEYOR (BELT TYPE)
- INCLINED CONVEYOR (BELT TYPE)
- CONVEYOR (SCREW TYPE)
- INCLINED CONVEYOR (SCREW TYPE)
- CONVEYOR (BUCKET TYPE)
- WEIGHING MACHINE
- WEIGHBRIDGE OR PLATFORM WEIGHER
- COLLECTOR / HOPPER
- DISINTEGRATOR/MACERATOR

18. CHLORINATION AND DECHLORINATION

- EVAPORATOR
- CHLORINATOR INCLUDING INJECTOR (Cl_2)
- GAS CYLINDER
- ELECTROLYSER (ELECTROLYSER)
- VACUUM REGULATOR (VAC)
- GAS DRUM
- UV LAMP

19. HEAT TRANSFER EQUIPMENT

- HEAT EXCHANGER
- ELECTRIC HEATER
- OIL BURNER
- GAS BURNER
- HEATER
- FLAME ARRESTOR
- BOILER
- FURNACE
- AIR COOLED CONDENSER
- DOUBLE PIPE HEAT EXCHANGER
- PLATE HEAT EXCHANGER
- FIN TUBE HEAT EXCHANGER
- VAPOURISER

20. GRIT AND OIL REMOVAL

- MECHANICAL CLASSIFIER
- GRIT CLASSIFIER (SCREW TYPE)

21. EQUIPMENT (MISC.)

- INSECT SCREENED VENT
- FIRE EXTINGUISHER
- SKIP BIN
- FIRE HOSE REEL
- HOSE COCK
- FIRE HYDRANT (HYDRANT)
- SCREW DOWN HYDRANT
- DELUGE SHOWER
- EYE WASH
- SAFETY SHOWER & EYE WASH
- CARBOY/CONTAINER
- CALIBRATION CYLINDER
- SIGHT LEVEL INDICATOR
- SIGHT LEVEL INDICATOR WITH GAUGE
- WHEELY BIN
- AUTOMATIC SAMPLER
- WATER SURFACE LEVEL
- HORN

21. EQUIPMENT (MISC.) CONT.

- FIXED HOIST (HAND OPERATED)
- TRAVELING HOIST
- OVERHEAD CRANE
- ELECTRICAL PLUG AND SOCKET
- SPRING

22. STORAGE AND PRESSURE VESSELS

- STORAGE TANK
- OPEN TANK
- OPEN TANK WITH COVER
- SEALED TANK
- SILO (BASIC SYMBOL)
- INSPECTION HATCH / MAINTENANCE HATCH
- ACCUMULATOR BOTTLE/PULSATION DAMPENER

22. STORAGE AND PRESSURE VESSELS CONT.

- ACCUMULATOR OR PULSATION DAMPENER
- PRESSURE VESSEL
- SCRUBBER WITH DEMIST PAD
- ODOUR ABSORPTION TOWER WITH DEMIST PAD AND MEDIA OR BIOTRICKLING FILTER
- ADSORPTION COLUMN OR TOWER
- HORIZONTAL TANK
- CONTACT TANK

23. WATER AND SEWAGE COMBINED FLUID CODES

1. REFER TO STD-SPE-M-002 FOR THE APPLICATION OF WATER AND SEWAGE TREATMENT FLUID CODES AS WELL AS VALVE AND PIPING IDENTIFICATION CODES.
2. REFER TO WORK INSTRUCTION WI05.14.04 TITLED "ENGINEERING ASSET IDENTIFICATION" FOR THE APPLICATION OF ASSET LABELING AND EQUIPMENT IDENTIFICATION CODES.

24. INSTRUMENTATION & CONTROL

	FIELD MOUNTED	PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR	LOCATION NORMALLY ACCESSIBLE TO OPERATOR	NORMALLY NOT ACCESSIBLE TO OPERATOR (BEHIND THE PANEL)
DISCRETE INSTRUMENTS	X / X	X / X	X / X	X / X
COMPUTER FUNCTION	X / X	X / X	X / X	X / X
SHARED DISPLAY SHARED CONTROL	X / X	X / X	X / X	X / X
PROGRAMMABLE LOGIC CONTROL (PLC)	X / X	X / X	X / X	X / X

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
PIPING AND INSTRUMENTATION DIAGRAM (P&ID)
DRAWING SYMBOLS
SHEET 2 OF 2

DRAWING STATUS: Current

SD-1101-D

A1

ISSUE: A

VALVES

			WATER	SEWER
	GATE VALVE		X	X
FUNCTIONALITY	ALT	ALTITUDE	X	
	BAV	BACKUP ALTITUDE	X	
		KNIFE	X	X
	M	MOTORISED	X	X
	M	MOTORISED - NORMALLY CLOSED	X	X
		NORMALLY CLOSED	X	X
	BUTTERFLY VALVE		X	
FUNCTIONALITY	ALT	ALTITUDE	X	
	BAV	BACKUP ALTITUDE	X	
	FRCV	DUAL FLOW RATE CONTROL	X	
	FAV	FLOW RATE ALTITUDE COMBINATION	X	
	FRCV	FLOW RATE CONTROL	X	
	M	MOTORISED	X	
	M	MOTORISED - NORMALLY CLOSED	X	
		NORMALLY CLOSED	X	
	PCV	PUMP CONTROL	X	
	GLOBE VALVE		X	
FUNCTIONALITY	ALT	ALTITUDE	X	
	BAV	BACKUP ALTITUDE	X	
	FAV	FLOW RATE ALTITUDE COMBINATION	X	
	FRCV	FLOW RATE CONTROL	X	
	OCV	OUTLET CONTROL	X	
	PRV	PRESSURE REDUCING	X	
	PSV	PRESSURE SUSTAINING	X	
	PCV	PUMP CONTROL	X	
	CONE VALVE		X	
FUNCT.	ALT	ALTITUDE	X	

		WATER	SEWER
AV	AIR VALVE - SINGLE	X	X
DAV	AIR VALVE - DOUBLE	X	X
EAV	AIR VALVE - ENHANCED DOUBLE	X	X
	BALL VALVE	X	X
*	ZONE VALVE	X	
DCV	DOUBLE CHECK VALVE	X	
	FLOAT OPERATED VALVE	X	
	NEEDLE VALVE	X	
P	PENSTOCK VALVE	X	X
PLUG	PLUG VALVE		X
	PRESSURE RELIEF VALVE	X	
SL	STOP LOG		X
SCOUR	STOP OR SCOUR VALVE (NORMALLY CLOSED ON SCOUR OR DRAIN PIPE)	X	X
*	TEMPORARY ZONE VALVE	X	

SERVICE CONNECTION FITTINGS

WATER	
◐	BILLING METER SMALL(<40mm)
◪	BILLING METER LARGE(≥40mm)
⊗	MAIN COCK
⊠	STOPCOCK

SEWER	
BVR	BURIED VERTICAL RISER (BVR)
⊘	SERVICE POINT
●	SLOPE JUNCTION

OTHER FITTINGS

WATER	
AG	AIR GAP DEVICE
	AIR VESSEL
	BLANK FLANGE
	DISMANTLING JOINT
	END CAP
FE	FLOW ELEMENT
F	FLOW METER OR RECORDING DEVICE
	GIBAULT JOINT
M	HYDRANT - MILCOCK
P	HYDRANT - PILLAR
	HYDRANT - SPRING
OH	OVERHEAD FILLING POINT
	INLINE VALVE - TONGUE REMOVED
MH	MAINTENANCE HOLE
	ORIFICE PLATE
P	PRESSURE GAUGE OR RECORDING DEVICE
	REDUCED PRESSURE ZONE DEVICE (RPZD)
XX x xx	REDUCER / TAPER
	PUMP, PUMP STATION
SP	SAMPLING POINT
○	TEE / OPEN END
▼	THRUST BLOCK
▽	TRENCH / SCOUR

SEWER	
	DEAD END
	DISCHARGE POINT
	GAUGING POINT (ACTIVE)
	GAUGING POINT (NON-ACTIVE)
SMS	INSPECTION SHAFT (STANDARD 225mm)
	MAINTENANCE HOLE
	REDUCER
RP	RODDING POINT
S	SCREEN
SIS	SPECIAL INSPECTION SHAFT
	STORAGE TANK (BURIED) OR SEWAGE OVERFLOW STRUCTURE
	STORAGE TANK (NOT BURIED)
SVE	VENT (EDUCT)
SVI	VENT (INDUCT)
SVD	VERTICAL DROP
V	VORTEX DROP
W	WEIR
	VERTICAL RISER
	TEE

NOTES:

1. ALL SYMBOLS SHALL BE SHOWN IN BLACK UNLESS PRESENTED OTHERWISE.
2. REFER TO DRAWING SD-1103 FOR LINETYPES.
3. SYMBOLS SIZED FOR LEGIBILITY WHEN PRINTED AT A3 SIZE.
4. VALVE AND FITTINGS NORMALLY OPEN UNLESS NOTED OTHERWISE.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	DISTRICT METER ZONE VALVE CHANGED TO ZONE VALVE	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X		
BWS	X	WAT	X	STP			
WTP		SEW	X				
WPS	X	REC	X				

ASSET AREA APPLICABILITY

STANDARD DRAWING
BULK WATER, WATER & SEWERAGE
DESIGN SYMBOLS FOR PLANS AND TIE BOOKS

DRAWING STATUS: Current

SD-1102-D

A1

ISSUE: B

TABLE 1: LINETYPES FOR THE PRODUCTION OF KEY PLANS, HYDRAULIC PLANS AND SERVICE PLANS

	LINE TYPE	SERVICE TYPE	LINE COLOUR	LINE THICKNESS (mm)
EXISTING ASSETS - WATER OR SEWER	eW	WATER MAIN/LINE (REF. NOTE 1)	7	0.25
	eS	GRAVITY SEWER MAIN		
	SRM	SEWER RISING MAIN		
	eS	SEWER SCOUR MAIN, SEWER TIE OR PROPERTY SERVICE LINE		
	eS	MAIN/LINE TO BE DECOMMISSIONED - SEWER OR WATER (REF. NOTE 2)		
PROPOSED OR NEW ASSETS - WATER NETWORK	W W	BULK WATER MAIN	35	0.70
	W W	WATER DISTRIBUTION MAIN	175	
	W W	WATER RETICULATION MAIN	145	
		WATER RISING MAIN	145	
		WATER NETWORK - DRAIN LINE	235	
		WATER NETWORK - OVERFLOW LINE	75	
		WATER NETWORK - SCOUR LINE	45	
		WATER NETWORK - WASHDOWN LINE	215	
		WATER NETWORK - DOMESTIC SERVICE LINE	135	0.70
		WATER NETWORK - FIRE SERVICE LINE	235	
PROPOSED OR NEW ASSETS - SEWERAGE NETWORK	S	SEWER GRAVITY MAIN - RETIC	245	0.70
	S	SEWER GRAVITY MAIN - TRUNK	245	
	S	SEWER GRAVITY MAIN - TUNNEL	245	
		SEWER SYPHON MAIN	145	
	SRM	SEWER RISING MAIN	245	
		SEWER SCOUR MAIN	65	
		SEWER NETWORK - TIE OR PROPERTY SERVICE LINE	232	0.25
		SEWER TIE (CONNECTED TO MAINS)	232	
	BVR	SEWER TIE (WITH BVR CONNECTED TO MAINS)	232	
OTHER		STAGE BOUNDARY	252	1.50
		WATER ZONE BOUNDARY	206	1.00

TABLE 2: HYDRAULIC INFORMATION BOXES

SEWER MAIN	SEWER TIE	STORMWATER (REF. NOTE 3)
612.220 — UPSTREAM INVERT LEVEL 150 PE — PIPE DIAMETER & MATERIAL 28.3 m — PIPE LENGTH (m) 0.46 % — PIPE GRADE 612.090 — DOWNSTREAM INVERT LEVEL	SEWER T 1.0 — TIE LENGTH (m) D 0.0 — TIE DEPTH (m) S 100 — TIE SIZE (mm) M uPVC — TIE MATERIAL	612.220 — UPSTREAM INVERT LEVEL 675 x — PIPE DIAMETER / MATERIAL 28.3 m — PIPE LENGTH (m) 0.46 % — PIPE GRADE 612.090 — DOWNSTREAM INVERT LEVEL

PIPE MATERIALS			LINE THICKNESS
PVC1	MS1	PIPE SPECIFICATION CHANGE POINT	0.25mm

L OF C — LIMIT OF CONTRACT — L OF C

TABLE 3: LINETYPES FOR THE PRODUCTION OF DRAINAGE PLANS & TIE BOOKS

	LINETYPE	SERVICE TYPE	LINE COLOUR	LINE THICKNESS (mm)
HYDRAULIC PLANS	W	DOMESTIC WATER SERVICE	3	0.50
	FS	FIRE SERVICE		
	SS	SPRINKLER SERVICE		
TIE BOOKS	S S	SEWER MAIN, MANHOLE AND JUNCTION	14	0.50
	SW	STORMWATER MAIN, MANHOLE AND SUMP (REF. NOTE 3)	84	
	W	WATER MAIN	174	

TABLE 4: LINETYPES FOR THE PRODUCTION OF KEY PLANS, HYDRAULIC PLANS & SERVICE PLANS - OTHER UTILITIES (NOTE 3)

	LINETYPE	SERVICE TYPE	LINE COLOUR	LINE THICKNESS (mm)
EXISTING ASSETS	ERM	EFFLUENT REUSE MAIN (EFF)	3	0.50
	E	ELECTRICITY (ELC)		
	G	GAS MAIN (GAS)		
	SW	STORMWATER MAIN (STW)		0.50
	T	TELECOMMUNICATIONS (e.g. TELSTRA)		
	x x	ABANDONED		
PROPOSED OR NEW ASSETS	ERM	EFFLUENT REUSE MAIN (EFF)	4	0.70
	E	ELECTRICITY (ELC)		
	G	GAS MAIN (GAS)		
	T	TELECOMMUNICATIONS (e.g. TELSTRA)		
	x x	ABANDONED		
	SW	STORMWATER MAIN (STW)	85	

NOTES:

1. WATER MAINS/LINES ARE DEFINED AS: BULK SUPPLY MAINS, DISTRIBUTION MAINS, RETICULATION MAINS, RISING MAINS, DRAIN LINES, OVERFLOW LINES, SCOUR LINES, WASHDOWN LINES, DOMESTIC SERVICE LINES AND FIRE SERVICE LINES, ALL OF WHICH HAVE THE INTENDED PURPOSE OF CONVEYING BULK OR POTABLE WATER.
2. A MAIN/LINE TO BE DECOMMISSIONED, WHETHER IT BE FOR WATER OR SEWERAGE, SHALL BE ANNOTATED TO SHOW THE TYPE OF DECOMMISSIONING. FOR EXAMPLE, DESCRIPTORS SUCH AS "ABANDONED" , "EXHUMED" , "DECOMMISSIONED AND END CAPPED" SHALL BE CLEARLY SHOWN ON THE RELEVANT PLANS. THIS WILL ALLOW ICON WATER TO BETTER DETERMINE WHETHER A DECOMMISSIONED LINE CAN BE REINSTATED FOR USE AT A LATER DATE.
3. UTILITIES NOT OWNED/OPERATED BY ICON WATER SHALL BE SHOWN IN ACCORDANCE WITH THE RELEVANT AGENCY/UTILITY'S DRAFTING STANDARDS ON THE CONDITION THAT EXISTING AND NEW/PROPOSED LINES ARE SHOWN IN COLOUR "0" (BLACK) WITH THE EXCEPTION OF STORMWATER. ICON WATER AND TRANSPORT CANBERRA AND COMMUNITY SERVICES (TCCS) HAVE AGREED THAT STORMWATER LINES (BOTH EXISTING AND PROPOSED) SHALL BE SHOWN IN ACCORDANCE WITH TCCS DRAFTING REQUIREMENTS (i.e. BLACK FOR EXISTING AND GREEN FOR NEW/PROPOSED). IF THE RELEVANT AGENCY/UTILITY DOES NOT HAVE A DEFINED DRAFTING STANDARD THEN THE ICON WATER PREFERRED LINETYPES SHOWN IN TABLE 4 SHALL BE APPLIED.
4. REFER TO DRAWING SD-1102 FOR THE DESIGN SYMBOLS TO BE USED.
5. THE LINE COLOURS INDICATED IN TABLES 1 TO 4 ABOVE REFER TO COLOUR NUMBERS FROM THE STANDARD AUTOCAD COLOUR PALETTE. THE LINEWEIGHTS INDICATED ARE FOR PRINTING AT A1 SIZE. WHEN PRINTING AT A3 SIZE, HALFWIDTHS SHALL BE USED.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	SEWER TIE INFORMATION BOX AND LINE TYPES UPDATED	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP				
WTP		SEW	X					
WPS	X	REC	X					

ASSET AREA APPLICABILITY

icon WATER

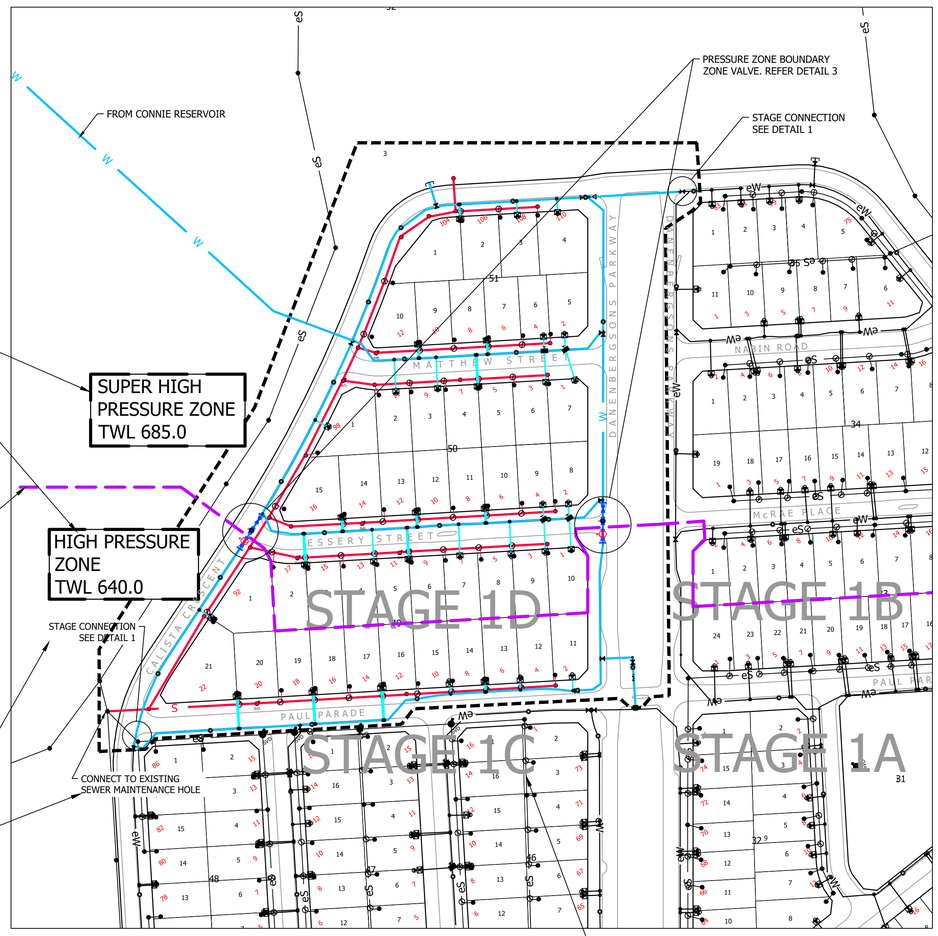
STANDARD DRAWING
BULK WATER, WATER & SEWERAGE LINETYPES AND NOTATION FOR PLANS AND TIE BOOKS

DRAWING STATUS: Current

SD-1103-D

A1

ISSUE: B



PRESSURE ZONE INFORMATION SHOWN

PRESSURE ZONE BOUNDARIES SHOWN

CONNECTION LOCATIONS SHOWN AND REFERENCED ON PLANS

BAILEY'S RESIDENTIAL ESTATE
STAGE 1 - SUB STAGE 1A
SEWER AND WATER KEY PLAN
SCALE 1:2000 @ A1

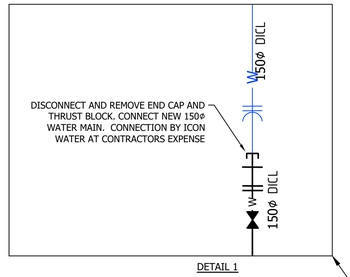
0 40 80 120 160 200m
SCALE 1:2000

LEGEND WITH ALL RELEVANT LINE TYPES AND SYMBOLS SHOWN

LEGEND

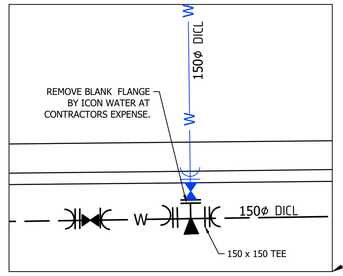
- EXISTING WATER MAIN
- EXISTING SEWER MAIN
- NEW WATER MAIN
- NEW WATER PROPERTY SERVICE LINE
- STAGE BOUNDARY
- PRESSURE ZONE BOUNDARY
- NEW SEWER MAIN / PROPERTY SERVICE LINE

(NEW)	(EXISTING)	
		WATER STOP VALVE
		WATER FIRE HYDRANT
		WATER REDUCER
		ZONE VALVE
		SEWER MAINTENANCE HOLE
SVD	SVD	SEWER VERTICAL DROP



DETAIL 1

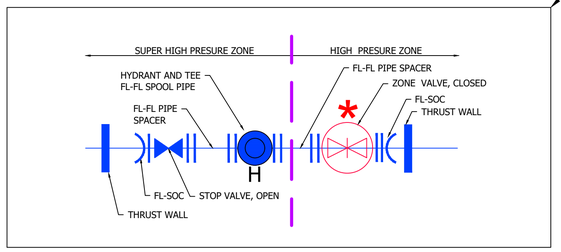
STAGE CONNECTION DETAIL



DETAIL 2

STAGE CONNECTION DETAIL

CONNECTION DETAILS (NOTE 3)



DETAIL 3

PRESSURE ZONE BOUNDARY ZONE VALVE

NOTES:

1. ARRANGEMENTS AND DETAILS OF SERVICES, THRUST RESTRAINTS AND EQUIPMENT DEPICTED IN THIS DRAWING ARE EXAMPLES ONLY. THIS DRAWING IS NOT TO BE USED AS A GUIDE TO WATER AND SEWER PIPE AND EQUIPMENT LAYOUTS.
2. A HYDRAULIC CONNECTIONS DRAWING MUST CONTAIN THE FOLLOWING DETAILS:
   - A PLAN VIEW OF THE FULL EXTENT OF THE CONNECTION AREA.
   - ALL ADJOINING (INCLUDING FUTURE) STAGES / ICON WATER ASSETS TO THE CONNECTION AREA.
   - LOCATION OF ALL ZONE VALVES, PRV'S, HYDRANTS AND SLUICE VALVES.
   - PRESSURE ZONES, WITH CLEAR BOUNDARIES AND LABELS STATING PRESSURE DETAILS.
   - ALL CONNECTION DETAILS, WITH REFERENCE TO THE RELEVANT CONNECTION DETAIL AND DRAWING NUMBER (IF APPLICABLE).
   - LEGEND WITH ALL RELEVANT LINE TYPES AND SYMBOLS.
3. DETAILS OF ALL CONNECTION POINTS ARE TO BE SHOWN ON THE HYDRAULIC CONNECTIONS PLAN. IF ADDITIONAL SPACE IS REQUIRED, A DEDICATED CONNECTION DETAILS DRAWING IS TO BE PROVIDED AS THE NEXT DRAWING IN THE SET.

Issued For Construction

No.	REVISION	DATE	ENG CHECKED	VERIFIED	DESIGN AUTH
A	INITIAL ISSUE	26/06/2019			

Drawn: I. McDonell
Designed: C. Allen

KEIRAN
BAILEY'S RESIDENTIAL ESTATE
STAGE 1D
HYDRAULIC CONNECTIONS
PLAN

Scale: | Date: 30/01/2018 | Sheet No.:
Project No.: CX10999 | Tender No.:

A1 | 2019/00112 | Rev

Water.ctb

TITLE BLOCK TO BE PREPARED IN ACCORDANCE WITH ICON WATER DRAFTING STANDARDS

STAGE LABEL

SCALE BAR TO BE SHOWN

ALL INFORMATION SHOWN ON THIS DRAWING MUST BE CLEAR WHEN PRINTED AT A3

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	26/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

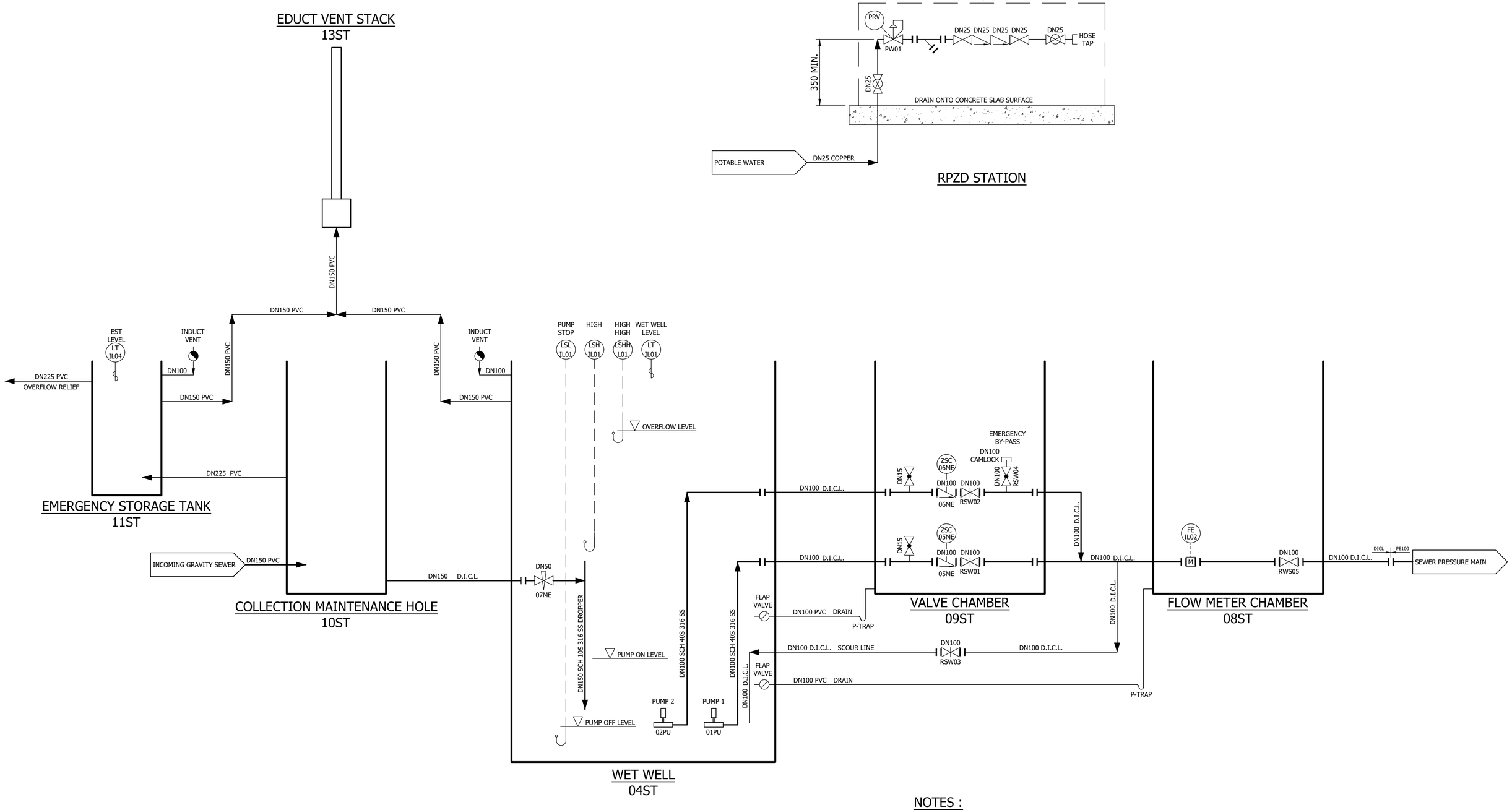
icon WATER

STANDARD DRAWING
WATER AND SEWER NETWORK
HYDRAULIC CONNECTIONS DRAWING
DRAWING EXAMPLE AND REQUIREMENTS

DRAWING STATUS: Current

SD-1104-C

A1 | | ISSUE A



NOTES :

1. REFER TO SD-1100 AND SD-1101 FOR P & ID SYMBOLS.
2. REFER TO SD-5500 TO SD-5503 INCLUSIVE FOR DN25 AND/OR DN50 RPZD STATION DETAILS.
3. THIS "TYPICAL" P & ID BASED ON A DUTY/STANDBY PUMP STATION FOR A DESIGN FLOW OF 15 l/s APPROX.
4. EXAMPLE DATA PROVIDED. DESIGNER SHALL MODIFY DETAILS TO MATCH SPECIFIC PROJECT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	NOTES AND TEXT UPDATE	17/09/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

STANDARD DRAWING
SEWAGE PUMP STATIONS
TYPICAL PIPING AND INSTRUMENTATION DIAGRAM

DRAWING STATUS: Current

SD-1200-C

A1

ISSUE: B

DEHUMIDIFIER
DHM-01

FLOW:	xx	m³/h (100% Flow)
PRESSURE:	xx	Pa (Nominal)

ACTIVATED CARBON TANK
TNK-01

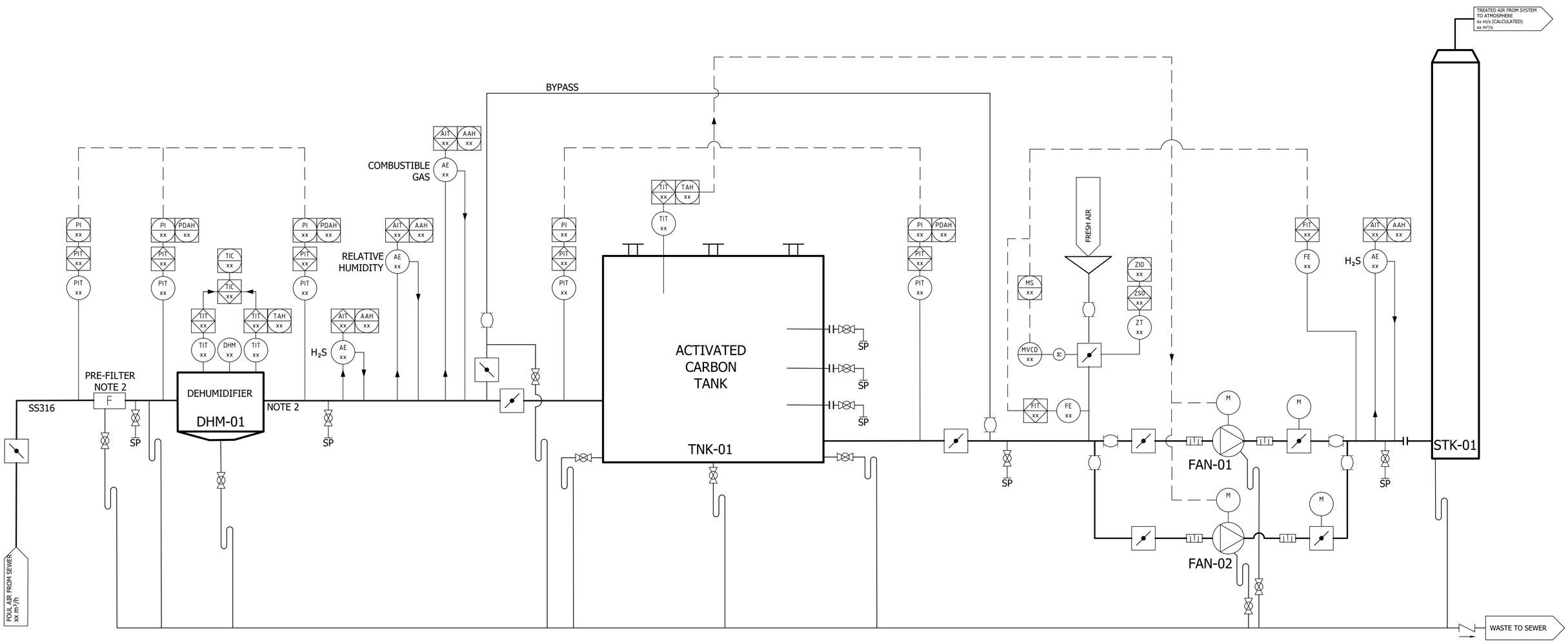
VELOCITY:	xx	m/s
CONTACT TIME:	xx	sec
BED DEPTH:	xx	m
VOLUME:	xx	m³
MASS OF CARBON:	xx	kg
PRESSURE DROP:	xx	Pa
PRESSURE:	xx	Pa (Nominal)

ODOUR CONTROL FAN
FAN-01 / FAN 2
DUTY / STANDBY

FLOW:	xx	m³/h (100% Flow)
PRESSURE:	xx	kPa

DISCHARGE STACK
STK-01

TREATED FLOW	xx	m³/h (100% Flow)
HEIGHT:	xx	m
EXIT VELOCITY:	xx	m/s
DIAMETER STACK:	xx	mm
DIAMETER EXIT CONE:	xx	mm



NOTES:

1. XX DENOTES FIELDS THAT ARE TO BE POPULATED WITH SITE / PROJECT SPECIFIC VALUES.
2. PRE-FILTER AND DEHUMIDIFIER BYPASSES NOT SHOWN FOR CLARITY.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	18/07/2018	S. Essery	S. Buck	K. Danenbergsons
B	DRAWING UPDATED	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X			
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

STANDARD DRAWING
ODOUR CONTROL UNIT
TYPICAL PROCESS AND INSTRUMENTATION DIAGRAM

DRAWING STATUS: Current

SD-1203-C

A1

ISSUE: B

GENERAL NOTES:

1. ONLY SAFETY-RELATED AND PUBLIC NOTIFICATION SIGNS SPECIFIC TO ICON WATER ASSETS HAVE BEEN DETAILED IN ICON WATER'S "1300 SERIES" OF STANDARD DRAWINGS. GENERIC "OFF-THE-SHELF" SIGNS COMPLYING WITH THE RELEVANT AUSTRALIAN STANDARDS HAVE NOT BEEN DETAILED. SUCH SIGNS MAY BE PURCHASED DIRECTLY FROM ANY REPUTABLE MANUFACTURER OR SUPPLIER WITHOUT RESTRICTION IF SUCH SIGNS MEET THE DURABILITY AND INSTALLATION REQUIREMENTS (AS WELL AS THE DESIGN INTENT) OF ICON WATER'S "1300 SERIES" OF STANDARD DRAWINGS.
2. THE DESIGN, FABRICATION, INSTALLATION AND LOCATION OF ALL SITE SAFETY-RELATED SIGNS SHALL COMPLY WITH AS 1319 (AND AS/NZS 2416.1 FOR WATER SAFETY SIGNS).
3. THE DESIGN, FABRICATION, INSTALLATION AND LOCATION OF ALL FIRE EXTINGUISHER SIGNS SHALL COMPLY WITH AS 2444.
4. ALL ROAD SIGNS SHALL MEET "TRANSPORT CANBERRA AND COMMUNITY SERVICES" (TCCS) REQUIREMENTS AND SHALL COMPLY WITH AS 1743.
5. THE USE OF THE ICON WATER LOGO SHALL COMPLY WITH ICON WATER'S CORPORATE IDENTITY MANUAL. REQUIREMENTS CAN BE OBTAINED FROM THE ICON WATER COMMUNICATIONS TEAM.
6. COLOURS SHALL BE SPECIFIED USING THE PANTONE MATCHING SYSTEM (PMS) AS PER THE FOLLOWING TABLE:

COLOUR	PMS No.	APPLICATION
BLUE	299	ICON WATER LOGO
SNOW WHITE	11-0602	LETTERING AND BACKGROUND AS APPLICABLE
BLACK	BLACK HC	LETTERING
RED	186C	ANNULUS AND WARNING SYMBOLS AS APPLICABLE

7. ALL ICON WATER SPECIFIC SIGNS SHALL BE PRODUCED USING THE SCREEN PRINTING METHOD.
8. ALL SIGNPOST FASTENERS SHALL BE GRADE 316 STAINLESS STEEL. BOLTS AND NUTS SHALL BE M10 UNLESS NOTED OTHERWISE. ANTISEIZE COMPOUND TO BE USED ON ALL THREADS.
9. ALL SIGNS SHALL HAVE ROUNDED CORNERS.
10. HORIZONTAL BRACING RAILS SHALL BE POSITIONED AT NO GREATER THAN 600 mm CENTRES. FOR EXAMPLE, THREE BRACING RAILS ARE REQUIRED FOR A SIGN WITH A VERTICAL DIMENSION OF 900 mm (AT 450 mm CENTRES).
11. SIGNS MAY BE FIXED TO PERMANENT STRUCTURES SUCH AS FENCES AND WALLS IN LIEU OF SIGNPOSTS AS APPLICABLE. ALL FASTENERS SHALL BE GRADE 316 STAINLESS STEEL.
12. THE CONCRETE FOOTING AND SIGNPOST EMBEDMENT DETAILS SHOWN IN ICON WATER'S "1300 SERIES" OF DRAWINGS ASSUME THAT THE FOOTING IS CAST IN UNDISTURBED GROUND WITH A SOIL CLASSIFICATION OF "MEDIUM" OR "SOUND". FOOTINGS IN "POOR" SOIL CONDITIONS SHALL HAVE THE FOOTING DEPTH INCREASED TO 700 mm (WITH NO CHANGE IN FOOTING DIAMETER).
13. ALL SIGNPOST FOOTINGS SHALL BE OF N20 PLAIN CONCRETE MINIMUM. HIGHER COMPRESSIVE STRENGTHS MAY BE SUBSTITUTED FOR CONVENIENCE IF REQUIRED.
14. REFER TO SD-9302 FOR SOIL CLASSIFICATION DEFINITIONS.
15. REFER TO SD-9100 FOR STEELWORK AND GENERAL FABRICATION NOTES.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

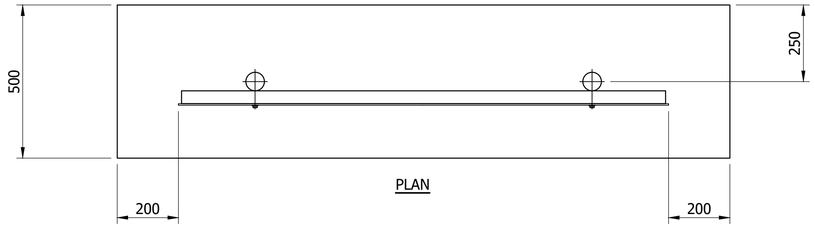
STANDARD DRAWING
SITE SIGNAGE AND SIGNPOSTS
NOTES

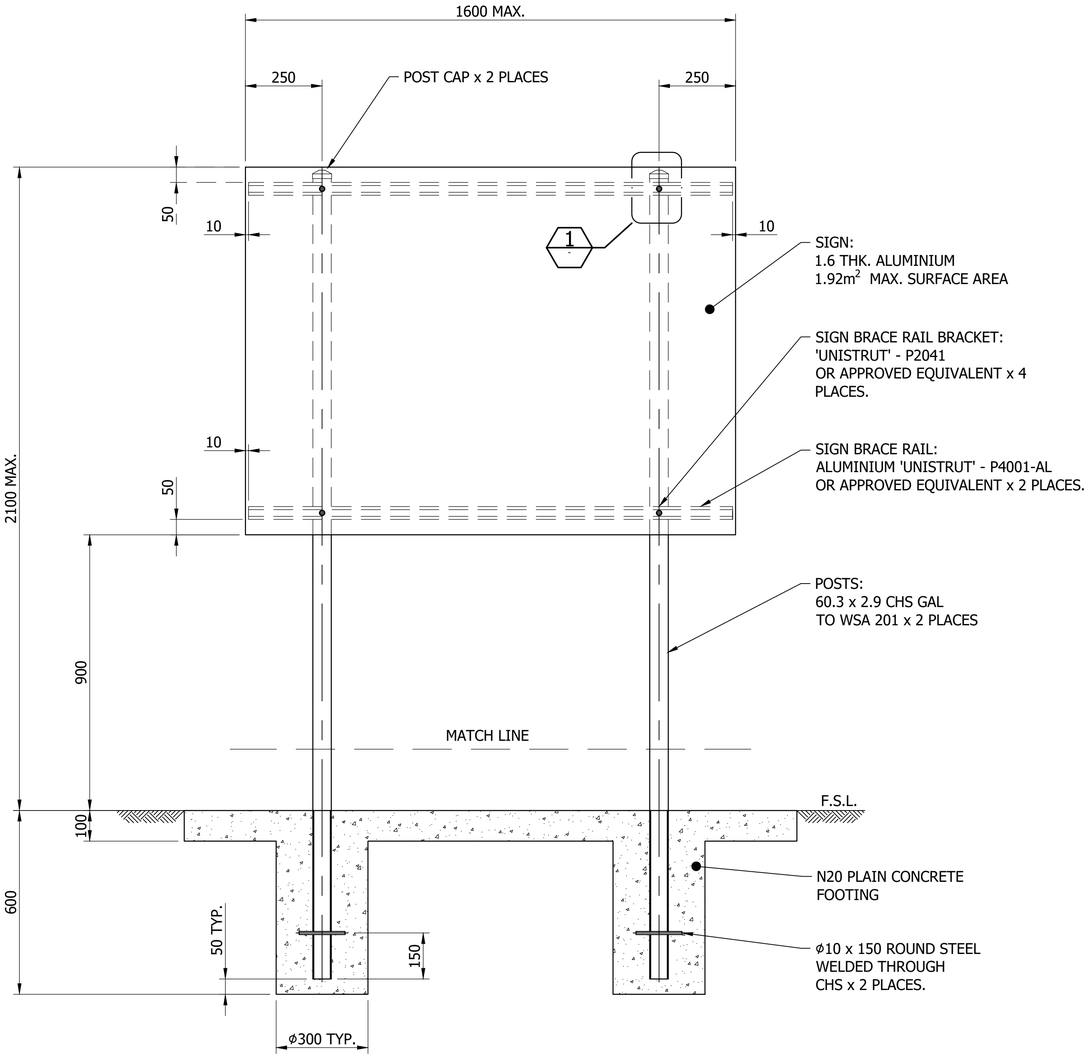
DRAWING STATUS: Current

SD-1300-D

A1

ISSUE: A

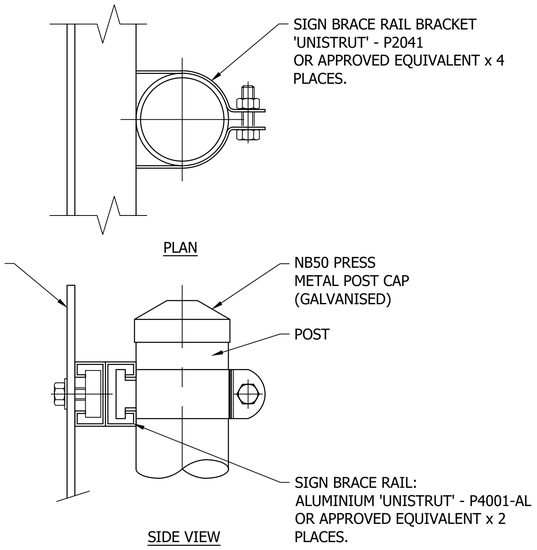




FRONT VIEW
(BURIED DETAILS SHOWN IN SECTION)

INSTALLATION TYPE 1: SIGNS WITH TWIN POSTS IN GRASSED AREAS

SCALE 1 : 10

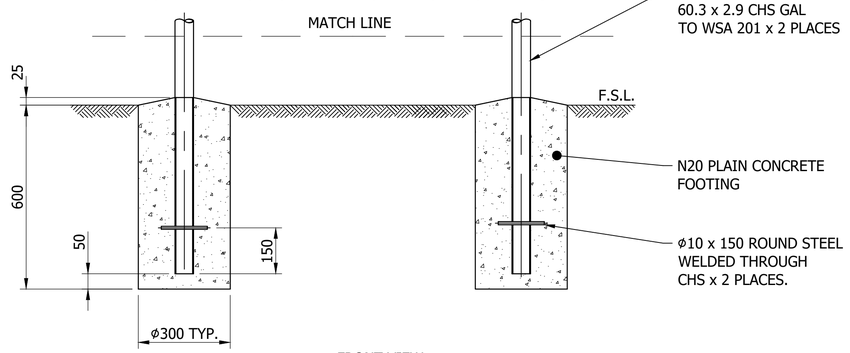


DETAIL 1

TYPICAL SIGN MOUNTING DETAILS

SCALE 1 :2

REFER TO THE DETAILS ABOVE THE MATCH LINE ON "INSTALLATION TYPE 1 "



FRONT VIEW
(BURIED DETAILS SHOWN IN SECTION)

INSTALLATION TYPE 2: SIGNS WITH TWIN POSTS IN NON-GRASSED AREAS

SCALE 1 : 10

NOTES:

1. REFER TO DRAWING SD-1300 FOR ALL NOTES.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2017	C. Dickson	K. Danenbergsons	D. Eager
B	MATERIAL UPDATES	10/09/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP	X			
WTP	X	SEW	X					
WPS	X	REC	X					

ASSET AREA APPLICABILITY

icon WATER

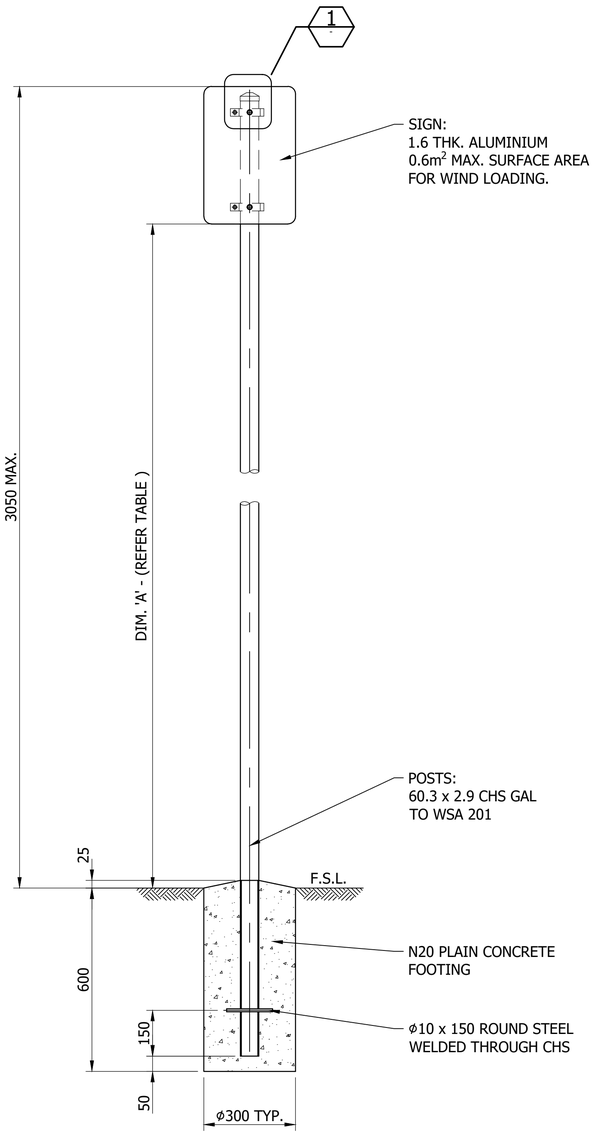
STANDARD DRAWING
SIGNS WITH TWIN POSTS
TYPICAL ARRANGEMENTS AND DETAILS

DRAWING STATUS: Current

SD-1301-D

A1

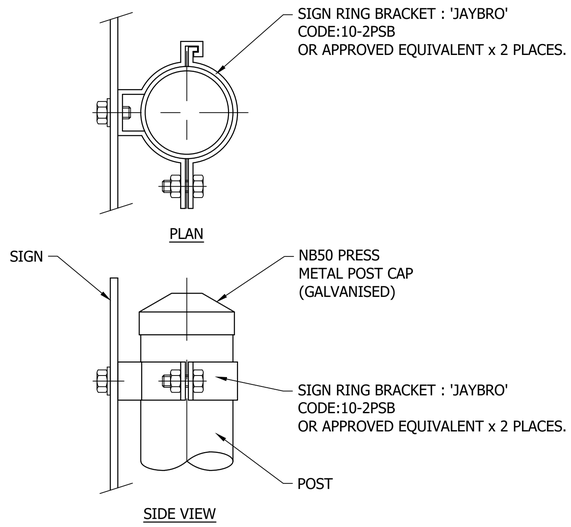
ISSUE: B



FRONT VIEW
(BURIED DETAILS SHOWN IN SECTION)

INSTALLATION TYPE 3: SIGNS WITH SINGLE POST IN NON-GRASSED AREA

SCALE 1:10



DETAIL 1

TYPICAL SIGN MOUNTING DETAILS

SCALE 1:2

SIGN POST HEIGHT	
LOCATION	DIMENSION 'A'
PEDESTRIAN & CYCLIST AREA	2050mm (NOTES 2, 3 & 4)
AWAY FROM PEDESTRIAN & CYCLIST AREAS	1500mm (NOTES 2, 3 & 4)

NOTES:

1. REFER TO DRAWING SD-1300 FOR ALL NOTES.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2028	C. Dickson	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

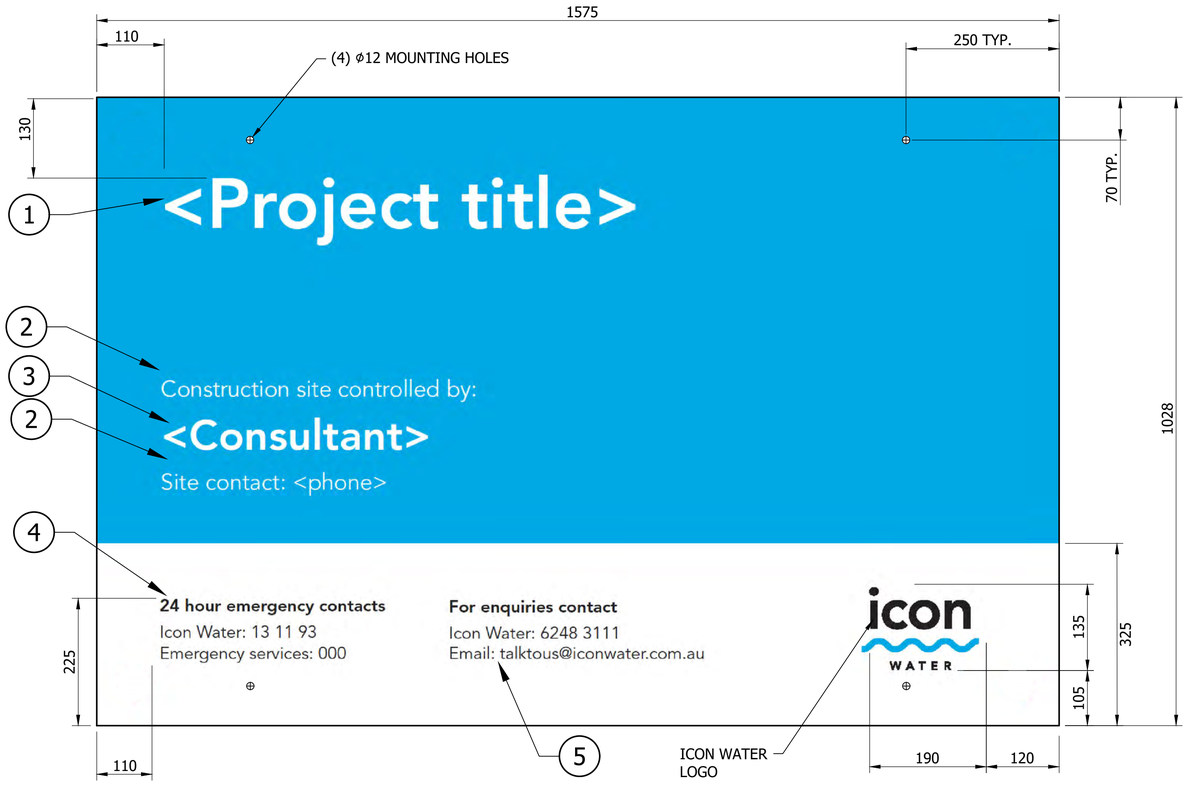
STANDARD DRAWING
SIGNS WITH SINGLE POST
TYPICAL ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-1302-D

A1

ISSUE: A



STANDARD PROJECT SIGN - LARGE

SCALE 1 : 5

MATERIAL: 1.6 mm ALUMINIUM
COATING: N/A
FINISH COLOUR: NOTE 1
MASS: 7.3 kg APPROX.

FONT	DESCRIPTION
1	AVENIR LT st 85 HEAVY, 328 pt
2	AVENIR LT st 45 BOOK, 105 pt
3	AVENIR LT st 85 HEAVY, 195 pt
4	AVENIR LT st 85 HEAVY, 82 pt
5	AVENIR LT st 45 BOOK, 82 pt

ITEM	AMDT.
PN130401	

STANDARD PROJECT SIGN - SMALL

SCALE 1 : 2

MATERIAL: 1.6 mm ALUMINIUM
COATING: N/A
FINISH COLOUR: NOTE 1
MASS: 1.1 kg APPROX.

FONT	DESCRIPTION
1	AVENIR LT st 85 HEAVY, 125 pt
2	AVENIR LT st 45 BOOK, 40 pt
3	AVENIR LT st 85 HEAVY, 75 pt
4	AVENIR LT st 85 HEAVY, 30 pt
5	AVENIR LT st 45 BOOK, 30 pt

ITEM	AMDT.
PN130402	

NOTES:

1. SIGNAGE COLOURS SHALL BE:
   - BLUE = PMS 299 (CYMK C:86 M:8 Y:0 K:0 / RGB R:0, G:163, B:224)
   - WHITE = PMS 11-0602 (CYMK C:0 M:0 Y:0 K:0 / RGB R:255, G:255, B:255)
   - BLACK = PMS BLACK (CYMK C:0 M:0 Y:0 K:100 / RGB: 0, G:0, B:0)
2. VISIT WWW.ICONWATER.COM.AU/DOWNLOADS TO ACCESS THE ARTWORK FILES OR THE ICON WATER LOGO IMAGE FILE.
3. CONTRACTORS MUST ENSURE THAT THE SIGNS ARE INSTALLED SUCH THAT THEY ARE CLEARLY VISIBLE FROM OUTSIDE OF THE WORKPLACE.
4. ONE LARGE SIGN IS TO BE INSTALLED PER SITE, UNLESS DIRECTED OTHERWISE BY ICON WATER. SMALL SIGNS SHALL BE INSTALLED ON A PROJECT SPECIFIC BASIS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	SIGNAGE FONTS, COLOURS AND DIMS UPDATED	3/07/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X						
BWS	X	WAT	X	STP	X						
WTP	X	SEW	X								
WPS	X	REC	X								

ASSET AREA APPLICABILITY

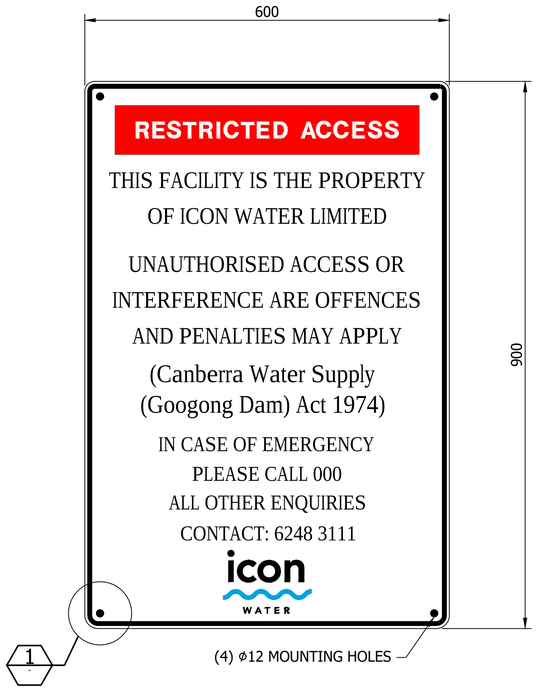
STANDARD DRAWING
PROJECT SIGNS - LARGE AND SMALL

DRAWING STATUS: Current

SD-1304-D

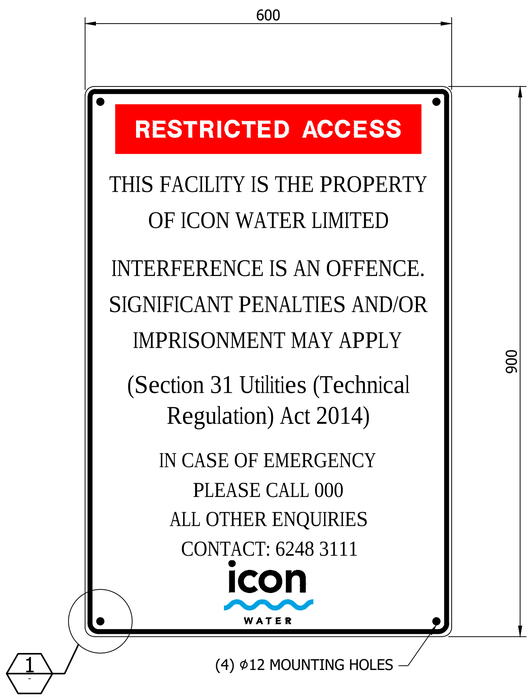
A1

ISSUE: B



MATERIAL: 1.6 mm ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 2.5 kg APPROX.

ITEM	AMDT.
PN130501	

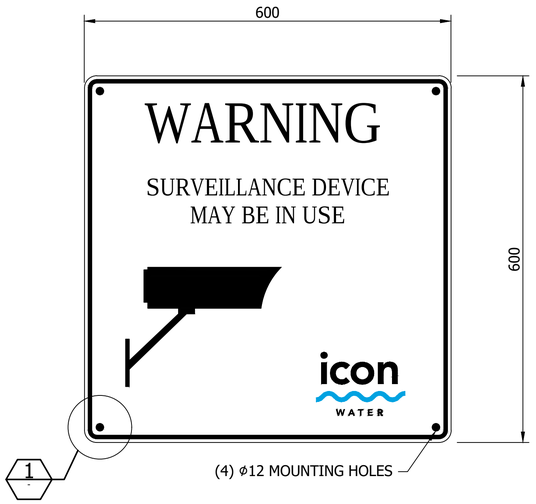


MATERIAL: 1.6 mm ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 2.5 kg APPROX.

ITEM	AMDT.
PN130502	

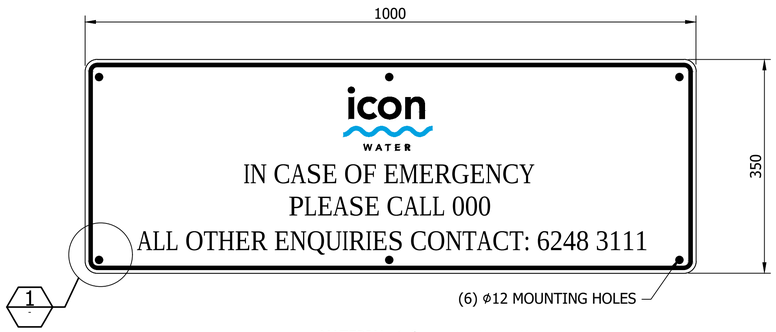
MATERIAL: 1.6 mm ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 1.2 kg APPROX.

ITEM	AMDT.
PN130503	



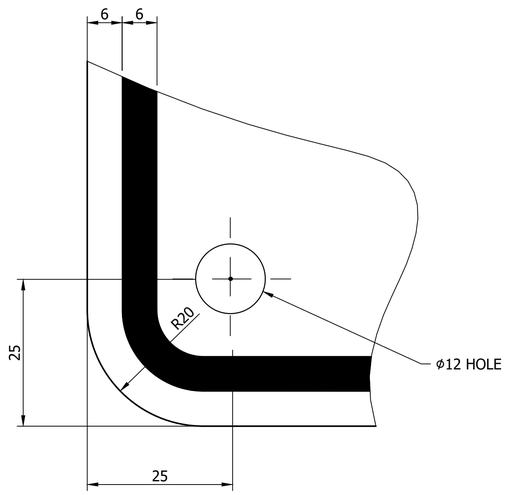
MATERIAL: 1.6 mm ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 1.6 kg APPROX.

ITEM	AMDT.
PN130504	



MATERIAL: 1.6 mm ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 1.4 kg APPROX.

ITEM	AMDT.
PN130505	



DETAIL 1

TYPICAL SIGN MOUNTING HOLE

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	SIGNAGE WORDING & ITEM INFORMATION UPDATED	12/03/2019	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

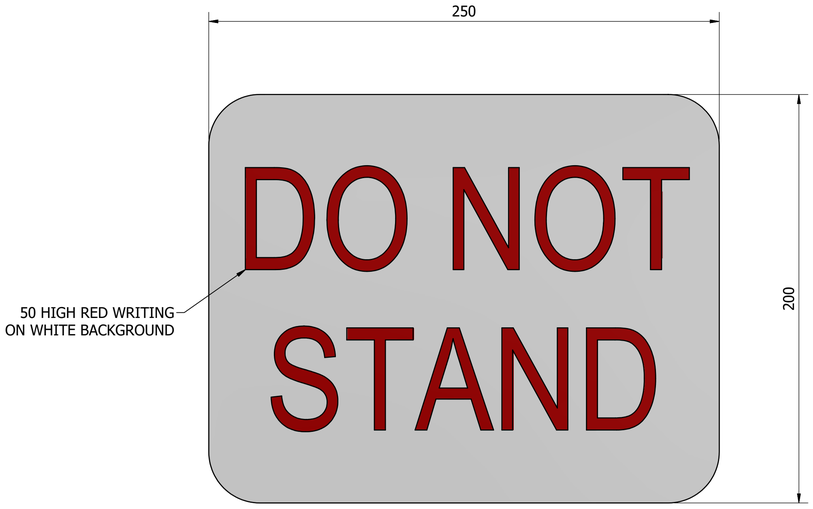
STANDARD DRAWING
RESTRICTED ACCESS, SURVEILLANCE AND EMERGENCY SIGNS

DRAWING STATUS: Current

SD-1305-D

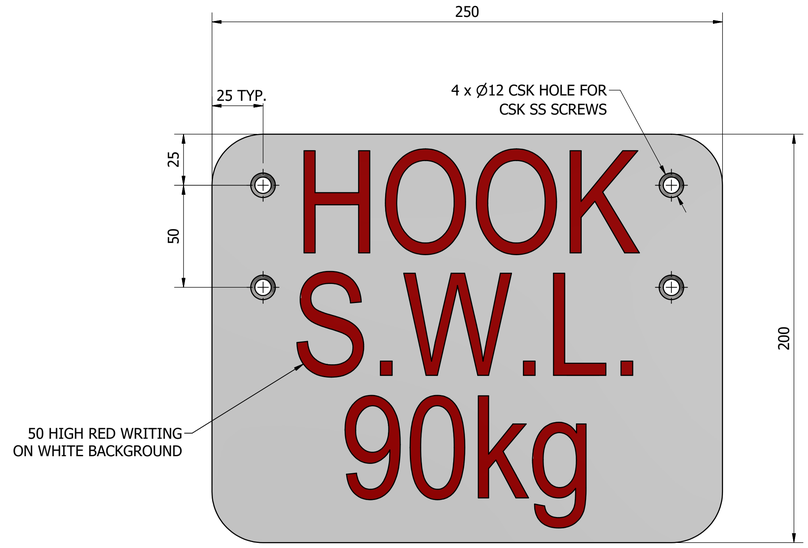
A1

ISSUE B



MATERIAL: 3.0 mm 316 GRADE STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 2 kg

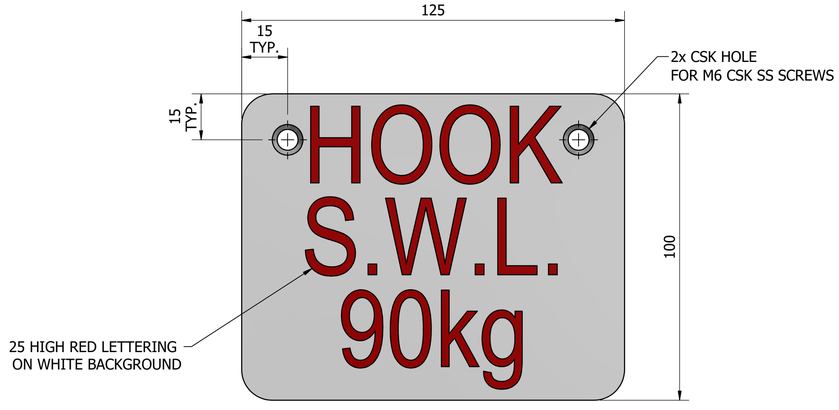
ITEM	AMDT.
PN130601	



NOTE: "90 kg" IS INDICATIVE ONLY. ACTUAL SAFE WORKING LOAD IS TO BE PROVIDED FOR THE SPECIFIC APPLICATION.

MATERIAL: 3.0 mm 316 GRADE STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 2 kg

ITEM	AMDT.
PN130602	



NOTE: "90 kg" IS INDICATIVE ONLY. ACTUAL SAFE WORKING LOAD IS TO BE PROVIDED FOR THE SPECIFIC APPLICATION.

MATERIAL: 1.6 mm 316 GRADE STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 1 kg

ITEM	AMDT.
PN130603	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

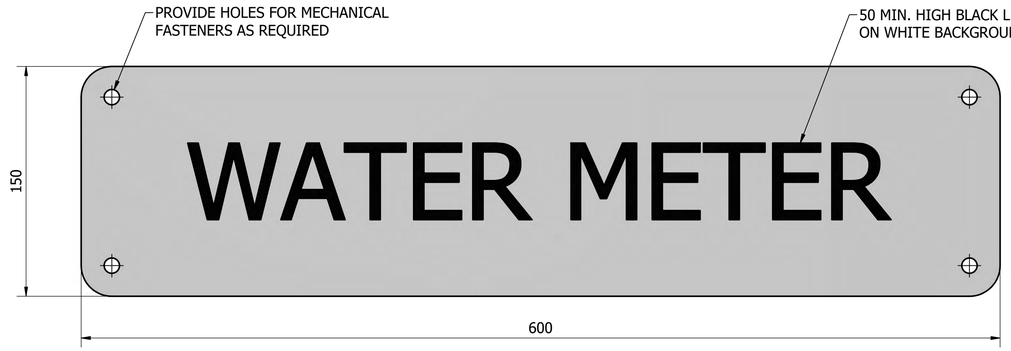
STANDARD DRAWING
WARNING SIGNS

DRAWING STATUS
Current

SD-1306-D

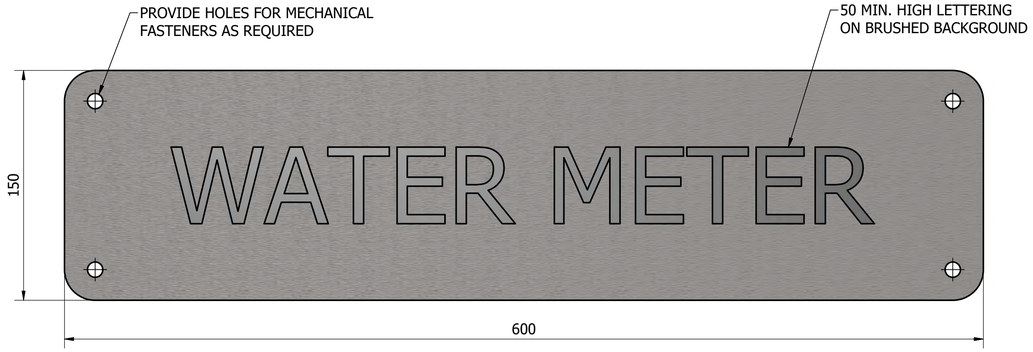
A1

ISSUE A



MATERIAL: 1.6 mm ALUMINIUM
COATING: N/A
FINISH COLOUR: BLACK LETTERING ON WHITE BACKGROUND
MASS: 1 kg

ITEM	AMDT.
PN130701	



MATERIAL: 1.6 mm 316 STAINLESS STEEL
COATING: N/A
FINISH COLOUR: BRUSHED WITH LETTERING PERMANENTELY INSCRIBED
MASS: 1 kg

ITEM	AMDT.
PN130702	

NOTES:

1. THE DESIGNER IS FREE TO CHOOSE THEIR PREFFERED SIGN DESIGN TO MATCH BUILDING AESTHETICS.
2. SIGNS ARE TO BE SECURED IN PLACE WITH MECHANICAL FIXINGS e.g RIVETTS OR SCREWS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	25/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

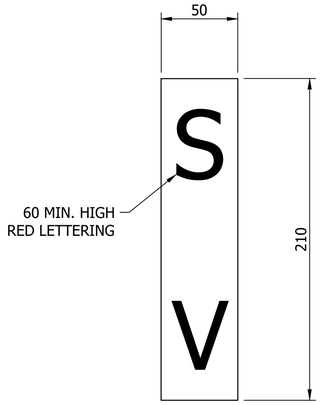
STANDARD DRAWING
METERING SIGN

DRAWING STATUS: Current

SD-1307-D

A1

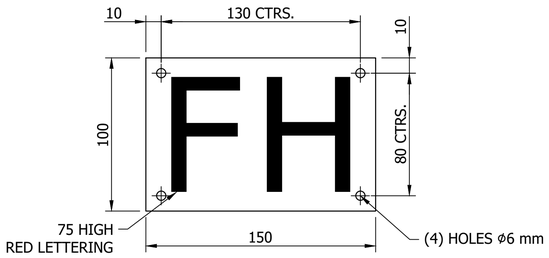
ISSUE: A



MATERIAL: REFLECTIVE ADHESIVE VINYL
COATING: N/A
FINISH COLOUR: CLASS 1 , WHITE REFLECTIVE BACKGROUND
MASS: N/A

MARKER POST LABEL

ITEM	AMDT.
PN133001	B



MATERIAL: 1.6 mm THICK ALUMINIUM
COATING: N/A
FINISH COLOUR: CLASS 1 , WHITE REFLECTIVE BACKGROUND
MASS: N/A

KERB MARKER LABEL

ITEM	AMDT.
PN133002	B

TABLE 1: MARKER ABBREVIATIONS/IDENTIFIERS

ABBREV.	DESCRIPTION
AV	AIR VALVE - SINGLE
ALT	ALTITUDE VALVE - ALL TYPES
BAV	BACKUP ALTITUDE VALVE - ALL TYPES
BVR	BURIED VERTICAL RISER
DCV	DOUBLE CHECK VALVE
DAV	DOUBLE AIR VALVE
FH	FIRE HYDRANT
FAV	FLOW RATE ALTITUDE COMBINATION VALVE - ALL TYPES
FRCV	FLOW RATE CONTROL VALVE - ALL TYPES
OCV	OUTLET CONTROL GLOBE VALVE
PRV	PRESSURE REDUCING GLOBE VALVE
PCV	PUMP CONTROL GLOBE VALVE
PSV	PRESSURE SUSTAINING GLOBE VALVE
RPZD	RPZ VALVE
SCV	SCOUR VALVE
SRM	SEWER RISING MAIN
SV	STOP VALVE
WM	WATER MAIN

TABLE 2: MARKER POST COLOURS

SERVICE	MARKING POST COLOUR
POTABLE WATER	BLUE
SEWAGE	CREAM
RAW WATER	GREEN
RECYCLED WATER	LILAC

NOTES:

1. REFER TO ICON WATER'S APPROVED PRODUCTS LIST FOR MARKER POST DETAILS.
2. MARKER POST LABELS TO FACE TOWARDS THE VALVE OR HYDRANT.
3. MARKER POSTS FOR BURIED PIPELINES SHALL BE PLACED IN THE LINE OF SIGHT AT A MAXIMUM SPACING OF 100 m AND SHALL BE LOCATED PERPENDICULAR TO THE PIPELINE AXIS.
4. MARKER POST LABEL LETTERING TO BE VERTICALLY ORIENTATED; KERB MARKER LETTERING TO BE HORIZONTALLY ORIENTATED.
5. KERB MARKERS MAY ALSO BE FIXED TO WALLS AND PAVEMENTS AS APPROPRIATE USING MASONRY NAILS OR EPOXY ADHESIVE.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	TEXT HEIGHT DIMENSIONS ADDED	11/12/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	
BWS	X	WAT	X	STP	
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

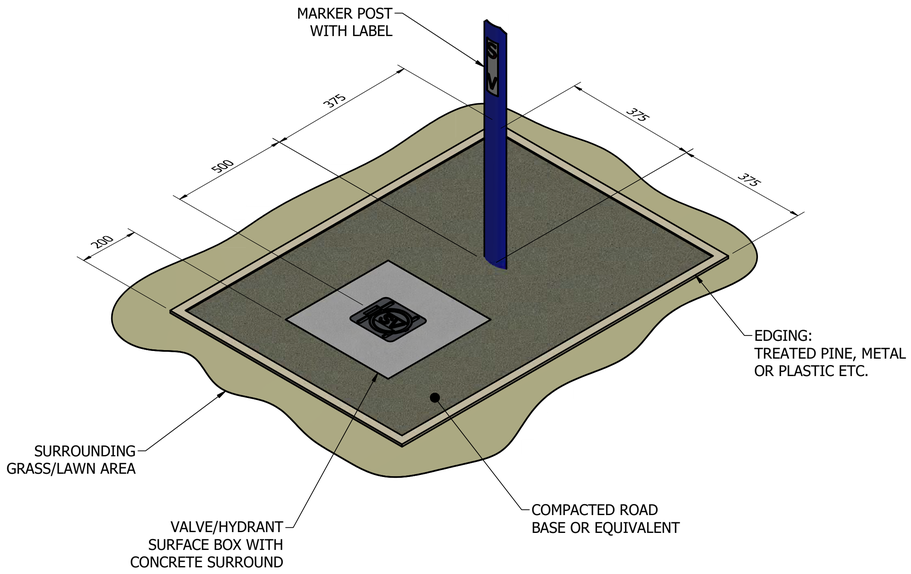
STANDARD DRAWING
PIPELINE AND NETWORKS
MARKER POSTS, KERB MARKINGS AND LABELS
SHEET 1 OF 2

DRAWING STATUS: Current

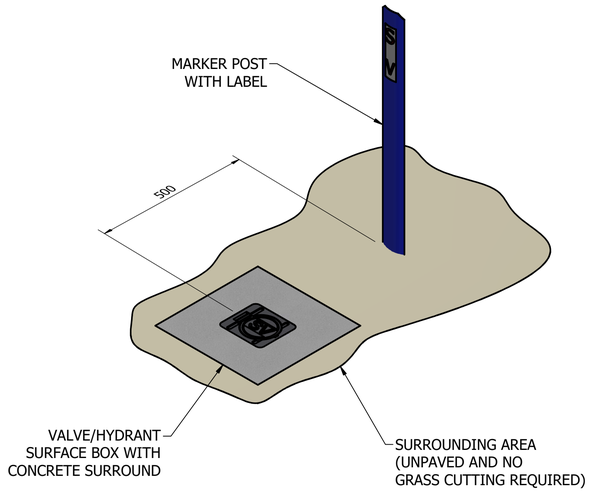
SD-1330-D

A1

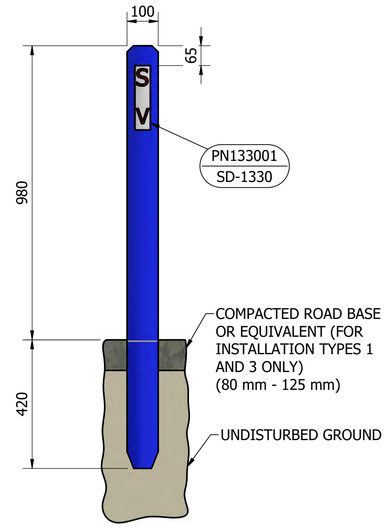
ISSUE B



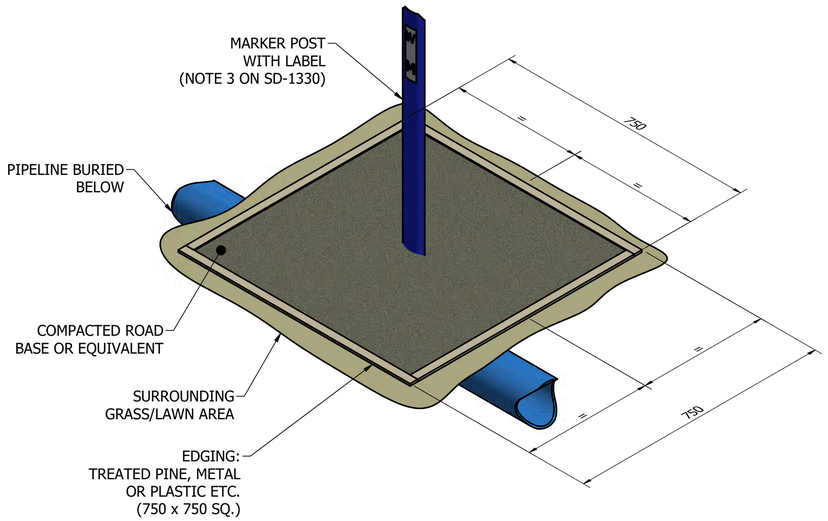
INSTALLATION TYPE 1
VALVE/HYDRANT MARKER POSTS
IN AREAS REQUIRING GRASS CUTTING



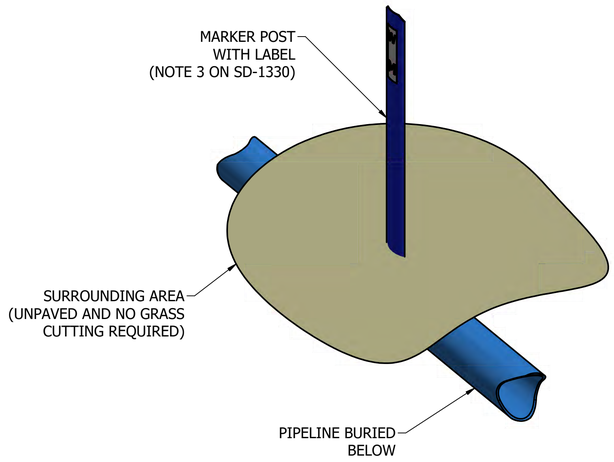
INSTALLATION TYPE 2
VALVE/HYDRANT MARKER POST IN UNPAVED AREAS
WHICH DO NOT REQUIRE GRASS CUTTING



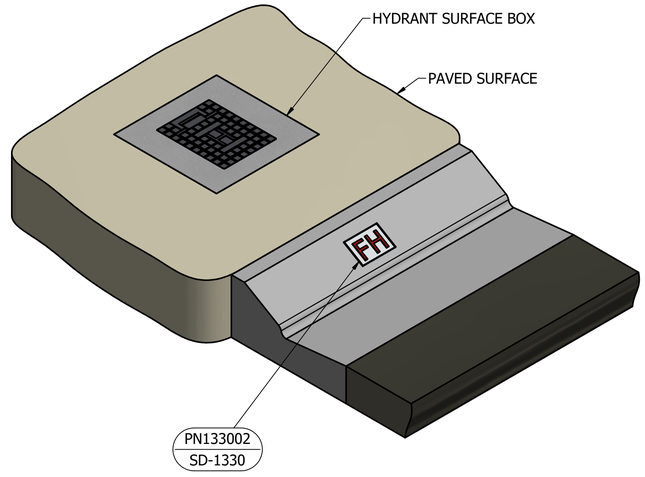
MARKER POST
TYPICAL INSTALLATION



INSTALLATION TYPE 3
PIPELINE MARKER POSTS IN
AREAS REQUIRING GRASS CUTTING



INSTALLATION TYPE 4
PIPELINE MARKER POSTS IN UNPAVED AREAS
WHICH DO NOT REQUIRE GRASS CUTTING



INSTALLATION TYPE 5
HYDRANT (OR VALVE) KERB MARKERS

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	APPLICABILITY CHART UPDATED	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

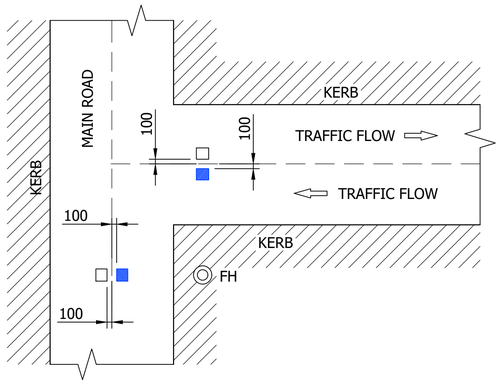
STANDARD DRAWING
PIPELINE AND NETWORKS
MARKER POSTS, KERB MARKINGS AND LABELS
SHEET 2 OF 2

DRAWING STATUS: Current

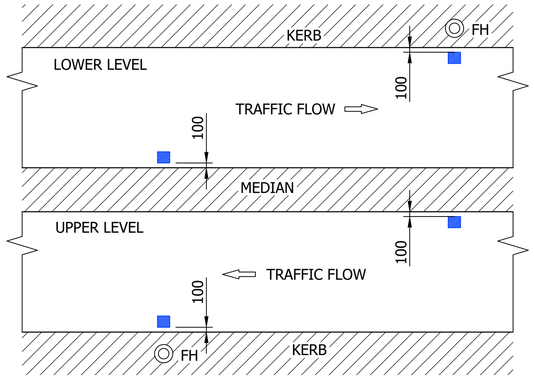
SD-1331-D

A1

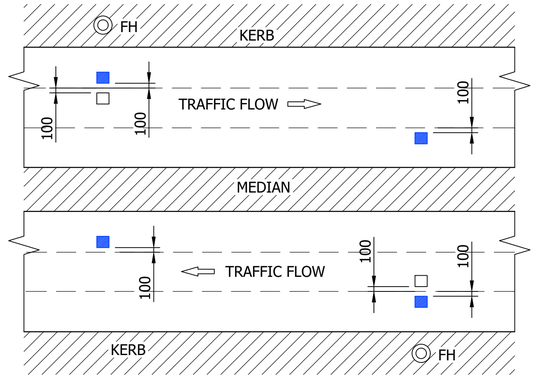
ISSUE: B



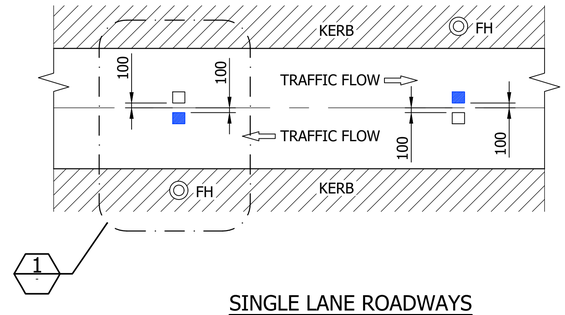
INTERSECTIONS



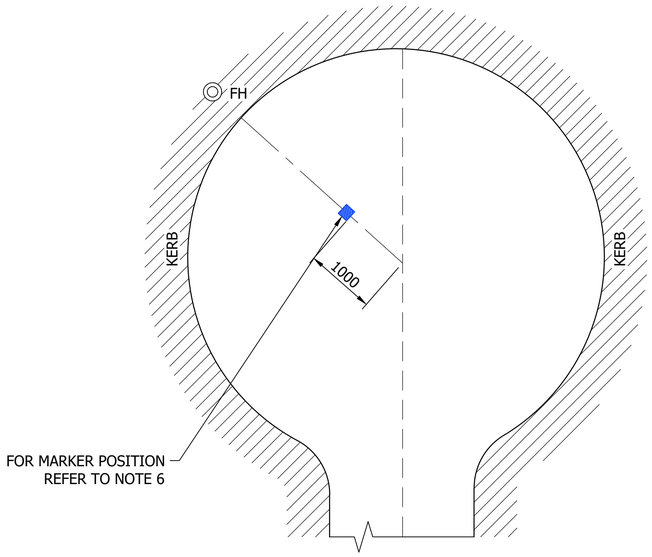
SPLIT LEVEL ROADS



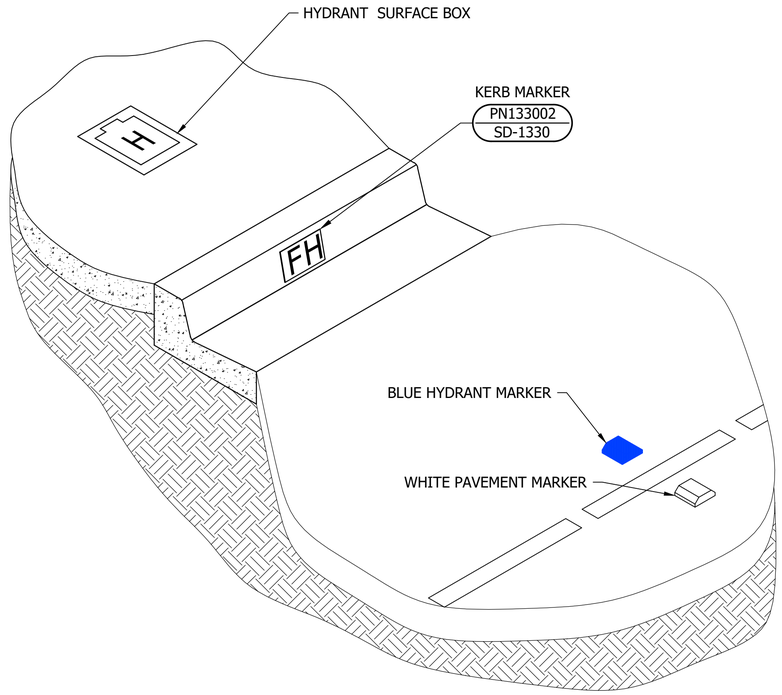
MULTILANE ROADWAYS



SINGLE LANE ROADWAYS



CUL DE SACS



DETAIL 1

TYPICAL HYDRANT KERB MARKER INSTALLATION

NOTES:

1. BLUE REFLECTIVE HYDRANT MARKERS ('CATS EYES' - 2-WAY BLUE) SHOULD BE ADHERED TO THE ROAD SURFACE WITH BITUMINOUS RESIN OR HIGH STRENGTH IMPACT EPOXY ADHESIVE.
2. THE BLUE MARKERS ARE TO BE ADHERED TO THE ROAD SURFACE IN LINE WITH THE HYDRANT, 100 mm OFF THE CENTRELINE OF THE ROAD TOWARDS THE SIDE ON WHICH THE HYDRANT IS LOCATED.
3. WHERE THE CENTRE OF THE ROAD IS NOT MARKED, A NORMAL WHITE PAVEMENT MARKER IS TO BE INSTALLED IN THE CENTRE OF THE ROAD AND THE BLUE MARKER ADJACENT TO IT AND IN LINE WITH THE HYDRANT.
4. ON MULTILANE ROADWAYS, MARKERS ARE TO BE INSTALLED 100 mm FROM THE LEFT AND RIGHT HAND LANE DELINEATORS, TOWARDS THE SIDE ON WHICH THE HYDRANT IS LOCATED.
5. WHERE A HYDRANT IS LOCATED AT AN INTERSECTION THE BLUE MARKERS ARE TO BE POSITIONED ON BOTH ROADS, IN LINE WITH THE HYDRANT AND 100 mm OFF THE CENTRELINE OF THE ROAD TOWARDS THE SIDE OF THE ROAD ON WHICH THE HYDRANT IS LOCATED.
6. IF A HYDRANT IS LOCATED IN A CUL DE SAC THE BLUE MARKER IS TO BE INSTALLED APPROXIMATELY ONE METRE FROM THE CENTRE OF THE CUL DE SAC, OFFSET TOWARDS THE POSITION OF THE HYDRANT.
7. IF A ROAD HAS ONE TRAFFIC LANE HIGHER THAN THE OTHER A BLUE MARKER IS TO BE INSTALLED IN LINE WITH THE HYDRANT 100 mm FROM THE KERB ON THE SIDE OF THE ROAD TOWARDS THE HYDRANT.
8. "FH" DENOTES FIRE HYDRANT, REFER TO STANDARD DRAWING SD-1330 FOR LABEL DETAILS.
9. A BLUE REFLECTIVE HYDRANT MARKER (IN THE ROAD) AND A KERB MARKER IS REQUIRED FOR EACH HYDRANT, NOT JUST ONE OR THE OTHER.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	MARKER NOTE ADDED	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

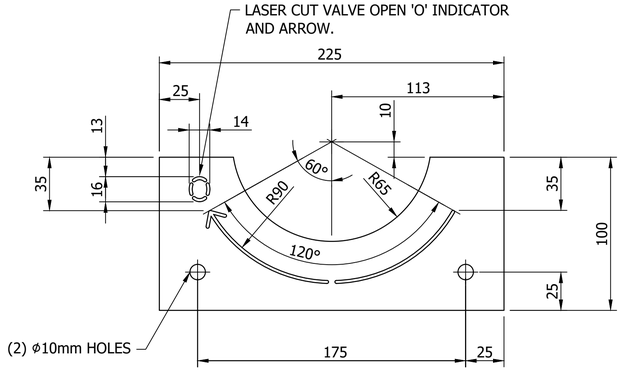
STANDARD DRAWING
WATER NETWORK
FIRE HYDRANT MARKERS ON ROADS

DRAWING STATUS: Current

SD-1332-D

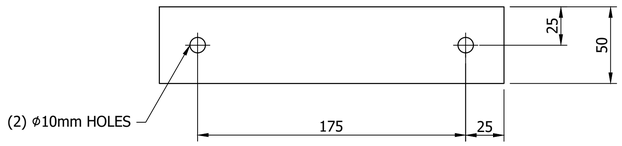
A1

ISSUE B



PLAN

INDICATOR PLATE

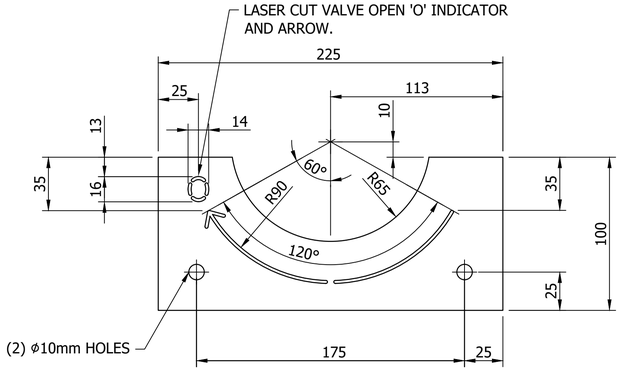


PLAN

SECURING PLATE

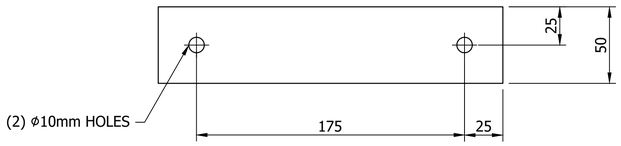
MATERIAL: STAINLESS STEEL - GRADE 316 - 3 mm THICK
COATING: NIL
FINISH COLOUR: MILL FINISH
MASS: N/A

ITEM	AMDT.
PN138001	



PLAN

INDICATOR PLATE

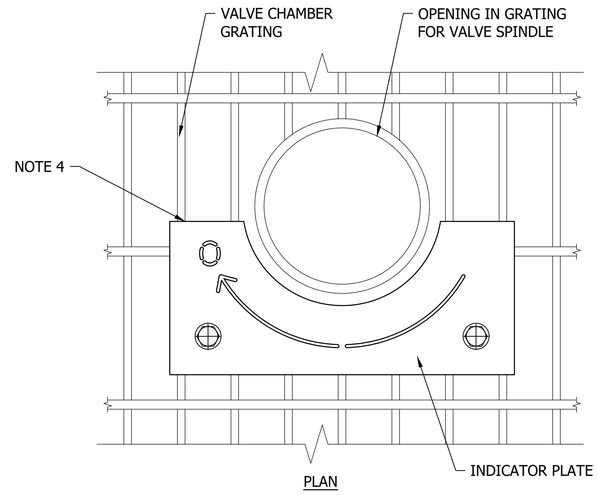


PLAN

SECURING PLATE

MATERIAL: ALUM. ALLOYS 5083-H116 OR 6060-T5 - 3 mm THICK
COATING: NIL
FINISH COLOUR: MILL FINISH
MASS: N/A

ITEM	AMDT.
PN138002	



PLAN

ELEVATION

GENERAL ARRANGEMENT VALVE OPEN/CLOSE INDICATOR PLATE

SCALE: N.T.S.

NOTES:

1. REFER TO ICON WATER'S "9100 SERIES" DRAWINGS FOR FABRICATION NOTES.
2. ALL VALVES TO HAVE DIRECTION OF ROTATION SHOWN AT THE POINT OF MANUAL OPERATION.
3. WATER NETWORK: GATE VALVES DN80 AND LARGER SHALL BE ANTICLOCKWISE CLOSE.
   SEWER NETWORK: GATE VALVES DN80 AND LARGER SHALL BE CLOCKWISE CLOSE.
4. INDICATOR PLATES MAY BE TACK-WELDED AS APPROPRIATE RATHER THAN MECHANICALLY FASTENED. GRIND DOWN PATTERN WHEN FASTENING OR WELDING TO CHECKER PLATE.
5. THE OPENING IN THE GRATING FOR THE VALVE SPINDLE SHALL BE MADE LARGER (AS APPROPRIATE) WHEN VALVE SPINDLES ARE NOT INSTALLED PLUMB (i.e. NOT VERTICAL). THE DIMENSIONS PROVIDED ON THIS DRAWING RELATE TO VERTICAL SPINDLES ONLY.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	NOTE 5 ADDED	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

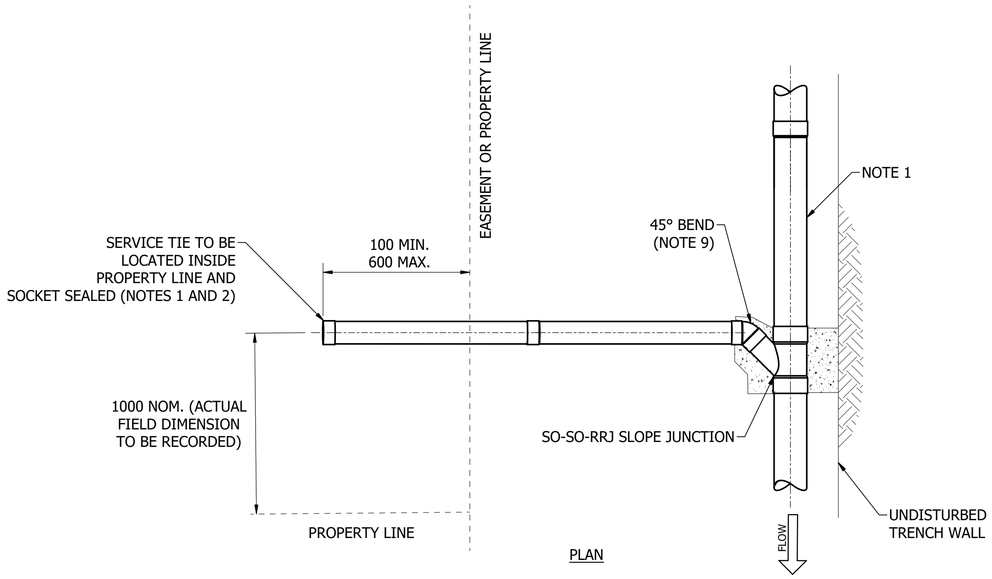
STANDARD DRAWING
WATER NETWORK
VALVE DIRECTION OF ROTATION INDICATOR PLATES

DRAWING STATUS: Current

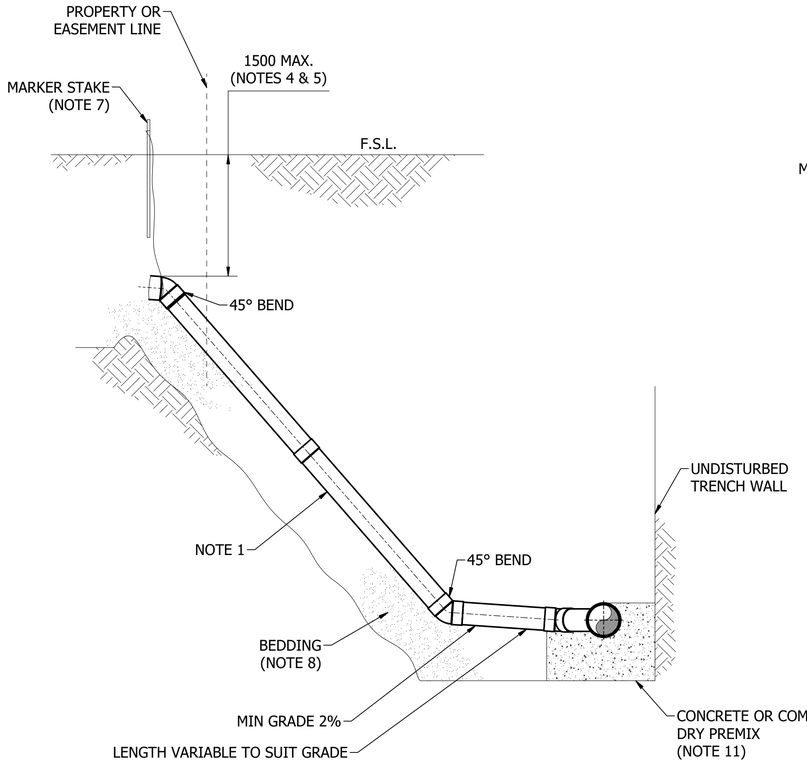
SD-1380-D

A1

ISSUE: B

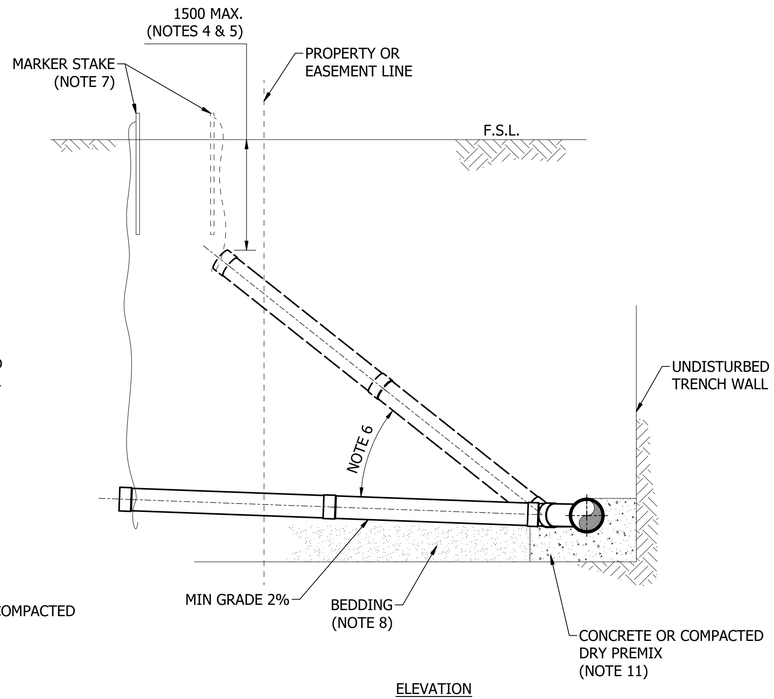


PLAN



ELEVATION

FOR SEWER DEPTHS BETWEEN 3500 AND 5000



ELEVATION

FOR SEWER DEPTHS LESS THAN 3500

45 DEGREE JUMP UP DIRECT CONNECTION TO SEWER OUTSIDE LEASE

NOTES:

1. ONLY ONE FIELD CUT SHALL BE PROVIDED ON FULL PIPE LENGTHS BETWEEN CONSECUTIVE SEWER TIES AND MH'S WITH THE EXCEPTION OF SHORT PIPE LENGTHS INSTALLED TO ALLOW FOR DIFFERENTIAL SETTLEMENT BETWEEN ADJACENT RIGID STRUCTURES. OTHERWISE, STANDARD LENGTHS MUST BE USED TO OBTAIN THE NECESSARY DIMENSIONS.

2. FOR DEAD ENDS AND SERVICE TIES, VC SERVICES SHALL BE SEALED WITH A VC PLUG, RUBBER RING AND GALVANISED WIRE RETAINING CLIP. PVC SERVICES SHALL BE SEALED WITH A SOLVENT CEMENTED END CAP OR SCREW CAP.

3. VERTICAL RISERS (AS SHOWN ON SD-2006) SHALL ONLY BE PROVIDED WHEN THE LICENSED PLUMBER OR BUILDER IS REQUIRED TO EXCAVATE (AS PART OF THEIR SCOPE OF WORKS) FOR A TIE DEPTH GREATER THAN 1500 mm OR WHEN THERE IS INSUFFICIENT SPACE ON PUBLIC LAND TO PERMIT ANY OTHER APPROVED MEANS OF ACHIEVING A TIE (e.g. 45° JUMP UP DIRECT CONNECTION OR A MAINTENANCE HOLE WITH AN EXTERNAL DROP). VERTICAL RISERS SHALL BE INSTALLED DURING THE INSTALLATION OF THE SEWER MAIN AND SHALL BE CAPPED AT A DEPTH OF 600 mm. IT IS THE RESPONSIBILITY OF THE LICENSED PLUMBER TO CONNECT TO THE RISER TO FORM THE TIE POINT AT THE APPROPRIATE DEPTH (TO A MAXIMUM OF 1500 mm). THE LICENSED PLUMBER SHALL, AT THE TIME OF CONNECTION, EXTEND THE RISER AND CAP IT AT THE FINISHED SURFACE LEVEL AS PER THE DETAILS SHOWN.

4. MINIMUM DEPTH OF COVER:

   a) FOR RESIDENTIAL BLOCKS, IT SHALL BE 600 mm AT ALL POINTS (BASED ON A MAXIMUM POSSIBLE LENGTH OF HOUSE DRAIN AT A GRADE OF 1 IN 50).

   b) FOR INDUSTRIAL AND COMMERCIAL BLOCKS, IT SHALL BE 900 mm.

   c) FOR ROAD RESERVES AND ROADWAYS, IT SHALL BE 900 mm.

5. THE DEPTH OF THE TIE POINT PROVIDED BY A PLUMBER OR BUILDER AS PART OF THEIR SCOPE OF WORKS FOR CONNECTION OF A SERVICE TIE SHALL BE 1500 mm MAX, UNLESS A PROJECT SPECIFIC APPROVAL IS OBTAINED FROM ICON WATER. PROJECT SPECIFIC APPROVALS SHALL BE LIMITED TO A MAXIMUM TIE POINT DEPTH OF 2500 mm.

6. SERVICE TIES MAY BE ANGLED UP TO SUIT TO A MAXIMUM OF A 100% GRADE (i.e. 1:1).

7. SERVICE TIE LOCATIONS SHALL BE IDENTIFIED WITH AN APPROVED MARKER TAPE (REF: ICON WATER APPROVED PRODUCTS LIST). THE TAPE SHALL BE SECURED TO THE END OF THE TIE AND BROUGHT VERTICALLY TO THE SURFACE AND ATTACHED TO A MARKER STAKE WHICH PROTRUDES 300 mm ABOVE THE FINISHED SURFACE LEVEL.

8. LOW SLUMP CONCRETE BEDDING SHALL BE USED FOR GRADES EXCEEDING 15% AND UP TO 50%. A 150 mm THICK N15 PLAIN CONCRETE SURROUND SHALL BE USED FOR GRADES EXCEEDING 50%.

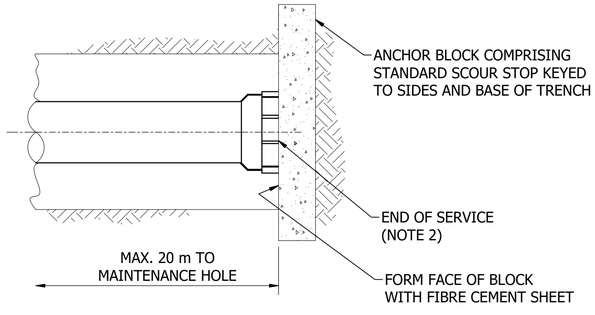
9. TIE AND SEWER BENDS SHALL HAVE A DIAMETER ≥ 2.5 x PIPE DIAMETER.

10. MINIMUM SEPARATION BETWEEN PROPERTY (SEWER) BRANCH LINES AND OTHER SERVICES SHALL BE 250 mm. FOR SEWER MAINS, REFER TO SD-2101.

11. CONCRETE OR COMPACT DRY PREMIX SUPPORTING THE SLOPE JUNCTION IS TO FULLY SUPPORT THE Y-ELBOW AND CURTAIL CONCRETE 25 mm BEFORE THE ENDS OF THE FITTINGS. NO SPECIAL FORMWORK IS REQUIRED ON THE PROVISO THAT THE JUNCTION IS FULLY SUPPORTED SO THAT (i) THE PIPE INVERT LEVEL DOES NOT DROP AND (ii) THE JUNCTION IS SUPPORTED TO PREVENT "PUNCH THROUGH" DURING RODDING ACTIVITIES.

12. REFER TO ICON WATER SPECIFICATION STD-SPE-M-006 FOR SPECIFIC DETAILS REGARDING WHEN MH's, BVR's AND JUMP UPS ARE TO BE USED.

13. ALL JUNCTION ARMS ARE TO BE RUBBER RING JOINT (TO ALLOW FOR DIFFERENTIAL SETTLEMENT BETWEEN THE MAIN AND BRANCH LINE).



SEWER DEAD END DETAIL

(ONLY TO BE USED FOR FUTURE UPSTREAM CONNECTIONS)

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	16/05/2018	S. Essery	K. Danenbergsons	D. Eager
B	NOTES AND SLOPE JUNCTION LEADER UPDATES	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick
C	NOTE 11 UPDATED	17/07/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS				
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

STANDARD DRAWING
SEWERAGE NETWORK
PROPERTY CONNECTION DETAILS
SEWER TIES
SHEET 1 OF 2

DRAWING STATUS: Current

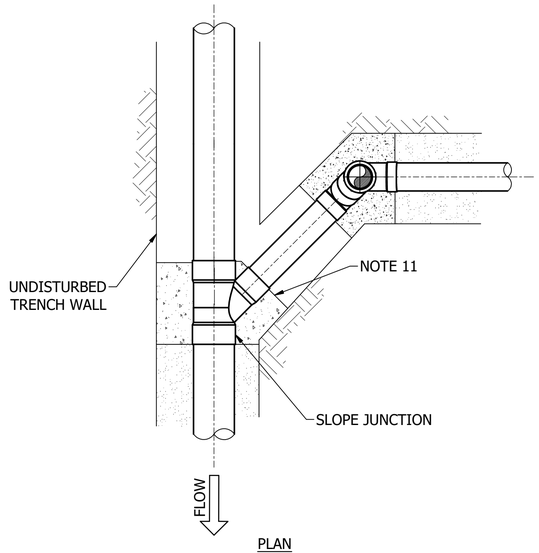
SD-2005-D

A1

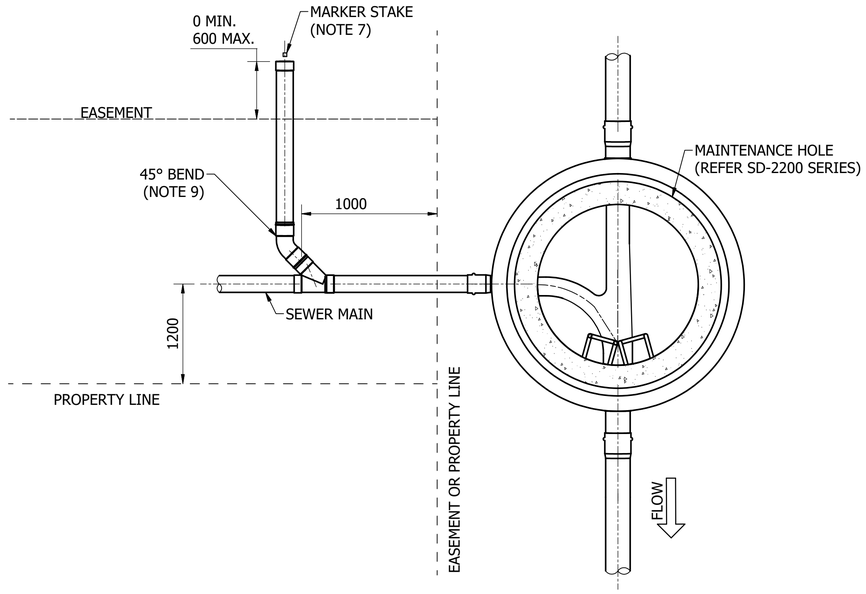
ISSUE: C

NOTES:

FOR ALL NOTES REFER TO SD-2005

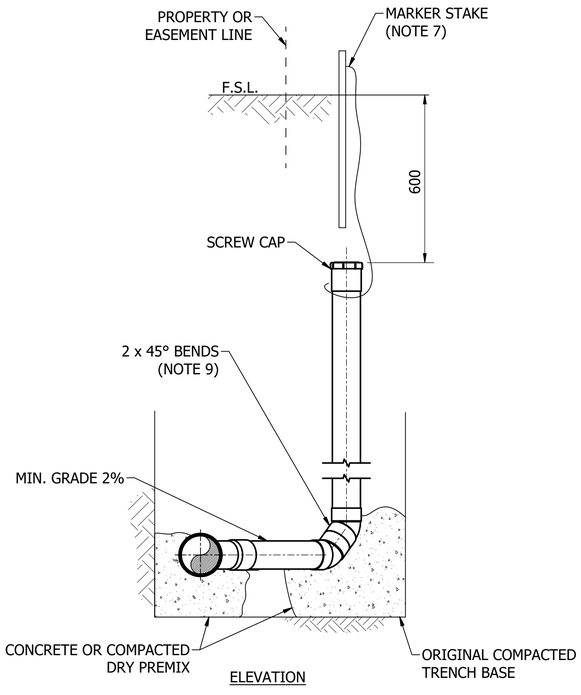


PLAN



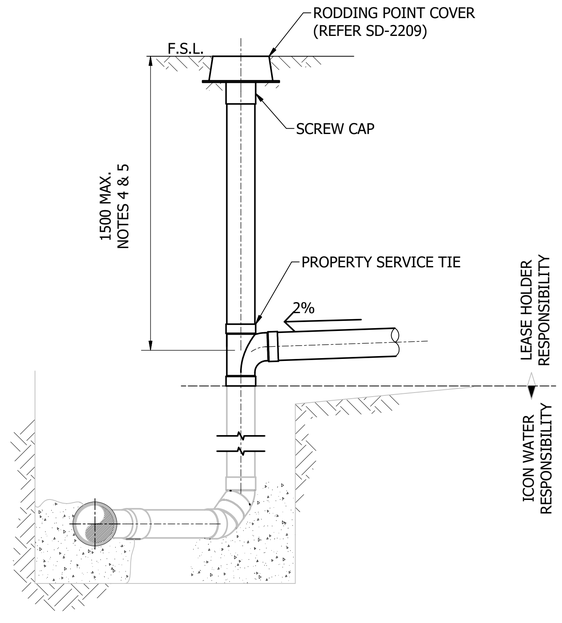
PLAN

SEWER MAIN AND TIE WITHIN LEASE



ELEVATION

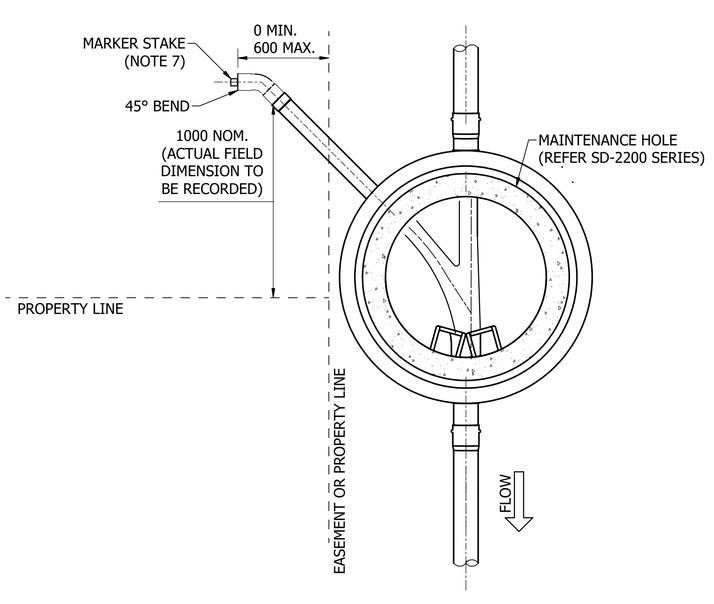
INITIAL SEWER AND
RISER INSTALLATION



ELEVATION

FINAL PROPERTY TIE CONNECTION

VERTICAL RISERS
INSTALLATION AND CONNECTION
(NOTE 3)



PLAN

SEWER TIE TO MAINTENANCE HOLE
(NOTE 12)

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM		RES		SPS				
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

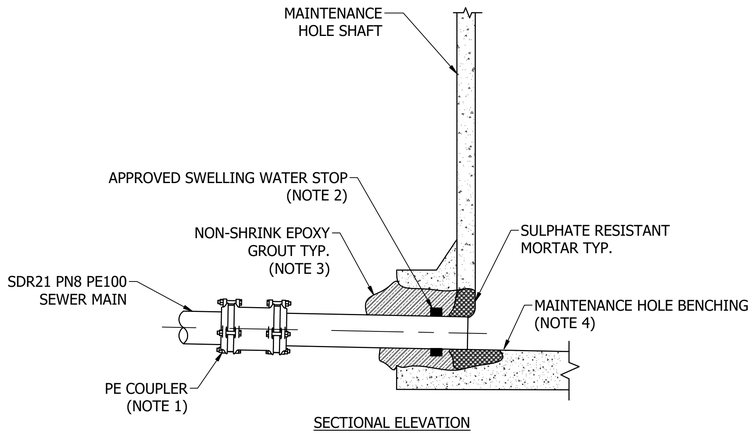
STANDARD DRAWING
SEWERAGE NETWORK
PROPERTY CONNECTION DETAILS
SEWER TIES
SHEET 2 OF 2

DRAWING STATUS: Current

SD-2006-D

A1

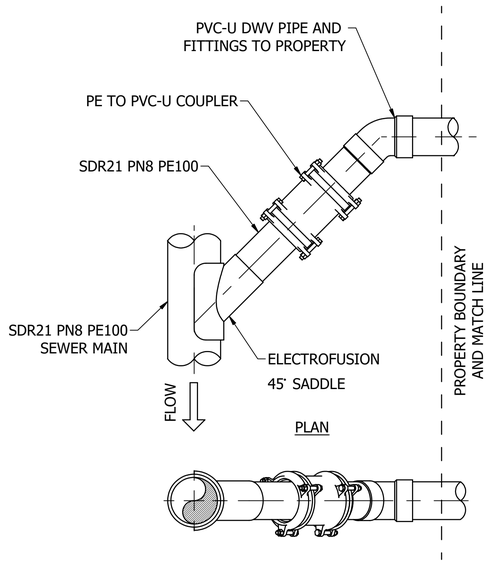
ISSUE: A



SECTIONAL ELEVATION

MAINTENANCE HOLE CONNECTION DETAILS

SCALE: N.T.S

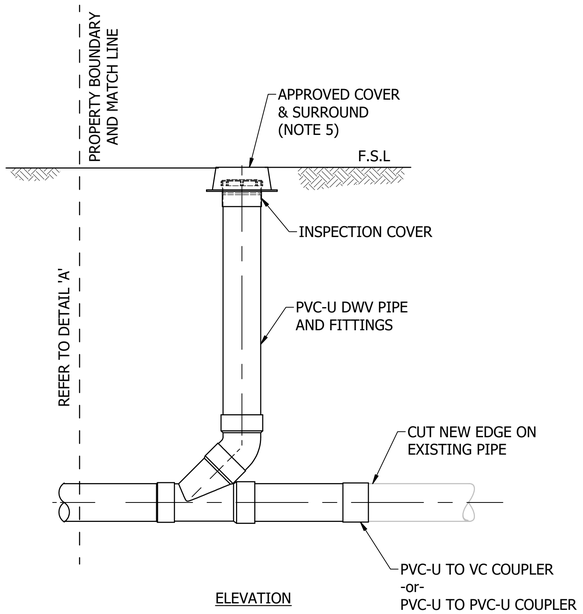


PLAN

ELEVATION

DETAIL 'A' TYPICAL MAINS CONNECTION

SCALE: N.T.S



ELEVATION

NORMAL GRADED TIE

SCALE: N.T.S

NOTES:

1. PE JUNCTION TO BE JOINED USING AN ELECTROFUSION COUPLING OR AN APPROVED MECHANICAL COUPLING.

2. WATERSTOP IS TO BE LOCATED IN THE CENTRELINE OF MAINTENANCE HOLE WALL.

3. COMPACTED GROUT IS TO FILL VOIDS LEFT FROM BREAKING OUT MAINTENANCE HOLE.

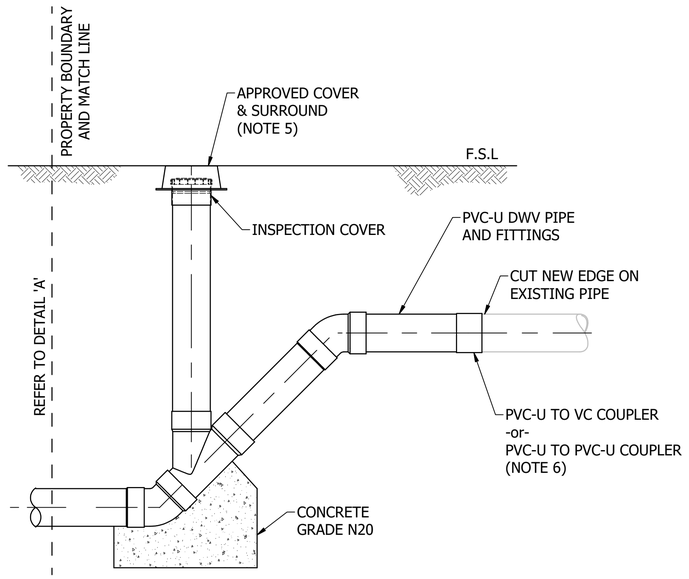
4. BENCHING IS TO BE REINSTATED AS PER SD-2208.

5. INSPECTION SHAFT COVER AND SURROUNDS DETAILS SHALL MATCH THE DETAILS FOR SEWER MAINTENANCE SHAFTS AND RODDING POINTS. REFER TO SD-2209.

6. IF THE CONNECTION TO THE PROPERTY LINE IS PVC-U TO VC OR EARTHENWARE, THE JOINT SHALL BE HAUNCHED WITH CONCRETE.

7. FOR BEDDING DETAILS, REFER TO TABLE 1 OF SD-2102 (AS WELL AS SD-2005 WHEN GRADES EXCEED 15%).

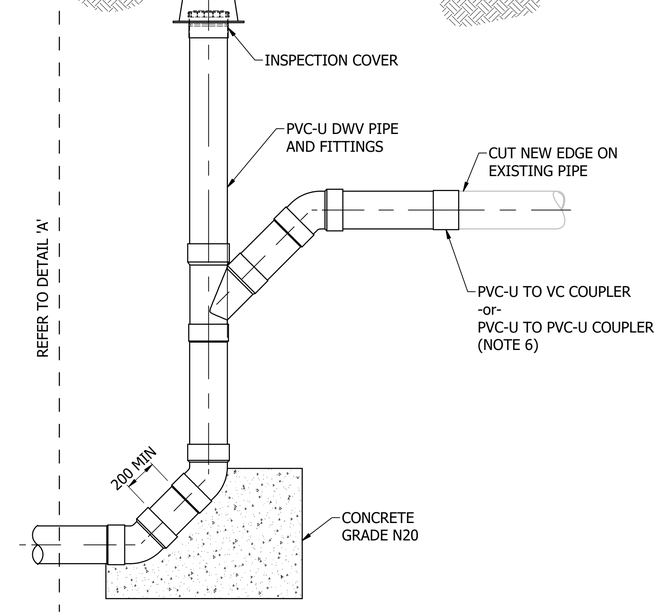
8. ALL CONSTRUCTION DETAILS ON THE CUSTOMER SIDE OF THE SEWER TIE SHALL COMPLY WITH THE PLUMBING CODE OF AUSTRALIA.



ELEVATION

45° JUMP-UP

SCALE: N.T.S



ELEVATION

VERTICAL JUMP-UP

SCALE: N.T.S

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	30/08/2018	S. Essery	W. Ambadeniya	K. Danenbergsons

DAM		RES		SPS				
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

STANDARD DRAWING
SEWERAGE NETWORK
TYPICAL MAINS CONSTRUCTION
TYPICAL MAINS RENEWAL - PIPEBURSTING

DRAWING STATUS: Current

SD-2010-D

A1

ISSUE: A

NOTES:

1. BENCHING IS TO BE REINSTATED AS PER SD-2208.

2. INSPECTION SHAFT COVER AND SURROUNDS DETAILS SHALL MATCH THE DETAILS FOR SEWER MAINTENANCE SHAFTS AND RODDING POINTS. REFER TO SD-2209.

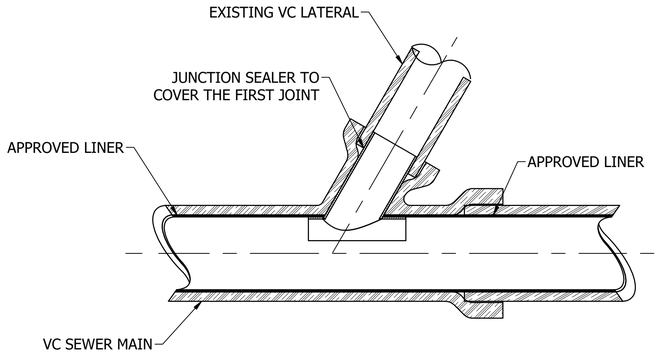
3. IF THE CONNECTION TO THE PROPERTY LINE IS PVC-U TO VC OR EARTHENWARE, THE JOINT SHALL BE HAUNCHED WITH CONCRETE.

4. FOR BEDDING DETAILS, REFER TO TABLE 1 OF SD-2102 (AS WELL AS SD-2005 WHEN GRADES EXCEED 15%).

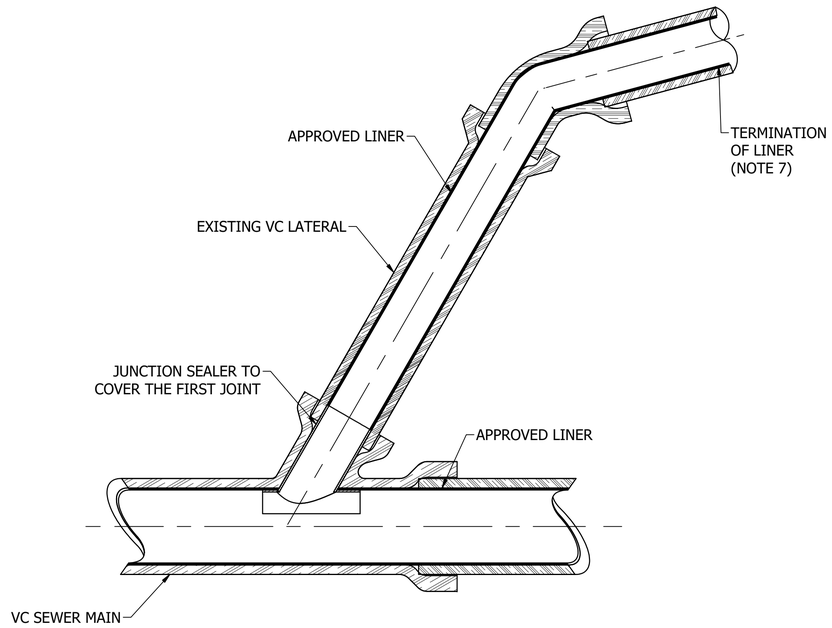
5. ALL CONSTRUCTION DETAILS ON THE CUSTOMER SIDE OF THE SEWER TIE SHALL COMPLY WITH THE PLUMBING CODE OF AUSTRALIA.

6. INSTALL THE PVC-EARTHENWARE CONNECTOR AS CLOSE AS POSSIBLE TO THE MAIN SEWER LINE TO ENSURE PIPE LINING COVERS THE JOINT. REMOVE THE VC PIPE SOCKET (IF APPLICABLE) TO FACILITATE THE CONNECTOR INSTALLATION LOCATION.

7. LATERAL LINER TO TERMINATE AT PROPERTY INSPECTION SHAFT OPENING.



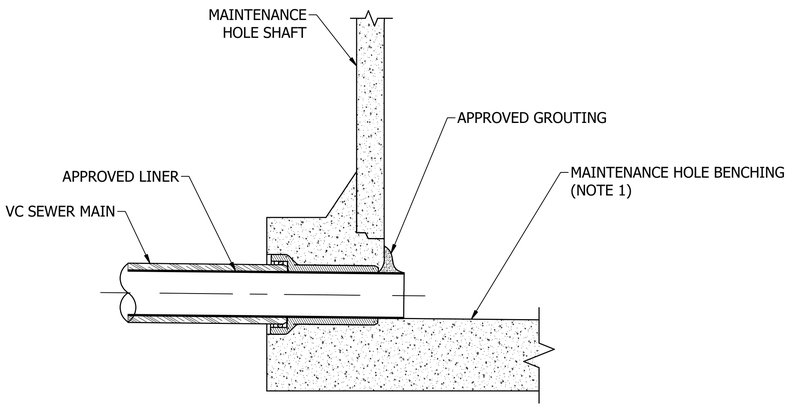
TYPE 1: JUNCTION ONLY LINING



TYPE 2: JUNCTION AND LATERAL LINING

MAINS SEWER LINING WITH EXISTING VC LATERAL

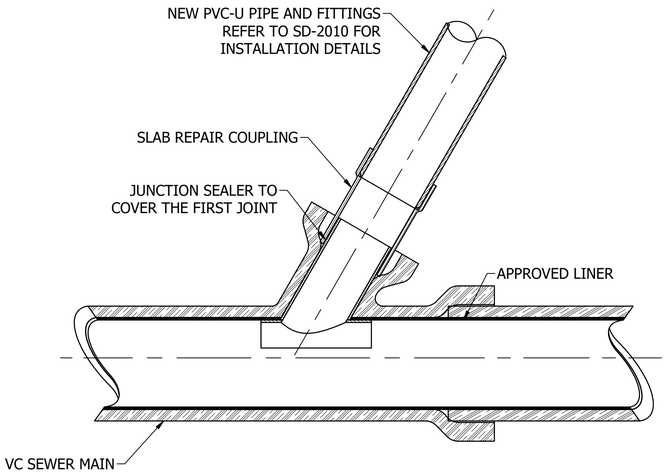
SCALE : N.T.S



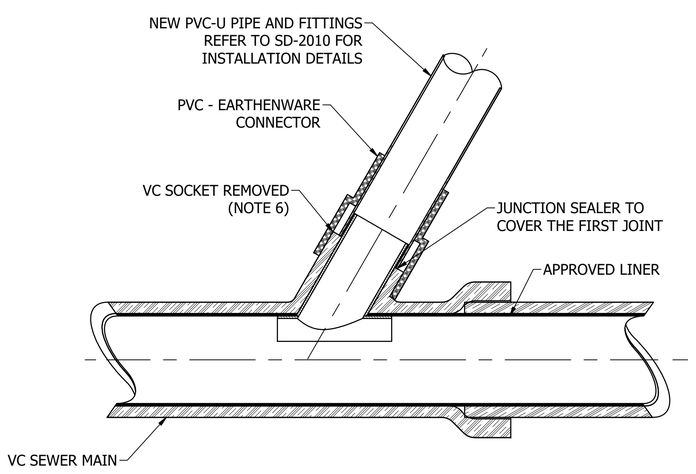
SECTIONAL ELEVATION

MAINTENANCE HOLE DETAILS

SCALE: N.T.S



TYPE 3: PVC-U LATERAL WITH SLAB REPAIR COUPLING



TYPE 4: PVC-U LATERAL WITH PVC-EARTHENWARE COUPLING

MAINS SEWER LINING WITH NEW PVC-U LATERAL

SCALE : N.T.S

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	30/08/2018	S. Essery	J. Moktan	K. Danenbergsons

DAM		RES		SPS	
BWS		WAT		STP	
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
SEWERAGE NETWORK
TYPICAL MAINS CONSTRUCTION
TYPICAL MAINS RENEWAL - PIPE LINING

DRAWING STATUS: Current

SD-2011-D

A1

ISSUE: A

TABLE 1
EMBEDMENT AND NATIVE SOIL - MATERIALS AND MODULI FOR DESIGN OF BURIED FLEXIBLE PIPES*

MATERIALS				MODULI E'_e (EMBANKMENT MATERIAL) AND E'_n (NATIVE MATERIAL) MPa			
DESCRIPTION	CLASSIFICATION		UNCOMPACTED	R_D (%) (DRY DENSITY RATIO)			
	AS 1726 †	AS 2758.1		85	90	95	100
				I_D (%) (DENSITY INDEX)			
				50	60	70	80
			STANDARD PENETRATION TEST ‡ NUMBER OF BLOWS				
			≤4	>4 ≤14	>14 ≤24	>24 ≤50	>50
GRAVEL - SINGLE SIZE	-	COARSE AGGREGATE	5§	7§	7§	10§	14
GRAVEL - GRADED	-		3§	5§	7§	10§	20
SAND AND COARSE-GRAINED SOIL WITH LESS THAN 12% FINES	GP, SW, SP AND GM-GL, GC-SC etc.	-	1	3§	5§	7§	14
COARSE-GRAINED SOIL WITH MORE THAN 12% FINES	GM, GC, SC, SM AND GM-SC, GC-SC	-	NR	1§	3§	5§	10
FINE-GRAINED SOIL (LL<50%) WITH MEDIUM TO NO PLASTICITY AND CONTAINING MORE THAN 25% COARSE-GRAINED PARTICLES	CL, ML, MIXTURES ML-CL, AND ML-MH	-	NR	1§	3§	5§	10
FINE-GRAINED SOIL (LL<50%) WITH MEDIUM TO NO PLASTICITY AND CONTAINING LESS THAN 25% COARSE-GRAINED PARTICLES	CI, CL, ML, MIXTURES ML-CL, CL-CH AND ML-MH	-	NR	NR	1	3	7
FINE-GRAINED SOIL (LL>50%) WITH MEDIUM TO HIGH PLASTICITY	CH, MH AND CH-MH	-	NR	NR	NR	NR	NR

* VALUES APPLY FOR COVERS TO 10.0 m AND ARE CONSERVATIVE FOR GREATER COVERS.

† SEE APPENDIX A OF AS/NZS 2566.1 SUPP 1.

‡ FOR NATIVE SOILS ONLY. SEE AS 1289.6.3.2.

§ THESE VALUES ARE THE MORE COMMONLY USED AND ACHIEVED IN PRACTICE.

NR = NO RELIABLE MODULUS VALUES FOR THESE MATERIALS. SPECIALIST GEOTECHNICAL ASSESSMENT AND STRUCTURAL DESIGN IS REQUIRED.

NOTES:

1. FOR DESIGN OF BURIED FLEXIBLE PIPES ONLY. FOR RC PIPES REFER TO AS 3725 AND FOR VC PIPES REFER TO AS 4060.
2. VALUES ARE CONSERVATIVE AS THEY CONTAIN A REDUCTION IN MODULUS WHICH OCCURS WHEN GROUND WATER IS ABOVE THE PIPE. ALLOWANCE CAN BE MADE FOR DRY GROUND CONDITIONS. (SEE AS/NZS 2566.1 SUPP 1.)
3. WHERE APPROPRIATE, GEOTEXTILE IS TO BE PLACED BETWEEN NATIVE SOIL AND EMBEDMENT MATERIAL TO PREVENT MIGRATION OF FINES.
4. WHERE STABILISED MATERIALS ARE USED, THE DESIGNER SHALL DETERMINE VALUES FOR E'_e FOR THE SPECIFIED MATERIAL.

TABLE 2
MINIMUM COMPACTION OF EMBEDMENT

MATERIAL TYPE	TEST METHOD	MINIMUM VALUE (%)			
		TRAFFICABLE AREAS		NON-TRAFFICABLE AREAS	
		EMBEDMENT	TRENCH / EMBANKMENT FILL	EMBEDMENT	TRENCH / EMBANKMENT FILL
COHESIONLESS [3]	DENSITY INDEX (I_D) AS 1289.5.6.1	FLEXIBLE PIPES: 70[1] RIGID PIPES: 70[1,4]	70[2]	60	60
COHESION	DRY DENSITY RATIO (R_D) TO AS 1289.5.4.1 & Hilf DENSITY[3] TO AS 1289.5.7.1	FLEXIBLE PIPES: 95 RIGID PIPES: 95	95	90	90

NOTES:

1. SINGLE SIZE COARSE AGGREGATES OF SIZES 7, 10 AND 14 mm ARE DEEMED "SELF COMPACTING" AND DO NOT REQUIRE COMPACTION TESTING WHEN USED FOR PIPE EMBEDMENT.
2. THE ROAD OWNER (e.g. TCCS) MAY SPECIFY ALTERNATIVE VALUES.
3. GRADED GRAVELS AND SANDS HAVING FINES (SILTS AND CLAYS) GREATER THAN 5% TO HAVE THEIR COMPACTION DETERMINED BY THE DRY DENSITY RATIO TEST METHOD.
4. INCREASE PIPE CLASS (STIFFNESS) TO AVOID USING SUPPORT TYPE BETTER THAN HS2 FOR GREATER BURIED DEPTH/COVER.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	APPLICABILITY CHART UPDATED	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES THE USE OF AS/NZS 2566 IN THE DEVELOPMENT OF THIS DRAWING.

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC			

ASSET AREA APPLICABILITY

STANDARD DRAWING
SEWERAGE AND WATER NETWORKS
PIPE EMBEDMENT AND TRENCH FILL MATERIALS

DRAWING STATUS: Current

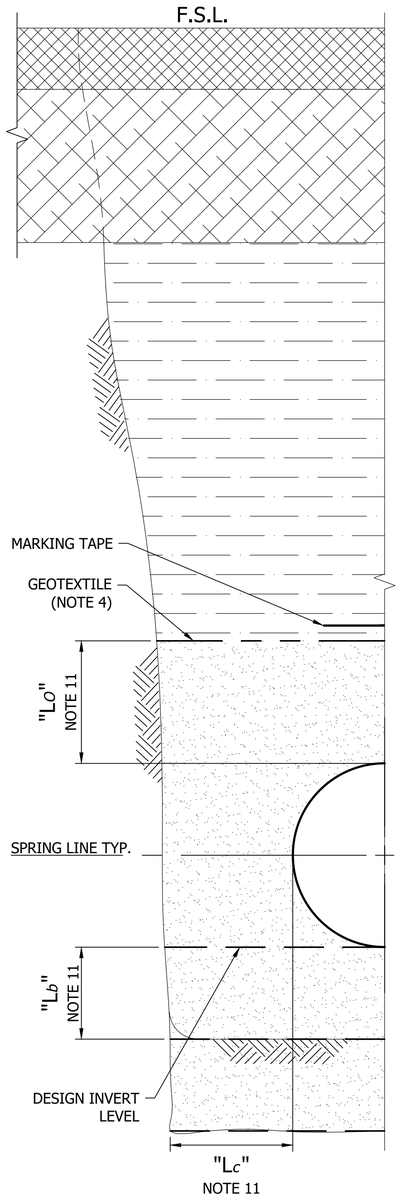
SD-2100-C

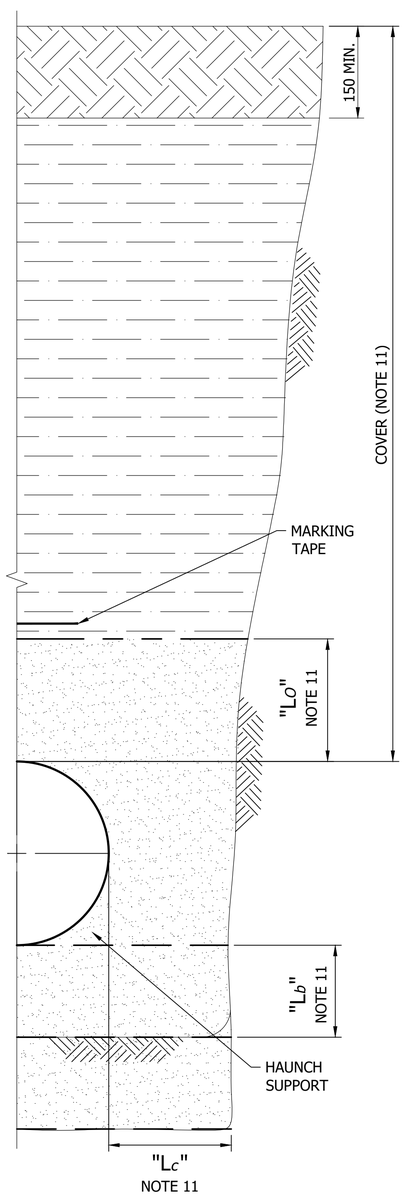
A1

ISSUE: B

MATERIAL		ZONE
ROAD SURFACE	VERGE & TRACK	
ROAD SURFACE LAYER	TO MATCH EXISTING	SURFACE COURSE
TO MATCH EXISTING ROAD BASE OR TO ROAD OWNERS REQUIREMENTS	ROAD SUB BASE MATERIAL DGS20, DGS40 OR GMS40 (REFER TO TCCS STANDARD SPECIFICATION)	ROAD BASE
ROAD SUB BASE MATERIAL DGS20, DGS40 OR GMS40 (REFER TO TCCS STANDARD SPECIFICATION)		TRENCH FILL
EMBEDMENT MATERIAL IN ACCORDANCE WITH DESIGN DRAWINGS AND ICON WATER REQUIREMENTS (NOTE 3) BEDDING MAY BE OMITTED IF TRENCH BASE IS GRANULAR SAND OR GRAVEL OF SUITABLE GRADING.		OVERLAY (EMBEDMENT)
		SIDE SUPPORT (EMBEDMENT)
		BEDDING (EMBEDMENT)
		OVER-EXCAVATION

TRAFFICABLE AREAS





ZONE		MATERIAL
TOPSOIL OR PAVEMENT		ORIGINAL OR IMPORTED MATERIAL TO MATCH EXISTING
TRENCH FILL		INORGANIC ENGINEERED FILL MATERIAL WITH 75 MAXIMUM STONE SIZE TO WSA-PS-363 OR DGS20 TO TCCS STANDARD SPECIFICATION
EMBEDMENT	OVERLAY	EMBEDMENT MATERIAL IN ACCORDANCE WITH DESIGN DRAWINGS AND ICON WATER REQUIREMENTS (NOTE 3) BEDDING MAY BE OMITTED IF TRENCH BASE IS GRANULAR SAND OR GRAVEL OF SUITABLE GRADING.
	SIDE SUPPORT	
	BEDDING	
OVER-EXCAVATION		

NON TRAFFICABLE AREAS

INCLUDES LOCATIONS WHERE OCCASIONAL VEHICLE LOADING OCCURS (e.g. RESERVES AND VERGES OUTSIDE THE TRAFFICABLE AREA).

NOTES:

1. SPECIFY SPECIAL BEDDING MATERIAL TO SUIT THE CONDITIONS IF THE TRENCH FLOOR HAS:
   - IRREGULAR OUTCROPS OF ROCK.
   - SOIL MODULUS DENOTED "NR" IN TABLE 1 ON DRAWING SD-2100.
   - BEEN DISTURBED BY UNCONTROLLED GROUND WATER.
2. COMPACT AND EVENLY GRADE TRENCH FLOOR.
3. EMBEDMENT, TRENCH FILL AND COMPACTION TO MEET THE REQUIREMENTS OF DESIGN DRAWINGS AND WSA 02 2014 V3.1 FOR SEWER AND WSA 03 FOR WATER AS AMENDED BY ICON WATER SUPPLEMENTS STD-SPE-G-011 AND 012 RESPECTIVELY.
4. USE GEOTEXTILE FILTER FABRIC WHERE SPECIFIED.
5. SIDES OF EXCAVATION TO BE KEPT VERTICAL TO AT LEAST 150 ABOVE PIPE.
6. MINIMUM COVER SHALL BE SPECIFIED BY THE DESIGNER IN DESIGN DRAWINGS IN ACCORDANCE WITH TABLE 1 OF SD-2106. PROVIDE COVER UNDER FINISHED ROAD LEVEL AS REQUIRED BY ROAD AUTHORITY AND ICON WATER.
7. CROSSINGS UNDER RAILWAYS SHALL BE DESIGNED USING ENGINEERING PRINCIPLES AND IN CONSULTATION WITH THE RAIL AUTHORITY.
8. IN GENERAL THE PIPE DESIGN SHALL ENSURE THAT PIPES ARE NOT LAID DEEPER THAN 5000. DESIGN OF PIPES DEEPER THAN 5000 SHALL BE SUBJECT TO SPECIAL APPROVAL BY ICON WATER. IN THESE CASES, ICON WATER MAY REQUIRE THAT THE PIPES BE LAID AS MAINTENANCE FREE CONDUITS WITH A PLAIN CONCRETE SURROUND (SEE BEDDING TYPE "G" ON SD-2103).
9. TRAFFICABLE AREAS INCLUDE:
   - THE FULL WIDTH OF ANY EXISTING OR PROPOSED ROAD CARRIAGEWAY PLUS SHOULDERS AND EXTENDING TO 1 m BEYOND THE SHOULDERS AND KERBS.
   - THE FULL WIDTH OF ANY PROPERTY ACCESS DRIVEWAY AND EXTENDING 1 m EITHER SIDE.
   - THE FULL LENGTH OF ANY CONSTRUCTED FOOTWAY INCLUDING, BUT NOT LIMITED TO, CONCRETE, ASPHALT AND CRUSHED ROCK PAVEMENTS.
   - THE FULL WIDTH OF ANY MEDIAN STRIP.
   - ANY OTHER AREA SUBJECT TO VEHICULAR TRAFFIC.
10. STANDARD TRENCH DETAILS NOT TO BE USED IN REGIONS OF POTENTIAL SLIP, UNSTABLE OR TALUS GROUND.
11. REFER TO SD-2106 FOR MINIMUM COVER, TRENCH CLEARANCES AND CLEARANCES TO OTHER SERVICES.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	MAJOR DRAWING UPDATE	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING, IN PARTICULAR, DRAWING :SEW-1201

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC			

ASSET AREA APPLICABILITY

icon WATER

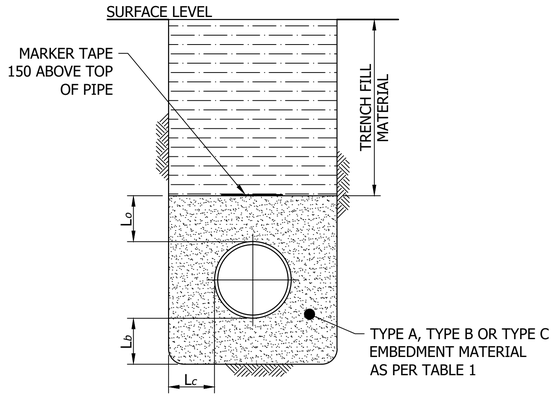
STANDARD DRAWING
SEWERAGE AND WATER NETWORKS
PIPE EMBEDMENT AND TRENCH FILL
TYPICAL ARRANGEMENT

DRAWING STATUS: Current

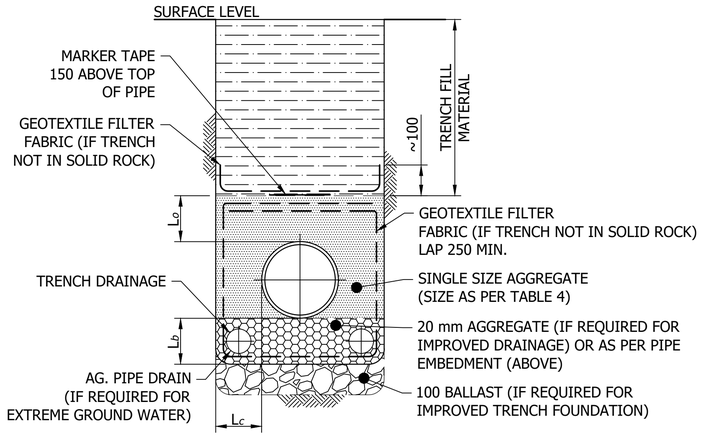
SD-2101-C

A1

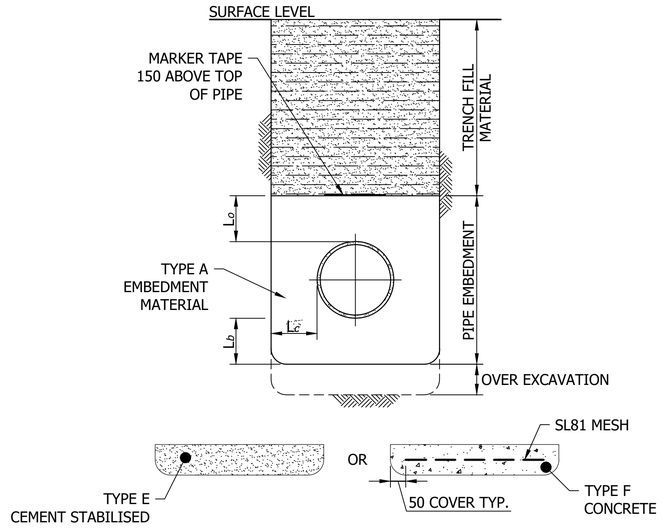
ISSUE B



TYPE A - STANDARD EMBEDMENT
TYPE B - CEMENT STABILISED
AND
TYPE C - CONTROLLED LOW STRENGTH MATERIAL (CLSM) EMBEDMENT



TYPE D - SINGLE SIZED AGGREGATE EMBEDMENT



TYPE E - CEMENT STABILISED
AND
TYPE F - CONCRETE
WHERE OVER-EXCAVATION OR LOW BEARING CAPACITY TRENCH BOTTOM OCCURS

TABLE 1

EMBEDMENT TYPE	APPLICATION	APPROVED MATERIALS*
TYPE A - STANDARD	FOR USE WHERE THERE ARE NO STRUCTURAL ISSUES OR GROUNDWATER	WSA PS-350, WSA PS-360, WSA PS-361
TYPE B - CEMENT STABILISED SAND	FOR USE WHEN ASSET PROTECTION IS REQUIRED (e.g. WATER MAINS UNDER MAJOR CROSSINGS) OR WHEN MINIMUM COVER CANNOT BE ACHIEVED.	WSA PS-350 (SAND) PLANT MIXED WITH 5% CEMENT PLACED AND COMPACTED DRY
TYPE C - CLSM	FOR USE WHERE COMPACTION IN TRENCH IS DIFFICULT TO ACHIEVE DUE TO TIME OR SPACE CONSTRAINTS OR WHERE NATIVE SOIL CONDITIONS PROVIDE INSUFFICIENT FOUNDATION STRENGTH OR SOIL MODULUS FOR SIDE SUPPORT	WSA PS 352, 28-day COMPRESSIVE STRENGTH 0.7 MPa, SLUMP 180 mm COMPACTION IS NOT REQUIRED

1. IF SIGNIFICANT GROUNDWATER IS OBSERVED DURING EXCAVATION BUT EMBEDMENT TYPE A IS NOMINATED IN THE DESIGN, THE DESIGNER SHOULD BE CONSULTED TO RECONSIDER THE EMBEDMENT SYSTEM SELECTION AND PROVISON OF DRAINAGE.
2. WHEN USING CLSM, MEASURES SHALL BE TAKEN TO PREVENT FLOATATION OF PIPE DURING PLACEMENT.

TABLE 2

EMBEDMENT TYPE	APPLICATION	APPROVED MATERIALS*
TYPE D - AGGREGATE (SINGLE SIZED)	FOR USE WHERE SIGNIFICANT GROUNDWATER IS PRESENT OR COULD REASONABLY BE EXPECTED	WSA PS-351

1. EMBEDMENT SHALL BE WRAPPED IN GEOTEXTILE TO WSA PS-355, WITH MINIMUM 250 mm LAP AT ALL JOINTS.
2. IF THE TRENCH HAS SOLID ROCK ON BOTH SIDES AND UNDERNEATH THE EMBEDMENT MATERIAL, FILTER FABRIC IS ONLY REQUIRED ON THE TOP SURFACE (AS SHOWN).
3. WHERE THE TRENCH FLOOR IS SOFT (i.e. BOOTS SINK INTO THE FLOOR UNDER A PERSON'S WEIGHT), PRESS 100 BALLAST INTO THE TRENCH FLOOR UNTIL IT CAN TAKE A PERSON'S WEIGHT WITHOUT MOVEMENT.
4. PROVIDE TRENCH STOPS AND/OR BULKHEADS AND TRENCH DRAINAGE (IF REQUIRED) AS PER SD-2104.
5. AGGREGATE TO BE WELL-ROUNDED WITH NO SHARPS.
6. MAXIUMUM PARTICLE SIZE AS PER TABLE 4.

TABLE 4 - MAXIMUM PARTICLE SIZE

NOMINAL PIPE DIAMETER (DN)	MAXIMUM PARTICLE SIZE (mm)
<100	10
100 ≤ DN ≤ 150	14
>150	20

TABLE 3

EMBEDMENT TYPE	APPLICATION	APPROVED MATERIALS*
TYPE E - CEMENT STABILISED SAND	FOR USE WHERE OVER EXCAVATION HAS OCCURRED DUE TO POOR SOIL CONDITIONS AND WHEN THERE IS LITTLE OR NO GROUNDWATER	WSA PS-350(SAND) PLANT MIXED WITH 5% CEMENT PLACED AND COMPACTED DRY
TYPE F - CONCRETE	FOR USE IN SHORT SPANS (<1000) OF LOW BEARING CAPACITY GROUND (SOFT CLAYS AND LOOSE SAND.	CONCRETE GRADE N25 TO AS 3600. STRENGTH - 25 MPa MAX AGGREGATE - 20 MAX SLUMP - 80

1. IF SIGNIFICANT GROUNDWATER IS OBSERVED DURING EXCAVATION BUT EMBEDMENT TYPE A IS NOMINATED IN THE DESIGN, THE DESIGNER SHOULD BE CONSULTED TO RECONSIDER THE EMBEDMENT SYSTEM SELECTION AND PROVISION OF DRAINAGE.
2. CONCRETE SHALL BE SULFATE RESISTANT TYPE IF NATIVE SOIL IS CLASSIFIED AS ACID SULFATE SOIL (ASS) WHICH CONTAINS GREATER THAN 0.1% SULFATE AND NET ACID GENERATION POTENTIAL GREATER THAN 0.0.

* DESIGNER SHALL NOMINATE ONLY ONE APPROVED MATERIAL ON THE PROJECT CONSTRUCTION DRAWINGS FOR EACH EMBEDMENT TYPE (FOR EXAMPLE "TYPE A EMBEDMENT, WSA PS-350").

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DIMENSIONS AND APPLICABILITY CHART UPDATES. DRAWING NOW -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES MRWA IN THE DEVELOPMENT OF THIS DRAWING, IN PARTICULAR, DRAWING : MRWA-S-202

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP	X			
WTP	X	SEW	X					
WPS	X	REC						

ASSET AREA APPLICABILITY

icon WATER

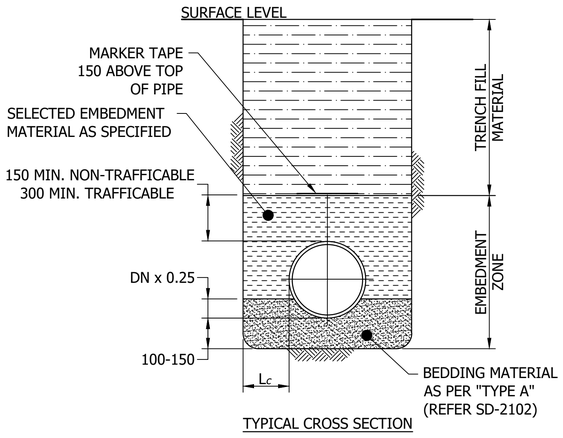
STANDARD DRAWING
SEWERAGE AND WATER NETWORKS
PIPE EMBEDMENT AND TRENCH FILL
GRANULAR AND CEMENT STABILISED EMBEDMENT
DETAILS

DRAWING STATUS: Current

SD-2102-D

A1

ISSUE B



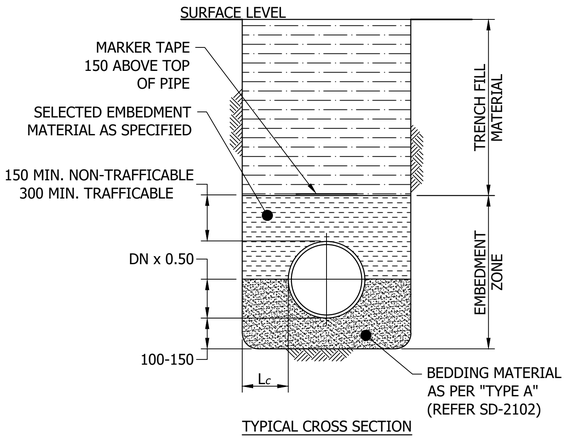
TYPICAL CROSS SECTION

TYPE G - EMBEDMENT

FOR RIGID PIPES (RCP AND VC) ONLY

SCALE: N.T.S.

TABLE 5		
EMBEDMENT TYPE	APPLICATION	APPROVED MATERIALS
TYPE G - EMBEDMENT	FOR USE WITH RCP AND VC PIPES WHERE SPECIFIED BY THE DESIGNER	BEDDING MATERIAL AS PER "TYPE A" (REFER SD-2102), AS SPECIFIED BY THE DESIGNER. REMAINING EMBEDMENT MATERIAL TO BE COMPACTED SELECT FILL TO WSA PS-364



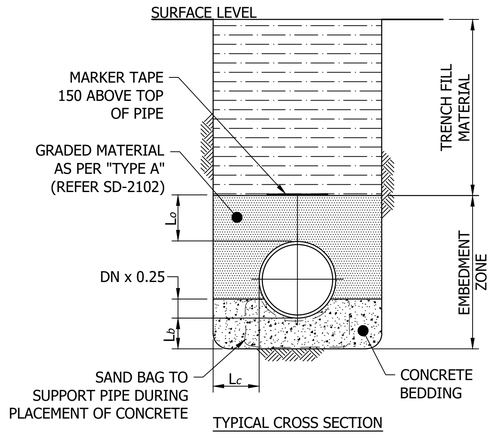
TYPICAL CROSS SECTION

TYPE H - EMBEDMENT

FOR RIGID PIPES (RCP AND VC) ONLY

SCALE: N.T.S.

TABLE 6		
EMBEDMENT TYPE	APPLICATION	APPROVED MATERIALS
TYPE H - EMBEDMENT	FOR USE WITH RCP AND VC PIPES WHERE SPECIFIED BY THE DESIGNER	BEDDING MATERIAL AS PER "TYPE A" (REFER SD-2102), AS SPECIFIED BY THE DESIGNER. REMAINING EMBEDMENT MATERIAL TO BE COMPACTED SELECT FILL TO WSA PS-364



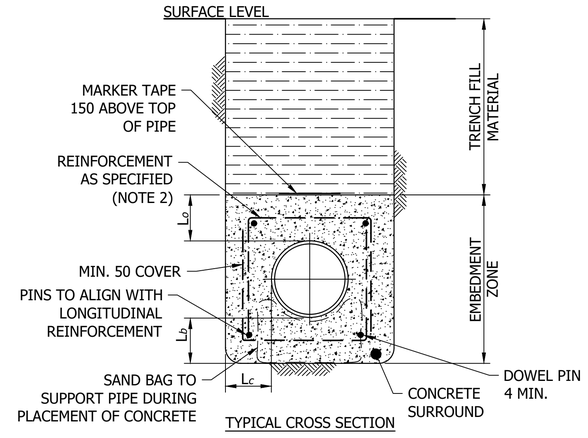
TYPICAL CROSS SECTION

TYPE J - CONCRETE BEDDING

FOR RIGID PIPES (RCP AND VC) ONLY

SCALE: N.T.S.

TABLE 7		
EMBEDMENT TYPE	APPLICATION	APPROVED MATERIALS
TYPE J - CONCRETE BEDDING (SIDE SUPPORT AND OVERLAY AS PER TYPE A)	FOR USE WHERE THERE IS UNSTABLE GROUND AND NO SIGNIFICANT RISK OF THIRD PARTY DAMAGE. UNSTABLE GROUND CAN EXIST WHERE THE PIPE IS LOCATED IN: · DECOMPOSING SOILS HIGH IN ORGANIC CONTENT; · HIGHLY REACTIVE CLAYS; · OLD REFUSE SITES; OR · NON-ENGINEERED FILL	CONCRETE GRADE N25 TO AS 3600. STRENGTH - 25 MPa MAX AGGREGATE - 20 MAX SLUMP - 80 (BEDDING CONCRETE MAY BE PLAIN OR REINFORCED, TO BE SPECIFIED BY THE DESIGNER)



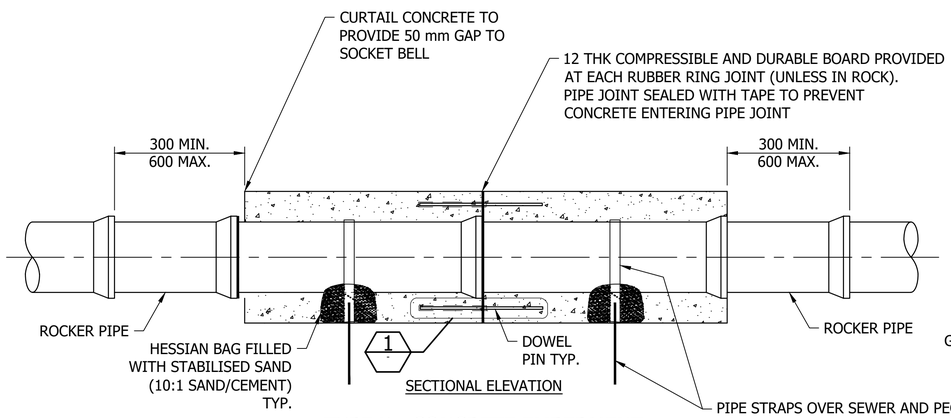
TYPICAL CROSS SECTION

TYPE K - CONCRETE EMBEDMENT

SCALE: N.T.S.

TABLE 8		
EMBEDMENT TYPE	APPLICATION	APPROVED MATERIALS
TYPE K - CONCRETE ENCASEMENT	FOR USE WHERE THERE IS UNSTABLE GROUND AND · THERE IS HIGH RISK OF THIRD PARTY DAMAGE · PIPES ARE LAID ACROSS CREEKS, · AREAS OF INSUFFICIENT FOUNDATION STRENGTH, OR · AREAS WHERE MINIMUM COVER CAN NOT BE OBTAINED.	CONCRETE GRADE N25 TO AS 3600. STRENGTH - 25 MPa MAX AGGREGATE - 20 MAX SLUMP - 80

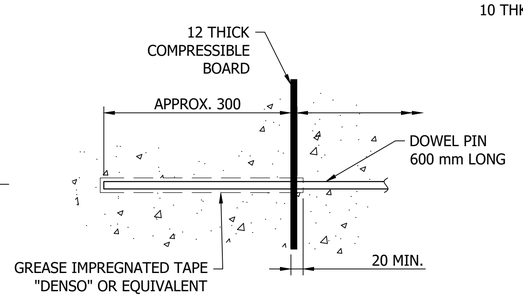
1. FOR DICL, VC, RCP, PE, MS AND GRP PIPES. HOWEVER IT IS PREFERRED THAT DICL BE USED IN THESE AREAS. PVC PIPE SHALL NOT BE USED.
2. MINIMUM STEEL REINFORCEMENT OF 0.4% CONCRETE CROSS SECTION. SPECIFY REINFORCEMENT FOR THE APPLICATION LOADING IN THE DESIGN DRAWINGS.
3. REINFORCED CONCRETE SURROUND SHALL EXTEND 5000 PAST THE POINT WHERE MINIMUM COVER IS RESTORED OR UP TO THE 1:2 ARI FLOODLINE. WHERE MINIMUM COVER CAN NOT BE OBTAINED, PIPE SECTIONS SHALL BE DESIGNED AS STRUCTURAL PIPE BRIDGES TAKING INTO ACCOUNT ALL RELEVANT HYDRAULIC FORCES. THE UNDER SIDE OF A PIPE BRIDGE SHALL BE ABOVE 1:1 ARI.
4. FOR SCOUR PROTECTION AND TRENCH STOP DETAILS SEE STANDARD DRAWING SD-2104.
5. CONCRETE SHALL BE SULFATE RESISTANT TYPE IF NATIVE SOIL IS CLASSIFIED AS ACID SULFATE SOIL (ASS) WHICH CONTAINS GREATER THAN 0.1% SULFATE AND NET ACID GENERATION POTENTIAL GREATER THAN 0.0.



SECTIONAL ELEVATION

TYPE K - CONCRETE EMBEDMENT
JOINT AND END OF ENCASEMENT DETAILS

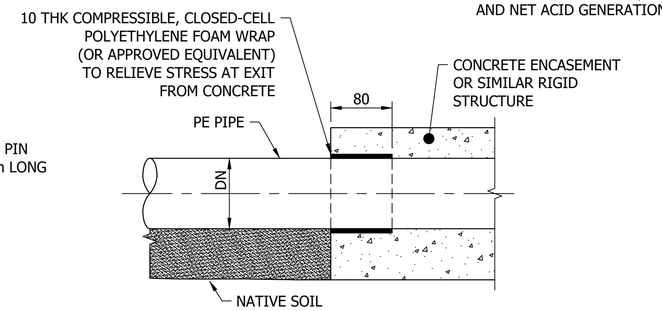
SCALE: N.T.S.



DETAIL 1

DOWEL PIN

SCALE: N.T.S.

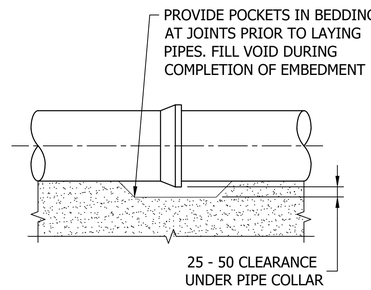


SECTIONAL ELEVATION

TYPE K - CONCRETE EMBEDMENT
PROTECTION OF PE PIPE AT EXIT FROM ENCASEMENT

FOR PE PIPE ONLY

SCALE: N.T.S.



PIPE JOINT BEDDING POCKETS FOR JOINT PROJECTIONS

SCALE: N.T.S.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DIMENSIONS AND APPLICABILITY CHART UPDATED. DRAWING NOW -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X						
BWS	X	WAT	X	STP	X						
WTP	X	SEW	X								
WPS	X	REC									

ASSET AREA APPLICABILITY

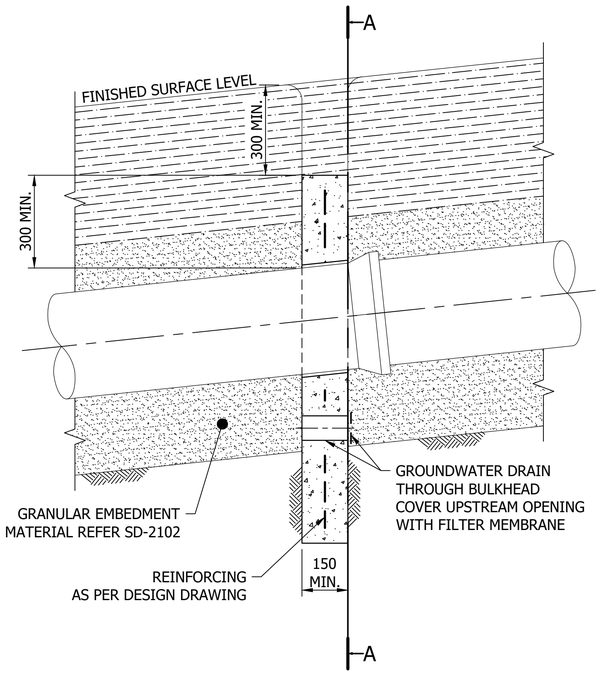
STANDARD DRAWING
SEWERAGE AND WATER NETWORKS
PIPE EMBEDMENT AND TRENCH FILL
CONCRETE BEDDING AND EMBEDMENT
DETAILS

DRAWING STATUS: Current

SD-2103-D

A1

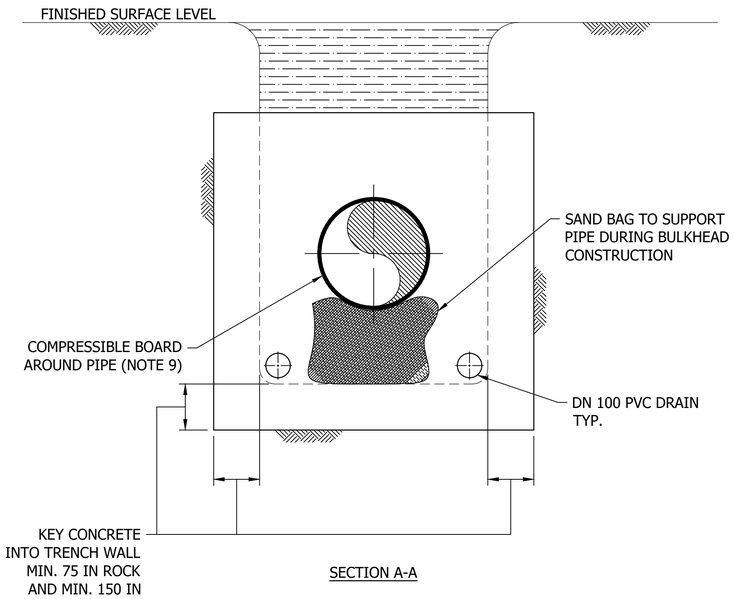
ISSUE B



SECTIONAL ELEVATION

CONCRETE BULKHEAD

SCALE: N.T.S.



SECTION A-A

TYPICAL BULKHEAD

SCALE: N.T.S.

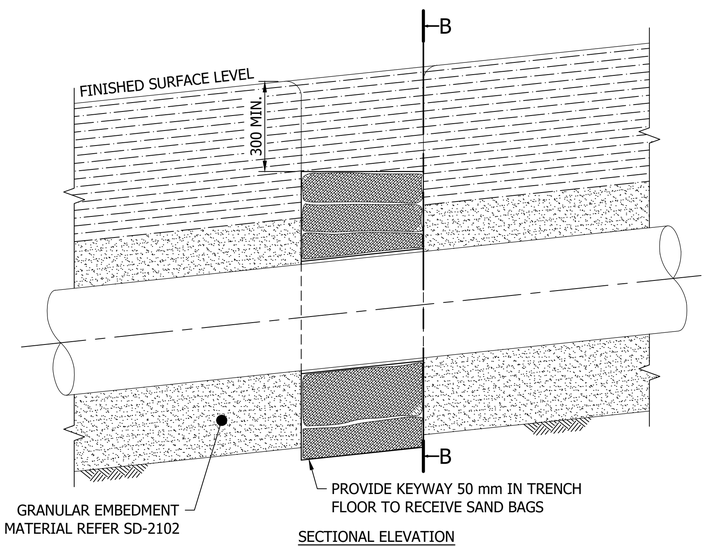
NOTES:

1. CONSTRUCT CONCRETE BULKHEADS AND TRENCH STOPS AT LOCATIONS SPECIFIED ON DESIGN DRAWINGS.
2. BULKHEADS LOCATED UNDER RETAINING WALLS TO BE DIRECTLY UNDER THE WALL.
3. KEY CONCRETE BULKHEADS AND TRENCH STOPS INTO SIDES AND BOTTOM OF TRENCH AGAINST A BEARING SURFACE OF UNDISTURBED SOIL.
4. CONCRETE TO BE CLASS N25.
5. DO NOT DEFORM PIPES DURING PLACEMENT OF CONCRETE.
6. SEAL BAGS TO PREVENT LEAKAGE OF MATERIAL CONTAINED INSIDE.
7. PROVIDE A CONTINUOUS DRAINAGE PATH:
   - THROUGH BULKHEADS AND TRENCH STOPS.
   - AROUND MAINTENANCE HOLES.
   - IN TRENCH EXCAVATIONS ACROSS ROADWAYS.
8. TRENCH DRAINAGE TO BE IN ACCORDANCE WITH SD-2105.
9. COMPRESSIBLE BOARD AROUND PIPE TO BE 3 mm THICK RUBBER FOR BULKHEADS AND TRENCH STOPS.
10. EMBEDMENT AND BACKFILL MATERIAL TO BE PLACED PROGRESSIVELY ON BOTH SIDES OF BULKHEAD / TRENCH STOP.
11. STANDARD TRENCH DETAILS NOT TO BE USED IN REGIONS OF POTENTIAL SLIP, UNSTABLE OR TALUS GROUND.

REQUIREMENTS FOR BULKHEADS AND TRENCH STOPS

TRENCH/PIPE GRADE (%)	REQUIREMENT	SPACING "S" (m)
5-14	TRENCH STOP	S = 100/GRADE(%)
15-29	CONCRETE BULKHEAD	S = L_P/GRADE(%), WHERE L_P = 80 x PIPE LENGTH (m) (450 MAX.) WHERE L_P > 100 m - USE INTERMEDIATE TRENCH STOPS AT SPACING <100/GRADE(%)
30-50	CONTINUOUS CONCRETE ENCASEMENT OF PIPELINE AND CONCRETE BULKHEADS	S= 100/GRADE(%)
>50	SPECIAL DESIGN	

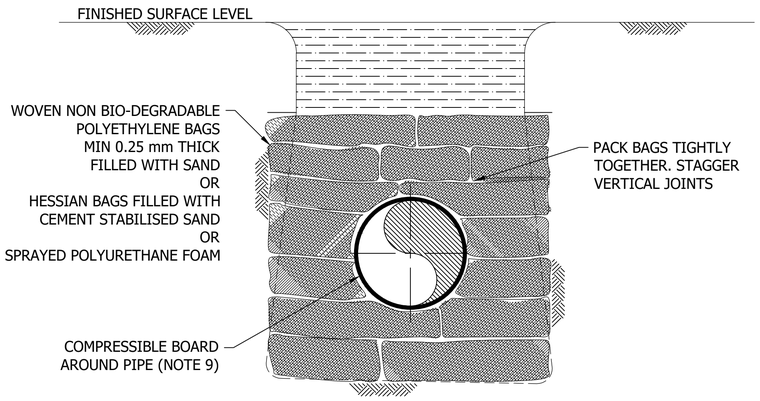
* PIPE LENGTH IS THE STANDARD PIPE LENGTH INSTALLED



SECTIONAL ELEVATION

TRENCH STOP

SCALE: N.T.S.



SECTION B-B

TRENCH STOP

SCALE: N.T.S.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	APPLICABILITY CHART UPDATED. DRAWING NOW -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING, IN PARTICULAR, DRAWING :SEW-1206

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC			

ASSET AREA APPLICABILITY

icon WATER

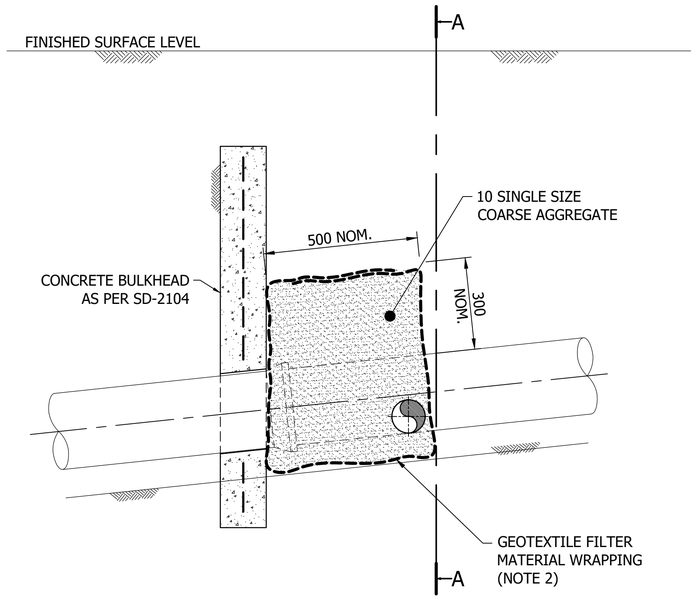
STANDARD DRAWING
SEWERAGE AND WATER NETWORKS
PIPE EMBEDMENT AND TRENCH FILL
BULKHEADS AND TRENCH STOPS
DETAILS

DRAWING STATUS: Current

SD-2104-D

A1

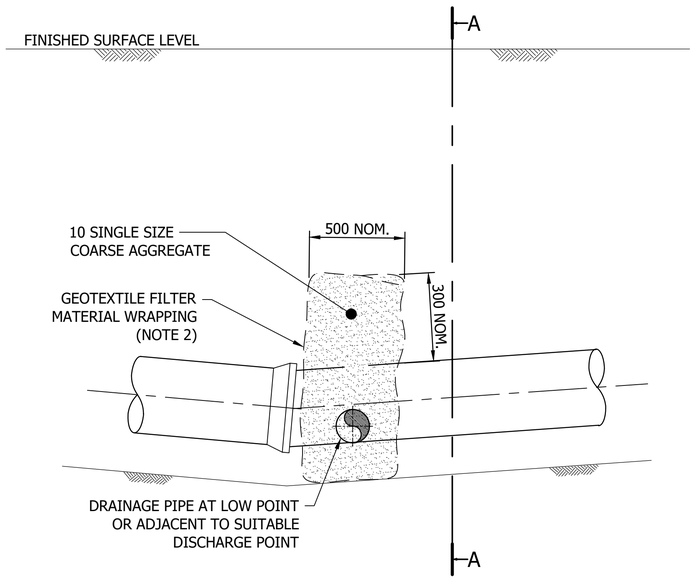
ISSUE B



SECTIONAL ELEVATION

BULKHEAD IN TRENCH

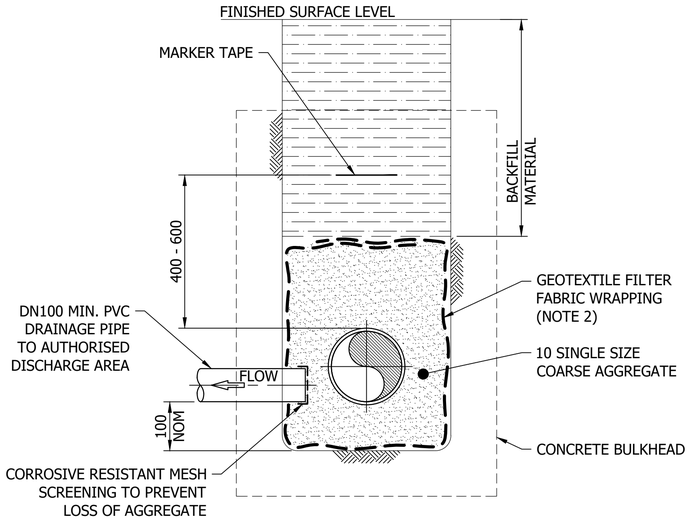
SCALE: N.T.S.



SECTIONAL ELEVATION

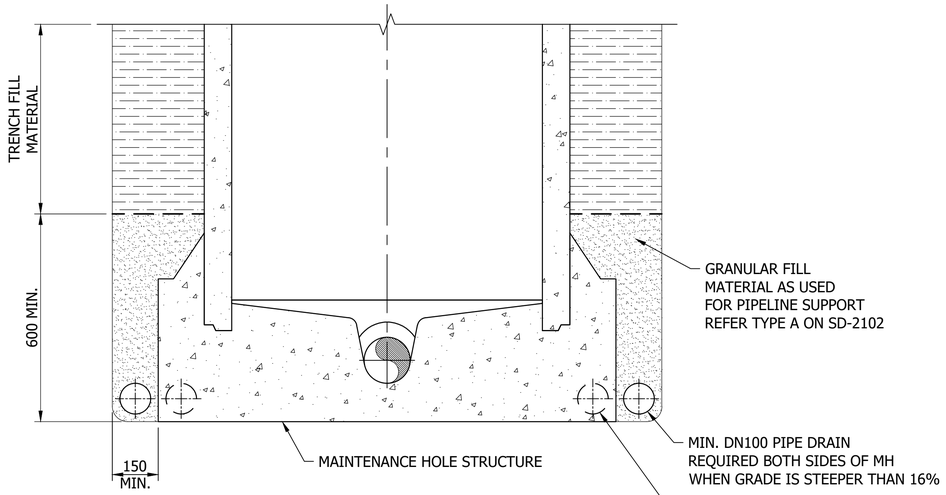
LOW POINT IN TRENCH

SCALE: N.T.S.



SECTION A-A

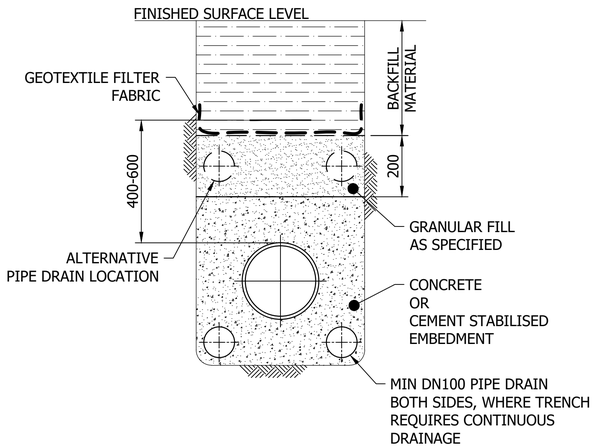
TYPICAL DISCHARGE SYSTEM FOR PIPE TRENCHES



TYPICAL SECTION

DRAINANGE PAST MAINTENANCE HOLES

SCALE: N.T.S.



TYPICAL SECTION

DRAINAGE FOR CONCRETE ENCASEMENT AND CEMENT STABILISATION

SCALE: N.T.S.

NOTES:

1. SHOW ALL DRAINAGE DETAILS INCLUDING TERMINATION POINT(S) ON DESIGN DRAWINGS.
2. LAY GEOTEXTILE FILTER FABRIC IN TRENCH TO FULLY ENCAPSULATE THE DRAINAGE MATERIAL (COARSE AGGREGATE). PROVIDE MINIMUM 250 LAP AT ALL FILTER FABRIC JOINTS.
3. WRAP BOTH ENDS OF DRAINAGE PIPE WITH GEOTEXTILE FILTER FABRIC AND INSTALL SUCH THAT THE PIPE PROTRUDES PAST THE CONCRETE ENCASEMENT INTO THE GRANULAR EMBEDMENT.
4. WHERE ENCASEMENT ENDS WITHIN 1000 OF A MAINTENANCE HOLE, EXTEND ENCASEMENT TO MH AND EXTEND DRAINAGE PIPE BEYOND MH TO ADJOINING PIPELINE EMBEDMENT.
5. PROVIDE A CONTINUOUS DRAINAGE PATH:
   -THROUGH BULKHEADS AND TRENCH STOPS.
   -AROUND MAINTENANCE HOLES.
   -IN TRENCH EXCAVATIONS ACROSS ROADWAYS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	APPLICABILITY CHART UPDATED, DRAWING NOW -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING, IN PARTICULAR DRAWING : SEW-1207

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC			

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
SEWERAGE AND WATER NETWORKS
PIPE EMBEDMENT AND TRENCH FILL
TRENCH DRAINAGE
TYPICAL DETALS

DRAWING STATUS: Current

SD-2105-D

A1

ISSUE B

TABLE 1 - MINIMUM PIPE COVER			
LOCATION	GRAVITY SEWER	PRESSURISED SEWER	WATER
PUBLIC AND PRIVATE BLOCKS, NOT SUBJECT TO VEHICULAR LOADING.	600 - NEW DEVELOPMENTS 450 - EXISTING DEVELOPMENTS	450 #	450 #
PRIVATE BLOCKS ZONED RESIDENTIAL, SUBJECT TO VEHICULAR LOADING.	750	600 #	450 #
FOOTWAYS, NATURE STRIPS, INDUSTRIAL AND COMMERCIAL BLOCKS, SEALED ROAD PAVEMENTS OTHER THAN MAJOR ROADS SUBJECT TO VEHICULAR LOADING.	900	600	600
UNSEALED ROAD CARRIAGEWAYS	1200	750	750
MAJOR ROAD CARRIAGEWAYS	1200	750	750
FUTURE ROAD, RAIL AND TRAM PAVEMENTS.	1200	1200	1200
EMBANKMENTS	750	750	750
FREEWAYS, STATE & NATIONAL HIGHWAYS	1200	1200	1200

WHERE MINIMUM COVER CANNOT BE ACHIEVED, PROVIDE ALTERNATIVE PROTECTION TO THE PIPELINE IN ACCORDANCE WITH THE PROJECT DESIGN DRAWINGS.

LESSER COVER PERMISSIBLE IN AS 3500 NOT TAKEN INTO ACCOUNT AND SHALL BE ASSESSED AS PER AS 3500 AND SOUND ENGINEERING PRINCIPLES

TABLE 2 - TRENCH CLEARANCE			
NOMINAL DIAMETER (DN)	MINIMUM CLEARANCE		
	CLEARANCE AT SPRING LINE ("L_c")	BED ZONE UNDER PIPE ("L_b")	DEPTH OF OVERLAY ("L_o")
≤150	100	100 - 150	150
>150 - ≤300	150	100 - 200	150
>300 - ≤450	200	100 - 200	150
>450 - ≤900	300	100 - 200	150

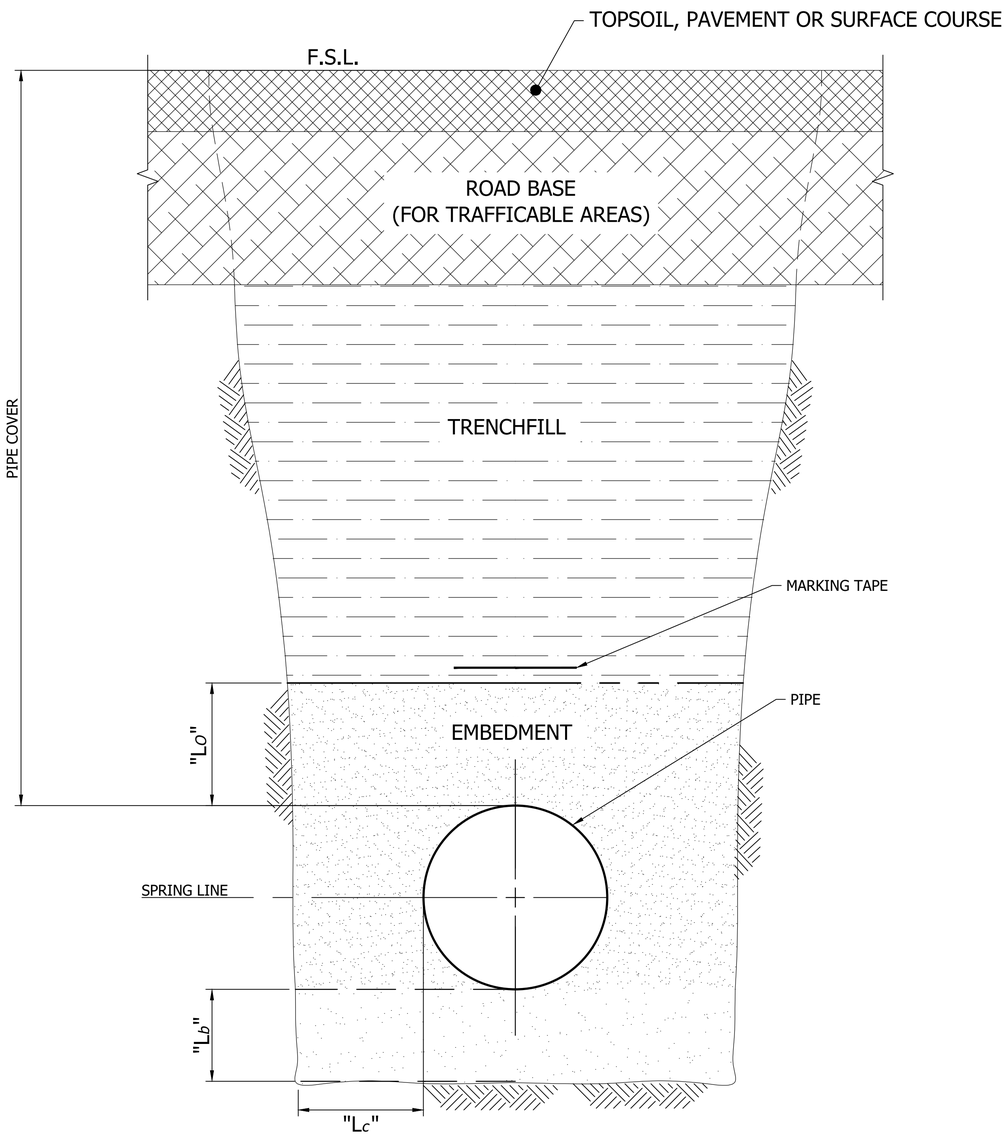
TRENCH WIDTH TO BE SUFFICIENT TO SAFELY LAY PIPE AND COMPACT THE SUPPORT ZONE.

ENSURE BEDDING IS DEEP ENOUGH THAT PIPE JOINT PROJECTIONS (SOCKETS AND FLANGES) DO NOT TOUCH THE TRENCH FLOOR.

TABLE BASED ON FLEXIBLE PIPELINE INSTALL ONLY NOT CONCRETE OR VC

TABLE 3 - CLEARANCES BETWEEN SEWERS AND OTHER UNDERGROUND SERVICES			
UTILITY (EXISTING SERVICES)	MINIMUM HORIZONTAL CLEARANCES (mm) NEW SEWER SIZE		MINIMUM VERTICAL CLEARANCE (mm)
	≤ DN 300	>DN 300	
SEWERS ≤DN 300	300	600	150 / 300
SEWERS >DN 300	600	600	300
GAS MAINS	300	600	150 / 300
COMMS SERVICES	300	600	150 / 300
ELECTRICITY SERVICES	500	1000	225 / 300
STORMWATER DRAINS	300	600	150
WATER MAINS	1000 / 600	1000 / 600	500
KERBS	150	600	N/A

NOTE: REFER TO CLAUSE 5.4.5.2 OF WSA 02 FOR NOTES SPECIFICALLY RELATING TO THIS TABLE.



NOTES:

1. THIS DRAWING SHALL ONLY BE SPECIFIED FOR USE BY THE DESIGNER FOR STANDARD CONDITIONS AND APPLICATIONS. THE DESIGNER SHALL USE THEIR SKILL, KNOWLEDGE AND JUDGEMENT TO DETERMINE IF THE COVER DEPTHS AND CLEARANCES ARE REQUIRED TO BE INCREASED IN NON-STANDARD CONDITIONS AND APPLICATIONS. IF IN ANY DOUBT, SEEK ADVICE FROM ICON WATER.

2. NON-STANDARD CONDITIONS INCLUDE, BUT ARE NOT LIMITED TO: REGIONS OF POTENTIAL SLIP, UNSTABLE OR TALUS GROUND, EXISTING "BROWNFIELDS" DEVELOPMENTS WHERE PIPE DEPTH IS CONSTRAINED AND ALTERNATIVE REMEDIES (e.g. PROTECTION SLABS, PILES) ARE REQUIRED.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	26/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW	X		
WPS		REC			

STANDARD DRAWING
SEWERAGE AND WATER NETWORKS
MINIMUM PIPE COVER AND CLEARANCES
STANDARD CONDITIONS AND APPLICATIONS

DRAWING STATUS: Current

SD-2106-D

A1

ISSUE: A

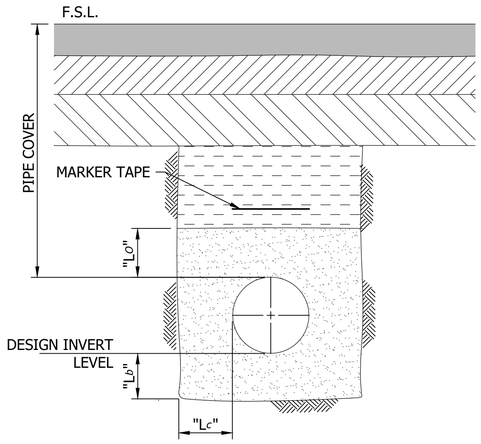


TABLE 1 - TRAFFICABLE AREAS	
ZONE	MATERIAL AND COMPACTION DETAILS
ROAD WEARING COURSE	ROAD WEARING COURSE, BASE AND SUB BASE MATERIALS SHALL BE TO TCCS STANDARDS WITH A MINIMUM COMPACTION OF 95% MAXIMUM MODIFIED DRY DENSITY (MMDD) TO AS 1289.5.2.1.
ROAD BASE	
ROAD SUB BASE	
TRENCH FILL	TCCS DGS20 COMPACTED TO AT LEAST 95% MAXIMUM MODIFIED DRY DENSITY (MMDD) TO AS 1289.5.2.1.
EMBEDMENT	TYPE A STANDARD EMBEDMENT CHOOSE FROM EITHER: 1. SAND TO WSA PS-350, OR 2. SAND TO WSA PS-360, OR 3. 5 mm CRUSHED ROCK TO WSA PS-361 COMPACTION TO AT LEAST 70% DENSITY INDEX. (AS 1289.5.6.1).

TRENCH DETAILS - TRAFFICABLE AREAS

GENERAL NOTES:

G1. THIS DRAWING HAS BEEN PRIMARILY DEVELOPED FOR "WATER SUPPLY MAINS-TO METER" AND "SEWER MAINS-TO-TIE" APPLICATIONS WITHIN THE LIMITS OF USE STATED ELSEWHERE ON THIS DRAWING. THIS DRAWING MAY ALSO BE USED FOR BOTH SEWER AND WATER MAIN PROJECTS (SUBJECT TO THE SAME LIMITS OF USE) WHERE APPROPRIATE.

G2. IF (i) SIGNIFICANT GROUNDWATER IS OBSERVED DURING EXCAVATION, OR (ii) THE NATIVE SOIL CONDITION IS DEEMED TO BE "POOR" IN ACCORDANCE WITH SD-9302, OR (iii) OVER-EXCAVATION OCCURS, THEN ICON WATER SHALL BE CONSULTED FOR THE PURPOSES OF DIRECTING THE DESIGNER TO RECONSIDER THE EMBEDMENT MATERIAL AND DRAINAGE DETAILS SPECIFIED FOR THE PROJECT.

G3. INORGANIC FILL (e.g. EXCAVATED MATERIAL) MUST MEET ALL OF THE FOLLOWING MANDATORY REQUIREMENTS:

A. FREE FROM ORGANIC MATTER.

B. CONTAINS NO ROCK OR HARD CLAY GREATER THAN 75 mm AND NOT MORE THAN 20% BY MASS.

C. IF IT IS COHESIONLESS SOIL (e.g. CLEAN SAND, SILTY SAND AND POORLY GRADED SAND AND GRAVEL MIXTURES) IT CAN ONLY BE USED IN AREAS WHERE THE NATURAL SOILS WITHIN WHICH WORKS ARE BEING UNDERTAKEN ARE ALSO COHESIONLESS (i.e. NOT CLAYEY). COMPACT TO AT LEAST 60% DENSITY INDEX (AS 1289.5.6.1) IN LIFTS NOT EXCEEDING 300 mm.

D. IF IT IS A COHESIVE SOIL (e.g. CLAYEY IN NATURE) COMPACT TO AT LEAST 90% MAXIMUM MODIFIED DRY DENSITY (MMDD) TO AS 1289.5.2.1 IN LIFTS NOT EXCEEDING 300 mm.

G4. GRADED MATERIALS (e.g. SAND, CRUSHED ROCK OR TCCS DGS20) CANNOT BE INSTALLED WHILST THE TRENCH IS WET.

G5. THE SIDES OF THE EXCAVTION SHALL BE KEPT VERTICAL TO AT LEAST 150 mm ABOVE THE PIPE.

G6. TRACER WIRE HAS NOT BEEN SHOWN FOR CLARITY. REFER TO TO STD-SPE-M-006 FOR DETAILS.

G7. SHOULD THE CONTRACTOR BE IN ANY DOUBT AS TO WHETHER THE TRENCH FILL OR EMBEDMENT MATERIAL FROM A GIVEN SUPPLIER MEETS THE REQUIRED WSAA PRODUCT SPECIFICATION (e.g. WSA PS-360) OR INORGANIC FILL PROPERTIES, CONTACT ICON WATER BEFORE PURCHASE (OR IN THE CASE OF EXCAVATED MATERIAL, BEFORE INSTALLATION).

G8. THIS DRAWING SHALL BE READ IN-CONJUNCTION WITH SD-2106. FOR DEFINITIONS OF "TRAFFICABLE" AND "NON-TRAFFICABLE" AREAS, REFER TO SD-2101.

G9. FOR THE TRENCH FILL ZONE AND ALL ZONES ABOVE FOR BOTH TRAFFICABLE AND NON-TRAFFICABLE AREAS, TCCS REQUIREMENTS TAKE PRECEDENCE OVER THE ICON WATER REQUIREMENTS STATED ON THIS DRAWING. HOWEVER, IN THE PIPE EMBEDMENT ZONE, ICON WATER REQUIREMENTS ARE MANDATORY REQUIREMENTS AND TAKE PRECEDENCE OVER ANY OTHER AGENCY'S REQUIREMENTS.

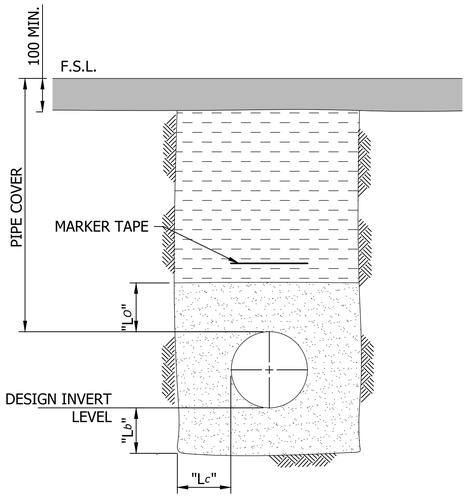


TABLE 2 - NON-TRAFFICABLE AREAS	
ZONE	MATERIAL AND COMPACTION DETAILS
TOP SOIL	TOP SOIL (AND GRASS SEEDING IF REQUIRED) TO TCCS STANDARDS.
TRENCH FILL	CHOOSE FROM EITHER: 1. INORGANIC GENERAL FILL, OR 2. TCCS DGS20 COMPACTED TO AT LEAST 90% MAXIMUM MODIFIED DRY DENSITY (MMDD) TO AS 1289.5.2.1. REFER TO GENERAL NOTE G.3 FOR INORGANIC FILL REQUIREMENTS (INCLUDING COMPACTION REQUIREMENTS).
EMBEDMENT	TYPE A STANDARD EMBEDMENT CHOOSE FROM EITHER: 1. SAND TO WSA PS-350, OR 2. SAND TO WSA PS-360, OR 3. 5 mm CRUSHED ROCK TO WSA PS-361 COMPACTION TO AT LEAST 60% DENSITY INDEX. (AS 1289.5.6.1).

TRENCH DETAILS - NON-TRAFFICABLE AREAS

LIMITS OF USE:

THIS DRAWING SHALL ONLY BE USED FOR DETAILED DESIGN AND CONSTRUCTION PURPOSES IF THE SPECIFIC APPLICATION AND LOCATION DETAILS COMPLY WITH ALL OF THE FOLLOWING LIMITS OF USE:

L1. THE APPLICATION INVOLVES THE LAYING OF EITHER A WATER MAINS-TO-METER PIPE RUN, A SEWER MAINS-TO-TIE PIPE RUN, A POTABLE WATER MAIN, A GRAVITY SEWER MAIN OR A SEWER RISING MAIN.

L2. THERE ARE NO STRUCTURAL ISSUES. FOR EXAMPLE, THE SOIL "QUALITY DESCRIPTOR" IS "MEDIUM" OR "SOUND" IN ACCORDANCE WITH SD-9302.

L3. THERE IS NO GROUNDWATER.

L4. THE MINIMUM DEPTHS OF COVER SHOWN ON SD-2106 CAN BE ACHIEVED.

L5. TRENCH OVER-EXCAVATION DOES NOT REQUIRE ICON WATER TO DIRECT AN ALTERNATIVE EMBEDMENT TYPE.

L6. THE PIPE GRADE IS NO GREATER THAN 15%.

L7. ASSET PROTECTION IS NOT REQUIRED.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	27/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW	X		
WPS		REC			

STANDARD DRAWING
SEWERAGE AND WATER NETWORKS
WATER MAINS-TO-METER AND SEWER TIE APPLICATIONS
TRENCH EMBEDMENT AND BACKFILL DETAILS

DRAWING STATUS: Current

SD-2107-D

A1

ISSUE: A

CUT-AWAY
ISOMETRIC VIEW

NOTES:

1. DN1050 PRECAST MAINTENANCE HOLES SHALL NOT BE USED FOR DEPTHS (TO BENCHING) LESS THAN 1.2 m & GREATER THAN 6.0 m OR WHEN OUTLET SEWER DIAMETER IS LARGER THAN DN450. REFER TO SD-2206 FOR PRECAST MAINTENANCE HOLE DETAILS FOR DEPTHS < 1200 mm.

2. MIN CONCRETE GRADE SHALL BE 40 MPa.

3. MAINTENANCE HOLE INTERIOR FINISH TO BE CLASS 2 AND CLASS 3 TO AS 3600 ON WALLS AND ON BENCHING RESPECTIVELY. ALL FEATHERS, DAGS AND SHARP GRIT TO BE REMOVED.

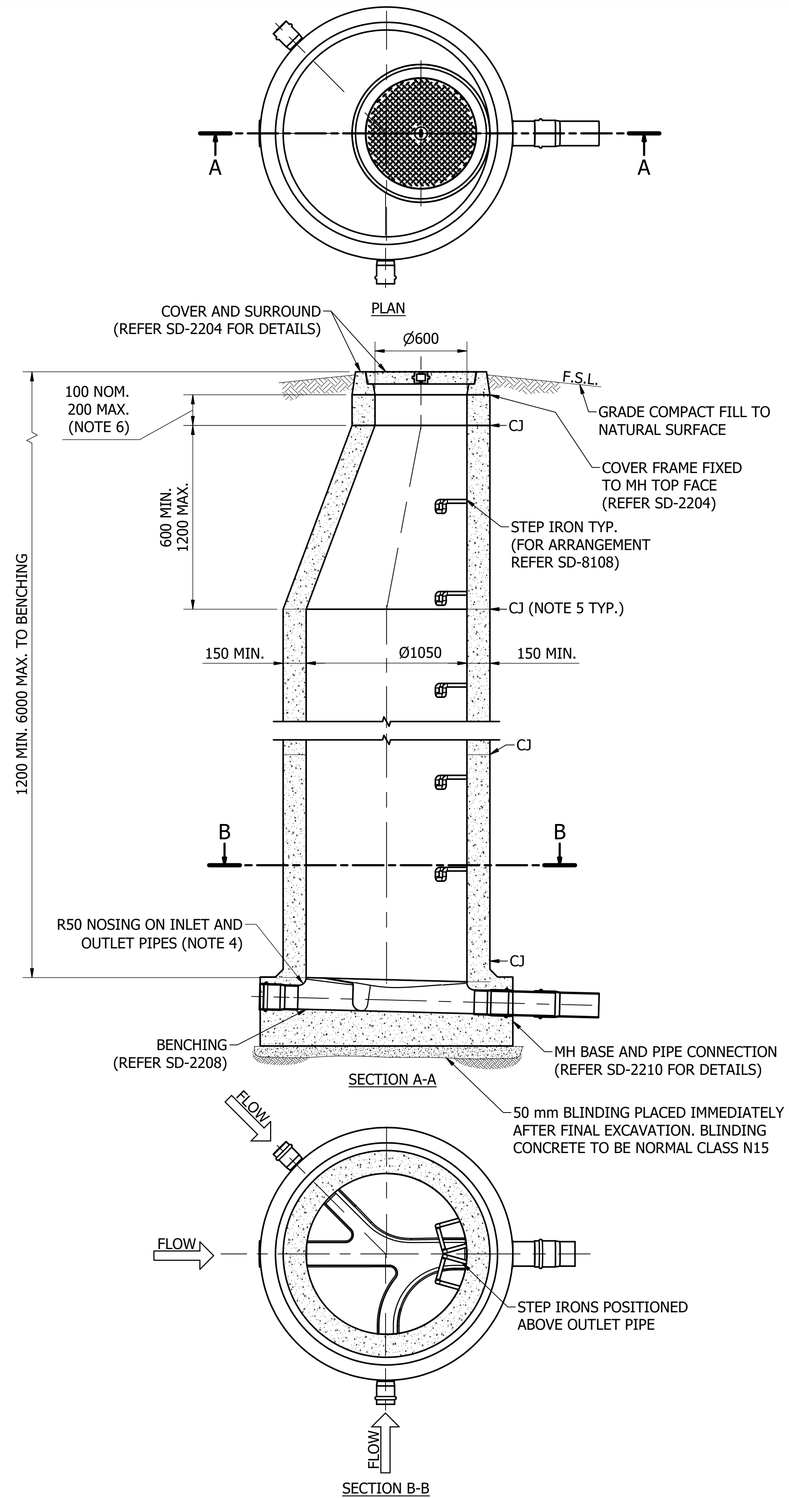
4. FORM ROUNDED NOSING ON UPPER EDGE OF INLET AND OUTLET PIPES TO PREVENT FUTURE DAMAGE TO JETTING EQUIPMENT, CCTV GUIDES AND CABLES.

5. CONSTRUCTION JOINT DETAILS SHALL BE FULLY SPECIFIED BY THE DESIGNER ON THE PROJECT SPECIFIC DESIGN DRAWINGS.

6. NECK HEIGHT TO BE 100 mm WHEN MAINTENANCE HOLE IS POSITIONED IN ROAD PAVEMENTS TO ALLOW FOR FUTURE LEVEL ADJUSTMENT.

7. REFER SD-2208 FOR PERMISSABLE HORIZONTAL DEFLECTION.

8. NUMBER, SIZE AND LOCATION OF INLETS AND OUTLETS ARE INDICATIVE ONLY.



Ø1050 CAST IN SITU MAINTENANCE HOLE
(SHOWN WITH BRANCHES)
SCALE: 1 : 20

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	NOTE 1 AMENDED. DRAWING NOW -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY							
DAM		RES		SPS	X		
BWS		WAT		STP	X		
WTP		SEW	X				
WPS		REC					

icon WATER

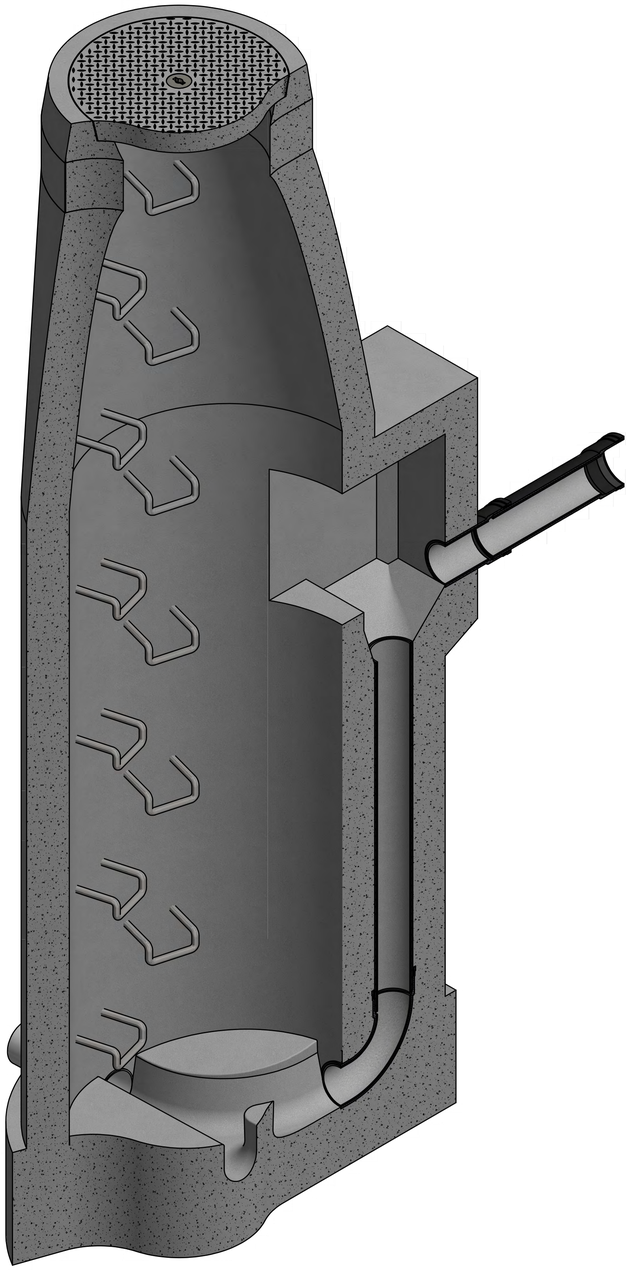
STANDARD DRAWING
SEWERAGE NETWORK
CAST IN SITU MAINTENANCE HOLE
1050 DIA. WITH BRANCHES
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-2201-D

A1

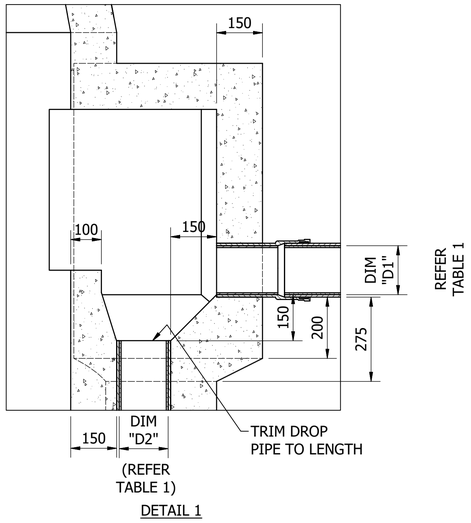
ISSUE B



CUT-AWAY ISOMETRIC VIEW

MAINTENANCE HOLE WITH EXTERNAL DROP

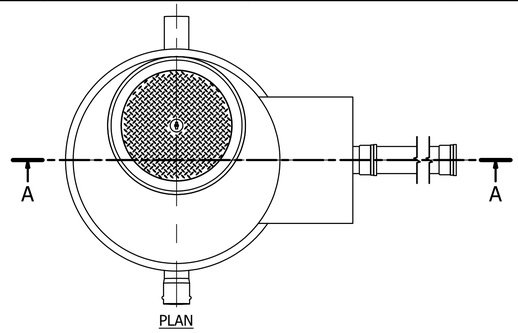
SCALE: N.T.S.



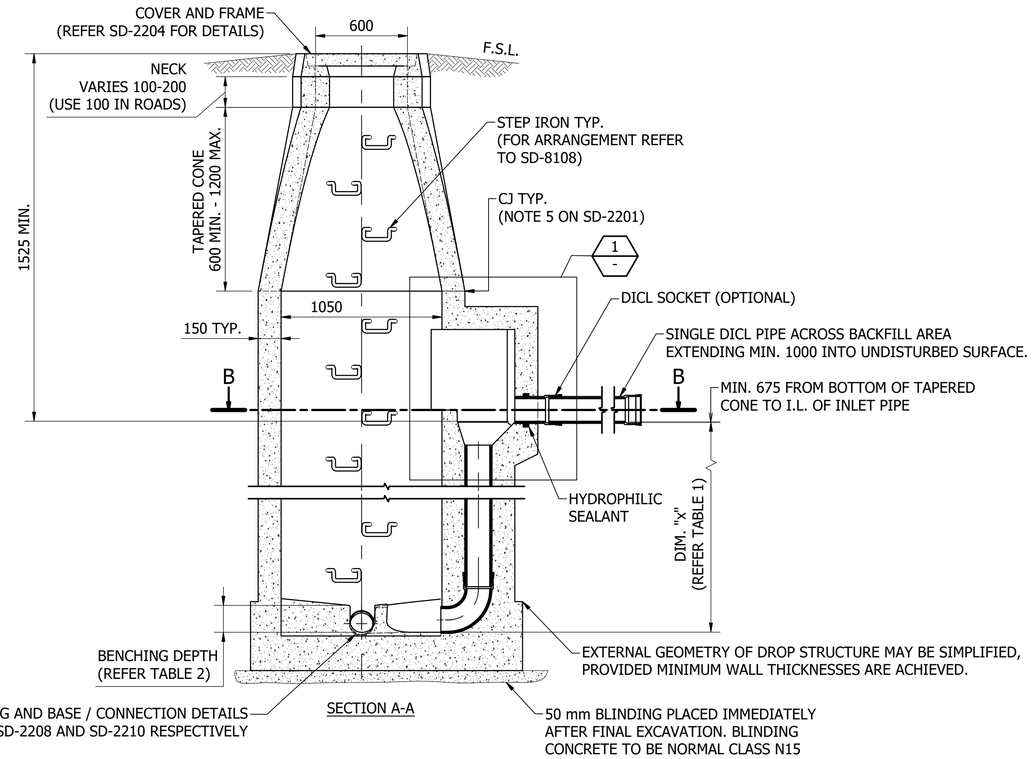
DETAIL 1

INLET CHAMBER AND WINDOW

SCALE: 1 : 10



PLAN



SECTION A-A

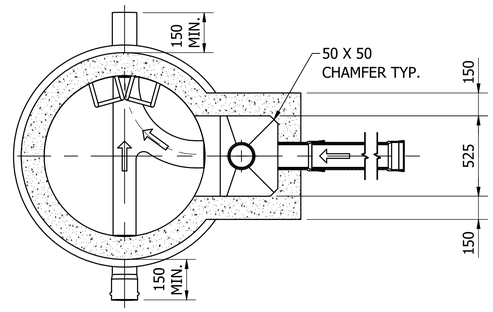
TABLE 1: INLET DIAMETER AND DROP HEIGHT		
BRANCH DIA. "D1"	MIN. DROP PIPE DIA. "D2"	MIN. DROP HEIGHT "x"
150	150	450
225	150	450
300	225	560
375	300	680

TABLE 2: BENCHING DEPTH	
LARGEST INLET PIPE	BENCHING DEPTH
≤ DN375	TO OBVERT LEVEL (MAX. 400)
DN 450	400 MIN.
DN >450	1/2 D + 100 (400 MIN)

NOTES:

1. THE NOTES ON SD-2201 ARE ALSO APPLICABLE TO THIS DRAWING.

2. DETAILED CONSTRUCTION INFORMATION SUCH AS CONSTRUCTION JOINTS HAVE NOT BEEN SHOWN. THESE DETAILS SHALL BE PROVIDED BY THE DESIGNER ON THE PROJECT SPECIFIC DRAWINGS.



SECTION B-B

MAINTENANCE HOLE WITH EXTERNAL DROP

SCALE: 1 : 20

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DRAWING CHANGED TO -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	X
BWS		WAT		STP	X
WTP		SEW	X		
WPS		REC			

icon WATER

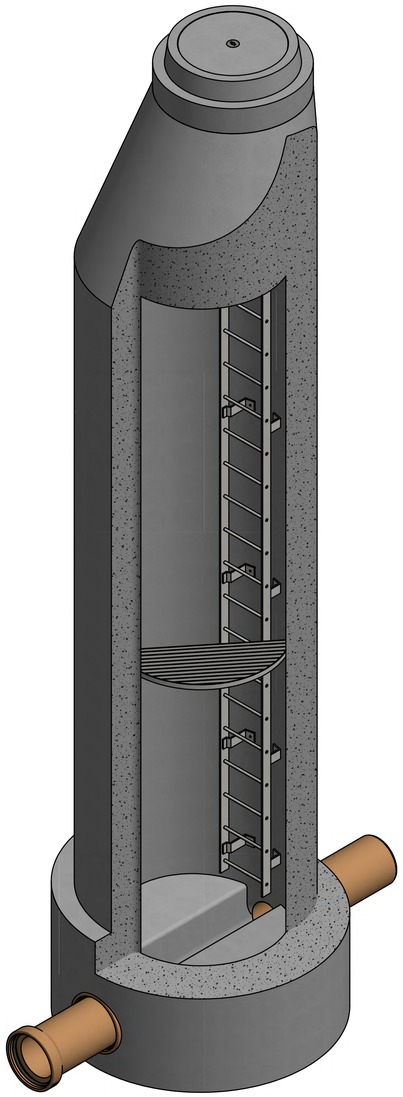
STANDARD DRAWING
SEWERAGE NETWORK
CAST IN SITU MAINTENANCE HOLE
1050 DIA. WITH EXTERNAL DROP
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-2202-D

A1

ISSUE: B



CUT-AWAY ISOMETRIC VIEW
SCALE: N.T.S.

NOTES:

1. DN1200 OR LARGER MAINTENANCE HOLES TO BE USED WHEN:
- SEWER SIZE DN525 TO DN675, OR
- MH DEPTH TO INVERT 6.0 m TO 8.0 m.

2. MIN CONCRETE GRADE SHALL BE 40 MPa.

3. MAINTENANCE HOLE INTERIOR FINISH TO BE CLASS 2 AND CLASS 3 TO AS 3600 ON WALLS AND ON BENCHING RESPECTIVELY. ALL FEATHERS, DAGS AND SHARP GRIT TO BE REMOVED.

4. FORM ROUNDED NOSING ON UPPER EDGE OF INLET AND OUTLET PIPES TO PREVENT FUTURE DAMAGE TO JETTING EQUIPMENT, CCTV GUIDES AND CABLES.

5. CONSTRUCTION JOINT DETAILS SHALL BE FULLY SPECIFIED BY THE DESIGNER ON THE PROJECT SPECIFIC DESIGN DRAWINGS.

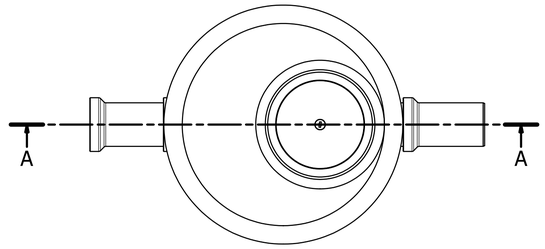
6. INTERMEDIATE LANDING TO BE CONSTRUCTED OF "WEBFORGE" C325 STAINLESS STEEL GRATING (OR APPROVED EQUIVALENT) BANDED ALL-ROUND. GRATING TO BE FIXED WITH 316 STAINLESS STEEL ANGLE SUPPORT AND CHEMICAL ANCHORS. THE DESIGNER SHALL SPECIFY THE DETAILS ON THE PROJECT SPECIFIC DESIGN DRAWINGS. THE INTERMEDIATE LANDING SHALL BE LOCATED SUCH THAT OVERFLOW FROM ANY VERTICAL DROP IS AVOIDED.

7. MAKEUP RING TO BE 100 HIGH WHEN MAINTENANCE HOLE IS POSITIONED IN ROAD PAVEMENTS TO ALLOW FOR FUTURE LEVEL ADJUSTMENT.

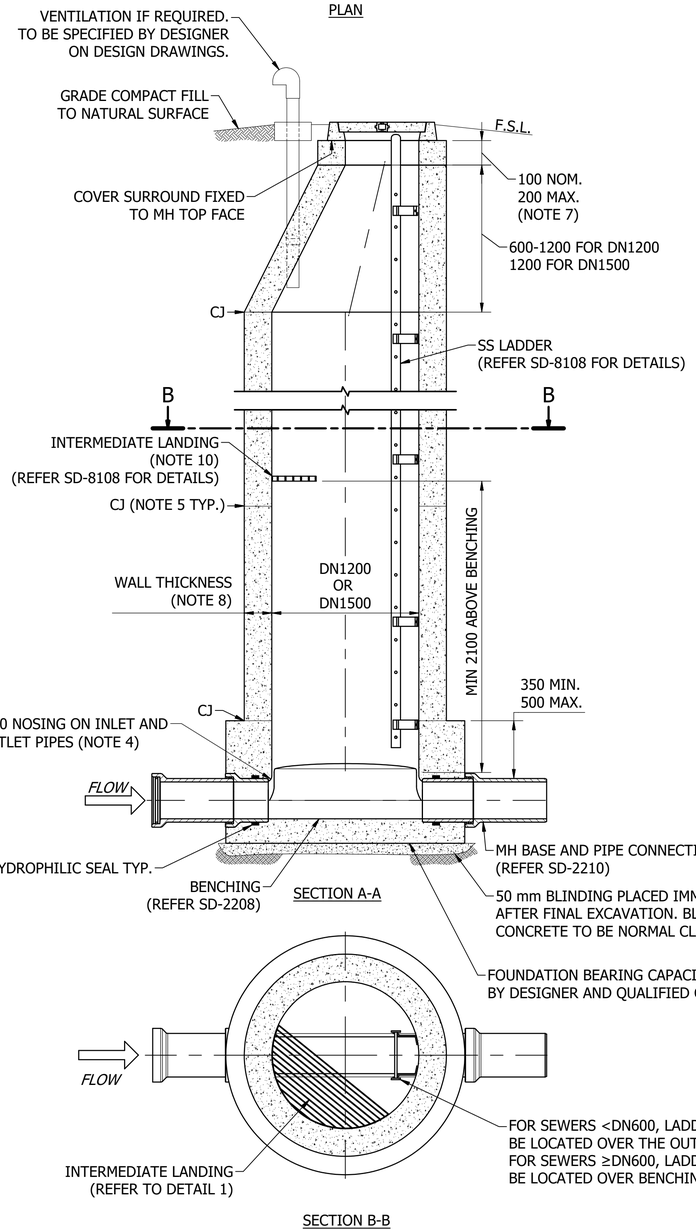
8. WALL THICKNESS SHALL BE 150 FOR MAINTENANCE HOLE DEPTHS LESS THAN 6000 AND DN NOT EXCEEDING 1200; 225 FOR MAINTENANCE HOLE DEPTHS BETWEEN 6000 AND 8000. FOR LARGER DIAMETERS, STRUCTURE TO BE DESIGNED IN ACCORDANCE WITH AS 1170 AND AS 3735.

9. WHERE LADDER IS LOCATED OVER BENCHING, MAINTENANCE HOLE TO BE OFFSET TO PROVIDE 150 BENCH WIDTH ON SIDE OPPOSITE LADDER.

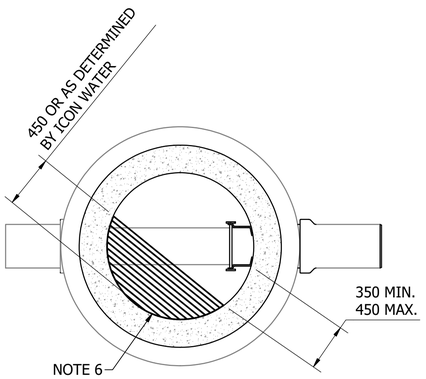
10. INTERMEDIATE LANDING REQUIRED FOR MAINTENANCE HOLES WITH DEPTH TO INVERT >6 m.



PLAN



SECTION A-A



DETAIL 1

SECTION B-B

INTERMEDIATE LANDING
SCALE: 1 : 25

Ø1200 AND Ø1500 CAST IN SITU MAINTENANCE HOLE
SCALE: 1 : 25

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	MODEL CORRECTION & DRAWING CHANGED TO -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY						
DAM		RES		SPS	X	
BWS		WAT		STP	X	
WTP		SEW	X			
WPS		REC				

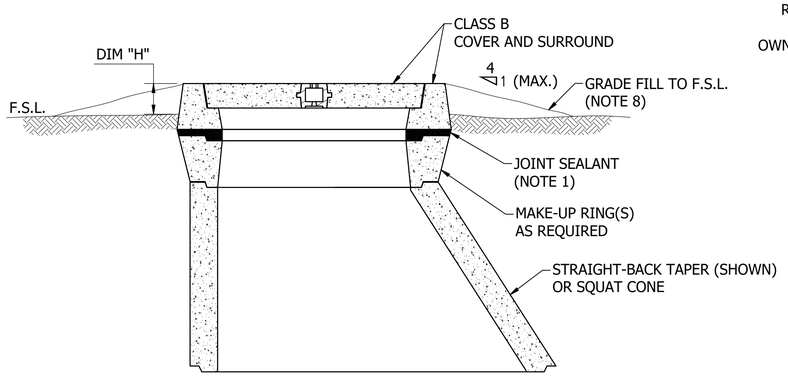
STANDARD DRAWING
SEWERAGE NETWORK
CAST IN SITU MAINTENANCE HOLES
1200 DIA. TO 1500 DIA.
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-2203-D

A1

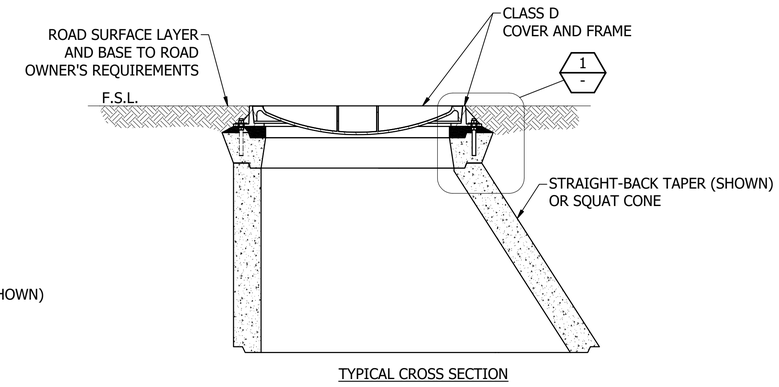
ISSUE B



TYPICAL CROSS SECTION

PRECAST MAINTENANCE HOLE NON-TRAFFICABLE AREA

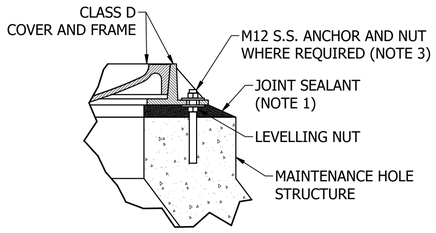
SCALE: 1 : 10



TYPICAL CROSS SECTION

PRECAST MAINTENANCE HOLE TRAFFICABLE AREA

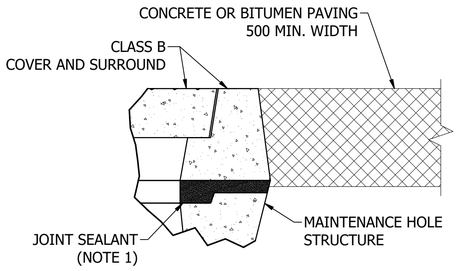
SCALE: 1 : 10



DETAIL 1

CLASS D COVER AND FRAME ANCHORING

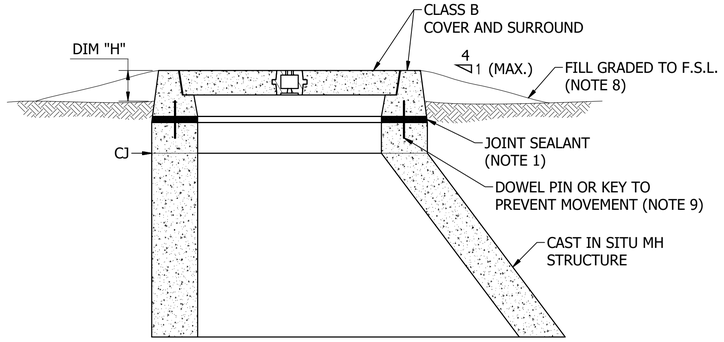
SCALE: 1 : 5



DETAIL 2

CLASS B COVER AND SURROUND IN PAVED (NON-TRAFFICABLE) AREAS

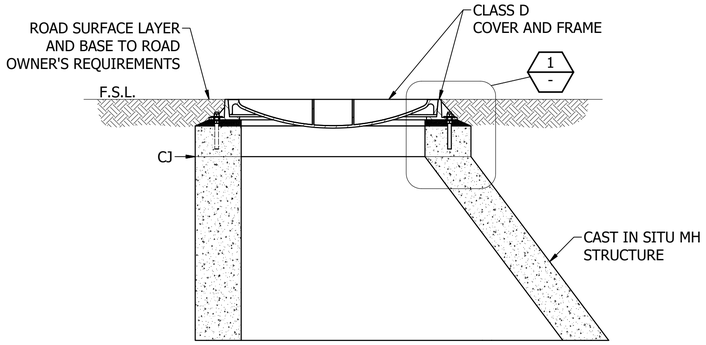
SCALE: 1 : 5



TYPICAL CROSS SECTION

CAST IN SITU MAINTENANCE HOLE NON-TRAFFICABLE AREA

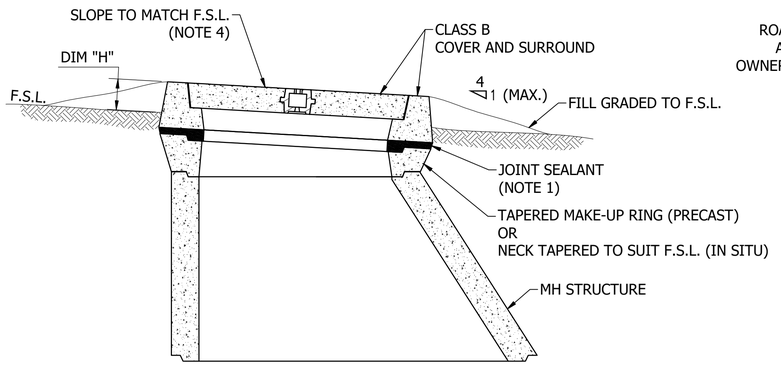
SCALE: 1 : 10



TYPICAL CROSS SECTION

CAST IN SITU MAINTENANCE HOLE TRAFFICABLE AREA

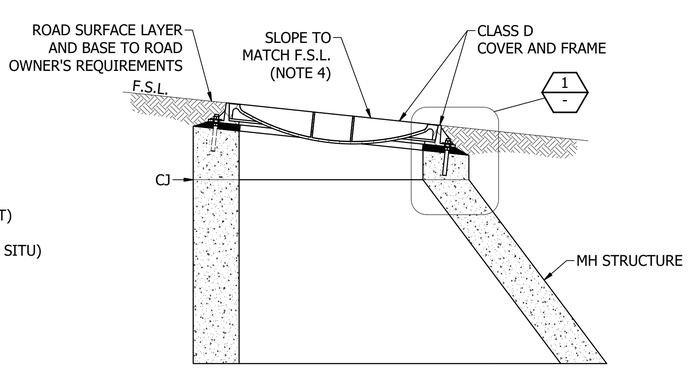
SCALE: 1 : 10



TYPICAL CROSS SECTION

PRECAST AND CAST IN SITU MAINTENANCE HOLE (PRECAST SHOWN) NON-TRAFFICABLE AREA (SLOPING GROUND)

SCALE: 1 : 10



TYPICAL CROSS SECTION

PRECAST AND CAST IN SITU MAINTENANCE HOLE (CAST IN SITU SHOWN) TRAFFICABLE AREA (SLOPING GROUND)

SCALE: 1 : 10

NOTES:

1. SEALING METHODS:
   a. MAKE JOINTS BETWEEN SHAFT TOP/MAKEUP RING AND COVER SUPPORT RING USING:
      - POLYURETHANE SEALANT.
      - CEMENT MORTAR PAD MADE FROM 3 PARTS SAND TO 1 PART CEMENT.
   b. APPLY POLYURETHANE SEALANT IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS, MAX THICKNESS 10.
   c. THICKNESS OF CEMENT MORTAR AT ANY JOINT TO BE NO GREATER THAN 50.
   d. SCABBLE AND CLEAN JOINT SURFACES SO THAT ALL LOOSE OR SOFT MATERIAL IS REMOVED.
   e. JOINT SURFACES TO BE BRUSHED CLEAN, SPONGED WET AND PRIMED WITH CEMENT/WATER SLURRY PRIOR TO PLACING THE CEMENT MORTAR.

2. IN AREAS SUBJECT TO SURCHARGE, USE CAST IN SITU MH. DOWEL OR BOLT COVER SLABS, DI COVER AND FRAME TO THE SHAFT SECTION IN SUCH A MANNER THAT SEPARATION DURING SURCHARGE IS PREVENTED.

3. WHERE SPECIFIED, JOIN METAL FRAME TO CAST IN SITU MH RISER AS FOLLOWS:
   MAKE JOINT BETWEEN SHAFT TOP AND METAL FRAME USING POLYURETHANE SEALANT AND LOCKING DOWN BOLTS EQUALLY PLACED AROUND THE CIRCUMFERENCE. USE 4 x M12 H.D.G OR STAINLESS STEEL BOLTS AND NUTS EXTENDING 75 MIN. INTO CONCRETE. FOR NON-TRAFFICABLE LOCATIONS USE A MINIMUM OF 2 BOLTS; FOR TRAFFICABLE LOCATIONS USE A MINIMUM OF 4 BOLTS.

4. MAXIMUM PERMISSIBLE SLOPE OF COVERS:
   - CLASS B = 1 IN 7
   - CLASS D = 1 IN 10

5. ALL COVERS TO BE WATER TIGHT. WHERE SPECIFIED USE GAS-TIGHT COVERS.

6. DUE TO INCREASED INJURY RATES ASSOCIATED WITH HAZARDOUS MANUAL TASKS, METAL COVERS WITH CONCRETE (OR TILED) INFILL SHALL NOT BE USED WITHOUT SPECIAL APPROVAL BY ICON WATER.

7. CLASS B REINFORCED PLASTIC COVERS MAY BE USED TO REPLACE EXISTING CLASS B COVERS IN AREAS NOT PRONE TO BUSHFIRE. SUCH COVERS SHALL NOT BE USED FOR NEW DEVELOPMENT AND SHALL ONLY BE INSTALLED BY ICON WATER PERSONNEL.

8. DETAIL 2 IS TO BE USED WHERE INDICATED IN THE TABLE BELOW.

9. A BONDED CONCRETE RING KEYED TO PREVENT MOVEMENT IN CONJUNCTION WITH A MORTAR PAD, COVER AND SURROUND IS AN APPROVED ALTERNATIVE TO THE DETAIL SHOWN FOR COMMERCIALLY MOWED OPEN SPACES.

LOCATION	MH COVER REQUIREMENTS	DIM "H" (mm)
TRAFFICABLE PAVED AREAS INCLUDING PUBLIC AND PRIVATE ROADS AS WELL AS RESIDENTIAL AND COMMERCIAL DRIVEWAYS.	CLASS D METAL COVER AND METAL SURROUND. BOLT DOWN IN ACCORDANCE WITH NOTE 3 WHEN THE LOCATION IS SUBJECT TO SURCHARGE (e.g. AN OVERLOADED SEWER OR WITHIN 100 METRES OF A SEWER RISING MAIN) OR IN A 1:100 ARI FLOOD EVENT ZONE.	IN BASEMENTS AND PAVED AREAS: H = 0 IN EXISTING AND BUILT-UP AREAS: H = 25 IN NEW SUBDIVISIONS: H = 75 IN UNDEVELOPED AREAS: H = 100 IN FLOOD PRONE AREAS: H = 150 MIN
NON-PAVED AREAS WHICH HAVE A HIGH LIKELIHOOD OF VEHICLE TRAFFIC.		
PAVED OR NON-PAVED AREAS NOT SUBJECT TO VEHICLE TRAFFIC OR SURCHARGE OR FLOOD WITH NO REQUIREMENT TO BE GAS-TIGHT.	CLASS B REINFORCED CONCRETE COVER AND SURROUND OR CLASS B METAL COVER AND METAL (OR CONCRETE) SURROUND. REFER TO DETAIL 2 FOR PAVED AREAS.	
BASEMENTS AND OTHER POORLY VENTILATED AREAS	CLASS B OR CLASS D METAL COVER AND SURROUND AS APPLICABLE DEPENDING UPON WHETHER LOCATION IS NON-TRAFFICABLE OR TRAFFICABLE RESPECTIVELY. GAS-TIGHT AND BOLT DOWN IN ACCORDANCE WITH NOTE 3.	
SEWAGE PUMPING STATIONS - COLLECTION MAINTENANCE HOLES		

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DRAWING AND NOTES UPDATED. DRAWING NOW -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick
C	DETAIL 2, NOTES 8 & 9 ADDED	17/07/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X			
BWS		WAT		STP	X			
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

icon WATER

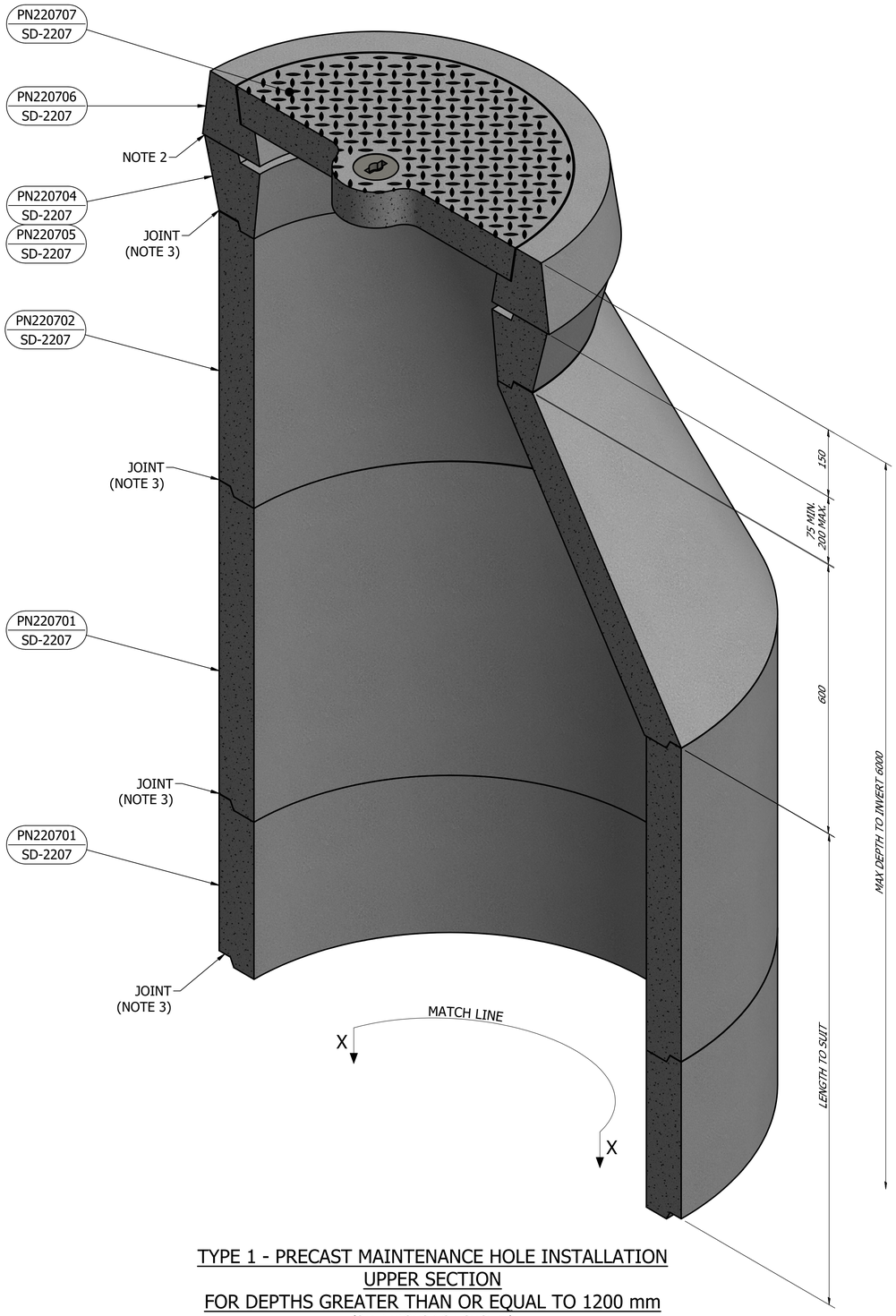
STANDARD DRAWING SEWERAGE NETWORK PRECAST AND CAST IN SITU MAINTENANCE HOLES 1050, 1200 AND 1500 DIA. COVERS AND SURROUNDS ARRANGEMENT AND FIXING DETAILS

DRAWING STATUS: Current

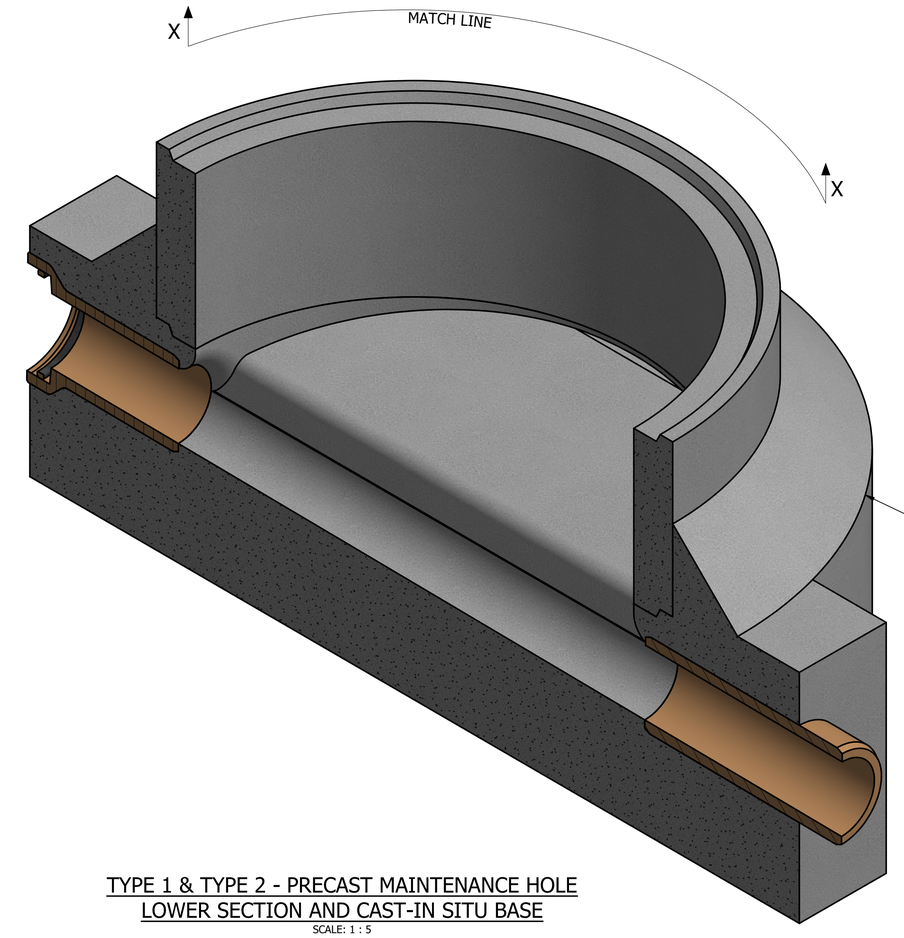
SD-2204-D

A1

ISSUE C



TYPE 1 - PRECAST MAINTENANCE HOLE INSTALLATION
UPPER SECTION
FOR DEPTHS GREATER THAN OR EQUAL TO 1200 mm
(STEP IRONS NOT SHOWN)
SCALE: 1 : 5



TYPE 1 & TYPE 2 - PRECAST MAINTENANCE HOLE
LOWER SECTION AND CAST-IN SITU BASE
SCALE: 1 : 5

PARTS LIST		
PART NUMBER	DESCRIPTION	REFERENCE
PN220701	SHAFT SECTION	SD-2207
PN220702	STRAIGHT BACK TAPER	SD-2207
PN220704	MAKEUP RING	SD-2207
PN220705	TAPERED MAKEUP RING	SD-2207
PN220706	COVER FRAME (CLASS B)	SD-2207
PN220707	REMOVABLE COVER (CLASS B)	SD-2207

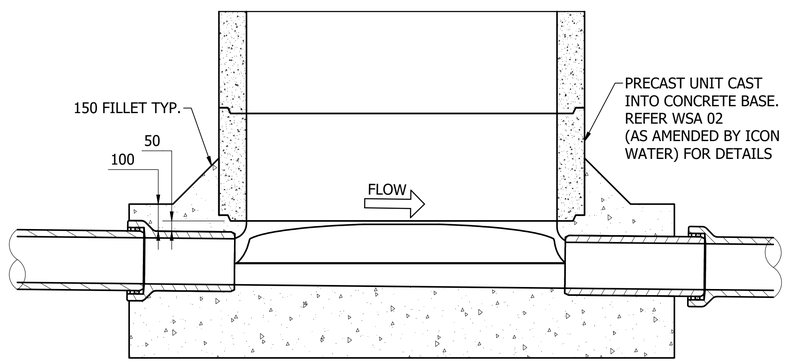
NOTES:

1. FOR MAINTENANCE HOLE COMPONENTS REFER TO SD-2207 FOR DETAILS.

2. FOR COVER FRAME FIXING DETAILS REFER TO SD-2204.

3. ALL JOINTS BETWEEN MAINTENANCE HOLE SEGMENTS ARE TO BE RUBBER RING, MASTIC OR EPOXY. USE APPROPRIATE JOINT TYPE BASED ON SOIL TYPE AND RESTRICTION OF WATER INGRESS REQUIREMENTS.

4. REFER TO THE ICON WATER APPROVED PRODUCTS LIST FOR APPROVED MANUFACTURERS.



SECTIONAL ELEVATION

CAST IN SITU BASE DETAIL
SCALE: 1 : 10

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	MODEL CORRECTION. DRAWING NOW -D	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X			
BWS		WAT		STP	X			
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

icon WATER

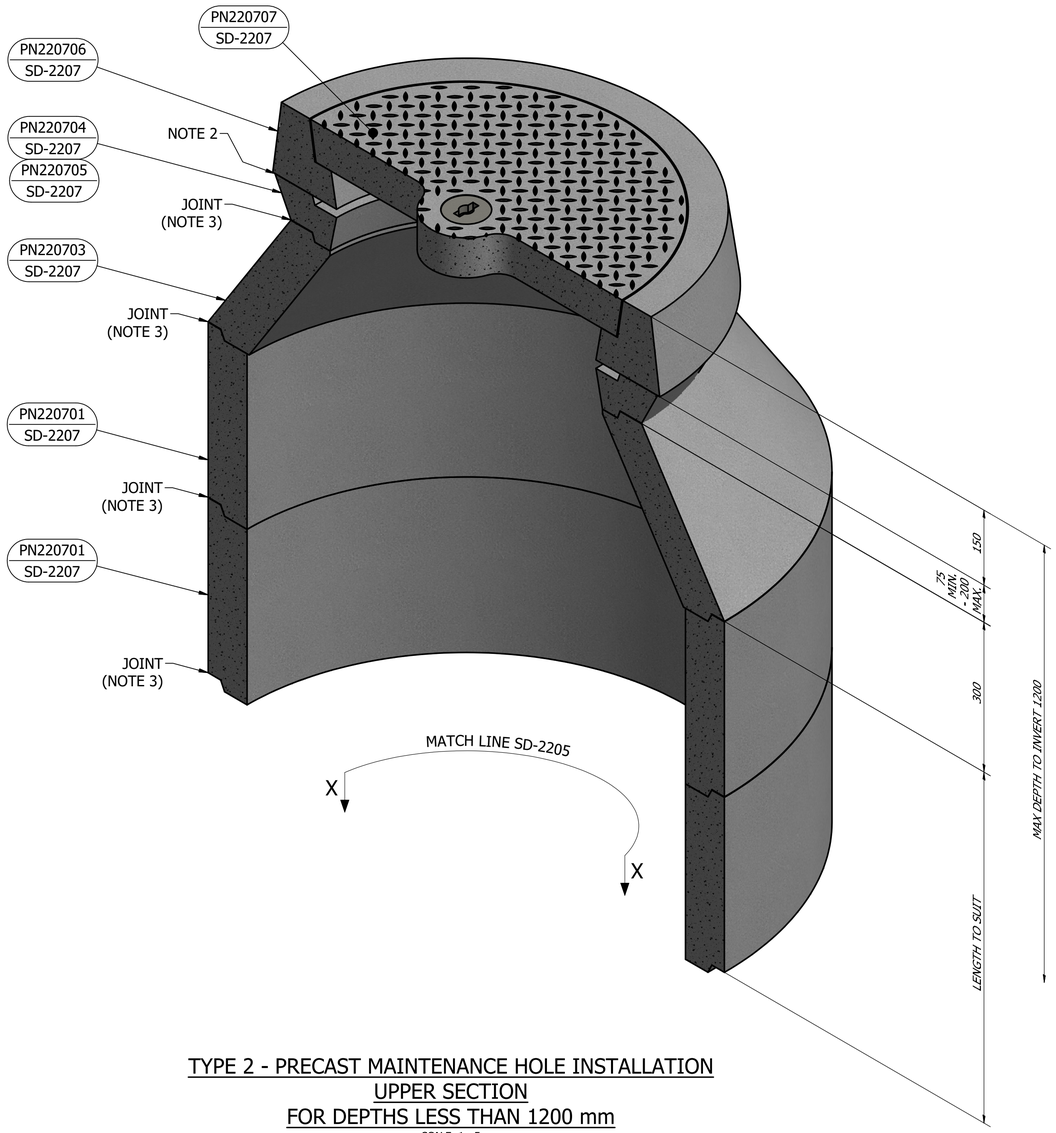
STANDARD DRAWING
SEWERAGE NETWORK
PRECAST MAINTENANCE HOLES
FOR DEPTHS LESS THAN 6000 mm
TYPICAL ARRANGEMENT AND BASE DETAILS

DRAWING STATUS: Current

SD-2205-D

A1

ISSUE B



TYPE 2 - PRECAST MAINTENANCE HOLE INSTALLATION
UPPER SECTION
FOR DEPTHS LESS THAN 1200 mm

SCALE: 1 : 5

PARTS LIST		
PART NUMBER	DESCRIPTION	REFERENCE
PN220701	SHAFT SECTION	SD-2207
PN220703	SQUAT CONE	SD-2207
PN220704	MAKEUP RING	SD-2207
PN220705	TAPERED MAKEUP RING	SD-2207
PN220706	COVER FRAME (CLASS B)	SD-2207
PN220707	REMOVABLE COVER (CLASS B)	SD-2207

NOTES:

1. FOR MAINTENANCE HOLE COMPONENTS REFER TO SD-2207 FOR DETAILS.

2. FOR COVER FRAME FIXING DETAILS REFER TO SD-2204.

3. ALL JOINTS BETWEEN MAINTENANCE HOLE SEGMENTS ARE TO BE RUBBER RING, MASTIC OR EPOXY. USE APPROPRIATE JOINT TYPE BASED ON SOIL TYPE AND RESTRICTION OF WATER INGRESS REQUIREMENTS.

4. REFER TO THE ICON WATER APPROVED PRODUCTS LIST FOR APPROVED MANUFACTURERS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DRAWING CHANGED TO -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	X
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

icon WATER

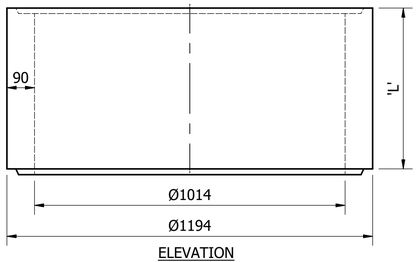
STANDARD DRAWING
SEWERAGE NETWORK
PRECAST MAINTENANCE HOLES
FOR DEPTHS LESS THAN 1200 mm
TYPICAL ARRANGEMENT

DRAWING STATUS: Current

SD-2206-D

A1

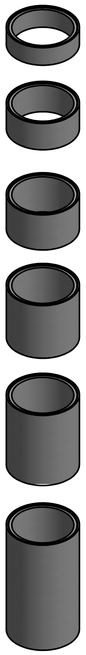
ISSUE B



ELEVATION

SHAFT SECTION

SCALE: 1 : 10



L = 350 mm
APPROX. MASS: 260 kg

L = 525 mm
APPROX. MASS: 390 kg

L = 700 mm
APPROX. MASS: 520 kg

L = 1050 mm
APPROX. MASS: 780 kg

L = 1400 mm
APPROX. MASS: 1040 kg

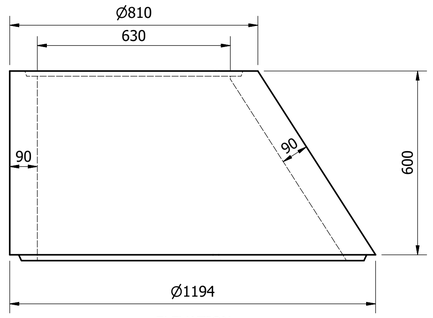
L = 2100 mm
APPROX. MASS: 1600 kg

LENGTHS AND MASS

SCALE: N.T.S.

ITEM	AMDT.
PN220701	

L = 600 mm
APPROX. MASS: 400 kg



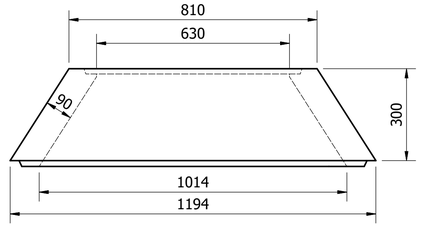
ELEVATION

STRAIGHT BACK TAPER

SCALE: 1 : 10

ITEM	AMDT.
PN220702	

L = 300 mm
APPROX. MASS: 260 kg

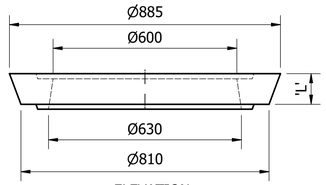


ELEVATION

SQUAT CONE

SCALE: 1 : 10

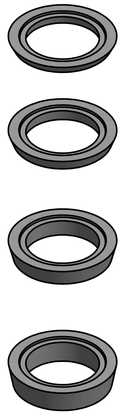
ITEM	AMDT.
PN220703	



ELEVATION

MAKE-UP RING

SCALE: 1 : 10



L = 75 mm
APPROX. MASS: 50 kg

L = 100 mm
APPROX. MASS: 65 kg

L = 150 mm
APPROX. MASS: 100 kg

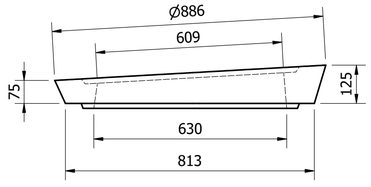
L = 200 mm
APPROX. MASS: 130 kg

LENGTHS AND MASS

SCALE: N.T.S.

ITEM	AMDT.
PN220704	

L = 75/125 mm
APPROX. MASS: 65 kg

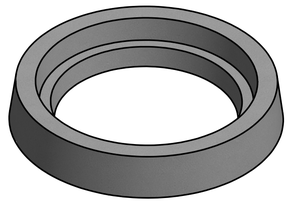


ELEVATION

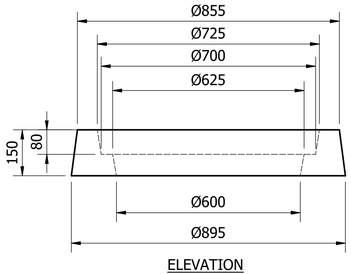
TAPERED MAKE-UP RING

SCALE: 1 : 10

ITEM	AMDT.
PN220705	



APPROX. MASS: 95 kg

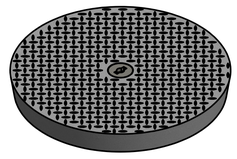


ELEVATION

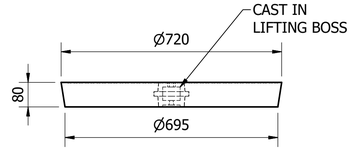
COVER FRAME - CLASS B

SCALE: 1 : 10

ITEM	AMDT.
PN220706	



APPROX. MASS: 80 kg



ELEVATION

COVER - CLASS B

SCALE: 1 : 10

ITEM	AMDT.
PN220707	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DRAWING CHANGED TO -D	18/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES			SPS	X			
BWS		WAT			STP	X			
WTP		SEW	X						
WPS		REC							

ASSET AREA APPLICABILITY

icon WATER

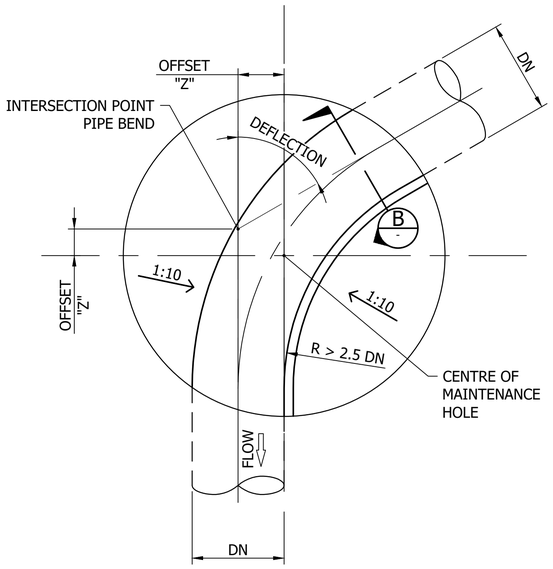
STANDARD DRAWING
SEWERAGE NETWORK
1050 DIA. PRECAST MAINTENANCE HOLES
TYPICAL COMPONENTS
DETAILS

DRAWING STATUS: Current

SD-2207-D

A1

ISSUE: B



DEFLECTION THROUGH MAINTENANCE HOLE

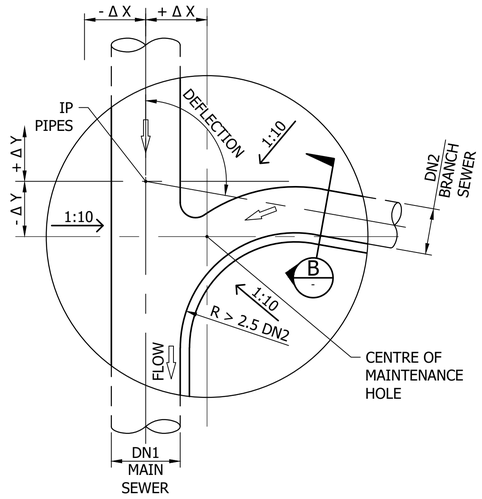
SCALE 1:10

TABLE 1

DN1050 MAINTENANCE HOLE								
PIPE DN	OFFSET "Z" FOR DEFLECTION ANGLE OF:							
	15°	30°	45°	60°	75°	90°	100°	110° (MAX)
150	0	0	100	150	200	300	300	400
225	0	0	100	150	200	82° MAX. 150 OFFSET		
300	0	0	100	150	60° MAX. 150 OFFSET			
375	0	100	150	45° MAX. 150 OFFSET				
450	0	0	38° MAX. 0 OFFSET					

TABLE 2

DN1200 MAINTENANCE HOLE								
PIPE DN	OFFSET "Z" FOR DEFLECTION ANGLE OF:							
	15°	30°	45°	60°	75°	90°	100°	110° (MAX)
150	0	0	100	150	200	300	300	400
225	0	0	100	150	200	300		
300	0	0	100	150	65° MAX. 150 OFFSET			
375	0	100	150	50° MAX. 150 OFFSET				
450	0	0	40° MAX. 100 OFFSET					



SINGLE BRANCH JUNCTION

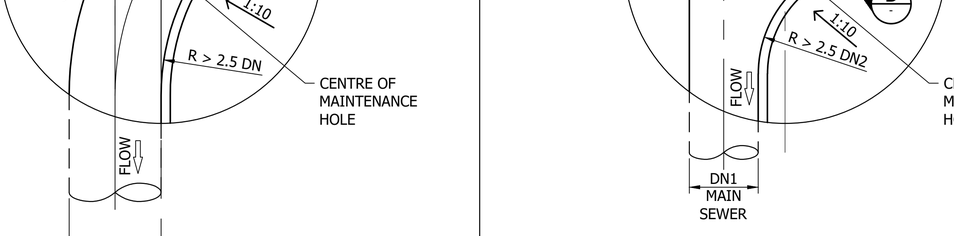
SCALE 1:10

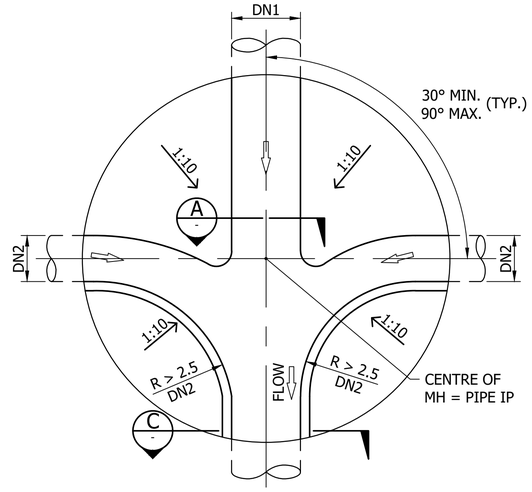
TABLE 3

STANDARD MH OFFSETS FOR SINGLE JUNCTIONS INTERMEDIATE VALUES TO BE INTERPOLATED			
DEFLECTION	Δ X	Δ Y	NOTES
(MIN.) 30°	80	340	
45°	100	220	
60°	120	130	
75°	150	80	
90°	170	-50	
(MAX.) 110°	200	-180	DN150 ONLY

TABLE 4

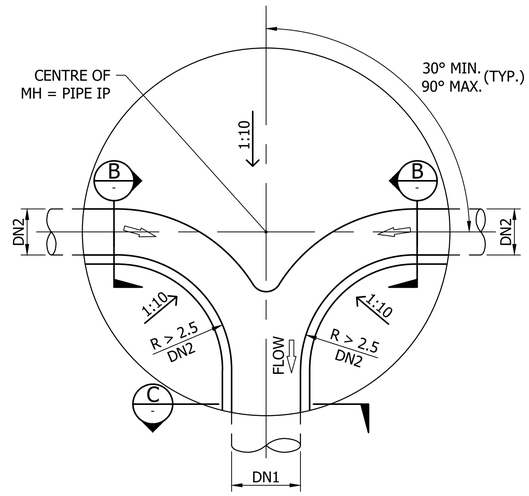
MINIMUM MH ID FOR SINGLE JUNCTIONS STANDARD OFFSETS AS PER TABLE 3			
DN1 (MAIN SEWER DIAMETER)	DN2 (BRANCH SEWER DIAMETER)		
	150	225	300
150	1050	N/A	N/A
225	1050	1200	N/A
300	1200	1200	1500
375	1200	1200	1500
450	1200	1200	1500





DOUBLE BRANCH JUNCTION

SCALE 1:10



"T" - INTERSECTION

SCALE 1:10

TABLE 5

MINIMUM MH ID FOR "T" AND TWO BRANCH JUNCTIONS			
DN1 (MAIN SEWER DIAMETER)	DN2 (BRANCH SEWER DIAMETER)		
	150	225	300
150	1050	N/A	N/A
225	1050	1500	N/A
300	1200	1500	1500
375	1200	1500	1500
450	1500	1500	1800

NOTES:

1. CONFIGURATIONS OF MAINTENANCE HOLES ON THIS SHEET REPRESENT THE MOST COMMON FOUND IN THE SEWERAGE SYSTEM. STANDARD CONFIGURATIONS INCLUDE:
   - A. DEFLECTIONS WITHIN LIMITS OF TABLE 1 AND TABLE 2.
   - B. SINGLE BRANCH JUNCTIONS AS PER TABLE 3 AND TABLE 4.
   - C. SMALL DIAMETER 'T' OR TWO BRANCH JUNCTIONS AS PER TABLE 5.
2. THERE MAY BE OTHER CONFIGURATIONS WHICH ARE ACCEPTABLE. REFER TO WSA 02 (AS AMENDED BY ICON WATER) FOR DETAILS
3. MAXIMUM DEFLECTION ON THE MAIN SEWER (DN1) THROUGH A SINGLE JUNCTION OR A DOUBLE BRANCH INTERSECTION IS LIMITED TO FIVE DEGREES. CONFIGURATIONS INVOLVING MAIN SEWER DEFLECTION GREATER THAN FIVE DEGREES SHALL BE DESIGNED IN THE CONTEXT OF NOTE 2 ABOVE.
4. MINIMUM RADIUS OF CURVATURE OF BENCHING ON THE INSIDE OF THE CURVE WILL BE 2.5 TIMES THE DIAMETER.
5. WHERE CURVATURE GREATER THAN 2.5 TIMES THE DIAMETER IS ACHIEVABLE, THE CENTRELINE OF THE CHANNEL IS TO DESCRIBE A SMOOTH CONSTANT RADIUS CURVE FROM INLET PIPE TO OUTLET PIPE.
6. ALL SHARP EDGES TO BE MADE ROUNDED CHAMFERS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	OFFSET "Z" DIMENSION ADDED. DRAWING NOW -D	23/11/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	X
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

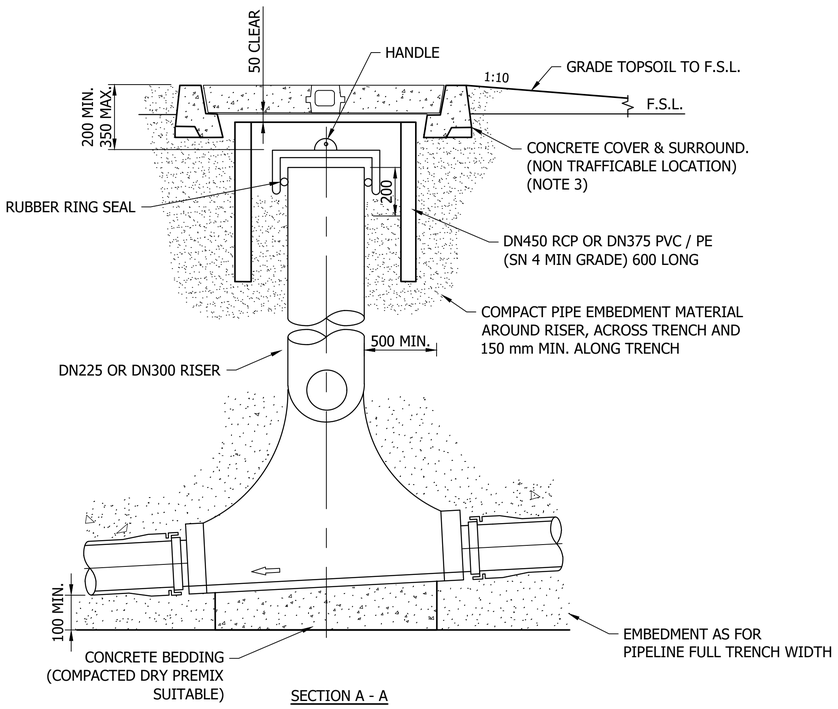
STANDARD DRAWING
SEWERAGE NETWORK
PRECAST AND CAST IN SITU MAINTENANCE HOLES
STANDARD OFFSETS AND BENCHING
DETAILS

DRAWING STATUS: Current

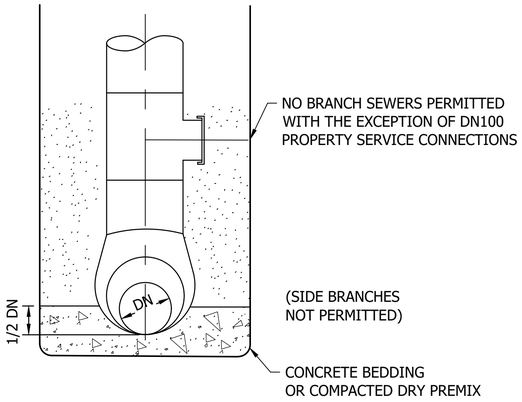
SD-2208-D

A1

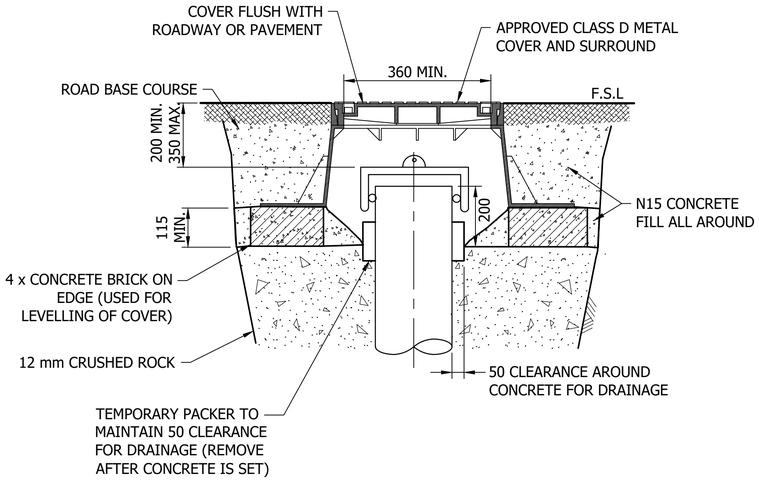
ISSUE B



SECTION A - A

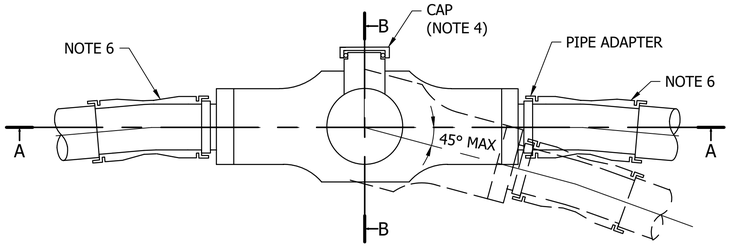


SECTION B - B



ELEVATION

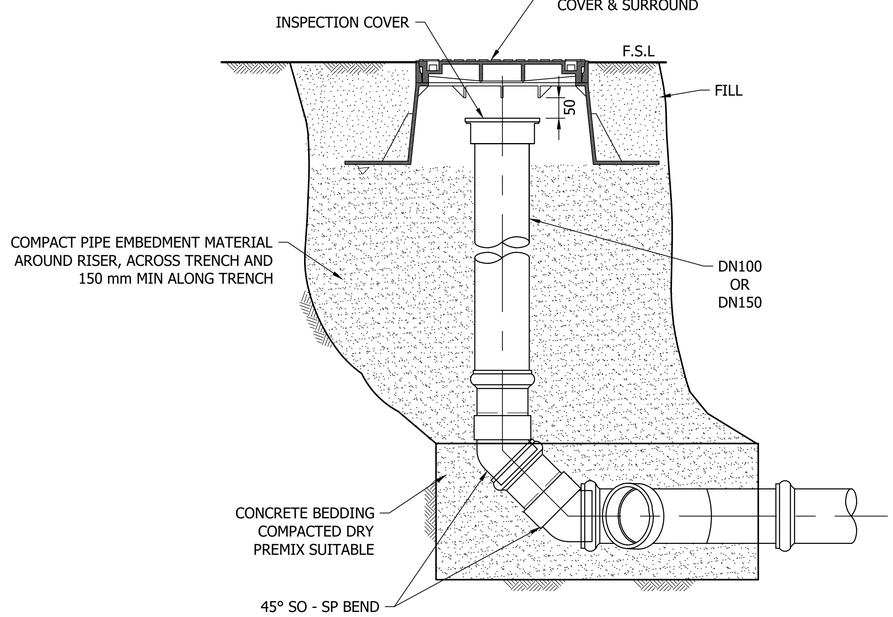
COVER AND SURROUND DETAILS SMS OR RP UNDER ROADWAYS (SMS) COVER SHOWN)



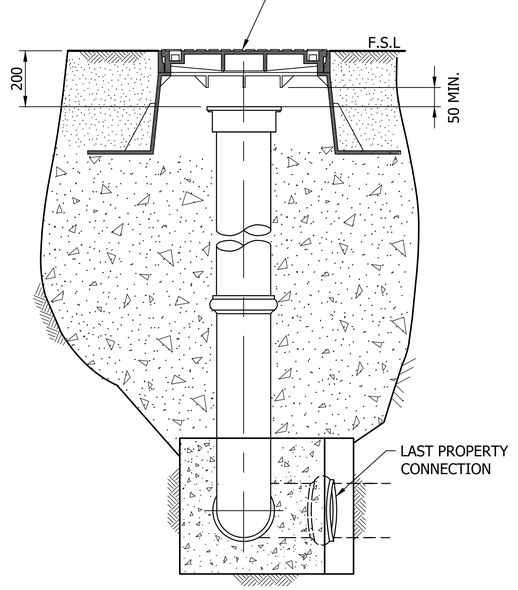
PLAN

SEWER MAINTENANCE SHAFT (SMS) TYPICAL ARRANGEMENT

(FOR SEWER MAINS DN150 & DN225 ONLY)



SIDE ELEVATION



END ELEVATION

NOTES:

1. SHAFT MANUFACTURED FROM PVC (SOLVENT WELDED) OR PE (AS SINGLE UNIT). REFER TO THE ICON WATER APPROVED PRODUCTS LIST FOR ACCEPTED/APPROVED MAKES/MODELS.
2. DEPTH TO INVERT MINIMUM 1150, MAXIMUM 7000.
3. FOR ACCESS COVER DETAILS REFER TO SD-2204.
4. ONLY DN100 PROPERTY SERVICE CONNECTIONS ALLOWED (NO BRANCH SEWERS).
5. PIPE FITTINGS TO SUIT CONNECTING SEWERS.
6. PERMITTED EXTERNAL BENDS ARE:
   - MAXIMUM OF 2 x 5° BENDS, ONE AT INLET ONE AT OUTLET.
   - BENDS ARE TO BE ADJACENT TO SHAFT.
7. RODDING POINTS SHALL BE SHOWN AS RP AND SEWER MAINTENANCE SHAFTS AS SMS.
8. FOR COMPACTION REQUIREMENTS REFER TO THE SD-2100 SERIES OF DRAWINGS.

RODDING POINTS AT DEAD ENDS (RP) (NON - TRAFFICABLE AREAS)

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DRAWING CHANGED TO -D	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	X
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

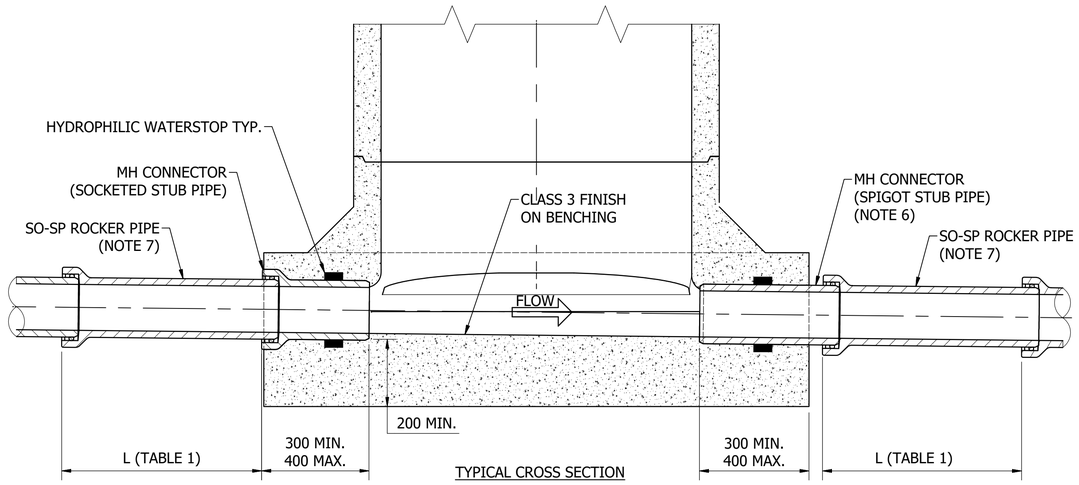
STANDARD DRAWING
SEWERAGE NETWORK
SEWER MAINTENANCE SHAFTS (SMS) AND RODDING POINTS
TYPICAL ARRANGEMENTS

DRAWING STATUS: Current

SD-2209-D

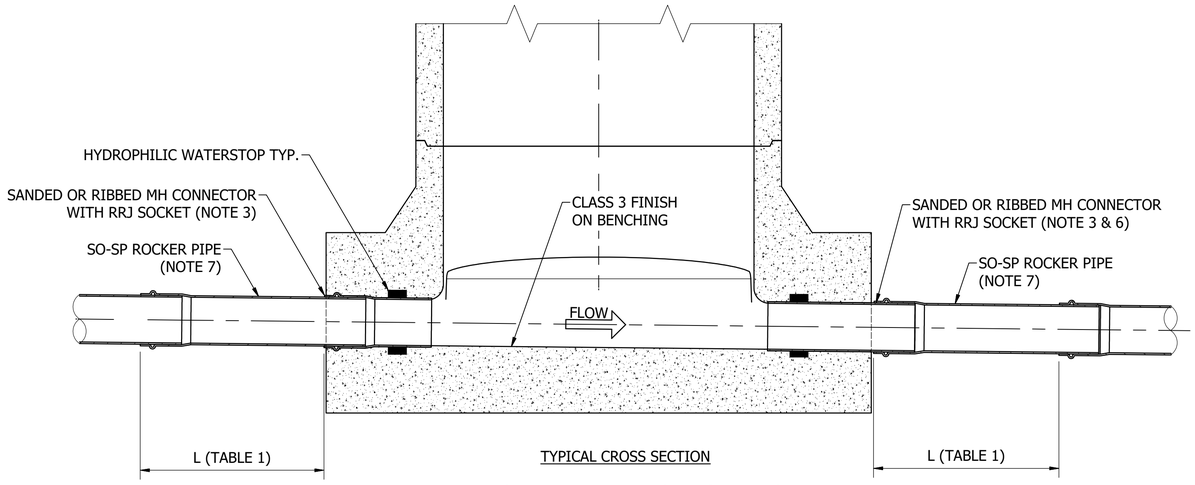
A1

ISSUE: B



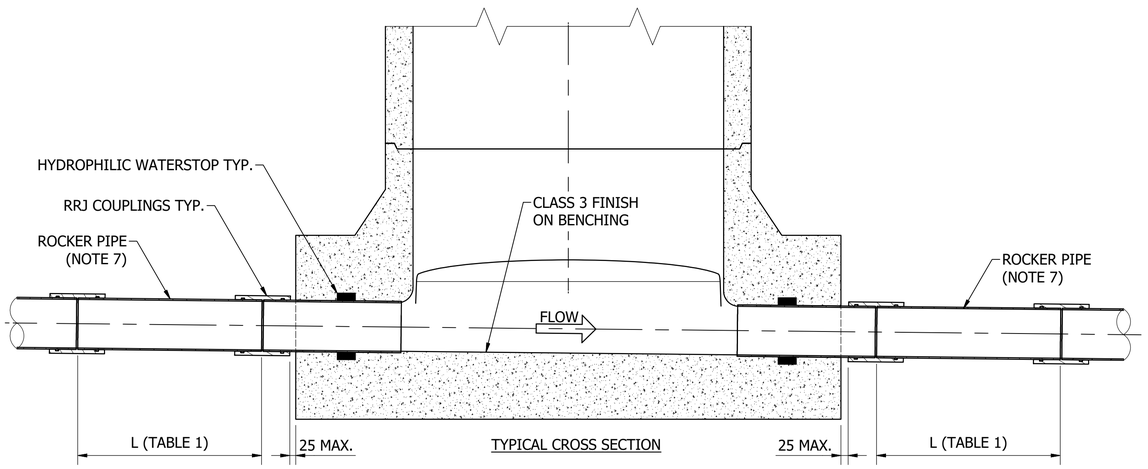
TYPICAL MAINTENANCE HOLE BASE
FOR VC, RC AND DI SEWER MAINS

SCALE: 1 : 10



TYPICAL MAINTENANCE HOLE BASE
FOR RUBBER RING JOINT PVC, SOLVENT CEMENT PVC
& ABS SEWER MAINS

SCALE: 1 : 10



TYPICAL MAINTENANCE HOLE BASE
FOR VC & GRP SLEEVE COUPLED SEWER MAINS

SCALE: 1 : 10

TABLE 1 - ROCKER PIPE DIMENSIONS

Sewer size DN	PVC		VC, RC	DI	GRP	
	"L" MIN	"L" MAX	"L"	"L"	"L" MIN	"L" MAX
150	300	450	600	1500	500	1000
225	450	650	600	1500	500	1000
300	600	900	700	1500	500	1000
375	750	1125	700	1500	500	1000

NOTE: THIS TABLE IS A DIRECT REPRODUCTION OF TABLE 7.3 OF WSA 02.

NOTES:

1. PIPE CONNECTION DETAILS APPLY TO PRECAST AND CAST IN SITU MAINTENANCE HOLES (REFER SD-2201, SD-2205 & SD-2206).

2. FORM ROUNDED NOSING ON INLET AND OUTLET PIPES TO PREVENT FUTURE DAMAGE TO JETTING EQUIPMENT, CCTV GUIDES AND CABLES.

3. PVC, ABS & GRP MH CONNECTORS LARGER THAN DN300 TO HAVE WEEP RINGS AND TO BE SANDED.

4. WHERE SPECIFIED, USE RRJ ROCKER PIPES AS SHOWN IN RRJ DETAIL WITH SOLVENT CEMENT JOINT PVC SEWERS.

5. SOLVENT CEMENTED PVC SEWERS ARE NOT SUITABLE IF THE SOIL BEARING CAPACITY IS LESS THAN 100 kPa.

6. SPIGOT STUB PIPES ARE TO EXTEND FROM THE MAINTENANCE HOLE SUCH THAT THE CONNECTING SOCKET IS AS CLOSE AS PRACTICABLE TO THE MAINTENANCE HOLE STRUCTURE.

7. ROCKER PIPES AND ANY ASSOCIATED CONNECTIONS MUST BE COMPLETELY FREE FROM CONCRETE ENCASEMENT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	MODEL CORRECTION. DRAWING CHANGED TO -D	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING. IN PARTICULAR, DRAWING SEW-1302

DAM		RES		SPS	X			
BWS		WAT		STP	X			
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

icon WATER

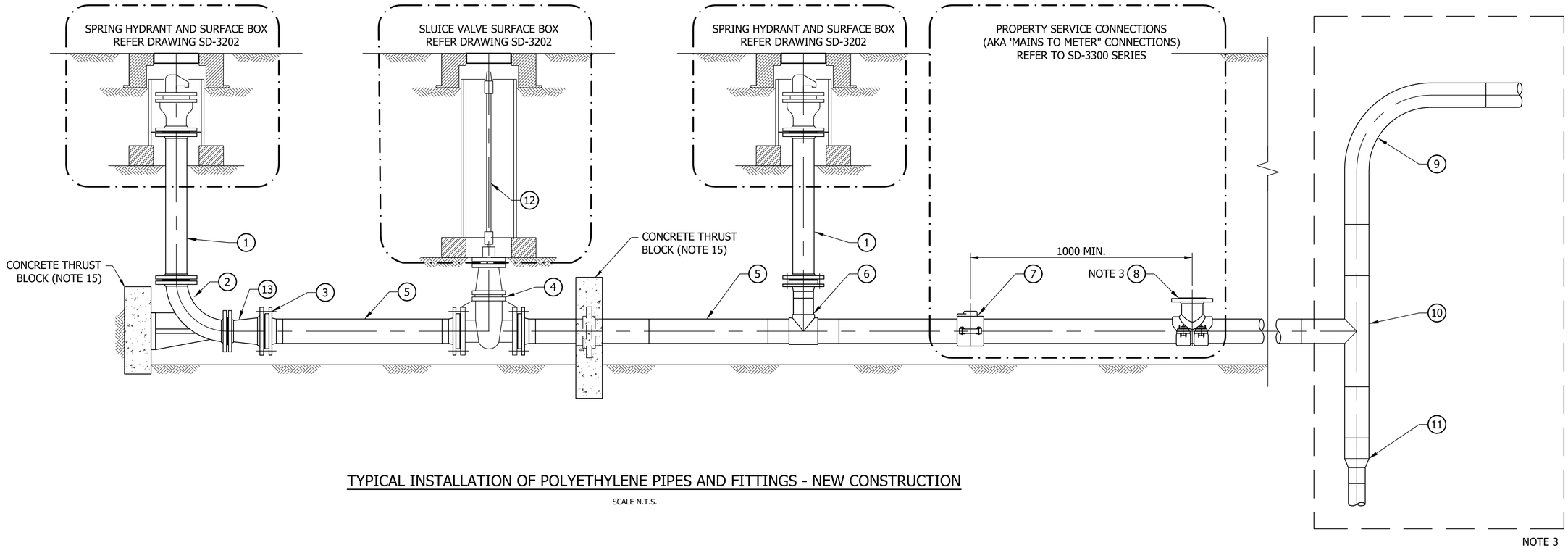
STANDARD DRAWING
SEWERAGE NETWORK
PRECAST AND CAST IN SITU MAINTENANCE HOLES
PIPE CONNECTION
DETAILS

DRAWING STATUS: Current

SD-2210-D

A1

ISSUE B



TYPICAL INSTALLATION OF POLYETHYLENE PIPES AND FITTINGS - NEW CONSTRUCTION

SCALE N.T.S.

NOTES:

1. REFER TO SD-5010 FOR FLANGED JOINTS DETAILS.
2. REFER TO SD-3011 FOR MAINS RENEWALS (PIPE BURSTING) WITH POLYETHYLENE.
3. ITEMS 8, 9, 10 AND 11 SHOWN ROTATED 90° FOR CLARITY.
4. ALL POLYETHYLENE PIPEWORK SHALL BE PE-100, SDR 11.
5. BUTT-WELDING SHALL BE CONDUCTED IN ACCORDANCE WITH WSA 01. IN-TRENCH BUTT-WELDING IS NOT PERMITTED.
6. FLANGED FITTINGS IN EITHER POLYETHYLENE (AS/NZS 4129) OR FBE COATED DI (AS/NZS 2280) MAY BE SUBSTITUTED IN LIEU OF BUTT-WELDING POLYETHYLENE FITTINGS. ELECTRO FUSION JOINTS ARE NOT PERMITTED.
7. POLYETHYLENE (PE100) PIPE MAY BE COLD-BENT TO A MINIMUM RADIUS OF 25 x DN ON THE PROVISO THAT ANY FORMERS USED SHALL NOT IMPOSE A POINT LOAD DURING THE BENDING OPERATION. FOR EXAMPLE, STAKES AND STAR PICKETS (OR SIMILAR ITEMS) SHALL NOT BE USED.
8. METAL-SEATED GATE VALVES SHALL BE USED FOR SCOUR APPLICATIONS.
9. INSTALL PIPEWORK PARALLEL TO PROPERTY BOUNDARIES.
10. CONSTRUCTOR TO MAKE ALLOWANCE FOR THE EXPANSION AND CONTRACTION OF POLYETHYLENE PIPE DUE TO TEMPERATURE CHANGES.
11. REFER TO SD-2101 AND WSA 03 (AS AMENDED BY ICON WATER IN STD-SPE-G-012) FOR DEPTH OF COVER REQUIREMENTS.
12. MARKER TAPE AND TRACER WIRE (NOT SHOWN FOR CLARITY) TO BE INSTALLED IN ACCORDANCE WITH WSA 03 (AS AMENDED BY ICON WATER) AND THE ICON WATER APPROVED PRODUCTS LIST.
13. ONLY ITEMS SPECIFICALLY LISTED IN ICON WATER'S APPROVED PRODUCTS LIST SHALL BE INSTALLED.
14. POLYETHYLENE MAINS SHALL NOT BE INSTALLED WITHOUT THE WRITTEN APPROVAL OF ICON WATER. ONLY PRE-APPROVED CONSTRUCTORS SHALL BE ENGAGED. CONTACT ICON WATER FOR THE LATEST LISTING OF APPROVED CONSTRUCTORS PRIOR TO COMPLETING DETAILED DESIGN ACTIVITIES.
15. CONCRETE THRUST BLOCKS ARE NOT REQUIRED IF FULL RESTRAINT HAS BEEN ACHIEVED THROUGH FLANGING AND BUTT-WELDING. REFER TO SD-5001, SD-5002 AND SD-5003 FOR GENERIC DETAILS. DUCK FOOT BEND ALSO NOT REQUIRED IF FULL RESTRAINT HAS BEEN ACHIEVED.
16. VALVE EXTENSION SPINDLES SHALL BE INSTALLED FOR ALL MAINS WHERE THE DEPTH FROM FINISHED SURFACE LEVEL TO THE TOP OF THE GATE VALVE STEM CAP EXCEEDS 350. A UNIVERSAL JOINT SHALL BE INCORPORATED INTO EXTENSION SPINDLES WHERE THE GRADE OF THE MAIN EXCEEDS 1:50. THE EXTENSION SPINDLE LENGTH SHALL BE CONFIRMED BY THE CONSTRUCTOR AND RECORDED ON THE WORK AS EXECUTED DRAWINGS ONCE INSTALLED.

ITEM	DESCRIPTION
1	HYDRANT RISER, DN80, DI, FL-FL, FBE COATED, FLANGED TO AS 4087 PN16. REFER NOTE 15
2	DUCK FOOT BEND, DI, FL-FL, FBE COATED, AS 4087 PN16
3	STUB FLANGE, PE100, C/W LOOSE BACKING RING, AS 4087 PN16, REFER NOTE 1
4	GATE VALVE, RESILIENT SEATED, FL-FL, FLANGED TO AS 4087 PN16, NOTE 8
5	POLYETHYLENE (PE100) PIPE, AS/NZS 4130, PN16, BUTT-WELDED, REFER NOTE 5
6	POLYETHYLENE (PE100) BUTT-WELDED TEE, C/W DN80 FLANGED TAKE-OFF, AS/NZS 4129, PN16, REFER NOTE 5 & 6
7	PIPE SADDLE, DI, FBE COATED, C/W THREADED BSP TAKE-OFF (UP TO DN50), PN16
8	PIPE SADDLE, DI, FBE COATED, C/W FLANGED TAKE-OFF (UP TO DN150), AS 4087, PN16
9	POLYETHYLENE (PE100), BUTT- WELDING ELBOW (OR BEND), AS/NZS 4129, PN16, REFER NOTE 6
10	POLYETHYLENE (PE100) BUTT- WELDING TEE, AS/NZS 4129, PN16, REFER NOTE 6
11	POLYETHYLENE (PE100) BUTT- WELDING REDUCER, AS/NZS 4129, PN16, REFER NOTE 6
12	EXTENSION SPINDLE, REFER NOTE 16
13	REDUCER, DI, FL-FL, FBE COATED, AS 4087 PN16

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	EXTENSION SPINDLE NOTE UPDATE	10/12/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

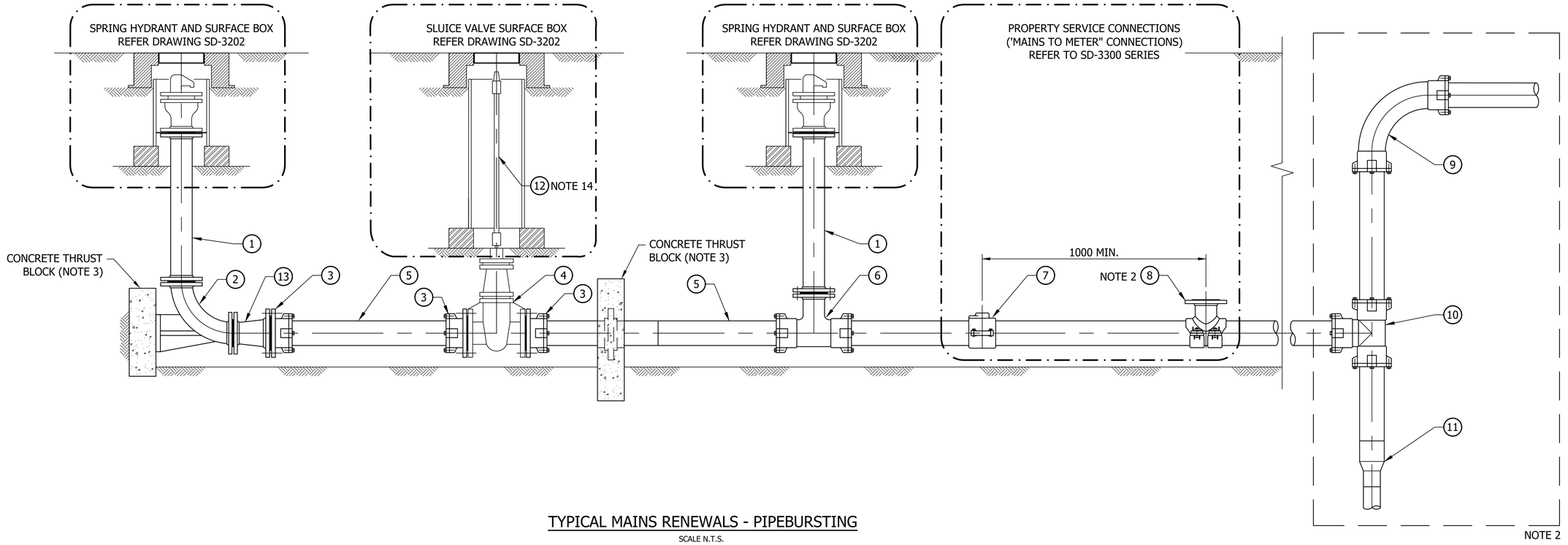
STANDARD DRAWING
WATER NETWORK
TYPICAL NEW MAINS CONSTRUCTION
POLYETHYLENE MAINS

DRAWING STATUS: Current

SD-3010-C

A1

ISSUE B



TYPICAL MAINS RENEWALS - PIPEBURSTING

SCALE N.T.S.

NOTES:

1. REFER TO SD-5010 FOR FLANGED JOINTS DETAILS.
2. ITEMS 8, 9, 10 AND 11 SHOWN ROTATED 90° FOR CLARITY.
3. CONCRETE THRUST BLOCKS ARE NOT REQUIRED IF FULL RESTRAINT HAS BEEN ACHIEVED THROUGH FLANGING, BUTT-WELDING OR FULLY-RESTRAINED PIPE COUPLINGS. DUCK FOOT BEND ALSO NOT REQUIRED IF FULL RESTRAINT HAS BEEN ACHIEVED. REFER TO SD-5001, SD-5002 AND SD-5003 FOR GENERIC DETAILS.
4. BUTT-WELDING SHALL BE CONDUCTED IN ACCORDANCE WITH WSA 01. IN-TRENCH BUTT-WELDING IS NOT PERMITTED.
5. BUTT-WELDING AND FLANGING ARE THE REQUIRED JOINING METHODS. APPROVED COUPLINGS (ITEMS 3, 6, 9 & 10) MAY BE USED IF THIS IS NOT PRACTICABLE. ELECTROFUSION JOINTS ARE NOT PERMITTED EXCEPT FOR FINAL CLOSURES OR WHEN OTHER APPROVED METHODS ARE NOT PRACTICABLE.
6. POLYETHYLENE (PE100) PIPE MAY BE COLD-BENT TO A MINIMUM RADIUS OF 25 x DN ON THE PROVISO THAT ANY FORMERS USED SHALL NOT IMPOSE A POINT LOAD DURING THE BENDING OPERATION. FOR EXAMPLE, STAKES AND STAR PICKETS (OR SIMILAR ITEMS) SHALL NOT BE USED.
7. METAL-SEATED GATE VALVES SHALL BE USED FOR SCOUR APPLICATIONS.
8. INSTALL PIPEWORK PARALLEL TO PROPERTY BOUNDARIES.
9. CONSTRUCTOR TO MAKE ALLOWANCE FOR THE EXPANSION AND CONTRACTION OF POLYETHYLENE PIPE DUE TO TEMPERATURE CHANGES.
10. REFER TO SD-2101 AND WSA 03 (AS AMENDED BY ICON WATER IN STD-SPE-G-012) FOR DEPTH OF COVER REQUIREMENTS.
11. MARKER TAPE AND TRACER WIRE (NOT SHOWN FOR CLARITY) TO BE INSTALLED IN ACCORDANCE WITH WSA 03 (AS AMENDED BY ICON WATER) AND THE ICON WATER APPROVED PRODUCTS LIST.
12. ONLY ITEMS SPECIFICALLY LISTED IN ICON WATER'S APPROVED PRODUCTS LIST SHALL BE INSTALLED.
13. PIPEBURSTING AND MAINS RENEWALS SHALL ONLY BE CONDUCTED BY APPROVED CONSTRUCTORS WHO ARE DIRECTLY CONTRACTED TO ICON WATER.
14. VALVE EXTENSION SPINDLES SHALL BE INSTALLED FOR ALL MAINS WHERE THE DEPTH FROM FINISHED SURFACE LEVEL TO THE TOP OF THE GATE VALVE STEM CAP EXCEEDS 350. A UNIVERSAL JOINT SHALL BE INCORPORATED INTO EXTENSION SPINDLES WHERE THE GRADE OF THE MAIN EXCEEDS 1:50. THE EXTENSION SPINDLE LENGTH SHALL BE CONFIRMED BY THE CONSTRUCTOR AND RECORDED ON THE WORK AS EXECUTED DRAWINGS ONCE INSTALLED.

ITEM	DESCRIPTION
1	HYDRANT RISER, DN80, DI, FL-FL, FBE COATED, FLANGED TO AS 4087 PN16. REFER NOTE 3.
2	DUCK FOOT BEND, DN80, DI, FL-FL, FBE COATED, FLANGED TO AS 4087 PN16
3	FULLY RESTRAINED COUPLING WITH FLANGE, DI, EPOXY COATED, PN16
4	GATE VALVE, RESILIENT SEATED, FL-FL, FLANGED TO AS 4087 PN16, REFER NOTE 7
5	POLYETHYLENE (PE100) PIPE, AS/NZS 4130, PN16, BUTT-WELDED, REFER NOTE 5
6	TEE, FULLY RESTRAINED COUPLING WITH FLANGE, DI, EPOXY COATED, REFER NOTE 5
7	PIPE SADDLE, DI, FBE COATED, C/W THREADED BSP TAKE-OFF (UP TO DN50), PN16
8	PIPE SADDLE, DI, FBE COATED, C/W FLANGED TAKE-OFF (UP TO DN150), AS 4087, PN16
9	90° ELBOW, DI, FULLY RESTRAINED COUPLINGS, EPOXY COATED, REFER NOTE 5
10	TEE, FULLY RESTRAINED COUPLING, EPOXY COATED, REFER NOTE 5
11	POLYETHYLENE (PE100) BUTT- WELDING REDUCER, AS/NZS 4129, PN16, REFER NOTE 5
12	EXTENSION SPINDLE, REFER NOTE 14
13	REDUCER, DI, FL-FL, FBE COATED, AS 4087 PN16

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	NOTES UPDATED	10/09/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

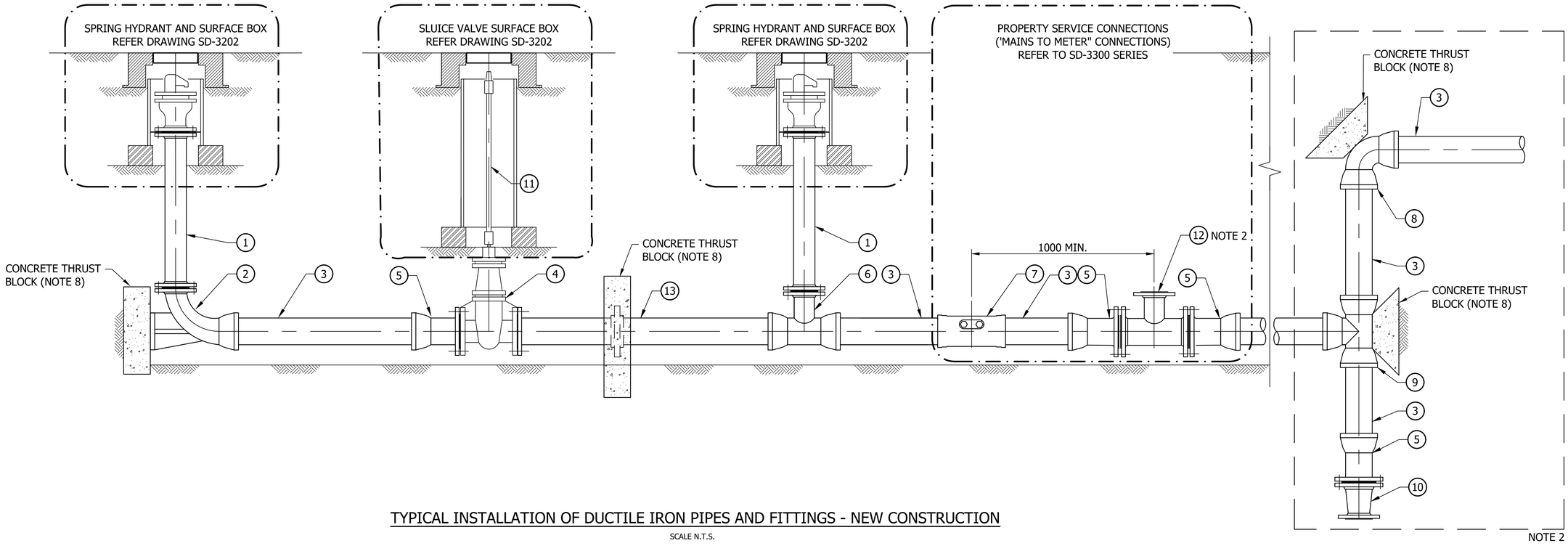
STANDARD DRAWING
WATER NETWORK
TYPICAL MAINS RENEWALS - PIPEBURSTING
POLYETHYLENE MAINS

DRAWING STATUS: Current

SD-3011-C

A1

ISSUE B



TYPICAL INSTALLATION OF DUCTILE IRON PIPES AND FITTINGS - NEW CONSTRUCTION

SCALE N.T.S.

NOTES:

1. REFER TO SD-5010 FOR FLANGED JOINTS DETAILS.
2. ITEMS 3, 5, 8, 9, 10 & 12 SHOWN ROTATED 90° FOR CLARITY.
3. ONLY ITEMS SPECIFICALLY LISTED IN ICON WATER'S APPROVED PRODUCTS LIST SHALL BE INSTALLED.
4. METAL-SEATED GATE VALVES SHALL BE USED FOR SCOUR APPLICATIONS.
5. INSTALL PIPEWORK PARALLEL TO PROPERTY BOUNDARIES.
6. REFER TO SD-2101 AND WSA 03 (AS AMENDED BY ICON WATER IN STD-SPE-G-012) FOR DEPTH OF COVER REQUIREMENTS.
7. MARKER TAPE AND TRACER WIRE (NOT SHOWN FOR CLARITY) TO BE INSTALLED IN ACCORDANCE WITH WSA 03 (AS AMENDED BY ICON WATER) AND THE ICON WATER APPROVED PRODUCTS LIST.
8. CONCRETE THRUST BLOCKS, ANCHORS AND THRUST WALLS TO BE EITHER ENGINEERED FOR THE SPECIFIC PROJECT OR IN ACCORDANCE WITH SD-5001, SD-5002 AND SD-5003 AS APPROPRIATE.
9. VALVE EXTENSION SPINDLES SHALL BE INSTALLED FOR ALL MAINS WHERE THE DEPTH FROM FINISHED SURFACE LEVEL TO THE TOP OF THE GATE VALVE STEM CAP EXCEEDS 350. A UNIVERSAL JOINT SHALL BE INCORPORATED INTO EXTENSION SPINDLES WHERE THE GRADE OF THE MAIN EXCEEDS 1:50. THE EXTENSION SPINDLE LENGTH SHALL BE CONFIRMED BY THE CONSTRUCTOR AND RECORDED ON THE WORK AS EXECUTED DRAWINGS ONCE INSTALLED.

ITEM	DESCRIPTION
1	HYDRANT RISER, DN80, DI, FL-FL, FBE COATED, FLANGED TO AS 4087 PN16.
2	DUCK FOOT BEND, REDUCING TYPE, DI, FL-SO, FBE COATED, FLANGED TO AS 4087 PN16
3	DUCTILE PIPE, DICL, PN35, AS/NZS 2280
4	GATE VALVE, RESILIENT SEATED, FL-FL, FLANGED TO AS 4087 PN16, REFER NOTE 4
5	CONNECTOR, DI, FL-SO, PN16
6	REDUCING TEE, DI, FBE COATED, SO-SO-FL, PN16
7	PRE-TAPPED CONNECTOR, DI, FBE COATED, PN16
8	90° ELBOW, DI, FBE COATED, SO-SO, PN16
9	TEE, DI, FBE COATED, SO-SO-SO, PN16
10	FLANGE TAPER, DI, FBE COATED, FL-FL, PN16
11	EXTENSION SPINDLE, , REFER NOTE 9
12	REDUCING TEE, DI, FBE COATED, FL-FL-FL, PN16
13	DUCTILE PIPE, DICL, PN35, FL-SP FLANGED TO AS 4087 PN16, C/W FACTORY FITTED THRUST FLANGE

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	SPINDLE AND THRUST BLOCK NOTES UPDATED	10/12/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

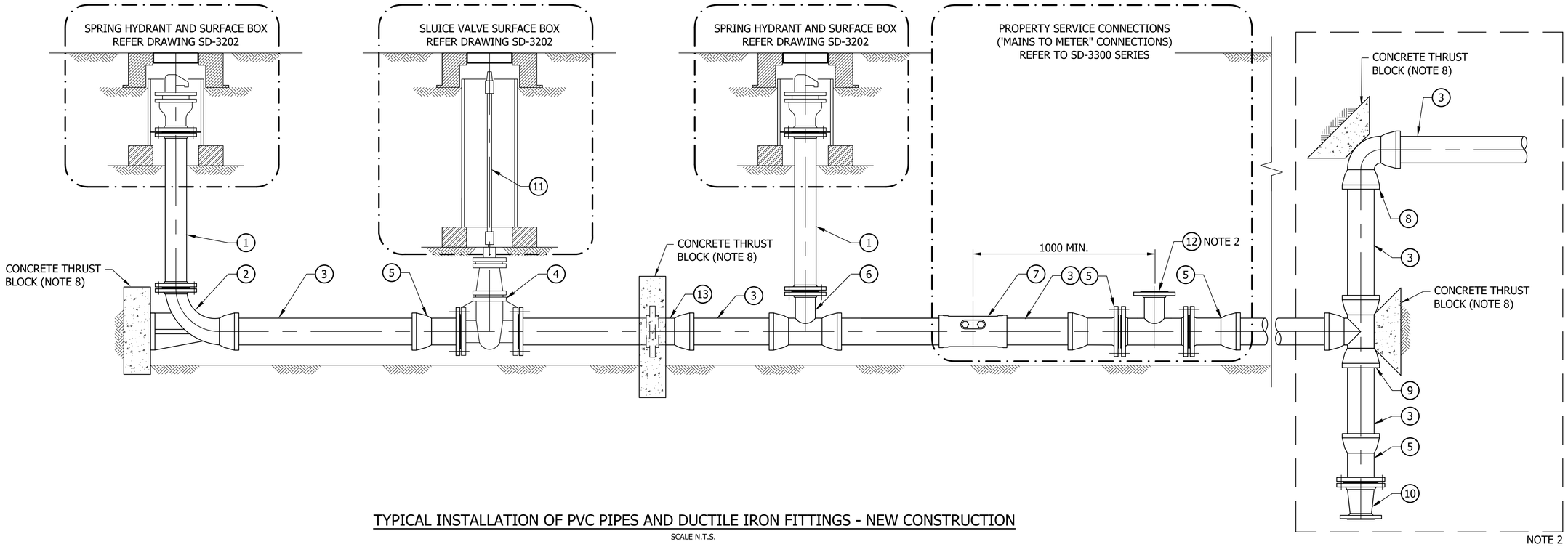
STANDARD DRAWING
WATER NETWORK
TYPICAL NEW MAINS CONSTRUCTION
DUCTILE IRON MAINS

DRAWING STATUS: Current

SD-3012-C

A1

ISSUE B



TYPICAL INSTALLATION OF PVC PIPES AND DUCTILE IRON FITTINGS - NEW CONSTRUCTION

SCALE N.T.S.

NOTES:

1. REFER TO SD-5010 FOR FLANGED JOINTS DETAILS.
2. ITEMS 3, 5, 8, 9, 10 & 12 SHOWN ROTATED 90° FOR CLARITY.
3. ONLY ITEMS SPECIFICALLY LISTED IN ICON WATER'S APPROVED PRODUCTS LIST SHALL BE INSTALLED.
4. METAL-SEATED GATE VALVES SHALL BE USED FOR SCOUR APPLICATIONS.
5. INSTALL PIPEWORK PARALLEL TO PROPERTY BOUNDARIES.
6. REFER TO SD-2101 AND WSA 03 (AS AMENDED BY ICON WATER IN STD-SPE-G-012) FOR DEPTH OF COVER REQUIREMENTS.
7. MARKER TAPE AND TRACER WIRE (NOT SHOWN FOR CLARITY) TO BE INSTALLED IN ACCORDANCE WITH WSA 03 (AS AMENDED BY ICON WATER) AND THE ICON WATER APPROVED PRODUCTS LIST.
8. CONCRETE THRUST BLOCKS, ANCHORS AND THRUST WALLS TO BE EITHER ENGINEERED FOR THE SPECIFIC PROJECT OR IN ACCORDANCE WITH SD-5001, SD-5002 AND SD-5003 AS APPROPRIATE.
9. VALVE EXTENSION SPINDLES SHALL BE INSTALLED FOR ALL MAINS WHERE THE DEPTH FROM FINISHED SURFACE LEVEL TO THE TOP OF THE GATE VALVE STEM CAP EXCEEDS 350. A UNIVERSAL JOINT SHALL BE INCORPORATED INTO EXTENSION SPINDLES WHERE THE GRADE OF THE MAIN EXCEEDS 1:50. THE EXTENSION SPINDLE LENGTH SHALL BE CONFIRMED BY THE CONSTRUCTOR AND RECORDED ON THE WORK AS EXECUTED DRAWINGS ONCE INSTALLED.

ITEM	DESCRIPTION
1	HYDRANT RISER, DN80, DI, FL-FL, FBE COATED, FLANGED TO AS 4087 PN16
2	DUCK FOOT BEND, REDUCING TYPE, DI, FL-SO, FBE COATED, FLANGED TO AS 4087 PN16
3	PIPE, PVC-M TO AS/NZS 4441, SERIES 2, PN16
4	GATE VALVE, RESILIENT SEATED, FL-FL, FLANGED TO AS4087 PN16, NOTE 4
5	CONNECTOR, DI, FBE COATED, FL-SO, PN16
6	TEE, DI, FBE COATED, SO-SO-FL, PN16
7	PRE-TAPPED CONNECTOR, DI, FBE COATED, PN16
8	90° ELBOW, DI, FBE COATED, SO-SO, PN16
9	TEE, DI, FBE COATED, SO-SO-SO, PN16
10	FLANGE TAPER, DI, FBE COATED, FL-FL, PN16
11	EXTENSION SPINDLE, REFER NOTE 9
12	TEE, DI, FBE COATED, FL-FL-FL, PN16
13	PIPE, DICL, FL-SO, FBE COATED, PN35, AS/NZS 2280, C/W FACTORY FITTED THRUST FLANGE

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	SPINDLE NOTE UPDATED	10/12/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

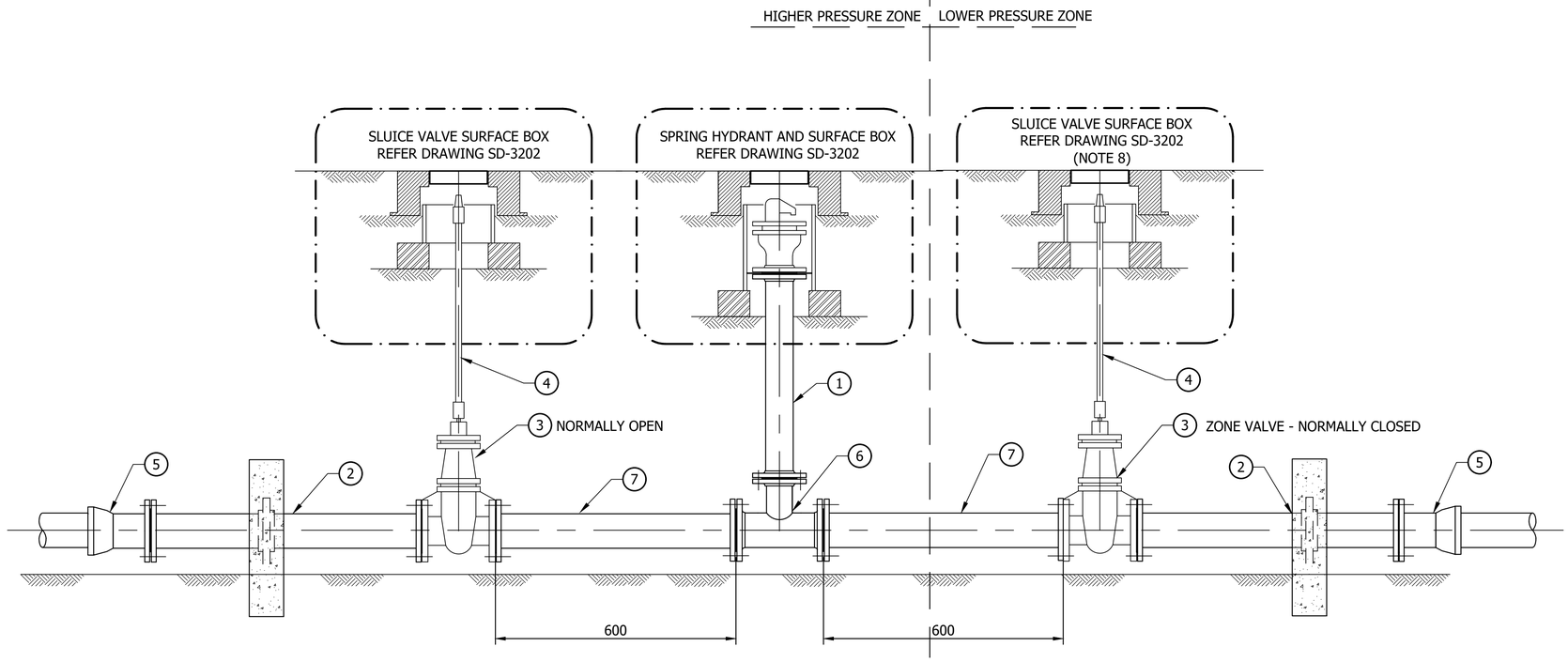
STANDARD DRAWING
WATER NETWORK
TYPICAL NEW MAINS CONSTRUCTION
PVC MAINS

DRAWING STATUS: Current

SD-3013-C

A1

ISSUE B



TYPICAL INSTALLATION OF PRESSURE ZONE BOUNDARY ZONE VALVE

SCALE: N.T.S.

NOTES:

1. THIS DRAWING SHOWS THE EQUIPMENT ARRANGEMENT ONLY. PIPE MATERIALS AND RATINGS ARE TO BE SPECIFIED BY THE DESIGNER ON THE PROJECT SPECIFIC DRAWINGS.
2. REFER TO SD-5010 FOR FLANGED JOINTS DETAILS.
3. ONLY ITEMS SPECIFICALLY LISTED IN ICON WATER'S APPROVED PRODUCTS LIST SHALL BE INSTALLED.
4. REFER TO SD-2101 AND WSA 03 (AS AMENDED BY ICON WATER IN STD-SPE-G-012) FOR DEPTH OF COVER REQUIREMENTS.
5. MARKER TAPE AND TRACER WIRE (NOT SHOWN FOR CLARITY) TO BE INSTALLED IN ACCORDANCE WITH WSA 03 (AS AMENDED BY ICON WATER) AND THE ICON WATER APPROVED PRODUCTS LIST.
6. CONCRETE THRUST BLOCKS, ANCHORS AND THRUST WALLS TO BE EITHER ENGINEERED FOR THE SPECIFIC PROJECT OR IN ACCORDANCE WITH SD-5001, SD-5002 AND SD-5003 AS APPROPRIATE.
7. VALVE EXTENSION SPINDLES SHALL BE INSTALLED FOR ALL MAINS WHERE THE DEPTH FROM FINISHED SURFACE LEVEL TO THE TOP OF THE GATE VALVE STEM CAP EXCEEDS 350. A UNIVERSAL JOINT SHALL BE INCORPORATED INTO EXTENSION SPINDLES WHERE THE GRADE OF THE MAIN EXCEEDS 1:50. THE EXTENSION SPINDLE LENGTH SHALL BE CONFIRMED BY THE CONSTRUCTOR AND RECORDED ON THE WORK AS EXECUTED DRAWINGS ONCE INSTALLED.
8. THE ZONE VALVE SURFACE BOX IS REQUIRED TO BE COLOURED YELLOW.

ITEM	DESCRIPTION
1	HYDRANT RISER, DI, FL-FL, FBE COATED, AS4087 PN16.
2	PIPE, DICL, FL-FL, FBE COATED, PN35, AS/NZS 2280, C/W FACTORY FITTED THRUST FLANGE
3	SLUICE VALVE, FL-FL, AS4087 PN16
4	EXTENSION SPINDLE, REFER NOTE 7
5	CONNECTOR, DI, FL-SOC, PN16.
6	TEE, FL-FL-FL, PN16
7	DUCTILE PIPE, DICL, PN35, FL-FL, FLANGED TO PN16

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	27/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

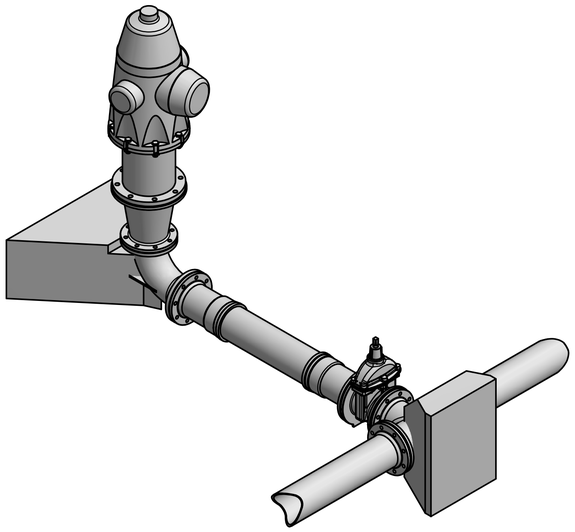
STANDARD DRAWING
WATER NETWORK
TYPICAL NEW MAINS CONSTRUCTION
PRESSURE ZONE BOUNDARY ZONE VALVE
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-3014-C

A1

ISSUE: A

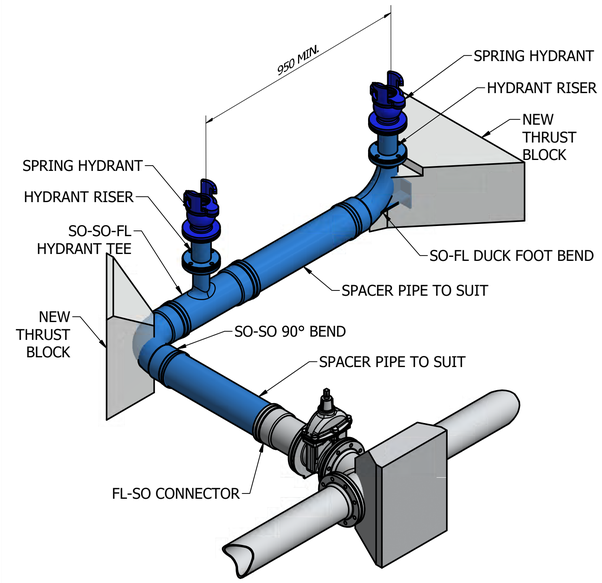


COLOUR KEY

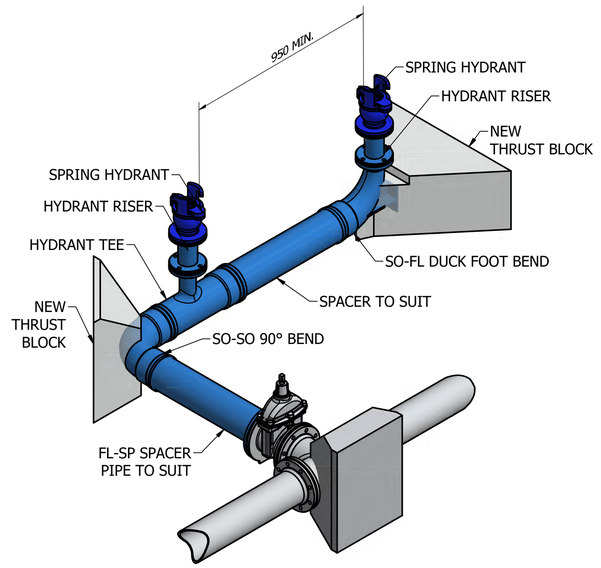
EXISTING

NEW

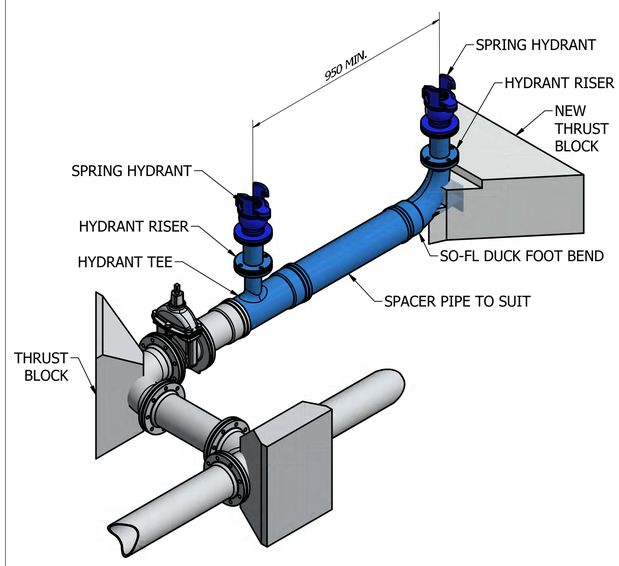
EXISTING " A"
HIGH CAPACITY HYDRANT ARRANGEMENT



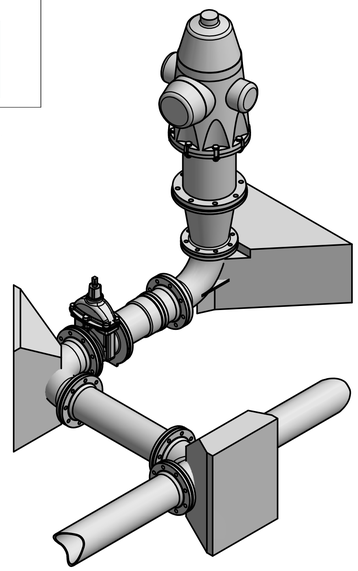
REPLACEMENT OPTION 1
ADJACENT TO MAIN CROSSING EXISTING SERVICE EASEMENTS



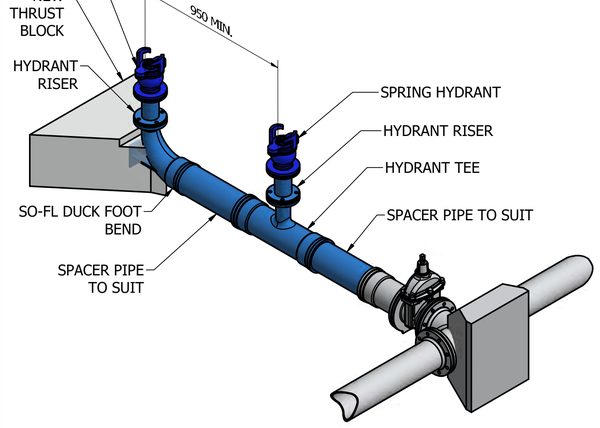
REPLACEMENT OPTION 2
ADJACENT TO MAIN



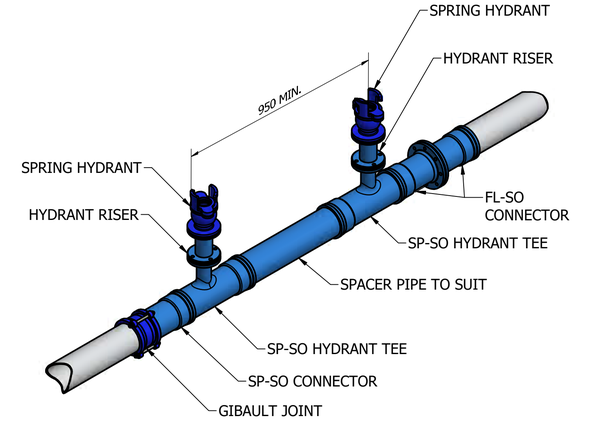
REPLACEMENT OPTION 3
ADJACENT TO MAIN ALTERNATIVE VALVE LOCATION



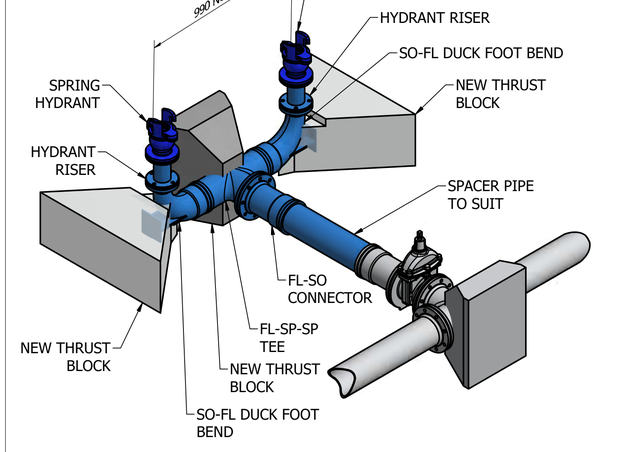
EXISTING "B"
HIGH CAPACITY HYDRANT ARRANGEMENT



REPLACEMENT OPTION 4
STANDARD REPLACEMENT



REPLACEMENT OPTION 5
DN150 TO DN225 MAINS ONLY



REPLACEMENT OPTION 6
ON DN150 BRANCH LINE

NOTES:

1. BURIED FLANGES, BOLTS, NUTS, ETC TO BE INSTALLED IN ACCORDANCE WITH SD-5010.

2. IN PAVED AREAS, INDICATOR PLATES SHALL BE USED. PLATE TO BE FIXED WITH EPOXY AND DRIVE PINS AT EACH CORNER (UNLESS NOTED OTHERWISE). REFER TO SD-1330.

3. IN NATURE STRIPS OR RURAL AREAS, SEMI FLEXIBLE OR FLEXIBLE MARKER POSTS OF STEEL CONSTRUCTION SHALL BE USED. REFER TO SD-1331.

4. VALVE AND HYDRANT COVERS NOT SHOWN FOR CLARITY. REFER TO SD-3202 FOR DETAILS.

5. VALVES LARGER THAN DN450 ARE TO BE INSTALLED IN A VALVE CHAMBER.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

icon WATER

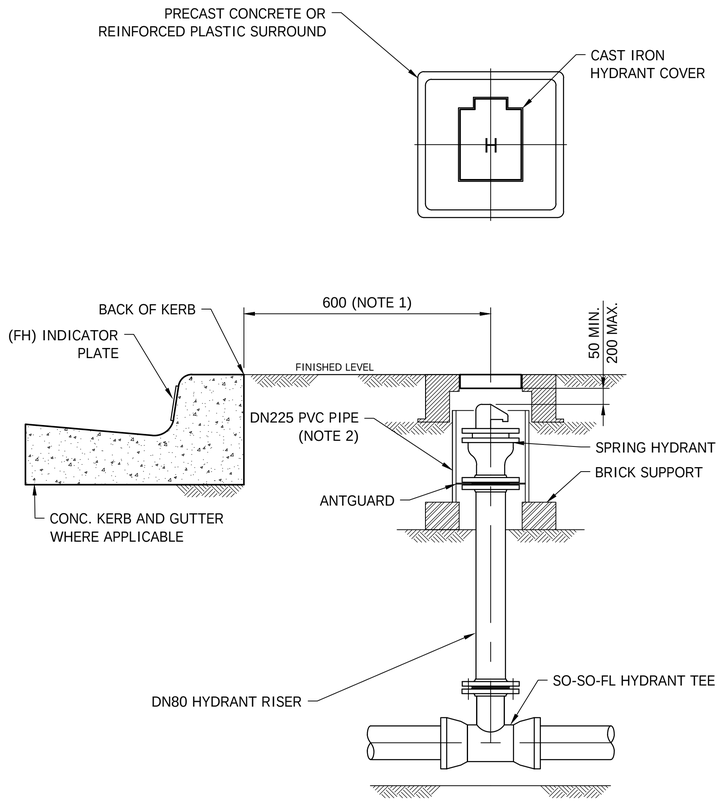
STANDARD DRAWING
WATER NETWORK
HIGH CAPACITY HYDRANTS
REPLACEMENT OPTIONS
TYPICAL ARRANGEMENTS

DRAWING STATUS: Current

SD-3201-D

A1

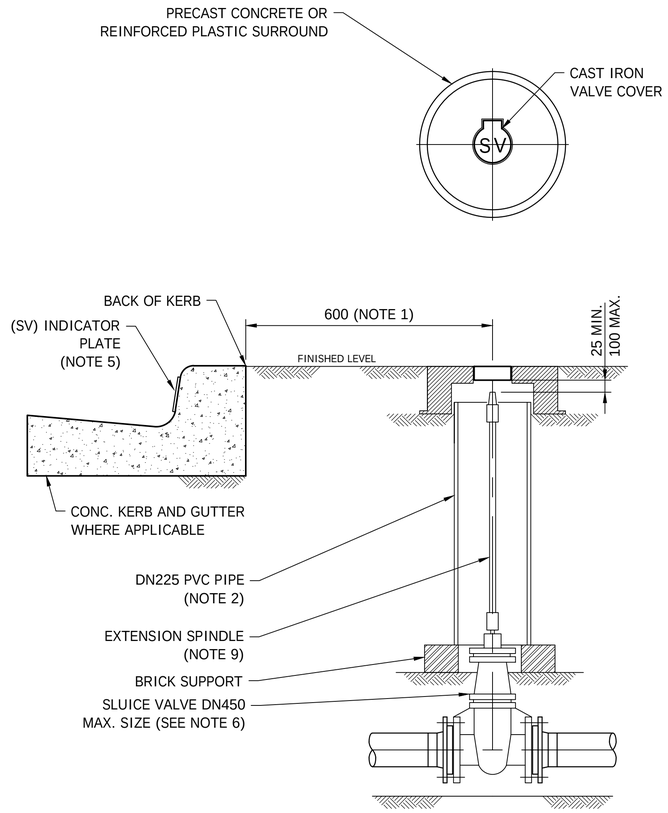
ISSUE: A



SECTIONAL ELEVATION

SPRING HYDRANT SURFACE BOX

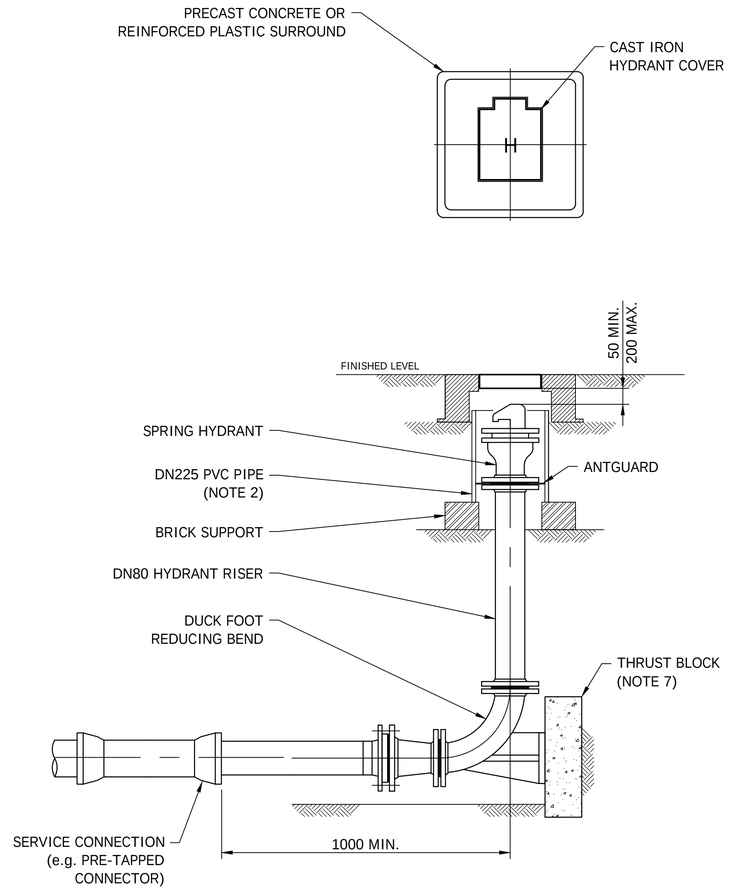
SCALE: N.T.S.



SECTIONAL ELEVATION

SLUICE VALVE SURFACE BOX

SCALE: N.T.S.



SECTIONAL ELEVATION

SPRING HYDRANT ARRANGEMENT FOR DEAD END MAINS

SCALE: N.T.S.

NOTES:

1. KERB OFFSET TO BE 600 mm FROM THE BACK OF THE KERB OR AS DIRECTED ON THE PROJECT DRAWINGS.
2. DN225 PVC STORMWATER PIPE TO BE USED AS A SHROUD.
3. REFER TO SD-5010 FOR FLANGED JOINT DETAILS.
4. ON PUBLIC (NON-SUBURBAN) LAND, RURAL AREAS AND NATURE PARKS ETC. , MARKER POSTS SHALL BE INSTALLED IN ACCORDANCE WITH SD-1330 AND SD-1331.
5. REFER TO SD-1330 FOR MARKER LABEL DETAILS.
6. SLUICE VALVES OF SIZES LARGER THAN DN450 SHALL BE INSTALLED IN A VALVE CHAMBER.
7. REFER TO SD-5002 AND SD-5003 FOR STANDARD THRUST BLOCK, THRUST ANCHOR AND THRUST WALL DETAILS.
8. SLUICE VALVE SURFACE BOXES ARE REQUIRED TO BE COLOUR CODED FOR SPECIAL INSTALLATIONS AS FOLLOW:
   ZONE VALVE = YELLOW
   FIRE SERVICE = RED
   KIDNEY DIALYSIS PATIENT = BLUE
9. VALVE EXTENSION SPINDLES SHALL BE INSTALLED FOR ALL MAINS WHERE THE DEPTH FROM FINISHED SURFACE LEVEL TO THE TOP OF THE GATE VALVE STEM CAP EXCEEDS 350. A UNIVERSAL JOINT SHALL BE INCORPORATED INTO EXTENSION SPINDLES WHERE THE GRADE OF THE MAIN EXCEEDS 1:50. THE EXTENSION SPINDLE LENGTH SHALL BE CONFIRMED BY THE CONSTRUCTOR AND RECORDED ON THE WORK AS EXECUTED DRAWINGS ONCE INSTALLED.
10. REINFORCED PLASTIC SURROUNDS FOR SURFACE FITTINGS SHALL NOT BE USED IN TRAFFICABLE AREAS. VALVE AND HYDRANT COVERS SHALL BE EITHER INSTALLED IN CONCRETE SURROUNDS OR DIRECTLY INTO THE ROAD PAVEMENT FOR TRAFFICABLE AREAS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	ANT GUARD, KERB LABEL AND NOTE 1 UPDATED	10/09/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY						
DAM		RES		SPS		
BWS		WAT	X	STP		
WTP		SEW				
WPS		REC				

icon WATER

STANDARD DRAWING
WATER NETWORK
INGROUND SLUICE VALVE
AND HYDRANT INSTALLATIONS
TYPICAL DETAILS

DRAWING STATUS: Current

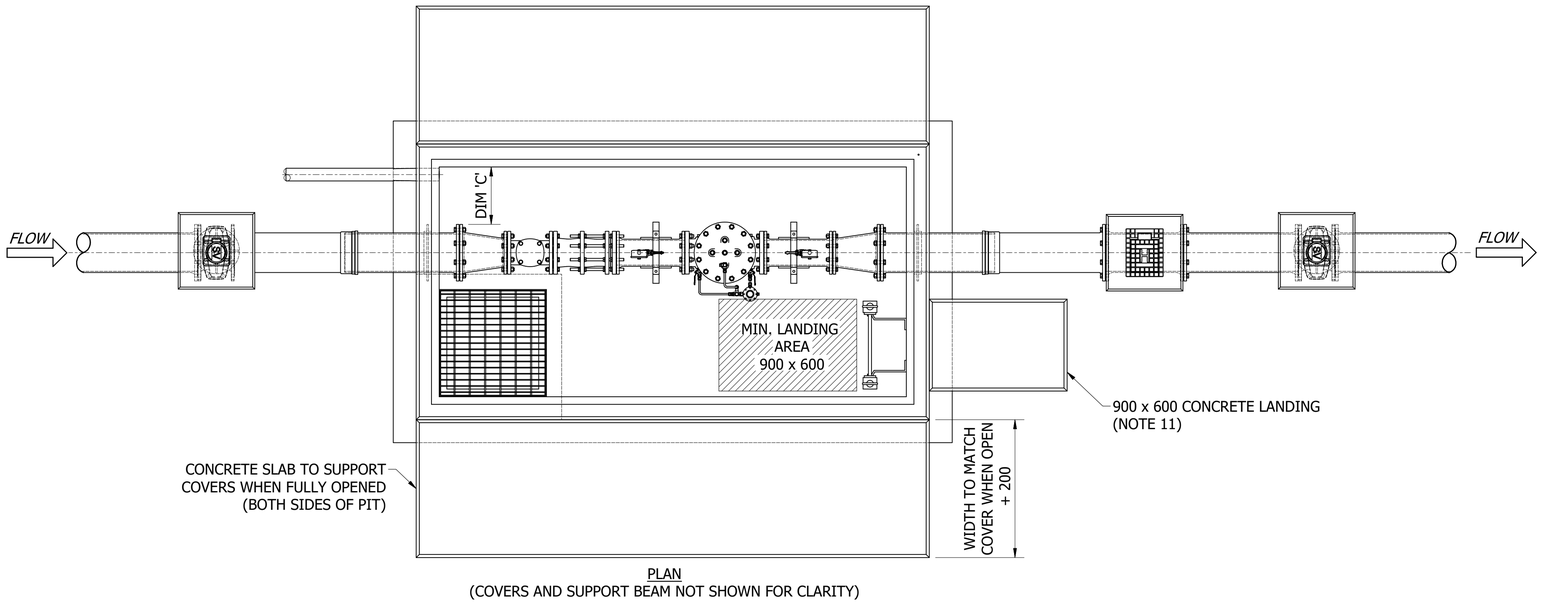
SD-3202-D

A1

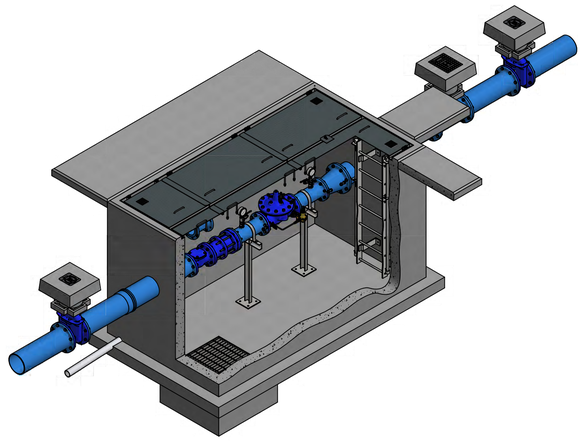
ISSUE: B

PRV SETTINGS			
PRV	INLET HEAD (m)	OUTLET HEAD (m)	BONNET RL. (m)

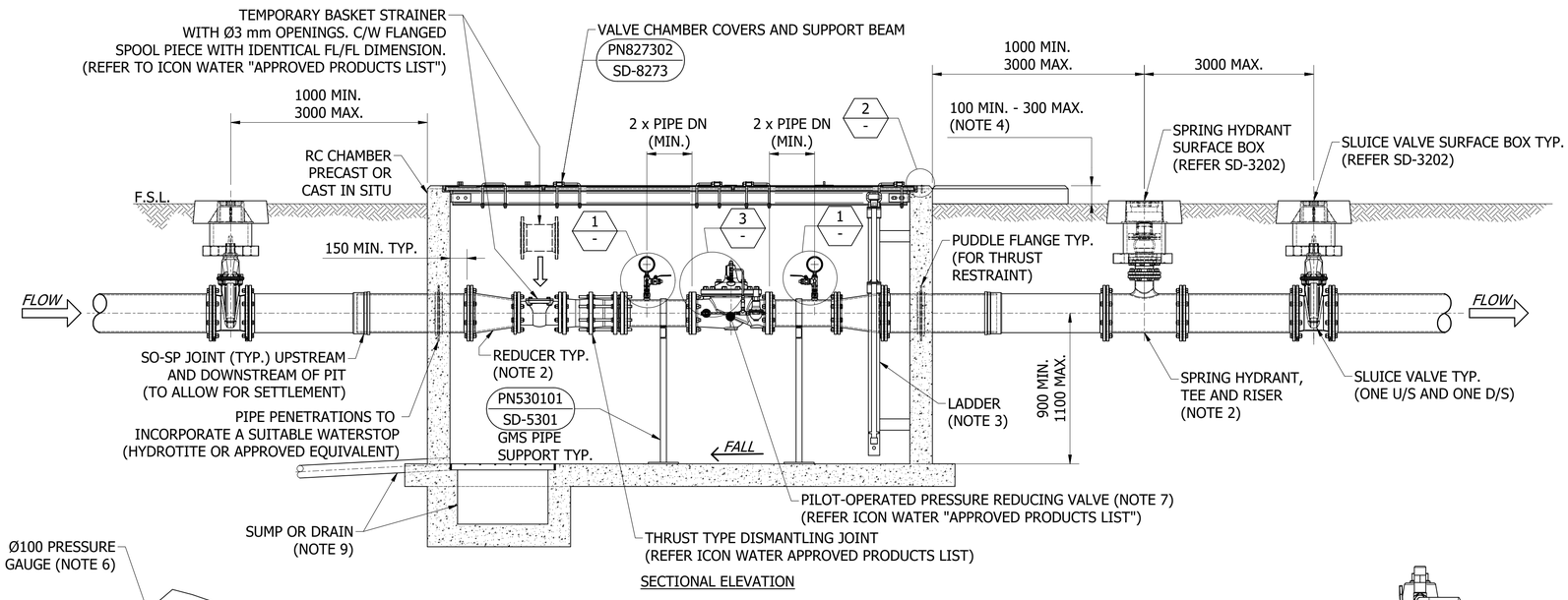
(EXAMPLE PRV SETTINGS TABLE - NOTE 7)



PLAN
(COVERS AND SUPPORT BEAM NOT SHOWN FOR CLARITY)



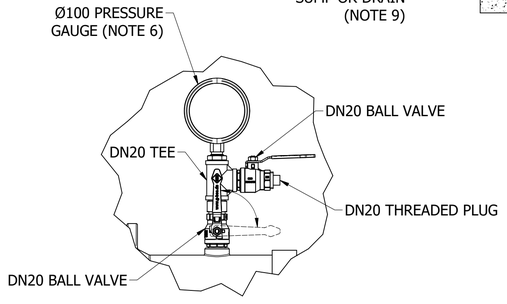
ISOMETRIC CUT-AWAY
NOT TO SCALE



SECTIONAL ELEVATION

PRESSURE REDUCING VALVE CHAMBER

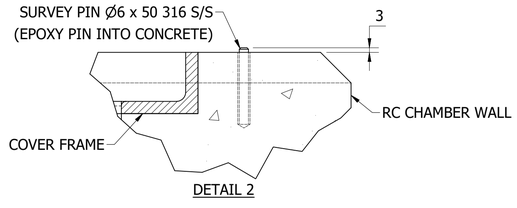
SCALE: 1 :20



DETAIL 1

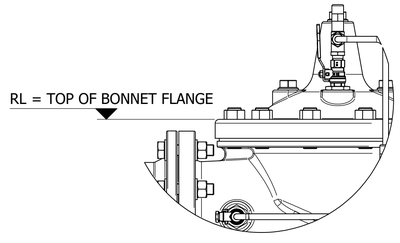
PRESSURE GAUGE x2

(UPSTREAM AND DOWNSTREAM OF PRV)



DETAIL 2

SURVEY PIN (NOTE 8)



DETAIL 3

PRV
BONNET RL REFERENCE POINT

NOTES:

1. DIM 'C' EQUALS DN+150 AND SHALL BE NO LESS THAN 300 UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER PRINCIPAL ENGINEER.

2. FOR MAINS DN225 AND ABOVE, TAPER PIPE TO ONE SIZE SMALLER FROM THE FIRST FLANGE IN THE CHAMBER TO THE LAST FLANGE IN THE CHAMBER AND INSTALL TWO (RATHER THAN ONE) SPRING HYDRANTS DOWNSTREAM.

3. FOR CHAMBER DEPTHS LESS THAN 2000 VERTICAL RUNG (TWIN STILE) LADDERS MAY BE USED IN LIEU OF INCLINED RUNG (TWIN STILE) LADDERS. FOR DEPTHS GREATER THAN 2000 A FIXED INCLINED RUNG LADDER SHALL BE INSTALLED. EXTENDABLE STANCHIONS ARE TO BE FITTED WHEREVER PRACTICABLE.

4. THE DETAILS RELATING TO ACCESS/EGRESS AND HEIGHT SAFETY AS DEPICTED ON THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE REQUIREMENTS DETAILED IN ICON WATER SPECIFICATIONS STD-SPE-G-008 AND G-009. THE DESIGNER SHALL PRODUCE PROJECT SPECIFIC (ISSUED FOR CONSTRUCTION) DESIGNS AS APPROPRIATE BASED ON THIS DRAWING AND THE REQUIREMENTS OF THE ABOVE-MENTIONED SPECIFICATIONS.

5. BEDDING AND BACKFILL DETAILS SHALL BE CHOSEN TO SUIT THE SPECIFIC SITE AND PIPELINE SIZING DETAILS.

6. UNLESS THE ZONE PRESSURE DICTATES OTHERWISE, PRESSURE GAUGES ARE TO BE GLYCERINE FILLED, 3/4" BSP (DN20) THREADED WITH (0-100 m HEAD @ 1 m GRADUATIONS). REFER TO THE ICON WATER APPROVED PRODUCTS LIST FOR ACCEPTABLE MAKES AND MODELS.

7. PRV SETTINGS (AS CONFIRMED BY THE ICON WATER ENGINEER) ARE TO BE SHOWN IN TABULAR FORM INCLUDING THE BONNET RL. WHICH SHALL BE DETERMINED BY A LICENSED SURVEYOR TO AN ACCURACY OF +/-5.0 mm (AND SHALL BE SHOWN ON WORK AS EXECUTED DRAWINGS).

8. TOP OF PIN RL TO BE PROVIDED BY A LICENSED SURVEYOR TO AN ACCURACY OF +/- 5.0 mm (AND SHALL BE SHOWN ON WORK AS EXECUTED DRAWINGS).

9. GRADE FLOOR TO DRAIN AND CONNECT TO SUITABLE STORMWATER OR DRAINAGE SYSTEM VIA DN80 MIN. PVC PIPE. IF NO SUITABLE DRAINAGE SYSTEM IS NEARBY THEN INSTALL A 600 SQ x 400 DEEP SUMP AND SUMP PUMP.

10. ALL PIPEWORK IN-CHAMBER AND BETWEEN UPSTREAM AND DOWNSTREAM SLUICE VALVES TO BE DICL.

11. THE DETAILS RELATING TO ACCESS/EGRESS AND HEIGHT SAFETY AS DEPICTED ON THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE REQUIREMENTS DETAILED IN ICON WATER SPECIFICATIONS STD-SPE-G-008 AND G-009. THE DESIGNER SHALL PRODUCE PROJECT SPECIFIC (ISSUED FOR CONSTRUCTION) DESIGNS AS APPROPRIATE BASED ON THIS DRAWING AND THE REQUIREMENTS OF THE ABOVE-MENTIONED SPECIFICATIONS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

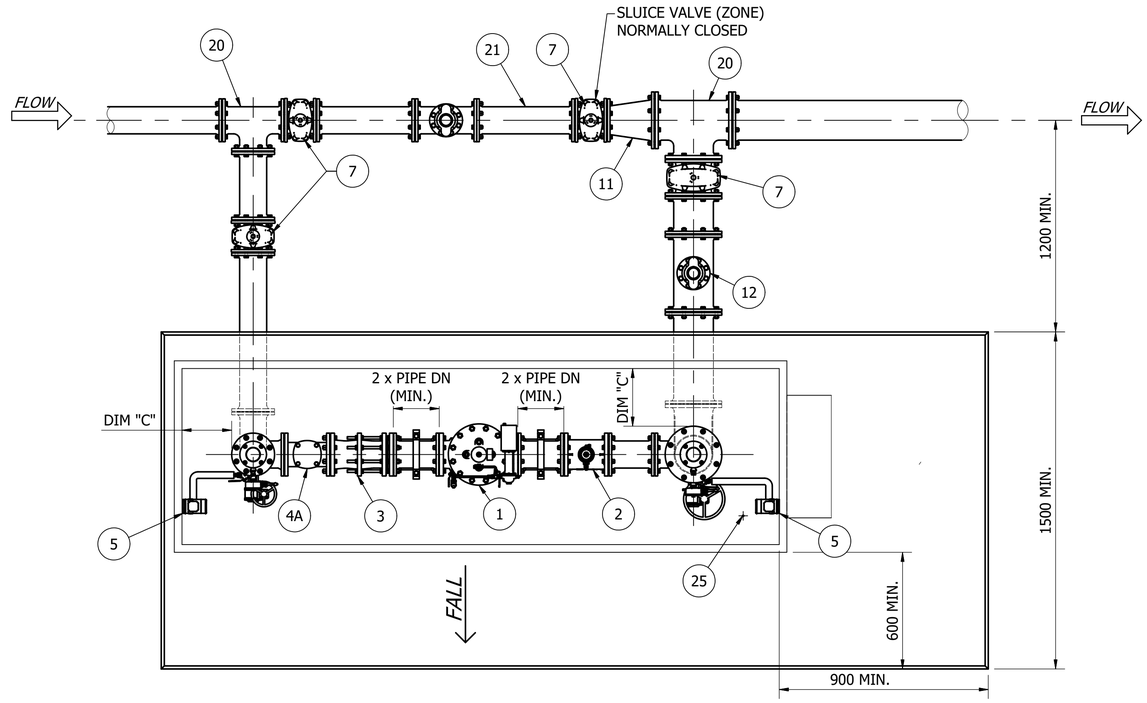
STANDARD DRAWING
"PASSIVE" PRESSURE REDUCING VALVES
VALVE CHAMBER
GENERAL ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

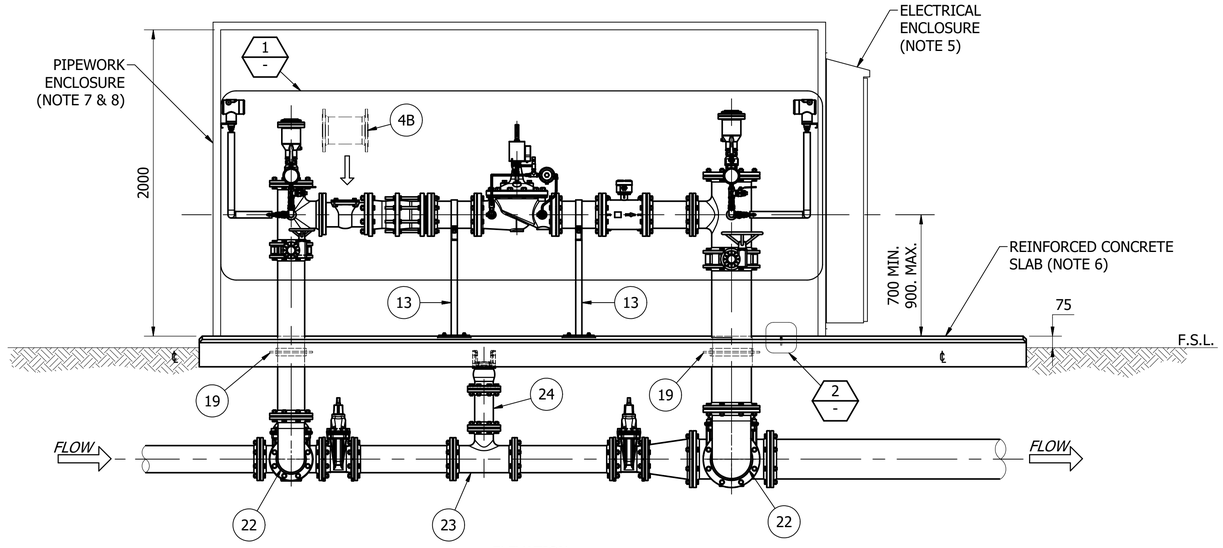
SD-3203-C

A1

ISSUE: A



PLAN
(VALVE COVERS, HYDRANT BOXES AND DOORS NOT SHOWN FOR CLARITY)



ELEVATION

PRESSURE REDUCING VALVE ABOVE GROUND ENCLOSURE

(ENCLOSURE DOORS NOT SHOWN FOR CLARITY)
SCALE: 1 : 20

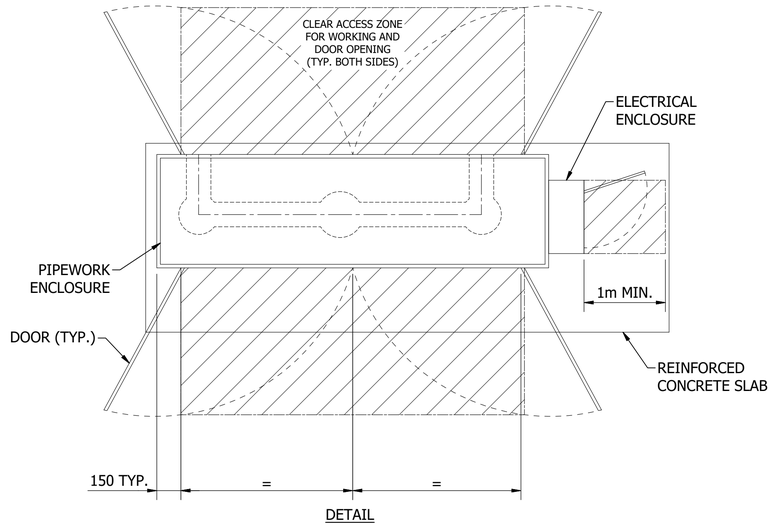
PRV SETTINGS			
PRV	INLET HEAD (m)	OUTLET HEAD (m)	BONNET RL. (m)

EXAMPLE PRV SETTINGS TABLE (NOTE 1)

PARTS LIST - PIPEWORK (NOTES 2, 12)		
ITEM	DESCRIPTION	QTY
1	PILOT-OPERATED PRESSURE REDUCING VALVE (REFER ICON WATER TECHNICAL SPECIFICATION STD-SPE-M-003). (NOTE 15)	1
2	ELECTRO-MAGNETIC FLOW METER, FULL-BORE TYPE.	1
3	THRUST-TYPE DISMANTLING JOINT.	1
4A	TEMPORARY BASKET STRAINER, WITH Ø3 mm HOLES (NOTE 3)	1
4B	PIPE SPOOL, FL-FL DIMENSIONS TO MATCH ITEM 4A (NOTE 3)	1
5	PRESSURE TRANSMITTER	2
6	BUTTERFLY VALVE, WAFER LUGGED, SEAL ON DISK, C/W WITH 90 DEGREE G/BOX, POSITION INDICATOR AND HANDWHEEL FOR SIZES LARGER THAN DN225 (NOTE 4)	2
7	SLUICE (GATE) VALVE, C/W VALVE SURFACE BOX (NOTE 4)	4
8	EQUAL TEE, DICL, FL-FL-FL, C/W DN20 BSP TAPPING	1
9	REDUCING TEE, DICL, FL-FL-FL, C/W DN20 BSP TAPPING (NOTE 4)	1
10	BLANK FLANGE, DI, C/W DN50 BSP TAPPING & HEX NIPPLE (NOTE 4)	2
11	REDUCER, DICL, FL-FL, C/W FBE COATING	1
12	SPRING HYDRANT, DI, C/W SURFACE BOX (NOTE 4)	2
13	PIPE SUPPORT, GALV. CARBON STEEL, REF. PN530101 ON SD-5301, C/W CHEMICAL ANCHORS	2
14	AIR VALVE, DOUBLE ACTING TYPE, THREADED, DN50 BSP	2
15	BALL VALVE, DN50 BSP	2
16	PRESSURE GAUGE, Ø100 mm FACE, DN20 BSP GLYCERINE FILLED, 0-100 m HEAD @ 1 m GRADUATIONS	2
17	BALL VALVE, DN20 BSP	6
18	THREADED HEX PLUG, DN20 BSP	2
19	PUDDLE FLANGE (NOTE 4)	2
20	EQUAL TEE, DICL, FL-FL-FL, C/W FBE COATING	2
21	PIPE, DICL, FL-FL (ALL BURIED FITTINGS TO BE FBE COATED)	LENGTH AND DIA. TO SUIT
22	BEND, 90°, DICL, FL-FL, C/W FBE COATING	2
23	HYDRANT TEE, DICL, FL-FL-FL, C/W FBE COATING	2
24	HYDRANT RISER, DICL, FL-FL, C/W FBE COATING.	2
25	SURVEY PIN Ø6 x 50 316 S/S	1

NOTES:

1. REFER TO DRAWING SD-3205 FOR ALL NOTES AND DETAILS.



DETAIL

DOOR LOCATIONS AND CLEAR WORKING AREAS

SCALE: N.T.S.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	NOTE NUMBERS UPDATED	23/11/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS		BWS		WAT	X	STP		WTP		SEW				WPS		REC			

ASSET AREA APPLICABILITY

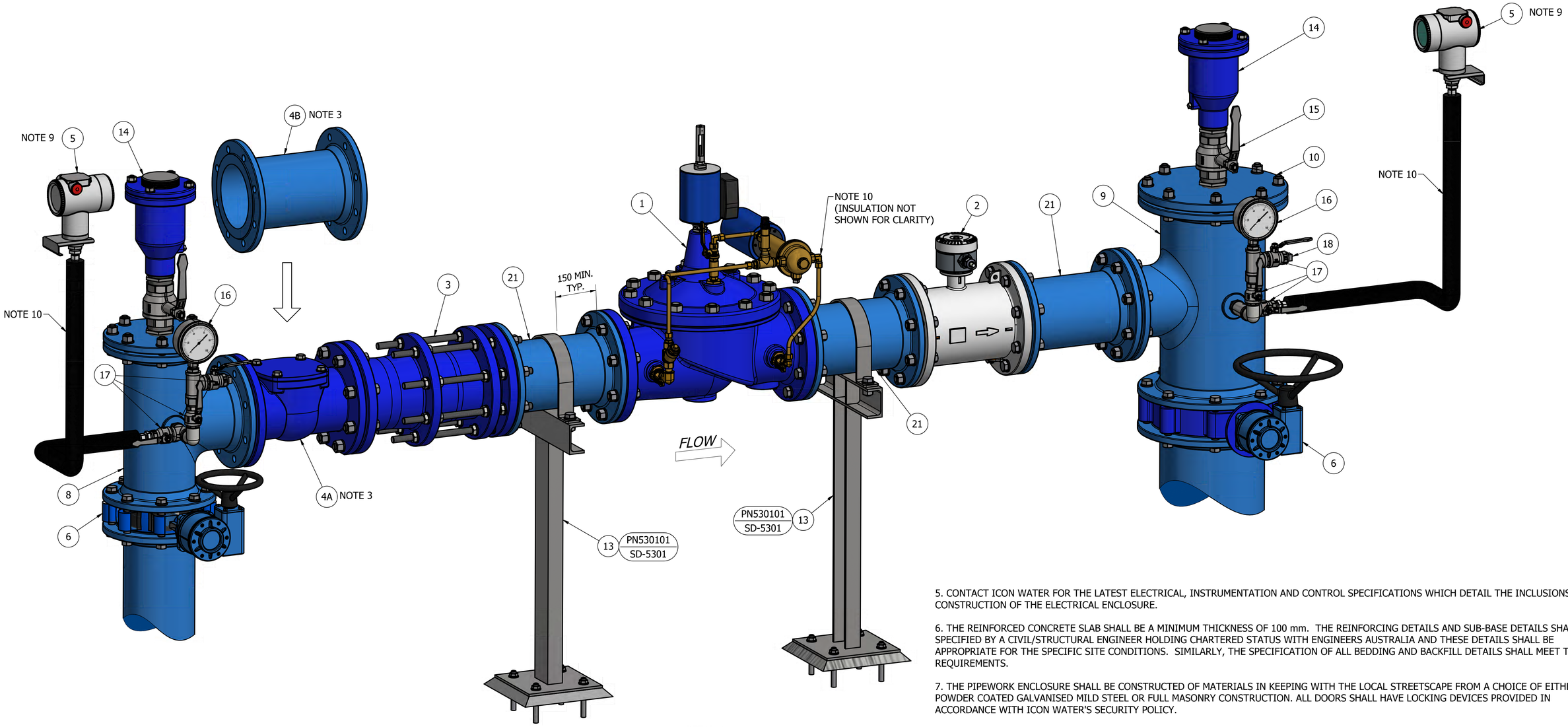
STANDARD DRAWING
"ACTIVE" PRESSURE REDUCING VALVES
ABOVE GROUND INSTALLATIONS
GENERAL ARRANGEMENT

DRAWING STATUS: Current

SD-3204-C

A1

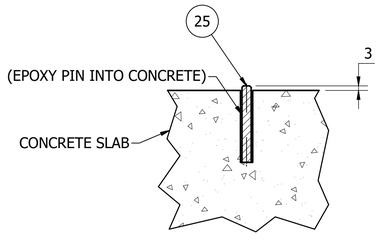
ISSUE: B



DETAIL 1

"ACTIVE" PRESSURE REDUCING VALVE ARRANGEMENT WITHIN ENCLOSURE

SCALE: 1 : 5



DETAIL 2

SURVEY PIN (NOTE 14)

SCALE: N.T.S.

NOTES:

1. PRV SETTINGS (AS CONFIRMED BY THE ICON WATER ENGINEER) ARE TO BE SHOWN IN TABULAR FORM INCLUDING THE BONNET RL WHICH SHALL BE DETERMINED BY A LICENSED SURVEYOR TO AN ACCURACY OF ± 5.0 mm (AND SHOWN ON THE WORK AS EXECUTED DRAWINGS).

2. THE PARTS LIST PROVIDED ON DRAWING SD-3204 IS INDICATIVE ONLY AND IS LIMITED TO PIPEWORK AND INSTRUMENTATION.

3. ITEM 4B (PIPE SPOOL) SHALL BE SUPPLIED AS A LOOSE ITEM AT THE SAME TIME AS ITEM 4A (BASKET STRAINER) IS INSTALLED IN THE ABOVE-GROUND PIPEWORK. ICON SHALL REPLACE ITEM 4A WITH ITEM 4B AT A FUTURE TIME. ITEM 4B SHALL BE STORED IN THE ENCLOSURE (WITH ENDS CAPPED).

4. FOR MAINS DN225 AND ABOVE, THE DISCHARGE PIPEWORK SHALL BE TAPERED TO ONE PIPE SIZE LARGER THAN THE INLET PIPEWORK AS SHOWN. THIS PRACTICE IS NOT REQUIRED FOR MAINS OF SIZE SMALLER THAN DN225. PARTS LIST QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.

5. CONTACT ICON WATER FOR THE LATEST ELECTRICAL, INSTRUMENTATION AND CONTROL SPECIFICATIONS WHICH DETAIL THE INCLUSIONS AND CONSTRUCTION OF THE ELECTRICAL ENCLOSURE.

6. THE REINFORCED CONCRETE SLAB SHALL BE A MINIMUM THICKNESS OF 100 mm. THE REINFORCING DETAILS AND SUB-BASE DETAILS SHALL BE SPECIFIED BY A CIVIL/STRUCTURAL ENGINEER HOLDING CHARTERED STATUS WITH ENGINEERS AUSTRALIA AND THESE DETAILS SHALL BE APPROPRIATE FOR THE SPECIFIC SITE CONDITIONS. SIMILARLY, THE SPECIFICATION OF ALL BEDDING AND BACKFILL DETAILS SHALL MEET THE SAME REQUIREMENTS.

7. THE PIPEWORK ENCLOSURE SHALL BE CONSTRUCTED OF MATERIALS IN KEEPING WITH THE LOCAL STREETSCAPE FROM A CHOICE OF EITHER POWDER COATED GALVANISED MILD STEEL OR FULL MASONRY CONSTRUCTION. ALL DOORS SHALL HAVE LOCKING DEVICES PROVIDED IN ACCORDANCE WITH ICON WATER'S SECURITY POLICY.

8. POWDER COATED GALVANISED ENCLOSURES SHALL HAVE:

-A FINISHED COLOUR OF G66 ENVIRONMENT GREEN TO AS 2700 UNLESS THE PROJECT ARCHITECT OR TCCS ADVISE OTHERWISE.

-"KNAUF CLIMAFOAM XPS" INSULATION BOARDS INSTALLED TO ALL INTERNAL SURFACES (INCLUDING DOORS) OF 30 mm MIN. THICKNESS.

9. PRESSURE TRANSMITTERS SHALL BE FIXED TO THE INNER WALL OF THE PIPEWORK ENCLOSURE USING SUITABLE BRACKETS.

10. ALL PIPEWORK AND TUBING DN50 AND SMALLER SHALL BE INSULATED TO PREVENT FREEZING.

11. DIM "C" EQUALS DN+150 AND SHALL BE NO LESS THAN 300 mm.

12. ALL PIPEWORK AND INSTRUMENTS SHALL BE OF THE TYPE AND MATERIALS SHOWN. ONLY THE MATERIALS AND MAKES/MODELS OF EQUIPMENT LISTED IN ICON'S APPROVED PRODUCTS LIST ARE TO BE INSTALLED. THE USE OF "NON LISTED" ITEMS IS STRICTLY PROHIBITED.

13. ALLOWANCE SHALL BE MADE FOR THE INSTALLATION OF AN AERIAL OF HEIGHT UP TO 5 METRES IF A RADIO SURVEY SHOWS SUCH A REQUIREMENT.

14. TOP OF PIN RL TO BE PROVIDED BY A LICENSED SURVEYOR TO AN ACCURACY OF +/- 5.0 mm AND SHOWN ON WORK AS EXECUTED DRAWINGS.

15. REFER TO STANDARD SPECIFICATION: STD-SPE-M-003 FOR A TABULATION OF PRV. SIZE AND CONFIGURATION COMPARED TO PIPE SIZE.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	ENCLOSURE COLOUR UPDATED	23/11/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

icon WATER

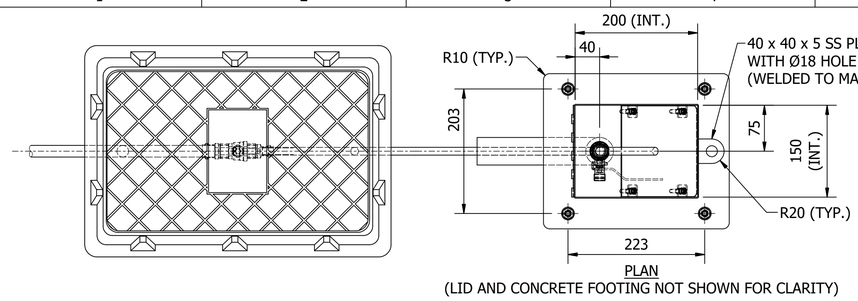
STANDARD DRAWING
"ACTIVE" PRESSURE REDUCING VALVES ABOVE GROUND INSTALLATIONS DETAILS AND NOTES

DRAWING STATUS: Current

SD-3205-C

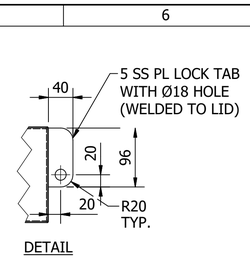
A1

ISSUE: B



PLAN

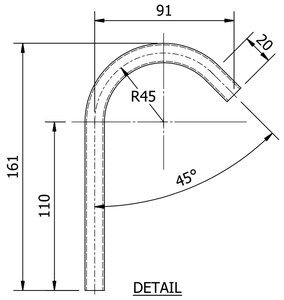
(LID AND CONCRETE FOOTING NOT SHOWN FOR CLARITY)



DETAIL

LOCKING TAB/HANDLE (LID ONLY)

SCALE: 1 : 5

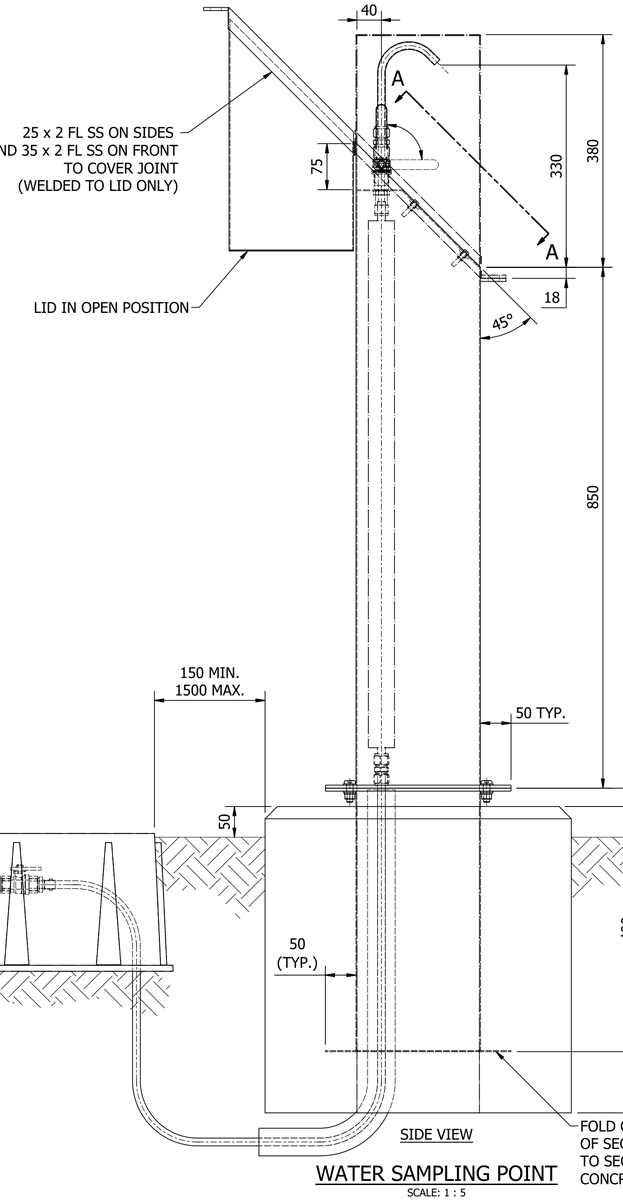


DETAIL

SPOUT (ITEM 14)

SCALE: 1 : 2

ITEM	DESCRIPTION	QTY
1	500 SQ x 500 DEEP CONCRETE FOOTING	0.1 m³ Approx
2	1.6PL SS CAST IN BASE (FOLDED RECTANGULAR SECTION) WITH 300 x 250 x 5 PL SS FLANGE	1
3	1.6PL SS SAMPLE POINT BODY (FOLDED RECTANGULAR SECTION) WITH 300 x 250 x 5 PL SS FLANGE	1
4	1.6PL SS SAMPLE POINT LID (FOLDED RECTANGULAR SECTION)	1
5	1.6PL SS SAMPLE POINT ACCESS PLATE (AS PER DETAIL ON THIS DRAWING)	1
6	75 x 150 x 1.6PL SS PLATE WELDED INSIDE TUBE WITH CENTRALLY PLACED HOLE TO SUIT BULKHEAD FITTING	1
7	40 SS UNDRILLED PIANO HINGE (150 LENGTH)	1
8	DN15 BALL VALVE, BRASS BODY, BALL CERTIFIED TO WATER MARK CIM 11CR	1
9	DN15 INLINE BALL VALVE, COMPACT HANDLE, BRASS BODY, BALL CERTIFIED TO WATER MARK CIM 11CR	1
10	DN15 THREADED COMPRESSION FITTING	1
11	DN15 BULKHEAD COMPRESSION FITTING	1
12	DN15 UNION COMPRESSION FITTING	1
13	PRESS FIT COUPLING	2
14	SPOUT - DN15 COPPER TUBE AS PER AS1432, TYPE B (AS PER DETAIL ON THIS DRAWING)	1
15	DN15 COPPER TUBE AS PER AS1432, TYPE B	2 m Approx
16	ARMAFLEX SOLAR LAGGING 15 THK, WEATHER RESISTANT, PRE-FORMED FOR DN15 TUBE	2 m Approx
17	M10 x 30 SS SOCKET HEAD BOLTS AND M10 NUTS WITH LOCKING WASHERS	4
18	M6 x 30 SS SOCKET HEAD CAP BOLTS	4
19	20 x 20 x 3 PL SS TAB WITH M6 SS "NUTSERT" (AS PER DETAIL ON THIS DRAWING)	4
20	DN20 PLASTIC METER BOX	1
21	METER BOX COVER - COLOUR: RAW/POTABLE = JADE (GREEN), RECYCLED = LILAC	1
22	SAND BACKFILL	0.02 m³ Approx
23	TRAFFOLYTE LABEL (NOTE 3)	1

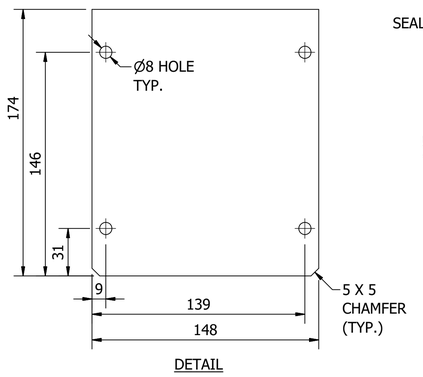


SIDE VIEW

WATER SAMPLING POINT

SCALE: 1 : 5

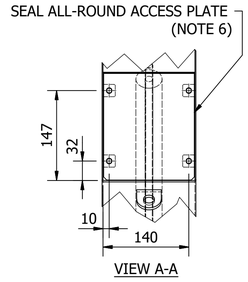
MATERIAL: STAINLESS STEEL GRADE 316
COATING: N/A
FINISH COLOUR: N/A
MASS: 21 kg (EXCL. CONCRETE, SAND AND PIPEWORK)



DETAIL

ACCESS PLATE (ITEM 5)

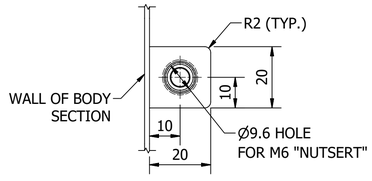
SCALE: 1 : 2

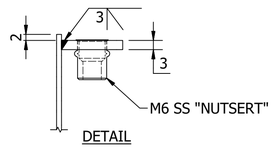


VIEW A-A

ACCESS PLATE INSTALLATION

SCALE: 1 : 5

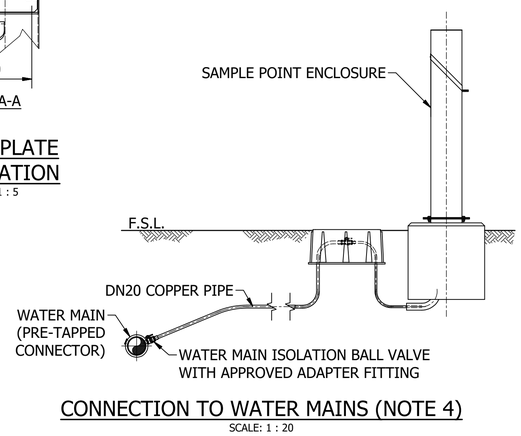




DETAIL

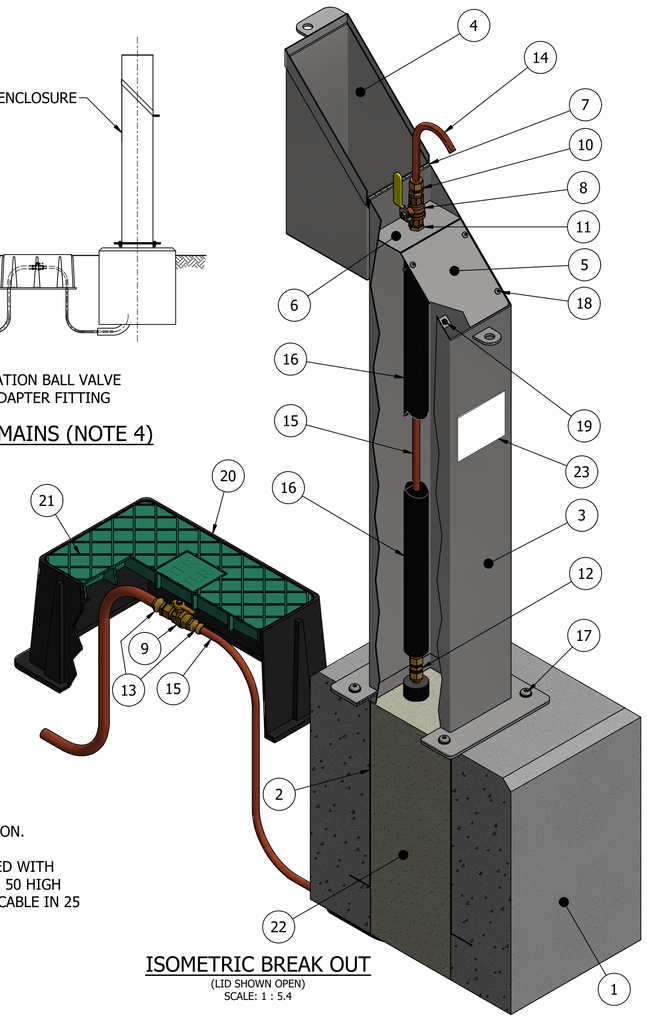
FIXING TABS FOR ACCESS PLATE (ITEM 18)

SCALE: 1 : 1



CONNECTION TO WATER MAINS (NOTE 4)

SCALE: 1 : 20



ISOMETRIC BREAK OUT

(LID SHOWN OPEN)
SCALE: 1 : 5.4

NOTES:

1. ALL EXPOSED STAINLESS STEEL SURFACES SHALL HAVE A BEAD BLASTED FINISH.

2. COPPER PIPE TO BE LAGGED AND NOT IN DIRECT CONTACT WITH ANY STEEL SECTIONS OF THE INSTALLATION.

3. TRAFFOLYTE LABEL TO BE 100 x 100 WITH ENGRAVED BLACK LETTERING ON WHITE BACKGROUND AND FIXED WITH EITHER SCREWS OR RIVETS. LABEL SHALL DISPLAY THE SAMPLE POINT NUMBER ASSIGNED BY ICON WATER IN 50 HIGH LETTERING, AND SHALL DISPLAY EITHER " POTABLE WATER" , "RAW WATER" OR "RECYCLED WATER" AS APPLICABLE IN 25 HIGH LETTERING.

4. REFER TO SD-3306 FOR ADDITIONAL REQUIREMENTS FOR WATER MAIN CONNECTIONS.

5. ALL EXPOSED CONCRETE EDGES TO HAVE 20 CHAMFER.

6. SEAL ALL-ROUND ITEM 5 UPON INSTALLATION WITH AN APPROVED WET AREA SILICONE SEALANT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
B	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
A	NON-POTABLE WATER CONFIGURATION INCLUDED	10/12/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES	X	SPS				
BWS	X	WAT	X	STP				
WTP		SEW						
WPS		REC	X					

ASSET AREA APPLICABILITY

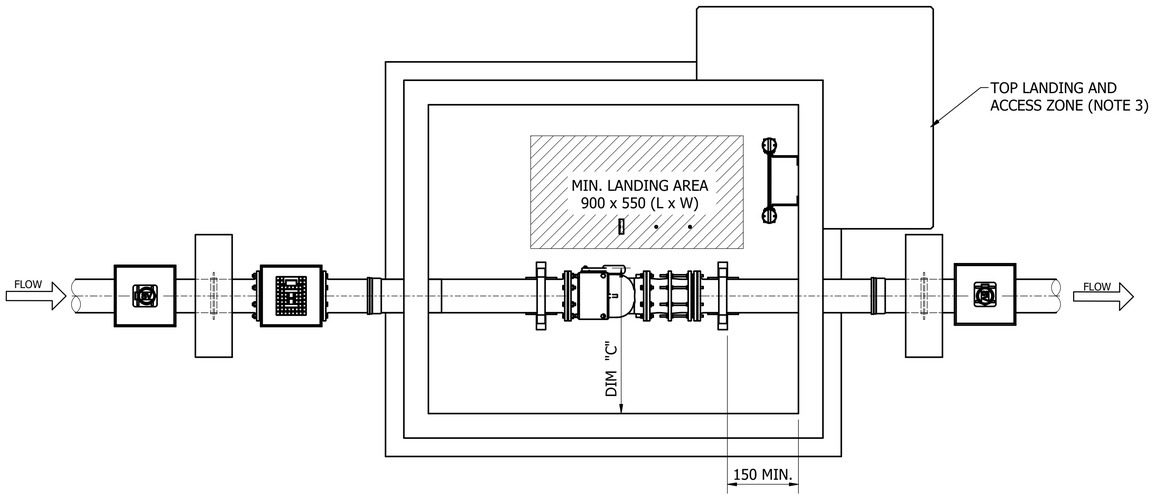
icon WATER

STANDARD DRAWING
WATER NETWORK
POTABLE AND NON-POTABLE WATER SAMPLING POINT
ARRANGEMENT AND DETAILS

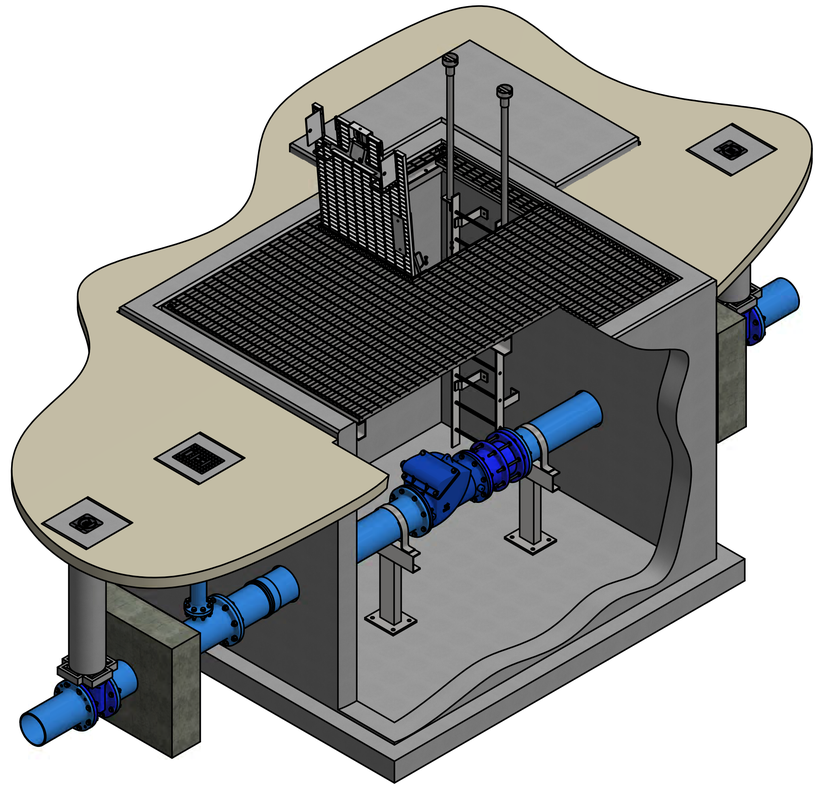
DRAWING STATUS: Current

SD-3206-D

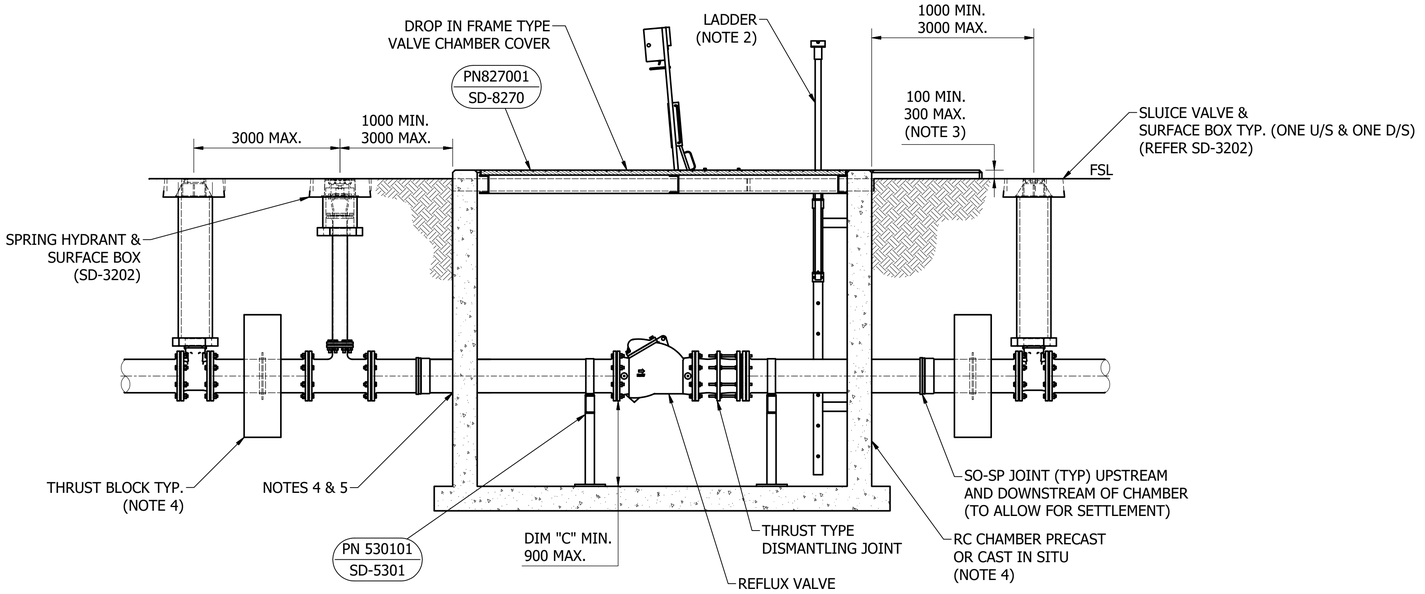
ISSUE: B



PLAN
(COVERS AND SUPPORT BEAMS NOT SHOWN FOR CLARITY)



ISOMETRIC CUT-AWAY
SCALE: NTS



SECTIONAL ELEVATION

REFLUX VALVE CHAMBER

SCALE : NTS

NOTES:

1. DIM "C" EQUALS DN + 150 AND SHALL BE NO LESS THAN 300 mm UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER PRINCIPAL ENGINEER.

2. FOR CHAMBER DEPTHS LESS THAN 3000 mm, VERTICAL RUNG (TWIN STILE) LADDERS MAY BE USED IN LIEU OF INCLINED RUNG (TWIN STILE) LADDERS. FOR DEPTHS GREATER THAN 3000 mm, A FIXED INCLINED RUNG LADDER SHALL BE INSTALLED. EXTENDABLE STANCHIONS ARE TO BE FITTED WHEREVER PRACTICABLE.

3. THE DETAILS RELATING TO ACCESS/EGRESS AND HEIGHT SAFETY AS DEPICTED ON THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE REQUIREMENTS DETAILED IN ICON WATER SPECIFICATIONS STD-SPE-G-008 AND G-009. THE DESIGNER SHALL PRODUCE PROJECT SPECIFIC (ISSUED FOR CONSTRUCTION) DESIGNS AS APPROPRIATE BASED ON THIS DRAWING AND THE REQUIREMENTS OF THE ABOVE-MENTIONED SPECIFICATIONS.

4. THRUST BLOCKS (EXTERNAL TO THE CHAMBER) ARE NOT REQUIRED FOR CAST IN SITU VALVE CHAMBERS WHERE PUDDLE FLANGES CAN BE CAST IN THE WALL WITH APPROPRIATE REINFORCEMENT. REFER TO DRAWINGS SD-5001, SD-5002 AND SD-5003 FOR GENERIC THRUST BLOCK REQUIREMENTS. PURPOSE ENGINEERED THRUST BLOCK DETAILS SHALL BE PROVIDED BY THE DESIGNER IN LIEU OF GENERIC DETAILS WHERE APPROPRIATE (e.g. POOR SOILS, MULTIPLE PIPELINES IN CLOSE PROXIMITY AND HIGHER PIPELINE PRESSURES etc).

5. ALL PIPE PENETRATIONS THROUGH THE VALVE CHAMBER WALLS SHALL INCORPORATE AN APPROVED HYDROPHYLIC WATERSTOP.

6. ALL MATERIALS AND PRODUCTS (e.g. VALVES, PIPES, FITTINGS etc.) SHALL BE SELECTED FROM THE ICON WATER APPROVED PRODUCTS LIST. UNLISTED PRODUCTS AND MATERIALS SHALL NOT BE USED.

7. REFLUX VALVES OF SIZES LESS THAN DN450 SHALL BE INSTALLED IN AN AIR VALVE CHAMBER (SUITABLY MODIFIED) FOR RURAL/SEMI-RURAL AREAS AS SHOWN ON DRAWING SD-3210.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	MODEL AND DRAWING CORRECTION. NOTES 2 & 4 UPDATED	10/09/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	
BWS	X	WAT	X	STP	
WTP	X	SEW			
WPS	X	REC	X		

icon WATER

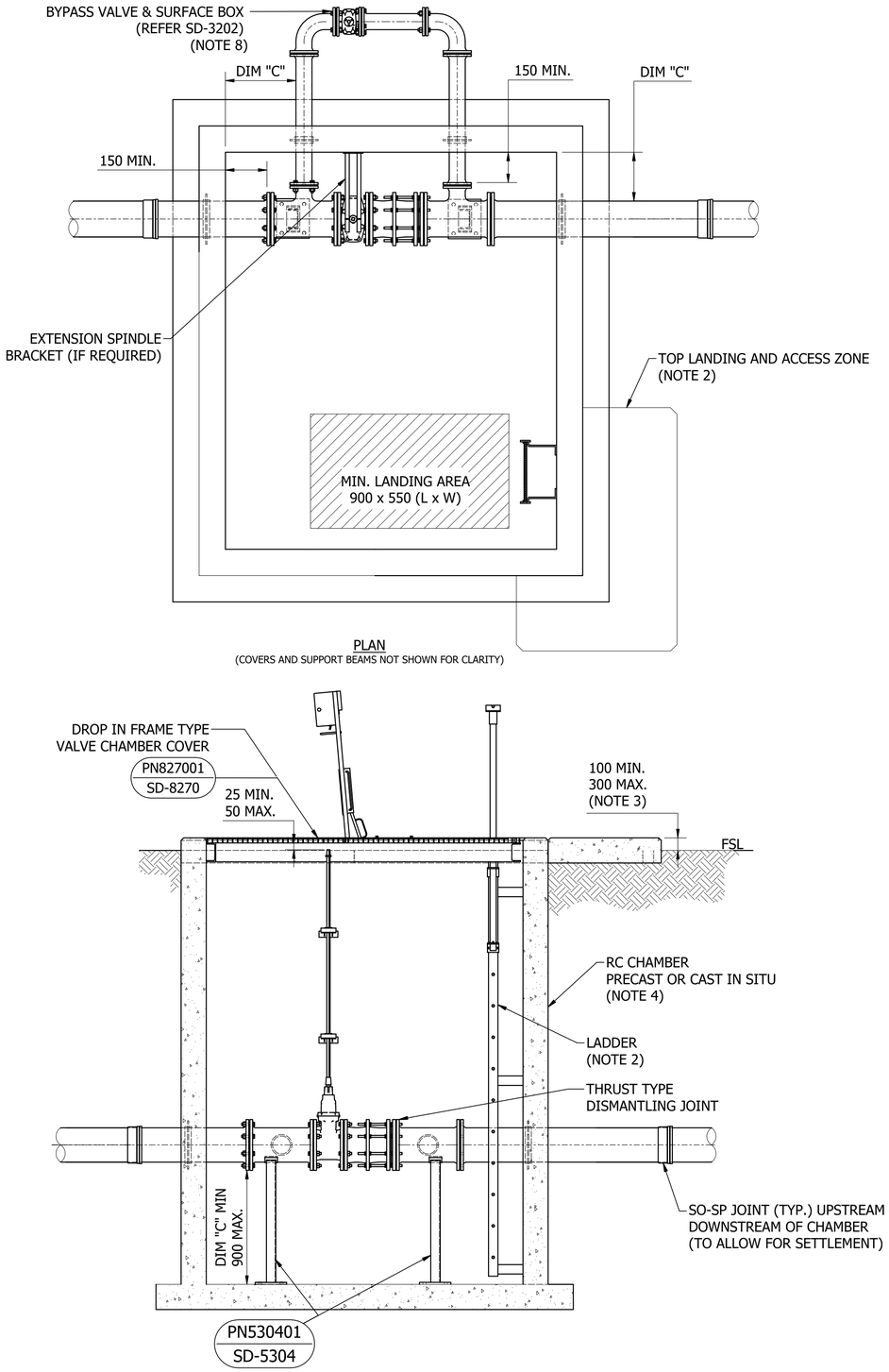
STANDARD DRAWING
VALVE CHAMBER
TYPICAL REFLUX VALVE INSTALLATION ARRANGEMENT

DRAWING STATUS: Current

SD-3207-C

A1

ISSUE: B

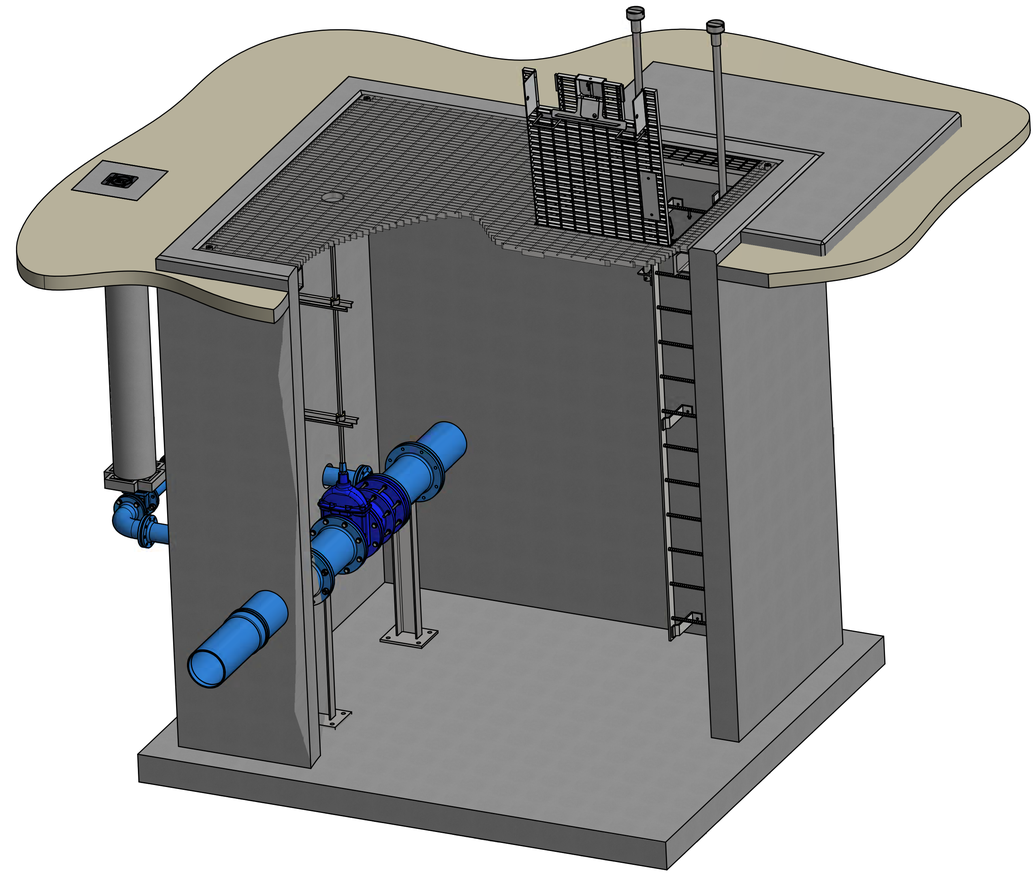


PLAN
(COVERS AND SUPPORT BEAMS NOT SHOWN FOR CLARITY)

SECTIONAL ELEVATION

SLUICE VALVE CHAMBER

SCALE : NTS



ISOMETRIC CUT-AWAY
SCALE : NTS

NOTES:

1. DIM "C" EQUALS DN +150 AND SHALL BE NO LESS THAN 300 UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER PRINCIPAL ENGINEER.

2. FOR CHAMBER DEPTHS LESS THAN 3000, VERTICAL RUNG (TWIN STILE) LADDERS MAY BE USED IN LIEU OF INCLINED RUNG (TWIN STILE) LADDERS. FOR DEPTHS GREATER THAN 3000, A FIXED INCLINED RUNG LADDER SHALL BE INSTALLED. EXTENDABLE STANCHIONS ARE TO BE FITTED WHEREVER PRACTICABLE.

3. THE DETAILS RELATING TO ACCESS/EGRESS AND HEIGHT SAFETY AS DEPICTED ON THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE REQUIREMENTS DETAILED IN ICON WATER SPECIFICATIONS STD-SPE-G-008 AND G-009. THE DESIGNER SHALL PRODUCE PROJECT SPECIFIC (ISSUED FOR CONSTRUCTION) DESIGNS AS APPROPRIATE BASED ON THIS DRAWING AND THE REQUIREMENTS OF THE ABOVE-MENTIONED SPECIFICATIONS.

4. THRUST BLOCKS (EXTERNAL TO THE CHAMBER) ARE NOT REQUIRED FOR CAST IN SITU VALVE CHAMBERS WHERE PUDDLE FLANGES CAN BE CAST IN THE WALL WITH APPROPRIATE REINFORCEMENT. REFER TO DRAWINGS SD-5001, SD-5002 AND SD-5003 FOR GENERIC THRUST BLOCK REQUIREMENTS. PURPOSE ENGINEERED THRUST BLOCK DETAILS SHALL BE PROVIDED BY THE DESIGNER IN LIEU OF GENERIC DETAILS WHERE APPROPRIATE (e.g. POOR SOILS, MULTIPLE PIPELINES IN CLOSE PROXIMITY AND HIGHER PIPELINE PRESSURES etc).

5. ALL PIPE PENETRATIONS THROUGH THE VALVE CHAMBER WALLS SHALL INCORPORATE AN APPROVED HYDROPHYLIC WATERSTOP.

6. ALL MATERIALS AND PRODUCTS (e.g. VALVES, PIPES, FITTINGS etc.) SHALL BE SELECTED FROM THE ICON WATER APPROVED PRODUCTS LIST. UNLISTED PRODUCTS AND MATERIALS SHALL NOT BE USED.

7. STOP VALVES OF SIZES SMALLER THAN DN450 MAY BE DIRECT BURIED. REFER TO SD-3202 FOR DETAILS.

8. WHILST THIS DRAWING DEPICTS AN EXTERNAL BYPASS, IT IS ICON WATER'S PREFERENCE THAT STOP VALVES BE PURCHASED/INSTALLED WITH AN INTEGRAL BYPASS ARRANGEMENT FULLY LOCATED INSIDE THE CHAMBER.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	NOTES 2 & 4 UPDATED	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	
BWS	X	WAT	X	STP	
WTP	X	SEW			
WPS	X	REC	X		

icon WATER

STANDARD DRAWING
VALVE CHAMBER
TYPICAL STOP VALVE INSTALLATION
ARRANGEMENT

DRAWING STATUS: Current

SD-3208-C

A1

ISSUE: B

NOTES:

1. DEPTH OF OUTLET PIPE IS SITE / LOCATION DEPENDENT.

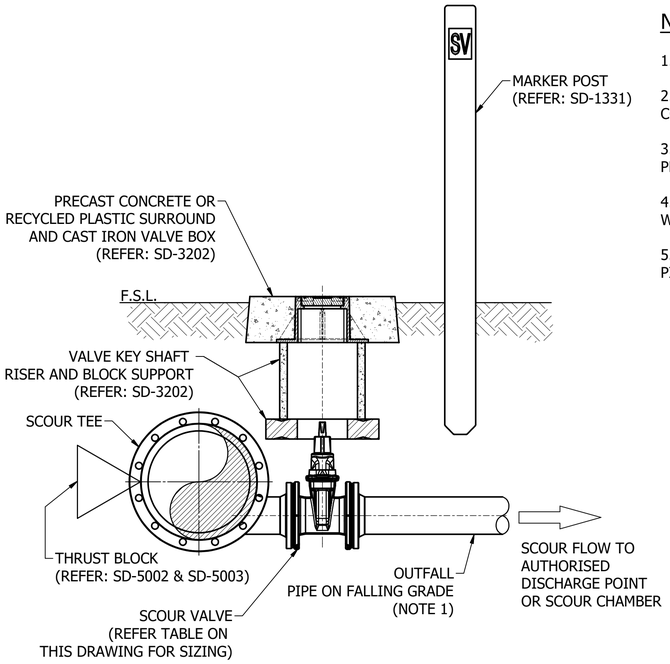
2. REFER TO THE TABLE ON THIS DRAWING FOR SIZING AND ENSURE SCOUR CONNECTION IS WITHIN 50 METRES OF PUMP SCOUR CHAMBER.

3. FOR CHAMBER DEPTHS GREATER THAN 3.0 m REFER TO THE ICON WATER PRINCIPAL ENGINEER FOR GUIDANCE.

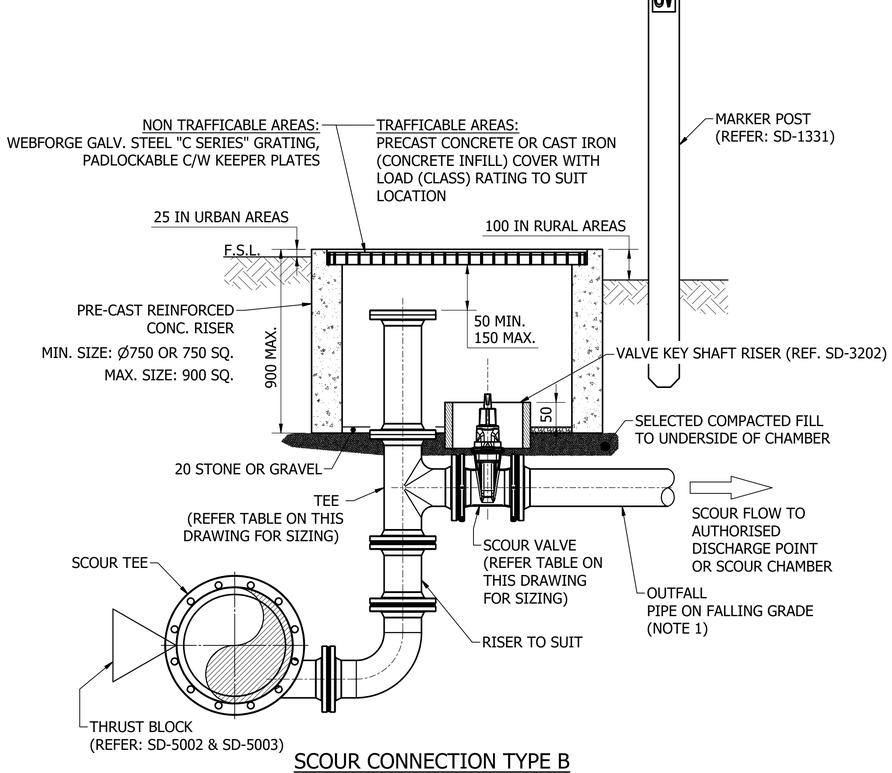
4. ALL PIPE PENETRATIONS THROUGH THE CHAMBER WALL ARE TO BE SEALED WITH AN APPROVED WATERSTOP (e.g. HYDROTITE).

5. THRUST BLOCKS NOT REQUIRED FOR FULLY RESTRAINED (e.g. FLANGED) PIPE.

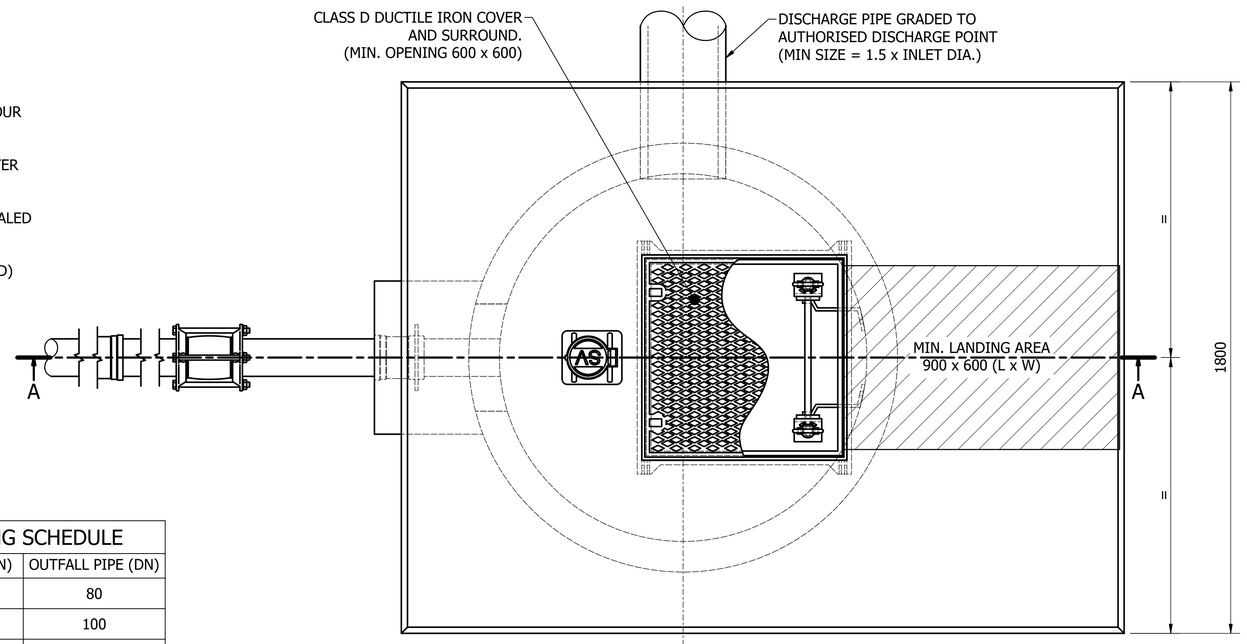
SCOUR OUTLET PIPEWORK SIZING SCHEDULE			
MAINS DIA. (DN)	SCOUR VALVE (DN)	TEE (DNxDN)	OUTFALL PIPE (DN)
150-200	80	80 x 80	80
225-300	100	100 x 100	100
375-600	150	150 x 100	100
750	225	225 x 150	150



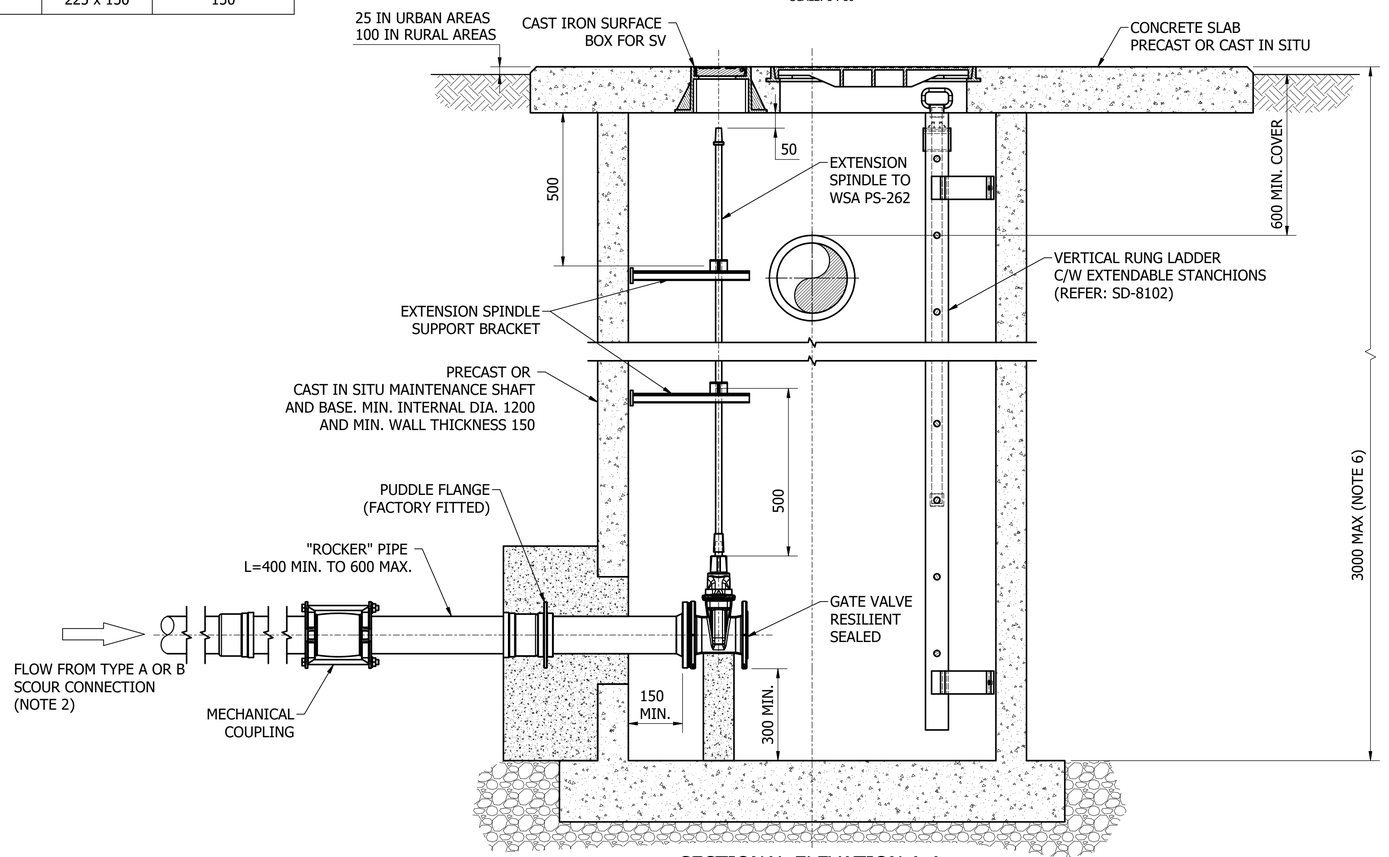
SCOUR CONNECTION TYPE A
SCALE: 1 : 10



SCOUR CONNECTION TYPE B
SCALE: 1 : 10



PUMP SCOUR CHAMBER
SCALE: 1 : 10



SECTIONAL ELEVATION A-A
SCALE: 1 : 10

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	NOTE NUMBERING CORRECTION	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	
BWS	X	WAT	X	STP	
WTP	X	SEW			
WPS	X	REC			

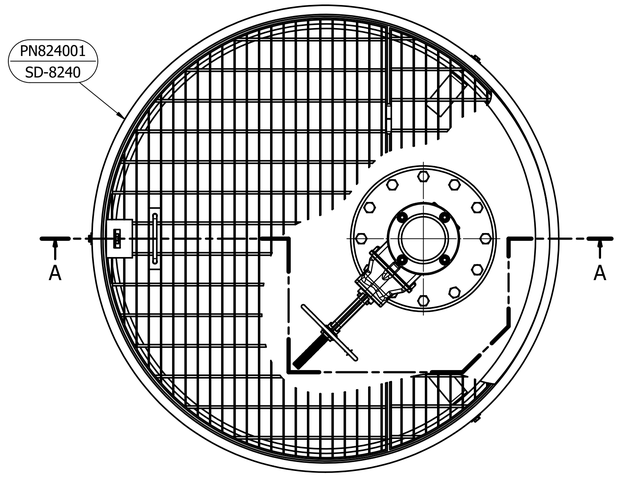
icon WATER

STANDARD DRAWING
WATER NETWORK
SCOUR INSTALLATIONS
GENERAL ARRANGEMENTS AND DETAILS

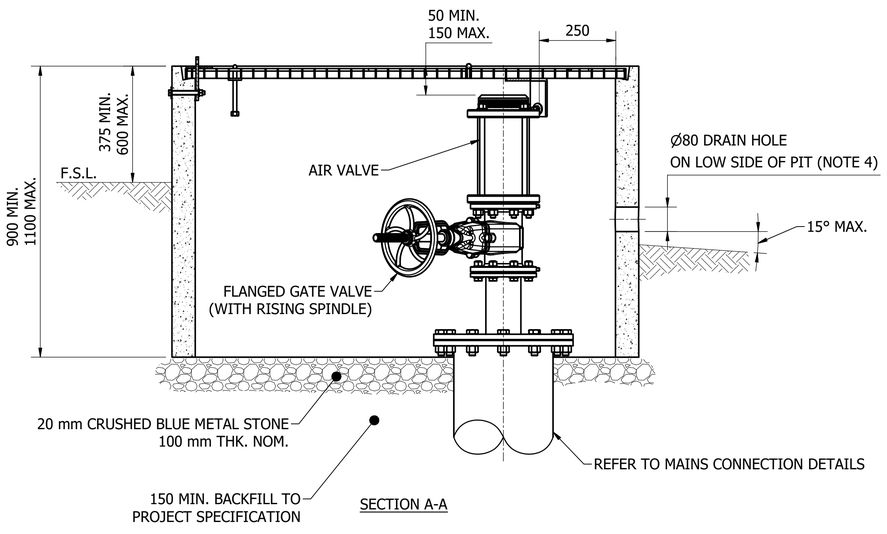
DRAWING STATUS: Current

SD-3209-C

ISSUE B



PLAN VIEW

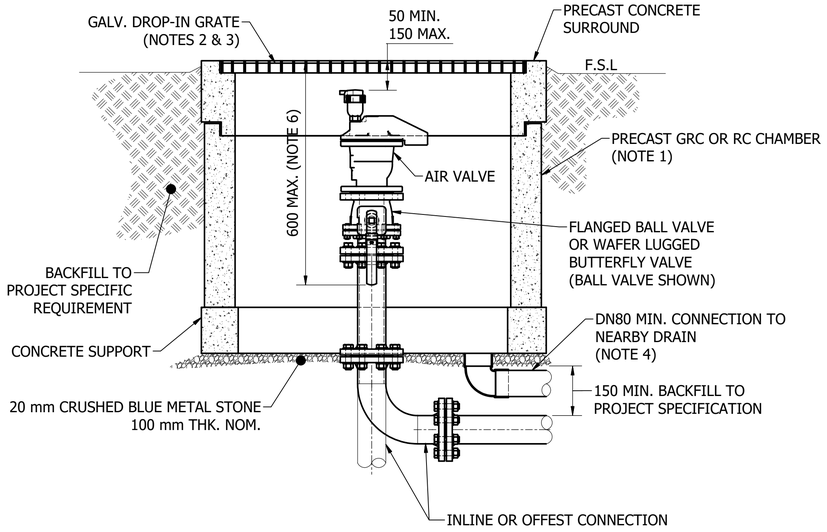


SECTION A-A

AIR VALVE INSTALLATION
(RURAL & SEMI RURAL AREAS)

COVER PANELS PARTIALLY SHOWN FOR CLARITY

SCALE: 1 : 10



AIR VALVE INSTALLATION
(URBAN AREAS, UNPAVED)

SCALE: 1 : 10

NOTES

1. CONSTRUCT CHAMBER FROM PRECAST GRC OR RC PITS AND RISERS TO SUIT REQUIRED DEPTH. PREFERRED MINIMUM SIZE OF 900 x 900 (INTERNAL DIMS.) RISERS TO COME WITH "SWIFT LIFT" LIFTING ANCHORS OR SIMILAR.

2. GALVANISED GRATE TO BE PAD-LOCKABLE AND BOLTED IN PLACE USING KEEPER PLATES TO PREVENT UNAUTHORISED ACCESS. 32 kg MAX. WEIGHT; CAPABLE OF MAX. MID-SPAN DEFLECTION OF 5 mm UDL @ 2.5 kPa.

3. TOP OF COVER TO SIT 25-35 ABOVE FINISHED GROUND LEVEL.

4. CHAMBER MUST BE SELF DRAINING. DRAIN HOLE MUST BE SITUATED BELOW THE AIR VALVE INLET/OUTLET NOZZLE TO AVOID THE AIR VALVE BEING MADE INOPERABLE DUE TO FLOODING.

5. CHAMBERS TO BE LOCATED A MINIMUM CLEARANCE OF 6.0 m AWAY FROM ROADWAYS. SEEK ADVICE FROM THE ICON WATER PRINCIPAL ENGINEER IF THIS CLEARANCE IS NOT ACHIEVABLE.

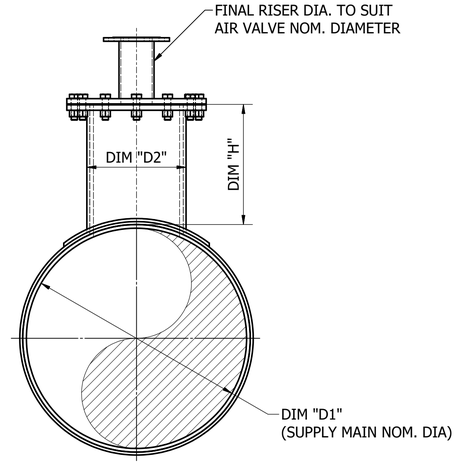
6. IF ISOLATION VALVE HANDLE TIP EXCEEDS MAXIMUM DIMENSION STATED, ISOLATION VALVE WITH GEARBOX SHALL BE INSTALLED. COVER TO INCLUDE A BANDED HOLE TO ALLOW AN EXTENSION SPINDLE TO MANUALLY OPERATE THE VALVE. IF THIS IS NOT PRACTICAL, LOCATE THE VALVE SO THAT A RURAL/SEMI-RURAL INSTALLATION CAN BE EMPLOYED.

7. THE DESIGNER SHALL FAMILIARISE THEMSELVES WITH THE REQUIREMENTS OF ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009 PRIOR TO DESIGNING ANY STRUCTURE WHICH REQUIRES HEIGHT SAFETY TO BE TAKEN INTO CONSIDERATION.

CONNECTION TO SUPPLY MAINS

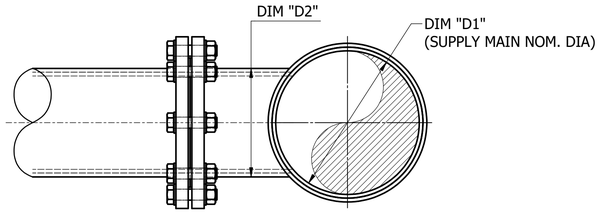
8. NOMINAL RISER DIAMETER "D2" SHALL BE A MINIMUM OF HALF THE SUPPLY MAIN DIAMETER "D1" EXCEPT WHERE "D1" EXCEEDS DN750, THEN "D2" SHALL BE DN300.

9. DIM "H" SHALL BE A MINIMUM OF HALF OF THE SUPPLY MAINS NOMINAL DIAMETER.



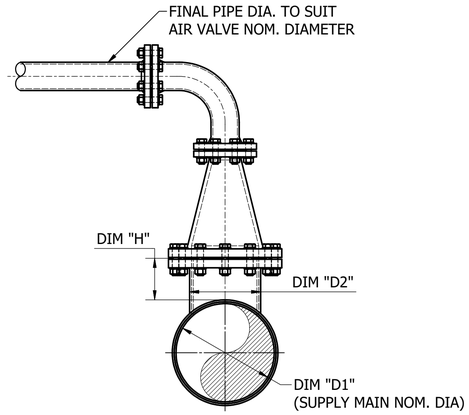
DETAIL A - IN LINE CONNECTION

SCALE: 1 : 10



DETAIL B - OFFSET CONNECTION
(FOR MAINS DN250 AND SMALLER)

SCALE: 1 : 5



DETAIL C - OFFSET CONNECTION
(FOR MAINS DN300 AND LARGER)

SCALE: 1 : 10

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	ACCESS GRATING ARRANGEMENT UPDATED	10/09/2018	S. Essery	K. Danenbergsons	C. Patrick

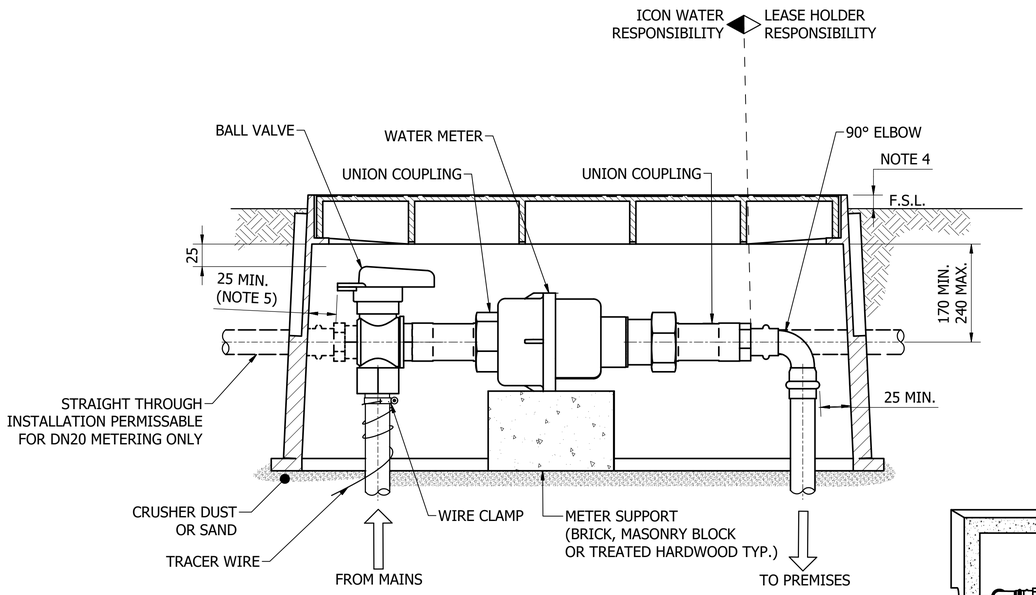
ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	
BWS	X	WAT	X	STP	
WTP	X	SEW			
WPS	X	REC			

STANDARD DRAWING
WATER NETWORK
AIR VALVES AND CONNECTION TO MAINS
GENERAL ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

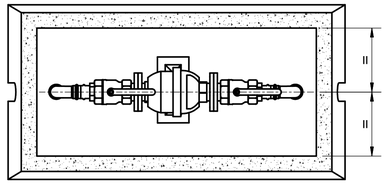
SD-3210-D

ISSUE: B

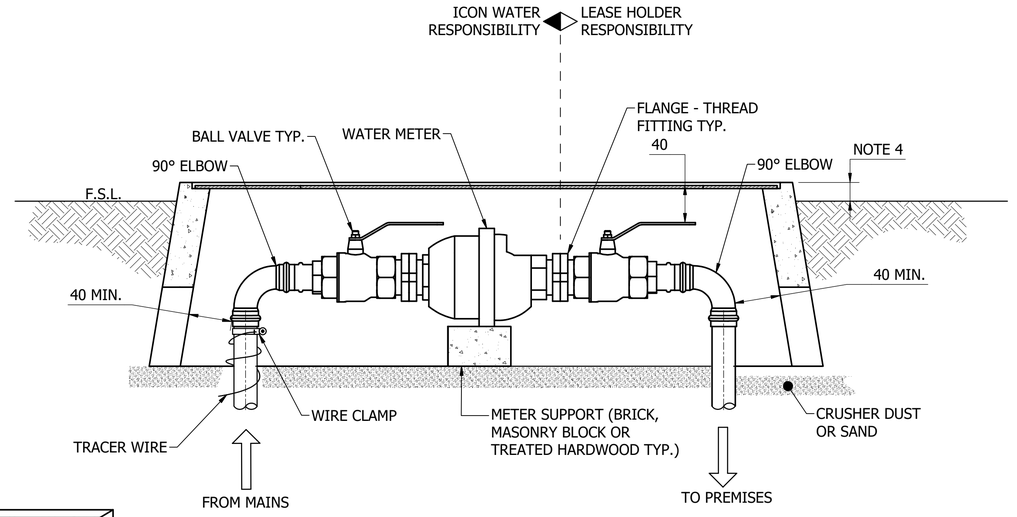


SECTIONAL ELEVATION

DN20 & DN25 METER INSTALLATION

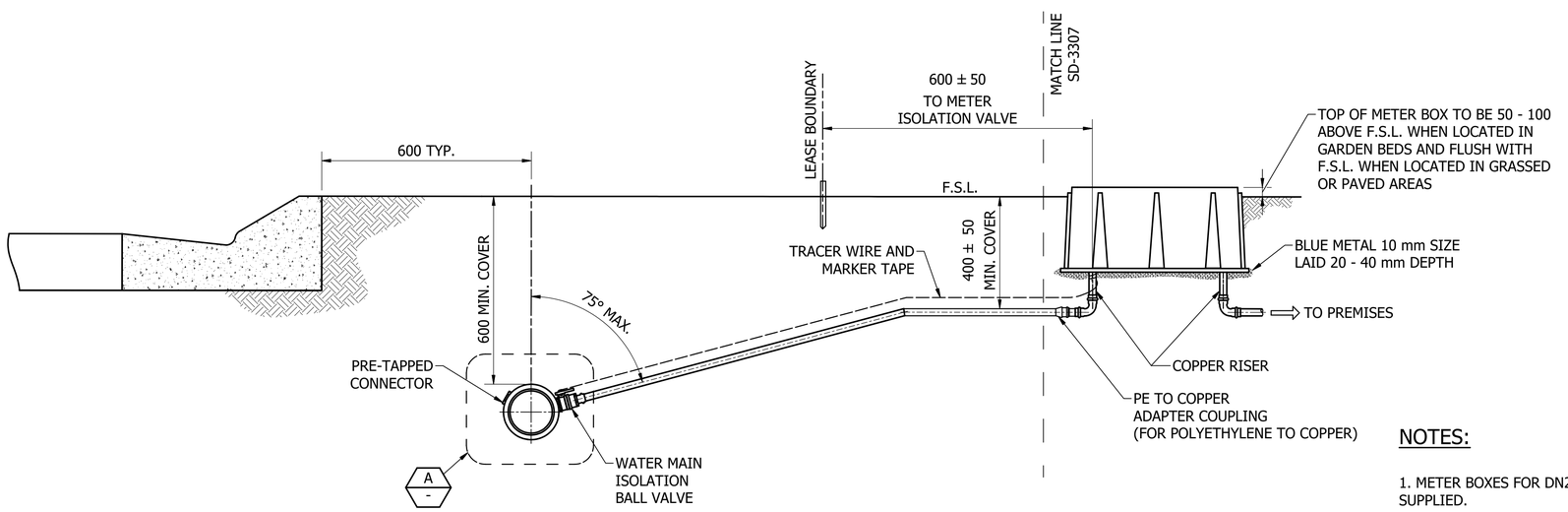


PLAN



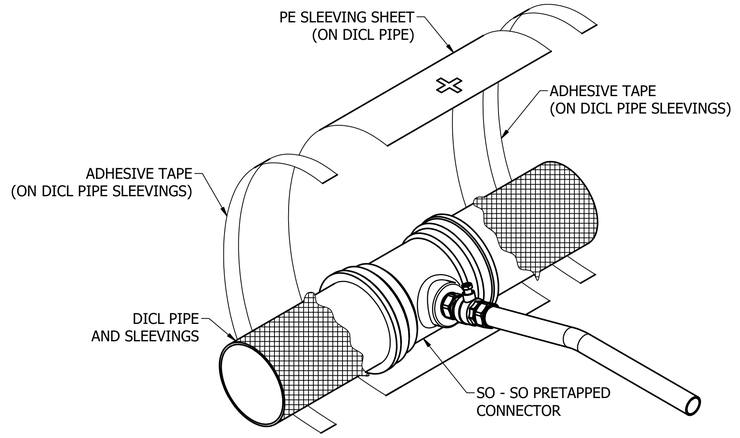
SECTIONAL ELEVATION

DN32 & DN40 METER INSTALLATION



ELEVATION

TYPICAL MAIN TO METER (SINGLE) PROPERTY SERVICE FOR METERS ≤ DN40



DETAIL A - PE SLEEVE FOR DICL MAINS DN225 AND ABOVE

(NOTE 3)

NOTES:

1. METER BOXES FOR DN25 METERS AND LARGER ARE CUSTOMER SUPPLIED.

2. REFER TO ICON WATER SPECIFICATION STD-SPE-M-006 FOR DETAILED PROPERTY SERVICE CONNECTION AND METERING REQUIREMENTS.

3. REFER TO THE ICON WATER APPROVED PRODUCTS LIST FOR EXEMPTIONS TO PE SLEEVING REQUIREMENTS.

4. TOP OF METER BOX LEVEL TO BE:
   -PAVED AREAS OR GRASS: FLUSH WITH FINISHED SURFACE LEVEL.
   -GARDEN BEDS: 50 - 100 ABOVE FINISHED SURFACE LEVEL.

5. 25 mm CLEARANCE BETWEEN VALVE HANDLES AND THE METERING ENCLOSURE MUST BE MET WITH HANDLE IN BOTH THE FULLY OPEN AND CLOSED POSITION.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	CHANGE DRAWING CLASSIFICATION FROM -C TO -D	10/12/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

icon WATER

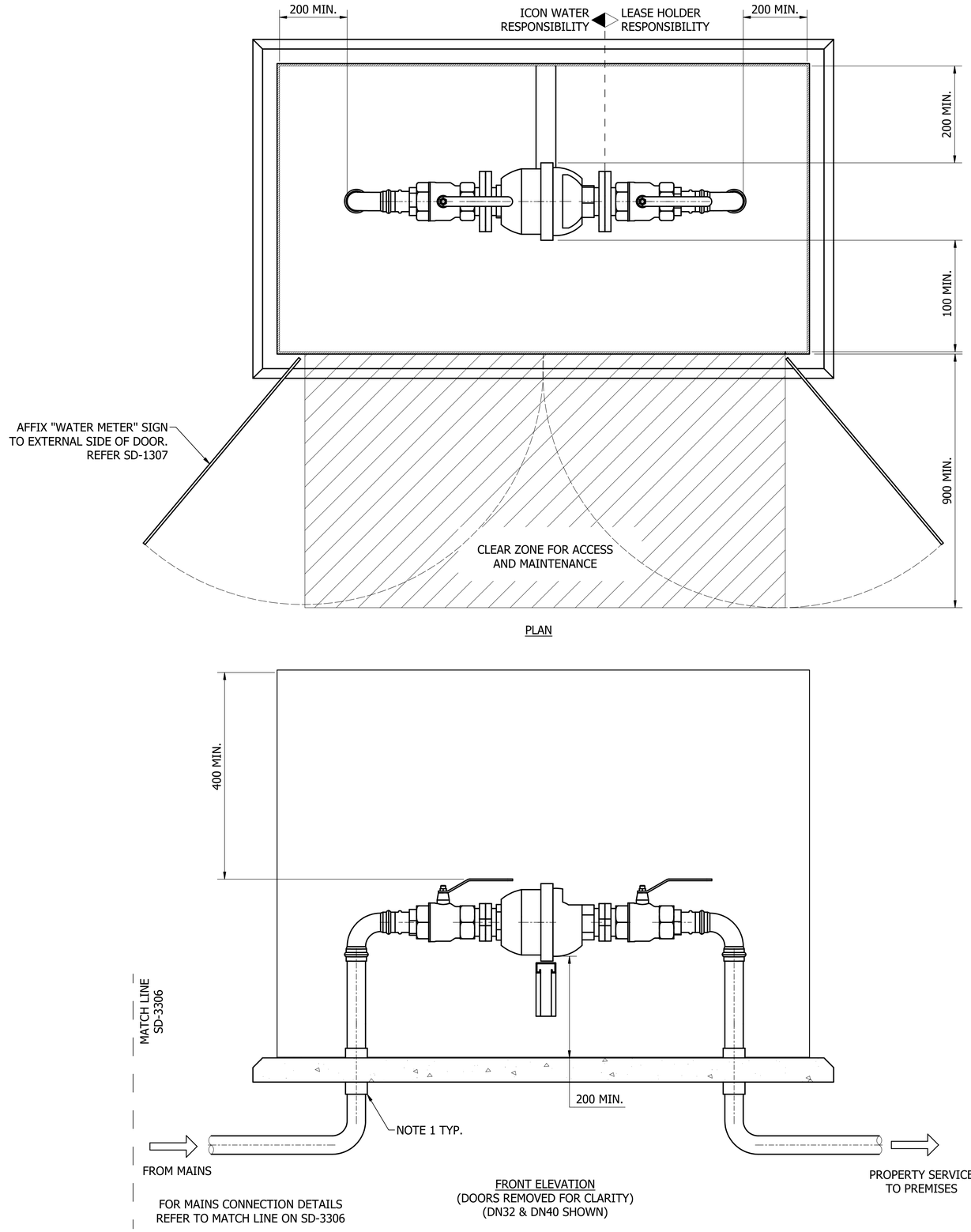
STANDARD DRAWING
WATER SERVICE CONNECTIONS
DN20 TO DN40 METERS
BELOW GROUND INSTALLATIONS
ARRANGEMENT AND CONNECTION DETAILS

DRAWING STATUS: Current

SD-3306-D

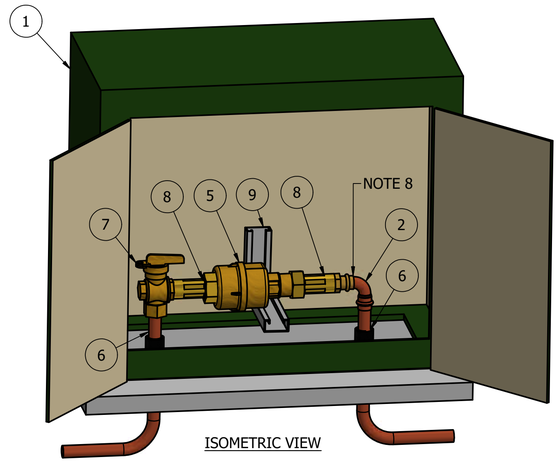
A1

ISSUE: B



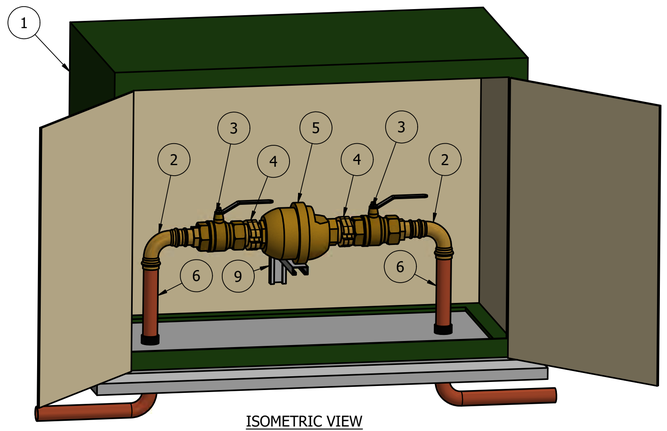
PLAN

FRONT ELEVATION
(DOORS REMOVED FOR CLARITY)
(DN32 & DN40 SHOWN)



ISOMETRIC VIEW

DN20 & DN25
SCALE: NTS



ISOMETRIC VIEW

DN32 &DN40
SCALE: NTS

PARTS LIST	
ITEM	DESCRIPTION
1	ENCLOSURE (POWDER COATED GALVANISED STEEL ENCLOSURE SHOWN) (NOTE 2 & 3)
2	90° ELBOW
3	BALL VALVE
4	FLANGE - THREAD FITTING
5	WATER METER
6	COPPER RISER
7	90° / STRAIGHT THROUGH BALL VALVE
8	UNION COUPLING
9	PIPE SUPPORT (UNISTRUT OR EQUIVALENT)

NOTES:

1. RISER PIPES SHALL BE INSULATED AND NOT IN DIRECT CONTACT WITH STEEL OR CONCRETE SURFACES.

2. METERING ENCLOSURES SHALL HAVE KNAUF "CLIMAFOAM XPS" INSULATION BOARDS INSTALLED TO ALL INTERNAL SURFACES (INCLUDING DOORS) OF 30 mm MIN. THICKNESS. ALTERNATIVES SUCH AS BLOCK OR BRICK CONSTRUCTION ARE ACCEPTABLE IN LIEU OF GALVANISED STEEL.

3. THE ENCLOSURE FINISH COLOUR SHALL BE NOMINATED BY THE DESIGNER TO SUIT THE PREVAILING ARCHITECTURE / STREETSCAPE. THE FINISH COLOUR MUST BE SHOWN ON THE DESIGN DRAWINGS FOR ACCEPTANCE BY ICON WATER. OTHERWISE, THE DEFAULT FINISH COLOUR SHALL BE G66 ENVIRONMENT GREEN TO AS 2700.

4. MINIMUM CLEARANCES SHOWN APPLY FOR ALL METERS SIZED≤DN40.

5. FOR DN20 & DN25 METERING ARRANGEMENTS, THE LEASE HOLDER'S RESPONSIBILITY BEGINS IMMEDIATELY AFTER THE DOWNSTREAM UNION COUPLING.

6. ALL PIPEWORK AND TUBING OF SIZES DN50 AND SMALLER SHALL BE INSULATED TO PREVENT FREEZING. REFER TO THE ICON WATER APPROVED PRODUCTS LIST FOR ACCEPTABLE INSULATION.

7. REFER TO ICON WATER SPECIFICATION STD-SPE-M-006 FOR DETAILED PROPERTY SERVICE CONNECTION AND METERING REQUIREMENTS.

8. INSTALL DOWNSTREAM ISOLATION VALVE IF REQUIRED e.g. MULTI STOREY INSTALLATION ON DN20 & DN25 METERING ARRANGEMENT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	NOTE 3 AND METER SIGN ADDED	10/09/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY						
DAM		RES		SPS		
BWS		WAT	X	STP		
WTP		SEW				
WPS		REC				

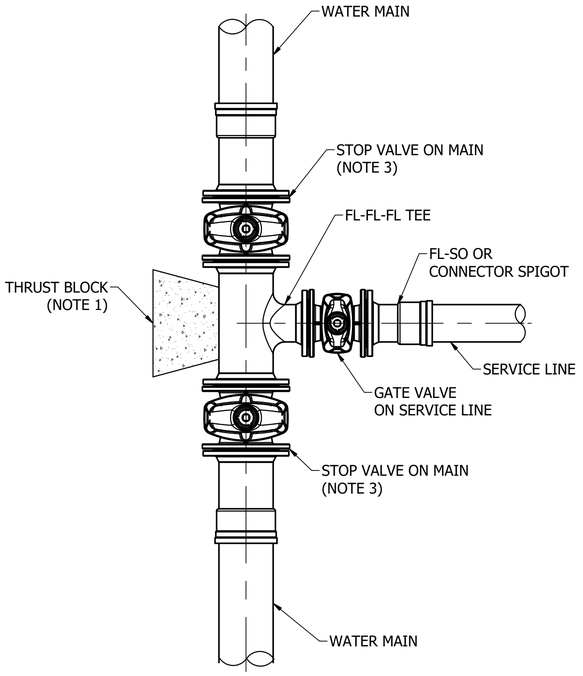
STANDARD DRAWING
WATER SERVICE CONNECTIONS
DN20 TO DN40 METERS
ABOVE GROUND INSTALLATIONS
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

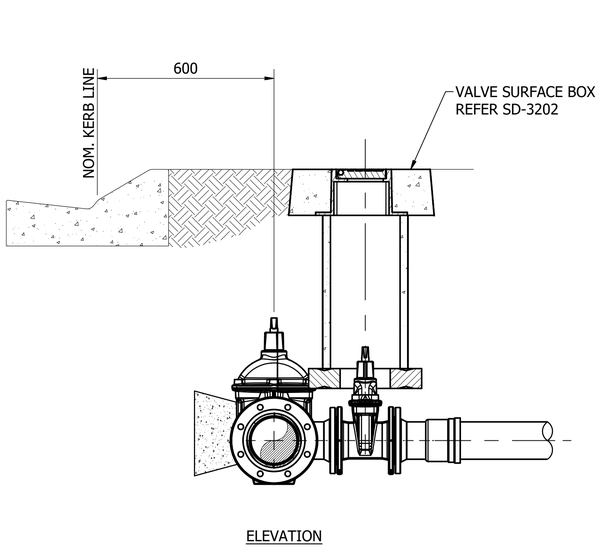
SD-3307-C

A1

ISSUE B



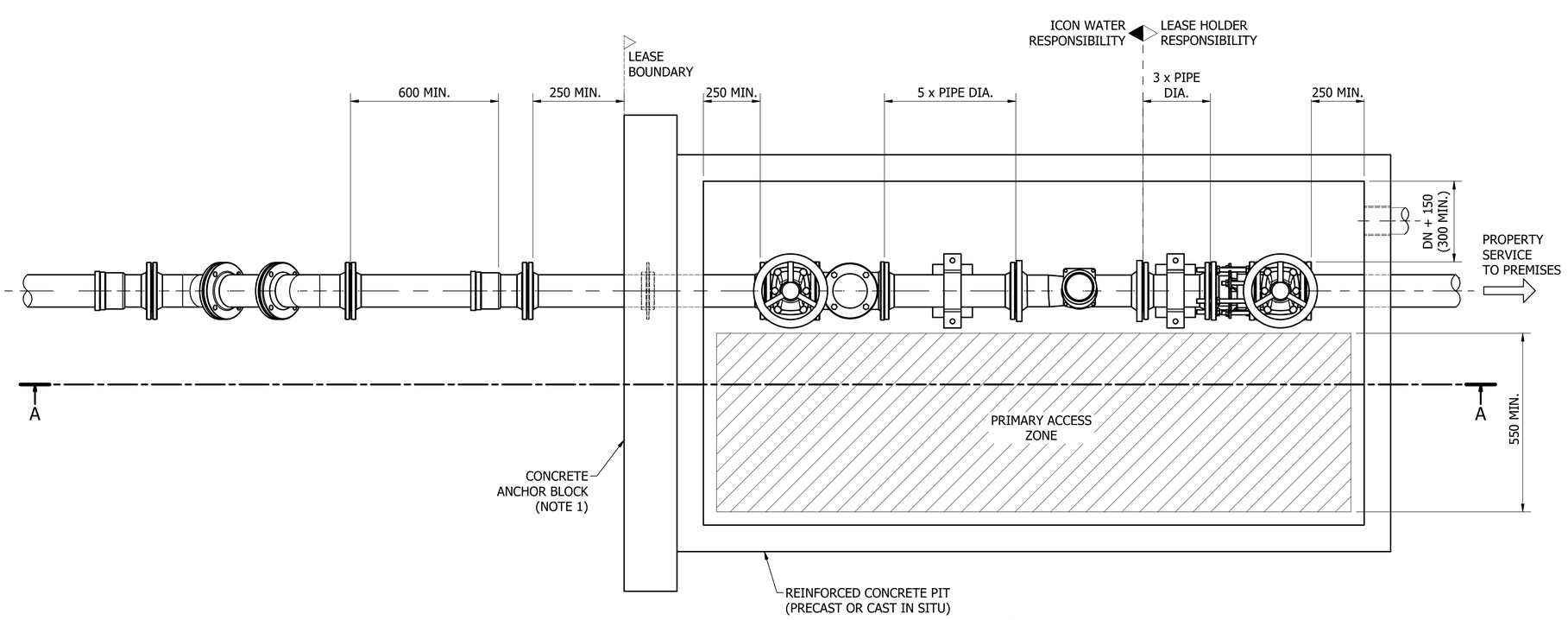
PLAN
(SURFACE BOX NOT SHOWN FOR CLARITY)



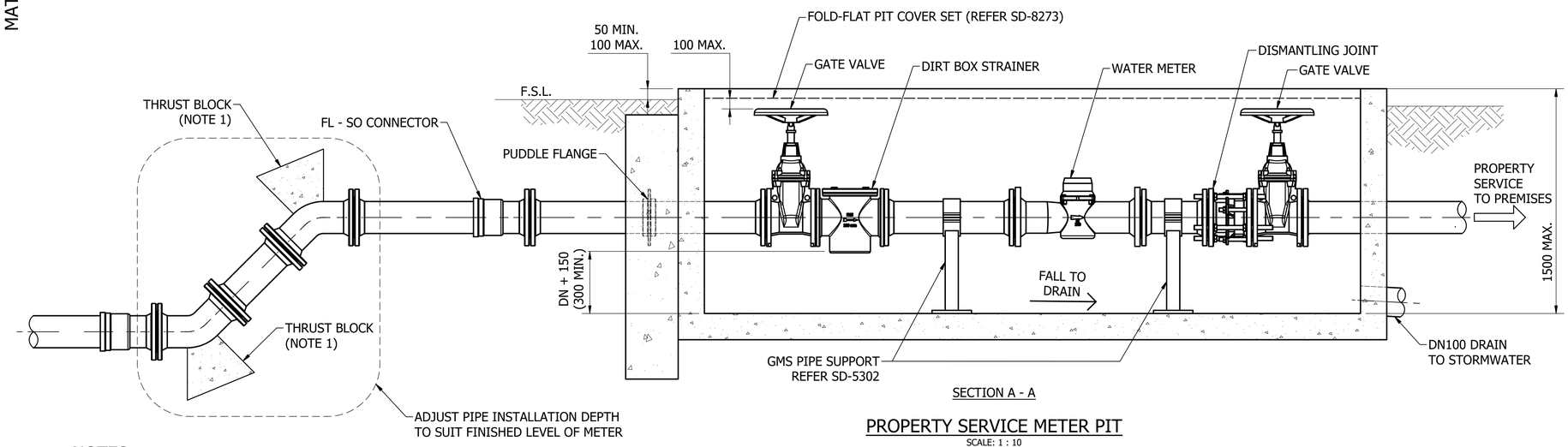
ELEVATION

MAINS CONNECTION
SCALE: 1 : 10

MATCH LINE



PLAN



SECTION A - A

PROPERTY SERVICE METER PIT
SCALE: 1 : 10

NOTES:

1. CONCRETE THRUST BLOCK, ANCHORS AND THRUST WALLS TO BE EITHER ENGINEERED FOR THE SPECIFIC PROJECT OR IN ACCORDANCE WITH SD-5002 AND SD-5003 AS APPROPRIATE

2.REFER TO ICON WATER SPECIFICATION STD-SPE-M-006 FOR DETAILED PROPERTY SERVICE CONNECTION AND METERING REQUIREMENTS.

3. STOP VALVES (ON MAIN) ARE REQUIRED FOR PROPERTY SERVICE CONNECTIONS SIZED DN100 AND LARGER BY DEFAULT. ICON WATER WILL ADVISE (ON A PROJECT-BY-PROJECT BASIS) IF STOP VALVES ARE REQUIRED FOR SMALLER PROPERTY SERVICE CONNECTIONS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	VALVES ON MAIN ADDED	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

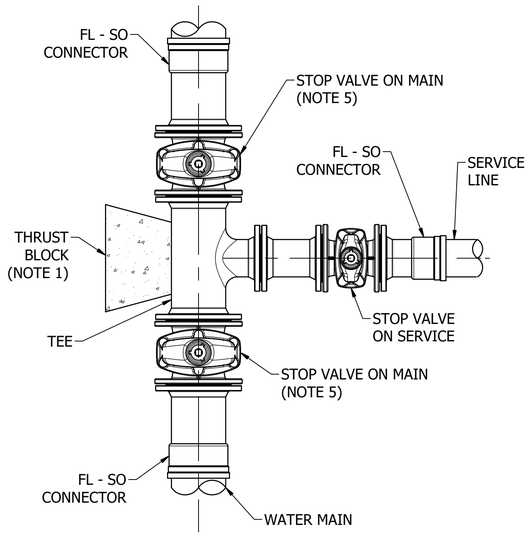
STANDARD DRAWING
WATER SERVICE CONNECTIONS
WATER METERS DN50 AND LARGER
BELOW GROUND INSTALLATIONS
ARRANGEMENT AND CONNECTION DETAILS

DRAWING STATUS: Current

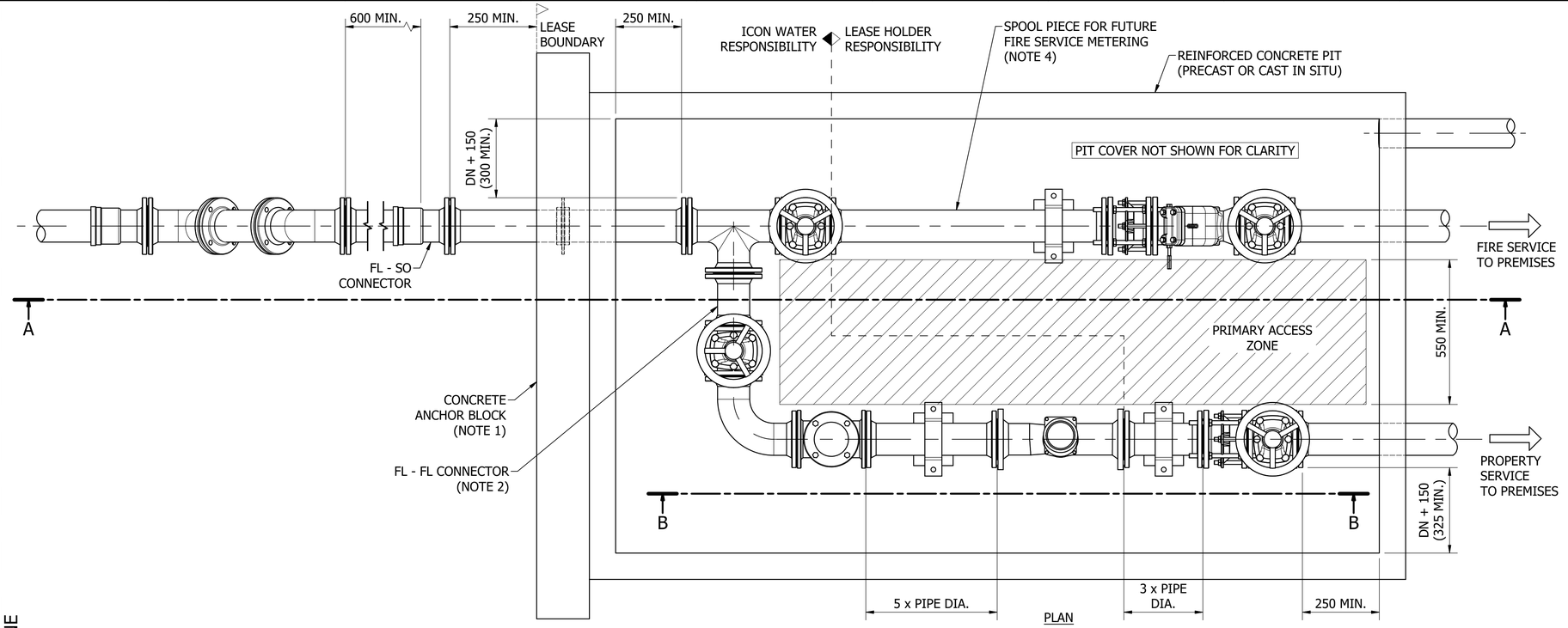
SD-3308-C

A1

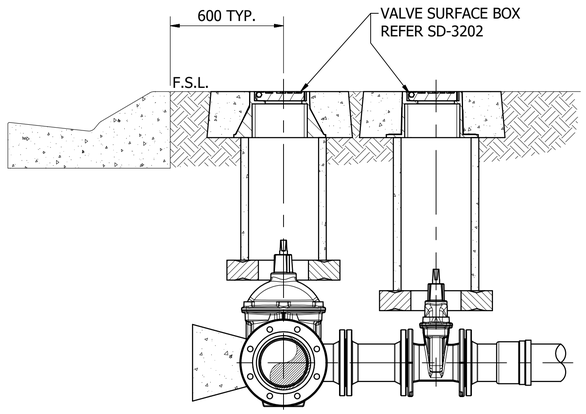
ISSUE B



PLAN
(SURFACE BOXES NOT SHOWN FOR CLARITY)



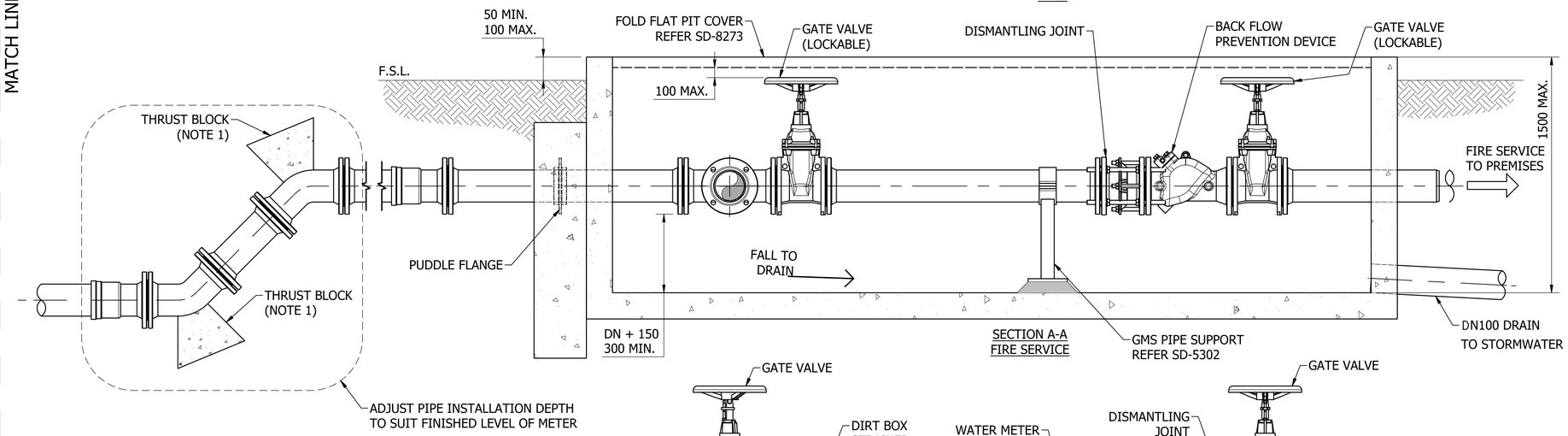
PLAN



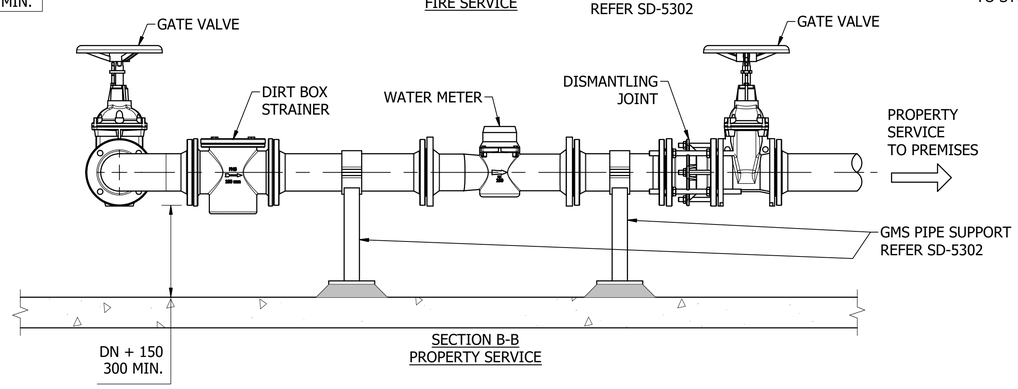
SECTIONAL ELEVATION

MAINS CONNECTION
SCALE: 1 : 10

MATCH LINE



SECTION A-A
FIRE SERVICE



SECTION B-B
PROPERTY SERVICE

PROPERTY SERVICE WITH SINGLE FIRE SERVICE METER PIT
SCALE: 1 : 10

NOTES:

1. CONCRETE THRUST BLOCKS, ANCHORS AND THRUST WALLS TO BE EITHER ENGINEERED FOR SPECIFIC PROJECT OR IN ACCORDANCE WITH SD-5002 AND SD-5003 AS APPROPRIATE.

2. FLANGE - FLANGE CONNECTOR LENGTH TO BE SIZED TO MAINTAIN MINIMUM 550 PRIMARY ACCESS ZONE BETWEEN PIPES.

3. REFER TO ICON WATER SPECIFICATION STD-SPE-M-006 FOR DETAILED PROPERTY SERVICE CONNECTION AND METERING REQUIREMENTS.

4. ARRANGE VALVES AND FITTINGS ON THE FIRE SERVICE TO MAXIMISE THE SPOOL PIECE LENGTH.

5. STOP VALVES (ON MAIN) ARE REQUIRED FOR PROPERTY SERVICE CONNECTIONS SIZED DN100 AND LARGER BY DEFAULT. ICON WATER WILL ADVISE (ON A PROJECT-BY-PROJECT BASIS) IF STOP VALVES ARE REQUIRED FOR SMALLER PROPERTY SERVICE CONNECTIONS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	STOP VALVE NOTE ADDED	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

icon WATER

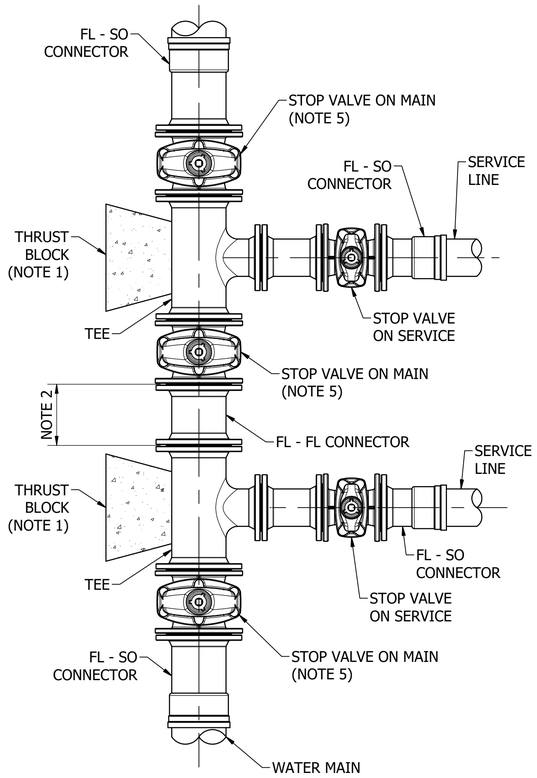
STANDARD DRAWING
WATER SERVICE CONNECTIONS
SINGLE FIRE SERVICE WITH METERED SERVICE
BELOW GROUND INSTALLATION
ARRANGEMENT AND CONNECTION DETAILS

DRAWING STATUS: Current

SD-3310-C

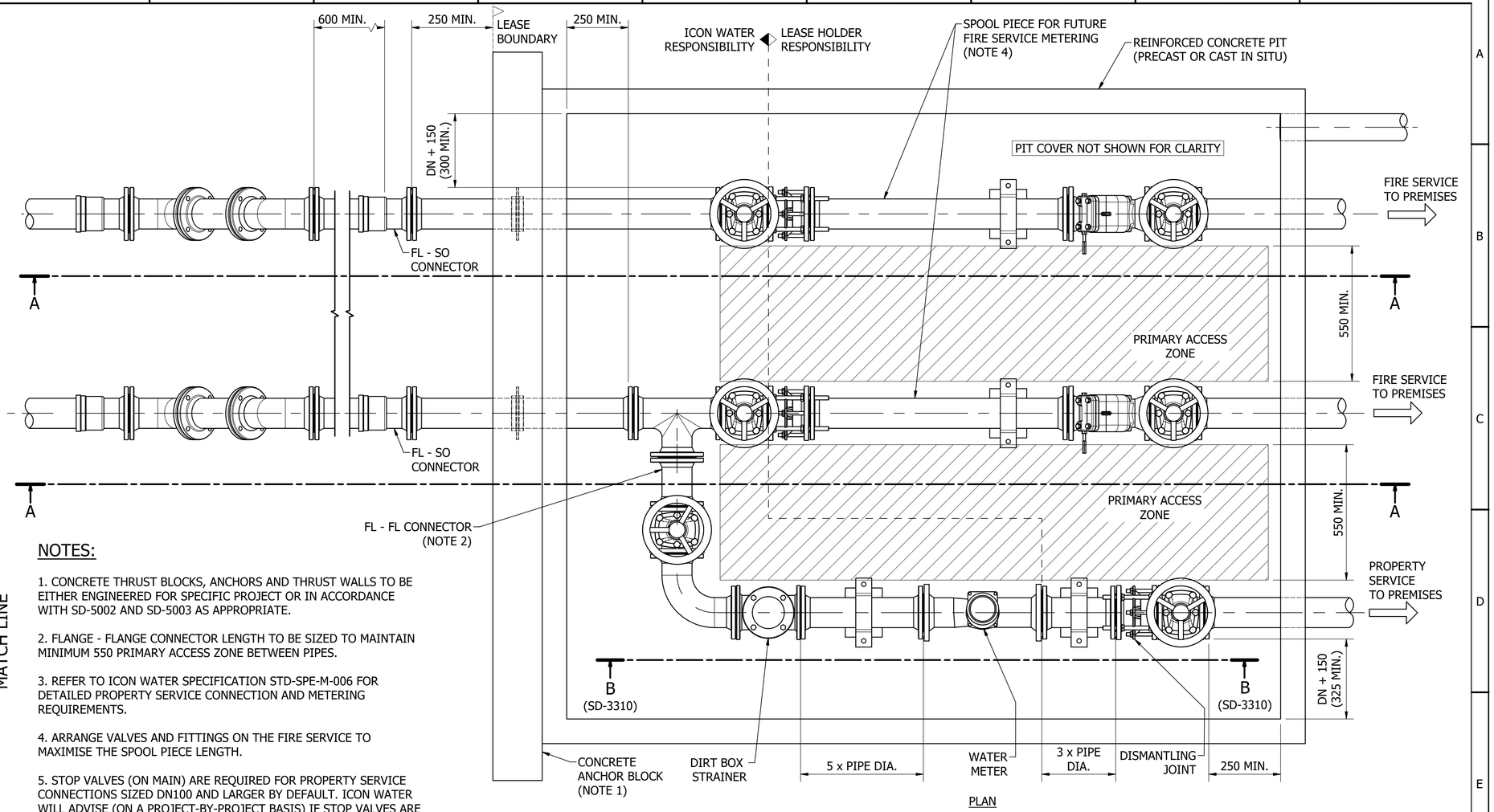
A1

ISSUE B



PLAN
(SURFACE BOXES NOT SHOWN FOR CLARITY)

MATCH LINE



PLAN

NOTES:

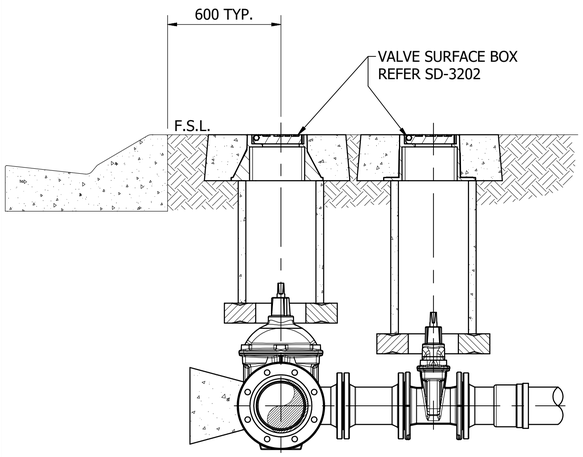
1. CONCRETE THRUST BLOCKS, ANCHORS AND THRUST WALLS TO BE EITHER ENGINEERED FOR SPECIFIC PROJECT OR IN ACCORDANCE WITH SD-5002 AND SD-5003 AS APPROPRIATE.

2. FLANGE - FLANGE CONNECTOR LENGTH TO BE SIZED TO MAINTAIN MINIMUM 550 PRIMARY ACCESS ZONE BETWEEN PIPES.

3. REFER TO ICON WATER SPECIFICATION STD-SPE-M-006 FOR DETAILED PROPERTY SERVICE CONNECTION AND METERING REQUIREMENTS.

4. ARRANGE VALVES AND FITTINGS ON THE FIRE SERVICE TO MAXIMISE THE SPOOL PIECE LENGTH.

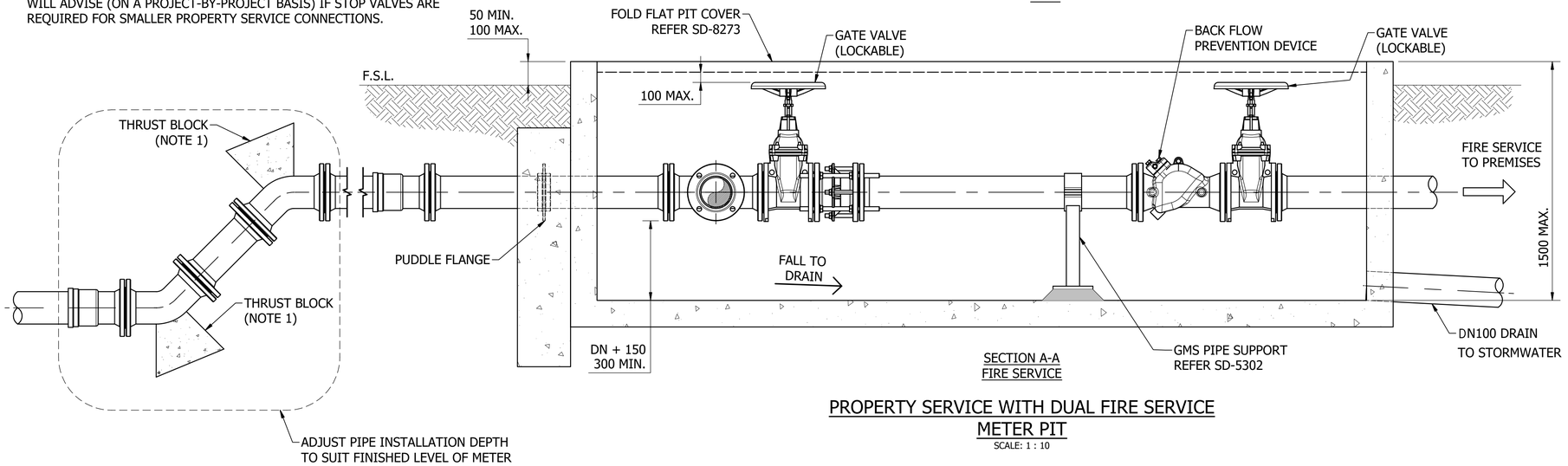
5. STOP VALVES (ON MAIN) ARE REQUIRED FOR PROPERTY SERVICE CONNECTIONS SIZED DN100 AND LARGER BY DEFAULT. ICON WATER WILL ADVISE (ON A PROJECT-BY-PROJECT BASIS) IF STOP VALVES ARE REQUIRED FOR SMALLER PROPERTY SERVICE CONNECTIONS.



SECTIONAL ELEVATION

MAINS CONNECTION

SCALE: 1 : 10



SECTION A-A
FIRE SERVICE

PROPERTY SERVICE WITH DUAL FIRE SERVICE METER PIT

SCALE: 1 : 10

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	MAIN VALVE NOTE ADDED	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS				
BWS		WAT	X	STP				
WTP		SEW						
WPS		REC						

ASSET AREA APPLICABILITY

icon WATER

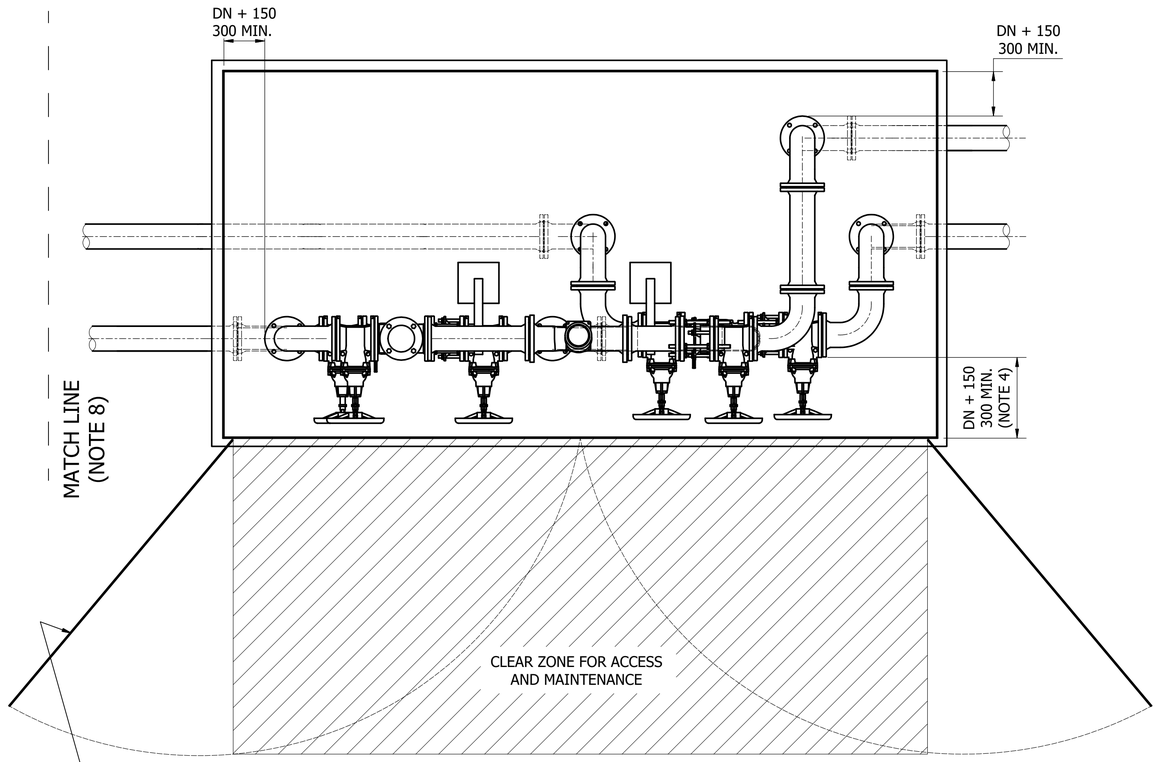
STANDARD DRAWING
WATER SERVICE CONNECTIONS
DUAL FIRE SERVICE WITH METERED SERVICE
BELOW GROUND INSTALLATION
ARRANGEMENT AND CONNECTION DETAILS

DRAWING STATUS: Current

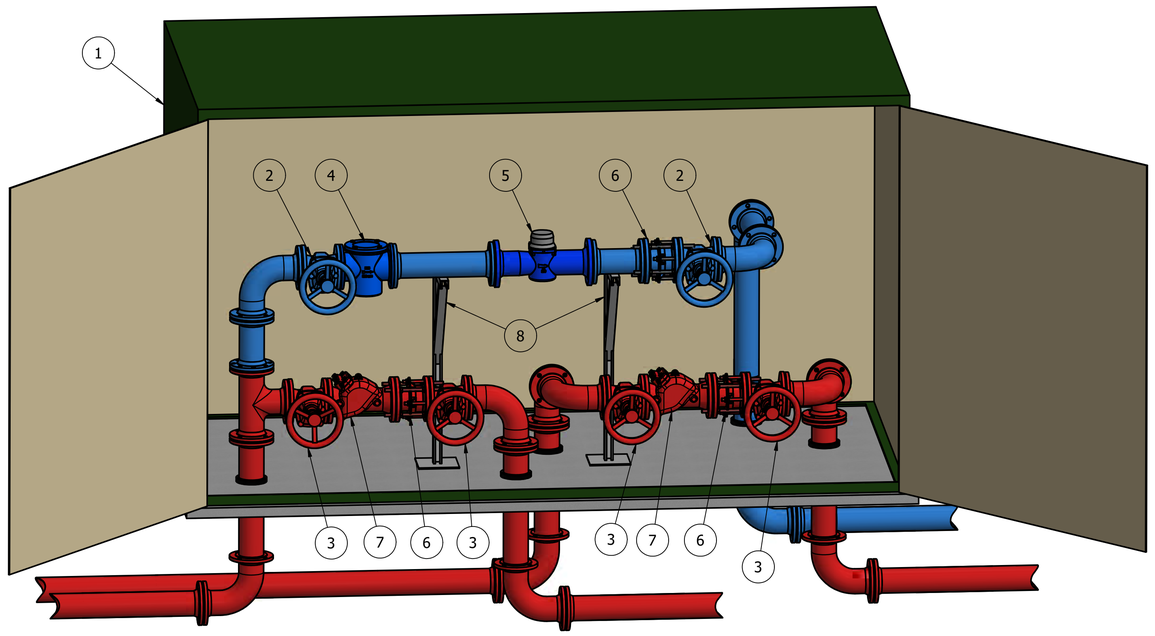
SD-3312-C

A1

ISSUE B

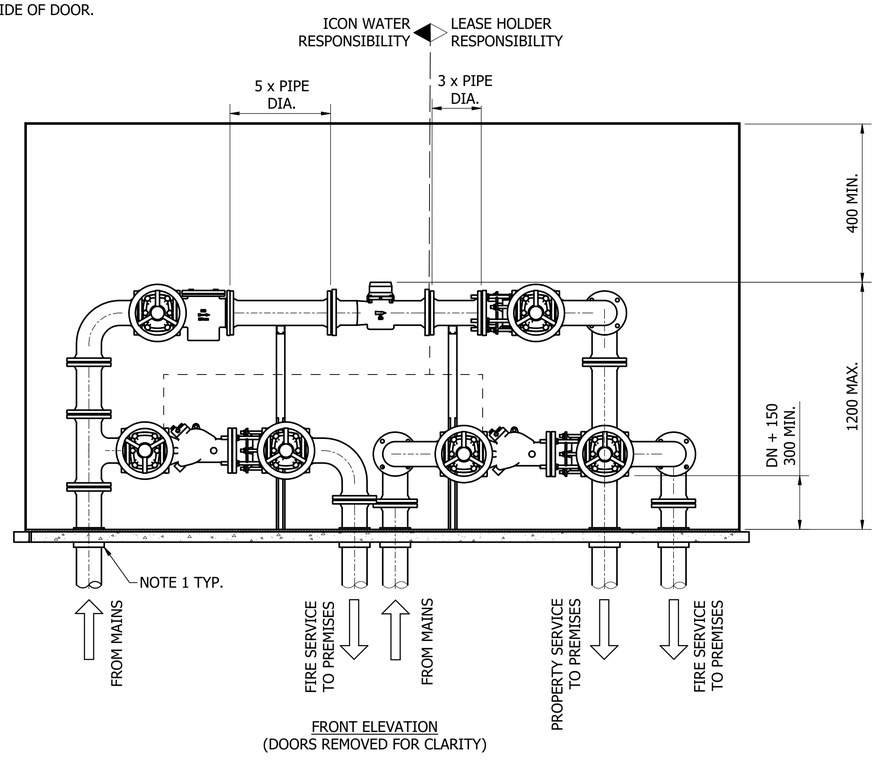


PLAN



ISOMETRIC VIEW

SCALE: NTS



FRONT ELEVATION
(DOORS REMOVED FOR CLARITY)

PARTS LIST	
ITEM	DESCRIPTION
1	METERING ENCLOSURE - POWDER COATED GALVANISED STEEL (NOTE 2 & 3)
2	GATE VALVE
3	GATE VALVE (LOCKABLE)
4	DIRT BOX STRAINER
5	WATER METER
6	DISMANTLING JOINT (NOTE 7)
7	BACKFLOW PREVENTION DEVICE
8	PIPE SUPPORTS (UNISTRUT OR EQUIVALENT)

NOTES:

1. RISER PIPEWORK SHALL BE INSULATED AND NOT IN DIRECT CONTACT WITH STEEL OR CONCRETE SURFACES.

2. METERING ENCLOSURES SHALL HAVE KNAUF "CLIMAFOAM XPS" INSULATION BOARDS INSTALLED TO ALL INTERNAL SURFACES (INCLUDING DOORS) OF 30 mm MIN. THICKNESS. ALTERNATIVES SUCH AS BLOCK OR BRICK CONSTRUCTIONS ARE ACCEPTABLE IN LIEU OF GALVANISED STEEL.

3. THE ENCLOSURE FINISH COLOUR SHALL BE NOMINATED BY THE DESIGNER TO SUIT THE PREVAILING ARCHITECTURE / STREETSCAPE. THE FINISH COLOUR MUST BE SHOWN ON THE DESIGN DRAWINGS FOR ACCEPTANCE BY ICON WATER. OTHERWISE, THE DEFAULT FINISH COLOUR SHALL BE G66 ENVIRONMENT GREEN TO AS 2700.

4. WORKING CLEARANCES TO THE FRONT OF THE CABINET CAN BE MINIMISED IF ADEQUATE ACCESS CAN BE ACHEIVED WHILST THE DOORS OF THE STRUCTURE ARE OPEN.

5. ALL PIPEWORK AND TUBING OF SIZES DN50 AND SMALLER SHALL BE INSULATED TO PREVENT FREEZING. REFER TO ICON WATER'S APPROVED PRODUCTS LIST FOR ACCEPTABLE INSULATION.

6. CLEARANCE BETWEEN FLANGES AND PIPEWORK OR FIXED STRUCTURES TO BE DN + 150 (MIN. 300) TO ALLOW FOR MAINTENANCE ACCESS.

7. DISMANTLING JOINTS ARE NOT REQUIRED IF MAINTENANCE CAN BE CARRIED OUT WITHOUT UNDUE FORCE BEING APPLIED TO ANY PIPEWORK OR FITTING.

8. FOR MAINS CONNECTION DETAILS REFER TO THE MATCH LINE ON THE FOLLOWING DRAWINGS:

   METER ≥ DN50 REFER SD-3308
   METER WITH SINGLE FIRE SERVICE REFER SD-3310
   METER WITH DUAL FIRE SERVICE REFER SD-3312

9. THE PIPE AND FITTINGS LAYOUT SHOWN IS AN EXAMPLE ONLY. OTHER LAYOUTS ARE ACCEPTABLE, PROVIDED THAT THE CLEARANCES AND ARRANGEMENTS SHOWN IN THIS DRAWING ARE ADHERED TO AND ACT FIRE & RESCUE HAVE APPROVED THE ARRANGEMENT IN WRITING.

10. REFER TO ICON WATER SPECIFICATION STD-SPE-M-006 FOR DETAILED PROPERTY SERVICE CONNECTION AND METERING REQUIREMENTS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	ENCLOSURE COLOUR NOTE AND METER SIGN ADDED	10/09/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

icon WATER

STANDARD DRAWING
WATER SERVICE CONNECTIONS
DUAL FIRE SERVICE WITH METERED SERVICE
ABOVE GROUND INSTALLATION
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-3313-C

A1

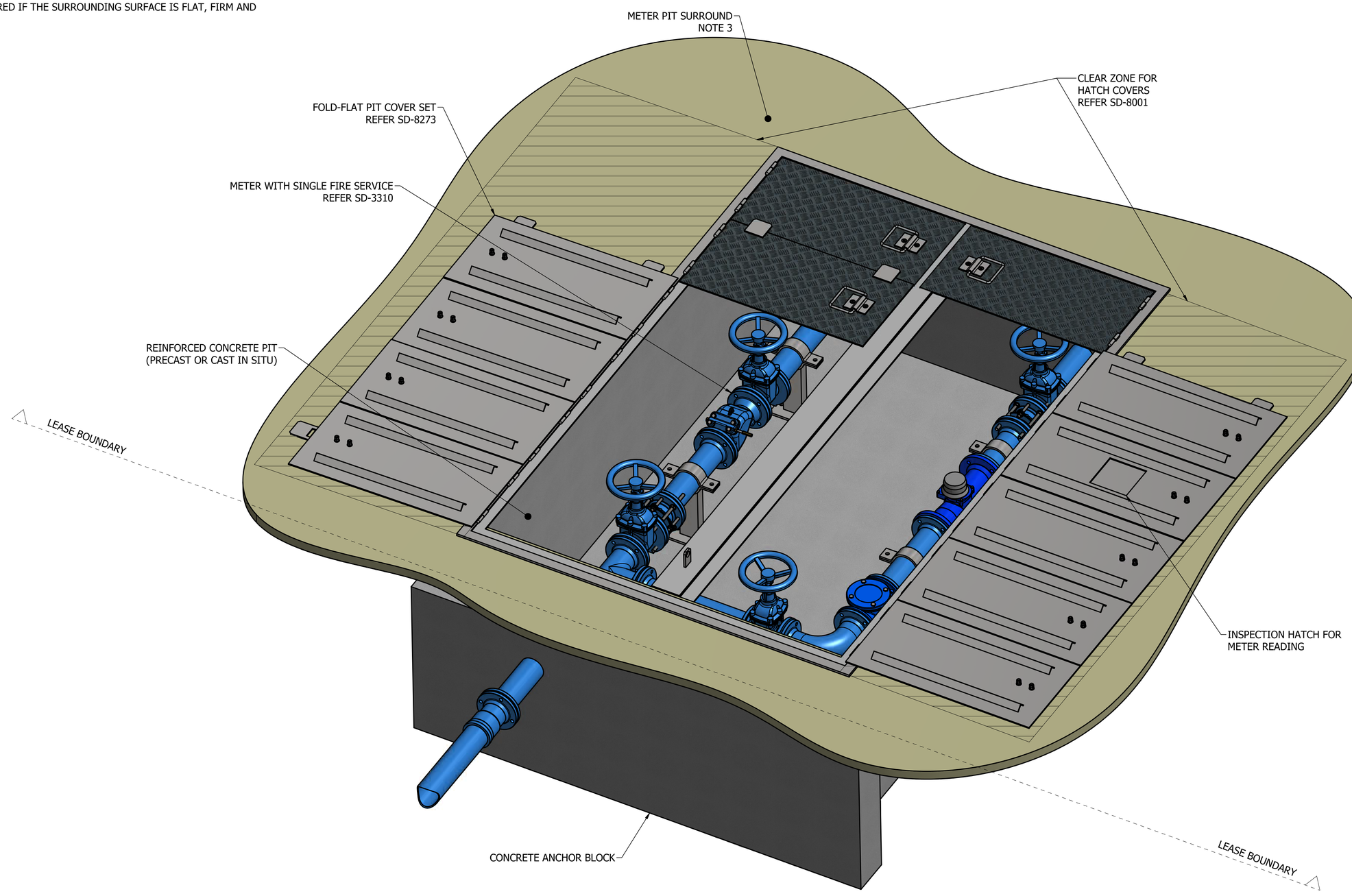
ISSUE: B

NOTES:

1. REFER TO ICON WATER SPECIFICATION STD-SPE-M-006 FOR DETAILED PROPERTY SERVICE CONNECTION AND METERING REQUIREMENTS.

2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH SD-3310.

3. CONCRETE APRON IS NOT REQUIRED IF THE SURROUNDING SURFACE IS FLAT, FIRM AND LEVEL (e.g. LAWN OR ROAD BASE)



No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM		RES		SPS	
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

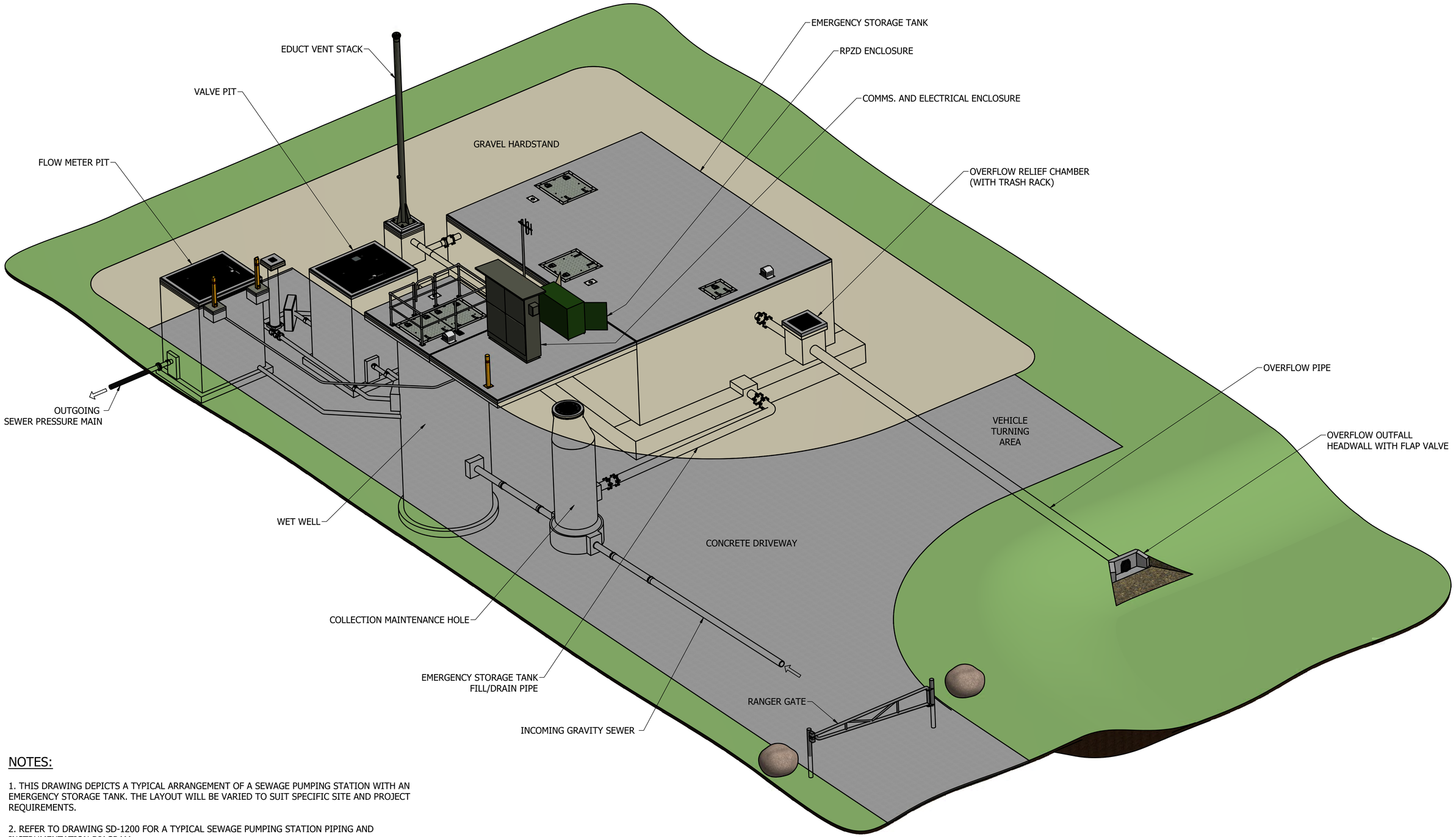
STANDARD DRAWING
WATER SERVICE CONNECTIONS
EXAMPLE BELOW GROUND INSTALLATION
SINGLE FIRE SERVICE WITH METERED SERVICE

DRAWING STATUS: Current

SD-3314-C

A1

ISSUE: A



NOTES:

1. THIS DRAWING DEPICTS A TYPICAL ARRANGEMENT OF A SEWAGE PUMPING STATION WITH AN EMERGENCY STORAGE TANK. THE LAYOUT WILL BE VARIED TO SUIT SPECIFIC SITE AND PROJECT REQUIREMENTS.

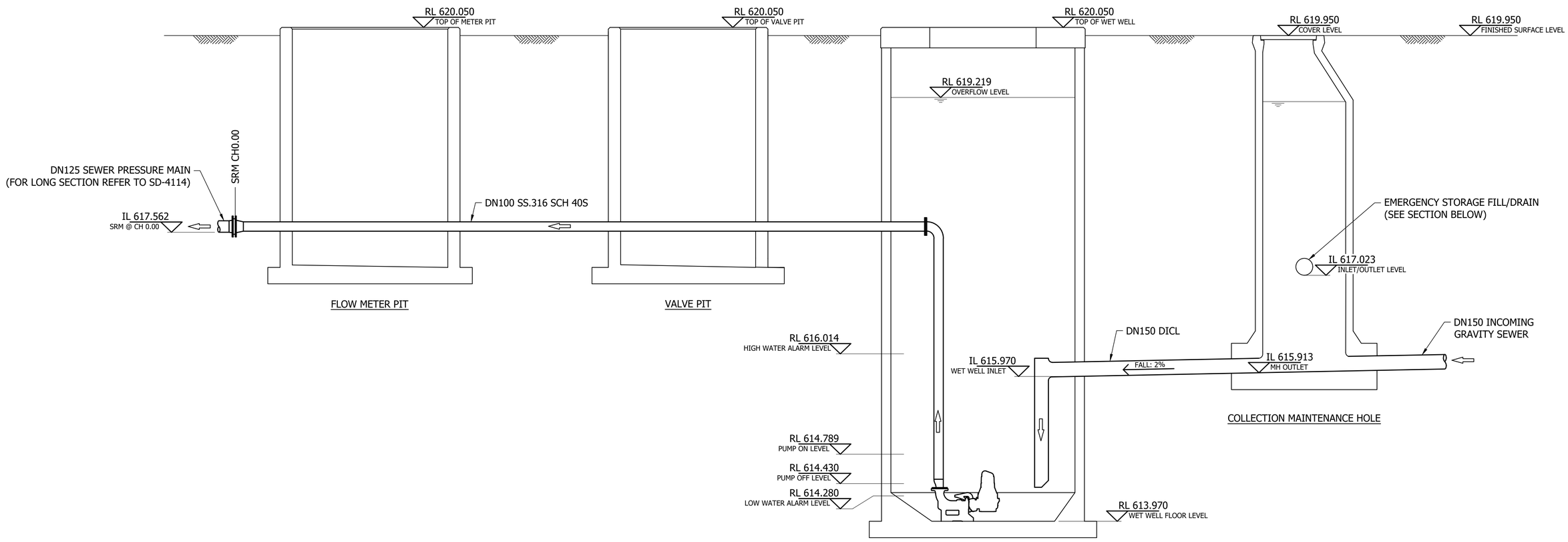
2. REFER TO DRAWING SD-1200 FOR A TYPICAL SEWAGE PUMPING STATION PIPING AND INSTRUMENTATION DIAGRAM.

SEWAGE PUMPING STATION SITE LAYOUT

SCALE: N.T.S.

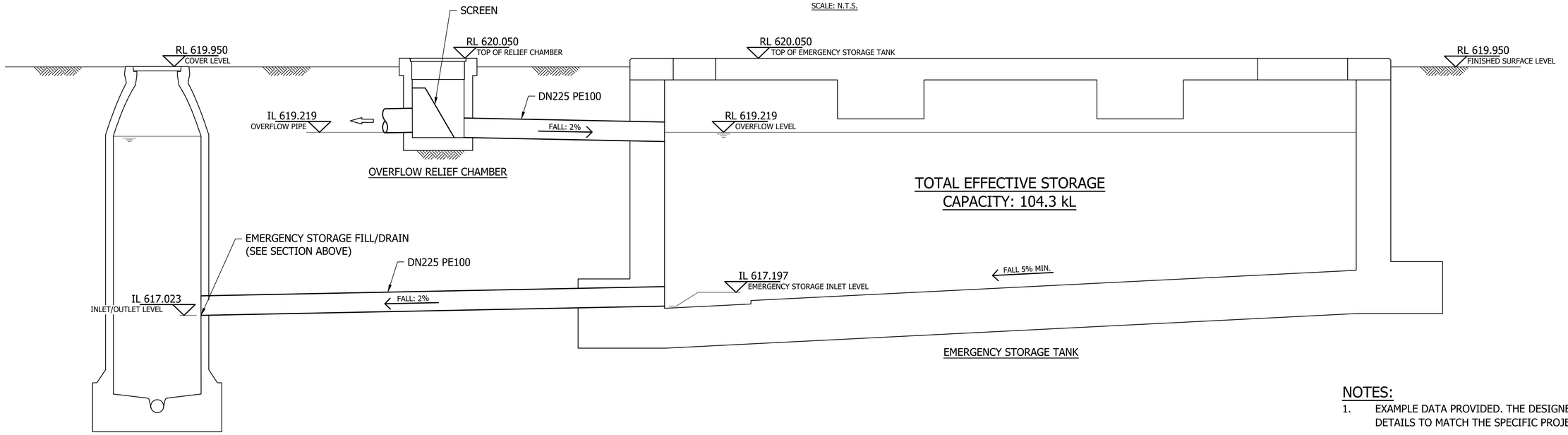
No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	25/05/2018	M. Matusiak	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY									
DAM		RES		SPS	X	icon WATER	STANDARD DRAWING SEWAGE PUMPING STATIONS TYPICAL SITE LAYOUT	DRAWING STATUS Current	
BWS		WAT		STP				SD-4100-C	
WTP		SEW	X					A1	ISSUE A
WPS		REC							



COLLECTION MAINTENANCE HOLE THROUGH TO SEWER RISING MAIN

SCALE: N.T.S.



NOTES:

1. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.

EMERGENCY STORAGE AND OVERFLOW

SCALE: N.T.S.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	25/05/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

STANDARD DRAWING
SEWAGE PUMPING STATIONS
TYPICAL HYDRAULIC PROFILE

DRAWING STATUS: Current

SD-4101-C

A1

ISSUE: A

SCREEN TREES

1.5 m MIN.

EMERGENCY STORAGE TANK
REFER SD-4108

INDUCT VENT
(EMERGENCY STORAGE)
REFER SD-4111

OVERFLOW RELIEF CHAMBER
WITH TRASH RACK
REFER SD-4110

4.5 m MIN.

4.0 m MIN.

DN225 OVERFLOW PIPE

OVERFLOW RELIEF HEADWALL
WITH FLAP VALVE REFER SD-4110

620.0
619.8
619.6
619.4
619.2
619.0
618.8

GRAVEL
HARDSTAND

VENTILATION PIPEWORK
REFER SD-4111

EDUCT VENT STACK
REFER SD-4112

VALVE CHAMBER
REFER SD-4104

GRAVEL HARDSTAND

VEHICLE TURNING
AREA

RPZD
WATER SUPPLY

DN225 FILL / DRAIN PIPE

R8.0 m MIN.
TYP

RPZD ENCLOSURE
REFER SD-5500

DN160 EDUCT VENT

COMMUNICATIONS AND
ELECTRICAL ENCLOSURE

DN100 PRESSURE MAIN

DN100 DRAIN

DN100 PRESSURE MAIN

DN150 GRAVITY SEWER

DN150 GRAVITY MAIN

FLOWMETER PIT
REFER SD-4106

DN100 PRESSURE MAIN

DN100 SCOUR

DN100 DRAIN

1.5 m
MIN.

4.5 m MIN.

CONCRETE DRIVEWAY

RANGER GATE
REFER TCCS STANDARDS

OUTGOING
SEWER PRESSURE MAIN
REFER SD-4114

REMOVABLE
BOLLARDS
REFER SD-9013

COMMUNICATIONS
AND ELECTRICAL
CONDUITS (TYP.)

WET WELL
REFER SD-4104

INCOMING
ELECTRICAL
FEED

INDUCT VENT
(WET WELL)
REFER SD-4111

STANDARD DUTY
BOLLARD
REFER SD-9012

COLLECTION MAINTENANCE HOLE
REFER SD-4103

INCOMING GRAVITY SEWER

SRM

NOTES:

1. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	30/05/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
SEWAGE PUMPING STATIONS
TYPICAL SITE PLAN

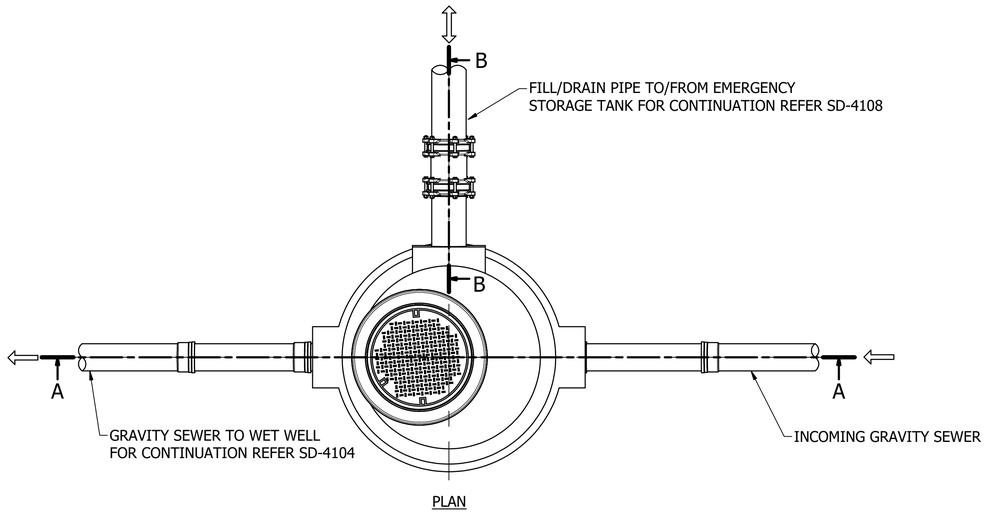
DRAWING STATUS: Current

SD-4102-C

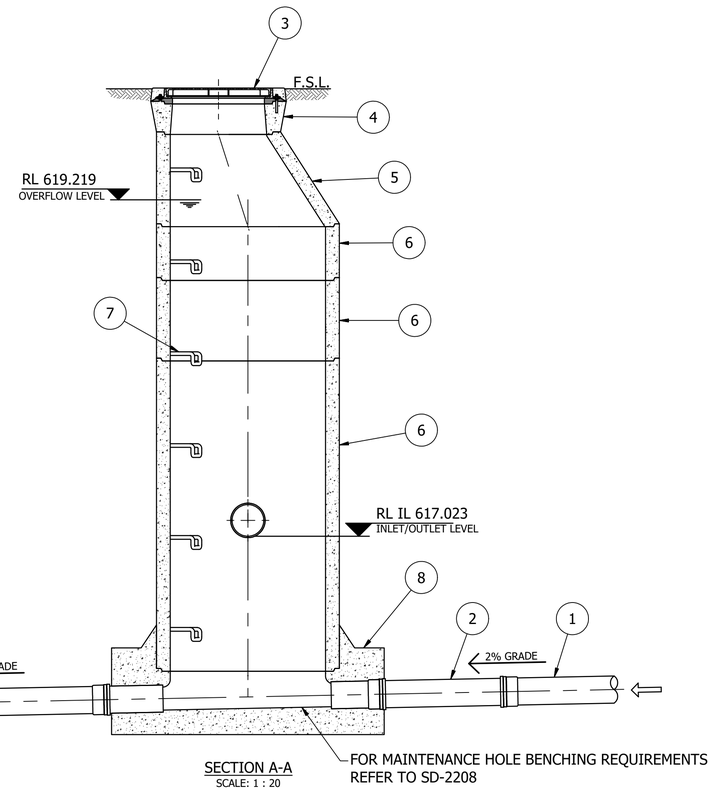
A1

ISSUE: A

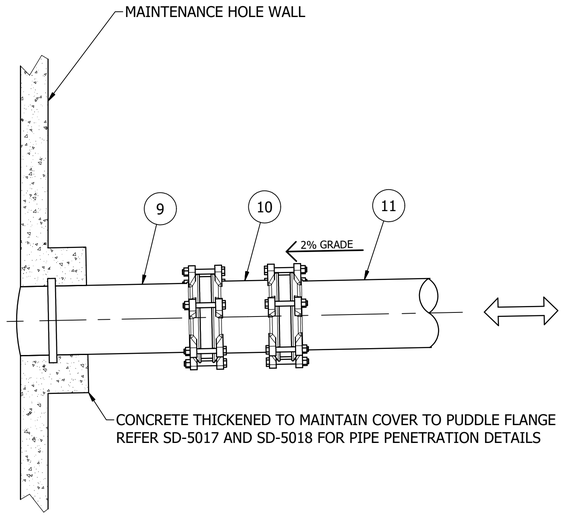
PARTS LIST		
ITEM	DESCRIPTION	QTY
1	DN150 DICL INCOMING GRAVITY SEWER	N/A
2	DN150 DICL ROCKER PIPE	1
3	CLASS D (TRAFFICABLE) MAINTENANCE HOLE COVER AND FRAME (BOLT DOWN), REFER SD-2204	1
4	MAKE-UP RING, REFER SD-2207	1
5	STRAIGHT BACK TAPER, REFER SD-2207	1
6	SHAFT SECTION, REFER SD-2207	VARIES WITH DEPTH
7	STEP IRON, REFER SD-8108	VARIES WITH DEPTH
8	MAINTENANCE HOLE BASE, REFER SD-2201	1
9	DN225 PN6.3 SDR26 PE100 FILL/DRAIN PIPE C/W FACTORY FITTED PUDDLE FLANGE	1
10	DN200 MECHANICAL COUPLING	1
11	DN225 PN6.3 SDR26 PE100 FILL/DRAIN PIPE	1
22		1
23		1



PLAN



SECTION A-A
SCALE: 1 : 20



SECTION B-B

EMERGENCY STORAGE FILL/DRAIN PIPE CONNECTION
SCALE: 1 : 10

NOTES:

1. MAINTENANCE HOLE CONSTRUCTION MAY BE PRECAST OR CAST IN SITU (PRECAST SHOWN). FOR ADDITIONAL MAINTENANCE HOLE DETAILS REFER TO SD-2200 SERIES OF DRAWINGS.

2. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	13/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X			
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

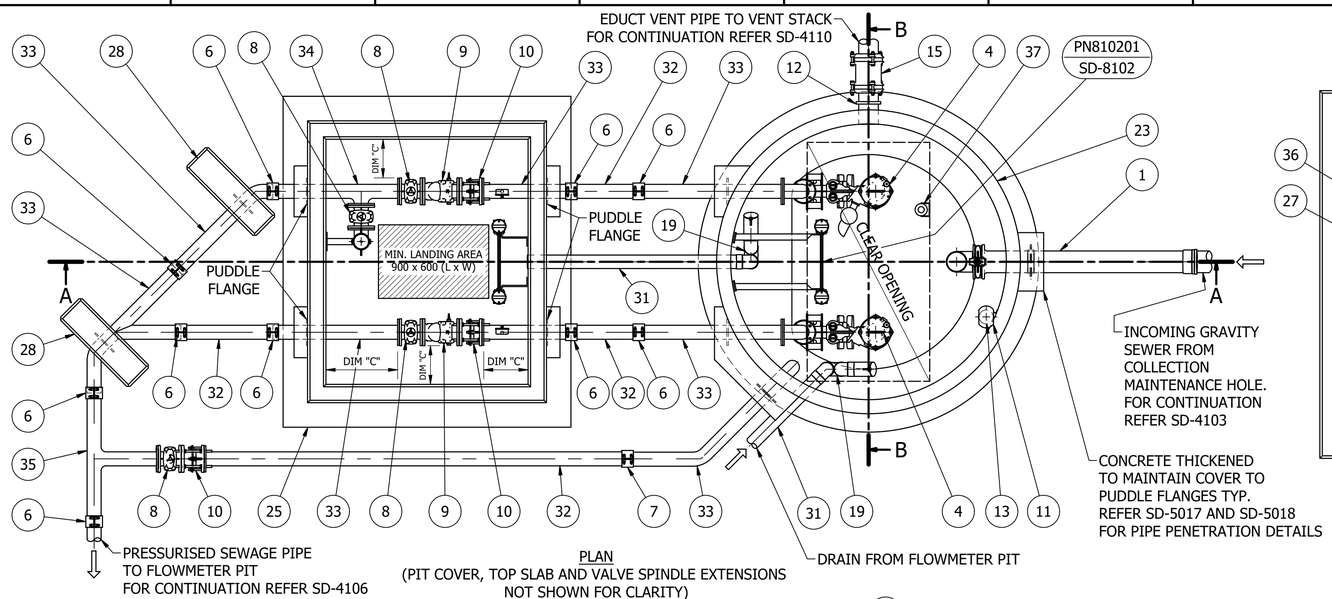
STANDARD DRAWING
SEWAGE PUMPING STATIONS
COLLECTION MAINTENANCE HOLE
GENERAL ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

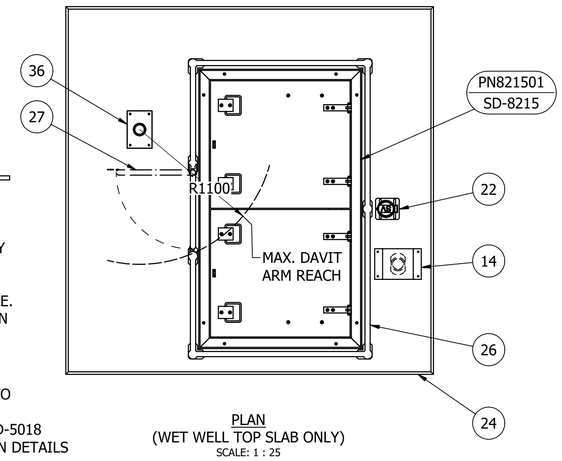
SD-4103-C

A1

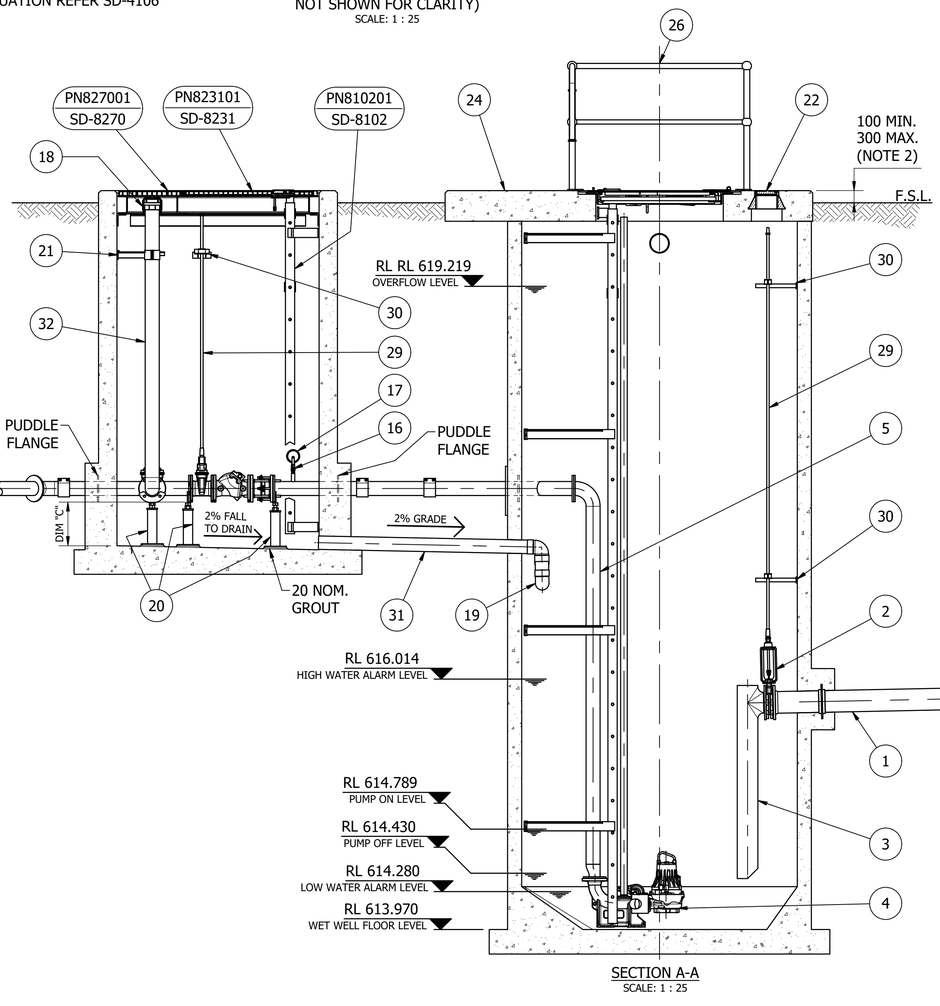
ISSUE: A



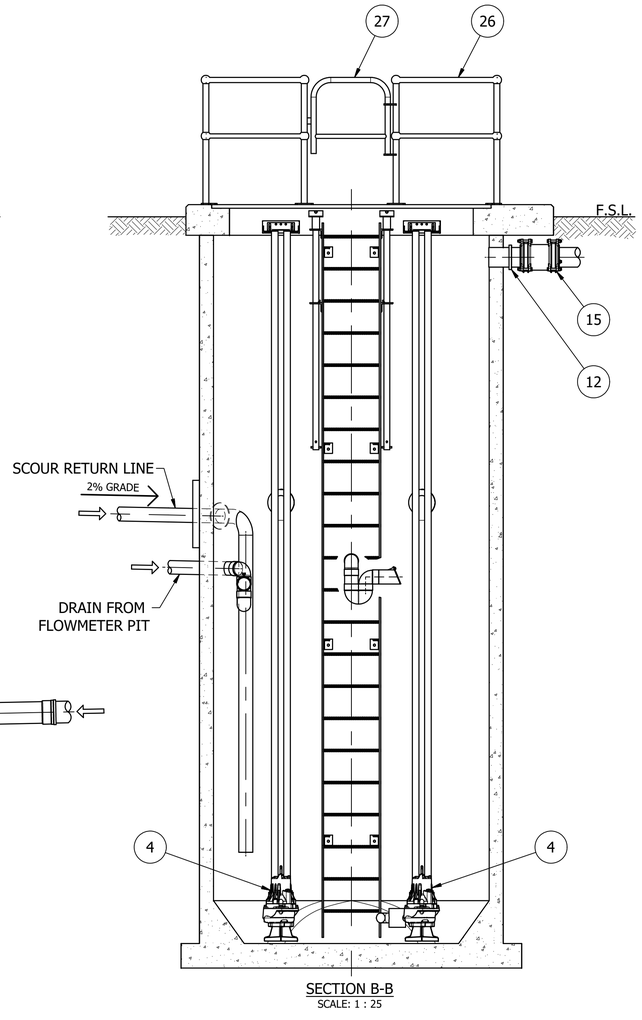
PLAN
(PIT COVER, TOP SLAB AND VALVE SPINDLE EXTENSIONS NOT SHOWN FOR CLARITY)
SCALE: 1 : 25



PLAN
(WET WELL TOP SLAB ONLY)
SCALE: 1 : 25



SECTION A-A
SCALE: 1 : 25



SECTION B-B
SCALE: 1 : 25

PARTS LIST

ITEM	DESCRIPTION	QTY
1	DN150 DICL INLET SEWER PIPE	1
2	DN150 KNIFE GATE VALVE	1
3	DN150 SS INLET SEWER DROPPER PIPE	1
4	CENTRIFUGAL PUMP, SUBMERSIBLE (ONE UNIT SUPPLIED WITH FLUSH VALVE)	2
5	DN80 TO DN100 SS PUMP RISER PIPE	2
6	DN100 MECHANICAL COUPLING, NON AXIALLY RESTRAINED, C/W CENTRE LIMIT STOP	10
7	MECHANICAL COUPLING, AXIALLY RESTRAINED	1
8	DN100 GATE VALVE	4
9	DN100 CHECK VALVE	2
10	DN100 DOUBLE FLANGED DISMANTLING JOINT	3
11	DN100 PVC AIR ADMITTANCE VENT	1
12	DN160 PN6.3 SDR26 PE100 VENT PIPE C/W FACTORY FITTED PUDDLE FLANGE	1
13	DN100 PVC-U VENT PIPE	1
14	SS INDUCT VENT COVER	1
15	DN125 MECHANICAL CONNECTOR	1
16	DN15 BALL VALVE, BRASS BODY, BALL CERTIFIED TO WATER MARK CIM 11CR	2
17	DIA 100 PRESSURE GAUGE	2
18	DN100 KAMLOK FEMALE	1
19	DN100 DWV DISCONNECTOR TRAP WITH FLAP VALVE	2
20	DN100 ADJUSTABLE PIPE SUPPORT (FLANGE MOUNTED)	5
21	DN100 SS WALL MOUNTED PIPE SUPPORT	1
22	DI VALVE COVER	2
23	RC WET WELL CHAMBER (PRECAST OR CAST IN SITU)	1
24	RC WET WELL TOP SLAB (PRECAST OR CAST IN SITU)	1
25	RC VALVE PIT CHAMBER (PRECAST OR CAST IN SITU)	1
26	WEBFORGE HANDRAILS (NOTE 2)	1
27	WEBFORGE SELF CLOSING GATE 750 C/O (NOTE 2)	1
28	CONCRETE THRUST BLOCK (REFER SD-5003)	2
29	SS VALVE SPINDLE EXTENSION	4
30	SS VALVE SPINDLE EXTENSION BRACKET	5
31	DN100 PVC-U DRAIN PIPE	2
32	DN100 SCHED 40S 316 SS PIPE	6
33	DN100 SCHED 40S 316 SS PIPE C/W FACTORY FITTED PUDDLE FLANGE	8
34	DN100 SCHED 40S 316 SS PIPE C/W FACTORY FITTED PUDDLE FLANGE AND FLANGED TEE	1
35	DN100 SCHED 40S 316 SS PIPE WITH FLANGED TEE	1
36	DBI SALA 'FLUSH MOUNT' DAVIT SLEEVE, CAST IN	1
37	LEVEL SENSOR, RADAR OR ULTRASONIC (NOTE 3)	1

NOTES:

1. DIM "C" EQUALS DN + 150 AND SHALL BE NO LESS THAN 300 UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER PRINCIPAL ENGINEER.

2. THE DETAILS RELATING TO ACCESS/EGRESS AND HEIGHT SAFETY AS DEPICTED ON THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE REQUIREMENTS DETAILED IN ICON WATER SPECIFICATIONS STD-SPE-G-008 AND G-009. THE DESIGNER SHALL PRODUCE PROJECT SPECIFIC (ISSUED FOR CONSTRUCTION) DESIGNS AS APPROPRIATE BASED ON THIS DRAWING AND THE REQUIREMENTS OF THE ABOVE-MENTIONED SPECIFICATIONS.

3. LEVEL SENSOR TO BE POSITIONED WHERE THERE ARE NO OBSTRUCTIONS BELOW THE SENSORS BEAM.

4. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	31/05/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

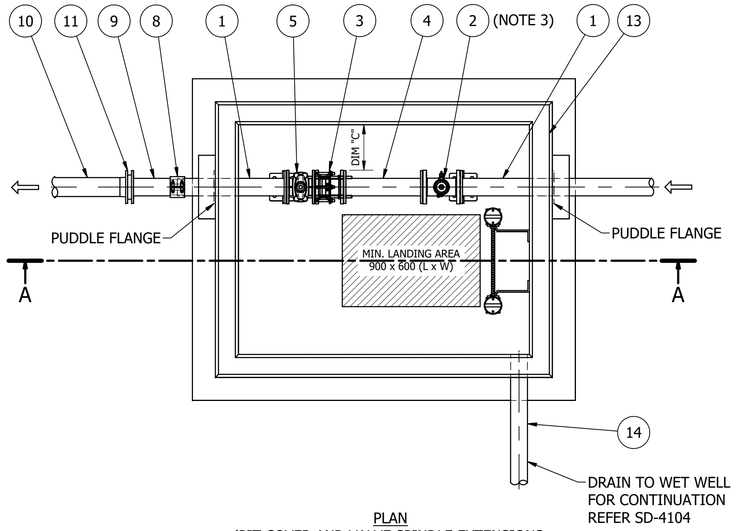
STANDARD DRAWING
SEWAGE PUMPING STATIONS
WET WELL AND VALVE PIT
GENERAL ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

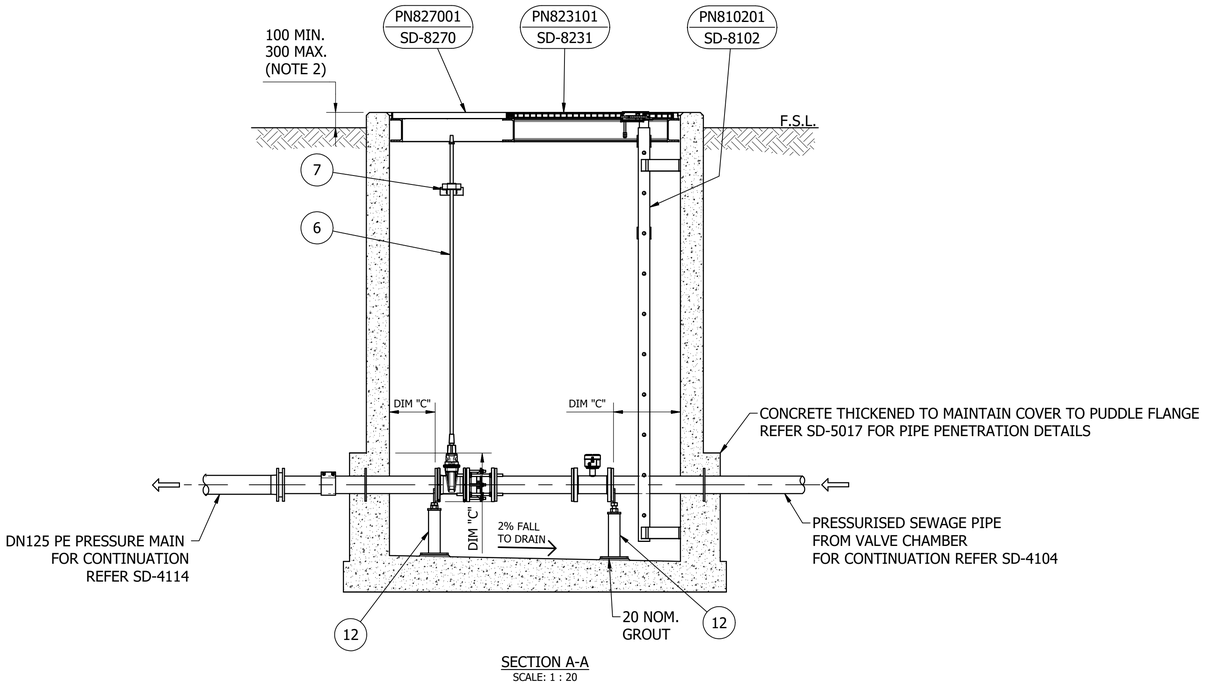
SD-4104-C

A1

ISSUE: A



PLAN
(PIT COVER AND VALVE SPINDLE EXTENSIONS
NOT SHOWN FOR CLARITY)
SCALE: 1 : 20



SECTION A-A
SCALE: 1 : 20

PARTS LIST

ITEM	DESCRIPTION	QTY
1	DN100 SCHED 40S 316 SS PIPE C/W FACTORY FITTED PUDDLE FLANGE	1
2	ELECTRO-MAGNETIC FLOWMETER, FULL BORE TYPE (NOTE 3)	1
3	DN100 DOUBLE FLANGE DISMANTLING JOINT	3
4	DN100 SCHED 40S 316 SS FL-FL SPOOL PIECE	1
5	DN100 GATE VALVE	1
6	SS VALVE SPINDLE EXTENSION	1
7	SS VALVE SPINDLE EXTENSION BRACKET	1
8	MECHANICAL COUPLING, AXIALLY RESTRAINED	1
9	DN100 - DN125 SCHED 40S 316 SS PIPE WITH CONCENTRIC REDUCER AND DN125 TABLE D FLANGE	1
10	DN125 PN16 PE100 SDR11 PRESSURE MAIN WITH PE STUB FLANGE	1
11	STAINLESS STEEL BACKING RING	1
12	DN100 ADJUSTABLE PIPE SUPPORT	2
13	CONCRETE VALVE PIT (PRECAST OR CAST IN SITU)	1
14	DN100 PVC-U DRAIN PIPE	1

NOTES:

1. DIM "C" EQUALS DN + 150 AND SHALL BE NO LESS THAN 300 UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER PRINCIPAL ENGINEER.

2. THE DETAILS RELATING TO ACCESS/EGRESS AND HEIGHT SAFETY AS DEPICTED ON THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE REQUIREMENTS DETAILED IN ICON WATER SPECIFICATIONS STD-SPE-G-008 AND G-009. THE DESIGNER SHALL PRODUCE PROJECT SPECIFIC (ISSUED FOR CONSTRUCTION) DESIGNS AS APPROPRIATE BASED ON THIS DRAWING AND THE REQUIREMENTS OF THE ABOVE-MENTIONED SPECIFICATIONS.

3. FLOWMETER TO HAVE A MINIMUM OF 5D OF STRAIGHT PIPE UPSTREAM AND 3D OF STRAIGHT PIPE DOWNSTREAM (FREE FROM DISMANTLING JOINTS AND OTHER FITTINGS) WHERE "D" EQUALS THE NOMINAL DIAMETER OF THE PIPE.

4. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	14/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X	ASSET AREA APPLICABILITY		
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

icon WATER

STANDARD DRAWING
SEWAGE PUMPING STATIONS
FLOWMETER PIT
GENERAL ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-4106-C

A1

ISSUE: A

PARTS LIST

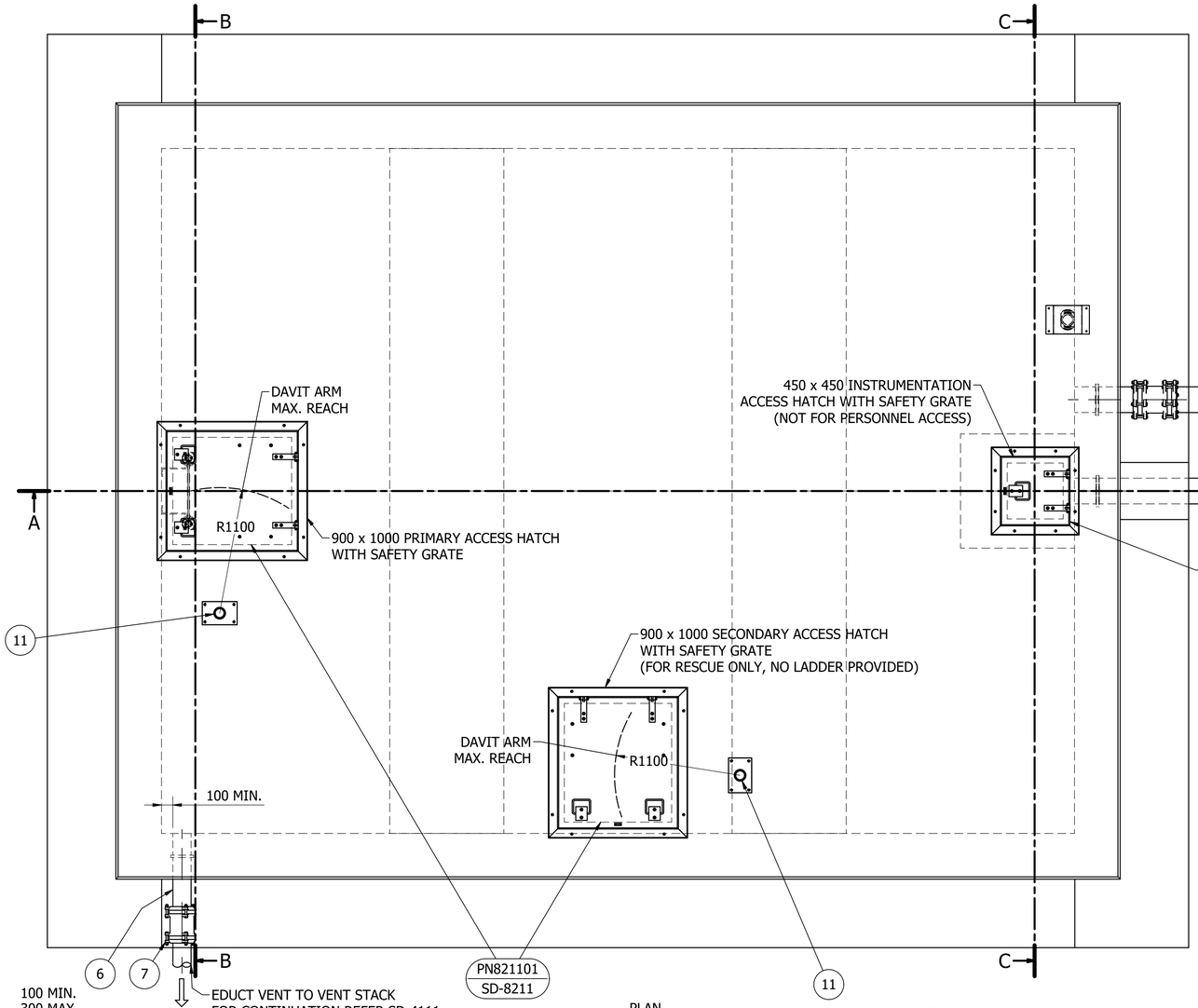
ITEM	DESCRIPTION	QTY
1	REINFORCED CONCRETE EMERGENCY STORAGE TANK STRUCTURE	1
2	REINFORCED CONCRETE EMERGENCY STORAGE TANK ROOF SLAB	1
3	DN225 PN6.3 SDR11 PE100 FILL/DRAIN PIPE C/W FACTORY FITTED PUDDLE FLANGE	1
4	DN225 PN6.3 SDR11 PE100 OVERFLOW PIPE C/W FACTORY FITTED PUDDLE FLANGE	1
5	DN200 MECHANICAL CONNECTOR	2
6	DN160 PN6.3 SDR11 PE100 EDUCT VENT PIPE C/W FACTORY FITTED PUDDLE FLANGE	1
7	DN160 MECHANICAL CONNECTOR	1
8	DN100 PVC-U INDUCT VENT PIPE	1
9	DN100 PVC AIR ADMITTANCE VENT	1
10	SS INDUCT VENT COVER	1
11	DBI SALA 'FLUSH MOUNT' DAVIT SLEEVE, CAST IN	2
12	DN100 SS PIPE SADDLE	3

NOTES:

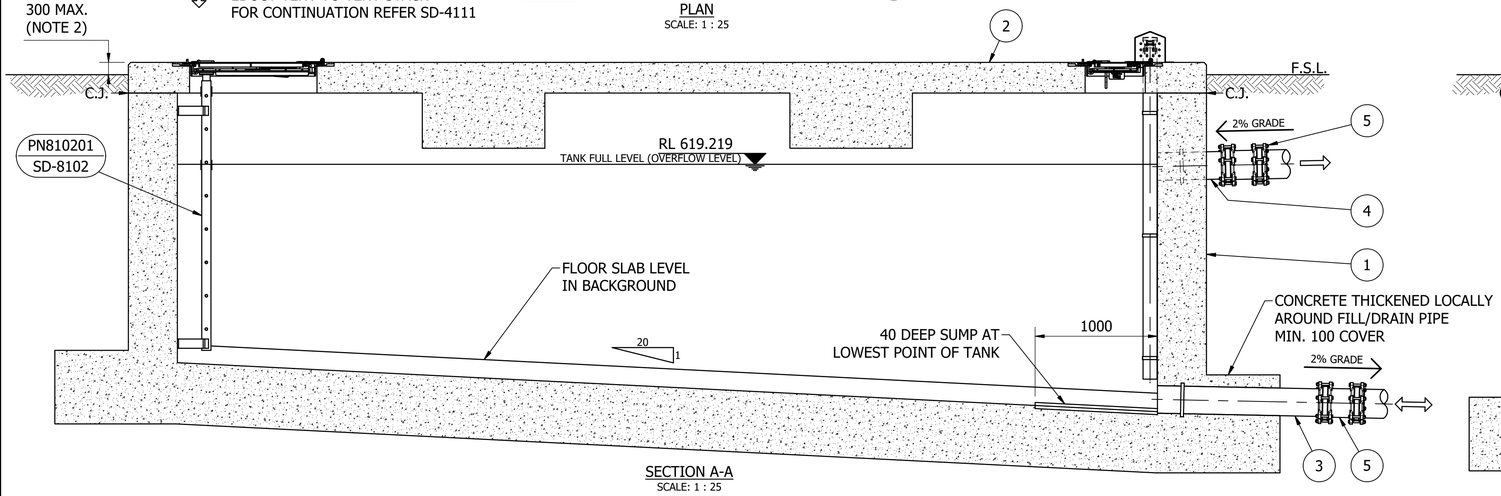
1. THE EMERGENCY STORAGE TANK STRUCTURE SHOWN IS INDICATIVE ONLY. FULL STRUCTURAL DESIGN OF THE TANK AND ROOF SLAB MUST BE PROVIDED TO SPECIFIC PROJECT/SITE REQUIREMENTS.

2. THE DETAILS RELATING TO ACCESS/EGRESS AND HEIGHT SAFETY AS DEPICTED ON THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE REQUIREMENTS DETAILED IN ICON WATER SPECIFICATIONS STD-SPE-G-008 AND G-009. THE DESIGNER SHALL PRODUCE PROJECT SPECIFIC (ISSUED FOR CONSTRUCTION) DESIGNS AS APPROPRIATE BASED ON THIS DRAWING AND THE REQUIREMENTS OF THE ABOVE-MENTIONED SPECIFICATIONS.

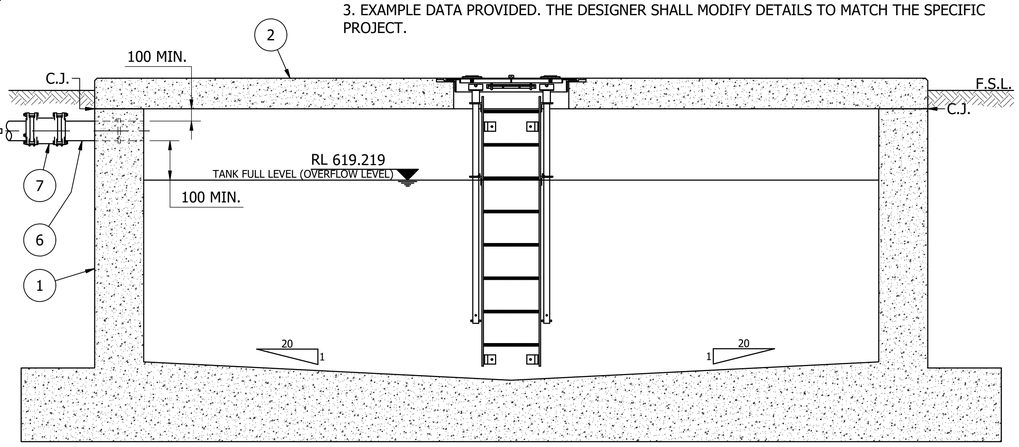
3. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.



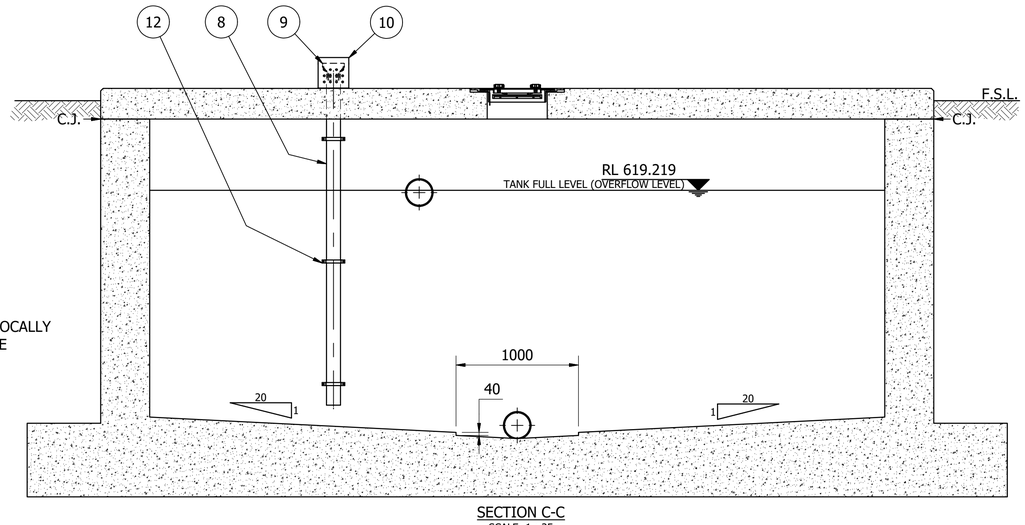
PLAN
SCALE: 1 : 25



SECTION A-A
SCALE: 1 : 25



SECTION B-B
SCALE: 1 : 25



SECTION C-C
SCALE: 1 : 25

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES			SPS	X
BWS		WAT			STP	
WTP		SEW	X			
WPS		REC				

ASSET AREA APPLICABILITY

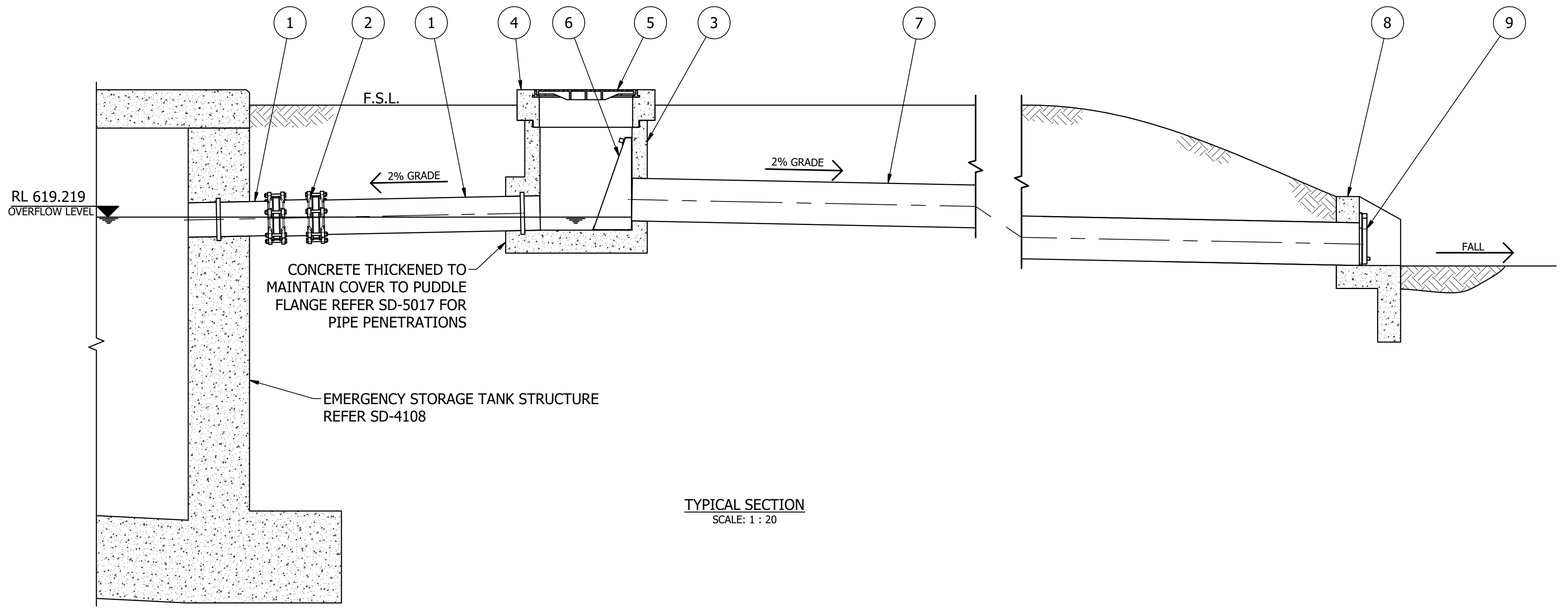
STANDARD DRAWING
SEWAGE PUMPING STATIONS
EMERGENCY STORAGE TANK
GENERAL ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-4108-C

A1

ISSUE: A



TYPICAL SECTION
SCALE: 1 : 20

PARTS LIST

ITEM	DESCRIPTION	QTY
1	DN225 PN6.3 SDR11 PE100 OVERFLOW PIPE C/W FACTORY FITTED PUDDLE FLANGE	2
2	DN200 MECHANICAL CONNECTOR	1
3	REINFORCED CONCRETE PIT (PRECAST OR CAST IN SITU)	1
4	CONCRETE SURROUND FOR CAST IRON COVER	1
5	CLASS D CAST IRON COVER (GAS-TIGHT)	1
6	STAINLESS STEEL TRASH RACK	1
7	DN225 CLASS 2 RCP OUTFALL PIPE	1
8	REINFORCED CONCRETE HEADWALL (TO TCCS REQUIREMENTS)	1
9	DN225 PE FLAP VALVE	1
231		1
232		1

NOTES:

1. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	22/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X			
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

STANDARD DRAWING
SEWAGE PUMPING STATIONS
EMERGENCY RELIEF STRUCTURES
SECTION AND DETAILS

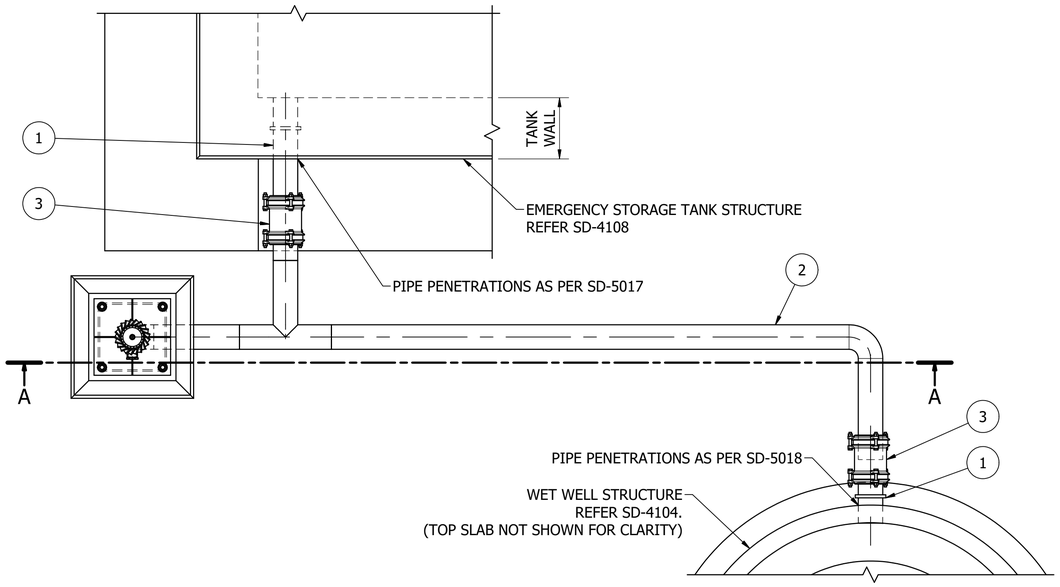
DRAWING STATUS
Current

SD-4110-C

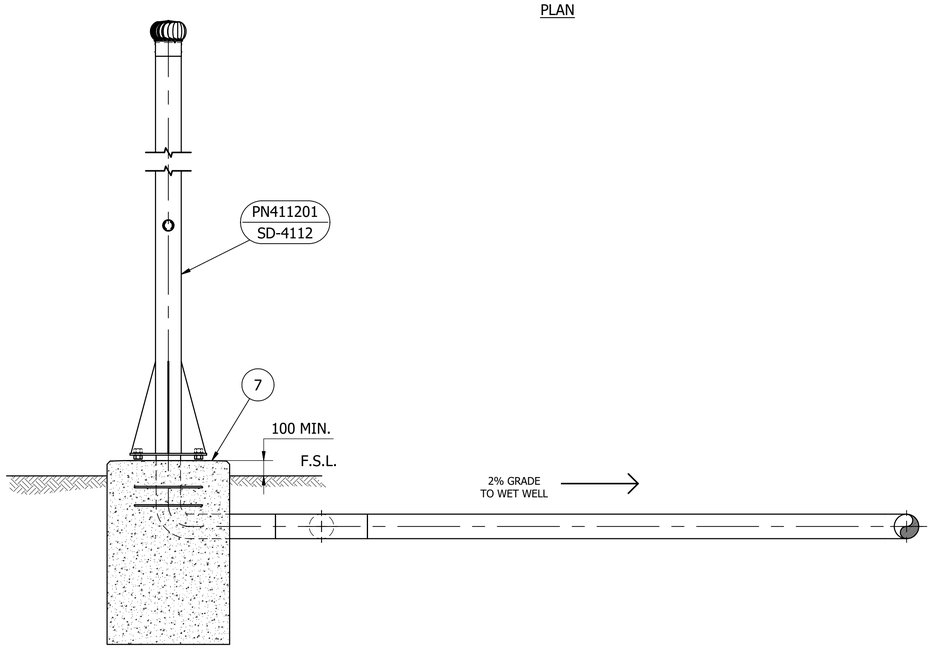
A1

ISSUE A

PARTS LIST		
ITEM	DESCRIPTION	QTY
1	DN160 PN6.3 SDR26 PE100 VENT PIPE C/W FACTORY FITTED PUDDLE FLANGE	1
2	DN160 PN6.3 SDR26 PE100 VENT PIPE WITH BUTT WELDED FITTINGS	1
3	DN160 MECHANICAL COUPLING	2
4	DN100 PVC-U INDUCT VENT PIPE	1
5	DN100 PVC AIR ADMITTANCE VENT	2
6	DN100 PIPE SADDLE	6
7	VENT STACK CONCRETE FOOTING	1
222		1
223		1



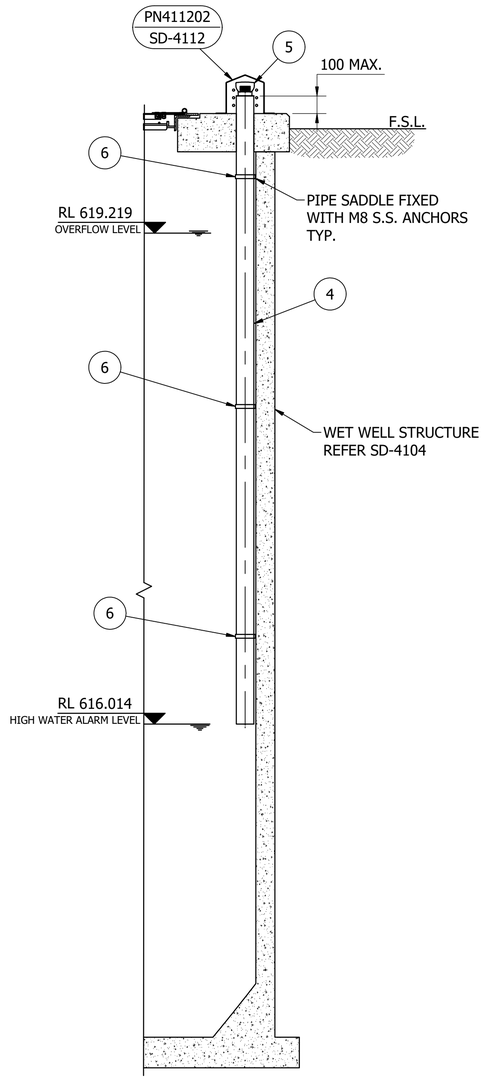
PLAN



SECTION A-A

EDUCT VENTILATION SYSTEM

SCALE: 1 : 20



SECTION

WET WELL - INDUCT VENT

SCALE: 1 : 20

SECTION

INDUCT VENT - EMERGENCY STORAGE TANK

SCALE: 1 : 20

NOTES:

1. INDUCT VENTS TO BE POSITIONED AT THE MAXIMUM PRACTICAL DISTANCE FROM THE EDUCT OUTLET OF THE INDIVIDUAL STRUCTURE TO MAXIMISE AIR CIRCULATION THROUGHOUT THE CHAMBER. COMPLEX CHAMBERS MAY NEED SPECIFIC VENTILATION DESIGN TO PREVENT STALE AIR POCKETS.

2. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	21/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY								
DAM		RES			SPS	X		
BWS		WAT			STP			
WTP		SEW	X					
WPS		REC						

icon WATER

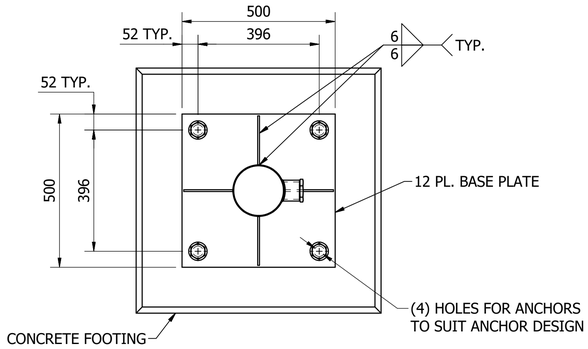
STANDARD DRAWING
SEWAGE PUMPING STATIONS
VENTILATION SYSTEM
GENERAL ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

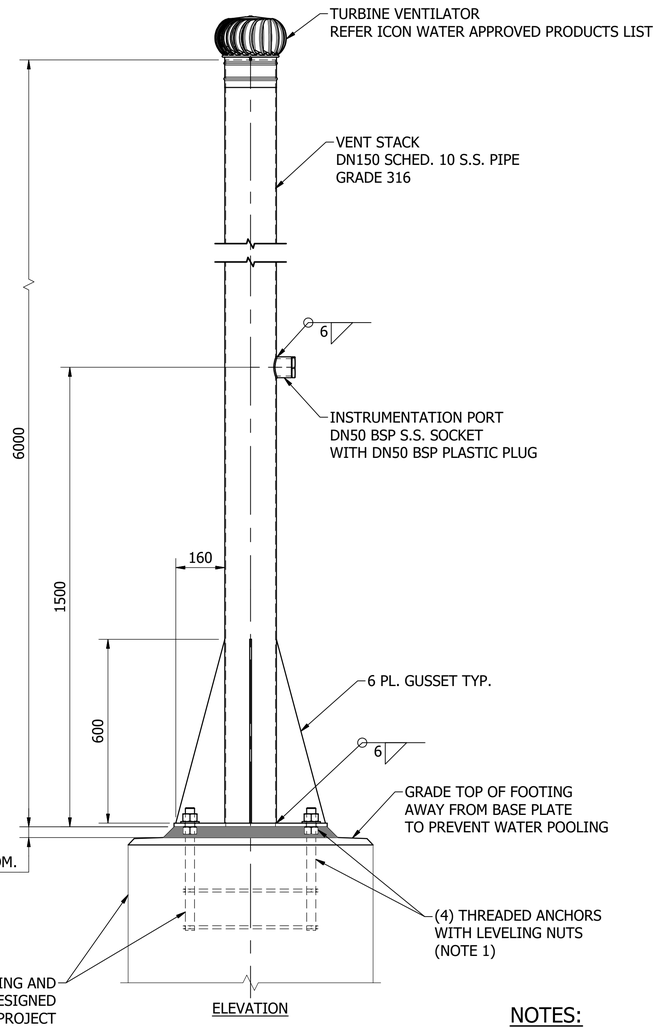
SD-4111-C

A1

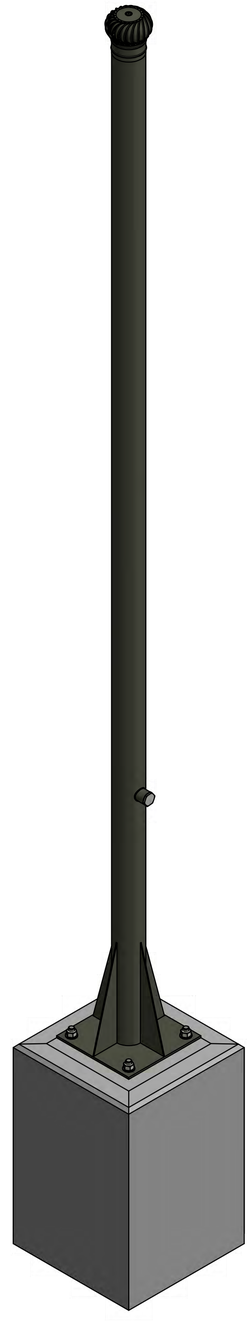
ISSUE: A



PLAN
(TURBINE VENTILATOR NOT SHOWN FOR CLARITY)



ELEVATION



ISOMETRIC VIEW

EDUCT VENT STACK

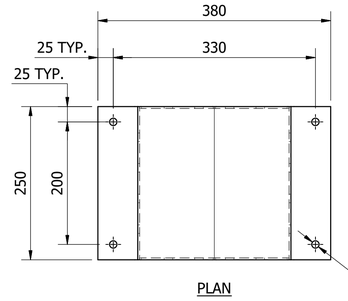
SCALE: 1 : 10

MATERIAL: STAINLESS STEEL
COATING: PAINTED (DULUX "AU_SD14048")
FINISH COLOUR: G66 ENVIRONMENT GREEN (AS 2700)
MASS: 120 kg

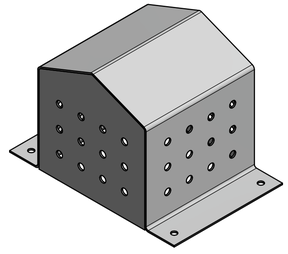
NOTES:

1. NYLON ISOLATION WASHERS TO BE INSTALLED BETWEEN DISSIMILAR MATERIALS.

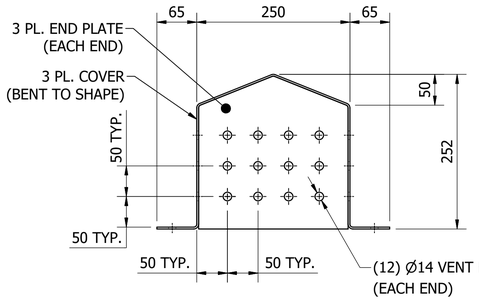
2. VENT STACK DESIGNED FOR A DESIGN WIND SPEED OF 45 m/s. FOR HIGHER DESIGN WIND SPEEDS, THE DESIGN IS NOT APPLICABLE.



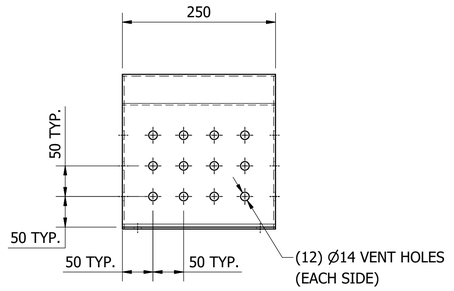
PLAN



ISOMETRIC VIEW



FRONT VIEW



SIDE VIEW

INDUCT VENT COVER

SCALE: 1 : 5

MATERIAL: ALUMINIUM 6106-T6
COATING: N/A
FINISH COLOUR: N/A
MASS: 2.5 kg

ITEM	AMDT.
PN411201	

ITEM	AMDT.
PN411202	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	21/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES HUNTER WATER CORPORATION IN THE DEVELOPMENT OF PARTS OF THIS DRAWING

DAM		RES		SPS	X			
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
SEWAGE PUMPING STATIONS
VENTILATION
EDUCT VENT STACK AND INDUCT VENT COVER DETAILS

DRAWING STATUS: Current

SD-4112-D

A1

ISSUE: A

PUMP STATION & PRESSURE MAIN PERFORMANCE/SYSTEM CURVES

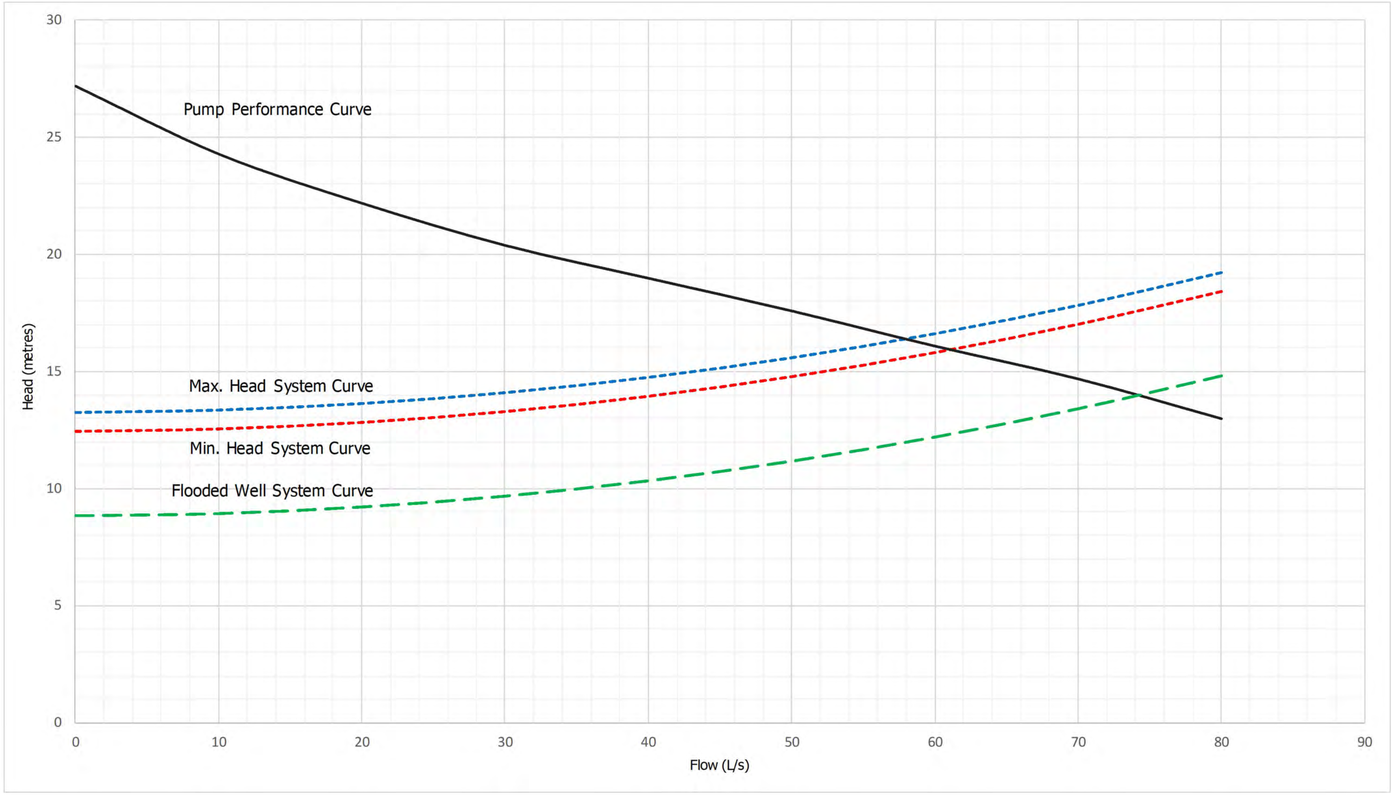


TABLE 1 - DESIGN DATA

FLOW ESTIMATION	
ADWF:	5.2 L/s
PDWF:	14.0 L/s
PWWF:	52.6 L/s
WET WELL	
PUMP ARRANGEMENT:	DUTY/STANDBY
PUMP MAKE:	ACME BRAND X
PUMP MODEL:	ABC1234
PUMP IMPELLER:	DIA. 261 mm
RATED POWER:	12.5 kW
OPERATING POINT - NORMAL OPERATION:	59.5 L/s @ 16.5 m
OPERATING POINT - WET WELL FLOODED:	74.2 L/s @ 14.0 m
WET WELL CONTROL VOLUME:	7.33 m^3
MAX. PUMP STARTS PER HOUR:	7.4
CUT-IN/CUT-OUT TIME AT ADWF:	134 s
CUT-IN/CUT-OUT TIME AT PDWF:	159 s
VALVE CHAMBER	
PIPING:	DN200 PN35 DICL
PIPE INTERNAL DIAMETER:	216 mm
DESIGN SPECIFIC ROUGHNESS:	0.30 mm
VELOCITY (NORMAL OPERATION):	1.55 m/s @ 60 L/s
VELOCITY (FLOODED OPERATION):	1.92 m/s @ 74.2 L/s
CONFIGURATION:	REF: DRAWING LMXXX-9999
PRESSURE MAIN	
PIPE:	DN315 PN16 SDR11 PE100
PIPE INTERNAL DIAMETER:	256 mm
LENGTH TO DISCHARGE MAINTENANCE HOLE:	490 m
DESIGN SPECIFIC ROUGHNESS:	0.60 mm
VELOCITY (NORMAL OPERATION):	1.17 m/s @ 60 L/s
VELOCITY (FLOODED OPERATION):	1.44 m/s @ 74.2 L/s
CONFIGURATION:	REF: DRAWING LMXXX-9999

NOTES

1. DESIGN SPECIFIC ROUGHNESS VALUES BASED ON "WALLINGFORD & BARR".
2. SYSTEM CURVES BASED ON COLEBROOK-WHITE AND DARCY-WEISBACH EQUATIONS.

NOTES:

1. EXAMPLE DATA AND NOTES PROVIDED. DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.
2. MULTI-STAGE DEVELOPMENTS WILL REQUIRE MULTIPLE PERFORMANCE CURVES AND DESIGN DATA SETS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	11/07/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

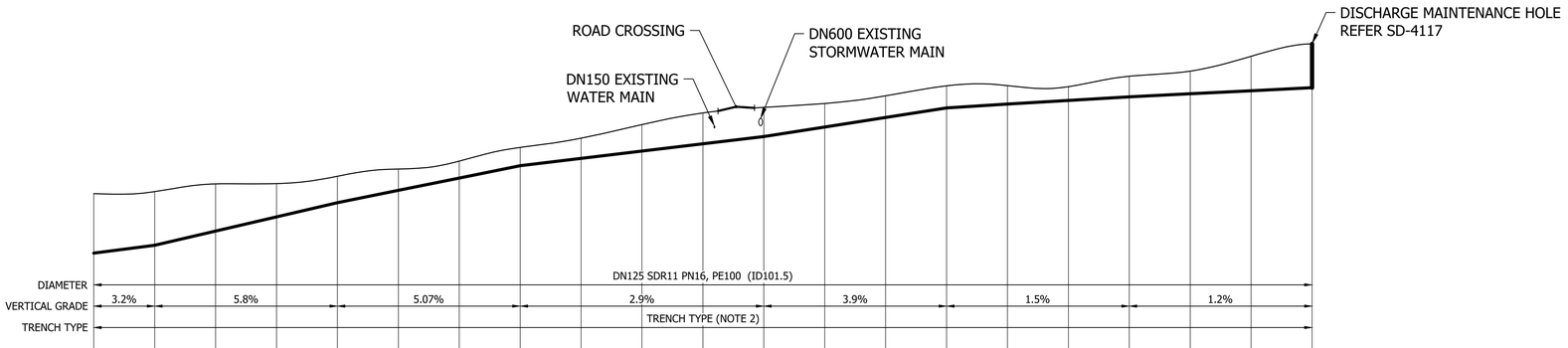
STANDARD DRAWING
SEWAGE PUMPING STATIONS
TYPICAL PUMP & PRESSURE MAIN CURVES

DRAWING STATUS: Current

SD-4113-C

A1

ISSUE: A



NATURAL SURFACE LEVEL	620.000	620.084	620.403	620.412	620.715	621.011	621.337	621.898	622.278	622.835	623.312	623.546	623.701	624.014	624.426	624.435	624.392	624.819	625.029	625.650	626.147
NATURAL SURFACE LEVEL	620.000	620.084	620.403	620.412	620.715	621.011	621.337	621.898	622.278	622.835	623.312	623.546	623.701	624.014	624.426	624.435	624.392	624.819	625.029	625.650	626.147
DEPTH TO INVERT	2.438	2.203	1.939	1.365	1.085	0.875	0.695	0.750	0.829	1.086	1.265	1.200	0.963	0.885	0.905	0.759	0.569	0.844	0.930	1.427	1.800
PRESSURE MAIN INVERT LEVEL	617.562	617.881	618.464	619.047	619.63	620.136	620.642	621.148	621.449	621.749	622.047	622.346	622.738	623.129	623.521	623.676	623.823	623.975	624.099	624.223	624.347
CHAINAGE	0.00	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	110.00	120.00	130.00	140.00	150.00	160.00	170.00	180.00	190.00	200.00

LONGITUDINAL SECTION - TYPICAL SEWER PRESSURE MAIN

SCALE: HOR - 1:500, VERT - 1:100

NOTES:

1. EXAMPLE DATA PROVIDED. DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT. INCLUDING SPECIFIC DETAILS FOR SPECIAL FEATURES SUCH AS ROAD, RAIL AND RIVER CROSSINGS ETC.
2. TRENCH, EMBEDMENT AND BACKFILL TO BE DESIGNED TO MEET PROJECT AND SITE SPECIFIC REQUIREMENTS. REFER SD-2100 SERIES DRAWINGS FOR GUIDANCE

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	25/05/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X			
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

icon WATER

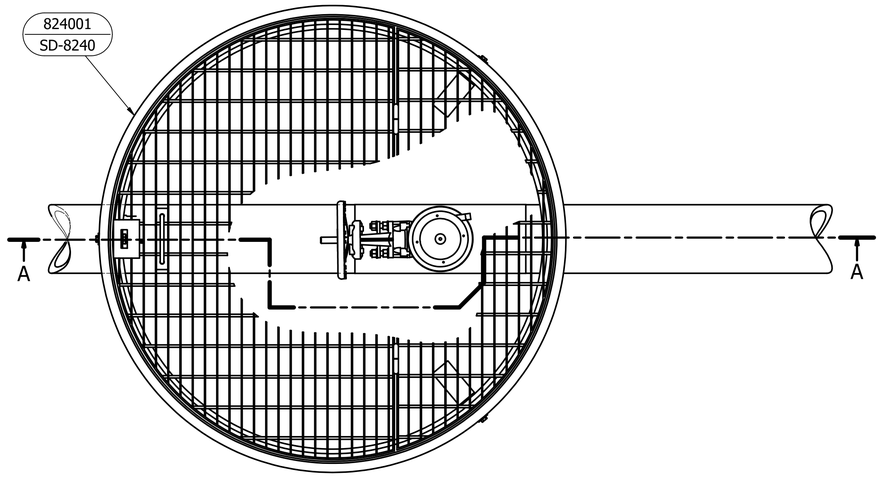
STANDARD DRAWING
SEWAGE PRESSURE MAIN
TYPICAL LONGITUDINAL SECTION

DRAWING STATUS: Current

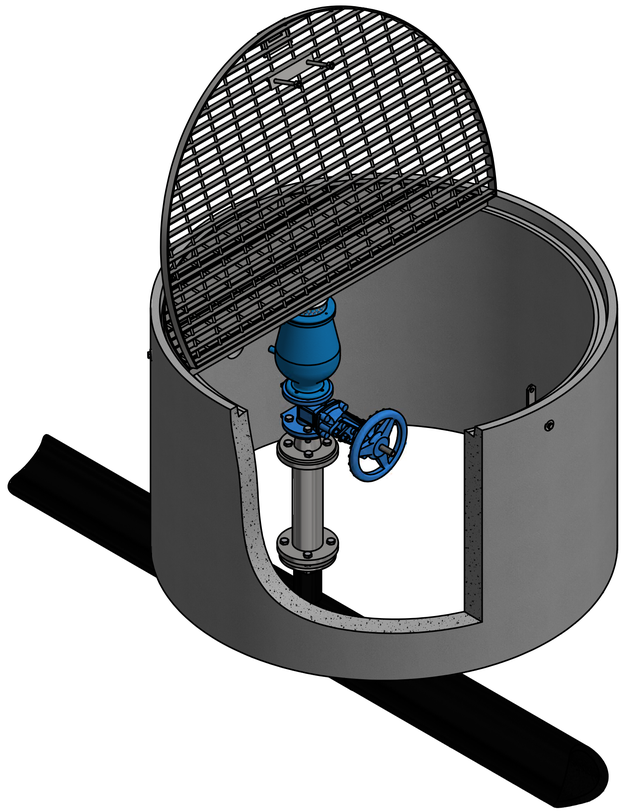
SD-4114-C

A1

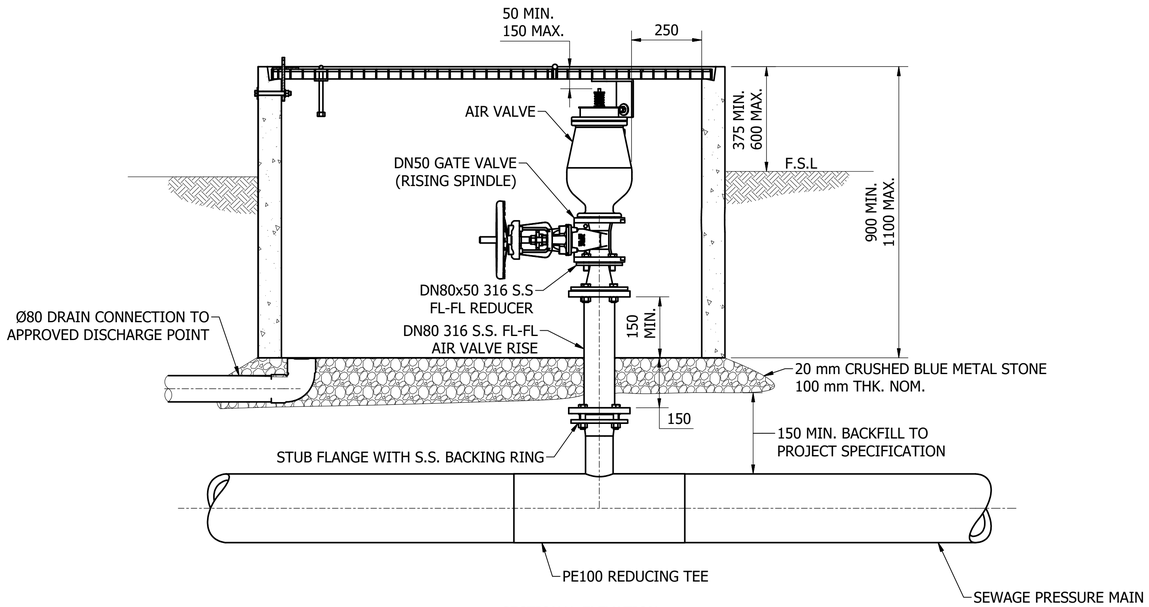
ISSUE: A



PLAN VIEW



ISOMETRIC VIEW



SECTIONAL ELEVATION

AIR VALVE INSTALLATION

SCALE: N.T.S

NOTES

1. CHAMBER MUST BE SELF DRAINING. DRAIN MUST BE SITUATED BELOW THE AIR VALVE INLET/OUTLET NOZZLE TO AVOID THE AIR VALVE BEING MADE INOPERABLE DUE TO FLOODING.

2. CHAMBER TO BE LOCATED A MINIMUM CLEARANCE OF 6.0 m AWAY FROM ROADWAYS. SEEK ADVICE FROM THE ICON WATER PRINCIPAL ENGINEER IF THIS CLEARANCE IS NOT ACHIEVABLE.

3. THE DESIGNER SHALL FAMILIARISE THEMSELVES WITH THE REQUIREMENTS OF ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009 PRIOR TO DESIGNING ANY STRUCTURE WHICH REQUIRES HEIGHT SAFETY TO BE TAKEN INTO CONSIDERATION.

4. INDICATIVE SEWAGE PRESSURE MAIN DETAILS SHOW AS PE100 POLYETHYLENE. THE DESIGN OF THE AIR VALVE INSTALLATION IS APPLICABLE FOR OTHER SEWAGE PRESSURE MAIN MATERIALS OF CONSTRUCTION WITH THE REDUCING TEE AND RISER TO BE SUBSTITUTED AS APPROPRIATE.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	19/11/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X				
BWS		WAT		STP					
WTP		SEW	X						
WPS		REC							

ASSET AREA APPLICABILITY

STANDARD DRAWING
SEWAGE PRESSURE MAIN
AIR VALVE
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-4115-D

A1

ISSUE: A

NOTES:

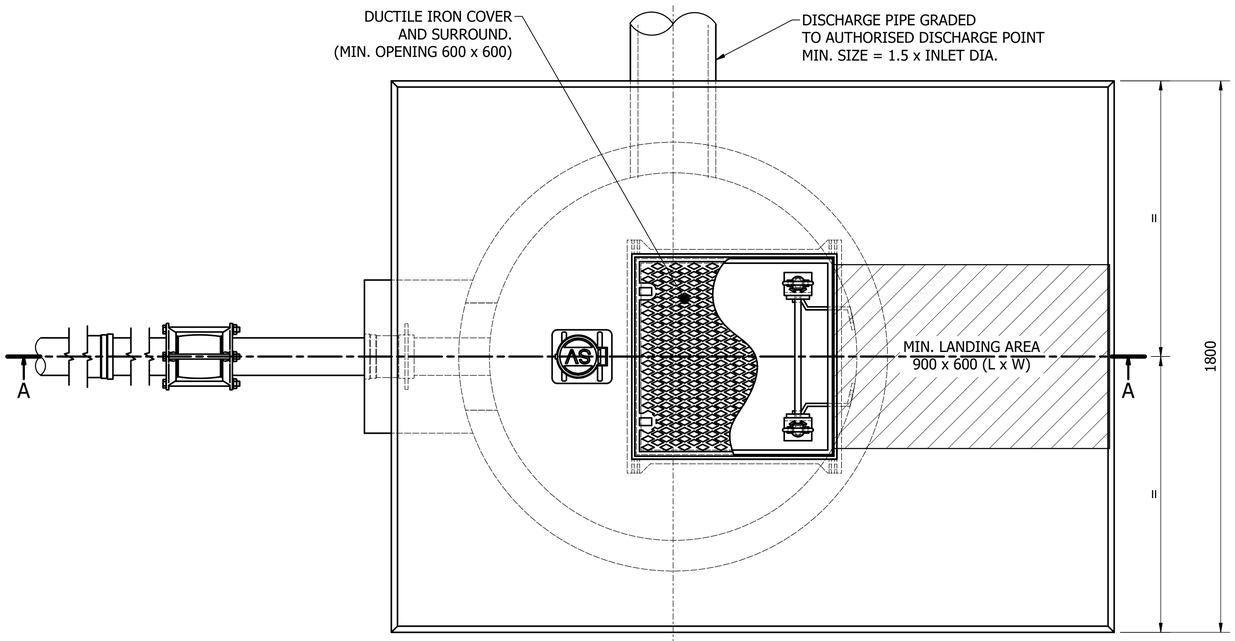
1. DEPTH OF OUTLET PIPE IS SITE/LOCATION DEPENDENT.

2. ENSURE SCOUR CONNECTION IS WITHIN 50 METRES OF PUMP SCOUR CHAMBER.

3. FOR CHAMBER DEPTHS GREATER THAN 3.0 m REFER TO THE ICON WATER PRINCIPAL ENGINEER FOR GUIDANCE.

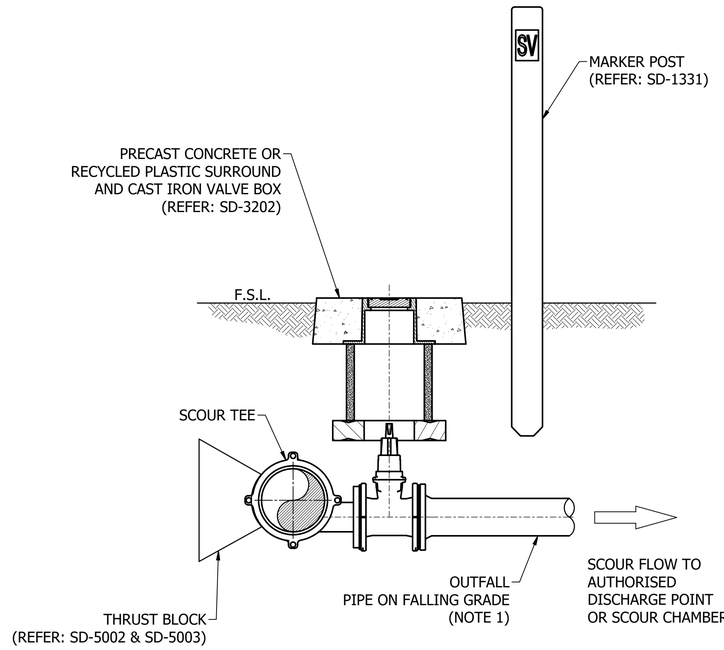
4. ALL PIPE PENETRATIONS THROUGH THE CHAMBER WALL ARE TO BE SEALED WITH AN APPROVED WATERSTOP (e.g. HYDROTITE) AND COMPLY WITH DRAWINGS SD-5017 AND SD-5018.

5. THRUST BLOCKS NOT REQUIRED FOR FULLY RESTRAINED (e.g. FLANGED) PIPE.



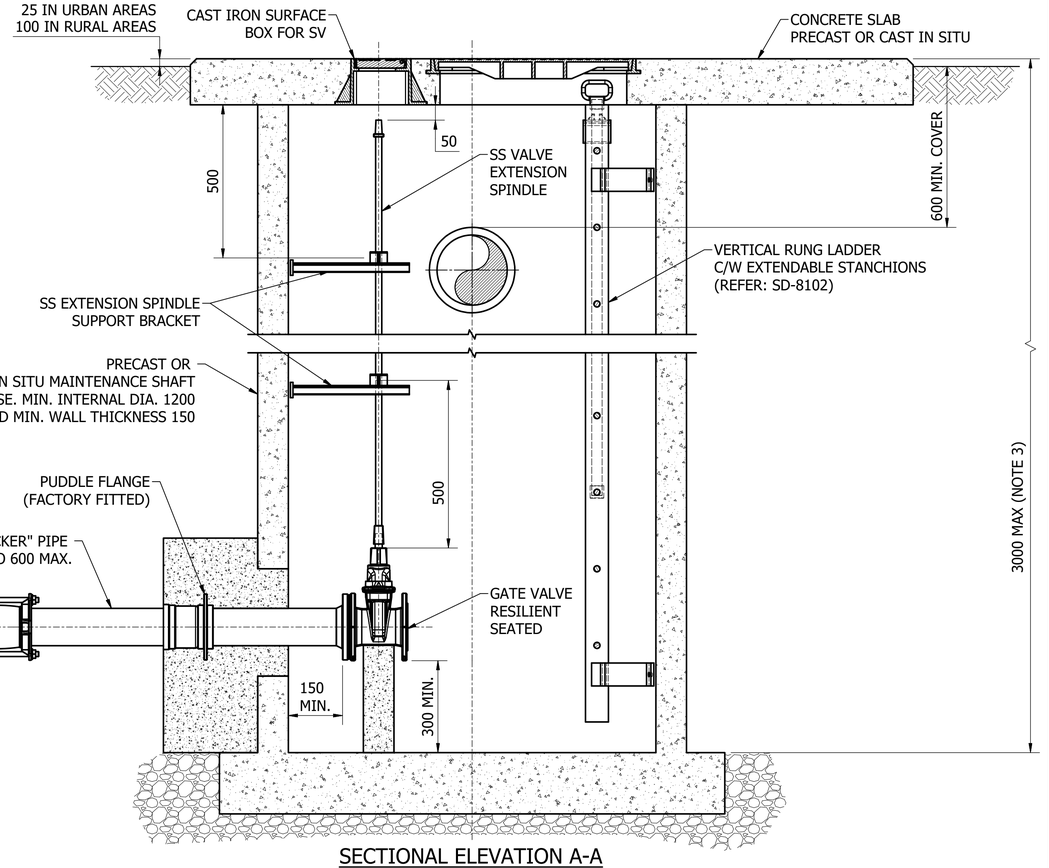
PUMP SCOUR CHAMBER

SCALE: 1 : 10



SCOUR CONNECTION

SCALE: 1 : 10



SECTIONAL ELEVATION A-A

SCALE: 1 : 10

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	27/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X			
BWS		WAT		STP				
WTP		SEW	X					
WPS		REC						

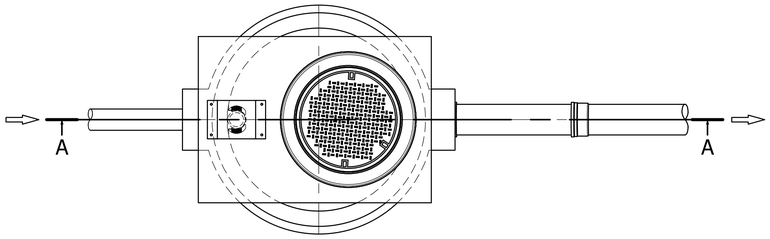
ASSET AREA APPLICABILITY

STANDARD DRAWING
SEWAGE PRESSURE MAIN
SCOUR INSTALLATIONS
GENERAL ARRANGEMENT, PLAN
SECTION AND DETAILS

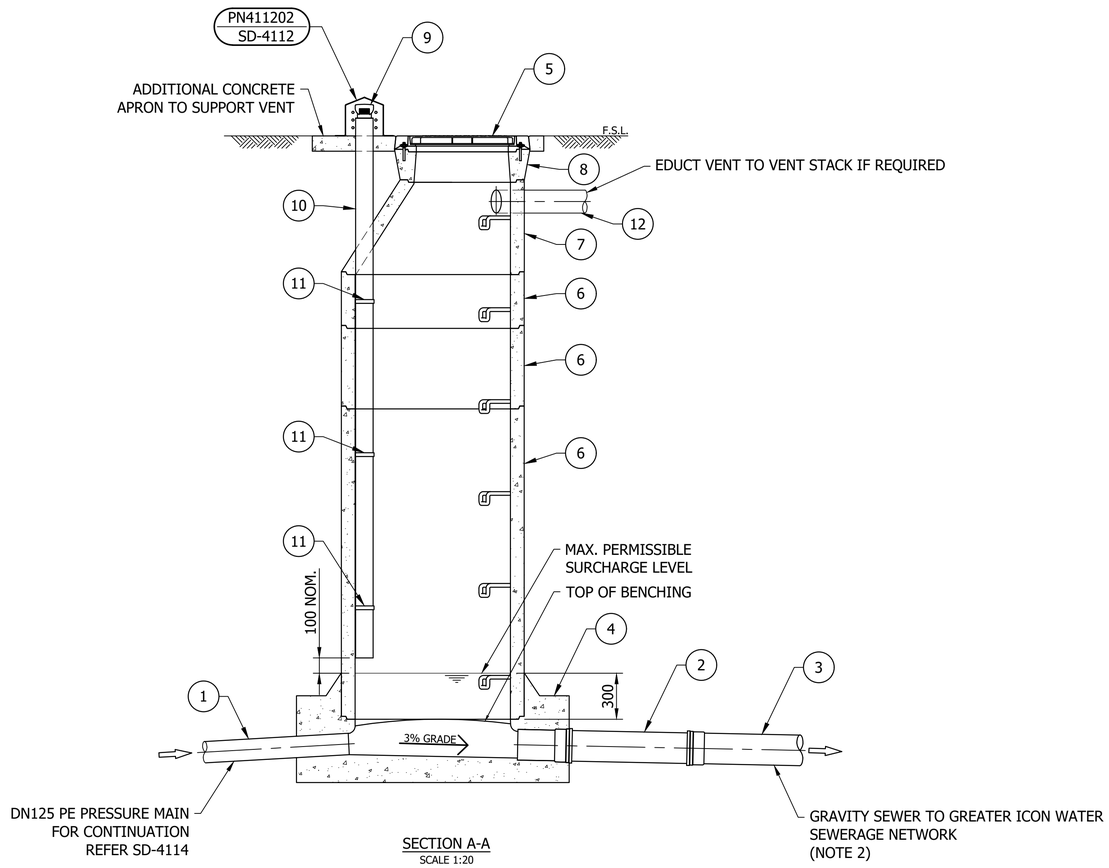
DRAWING STATUS: Current

SD-4116-C

ISSUE: A



PLAN



SECTION A-A
SCALE 1:20

PARTS LIST

ITEM	DESCRIPTION	QTY
1	DN125 PN16 PE100 SDR11 PRESSURE MAIN	1
2	ROCKER PIPE (NOTE 2)	1
3	SEWER MAIN (NOTE 2)	1
4	MAINTENANCE HOLE BASE, REFER SD-2201	1
5	CLASS B (OR CLASS D IF TRAFFICABLE) MAINTENANCE HOLE COVER AND FRAME, REFER SD-2204	1
6	SHAFT SECTION, REFER SD-2207	VARIES WITH DEPTH
7	STRAIGHT BACK TAPER, REFER SD-2207	1
8	MAKE-UP RING, REFER SD-2207	1
9	DN100 PVC-U AIR ADMITTANCE VENT	1
10	DN100 PVC-U VENT PIPE	1
11	DN100 SS PIPE SADDLE	3
12	DN150 PVC-U EDUCT VENT (IF REQUIRED)	1

NOTES:

1. FOR MAINTENANCE HOLE DETAILS INCLUDING PIPE CONNECTIONS REFER TO "SD-2200" SERIES DRAWINGS.
2. DOWNSTREAM SEWER TO BE SIZED TO PREVENT UPSTREAM SURCHARGE.
3. DISCHARGE MAINTENANCE HOLE CONCRETE TO BE PROVIDED WITH INTERNAL CORROSION PROTECTION, IN ACCORDANCE WITH WSA 201 AS AMENDED BY ICON WATER IN STD-SPE-G-005.
4. EXAMPLE DATA PROVIDED. THE DESIGNER SHALL MODIFY DETAILS TO MATCH THE SPECIFIC PROJECT.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	14/06/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X
BWS		WAT		STP	
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

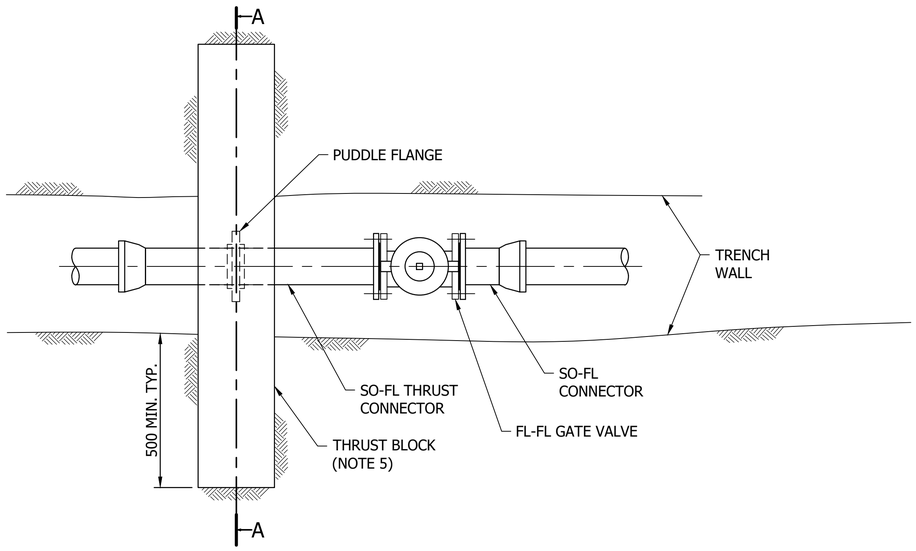
STANDARD DRAWING
SEWAGE PRESSURE MAINS
DISCHARGE MAINTENANCE HOLE
ARRANGEMENT AND DETAILS
MAINS DN375 AND SMALLER

DRAWING STATUS: Current

SD-4117-C

A1

ISSUE: A

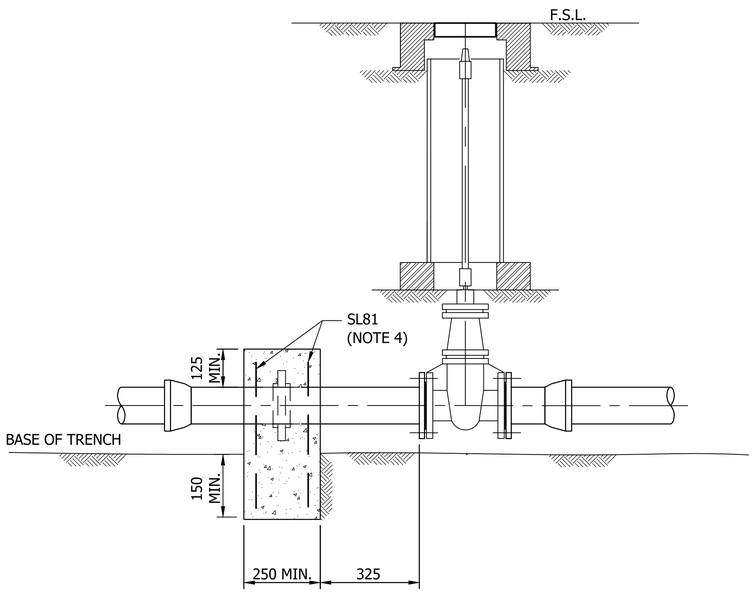


PLAN
SCALE: N.T.S.

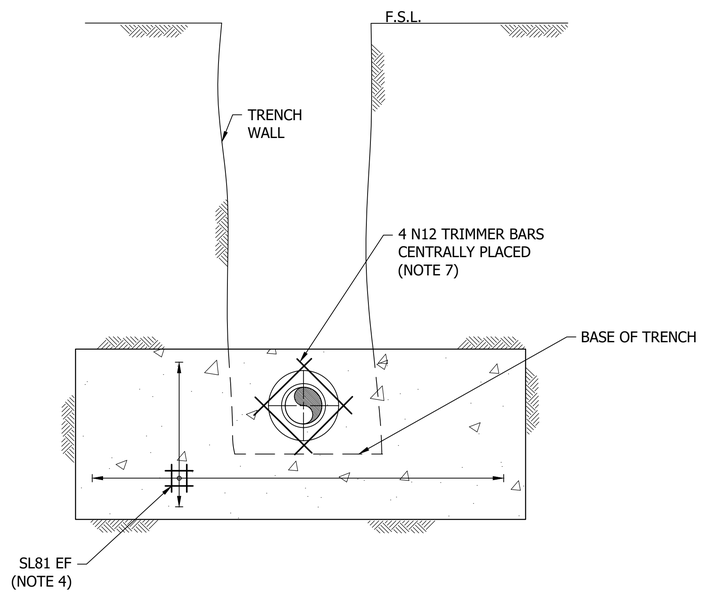
NOTES:

1. MINIMUM BEARING AREA IS BASED ON 50 kPa ALLOWABLE HORIZONTAL BEARING PRESSURE. THE MINIMUM BEARING AREA SHALL EXCLUDE DISTURBED AREAS OF SOIL.
2. FOR PIPES >DN225 THRUST BLOCKS SHALL BE DESIGNED BY STRUCTURAL ENGINEER USING ASSESSED ALLOWABLE HORIZONTAL BEARING PRESSURE FOR THE SOIL WITH A MINIMUM FACTOR OF SAFETY OF 1.5 APPLIED TO THE BEARING AREA. ANCHOR BLOCKS SHALL BE DESIGNED FOR A TEST PRESSURE OF 1400 kPa (140 m HEAD). UNLESS HIGHER PRESSURE RATED PIPE IS REQUIRED.
3. WHERE DICL PIPES AND FITTINGS WITH RESTRAINED JOINTS ARE SPECIFICALLY APPROVED AND USED, THRUST BLOCKS ARE NOT REQUIRED.
4. THRUST BLOCK REINFORCEMENT SHALL BE MINIMUM OF SL81 BOTH FACES REINFORCING MESH TO AS/NZS 4671. MINIMUM CONCRETE COVER TO REINFORCEMENT IS 75.
5. CONCRETE TO BE 32 MPa POURED AGAINST UNDISTURBED GROUND AND FORM WORK IN THE TRENCH.
6. THIS STANDARD DRAWING IS LIMITED TO HORIZONTAL PIPELINES WITH SLOPE LESS THAN 20%.
7. 4 N12 TRIMMER BARS SHALL BE USED IN THE CENTRE FOR DN150 AND DN225, THE MINIMUM EMBEDMENT LENGTH OF THE N12 SHALL BE 400 mm. TRIMMER BARS ARE NOT REQUIRED FOR DN100.
8. FOR TRENCH BACKFILL DETAILS REFER TO ICON WATER STANDARD DRAWING: SD-2101.

THRUST BLOCK BEARING AREA	
SIZE DN	MIN. BEARING AREA (m^2) (NOTE 1)
100	0.5
150	1.0
225	2.1



SECTIONAL ELEVATION
SCALE: N.T.S.



SECTION A-A

CONCRETE REINFORCEMENT DETAIL
SCALE: N.T.S.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP	X			
WTP	X	SEW	X					
WPS	X	REC	X					

ASSET AREA APPLICABILITY

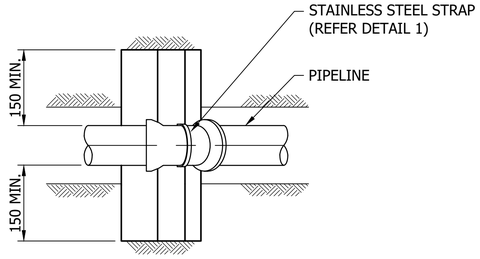
STANDARD DRAWING
PIPELINES
THRUST BLOCKS AND ANCHORS
GATE VALVE THRUST RESTRAINT
TYPICAL DETAILS

DRAWING STATUS: Current

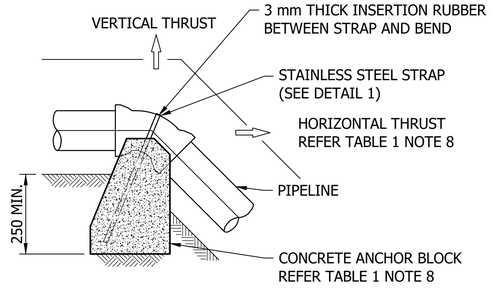
SD-5001-D

A1

ISSUE: A



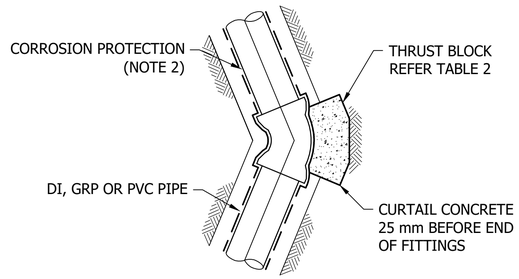
PLAN



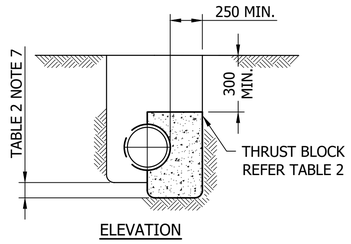
ELEVATION

ANCHORS - VERTICAL BENDS
SCALE 1:20

(CORROSION PROTECTION NOT SHOWN FOR CLARITY. REFER NOTE 2.)



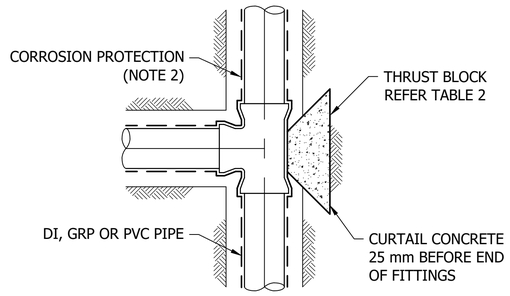
PLAN



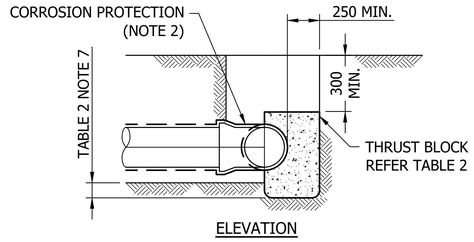
ELEVATION

THRUST BLOCK FOR BENDS
SCALE 1:20

(FOR HORIZONTAL THRUST)



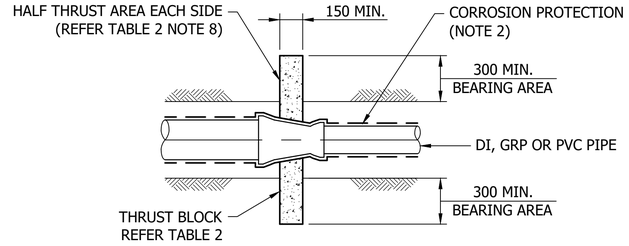
PLAN



ELEVATION

THRUST BLOCK FOR TEES
SCALE 1:20

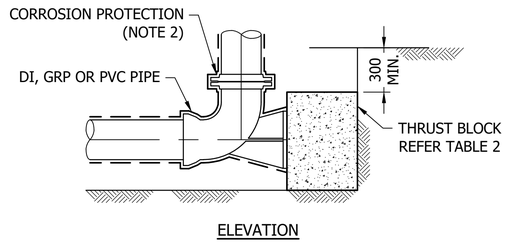
(FOR HORIZONTAL THRUST)



PLAN

TAPER THRUST BLOCK
SCALE 1:20

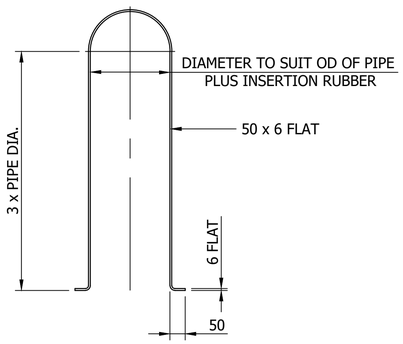
(FOR HORIZONTAL THRUST)



ELEVATION

FLUSHING/WASHOUT BEND THRUST BLOCK
SCALE 1:20

(FOR HORIZONTAL THRUST)
(MINIMUM REQUIRED THRUST AREA AS PER DEAD END)



TYPICAL ANCHOR STRAP

DETAIL 1
SCALE 1:10

MATERIAL: STAINLESS STEEL - GRADE 316
COATING: N/A
FINISH COLOUR: N/A
MASS: N/A

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING SD-5003 (INCLUDING ALL NOTES).
2. UNLESS NOTED OTHERWISE IN THE ICON WATER APPROVED PRODUCTS LIST, ALL DUCTILE IRON PIPE SIZED DN225 AND LARGER SHALL HAVE POLYETHYLENE SLEEVING INSTALLED. SLEEVING SHALL BE COLOURED "BLUE" FOR POTABLE WATER, "GREEN" FOR RAW WATER, "LILAC" FOR RECYCLED WATER AND "CREAM" FOR SEWAGE.
3. THRUST BLOCK REINFORCEMENT AND THRUST AREA TO BE DESIGNED SPECIFICALLY FOR THE PROJECT AND ON-SITE CONDITIONS.

ITEM	AMDT.
PN500201	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	NOTE 1 UPDATED	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

THIS DRAWING HAS BEEN BASED ON WSAA DRAWINGS WAT-1205 AND WAT-1206. ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

STANDARD DRAWING
PIPELINES
THRUST BLOCKS AND ANCHORS (DN100 - DN750)
DETAILS
SHEET 1 OF 2

DRAWING STATUS: Current

SD-5002-D

A1

ISSUE: B

TABLE 1 : MINIMUM BLOCK VOLUME FOR ANCHORAGE OF VERTICAL COMPONENT OF THRUST

FOR VERTICAL BENDS FOR TEST PRESSURE OF 1000 kPa (SEE NOTE 6)				
PIPE DN	TYPICAL PIPE OD	CONCRETE VOLUME m^3		
		11.25° BEND	22.25° BEND	45° BEND
100	122	0.10	0.20	0.35
150	177	0.20	0.40	0.75
200	232	0.35	0.70	1.25
225	259	0.45	0.85	1.60
250	286	0.55	1.05	1.95
300	345	0.75	1.50	2.80
375	426	1.20	2.30	4.30
450	507	DETAILED DESIGN REQUIRED ALTERNATIVE METHODS TO BE CONSIDERED		
500	560			
600	667			
750	826			

IN CALCULATING THE CONCRETE VOLUME NO CONTRIBUTION FROM THE PIPELINE SELF WEIGHT HAS BEEN INCLUDED.

NOTES TO TABLE 1:

1. LOCATE ANCHOR BLOCK CENTRALLY AROUND BEND.
2. KEY ANCHOR BLOCK INTO BASE OF UNDISTURBED TRENCH A MINIMUM DEPTH OF 250 mm.
3. POUR CONCRETE AGAINST A SOLID EXCAVATION FACE.
4. USE GRADE N20 CONCRETE.
5. KEEP CONCRETE CLEAR OF ALL BOLTS, NUTS AND PIPE JOINTS.
6. ANCHOR BLOCKS IN TABLE 1 ARE DESIGNED FOR A TEST PRESSURE OF 1000 kPa (NOMINALLY 100 m HEAD). ADJUST THE CONCRETE VOLUME TO SUIT THE ACTUAL TEST PRESSURE. REFER TABLE 2 NOTE 12.
7. THRUST BLOCK REINFORCEMENT DETAILS SHALL BE SPECIFIED IN THE PROJECT DESIGN DRAWINGS.
8. THE DESIGN OF ANCHOR BLOCKS AT VERTICAL BENDS SHALL ALSO INCLUDE ALLOWANCE FOR THE HORIZONTAL COMPONENT OF THRUST.
9. DN200 AND DN250 PIPES ARE NOT ACCEPTED BY ICON WATER FOR USE WITHIN THE WATER AND SEWERAGE NETWORK.

TABLE 2 : MINIMUM THRUST AREA FOR THRUST BLOCKS

SOIL CLASSIFICATION AND ALLOWABLE HORIZONTAL BEARING PRESSURE OF GROUND (SEE NOTE 3)	FOR HORIZONTAL THRUST IN BENDS, TEES, TAPERS, VALVES AND DEAD ENDS FOR TEST PRESSURE OF 1000 kPa. (SEE NOTE 6 & 12)															
	FOR HORIZONTAL THRUST ON TRENCH WALLS WHERE THE COVER OVER PIPES IS 450 mm OR GREATER	90° & 60° HORIZONTAL BENDS			45° & 30° HORIZONTAL BENDS			22.5° HORIZONTAL BENDS			11.25° HORIZONTAL BENDS			TEES AND DEAD ENDS		
		STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY DENSE CLEAN SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY DENSE CLEAN SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY DENSE CLEAN SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY DENSE CLEAN SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK	STIFF CLAY MEDIUM DENSE CLEAN SAND	VERY STIFF CLAY DENSE CLEAN SAND/GRAVEL DECOMPOSED ROCK	HARD CLAY SOUND ROCK
	AHBP kPa	50.00	100.00	200.00	50.00	100.00	200.00	50.00	100.00	200.00	50.00	100.00	200.00	50.00	100.00	200.00
NOMINAL DIAMETER OF FITTING (DN)	100	0.34	0.17	N	0.18	N	N	0.10	N	N	N	N	N	0.24	0.12	N
	150	0.70	0.35	0.18	0.38	0.19	0.10	0.20	0.10	N	0.10	N	N	0.50	0.25	0.13
	200 [11]	1.20	0.60	0.30	0.65	0.33	0.17	0.33	0.17	N	0.17	N	N	0.85	0.43	0.22
	225	1.49	0.75	0.38	0.81	0.41	0.21	0.42	0.21	0.11	0.21	0.11	N	1.06	0.53	0.27
	250 [11]	1.82	0.91	0.46	0.99	0.50	0.25	0.51	0.26	0.13	0.26	0.13	N	1.29	0.65	0.33
	300	2.65	1.33	0.67	1.43	0.72	0.36	0.73	0.37	0.19	0.37	0.19	0.10	1.87	0.94	0.47
	375	4.03	2.02	1.01	2.18	1.09	0.55	1.12	0.56	0.28	0.56	0.28	0.14	2.85	1.43	0.72
	450	5.71	2.86	1.43	3.09	1.55	0.78	1.58	0.79	0.40	0.80	0.40	0.20	4.04	2.02	1.01
	500	6.96	3.48	1.74	3.77	1.89	0.95	1.93	0.97	0.49	0.97	0.49	0.25	4.93	2.47	1.24
	600	9.88	4.94	2.47	5.35	2.68	1.34	2.73	1.37	0.69	1.37	0.69	0.35	6.99	3.50	1.75
	750	15.15	7.58	3.79	8.20	4.10	2.05	4.18	2.09	1.05	2.10	1.05	0.53	10.71	5.36	2.68

NOTES TO TABLE 2:

1. 'N' DENOTES NOMINAL THRUST AREA - (SEE NOTES 4 & 5) . 'AHBP' - ALLOWABLE HORIZONTAL BEARING PRESSURE.
2. CAST THE THRUST AREA OF ALL THRUST BLOCKS AGAINST A CLEAN FACE OF UNDISTURBED NATURAL SOIL. THRUST BLOCKS SHALL NOT INTERFERE WITH OTHER SERVICES.
3. SOIL CLASSIFICATIONS ARE DEFINED ON SD-9302.
4. DO NOT USE STANDARD THRUST BLOCKS AS SPECIFIED IN THIS DRAWING IN:
   - VERY SOFT, SOFT OR FIRM CLAY.
   - LOOSE CLEAN SAND.
   - UNCOMPACTED FILL OR REFUSE.

   A GEOTECHNICAL ASSESSMENT AND INDIVIDUAL DESIGN IS REQUIRED FOR THESE SOILS.
5. THE NOMINAL THRUST AREA 'N' TO BE ACHIEVED BY POURING CONCRETE THE FULL LENGTH OF THE FITTING AND EXTENDING FROM THE FLOOR OF THE TRENCH TO ABOVE THE FITTING (NOTE 7).
6. DESIGN PRESSURES OTHER THAN 1000 kPa REDUCE OR INCREASE THE MINIMUM THRUST AREA BY THE RATIO OF THE DESIGN PRESSURES EXCEPT WHERE:
   - MINIMUM THRUST AREA IS < 0.1 m^2, AND
   - 'N' APPEARS IN THE TABLE AND DESIGN PRESSURE IS ABOVE 1000 kPa CALCULATE THE AREA.
7. FINISH THRUST BLOCKS APPROXIMATELY 100 mm ABOVE THE TOP OF THE FITTING OR BEARING PAD AND EXTEND TO THE FLOOR OF THE TRENCH OR DEEPER IF NECESSARY TO ACHIEVE THE REQUIRED THRUST AREA. MAXIMUM PIPE ENGAGEMENT TO BE 180°.
8. THE MINIMUM THRUST AREA FOR TAPER THRUST BLOCKS TO BE EQUAL TO THE DIFFERENCE BETWEEN THE THRUST AREAS FOR DEAD ENDS OF EQUIVALENT DIAMETER TO THOSE EACH SIDE OF TAPER.
9. FOR DOWNWARD VERTICAL THRUST, THE ALLOWABLE BEARING PRESSURES FOR VARIOUS SOILS MAY BE TAKEN AS TWICE THAT FOR HORIZONTAL THRUST SHOWN.
10. WHEN POURING CONCRETE AGAINST FITTINGS PLACE A MEMBRANE OF POLYETHYLENE OR PVC BETWEEN THE FITTING AND CONCRETE TO PREVENT DAMAGE TO THE FITTING. BOLTS, NUTS AND JOINTS ARE TO BE KEPT CLEAR OF CONCRETE.
11. DN200 AND DN250 PIPES ARE NOT ACCEPTED BY ICON WATER FOR USE WITHIN THE WATER AND SEWERAGE NETWORK.
12. STATIC TEST PRESSURE SHALL BE 1400 kPa UNLESS NOTED OTHERWISE ON PROJECT SPECIFIC DOCUMENTATION. THEREFORE MULTIPLY THE AREAS LISTED IN TABLE 2 BY 1.4 TO DETERMINE THE REQUIRED MINIMUM THRUST AREA.
13. THRUST BLOCK REINFORCEMENT DETAILS SHALL BE SPECIFIED IN THE PROJECT DESIGN DRAWINGS.
14. THRUST AREA IS TO BE CENTRALISED ABOUT THE PIPE CENTRELINE.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	NOTES AND DRAWING CORRECTIONS	26/06/2019	S. Essery	K. Danenbergsons	C. Patrick

THIS DRAWING HAS BEEN BASED ON WSAA DRAWINGS WAT-1200, WAT-1205,WAT-1206 AND WAT-1207.
ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
PIPELINES
THRUST BLOCKS AND ANCHORS (DN100 - DN750)
DETAILS
SHEET 2 OF 2

DRAWING STATUS Current

SD-5003-D

A1

ISSUE B

DN	BENDS (SEE NOTE 3)										DEAD ENDS
	HORIZONTAL				VERTICAL DOWN			VERTICAL UP			
	11 1/4°	22 1/2°	45°	90°	11 1/4°	22 1/2°	45°	11 1/4°	22 1/2°	45°	
	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)	(m)
100	0.8	1.6	3.3	8.0	2.4	4.9	10.1	0.8	1.6	3.3	24.4
150	1.1	2.2	4.6	11.2	3.4	6.9	14.3	1.1	2.2	4.6	34.6
225	1.5	3.1	6.4	15.5	4.8	9.7	20.3	1.5	3.1	6.4	48.9
300	1.9	3.9	8.1	19.6	6.1	12.4	25.9	1.9	3.9	8.1	62.4

MAIN PIPE DN	BRANCH PIPE DN	MIN. DISTANCE BETWEEN JOINTS 'A'		
		2 METRES	5.5 METRES	11 METRES
		RESTRAINED LENGTH 'B' (m)	RESTRAINED LENGTH 'B' (m)	RESTRAINED LENGTH 'B' (m)
100	100	20.3	13.1	1.7
150	100	17.5	7.0	0.2
	150	30.4	23.1	11.5
225	100	13.4	0.2	0.2
	150	26.6	15.8	0.2
	225	44.6	37.1	25.3
300	100	9.3	0.2	0.2
	150	22.7	8.4	0.2
	225	40.4	30.4	14.7
	300	58.1	50.5	38.5

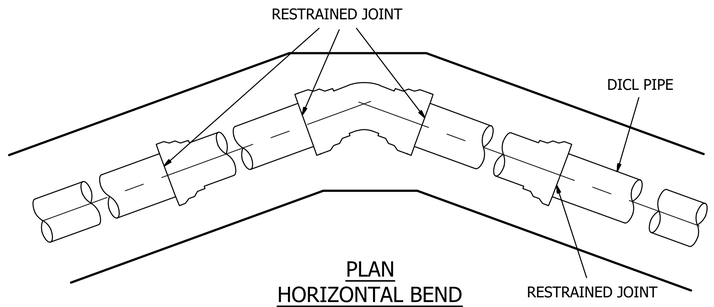
TEES
(SEE NOTE 5)

LARGE PIPE DN	SMALL PIPE DN	MIN. LENGTH OF SMALL PIPE FOR ONE RESTRAINT (m)	MIN. LENGTH OF LARGE PIPE FOR FULL RESTRAINT (m)
150	100	26.0	18.2
225	100	77.9	38.1
225	150	37.3	26.1
300	100	147.0	54.6
300	150	86.5	46.0
300	225	35.7	27.2

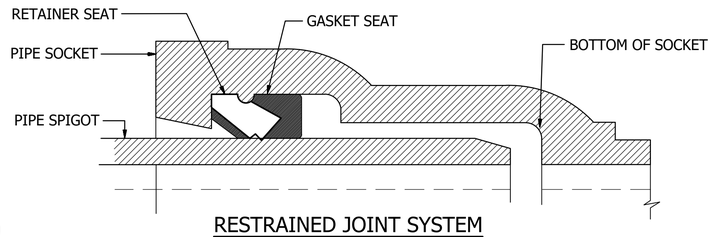
TAPERS
(SEE NOTE 6)

DN	RESTRAINED CUT-IN		
	INSERT L1 (mm)	CONNECTOR L2 (mm)	OVERALL L3 (mm)
100	356	110	582
150	406	135	682
225	508	155	824
300	610	170	956

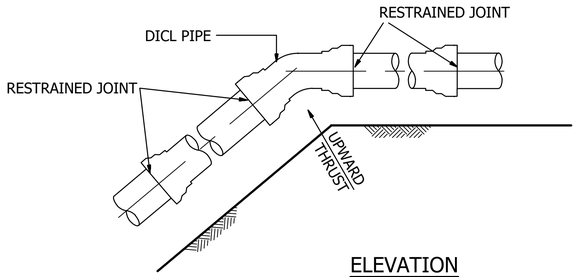
DESIGN PARAMETERS	
MAXIMUM PRESSURE (INC. SURCHARGE) (MPa)	1.4
COVER (mm)	600
GREENSLEEVE	Y



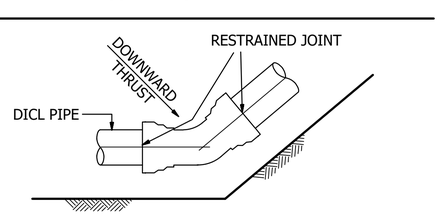
PLAN
HORIZONTAL BEND
SCALE : NTS



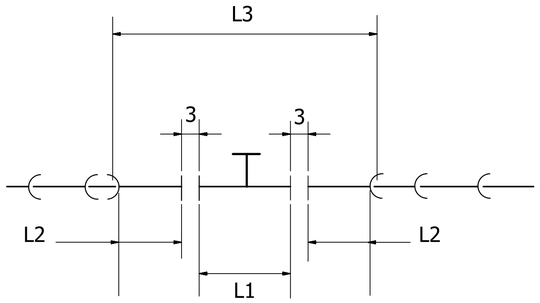
RESTRAINED JOINT SYSTEM
SCALE : NTS



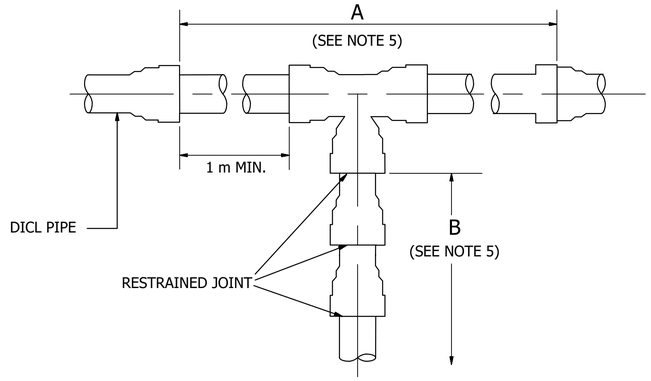
ELEVATION
VERTICAL BEND - UPWARD THRUST
SCALE : NTS



ELEVATION
VERTICAL BEND - DOWNWARD THRUST
SCALE : NTS



RESTRAINED CUT-IN
SCALE : NTS



PLAN
HORIZONTAL TEE
SCALE : NTS

NOTES:

1. RESTRAINED JOINT SYSTEMS SHALL NOT BE PERMITTED UNLESS AUTHORISED IN WRITING BY THE RELEVANT ICON WATER PRINCIPAL ENGINEER.
2. ALL RESTRAINED LENGTHS ARE APPLICABLE FOR BURIED PIPELINES ONLY. THE MINIMUM OF PIPELINE REQUIRED TO BE RESTRAINED IS CALCULATED FROM THE PIPE DIAMETER, FITTING TYPE, STANDARD TRENCH CONDITIONS AND DESIGN PARAMETERS AS SHOWN.
3. THE LENGTH OF RESTRAINT REQUIRED IS THE AMOUNT OF PIPELINE THAT MUST BE ANCHORED EITHER SIDE OF THE FITTING, INCLUDING THE FITTING JOINTS.
4. SPECIAL CONSIDERATION IS REQUIRED IF THE DESIGNATED RESTRAINED LENGTH FOR A FITTING ENCROACHES, OR OVERLAPS, WITH THE DESIGNATED RESTRAINED LENGTH FOR ANOTHER FITTING. THE MANUFACTURER'S OR DESIGN CONSULTANT'S GUIDANCE SHOULD BE SOUGHT.
5. THE LENGTH OF RESTRAINT REQUIRED FOR TEES APPLIES TO THE BRANCH ONLY. THE 'MINIMUM DISTANCE BETWEEN JOINTS' "A" IS THE MINIMUM DISTANCE BETWEEN THE NEAREST UNRESTRAINED JOINT EITHER SIDE OF THE TEE, NOT INCLUDING THE TEE. RESTRAINT IS NOT REQUIRED IN THE MAIN LINE SOCKETS OR GIBAULT JOINTS, UNLESS ENCROACHING (SEE NOTE 4). HYDRANT TEES AND OTHER NON-THRUST BEARING FITTINGS DO NOT REQUIRE RESTRAINT.
6. FOR TAPERS, IF THE MINIMUM LENGTH OF THE ADJACENT SMALL PIPE SIZE OCCURS, WITHOUT ENCROACHING ANOTHER FITTINGS RESTRAINT, THEN ONLY ONE RESTRAINED JOINT IS REQUIRED IN THE LARGE SOCKET OF THE TAPER. IF THE MINIMUM LENGTH OF SMALL PIPE DOES OCCUR THEN FULL RESTRAINT IS REQUIRED.
7. FLUSHING BENDS SHALL BE TREATED AS A DEAD END.
8. SPECIAL DESIGN SHALL BE REQUIRED FOR 90 DEGREE VERTICAL BENDS.
9. IDENTIFICATION TAPE FOR IDENTIFICATION OF RESTRAINED SECTIONS OF THE PIPELINE, SHALL BE PLACED ALONG THE TOP OF THE RESTRAINED PIPE LENGTHS AND FASTENED TO THE PIPE AT NOT LESS THAN 3000 CENTRES. THE IDENTIFICATION TAPE SHALL BE PINK COLOURED POLYETHYLENE TAPE APPROXIMATELY 100 WIDE WITH THE INSCRIPTION:
   'WARNING - RESTRAINED PIPELINE - USE RESTRAINED FITTINGS ONLY'.
10. WHEN MAINTAINING OR CUTTING RESTRAINED SECTIONS OF PIPELINE IT IS ADVISED THAT THE EFFECTIVE LENGTHS OF THE FITTINGS ARE MEASURED ON SITE TO CONFIRM THEIR COMPLIANCE WITH THIS DRAWING.
11. RESTRAINED JOINTS MAY BE ASSUMED TO ACT THE SAME AS A FLANGED JOINT.
12. FOR THE DESIGN AND CONSTRUCTION OF THRUST BLOCKS AND ANCHOR BLOCKS FOR GATE VALVES AND UN-RESTRAINED VERTICAL BENDS, REFER TO SD-5002 AND SD-5003.

ASSEMBLY

A. JOINTING SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

B. RESTRAINT VIA LOCKING GASKETS IS ONLY TO BE USED WITH DUCTILE IRON PIPES AND FITTINGS FEATURING THE TYTON REGISTERED JOINT. DO NOT USE WITH OTHER DUCTILE IRON SOCKET PROFILES, CAST IRON (GREY IRON) PIPES AND/OR FITTINGS OR PVC PIPES AND/OR FITTINGS.

C. JOINT DEFLECTION IS NOT PERMITTED.

DISASSEMBLY

A. JOINTS MAY BE DISASSEMBLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. DO NOT REUSE RESTRAINED JOINT GASKETS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

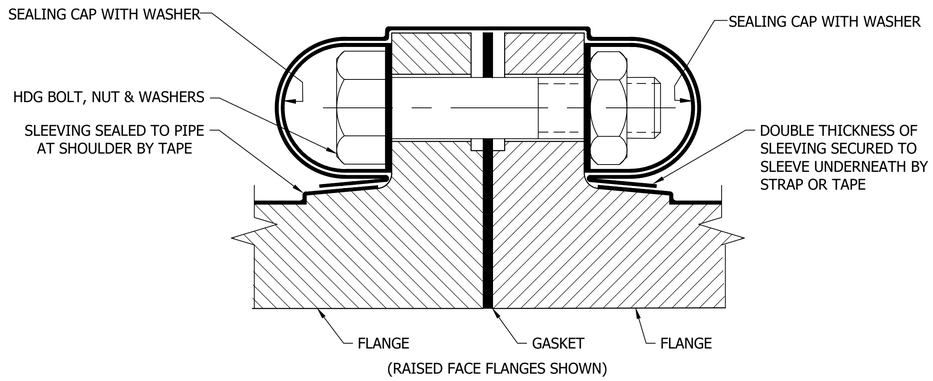
STANDARD DRAWING
PIPELINES
RESTRAINED JOINT SYSTEM
DUCTILE IRON PIPELINES, DN100 TO DN300

DRAWING STATUS: Current

SD-5004-D

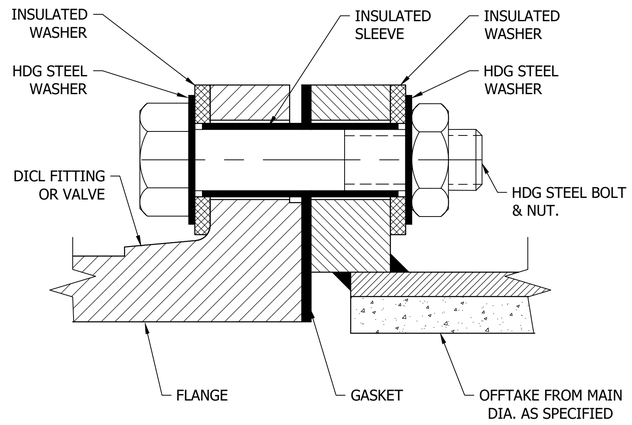
A1

ISSUE: A



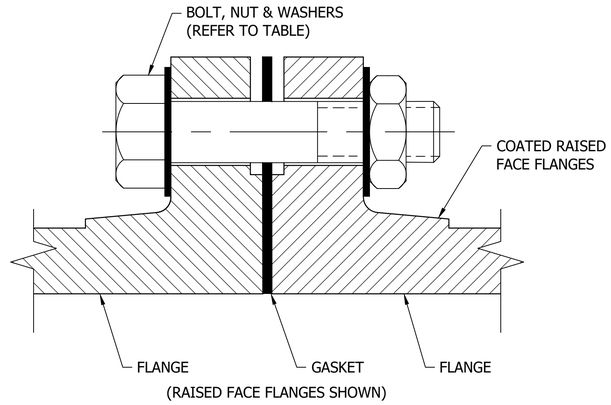
DETAIL A

BURIED (UNCOATED) DUCTILE IRON OR CAST IRON FLANGES CORROSION PROTECTION AND BOLTING REQUIREMENTS



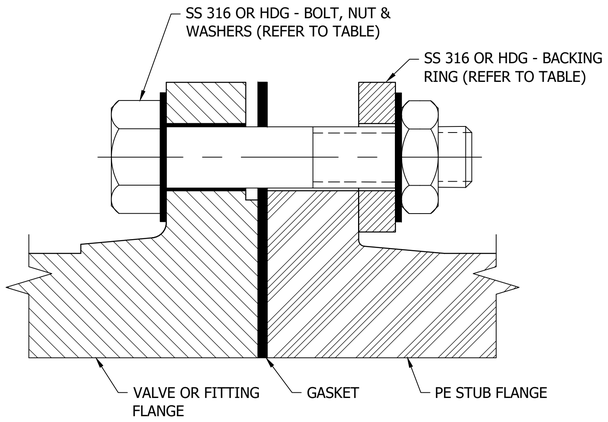
DETAIL B

TYPICAL INSULATED JOINT DUCTILE IRON TO STEEL OR (STEEL TO STEEL)



DETAIL C

BURIED OR ABOVE-GROUND PRECOATED DUCTILE IRON FLANGES CORROSION PROTECTION AND BOLTING REQUIREMENTS



DETAIL D

PE100 FLANGE BOLTING TO VALVE OR FITTING

NOTES:

1. REFER TO WSA 109 FOR ADDITIONAL DETAILS RELATING TO GASKETS AND TIGHTENING TORQUES.
2. THE USE OF HIGH STRENGTH BOLTS TO AS 1252 IS STRICTLY PROHIBITED DUE TO THE OVERSIZED HEAD WHICH CAN CAUSE 'FOULING' WITH PIPE WELDS OR VALVE BODIES.
3. ADDITIONAL REQUIREMENTS FOR DETAILS A, B, C AND D ARE AS PER THE FOLLOWING TABLE:

REFERENCE	FLANGE MATERIAL	GASKET (IN ACCORDANCE WITH WSA 109)	BOLTS & NUTS (IN ACCORDANCE WITH AS 1110, AS 1111 AND AS 1112)	CORROSION PROTECTION AND GENERAL NOTES
DETAIL A	UNCOATED DI OR CI	≤ PN16 & ≤ DN600: 3.0 EPDM > PN16 & > DN600: 1.6 NACF	≤ PN16 & ≤ DN600: GRADE 4.6 HDG > PN16 OR > DN600: GRADE 8.8 HDG LUBRICATE ALL THREADS PRIOR TO ASSEMBLY	A. APPLY A LIBERAL COAT OF APPROVED CORROSION PREVENTION PRIMING PASTE TO ALL BOLTS, NUTS AND WASHERS. B. INSTALL SEALING CAPS TO ALL BOLTS AND NUTS (ENCAPSULATING WASHERS) OR APPLY MASTIC IN LIEU OF SEALING CAPS. C. WRAP THE ASSEMBLY WITH AN APPROVED PETROLATUM TAPE OR ALTERNATIVELY WITH PE SLEEVING AND AN APPROVED TAPE.
DETAIL B	DI TO STEEL OR STEEL TO STEEL			A. INSULATING SLEEVE, WASHER AND GASKET KIT TO BE IN ACCORDANCE WITH ICON WATER'S APPROVED PRODUCTS LIST. B. THE INTEGRITY OF EACH INSULATED JOINT SHALL BE VERIFIED AFTER ASSEMBLY. C. FOR BURIED APPLICATIONS, A PETROLATUM-BASED TAPE SYSTEM (AS PER THE CORROSION PROTECTION SYSTEM DESCRIBED FOR "DETAIL A") SHALL BE INSTALLED.
DETAIL C	FBE COATED DI		≤ PN16 & ≤ DN600: GRADE 50 SS316 > PN16 OR > DN600: GRADE 70 SS316 OR FOR APPLICATIONS CLASSIFIED AS "LOW" OR "MODERATE" TO TABLE 2.1 OF WSA 201: ≤ PN16 & ≤ DN600: GRADE 4.6 HDG > PN16 OR > DN600: GRADE 8.8 HDG LUBRICATE ALL THREADS PRIOR TO ASSEMBLY	A. ADDITIONAL CORROSION PROTECTION IS NOT REQUIRED FOR FBE COATED FLANGES INCORPORATING STAINLESS STEEL 316 BOLTS, NUTS AND WASHERS. B. ROUGHEN FBE COATED RAISED FACE FLANGE (CONTACT) SURFACES BEFORE ASSEMBLY TAKING CARE TO NOT DAMAGE ANY OTHER AREAS OF THE FBE COATING. INSPECT FOR DAMAGE TO NON-CONTACT SURFACES PRIOR TO ASSEMBLY AND APPLY TOUCH-UP PAINT IF REQUIRED IN ACCORDANCE WITH WSA 201 AND THE MANUFACTURER'S INSTRUCTIONS. C. FOR STAINLESS STEEL BOLTS AND NUTS, APPLY AN APPROVED NICKEL-BASED ANTI-SIEZE COMPOUND PRIOR TO INSTALLING AND TAKE CARE TO ROTATE THE NUT SLOWLY TO AVOID GALLING.
DETAIL D	PE100 TO STEEL OR PE100 TO DI			A. IF HOT-DIP GALVANISED BOLTS, NUTS AND WASHERS ARE USED, THE FLANGE BACKING RINGS SHALL ALSO BE HOT-DIPPED GALVANISED. B. FOR STAINLESS STEEL BOLTS AND NUTS, APPLY AN APPROVED NICKEL-BASED ANTI-SIEZE COMPOUND PRIOR TO INSTALLING AND TAKE CARE TO ROTATE THE NUT SLOWLY TO AVOID GALLING.

KEY:

CI = CAST IRON
DI = DUCTILE IRON
EPDM = EPDM RUBBER
FBE = FUSION BONDED EPOXY
HDG = HOT DIP GALVANISED
NACF = NON-ASBESTOS COMPRESSED FIBRE
PE100 = POLYETHYLENE
SS316 = STAINLESS STEEL GRADE 316

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

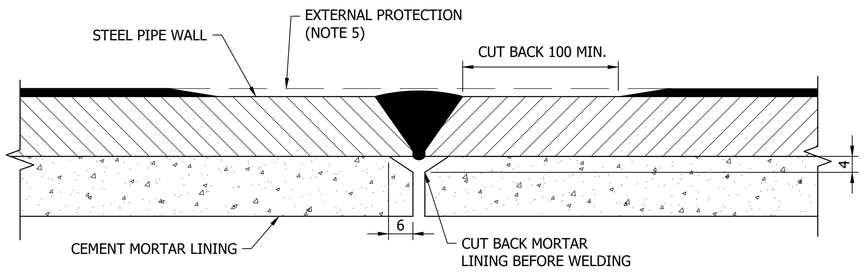
STANDARD DRAWING
PIPELINES
FLANGED JOINTS
CORROSION PROTECTION AND BOLTING DETAILS

DRAWING STATUS: Current

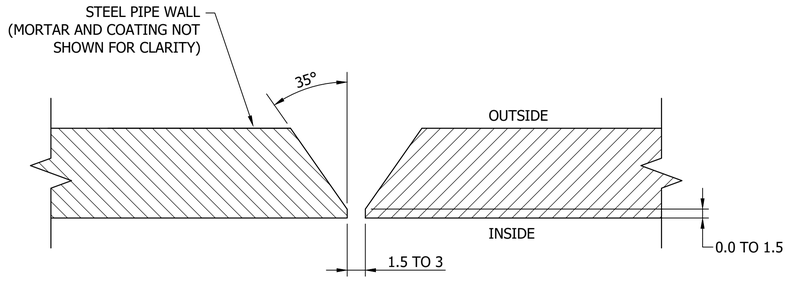
SD-5010-D

A1

ISSUE: A



MORTAR & COATING PREPARATION



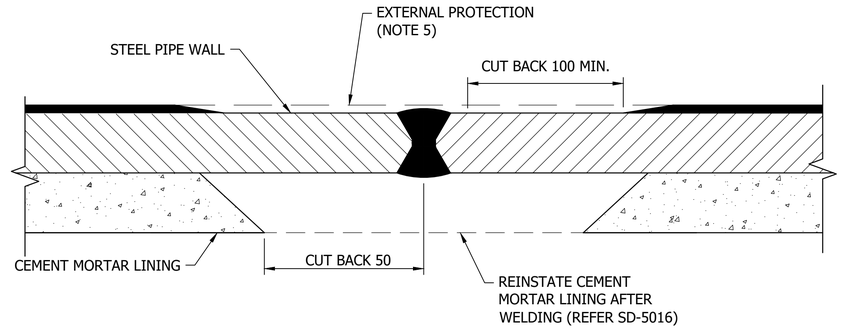
DETAIL A

WELD PREPARATION

BUTT WELD FOR STEEL PIPES < DN750 (WELDED FROM OUTSIDE ONLY)

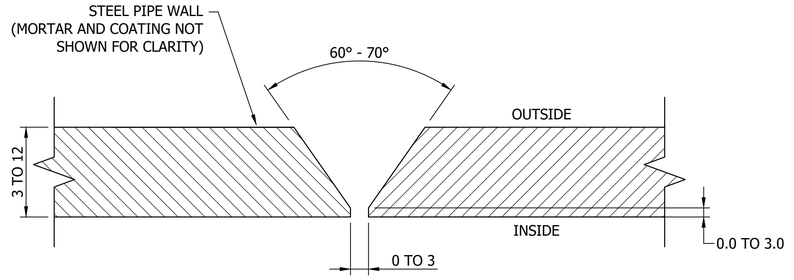
NOTES:

1. JOINT DEFLECTION PROHIBITED WHERE BUTT WELDING IS CARRIED OUT.
2. AXIAL DEFLECTION OF PIPES TO BE JOINED IS NOT PERMITTED.
3. ALL WELDING TO BE FULL PENETRATION BUTT WELDS CARRIED OUT AND TESTED IN ACCORDANCE WITH AS/NZS 1554.1 CATEGORY SP.
4. IN DETAIL B FOR THICKNESS ≤ 12 mm, WELD OUTSIDE FIRST THEN BACK GOUGE TO SOUND METAL BEFORE WELDING INSIDE.
5. REINSTATE EXTERNAL PROTECTION IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS.



MORTAR & COATING PREPARATION

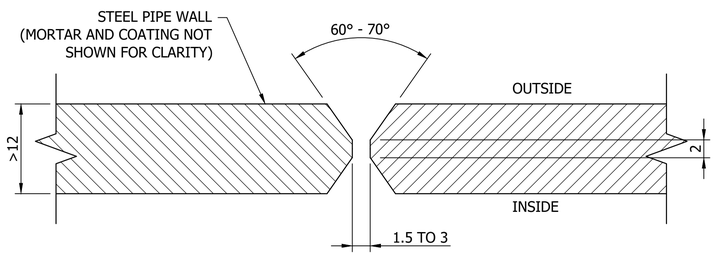
(WELD DETAIL SHOWN FOR WALL THICKNESS > 12 mm)



DETAIL B

WELD PREPARATION FOR WALL THICKNESS ≤ 12 mm

(NOTE 4)



DETAIL C

WELD PREPARATION FOR WALL THICKNESS > 12 mm

BUTT WELD FOR STEEL PIPES ≥ DN750 TO DN1200 (WELDED FROM BOTH SIDES)

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

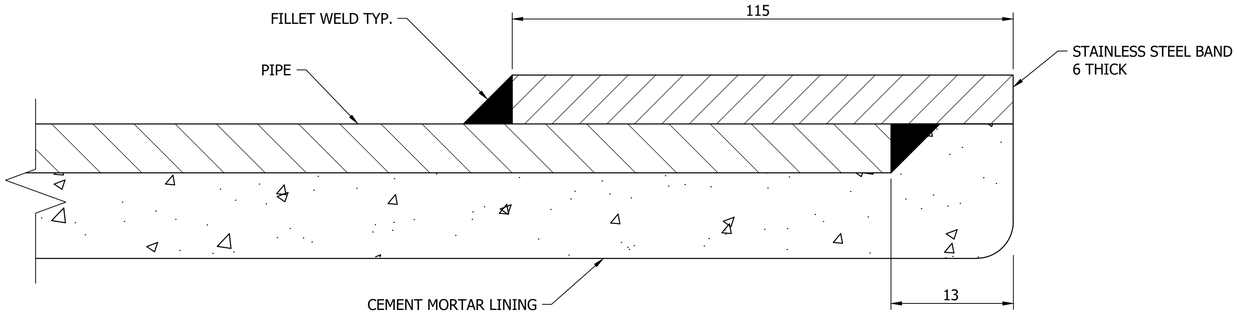
STANDARD DRAWING
PIPELINES
STEEL PIPELINE BUTT WELDED JOINTS
DETAILS

DRAWING STATUS: Current

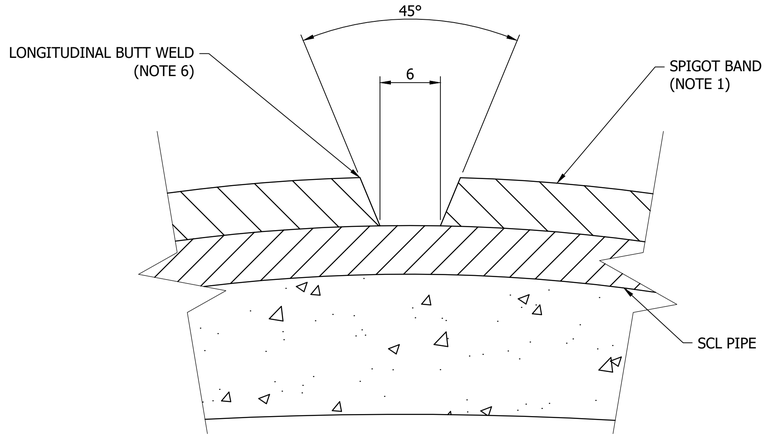
SD-5011-D

A1

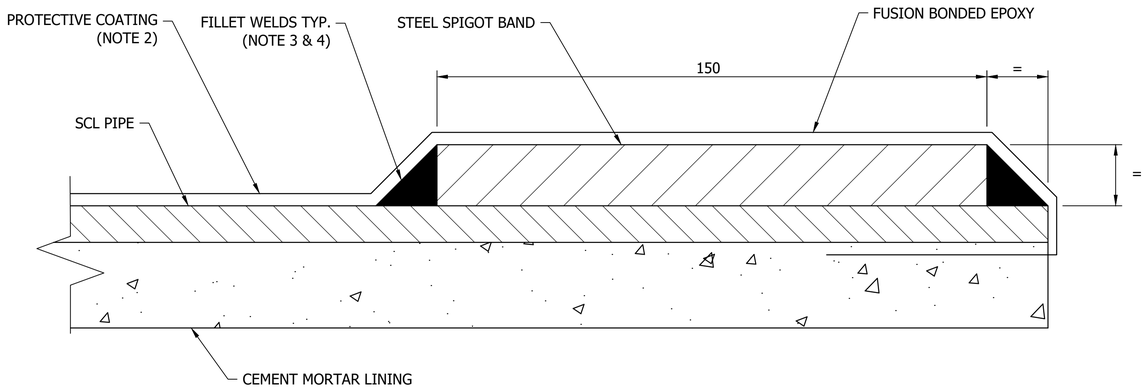
ISSUE: A



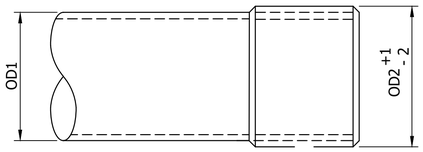
STAINLESS STEEL SPIGOT BAND FOR DISMANTLING JOINT



TYPICAL WELD PREPARATION



STEEL SPIGOT BAND COATED WITH FUSION BONDED POLYETHYLENE



SPIGOT BAND DIMENSIONS FOR CONNECTION TO DICL SOCKET (NOTE 2 & 5)		
DN DICL PIPE SIZE	OD1 STEEL PIPE OUTSIDE DIA.	OD2 SPIGOT BAND OUTSIDE DIA.
200	219	232
250	273	286
300	324 337	345
375	406 419	426
450	508	NOTE 7
500	559	NOTE 7
600	648 660	667
750	807 813	826

NOTES:

1. STEEL SPIGOT BANDS TO BE MANUFACTURED FROM MATERIALS AS FOLLOW:
   - CARBON STEEL IN ACCORDANCE WITH AS/NZS 3678.
   - STAINLESS STEEL TO BE TYPE 316L.
2. EXTERNAL PROTECTIVE COATING TO BE FACTORY APPLIED IN ACCORDANCE WITH AS 4321.
   ALLOWANCE TO BE MADE FOR 2 mm / SIDE THICKNESS OF COATING. FACTORY APPLIED METALISING MAY BE USED AS AN ALTERNATIVE COATING.
3. BANDS TO BE WELDED TO PIPE WITH CONTINUOUS FILLET WELDS OF MIN. LEG LENGTH OF 5 mm.
4. GRIND ALL WELDS FLUSH WITH EXTERNAL SURFACE. REMOVE ANY SHARP CORNERS TO PREVENT DAMAGE TO RUBBER RING.
5. TABLE APPLIES ONLY TO STEEL SPIGOT BANDS FOR JOINTING AS 1579 STEEL PIPE TO DICL SOCKETS TO AS/NZS 2280 DIMENSIONS. FOR OTHER MATERIALS REFER TO THE MANUFACTURER FOR SPIGOT SIZES.
6. WELDING TO BE IN ACCORDANCE WITH AS/NZS 1554.1 CATEGORY SP AND AS/NZS 1554.6 FOR WELDING OF STAINLESS STEEL TO STEEL.
7. STEEL PIPE OD IS EQUAL TO DICL PIPE OD FOR DN450 AND DN500, THEREFORE A SPIGOT BAND IS NOT REQUIRED.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

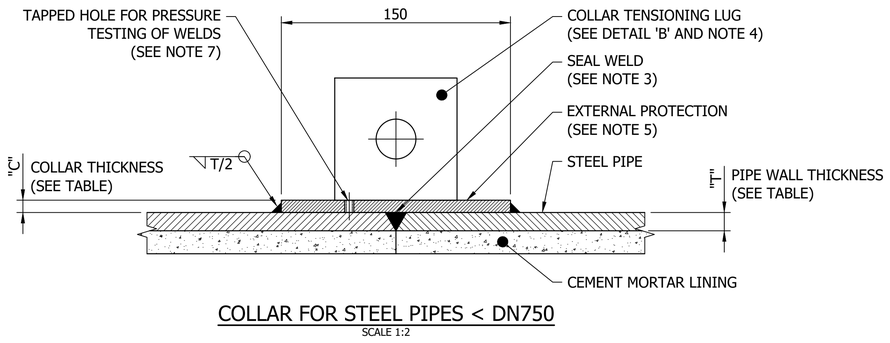
STANDARD DRAWING
PIPELINES
STEEL PIPELINE SPIGOT BANDS FOR RUBBER RING JOINTS
DETAILS

DRAWING STATUS: Current

SD-5012-D

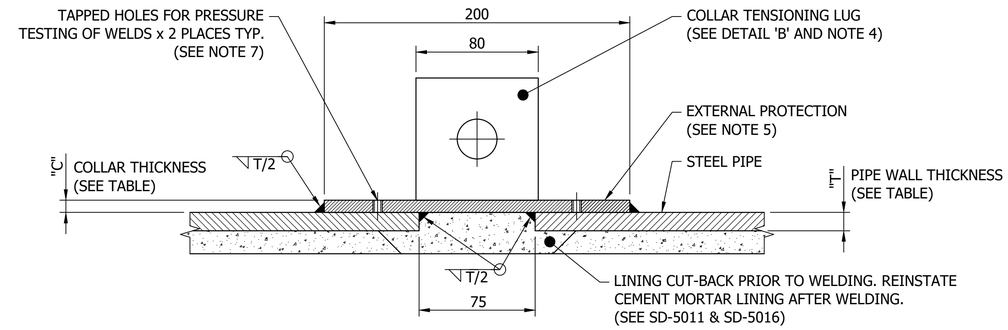
A1

ISSUE: A



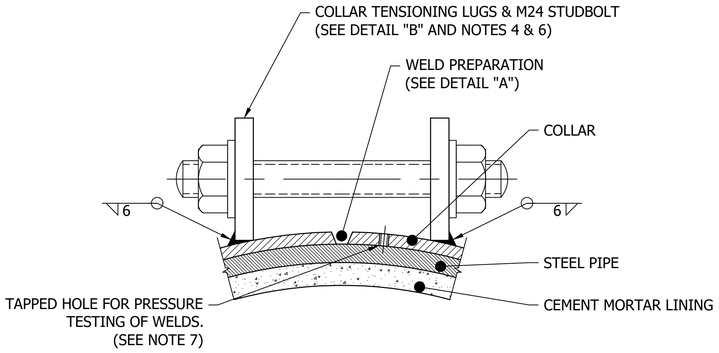
COLLAR FOR STEEL PIPES < DN750

SCALE 1:2



COLLAR FOR STEEL PIPES ≥ DN750 TO DN1200

SCALE 1:2



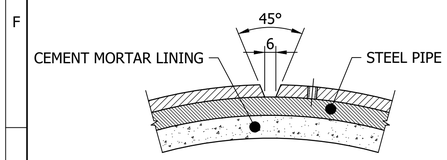
VIEW OF COLLAR IN WELDING POSITION

SCALE 1:2

COLLAR DETAILS		
PIPE SIZE DN	PIPE WALL THICKNESS ≤ "T"	COLLAR THICKNESS "C"
100 TO 225	5	6
250 TO 350	5	6
	6	8
400 TO 750	5	6
	8	10
	10	12
800 & OVER	6	8
	8	10
	10	12
	12	16
	16	20
	20	25
	25	32

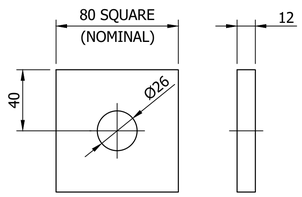
NOTES:

1. STEEL USED FOR COLLARS TO BE IN ACCORDANCE WITH AS/NZS 3678.
2. WELDING TO BE IN ACCORDANCE WITH AS/NZS 1554.1 CATEGORY SP.
3. SEAL WELD TO CONSIST OF A SINGLE CONTINUOUS WELD BEAD AROUND PIPE AND TO BE GROUND FLUSH WITH PIPE OD. PRIOR TO FITTING COLLAR.
4. REMOVE STUDBOLTS & WELDING LUGS AFTER COLLAR HAS BEEN WELDED. GRIND FINISHED SURFACES FLUSH.
5. WRAP EXTERNAL SURFACE USING AN APPROVED BITUMEN IMPREGNATED TAPE WRAP SYSTEM.
6. WRAP AROUND CHAIN TENSIONERS MAY BE USED AS AN ALTERNATIVE TO COLLAR TENSIONING LUGS.
7. PROVIDE A TAPPED HOLE TO ALLOW THE GAP UNDER THE COLLAR TO BE PRESSURISED TO CONFIRM COMPLETE WELDING INTEGRITY. HOLE TO BE PLUGGED ON COMPLETION OF TEST. HOLE IS TO BE DRILLED AND TAPPED BEFORE COLLAR IS POSITIONED.
8. WHERE SAFETY REASONS PREVENT ENTRY TO PIPE, ONE SIDED WELDING MAY BE AUTHORISED FOR PIPE > DN750 PROVIDED WELD SIZE IS INCREASED TO "T".
9. AXIAL DEFLECTION OF PIPES TO BE JOINED IS NOT PERMITTED.



DETAIL "A"
TYPICAL WELD PREPARATION

SCALE 1:2



DETAIL "B"
COLLAR TENSIONING LUG

SCALE 1:2

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING. IN PARTICULAR, DRAWING WAT-1402.

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

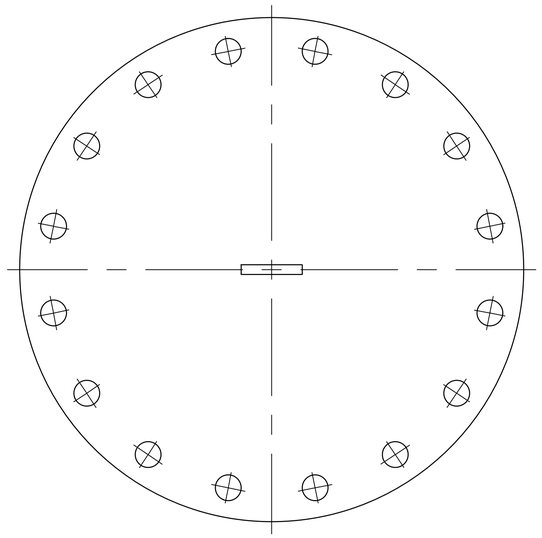
STANDARD DRAWING
PIPELINES
STEEL PIPELINE COLLARS
DETAILS

DRAWING STATUS: Current

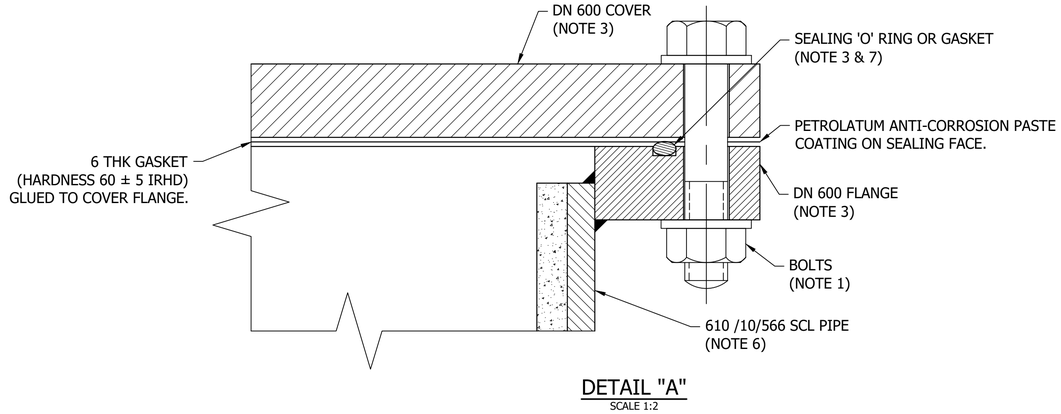
SD-5013-D

A1

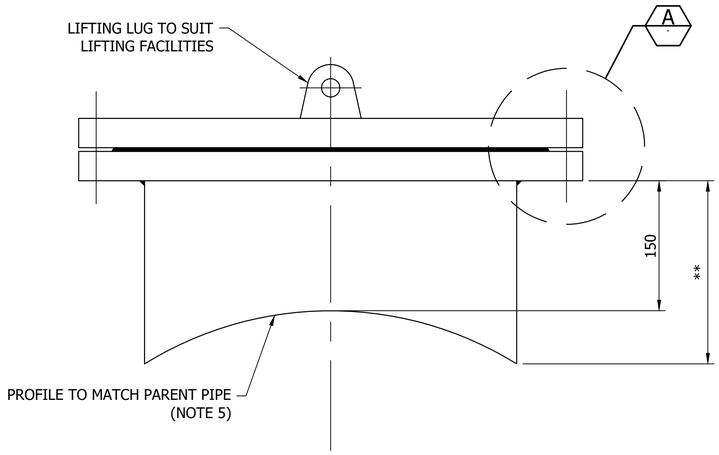
ISSUE: A



PLAN



DETAIL "A"
SCALE 1:2



(** VARIES ACCORDING TO PIPE DIAMETER)

ELEVATION

NOTES:

1. BOLTING DETAILS TO BE AS SHOWN ON SD-5010 FOR GALVANISED BOLTING SYSTEM.
2. WELDING TO BE IN ACCORDANCE WITH AS/NZS 1554.1 CATEGORY SP.
3. FLANGES AND DRILLING TO IN ACCORDANCE WITH AS 4087 FIG. B7, B8 & B9.
4. CEMENT LINED STEEL PIPES TO AS 1579 & AS 1281 TO SUIT DESIGN PRESSURE.
5. REINFORCING COLLARS MAY BE REQUIRED TO BE INSTALLED AS SHOWN IN PROJECT SPECIFIC DETAIL DRAWING.
6. CEMENT MORTAR LINING TO BE IN ACCORDANCE WITH AS 1281.
7. GASKETS AND 'O' RINGS TO COMPLY WITH WSA 109.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING. IN PARTICULAR, DRAWING WAT-1404.

DAM	X	RES	X	SPS	X
BWS	X	WAT		STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

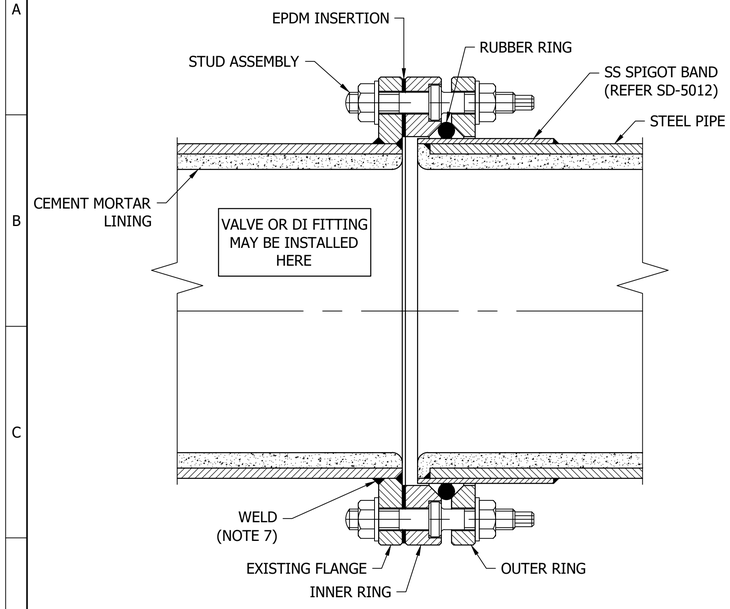
STANDARD DRAWING
PIPELINES
STEEL PIPELINE ACCESS OPENINGS FOR PIPES DN750 AND ABOVE
DETAILS

DRAWING STATUS: Current

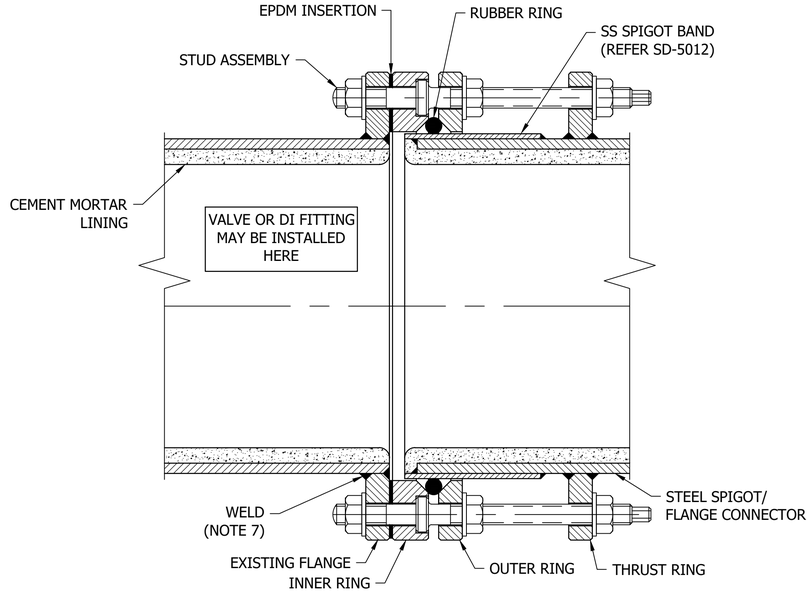
SD-5014-C

A1

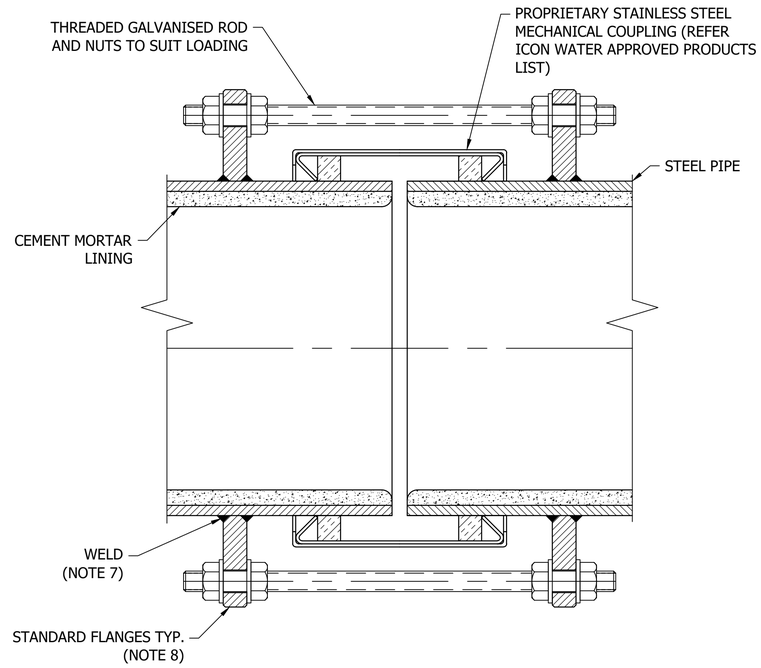
ISSUE: A



SECTION OF ASSEMBLED DISMANTLING JOINT
NON-THRUST TYPE JOINT
(NOTE 1 & 2)



SECTION OF ASSEMBLED DISMANTLING JOINT
THRUST TYPE JOINT
(NOTE 1 & 3)



SECTION OF ASSEMBLED RESTRAINED JOINT
IN-LINE RESTRAINED JOINT
(NOTE 1 & 4)

PIPE SIZE DN	SAFE HEAD (m)	FLANGE P.C.D.	NUMBER OF STUDS	STUD DIA.	STUD LENGTH	
					NON THRUST	THRUST
375	122	495	12	M24	194	329
	215	521	16	M27	213	365
450	122	584	12	M24	206	349
	215	610	20	M30	235	407
500	122	641	16	M24	219	377
	215	673	24	M30	245	424
600	122	756	16	M27	232	394
	215	781	24	M33	263	454
750	122	927	20	M30	248	424
	215	940	28	M33	254	434
900	122	1092	24	M33	257	442
	215	1105	32	M36	276	470
1050	122	1250	28	M33	263	457
	215	1270	36	M36	289	497
1200	122	1410	32	M33	270	468
	215	1441	40	M39	323	557

NOTES:

1. SUITABLE CORROSION PROTECTION SHALL BE APPLIED.
2. NON-THRUST DISMANTLING JOINT TO CONSIST OF:
   ONE INNER RING
   ONE OUTER RING
   ONE EPDM INSERTION, SPECIAL
   ONE RUBBER RING
   THE REQUIRED NUMBER OF STUDS AND NUTS
   ONE SPIGOT/FLANGE CONNECTOR (OPTIONAL).
3. THRUST TYPE DISMANTLING JOINT TO CONSIST OF:
   ONE INNER RING
   ONE OUTER RING
   ONE THRUST RING
   ONE EDPM INSERTION, SPECIAL
   ONE RUBBER RING
   THE REQUIRED NUMBER OF LONG STUDS AND NUTS
   ONE SPIGOT/FLANGE CONNECTOR.
4. IN-LINE RESTRAINED JOINT CAN BE ADJUSTED IN SITU TO ALLOW FOR MINOR ANGULAR DEFLECTION.
5. ALL STEEL USED IN FABRICATION TO BE IN ACCORDANCE WITH AS/NZS 3678.
6. SUITABLE CORROSION PROTECTION TO BE APPLIED TO ALL EXPOSED STEEL SURFACES.
7. WELDING OF FLANGES TO BE IN ACCORDANCE WITH AS/NZS 1554.1 CATEGORY SP.
8. STANDARD FLANGES TO BE IN ACCORDANCE WITH AS 4087, FIGURES B7, B8 & B9 TO SUIT PRESSURE APPLICATION.
9. ONLY APPROVED DISMANTLING JOINTS AND MECHANICAL COUPLINGS SHALL BE USED. REFER TO THE ICON WATER APPROVED PRODUCTS LIST FOR DETAILS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

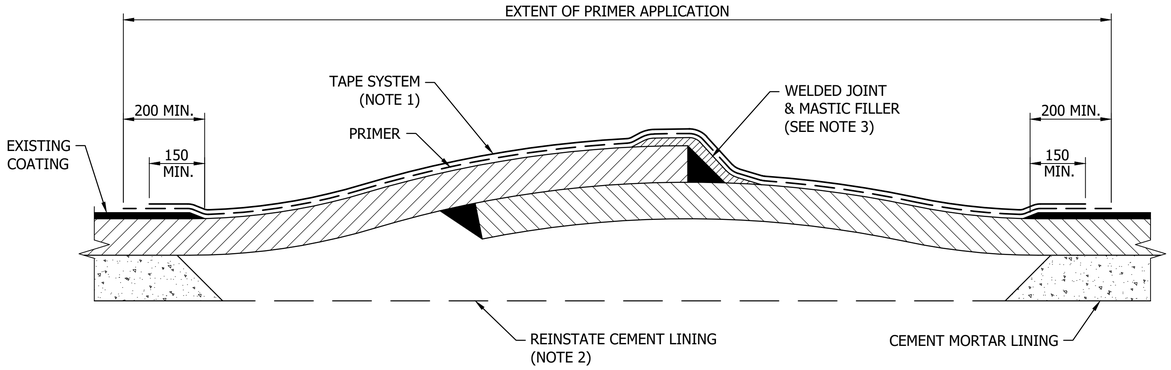
STANDARD DRAWING
PIPELINES
STEEL PIPELINES DISMANTLING JOINTS
DETAILS

DRAWING STATUS
Current

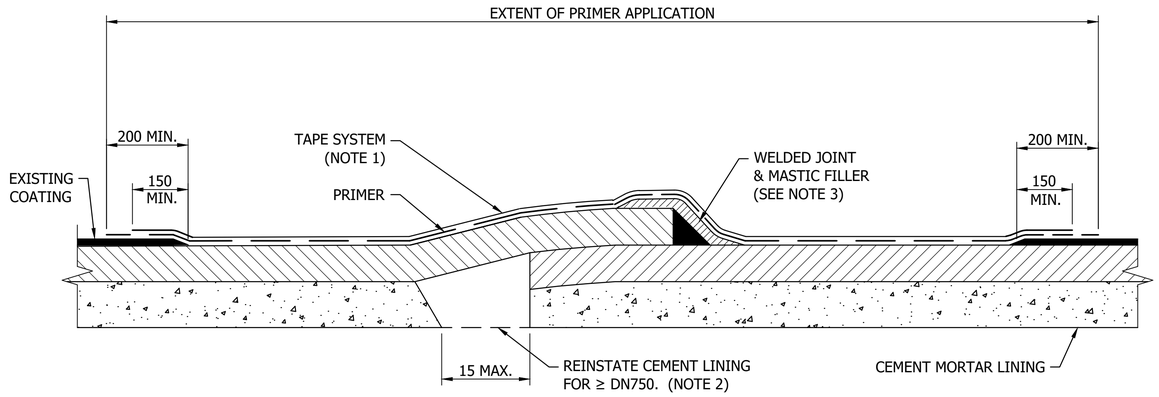
SD-5015-C

A1

ISSUE A

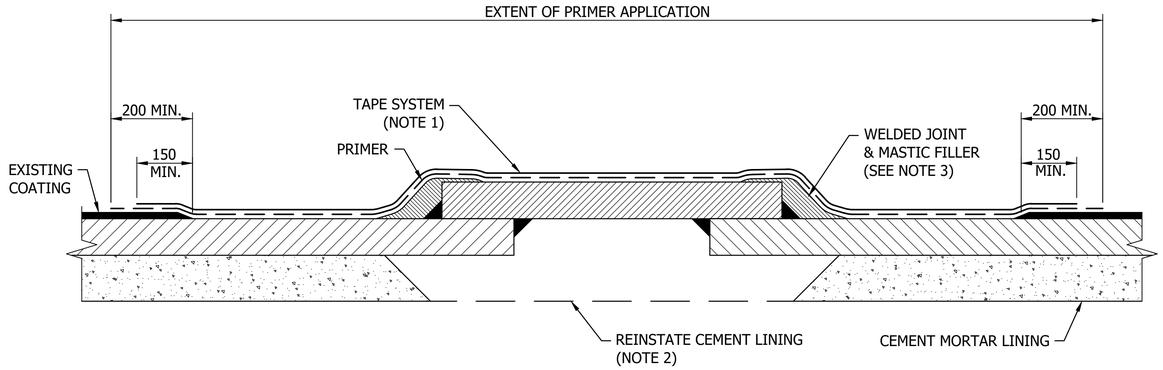


BALL AND SOCKET JOINT FOR PIPEWORK > DN750

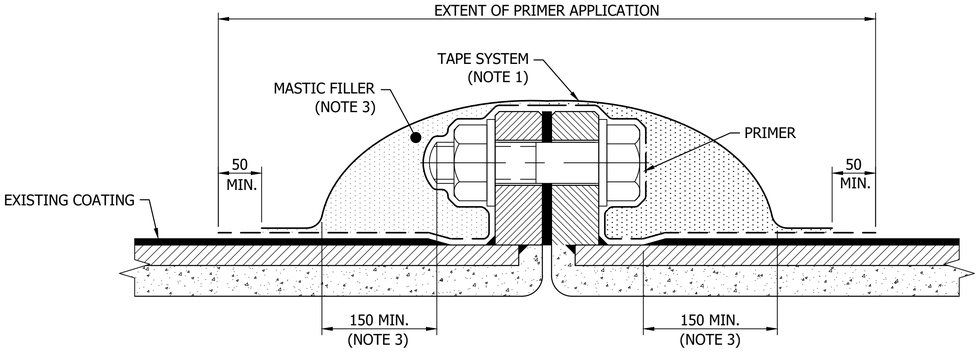


SLIP-IN WELDED JOINT

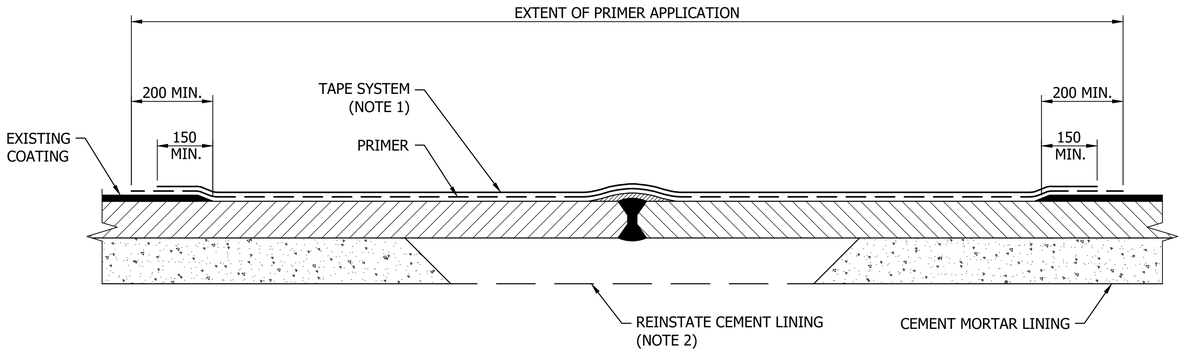
(AS SHOWN FOR NON PERSON ENTRY SITUATION AND PIPES < DN 750 FOR ≥ DN750 MAY BE WELDED INSIDE & LINING REINSTATED)



PLAIN END WELDED COLLAR JOINT FOR PIPEWORK > DN750



FLANGED JOINT



PLAIN END BUTT WELDED JOINT FOR PIPEWORK > DN750

NOTES:

1. EXTERNAL CORROSION PROTECTION AT JOINTS - TAPE SYSTEMS:

   (1.1) SURFACE PREPARATION:
   - REMOVE ALL WELD SPLATTER.
   - GRIND SMOOTH ANY RAISED AREAS.
   - SMOOTH ANY ROUGH CUT EDGES OF EXISTING COATING.
   - WIRE BRUSH ALL SURFACES TO BE WRAPPED REMOVING LOOSE DIRT AND RUST.
   - ENSURE NO FREE MOISTURE IS PRESENT.

   (1.2) PRIMER:
   - APPLY A THIN EVEN COAT OF PRIMER IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
     NOTE: ONLY USE THE PRIMER SUPPLIED BY THE TAPE MANUFACTURER.

   (1.3) MASTIC FILLER:
   - WHERE NECESSARY CONTOUR ANY IRREGULAR PROFILES WITH FILLER TO ENSURE TAPE WILL NOT BRIDGE IN SERVICE.
     NOTE: ONLY USE FILLER MATERIAL SUPPLIED BY THE TAPE MANUFACTURER.

   (1.4) TAPE APPLICATION:
   - SPIRALLY APPLY TAPE ENSURING A 55% OVERLAP BETWEEN SUCCESSIVE LAYERS IS ACHIEVED.
   - ENSURE TAPE IS FREE OF WRINKLES AND VOIDS.
2. REINSTATE/COMPLETE CEMENT LINING USING AN APPROVED PRIMER AND A MORTAR MIX CONSISTING OF 2:1 (CLEAN SHARP SAND/CEMENT).
3. PRIMER AND MASTIC TO OVERLAP EXISTING COATING BY 150 mm MINIMUM.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
PIPELINES
STEEL PIPELINE JOINT CORROSION PROTECTION DETAILS

DRAWING STATUS: Current

SD-5016-D

A1

ISSUE: A

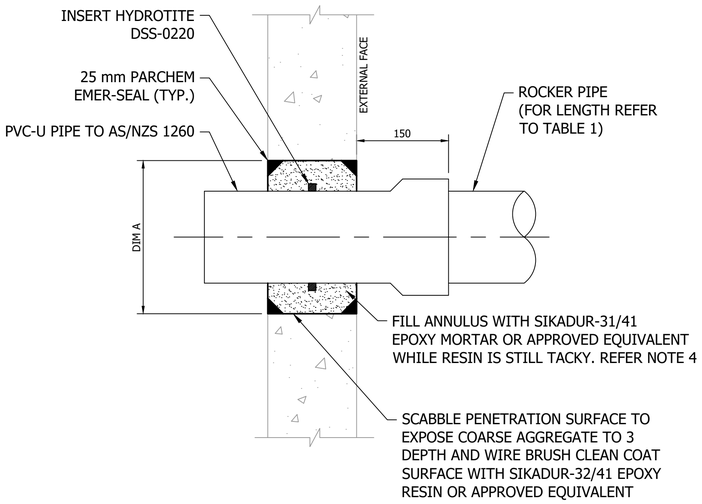


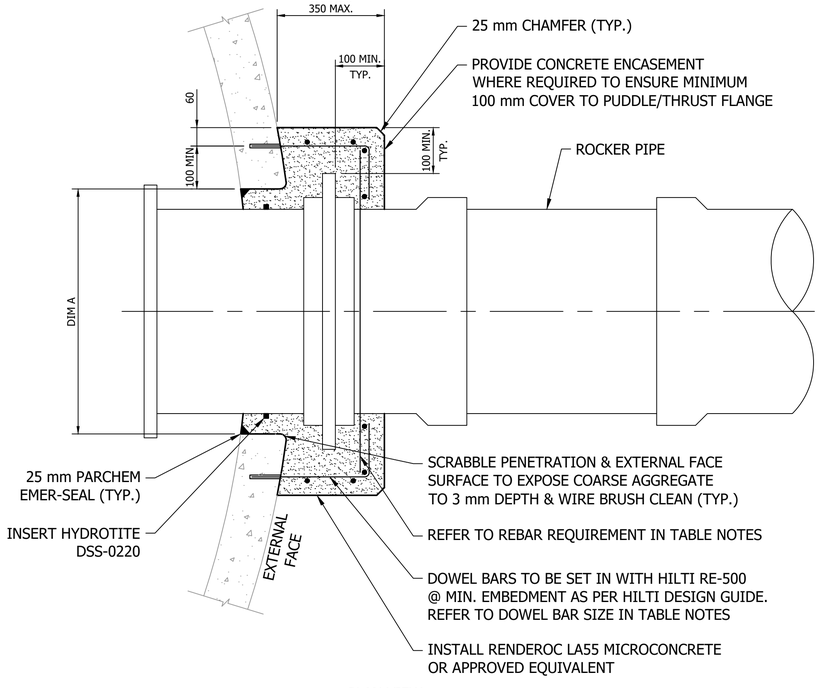
TABLE 1 NON THRUST PENETRATION DETAILS			
PIPE DN	CORE HOLE DIM "A"	ROCKER PIPE LENGTH	
		L.MIN.	L.MAX.
80	180	160	240
150	250	300	450
225	325	450	675
300	500	600	900
375	575	750	1125

TYPE 1 PENETRATION DETAIL SPECIFIC NOTES;
1.1 VALID FOR BOTH CAST IN SITU & PRECAST UNITS.
1.2 VALID FOR CIRCULAR AND RECTANGULAR CONCRETE STRUCTURES.

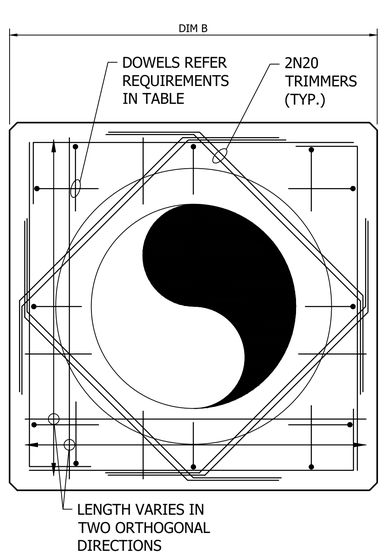
NOTES:

1. RC CAST-IN PIPES IN CONTACT WITH CONCRETE SHALL BE WIRE BRUSHED TO REMOVE LAITANCE AND COATED WITH EPOXY CONCRETE BINDER IMMEDIATELY PRIOR TO POURING OF CONCRETE ENCASEMENT.
2. CUT MAIN REINFORCEMENT AROUND PIPE OPENING TO SUIT, PLACE TRIMMER BARS EACH FACE ALL ROUND AS SHOWN. DIAGONAL TRIMMER BARS SHALL BE PLACED INSIDE MAIN REINFORCEMENT. COG TRIMMER BARS WHERE NECESSARY INTO ADJACENT WALL OR SLAB.
3. IN ADDITION TO DIAGONAL TRIMMER BARS, REPLACE CUT VERTICAL AND HORIZONTAL BARS IN EACH FACE WITH TRIMMERS AS SHOW, USING THE SAME DIAMETER AND SHAPE AS MAIN BARS. LAP TRIMMER BARS WITH MAIN BARS. THE MINIMUM CROSS SECTIONAL AREA OF THE HORIZONTAL AND VERTICAL TRIMMERS SHALL HAVE A TOTAL CROSS SECTIONAL AREA THAT MATCHES THAT OF CUT REBARS.
4. ALL PENETRATIONS ARE ASSUMED TO BE AT RIGHT ANGLES TO THE WALL.
5. STRUCTURE DEPTH MAXIMUM = 10 m.
6. MAXIMUM THRUST, THRUST TYPE PENETRATIONS DESIGNED FOR = 140 m OF WATER COLUMN.
7. THE LOCATION OF THE PIPE PENETRATION SHALL BE DRY DURING INSTALLATION.
8. NO PE PIPE PENETRATION HAS BEEN ALLOWED FOR, BECAUSE OF COMPLEX BEHAVIOUR SUCH AS POISSON EFFECT.
9. NO LOADING AS A RESULT OF FLOTATION, MINE SUBSIDENCE AND DIFFERENTIAL GROUND SETTLEMENT.
10. STANDARD HOOK, COG AND LAP LENGTHS TO AS 3600. SKEW HOOKS AND COGS TO MAINTAIN COVER AS REQUIRED.
11. ALL NEW CONCRETE SHALL BE OF SPECIAL CLASS TO WSA 114 WITH A CHARACTERISTIC COMPRESSIVE STRENGTH OF 40 MPa, U.N.O.

PENETRATION TYPE 1
DN80 TO DN350 NON-THRUST PVC PIPES/CONDUITS



PLAN VIEW



FRONT VIEW

TABLE 2 THRUST PENETRATION DETAILS								
PIPE DN	THRUST (kN)	DIM A (CUT OUT SIZE) SQ.	DIM B BACKING BLOCK SIZE SQ.	THRUST DIRECTION	ROCKER PIPE LENGTH		REBAR REQUIREMENTS	DOWEL REQUIREMENTS
					L.MIN.	L.MAX.		
80	7	180	480	ACTING INWARDS ONLY	160	240	N12-200 EW	NO DOWEL BARS REQUIRED
150	25	250	550	ACTING INWARDS ONLY	300	450	N12-200 EW	4N12 DOWEL BARS (400 SPACINGS EW)
225	56	325	725	ACTING INWARDS ONLY	450	675	N12-200 EW	4N12 DOWEL BARS (400 SPACINGS EW)
300	99	500	900	ACTING INWARDS ONLY	600	900	N12-200 EW	8N12 DOWEL BARS (400 SPACINGS EW)
375	155	575	975	ACTING INWARDS ONLY	750	1125	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)
450	223	650	1050	ACTING INWARDS ONLY	900	1350	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)
500	275	700	1100	ACTING INWARDS ONLY	1000	1500	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)
525	303	725	1125	ACTING INWARDS ONLY	1050	1575	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)
600	396	800	1200	ACTING INWARDS ONLY	1200	1800	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)

TYPE 2 PENETRATION DETAIL SPECIFIC NOTES;
2.1 VALID FOR BOTH CAST IN SITU & PRECAST UNITS UNLESS NOTED OTHERWISE.
2.2 MINIMUM PRECAST THICKNESS ASSUMED TO BE 150 mm, NOT VALID FOR THINNER PRECAST UNITS.
2.3 MINIMUM CAST IN SITU THICKNESS IS 250 mm WITH 2 LAYERS OF REINFORCEMENT AS PER MINIMUM REQUIREMENTS OF AS 3735.
2.4 INWARD THRUST ONLY, THRUST AWAY FROM STRUCTURE REQUIRES SITE SPECIFIC DESIGN.
2.5 THRUST IN OUTWARD DIRECTION TAKEN BY PUMP STAND.

PENETRATION TYPE 2
DN80 TO DN600 FOR STEEL/DICL PIPES THROUGH CIRCULAR WALL

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	30/10/2018	ATLAS ES.	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

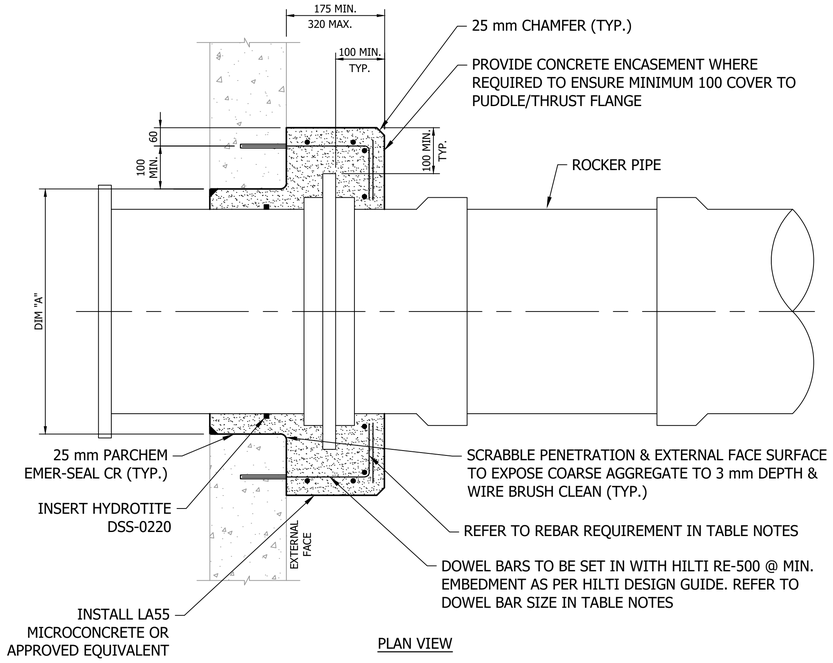
STANDARD DRAWING
PIPELINES
PIPE PENETRATION DETAILS
TYPE 1 & TYPE 2

DRAWING STATUS: Current

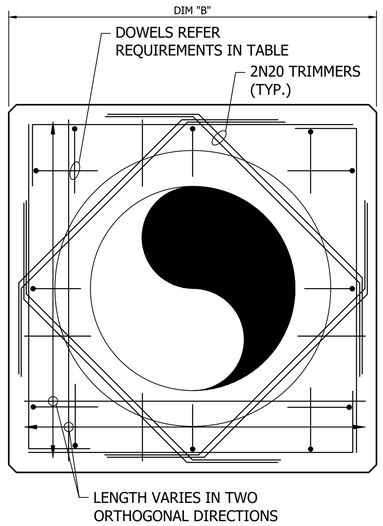
SD-5017-D

A1

ISSUE A



PLAN VIEW



FRONT VIEW

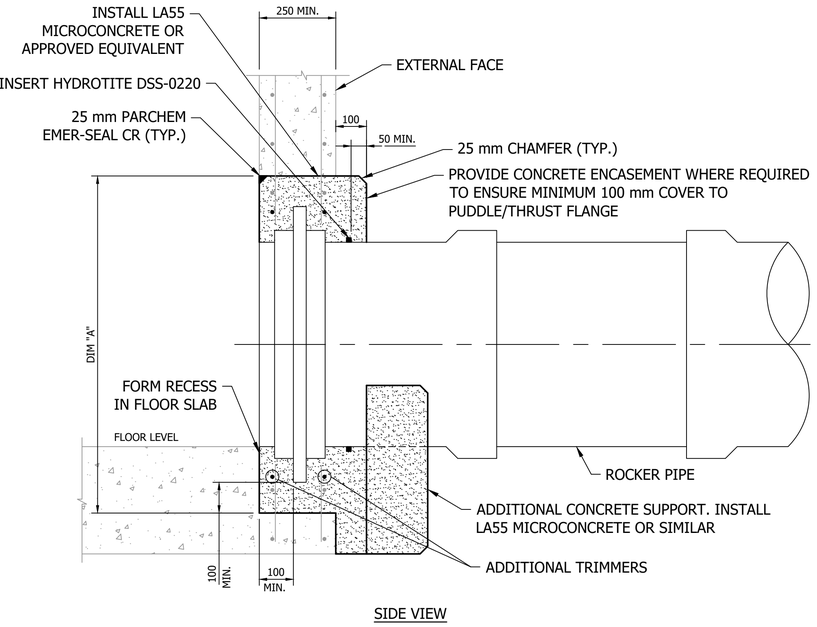
PENETRATION TYPE 3
DN80 TO DN600 FOR STEEL/DICL PIPES THROUGH WALL - NON THRUST

TABLE 3 NON THRUST PENETRATION DETAILS							
PIPE DN	DIM A (CUT OUT SIZE) SQ.	DIM B BACKING BLOCK SIZE SQ.	THRUST DIRECTION	ROCKER PIPE LENGTH		REBAR REQUIREMENTS	DOWEL REQUIREMENTS
				L.MIN.	L.MAX.		
80	180	480	ACTING INWARDS ONLY	160	240	N12-200 EW	NO DOWEL BARS REQUIRED
150	250	550	ACTING INWARDS ONLY	300	450	N12-200 EW	4N12 DOWEL BARS (400 SPACINGS EW)
225	325	725	ACTING INWARDS ONLY	450	675	N12-200 EW	4N12 DOWEL BARS (400 SPACINGS EW)
300	500	900	ACTING INWARDS ONLY	600	900	N12-200 EW	8N12 DOWEL BARS (400 SPACINGS EW)
375	575	975	ACTING INWARDS ONLY	750	1125	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)
450	650	1050	ACTING INWARDS ONLY	900	1350	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)
500	700	1100	ACTING INWARDS ONLY	1000	1500	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)
525	725	1125	ACTING INWARDS ONLY	1050	1575	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)
600	800	1200	ACTING INWARDS ONLY	1200	1800	N16-150 EW	8N16 DOWEL BARS (400 SPACINGS EW)

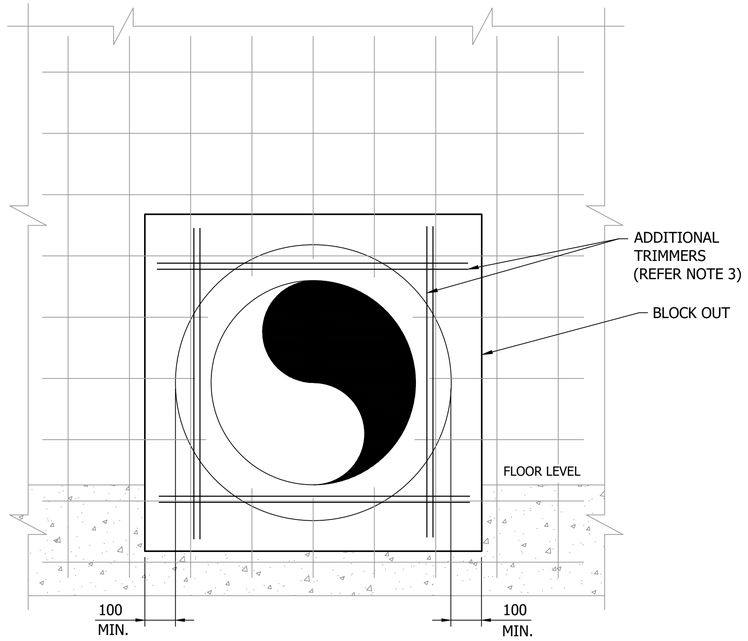
TYPE 3 - PENETRATION DETAIL SPECIFIC NOTES;
3.1 VALID FOR BOTH CAST IN SITU & PRECAST UNITS UNLESS NOTED OTHERWISE.
3.2 PENETRATION DETAIL IS FOR GRAVITY MAINS WHERE THE MAXIMUM HEAD WHICH CAN ACT AT THE END OF THE GRAVITY MAIN DUE TO ISOLATION OF THE MAIN IS 10 mH.
3.3 INWARD THRUST ONLY, THRUST AWAY FROM STRUCTURE REQUIRES SITE SPECIFIC DESIGN.

NOTES:

1. RC CAST-IN PIPES IN CONTACT WITH CONCRETE SHALL BE WIRE BRUSHED TO REMOVE LAITANCE AND COATED WITH EPOXY CONCRETE BINDER IMMEDIATELY PRIOR TO POURING OF CONCRETE ENCASEMENT.
2. CUT MAIN REINFORCEMENT AROUND PIPE OPENING TO SUIT, PLACE TRIMMER BARS EACH FACE ALL ROUND AS SHOWN. DIAGONAL TRIMMER BARS SHALL BE PLACED INSIDE MAIN REINFORCEMENT. COG TRIMMER BARS WHERE NECESSARY INTO ADJACENT WALL OR SLAB.
3. IN ADDITION TO DIAGONAL TRIMMER BARS, REPLACE CUT VERTICAL AND HORIZONTAL BARS IN EACH FACE WITH TRIMMERS AS SHOWN, USING THE SAME DIAMETER AND SHAPE AS MAIN BARS. LAP TRIMMER BARS WITH MAIN BARS. THE MINIMUM CROSS SECTIONAL AREA OF THE HORIZONTAL AND VERTICAL TRIMMERS SHALL HAVE A TOTAL CROSS SECTIONAL AREA THAT MATCHES THAT OF CUT REBARS.
4. ALL PENETRATIONS ARE ASSUMED TO BE AT RIGHT ANGLES TO THE WALL.
5. STRUCTURE DEPTH MAXIMUM = 10 m.
6. THE LOCATION OF THE PIPE PENETRATION SHALL BE DRY DURING INSTALLATION.
7. NO PE PIPE PENETRATION HAS BEEN ALLOWED FOR, BECAUSE OF COMPLEX BEHAVIOUR SUCH AS POISSON EFFECT.
8. NO LOADING AS A RESULT OF FLOTATION, MINE SUBSIDENCE AND DIFFERENTIAL GROUND SETTLEMENT.
9. STANDARD HOOK, COG AND LAP LENGTHS TO AS3600. SKEW HOOKS AND COGS TO MAINTAIN COVER AS REQUIRED.
10. ALL NEW CONCRETE SHALL BE OF SPECIAL CLASS TO WSA114 WITH A CHARACTERISTIC COMPRESSIVE STRENGTH OF 40 MPa, U.N.O.
11. BLOCK OUT TO BE STYROFOAM AND BARS TO BE CUT LOCALLY AFTER CONCRETE HAS CURED FOR A MINIMUM OF 7 DAYS.



SIDE VIEW



FRONT VIEW

PENETRATION TYPE 4
DN80 TO DN600 FOR STEEL/DICL PIPES THROUGH WALL - NON THRUST

TABLE 4 NON THRUST PENETRATION DETAILS				
PIPE DN	DIM A (CUT OUT SIZE) SQ.	ROCKER PIPE LENGTH		NOTES
		L.MIN.	L.MAX.	
80	480	160	240	REINFORCEMENT IN DETAIL
150	550	300	450	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS
225	725	450	675	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS
300	900	600	900	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS
375	975	750	1125	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS
450	1050	900	1350	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS
500	1100	1000	1500	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS
525	1125	1050	1575	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS
600	1200	1200	1800	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS

TYPE 4 - PENETRATION DETAIL SPECIFIC NOTES;
4.1 VALID FOR CAST IN SITU UNITS ONLY.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	30/10/2018	ATLAS ES.	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

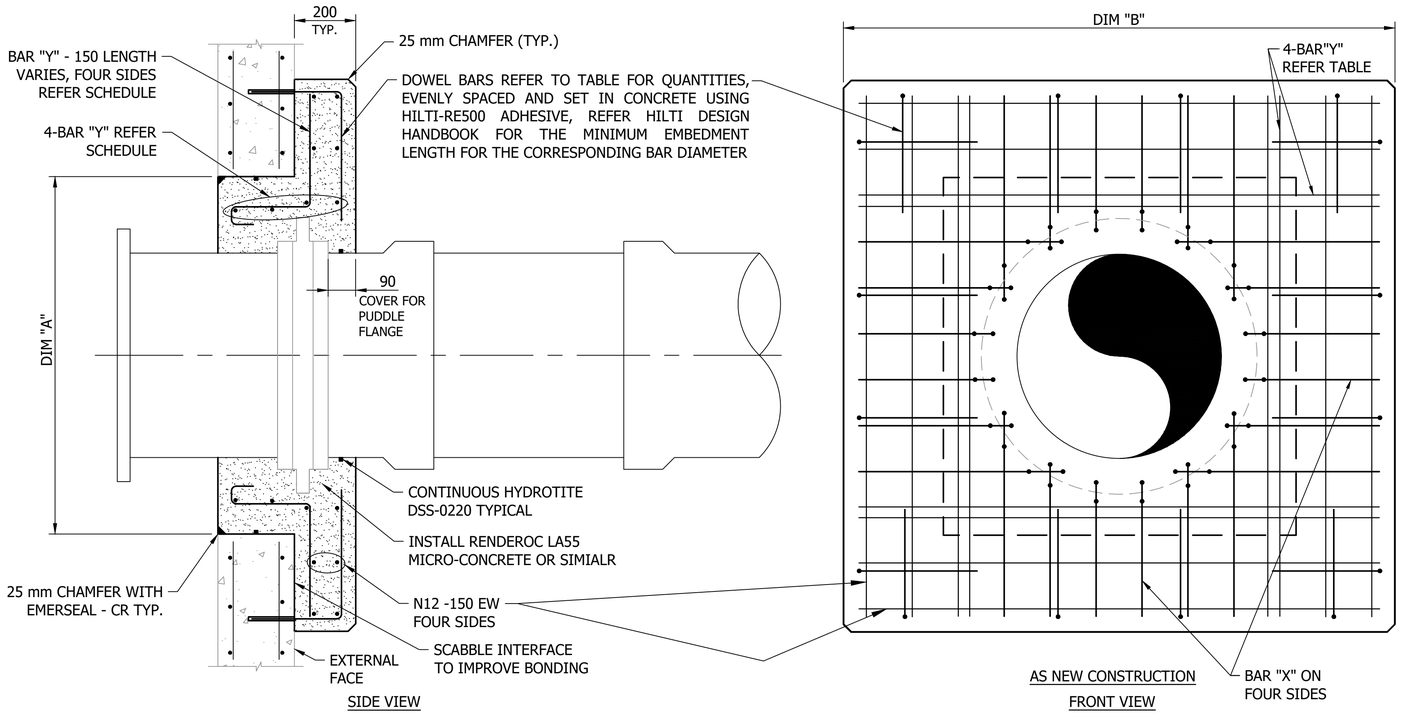
icon WATER

STANDARD DRAWING
PIPELINES
PIPE PENETRATION DETAILS
TYPE 3 & TYPE 4

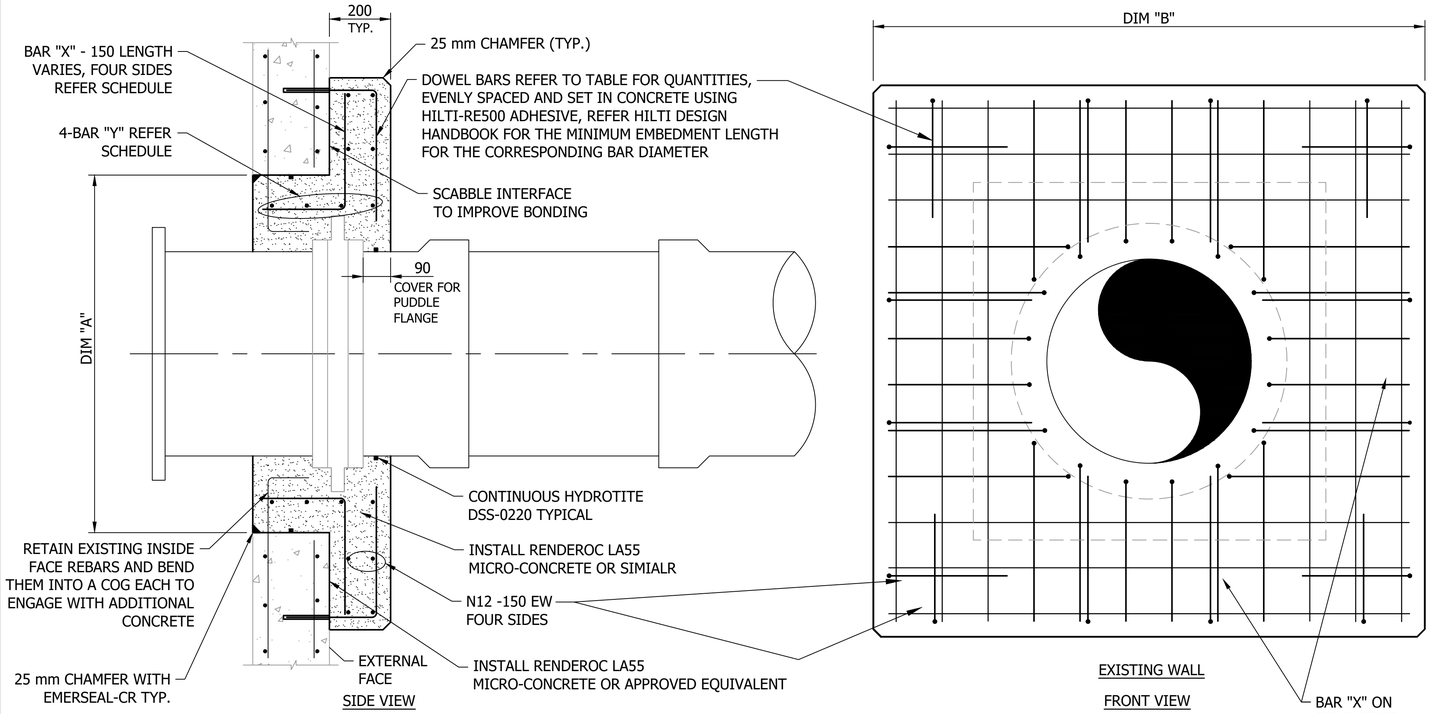
DRAWING STATUS: Current

SD-5018-D

A1 | ISSUE: A



PENETRATION TYPE 5
DN80 TO DN600 FOR STEEL/DICL PIPES CAST IN SITU WALL AS NEW CONSTRUCTION



PENETRATION TYPE 6
DN80 TO DN600 FOR STEEL/DICL PIPES THROUGH EXISTING WALL - NEW PENETRATION

NOTES:

1. REFER SD-5017 FOR GENERAL NOTES.

TABLE 5
PENETRATION TYPE 5 - THRUST PENETRATION IN AS NEW CONSTRUCTION DETAILS

PIPE DN	THRUST (kN)	DIM A (CUT OUT SIZE) SQ.	DIM B BACKING BLOCK SIZE SQ.	THRUST DIRECTION	ROCKER PIPE LENGTH		REBAR REQUIREMENTS	DOWEL REQUIREMENTS
					L.MIN.	L.MAX.		
80	7	280	1080	ACTING INWARDS ONLY	160	240	REINFORCEMENT IN DETAIL	NO DOWEL BARS REQUIRED
150	25	350	1150	ACTING INWARDS ONLY	300	450	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	8N12 DOWEL BARS (400 SPACINGS EW)
225	56	425	1325	ACTING INWARDS ONLY	450	675	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	8N12 DOWEL BARS (400 SPACINGS EW)
300	99	600	1500	ACTING INWARDS ONLY	600	900	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	8N12 DOWEL BARS (400 SPACINGS EW)
375	155	675	1575	ACTING INWARDS ONLY	750	1125	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	8N16 DOWEL BARS (400 SPACINGS EW)
450	223	750	1650	ACTING INWARDS ONLY	900	1350	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	N20 DOWEL BARS (400 SPACINGS EW)
500	275	800	1700	ACTING INWARDS ONLY	1000	1500	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	N20 DOWEL BARS (400 SPACINGS EW)
525	303	825	1725	ACTING INWARDS ONLY	1050	1575	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	N20 DOWEL BARS (400 SPACINGS EW)
600	396	900	1800	ACTING INWARDS ONLY	1200	1800	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	N20 DOWEL BARS (400 SPACINGS EW)

TYPE 5 - PENETRATION DETAIL SPECIFIC NOTES;
5.1 VALID FOR CAST IN SITU UNITS ONLY.
5.2 WALL DIMENSIONS MAX. 5 m WIDE AND MIDWAY BETWEEN RETURN WALL.
5.3 WALL DIMENSIONS AT ⅔ DEPTH OF WALL ALLOWANCE = 10 m.

BAR SCHEDULE
"X" N12 FOR CAST-IN AS NEW CONSTRUCTION; N16 FOR EXISTING WALL PENETRATION
"Y" N20 FOR PIPE <DN150, N24 FOR PIPE =>DN150

TABLE 6
PENETRATION TYPE 6 - THRUST PENETRATION IN EXISTING WALL DETAILS

PIPE DN	THRUST (kN)	DIM A (CUT OUT SIZE) SQ.	DIM B BACKING BLOCK SIZE SQ.	THRUST DIRECTION	ROCKER PIPE LENGTH		REBAR REQUIREMENTS	DOWEL REQUIREMENTS
					L.MIN.	L.MAX.		
80	7	280	1080	ACTING INWARDS ONLY	160	240	REINFORCEMENT IN DETAIL	NO DOWEL BARS REQUIRED
150	25	350	1150	ACTING INWARDS ONLY	300	450	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	8N12 DOWEL BARS (400 SPACINGS EW)
225	56	425	1325	ACTING INWARDS ONLY	450	675	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	8N12 DOWEL BARS (400 SPACINGS EW)
300	99	600	1500	ACTING INWARDS ONLY	600	900	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	8N12 DOWEL BARS (400 SPACINGS EW)
375	155	675	1575	ACTING INWARDS ONLY	750	1125	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	8N16 DOWEL BARS (400 SPACINGS EW)
450	223	750	1650	ACTING INWARDS ONLY	900	1350	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	N20 DOWEL BARS (400 SPACINGS EW)
500	275	800	1700	ACTING INWARDS ONLY	1000	1500	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	N20 DOWEL BARS (400 SPACINGS EW)
525	303	825	1725	ACTING INWARDS ONLY	1050	1575	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	N20 DOWEL BARS (400 SPACINGS EW)
600	396	900	1800	ACTING INWARDS ONLY	1200	1800	REFER DETAIL X FOR REINFORCEMENT REQUIREMENTS & ACCEPTABLE PRODUCT DETAILS	N20 DOWEL BARS (400 SPACINGS EW)

TYPE 6 - PENETRATION DETAIL SPECIFIC NOTES;
6.1 VALID FOR CAST IN SITU UNITS ONLY.

BAR SCHEDULE
"X" N12 FOR CAST-IN AS NEW CONSTRUCTION; N16 FOR EXISTING WALL PENETRATION
"Y" N20 FOR PIPE <DN150, N24 FOR PIPE =>DN150

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	30/10/2018	ATLAS ES.	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

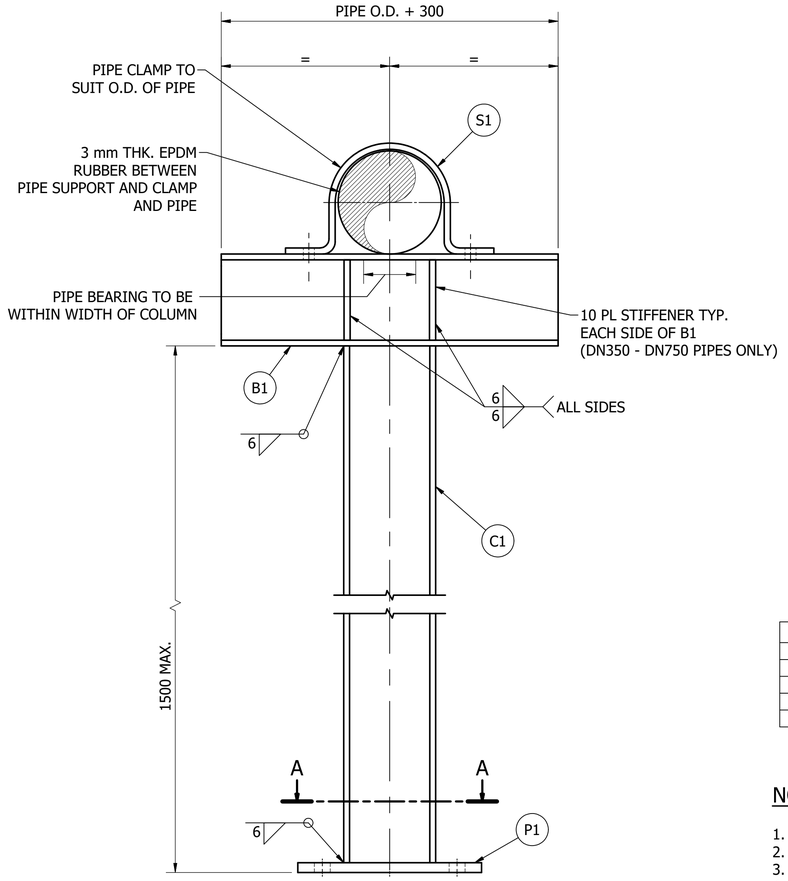
STANDARD DRAWING
PIPELINES
PIPE PENETRATION DETAILS
TYPE 5 & TYPE 6

DRAWING STATUS: Current

SD-5019-D

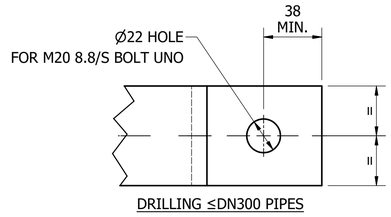
A1

ISSUE: A

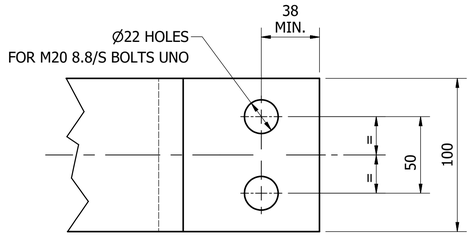


ELEVATION
VERTICAL PIPE SUPPORT - TYPE 1
SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: APPROX. 50 kg @ 1500 HIGH, ≤DN300

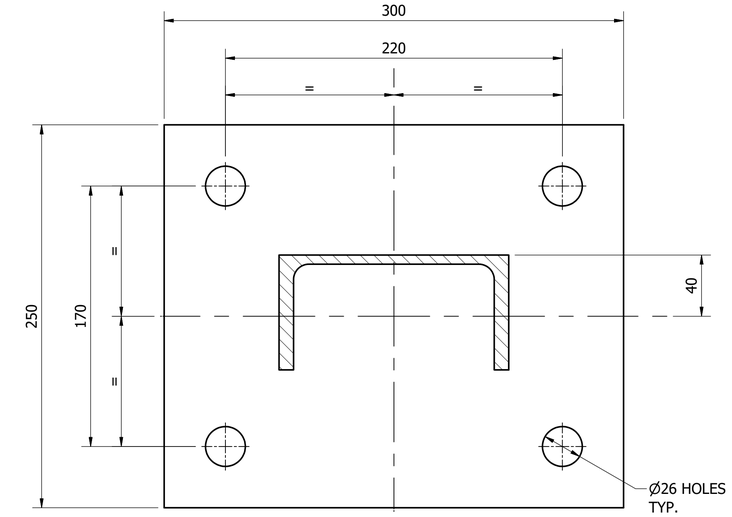


DRILLING ≤DN300 PIPES



DRILLING DN350 - DN750 PIPES

ITEM S1
DRILLING DETAILS
SCALE: 1 : 2

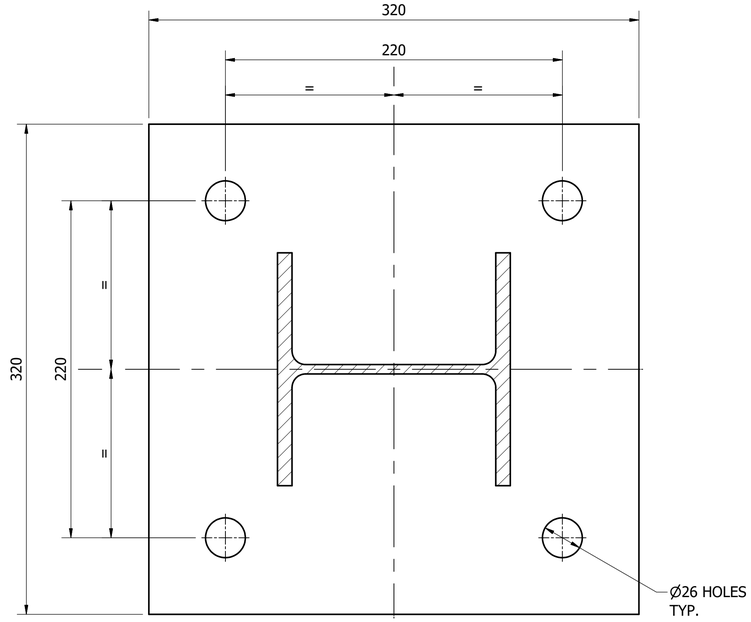


SECTION A-A
FOR PIPES ≤ DN300
SCALE: 1 : 2

MEMBER SIZES			
MARK	DESCRIPTION	≤ DN300 PIPES	DN350 - DN750 PIPES
B1	PIPE SUPPORT BEAM	150 PFC	150 UC 23
C1	PIPE SUPPORT COLUMN	150 PFC	150 UC 23
P1	BASE PLATE	16 PL	20 PL
S1	PIPE CLAMP	65 x 10 FL	100 x 16 FL

NOTES:

1. FOR STEELWORK NOTES REFER TO DRAWING: SD-9100.
2. SUPPORT DESIGNED FOR VERTICAL LOADS ONLY.
3. PIPE SUPPORTS APPLICABLE TO FLANGED OR WELDED PIPES ONLY.
4. DESIGN LOAD CAPACITY (WORKING LOAD):
   - ≤ DN300 - 50 kN
   - DN350 TO DN750 - 100 kN
5. OVERSIZE BOLT HOLES REQUIRE 4 mm PLATE WASHER INSTALLED UNDER BOTH NUT AND BOLT HEAD.
6. OVERSIZE HOLD DOWN BOLT HOLES REQUIRE 4 mm PLATE WASHER INSTALLED UNDER BOTH NUT HEADS.
7. HOLD DOWN ANCHOR BOLTS TO BE M20 SS316 CHEMICAL ANCHORS.
8. 20 mm NON-SHRINK GROUT TO BE INSTALLED UNDER ALL PIPE SUPPORTS.



SECTION A-A
FOR PIPES DN350 - DN750
SCALE: 1 : 2

ITEM	AMDT.
PN530101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

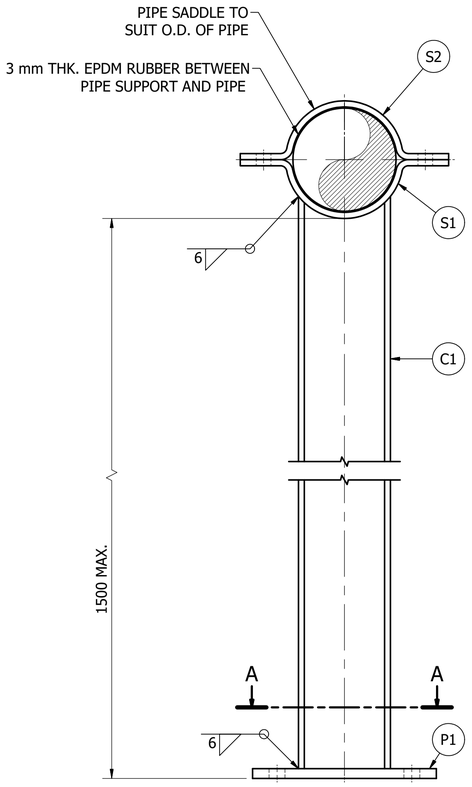
STANDARD DRAWING
PIPE SUPPORTS
HOT DIP GALVANISED
VERTICAL PIPE SUPPORT - TYPE 1
DETAILS

DRAWING STATUS: Current

SD-5301-D

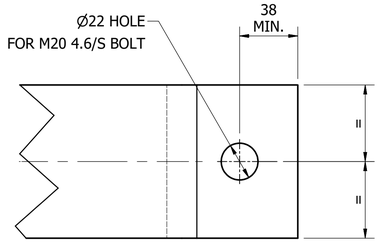
A1

ISSUE: A

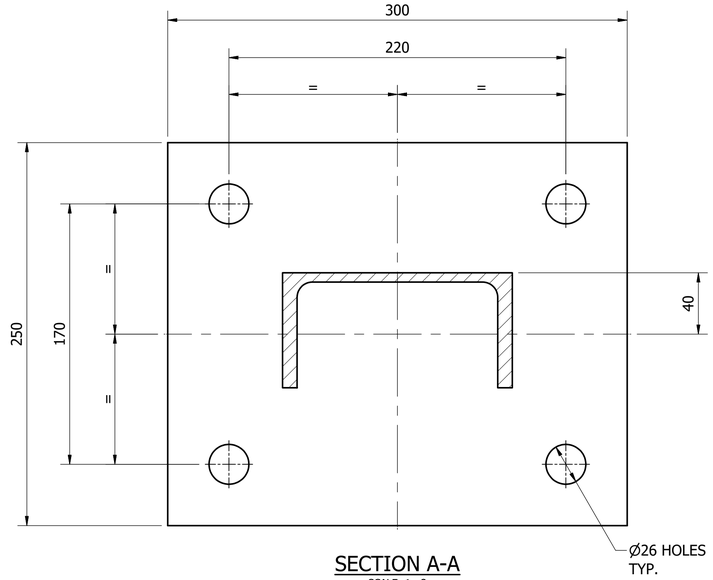


ELEVATION
VERTICAL PIPE SUPPORT - TYPE 2
FOR PIPES ≤ DN300 ONLY
SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: APPROX. 45 kg @ 1500 HIGH



ITEM S1, S2
DRILLING DETAILS
SCALE: 1 : 2



SECTION A-A
SCALE: 1 : 2

MEMBER SIZES		
MARK	DESCRIPTION	≤ DN300 PIPES
C1	PIPE SUPPORT COLUMN	150 PFC
P1	BASE PLATE	16 PL
S1	PIPE SADDLE BASE	100 x 10 FL
S2	PIPE SADDLE TOP	100 x 10 FL

NOTES:

1. FOR STEELWORK NOTES REFER TO DRAWING: SD-9100.
2. SUPPORT DESIGNED FOR VERTICAL LOADS ONLY.
3. PIPE SUPPORTS APPLICABLE TO FLANGED OR WELDED PIPES ONLY.
4. DESIGN LOAD CAPACITY (WORKING LOAD):
   - ≤ DN300 - 50 kN
5. OVERSIZE BOLT HOLES REQUIRE 4 mm PLATE WASHER INSTALLED UNDER BOTH NUT AND BOLT HEAD.
6. OVERSIZE HOLD DOWN BOLT HOLES REQUIRE 4 mm PLATE WASHER INSTALLED UNDER BOTH NUT HEADS.
7. HOLD DOWN ANCHOR BOLTS TO BE M20 SS316 CHEMICAL ANCHORS.
8. 20 mm NON-SHRINK GROUT TO BE INSTALLED UNDER ALL PIPE SUPPORTS.

THIS PIPE SUPPORT IS APPLICABLE FOR PIPES ≤DN300 ONLY

ITEM	AMDT.
PN530201	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

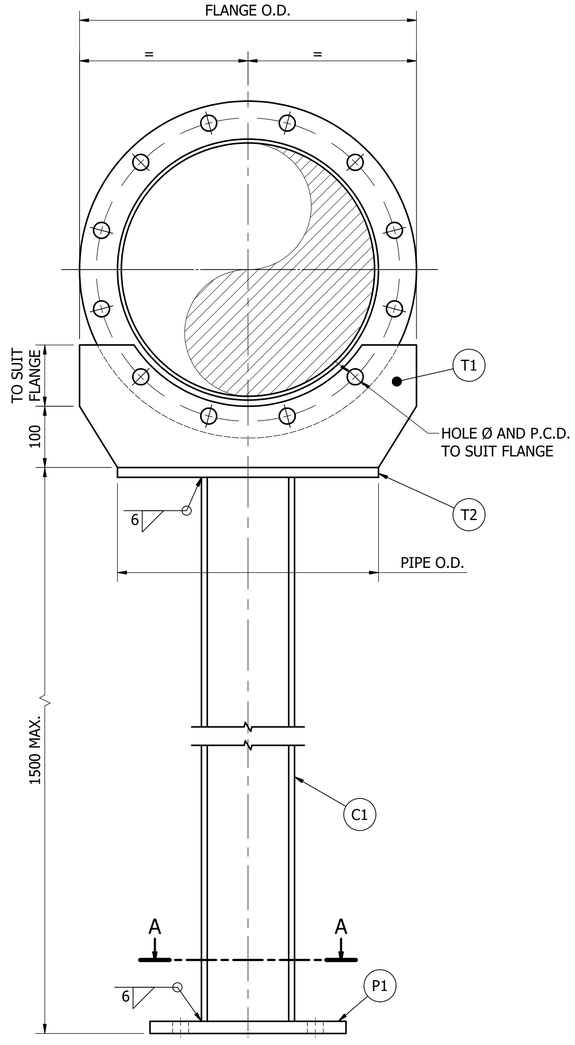
STANDARD DRAWING
PIPE SUPPORTS
HOT DIP GALVANISED
VERTICAL PIPE SUPPORT - TYPE 2
DETAILS

DRAWING STATUS: Current

SD-5302-D

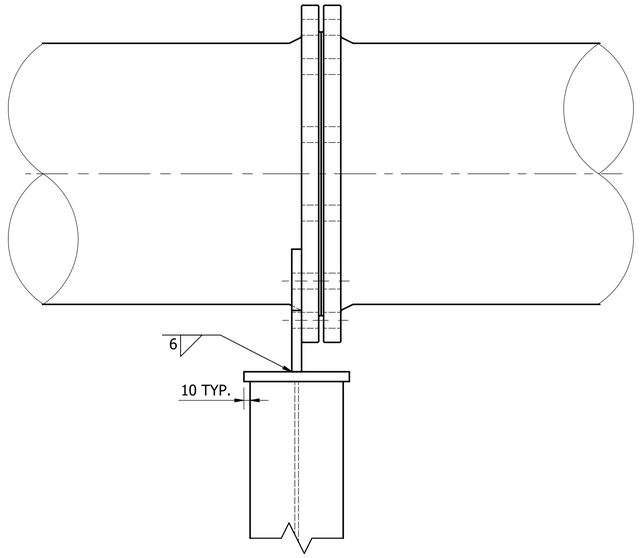
A1

ISSUE: A



ELEVATION
VERTICAL PIPE SUPPORT - TYPE 3
SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: APPROX. 80 kg @ 1500 HIGH, DN375

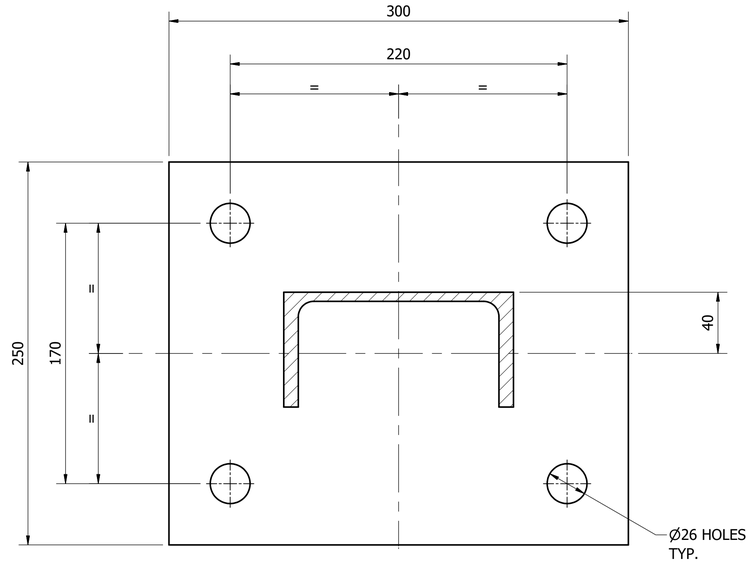


SIDE ELEVATION
CONNECTION TO PIPE
SCALE: 1 : 5

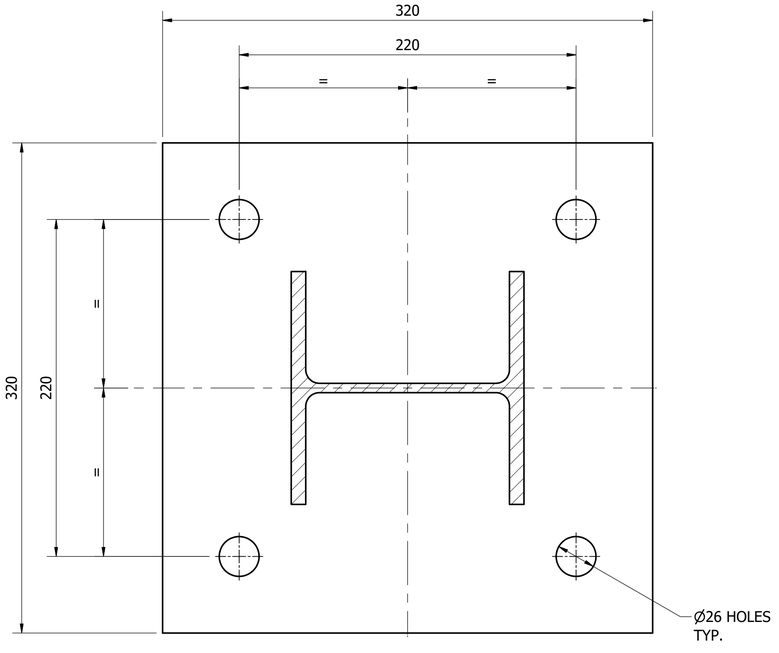
MEMBER SIZES			
MARK	DESCRIPTION	≤ DN300 PIPES	DN350 - DN750 PIPES
C1	PIPE SUPPORT COLUMN	150 PFC	150 UC 23
P1	BASE PLATE	16 PL	20 PL
T1	"T" CLEAT PIPE BRACKET	12 PL	16 PL
T2	"T" CLEAT TOP PLATE	12 PL	16 PL

NOTES:

1. FOR STEELWORK NOTES REFER TO DRAWING: SD-9100.
2. SUPPORT DESIGNED FOR VERTICAL LOADS ONLY.
3. PIPE SUPPORTS APPLICABLE TO FLANGED OR WELDED PIPES ONLY.
4. DESIGN LOAD CAPACITY (WORKING LOAD):
   - ≤ DN300 - 50 kN
   - DN350 TO DN750 - 100 kN
5. OVERSIZE HOLD DOWN BOLT HOLES REQUIRE 4 mm PLATE WASHER INSTALLED UNDER BOTH NUT HEADS.
6. HOLD DOWN ANCHOR BOLTS TO BE M20 SS316 CHEMICAL ANCHORS.
7. 20 mm NON-SHRINK GROUT TO BE INSTALLED UNDER ALL PIPE SUPPORTS.



SECTION A-A
FOR PIPES ≤ DN300
SCALE: 1 : 2



SECTION A-A
FOR PIPES DN350 - DN750
SCALE: 1 : 2

ITEM	AMDT.
PN530301	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

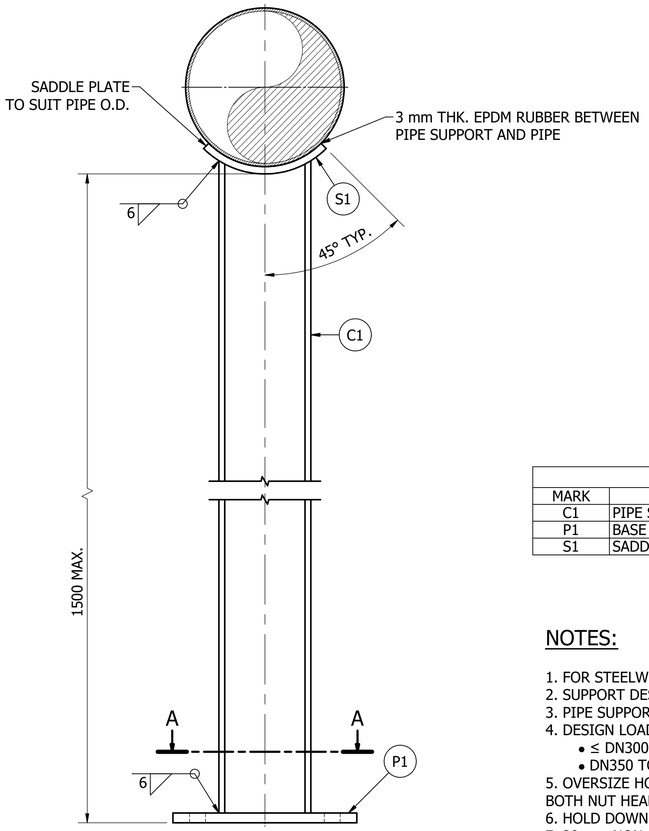
STANDARD DRAWING
PIPE SUPPORTS
HOT DIP GALVANISED
VERTICAL PIPE SUPPORT - TYPE 3
DETAILS

DRAWING STATUS: Current

SD-5303-D

A1

ISSUE: A



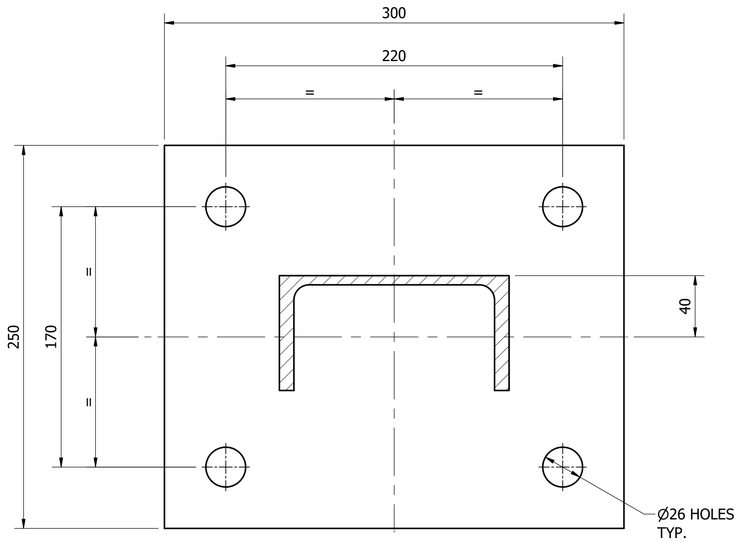
ELEVATION
VERTICAL PIPE SUPPORT - TYPE 4
SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: APPROX. 40 kg @ 1500 HIGH, DN225

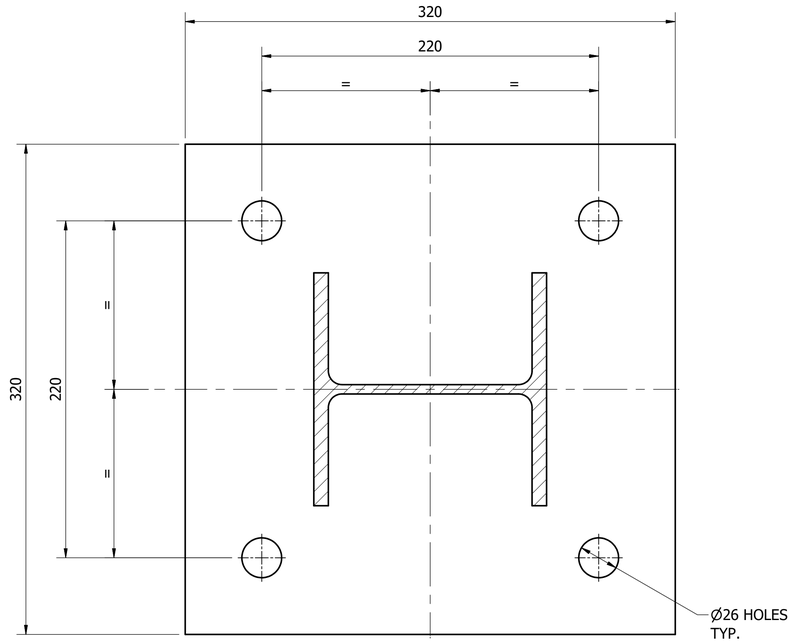
MEMBER SIZES			
MARK	DESCRIPTION	≤ DN300 PIPES	DN350 - DN750 PIPES
C1	PIPE SUPPORT COLUMN	150 PFC	150 UC 23
P1	BASE PLATE	16 PL	20 PL
S1	SADDLE PLATE	150 x 12 FL	150 x 12 FL

NOTES:

1. FOR STEELWORK NOTES REFER TO DRAWING: SD-9100.
2. SUPPORT DESIGNED FOR VERTICAL LOADS ONLY.
3. PIPE SUPPORTS APPLICABLE TO FLANGED OR WELDED PIPES ONLY.
4. DESIGN LOAD CAPACITY (WORKING LOAD):
   - ≤ DN300 - 50 kN
   - DN350 TO DN750 - 100 kN
5. OVERSIZE HOLD DOWN BOLT HOLES REQUIRE 4 mm PLATE WASHER INSTALLED UNDER BOTH NUT HEADS.
6. HOLD DOWN ANCHOR BOLTS TO BE M20 SS316 CHEMICAL ANCHORS.
7. 20 mm NON-SHRINK GROUT TO BE INSTALLED UNDER ALL PIPE SUPPORTS.



SECTION A-A
FOR PIPES ≤ DN300
SCALE: 1 : 2



SECTION A-A
FOR PIPES DN350 - DN750
SCALE: 1 : 2

ITEM	AMDT.
PN530401	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	16/05/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP	X			
WTP	X	SEW	X					
WPS	X	REC	X					

ASSET AREA APPLICABILITY

icon WATER

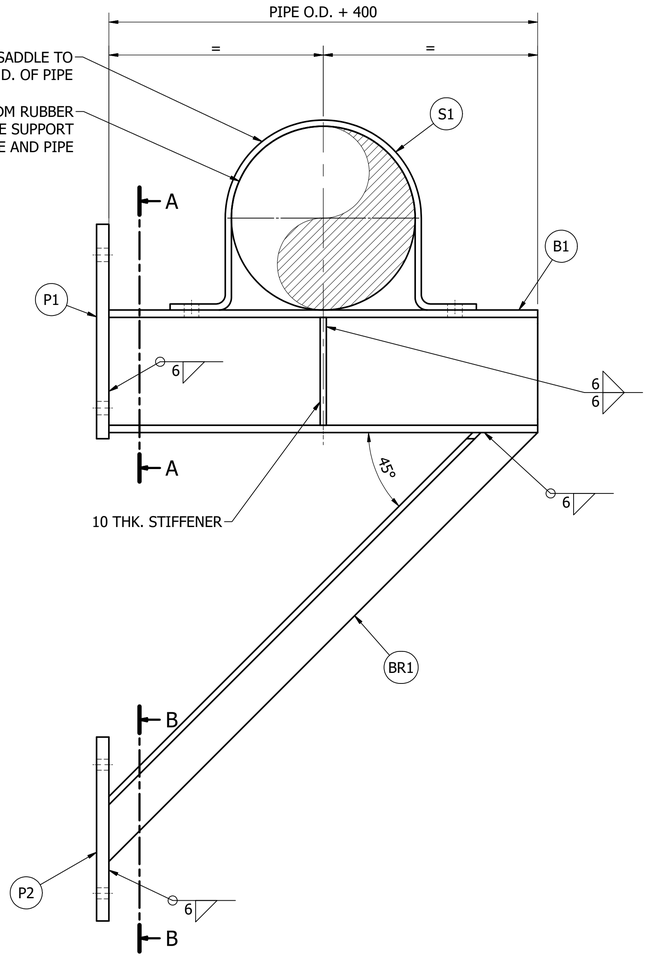
STANDARD DRAWING
PIPE SUPPORTS
HOT DIP GALVANISED
VERTICAL PIPE SUPPORT - TYPE 4
DETAILS

DRAWING STATUS: Current

SD-5304-D

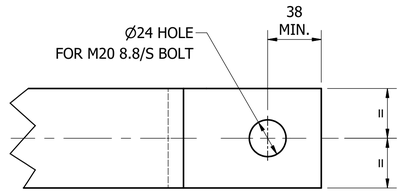
A1

ISSUE: A



ELEVATION
BRACED CANTILEVER PIPE SUPPORT
SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: APPROX. 60 kg @ DN300

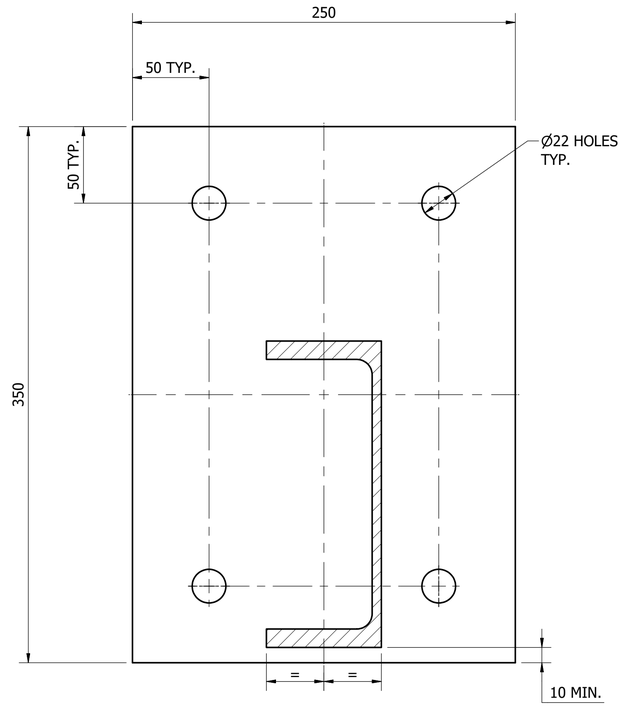


ITEM S1
DRILLING DETAILS
SCALE: 1 : 2

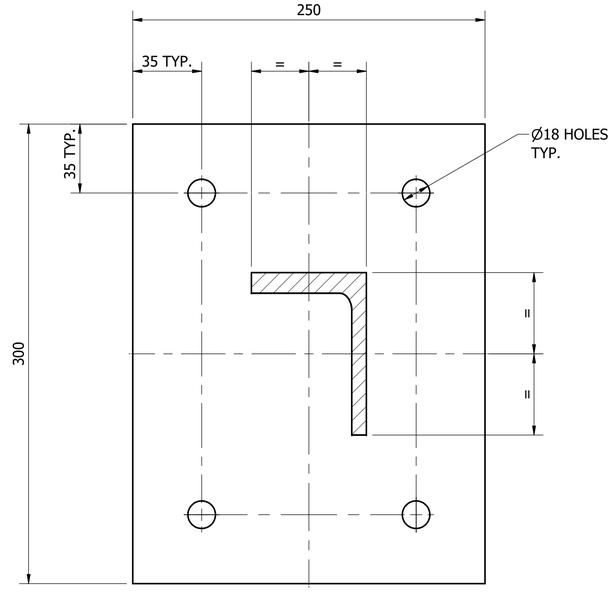
MEMBER SIZES		
MARK	DESCRIPTION	≤ DN300 PIPES
B1	PIPE SUPPORT BEAM	200 PFC
BR1	BRACE	75 x 10 EA
P1	UPPER END PLATE	20 PL
P2	LOWER END PLATE	20 PL
S1	PIPE SADDLE	65 x 10 FL

NOTES:

1. FOR STEELWORK NOTES REFER TO DRAWING: SD-9100.
2. PIPE SUPPORTS APPLICABLE TO FLANGED OR WELDED PIPES ONLY.
3. DESIGN LOAD CAPACITY (WORKING LOAD):
   - ≤ DN300 - 50 kN
4. HOLD DOWN ANCHOR BOLTS TO BE M20 SS316 CHEMICAL ANCHORS & M16 SS316 FOR TOP AND BOTTOM PLATES RESPECTIVELY.
5. 10 mm NON-SHRINK GROUT TO BE INSTALLED UNDER ALL PIPE SUPPORTS.
6. PIPE SUPPORT SUBSTRATE MATERIAL TO BE CONCRETE NOT BRICK. FOR CONNECTION TO BRICK SUBSTRATE ANCHOR CONNECTION TO BE ASSESSED.



SECTION A-A
SCALE: 1 : 2



SECTION B-B
SCALE: 1 : 2

THIS PIPE SUPPORT IS APPLICABLE FOR PIPES ≤DN300 ONLY

ITEM	AMDT.
PN530501	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	16/05/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

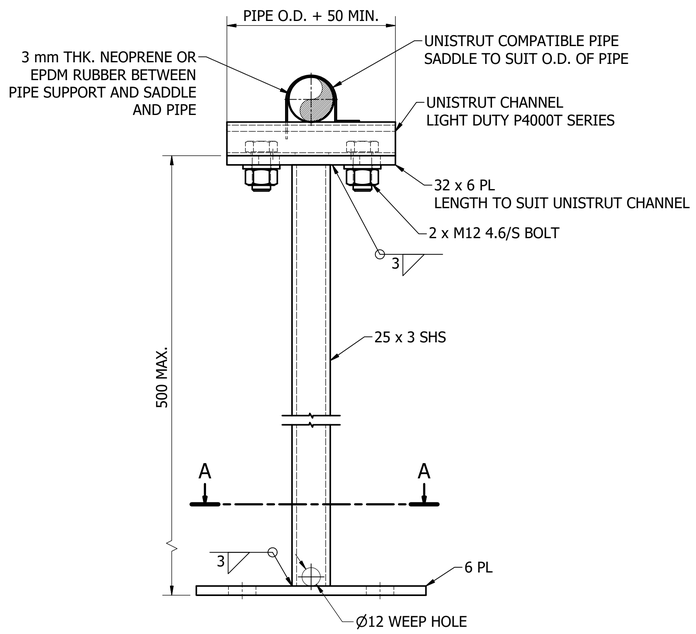
STANDARD DRAWING
PIPE SUPPORTS
HOT DIP GALVANISED
BRACED CANTILEVER PIPE SUPPORT
DETAILS

DRAWING STATUS: Current

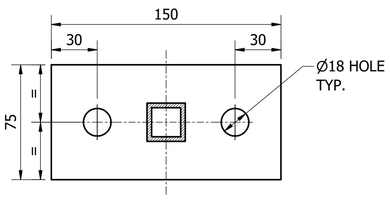
SD-5305-D

A1

ISSUE: A



ELEVATION
SCALE: 1 : 2



SECTION A-A
BASE PLATE
SCALE: 1 : 2

THIS PIPE SUPPORT IS APPLICABLE FOR PIPES ≤ DN80 ONLY

LIGHT DUTY VERTICAL PIPE SUPPORT

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 2.5 kg @ 500 HIGH

NOTES:

1. FOR STEELWORK NOTES REFER TO DRAWING SD-9100.
2. HOLD DOWN ANCHOR BOLTS TO BE M16 SS316 CHEMICAL ANCHORS.
3. 20 mm NON-SHRINK GROUT TO BE INSTALLED UNDER ALL PIPE SUPPORTS.

ITEM	AMDT.
PN530601	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

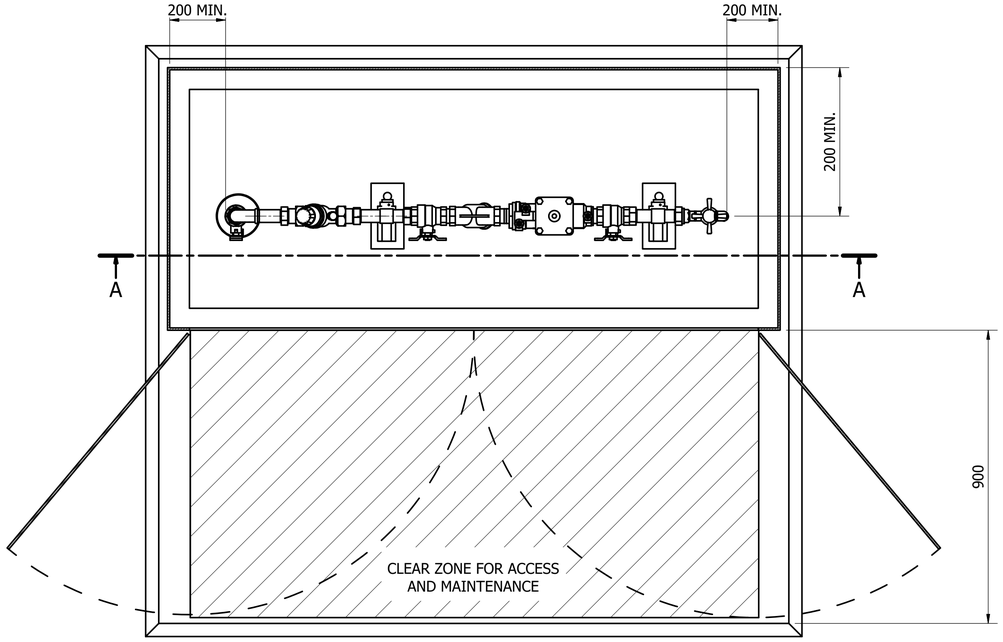
STANDARD DRAWING
PIPE SUPPORTS
HOT DIP GALVANISED
LIGHT DUTY TYPE
DETAILS

DRAWING STATUS: Current

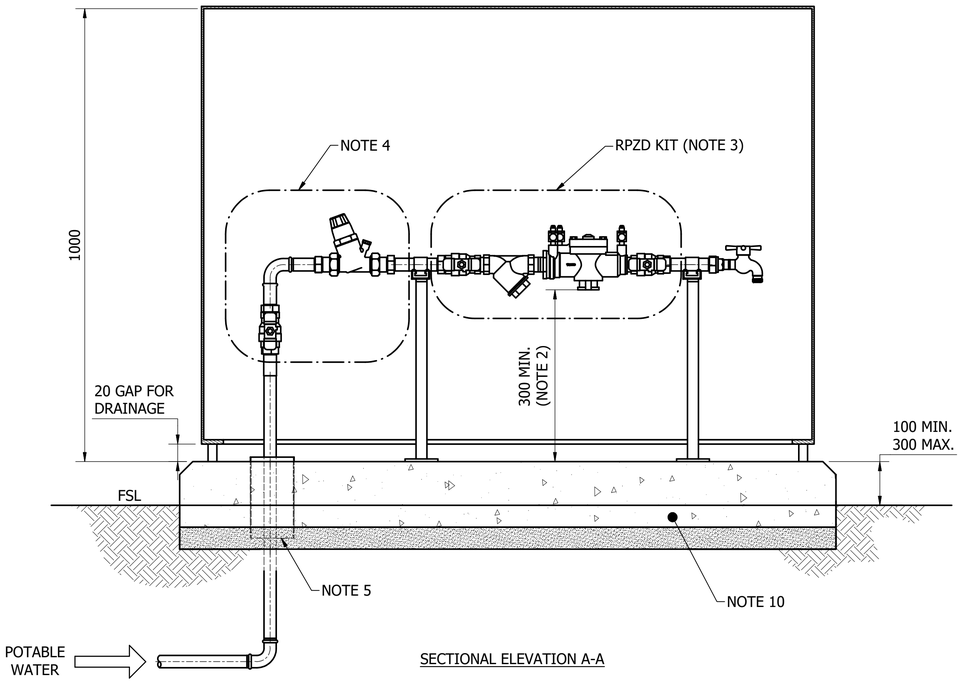
SD-5306-D

A1

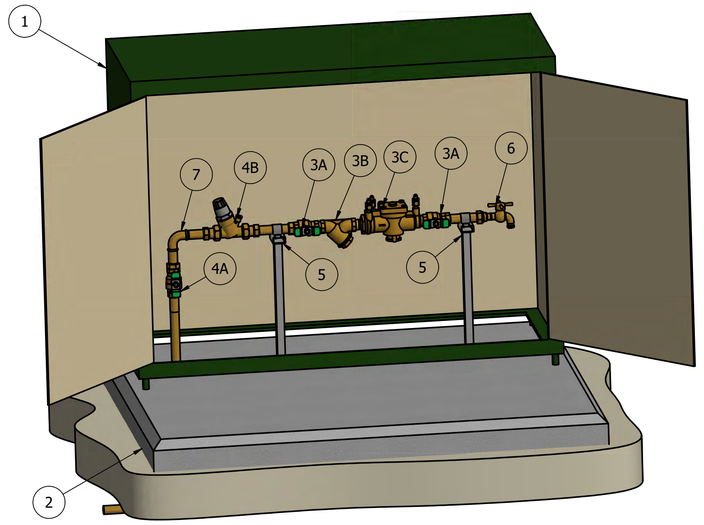
ISSUE: A



PLAN



SECTIONAL ELEVATION A-A



ISOMETRIC VIEW

SCALE: NTS

PARTS LIST		
ITEM	DESCRIPTION	QTY
1	GALVANISED STEEL ENCLOSURE, INSULATED, REFER NOTE 7 & 8	1
2	REINFORCED CONCRETE SLAB, REFER NOTE 10	1
3A	ISOLATING BALL VALVE, REFER NOTE 3	2
3B	Y STRAINER, REFER NOTE 3	1
3C	REDUCED PRESSURE ZONE DEVICE, REFER NOTE 3	1
4A	ISOLATING BALL VALVE, NOTE 4	1
4B	PRESSURE REDUCING VALVE, ADJUSTABLE TYPE TO AS 1357.2	1
5	PIPE SUPPORT - PN530601 ON DRAWING SD-5306, C/W HOLD DOWN BOLTS ETC.	2
6	HOSE TAP, BRASS "CLICK ON" TYPE, C/W TAP ADAPTER FOR STANDARD HOSE CONNECTION	1
7	COPPER PIPE & FITTINGS AS 1432 - TYPE B HARD DRAWN	AS REQ'D

NOTES

1. ALL VALVES AND FITTINGS SHALL HAVE WATERMARK CERTIFICATION AND BE SELECTED FROM ICON WATER'S APPROVED PRODUCTS LIST.

2. BACKFLOW PREVENTION DETAILS SHALL BE IN FULL COMPLIANCE WITH AS/NZS 3500.

3. ITEMS 3A, 3B AND 3C ARE TO BE PURCHASED AS A COMPETE KIT.

4. ITEMS 4A AND 4B ARE ONLY REQUIRED WHEN THE SUPPLY (MAINS) PRESSURE IS GREATER THAN 900 kPa.

5. INCOMING SUPPLY RISER SHALL BE LAGGED AND NOT IN DIRECT CONTACT WITH STEEL OR CONCRETE SURFACES.

6. ALL PIPEWORK AND TUBING OF SIZES DN50 AND SMALLER SHALL BE INSULATED TO PREVENT FREEZING. REFER TO ICON WATER'S APPROVED PRODUCTS LIST FOR ACCEPTABLE INSULATION.

7. THE PIPEWORK ENCLOSURE SHALL HAVE KNAUF "CLIMAFOAM XPS" INSULATION BOARDS INSTALLED TO ALL INTERNAL SURFACES (INCLUDING DOORS) OF 30 mm MIN. THICKNESS. ALTERNATIVES SUCH AS BRICK OR BLOCK CONSTRUCTION ARE ALSO ACCEPTABLE IN LIEU OF GALVANISED STEEL.

8. THE ENCLOSURE FINISH COLOUR SHALL BE NOMINATED BY THE DESIGNER TO SUIT THE PREVAILING ARCHITECTURE / STREETSCAPE. THE FINISH COLOUR MUST BE SHOWN ON THE DESIGN DRAWINGS FOR ACCEPTANCE BY ICON WATER. OTHERWISE, THE DEFAULT FINISH COLOUR SHALL BE G66 ENVIRONMENT GREEN TO AS 2700.

9. ALL DOORS SHALL HAVE LOCKING DEVICES PROVIDED IN ACCORDANCE WITH ICON WATER'S SECURITY POLICY.

10. THE REINFORCED CONCRETE SLAB DETAILS AND SUB-BASE DETAILS SHALL BE DETAILED ON THE PROJECT SPECIFIC DRAWINGS AND SHALL BE APPROVED FOR THE SPECIFIC SITE CONDITIONS.

RPZD STATION

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	ENCLOSURE COLOUR NOTE ADDED	10/09/2018	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM		RES		SPS	X
BWS		WAT	X	STP	
WTP		SEW			
WPS		REC			

icon WATER

STANDARD DRAWING
RPZD STATION
GENERAL ARRANGEMENT AND NOTES

DRAWING STATUS: Current

SD-5500-C

A1

ISSUE: B

NOTES:

1. LENGTH OF C-SECTION TO SPAN ACROSS 2 RESERVOIR ROOF PERLINS MIN.

2. C-SECTION IS TO BE FIXED TO THE ROOF PERLINS BY TEK HEXAGON HEAD SCREWS FOR METAL. WHERE PERLINS ARE STRUCTURAL STEEL SECTION, ZINC PLATED SERIES 500 GAUGE 12 SELF TAPPING SCREWS ARE TO BE USED.

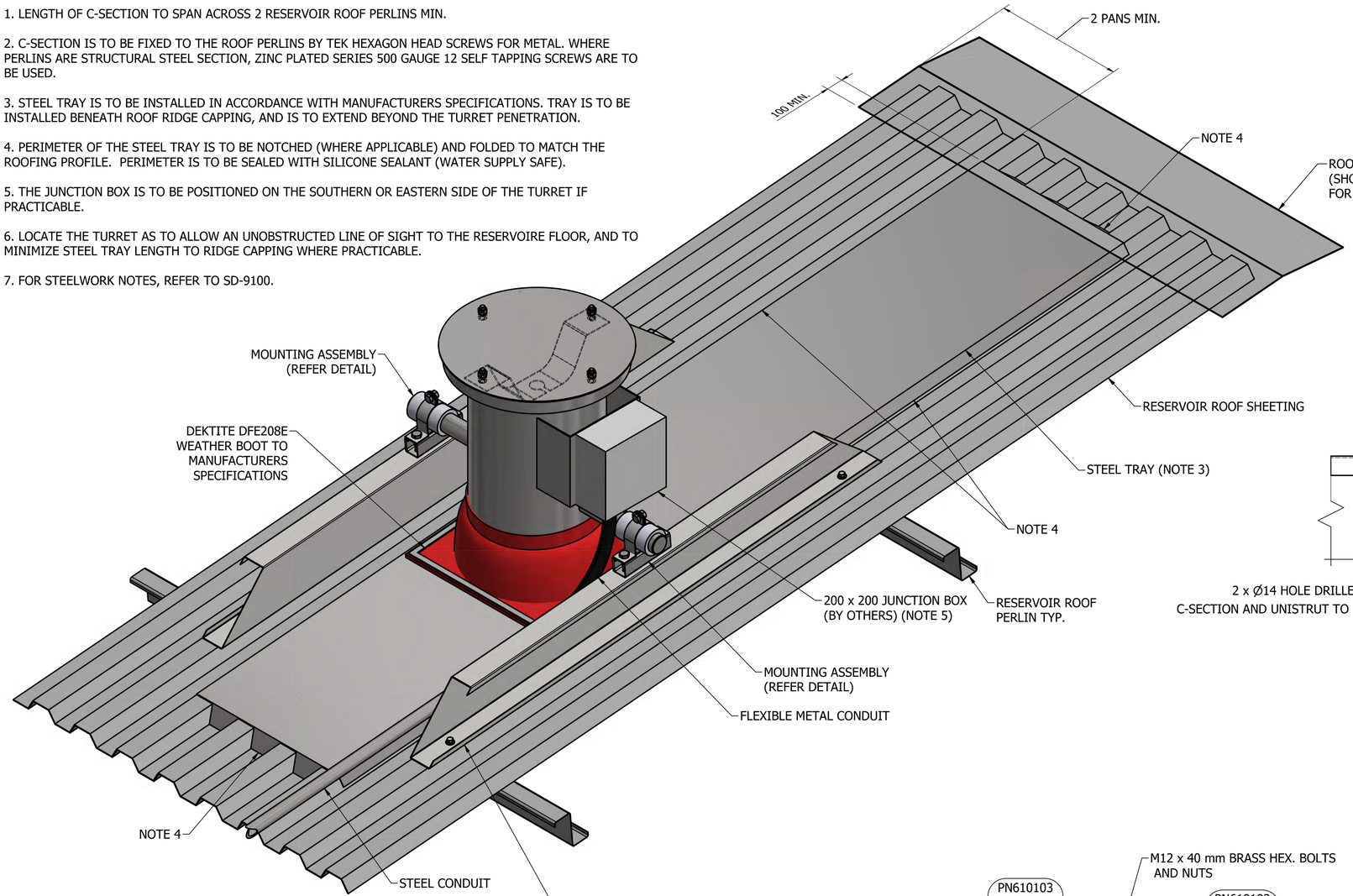
3. STEEL TRAY IS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS. TRAY IS TO BE INSTALLED BENEATH ROOF RIDGE CAPPING, AND IS TO EXTEND BEYOND THE TURRET PENETRATION.

4. PERIMETER OF THE STEEL TRAY IS TO BE NOTCHED (WHERE APPLICABLE) AND FOLDED TO MATCH THE ROOFING PROFILE. PERIMETER IS TO BE SEALED WITH SILICONE SEALANT (WATER SUPPLY SAFE).

5. THE JUNCTION BOX IS TO BE POSITIONED ON THE SOUTHERN OR EASTERN SIDE OF THE TURRET IF PRACTICABLE.

6. LOCATE THE TURRET AS TO ALLOW AN UNOBSTRUCTED LINE OF SIGHT TO THE RESERVOIRE FLOOR, AND TO MINIMIZE STEEL TRAY LENGTH TO RIDGE CAPPING WHERE PRACTICABLE.

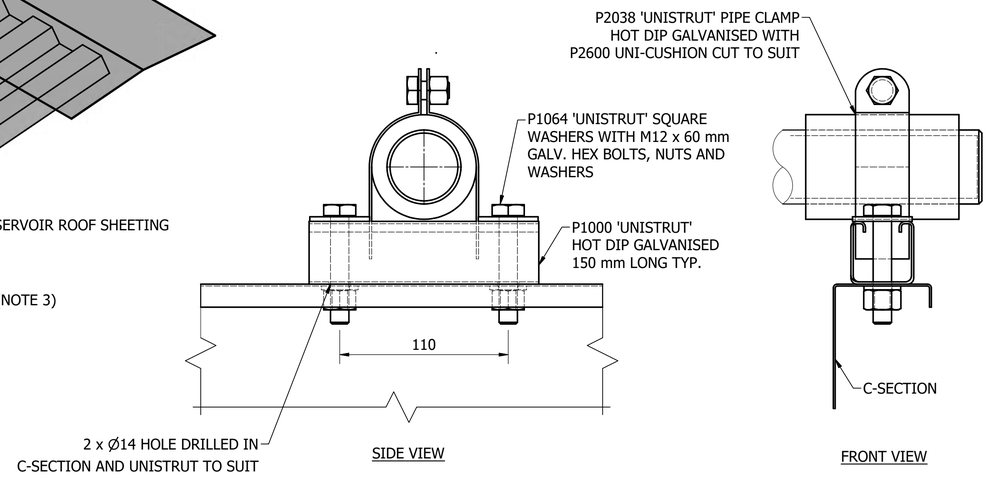
7. FOR STEELWORK NOTES, REFER TO SD-9100.



ISOMETRIC VIEW

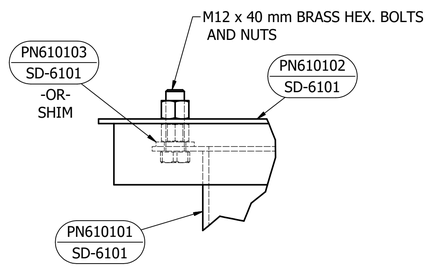
TURRET INSTALLATION ARRANGEMENT AND DETAILS

SCALE: N.T.S



MOUNTING ASSEMBLY DETAIL

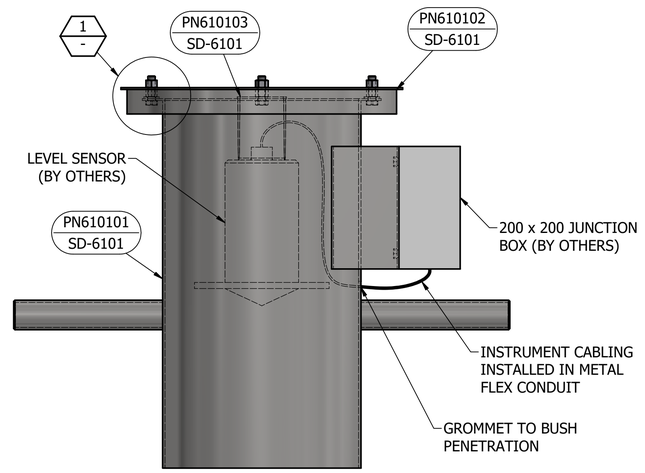
SCALE: 1 : 2



DETAIL 1

LID AND BRACKET ARRANGEMENT

SCALE: 1 : 2



FRONT VIEW

TURRET ASSEMBLY DETAILS

SCALE: 1 : 5

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	REDRAWN TO INCORPORATE DESIGN UPDATES	26/04/2019	S. Essery	I. McRae	D. Eager

DAM		RES	X	SPS				
BWS		WAT	X	STP				
WTP		SEW						
WPS		REC						

ASSET AREA APPLICABILITY

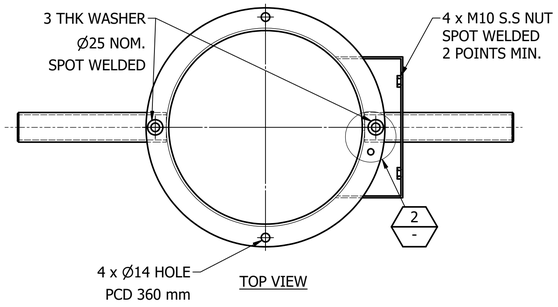
icon WATER

STANDARD DRAWING
RESERVOIRS
LEVEL SENSOR SUPPORT COLUMN
GENERAL ARRANGEMENT
AND INSTALLATION DETAILS

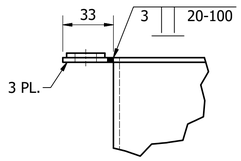
DRAWING STATUS: Current

SD-6100-D

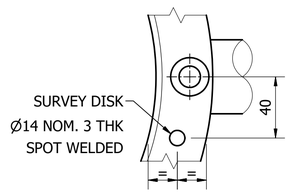
ISSUE B



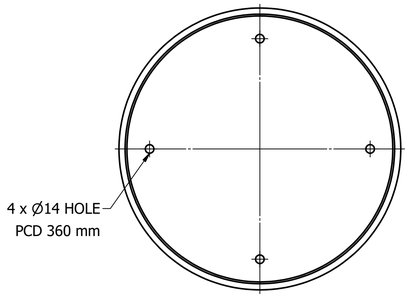
TOP VIEW



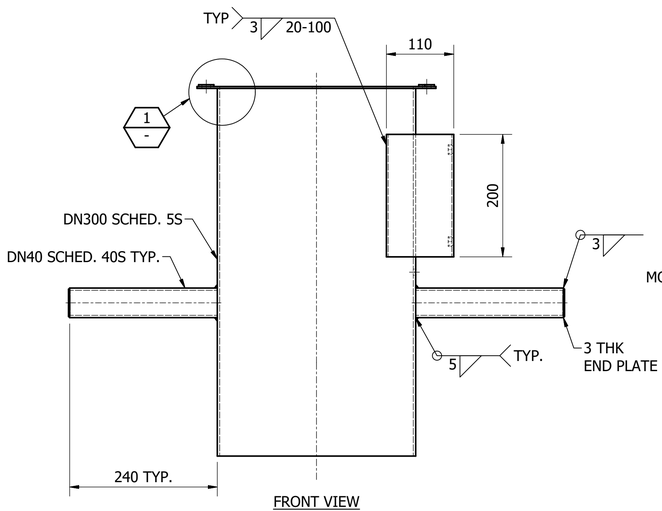
DETAIL 1
SCALE : 1:2



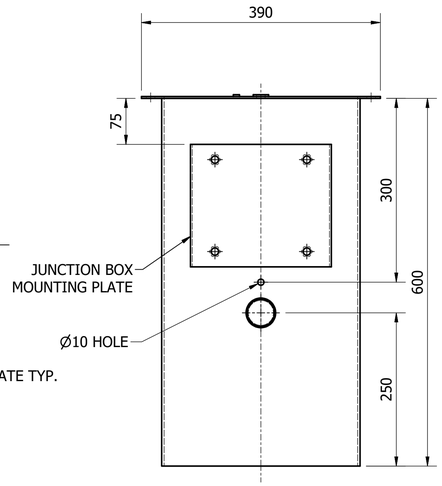
DETAIL 2
SCALE: 1 : 2



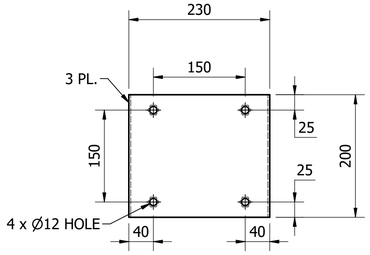
TOP VIEW



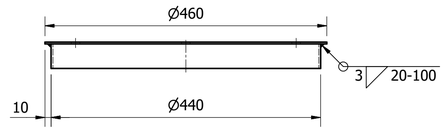
FRONT VIEW



SIDE VIEW



JUNCTION BOX MOUNTING PLATE DETAIL
SCALE: 1 : 5



FRONT VIEW

LID
SCALE: 1 : 5

MATERIAL: STAINLESS STEEL GRADE 316, 3 THK
COATING: N/A
FINISH COLOUR: MILL
MASS: 5 kg APPROX.

ITEM	AMDT.
PN610102	

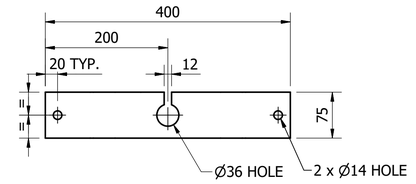
SUPPORT COLUMN
SCALE: 1 : 5

MATERIAL: STAINLESS STEEL
COATING: POWDER COATING
FINISH COLOUR: MILL
MASS: 30 kg APPROX.

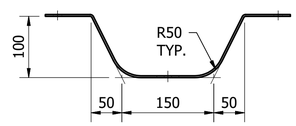
ITEM	AMDT.
PN610101	

NOTES:

1. FOR ALL NOTES, REFER TO SD-6100.



TOP VIEW



FRONT VIEW

RADAR BRACKET
SCALE: 1 : 5

MATERIAL: STAINLESS STEEL GRADE 316, 3 THK
COATING: N/A
FINISH COLOUR: MILL
MASS: 1 kg

ITEM	AMDT.
PN610103	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager
B	REDRAWN TO INCORPORATE DESIGN UPDATES	26/04/2019	S. Essery	I. McRae	D. Eager

DAM		RES	X	SPS				
BWS		WAT	X	STP				
WTP		SEW						
WPS		REC						

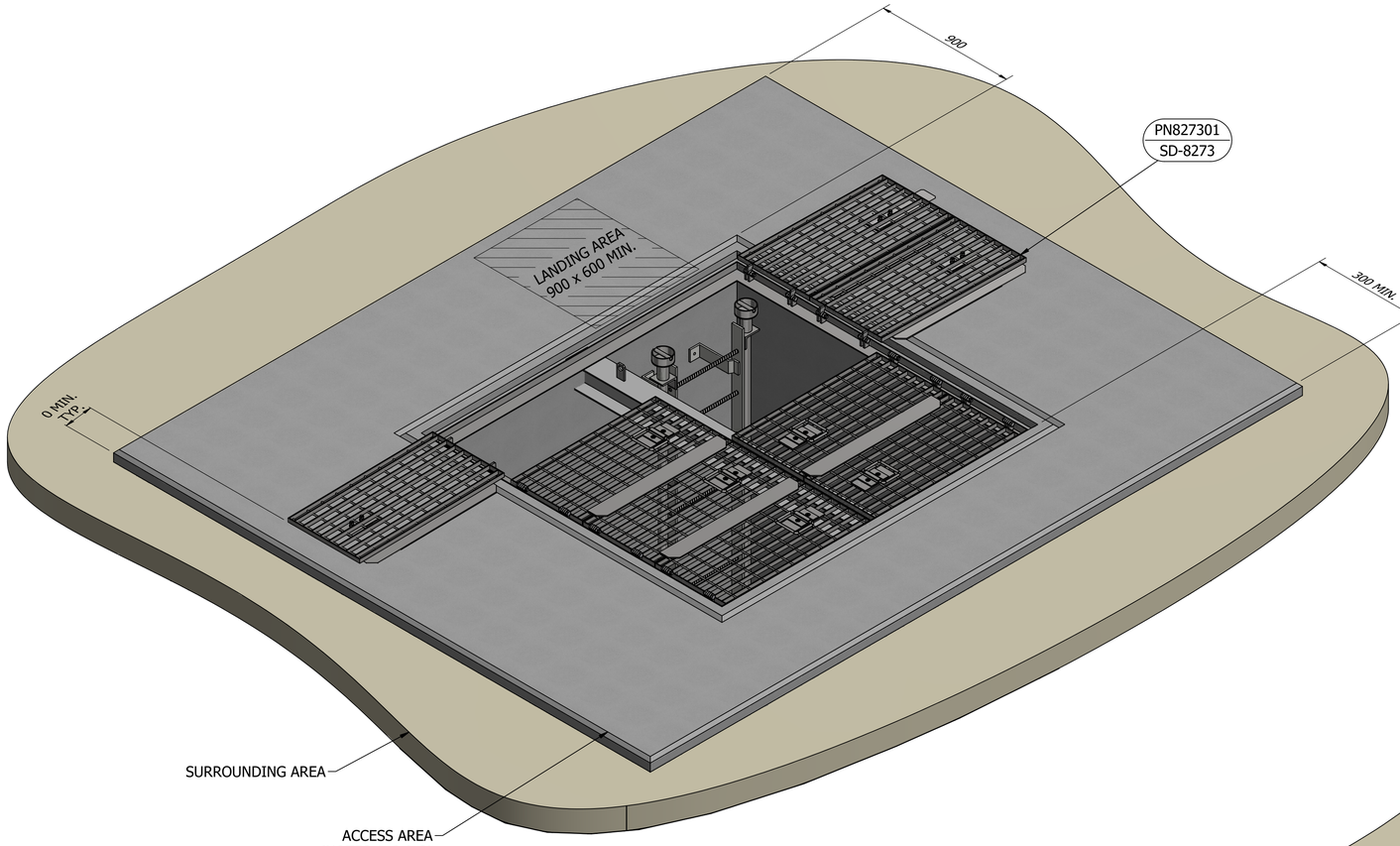
ASSET AREA APPLICABILITY

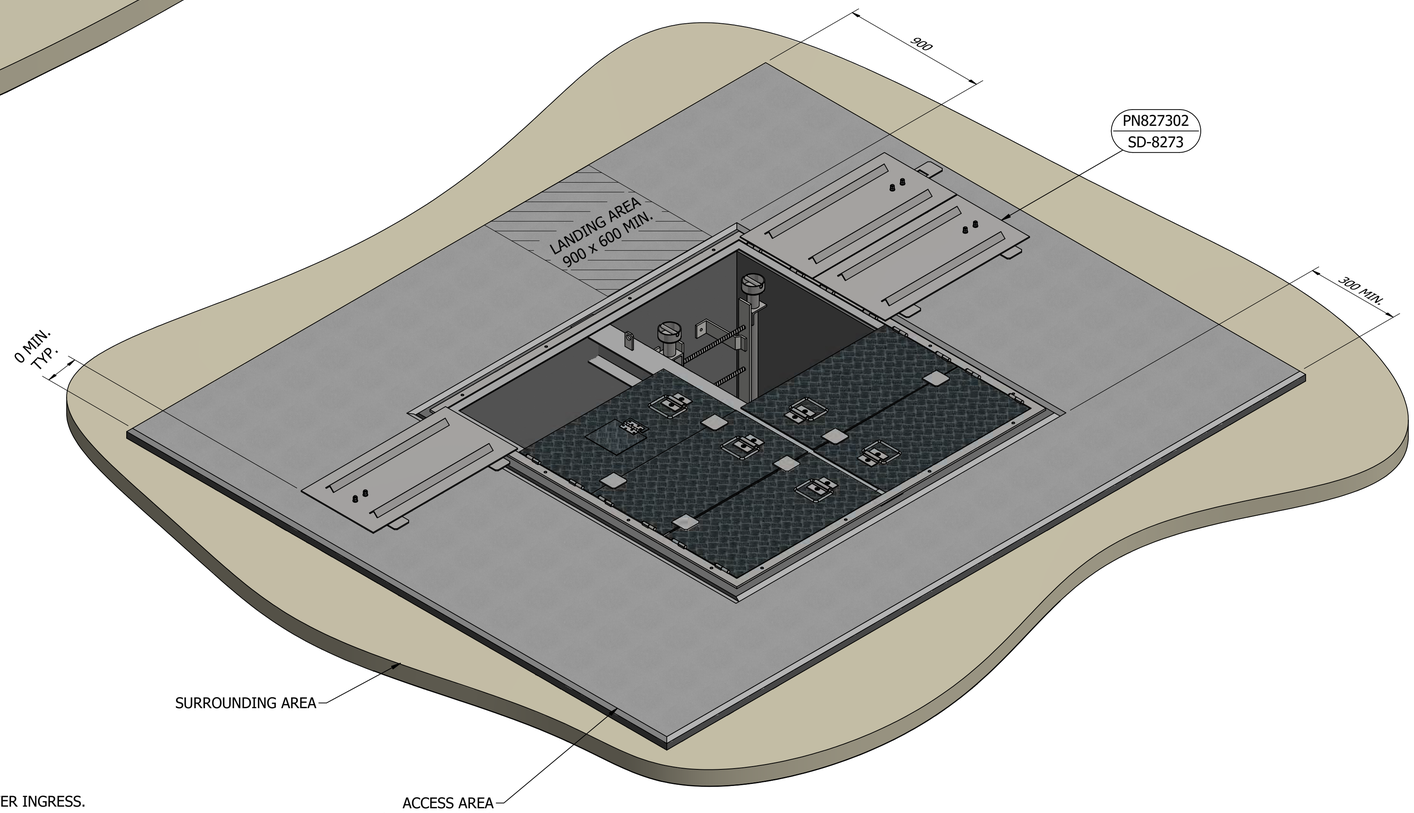
STANDARD DRAWING
RESERVOIRS
LEVEL SENSOR SUPPORT COLUMN
COLUMN, LID AND BRACKET
DETAILS

DRAWING STATUS
Current

SD-6101-D

ISSUE B





NOTES:

1. R.C. OR HARDSTAND ACCESS AREA TO EXTEND AS SHOWN SO THAT THE FOLD FLAT COVERS CAN BE WALKED UPON WHEN FULLY OPEN.

2. ACCESS AREA TO BE A MIN. HEIGHT OF 100 AND A MAX. HEIGHT OF 300 ABOVE THE SURROUNDING AREA TO AVOID/MINIMISE SURFACE WATER INGRESS.

3. WHERE COMPACTED FILL IS USED TO FORM HARDSTAND, BATTER FILL TO NATURAL SURFACE BEYOND REQUIRED FLAT ZONE. BATTER GRADE TO BE NO MORE THAN 1 IN 4.

4. LADDER TYPES SHOWN ARE FOR EXAMPLE PURPOSES ONLY. OTHER LADDER TYPES MAY BE INSTALLED.

5. THE DESIGNER SHALL FAMILIARISE THEMSELVES WITH THE REQUIREMENTS OF ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009 PRIOR TO DESIGNING ANY STRUCTURE WHICH REQUIRES HEIGHT SAFETY TO BE TAKEN INTO CONSIDERATION.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

icon WATER

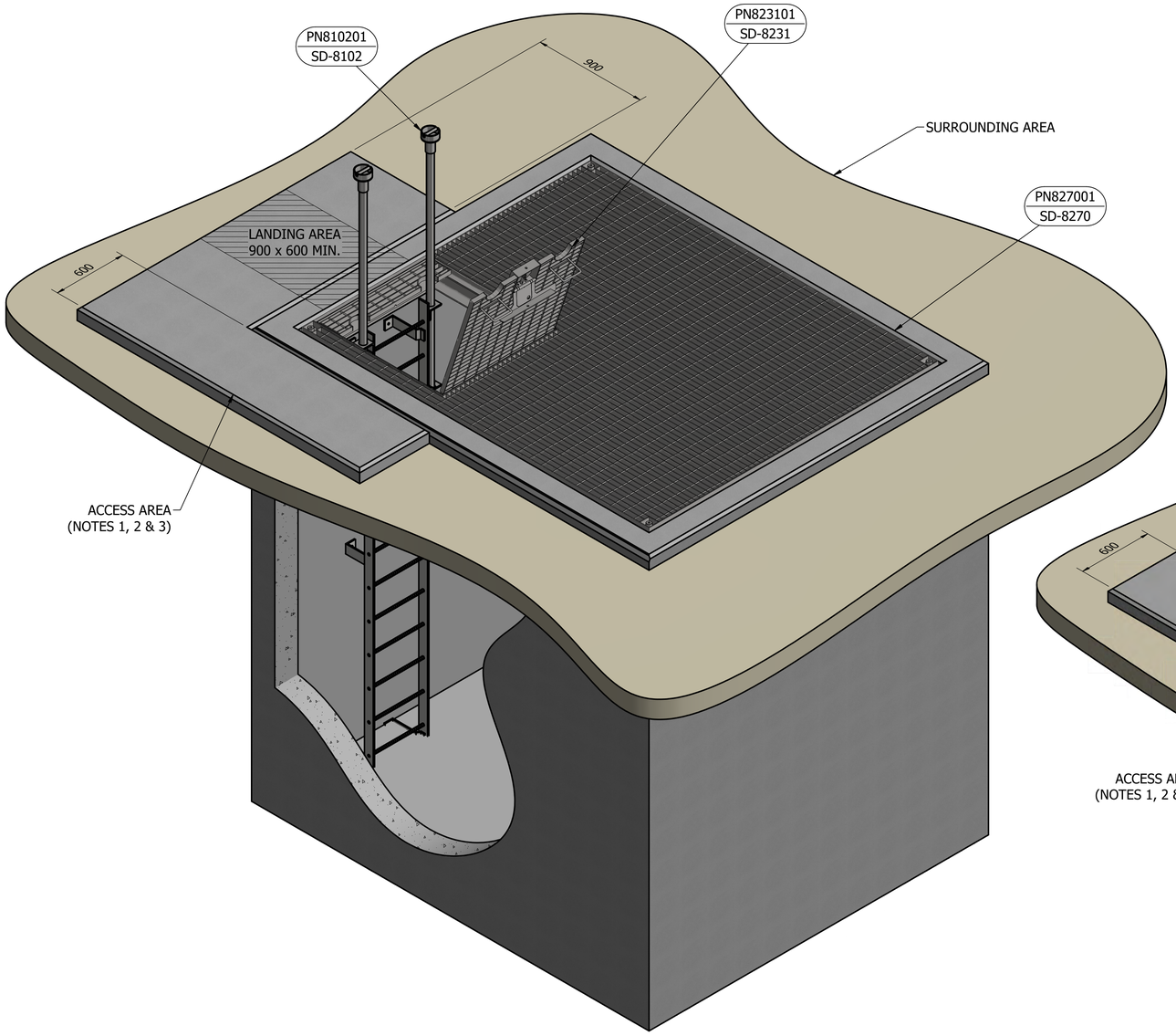
STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL
FIXED FRAME (FOLD FLAT) COVERS
EXAMPLE INSTALLATIONS

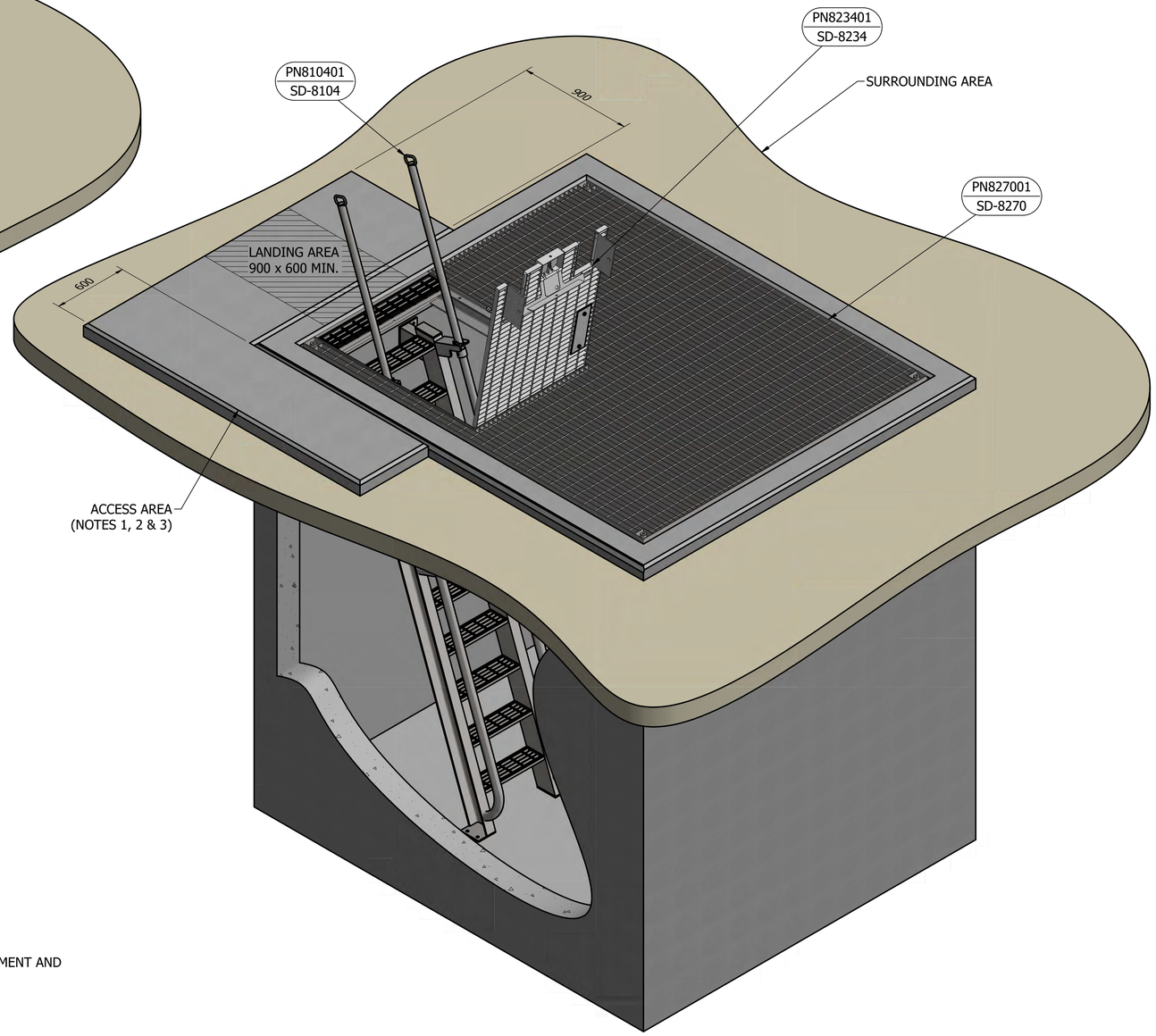
DRAWING STATUS: Current

SD-8001-C

A1

ISSUE: A





NOTES:

1. R.C. OR HARDSTAND ACCESS AREA AND PERIMETER AROUND THE DROP-IN COVER TO BE SIZED SO THAT APPROVED ICON WATER LIMITED FREE FALL ARREST EQUIPMENT AND PORTABLE BARRIERS CAN BE SET UP APPROPRIATELY. THE LANDING AREA SHALL BE IN ACCORDANCE WITH AS 1657 AS AMENDED BY ICON WATER.

2. ACCESS AREA TO BE A MIN. HEIGHT OF 100 AND A MAX. HEIGHT OF 300 ABOVE THE SURROUNDING AREA TO AVOID/MINIMISE SURFACE WATER INGRESS.

3. WHERE COMPACTED FILL IS USED TO FORM HARDSTAND, BATTER FILL TO NATURAL SURFACE BEYOND REQUIRED FLAT ZONE. BATTER GRADE TO BE NO MORE THAN 1 IN 4.

4. THE LADDERS AND COVER COMBINATIONS SHOWN ARE EXAMPLES ONLY. OTHER COMBINATIONS MAY BE INSTALLED AS APPROPRIATE.

5. THE DESIGNER SHALL FAMILIARISE THEMSELVES WITH THE REQUIREMENTS OF ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009 PRIOR TO DESIGNING ANY STRUCTURE WHICH REQUIRES HEIGHT SAFETY TO BE TAKEN INTO CONSIDERATION.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

icon WATER

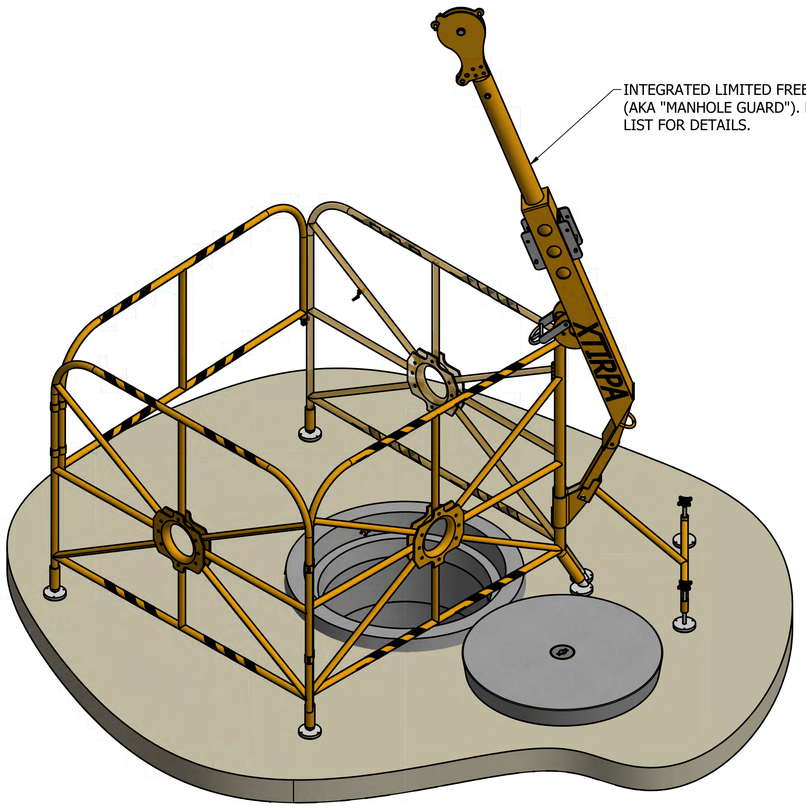
STANDARD DRAWING
ACCESS COVERS - DROP IN TYPE
VERTICAL AND INCLINE RUNG LADDER WITH EXTENDABLE STANCHIONS
EXAMPLE INSTALLATIONS

DRAWING STATUS: Current

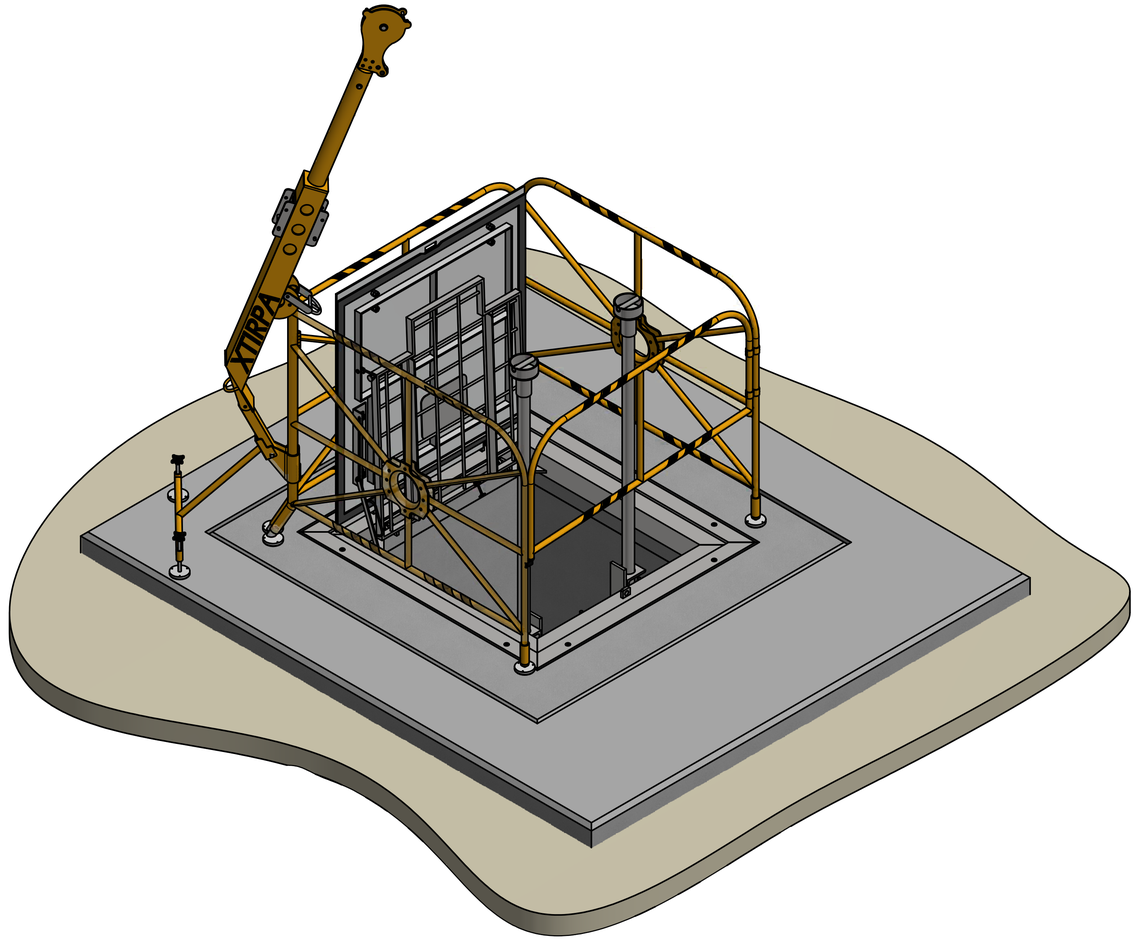
SD-8002-C

A1

ISSUE: A



EXAMPLE INSTALLATION 1
"MANHOLE GUARD" AROUND MAINTENANCE HOLE



EXAMPLE INSTALLATION 2
"MANHOLE GUARD" AROUND FLUSH FIT COVER

NOTES:

1. THE PURPOSE OF THIS DRAWING IS TO ILLUSTRATE HOW ICON WATER MAINTENANCE PERSONEL MAY ACCESS STANDARD MAINTENANCE HOLES AND OTHER BURIED MAINTENANCE STRUCTURES SUCH AS VALVE CHAMBERS. DESIGNERS SHALL TAKE INTO CONSIDERATION METHODS OF ACCESS, EGRESS AND FREE FALL ARREST WHEN DESIGNING SUCH STRUCTURES. REFER TO ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009 FOR DETAILED REQUIREMENTS AS WELL AS THE RELEVANT DRAWINGS ON ICON WATER'S STANDARD DRAWING SET NUMBERED SD-8000 TO SD-9000.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

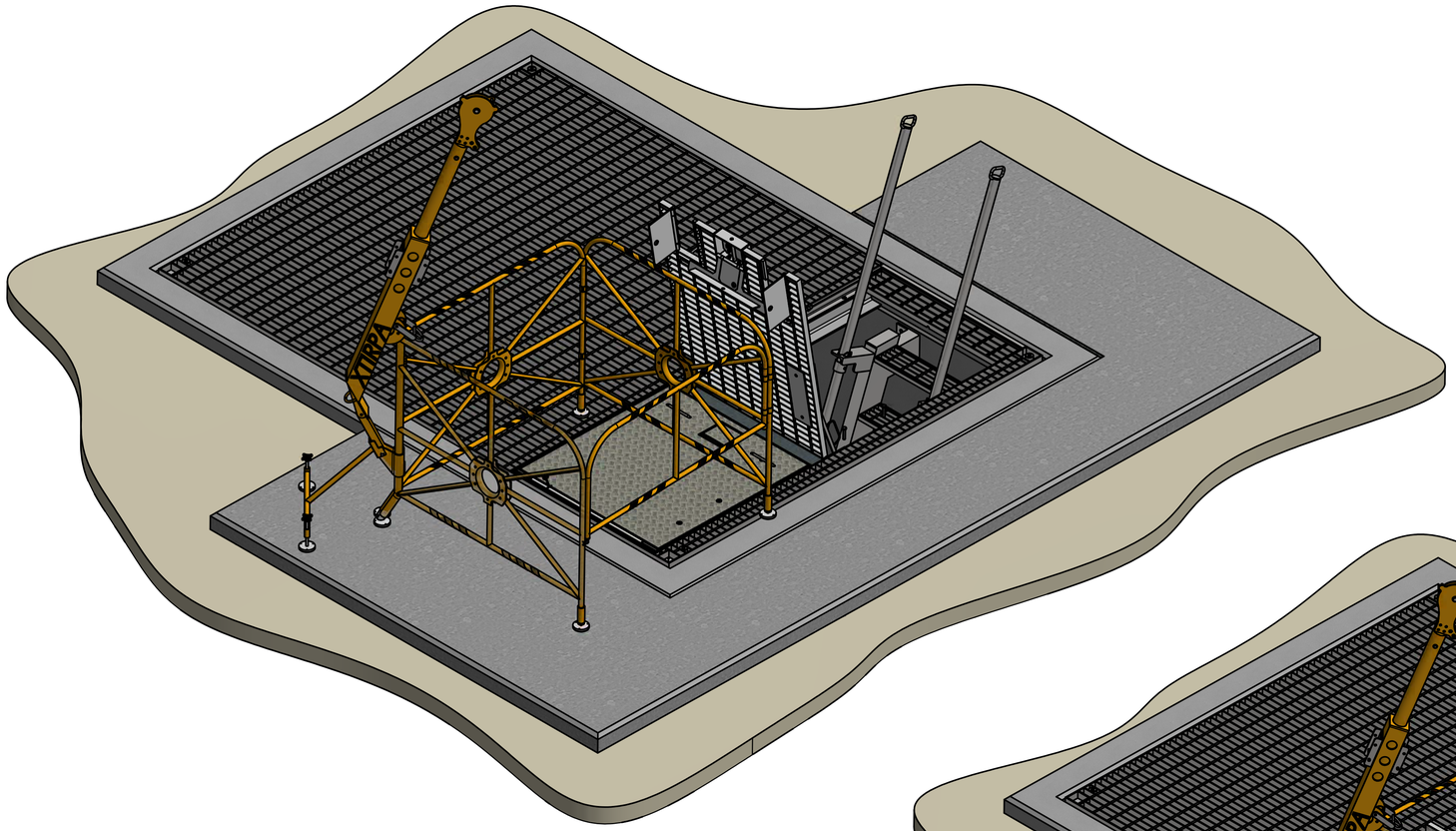
STANDARD DRAWING
PORTABLE EDGE PROTECTION AND DAVITS
SETUP AROUND HATCHES AND COVERS
EXAMPLE INSTALLATIONS SHEET 1 OF 2

DRAWING STATUS: Current

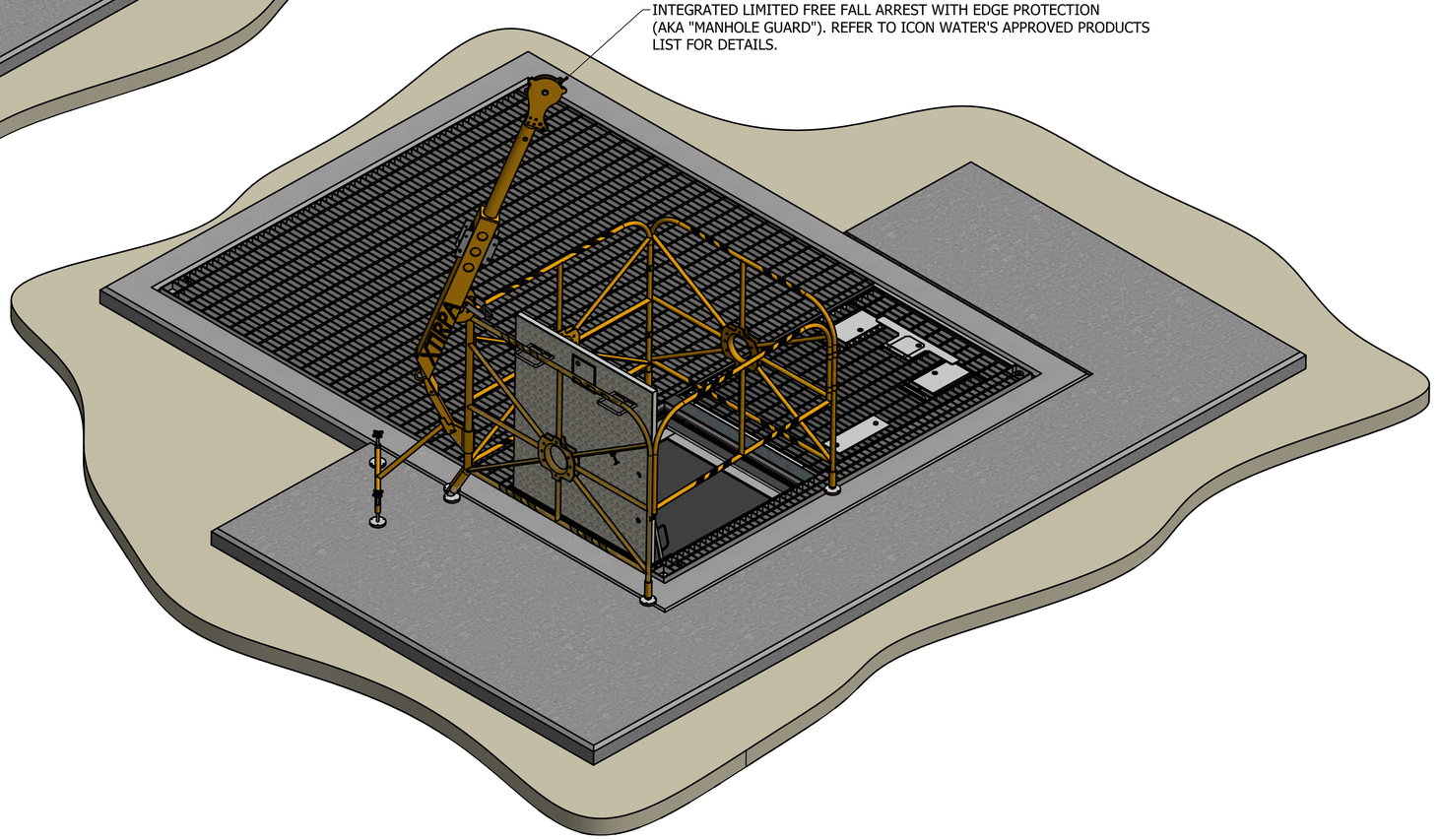
SD-8004-C

A1

ISSUE: A



EXAMPLE INSTALLATION 3 - POSITION 1
"MANHOLE GUARD" SHOWN IN STANDBY
POSITION OVER SECONDARY RESCUE HATCH



EXAMPLE INSTALLATION 3 - POSITION 2
"MANHOLE GUARD" SHOWN IN RESCUE
POSITION OVER SECONDARY RESCUE HATCH

NOTES:

1. THE PURPOSE OF THIS DRAWING IS TO ILLUSTRATE HOW ICON WATER MAINTENANCE PERSONEL MAY ACCESS STANDARD MAINTENANCE HOLES AND OTHER BURIED MAINTENANCE STRUCTURES SUCH AS VALVE CHAMBERS. DESIGNERS SHALL TAKE INTO CONSIDERATION METHODS OF ACCESS, EGRESS AND FREE FALL ARREST WHEN DESIGNING SUCH STRUCTURES. REFER TO ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009 FOR DETAILED REQUIREMENTS AS WELL AS THE RELEVANT DRAWINGS ON ICON WATER'S STANDARD DRAWING SET NUMBERED SD-8000 TO SD-9000.

2. SECONDARY RESCUE HATCHES MAY BE REQUIRED FOR BURIED MAINTENANCE STRUCTURES WHEN INCLINED LADDERS OR STAIRS ARE INSTALLED AS THE PRIMARY MEANS OF ACCESS AND EGRESS. DESIGNERS SHALL TAKE INTO CONSIDERATION POTENTIAL RESCUE PLANS WHEN SPECIFYING SUCH DESIGN ELEMENTS FOR STRUCTURES WHICH ARE DETERMINED TO BE "CONFINED SPACES" AS DEFINED BY AS 2865.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

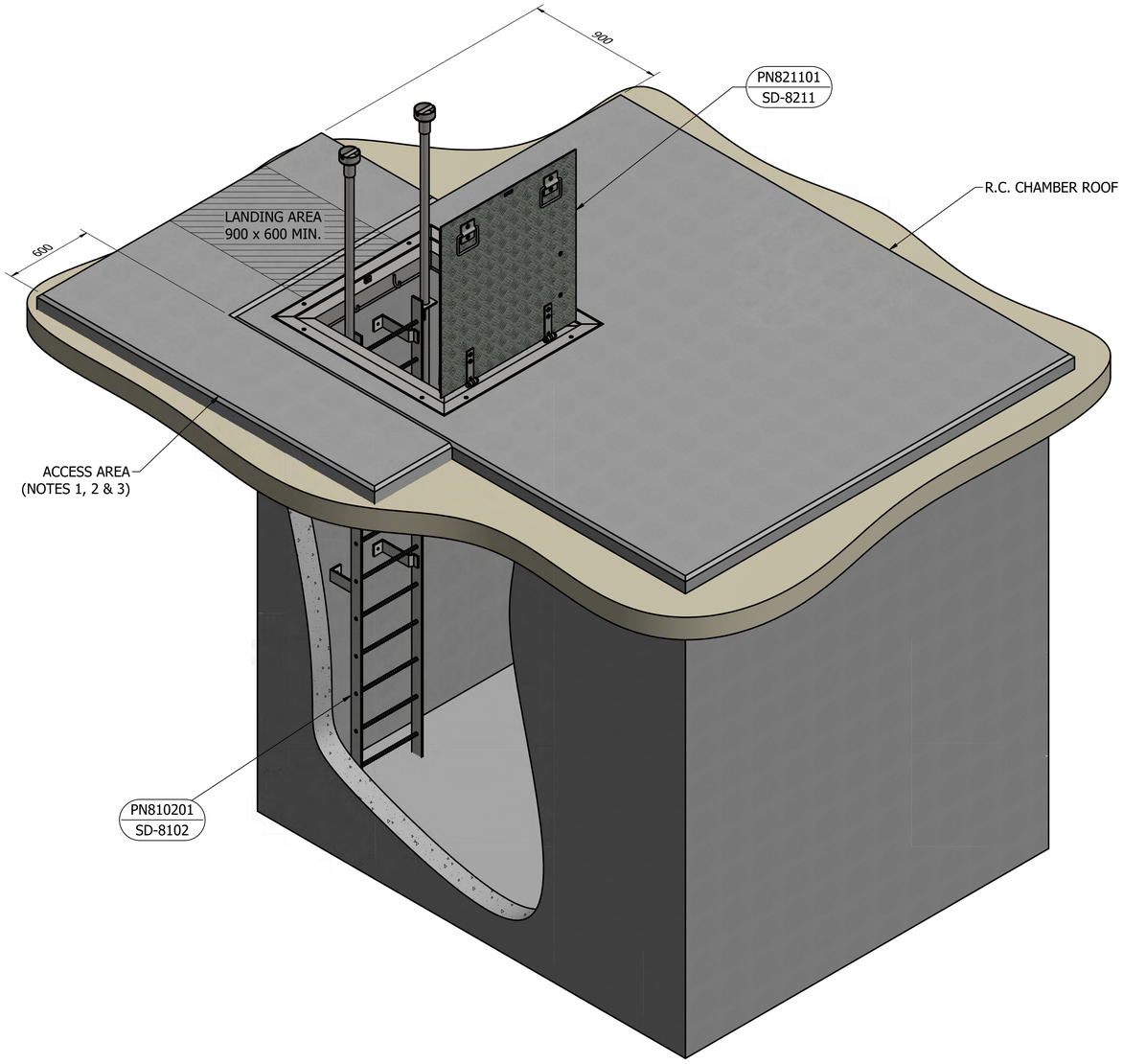
STANDARD DRAWING
PORTABLE EDGE PROTECTION AND DAVITS
SETUP AROUND HATCHES AND COVERS
EXAMPLE INSTALLATIONS SHEET 2 OF 2

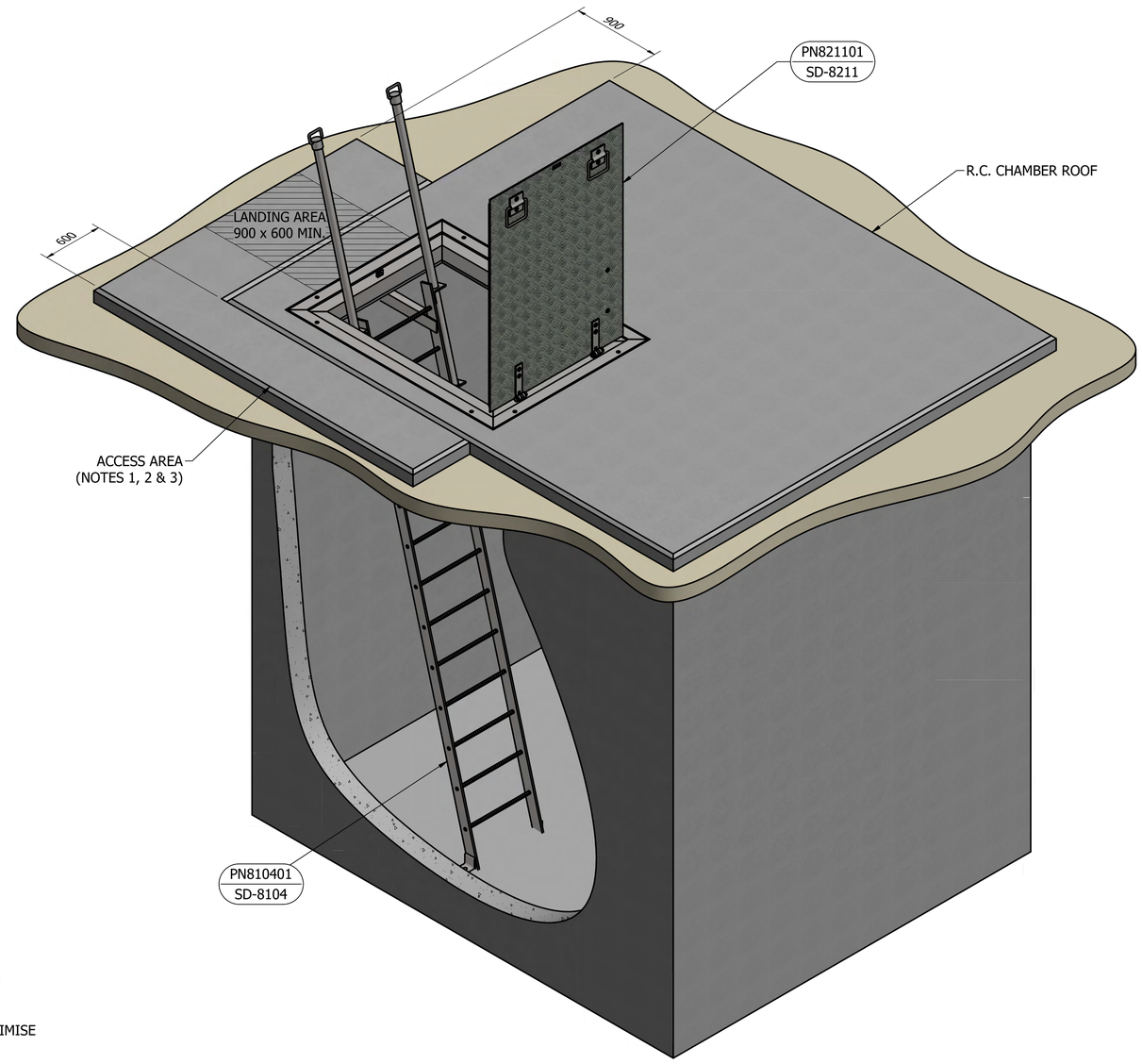
DRAWING STATUS: Current

SD-8005-C

A1

ISSUE: A





NOTES:

1. R.C. OR HARDSTAND ACCESS AREA AND PERIMETER AROUND THE DROP-IN COVER TO BE SIZED SO THAT APPROVED ICON WATER LIMITED FREE FALL ARREST EQUIPMENT AND PORTABLE BARRIERS CAN BE SET UP APPROPRIATELY. THE LANDING AREA SHALL BE IN ACCORDANCE WITH AS 1657 AS AMENDED BY ICON WATER.

2. THE ACCESS AREA AND PERIMETER AROUND THE DROP-IN COVER SHALL BE A MIN. HEIGHT OF 100 AND A MAX HEIGHT OF 300 ABOVE THE SURROUNDING AREA TO AVOID/MINIMISE SURFACE WATER INGRESS.

3. WHERE COMPACTED FILL IS USED TO FORM HARDSTAND, BATTER FILL TO NATURAL SURFACE BEYOND REQUIRED FLAT ZONE. BATTER GRADE TO BE NO MORE THAN 1 IN 4.

4. THE LADDERS AND COVER COMBINATIONS SHOWN ARE EXAMPLES ONLY. OTHER COMBINATIONS MAY BE INSTALLED AS APPROPRIATE.

5. THE DESIGNER SHALL FAMILIARISE THEMSELVES WITH THE REQUIREMENTS OF ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009 PRIOR TO DESIGNING ANY STRUCTURE WHICH REQUIRES HEIGHT SAFETY TO BE TAKEN INTO CONSIDERATION.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM		RES		SPS	X	WTP		SEW	X
BWS		WAT		STP	X	WPS		REC	

ASSET AREA APPLICABILITY

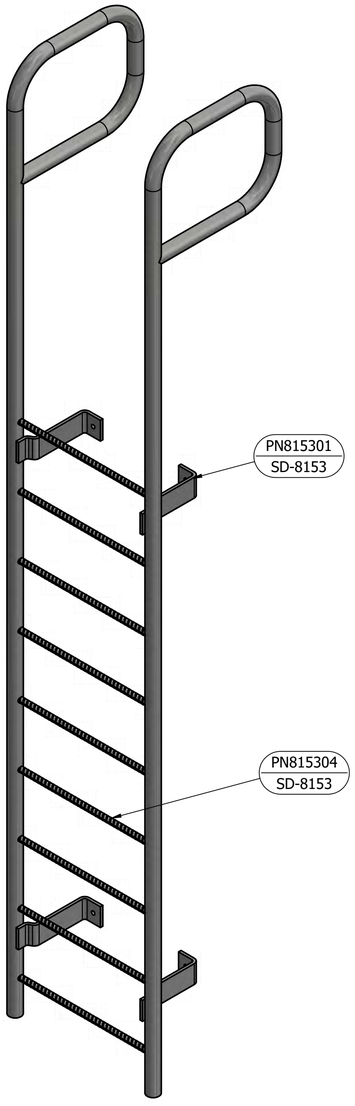
STANDARD DRAWING
GAS TIGHT COVERS
EXAMPLE INSTALLATIONS

DRAWING STATUS: Current

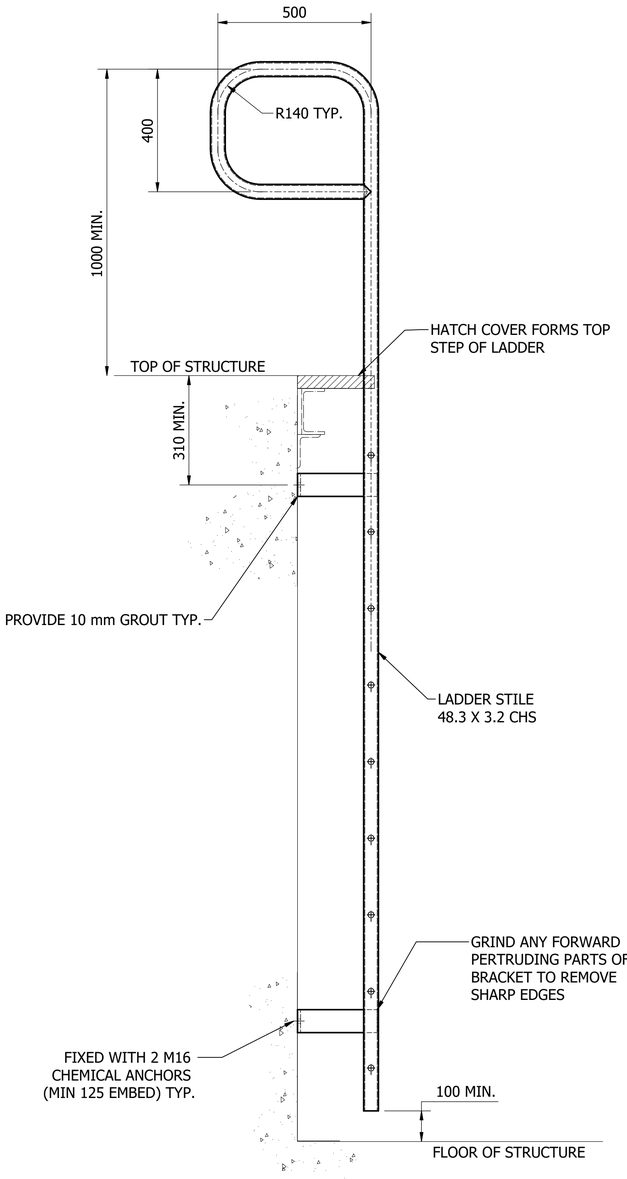
SD-8006-C

A1

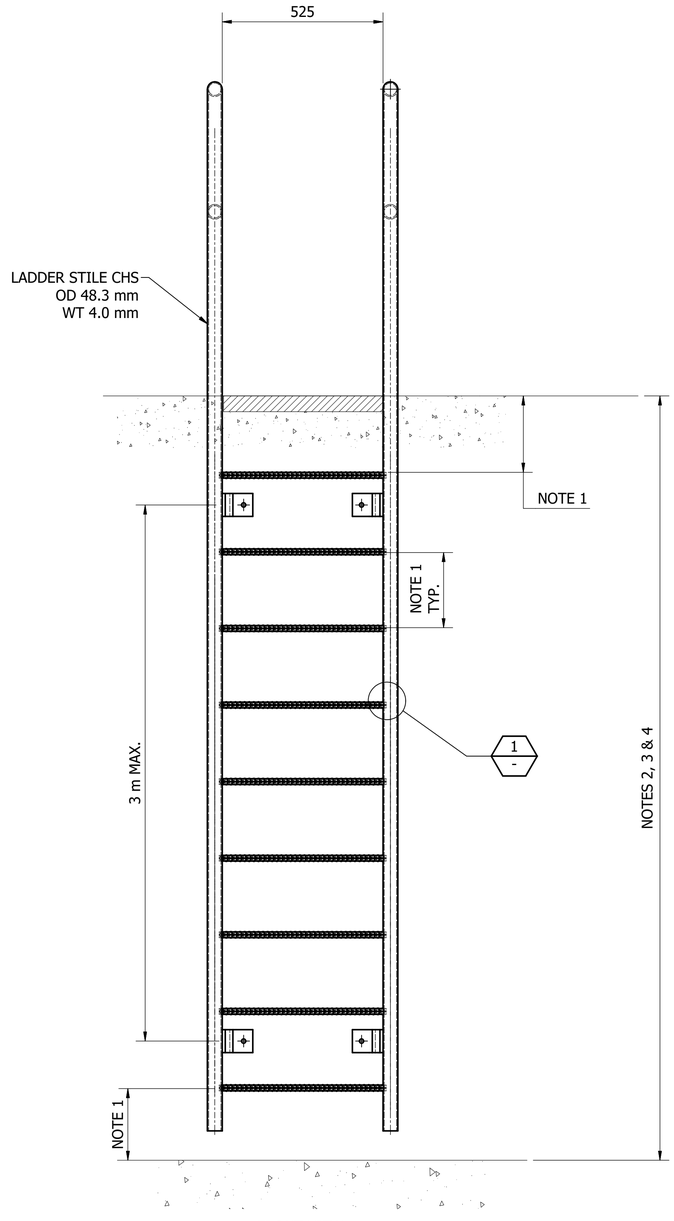
ISSUE: A



ISOMETRIC VIEW



SIDE VIEW



FRONT VIEW

NOTES

1. RUNG SPACING TO BE BETWEEN 250 AND 300 ENSURING A CONSISTENT SPACING WHEN STEPPING ON AND OFF THE LADDER. RUNG SPACING TOLERANCE TO BE ± 5.

2. LADDER HEIGHTS ABOVE THE FLOOR OF THE STRUCTURE SHALL NOT EXCEED 6 m UNLESS FITTED WITH A LADDER CAGE.

3. INDIVIDUAL LADDER LENGTHS SHALL NOT EXCEED 6 m.

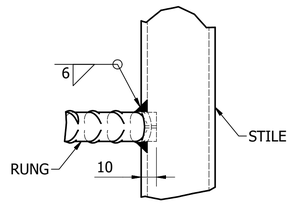
4. DESIGNER TO SPECIFY OVERALL LADDER LENGTH ON PROJECT DRAWING(S).

5. THIS LADDER IS COMPATIBLE WITH THE ACCESS HATCH SHOWN ON DRAWING SD-8231.

6. QUANTITY AND MASS BASED ON A LADDER APPROX. 2500 IN LENGTH.

7. REFER TO DRAWING SD-9100 FOR STEELWORK NOTES.

8. ALL WORKS SHALL COMPLY WITH AS 1657 AND ICON WATER SUPPPLEMENT DOCUMENTS STD-SPE-G-008 AND 009.



DETAIL 1

RUNG WELD DETAIL TYP.
SCALE: 1 : 2

VERTICAL RUNG LADDER WITH FIXED STANCHIONS - TYPICAL ASSEMBLY

SCALE : 1 : 10

PARTS LIST				
PART NUM	DESCRIPTION	QTY	MASS	REFERENCE
N/A	LADDER STILES	2	20.3 kg	SD-8101
PN815304	LADDER RUNG	VARIES	1.2 kg	SD-8153
PN815301	WALL BRACKET	4	1.9 kg	SD-8153

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: DESIGNER TO PROVIDE PROJECT SPECIFIC DETAILS

ITEM	AMDT.
PN810101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

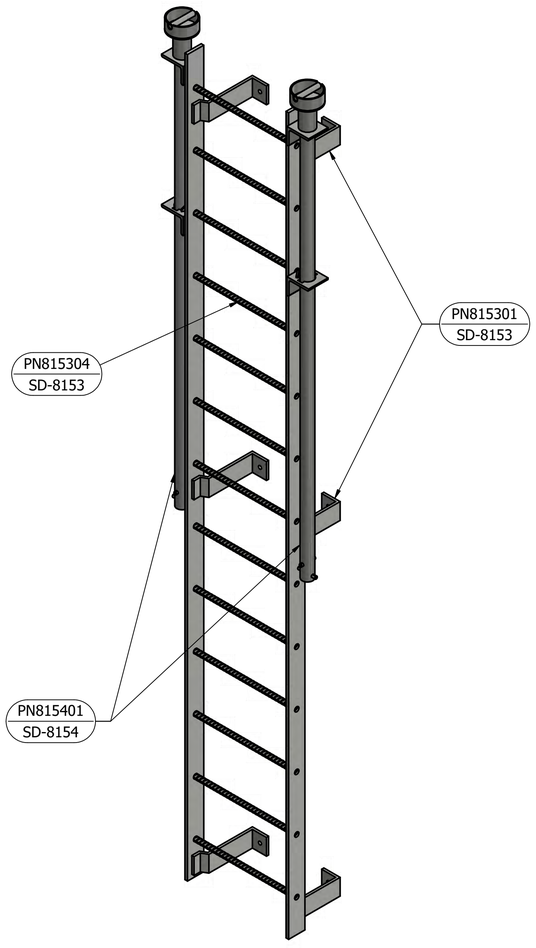
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
FIXED VERTICAL RUNG LADDER WITH FIXED STANCHIONS
ASSEMBLY AND DETAILS

DRAWING STATUS: Current

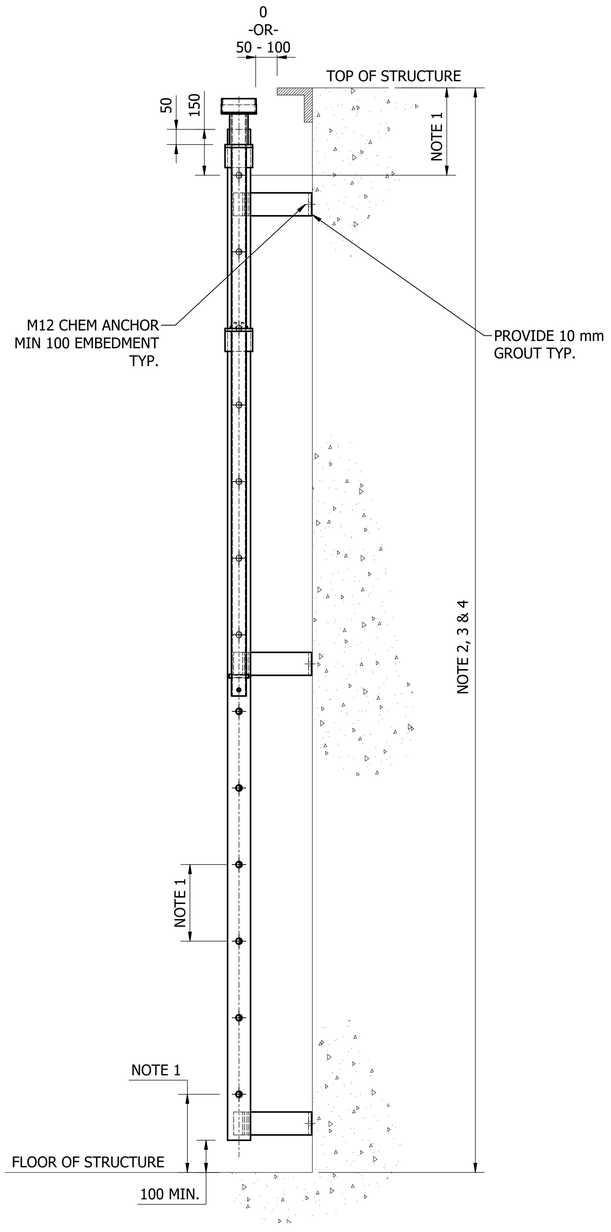
SD-8101-D

A1

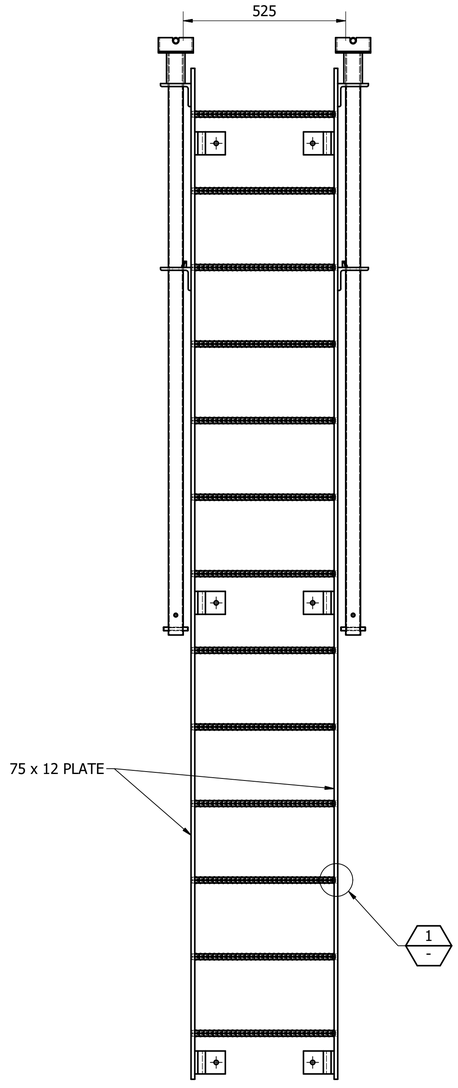
ISSUE: A



ISOMETRIC VIEW



SIDE VIEW



FRONT VIEW

NOTES:

1. THE DESIGNER SHALL NOMINATE AN EVEN RUNG PITCH BETWEEN 250 AND 300 ENSURING A CONSISTENT PITCH WHEN STEPPING ON & OFF THE LADDER. RUNG PITCH TOLERANCE SHALL BE ± 5.

2. LADDER HEIGHTS ABOVE THE FLOOR OF THE STRUCTURE SHALL NOT EXCEED 6 m UNLESS FITTED WITH A LADDER CAGE.

3. INDIVIDUAL LADDER LENGTHS SHALL NOT EXCEED 6 m.

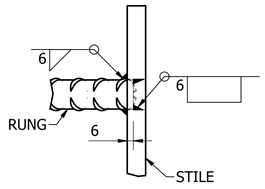
4. DESIGNER TO SPECIFY OVERALL LADDER LENGTH ON PROJECT DRAWING(S).

5. THIS LADDER IS COMPATIBLE WITH THE ACCESS HATCHES SHOWN ON SD-8201, 8211 AND 8231.

6. QUANTITY AND MASS BASED ON A LADDER APPROX 3000 IN LENGTH.

7. REFER TO DRAWING SD-9100 FOR STEELWORK NOTES.

8. ALL WORKS SHALL COMPLY WITH AS 1657 AND ICON WATER SUPPPLEMENT DOCUMENTS STD-SPE-G-008 AND 009.



DETAIL 1

RUNG WELD DETAIL TYP.
SCALE: 1 : 2

VERTICAL RUNG LADDER WITH PULL-UP STANCHIONS
TYPICAL ASSEMBLY
SCALE : 1 : 10

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN815301	WALL BRACKET	6	2 kg	SD-8153
PN815304	LADDER RUNG	13	1 kg	SD-8153
PN815401	EXTENDABLE STANCHION	2	11 kg	SD-8154

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: DESIGNER TO PROVIDE PROJECT SPECIFIC DETAILS

ITEM	AMDT.
PN810201	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

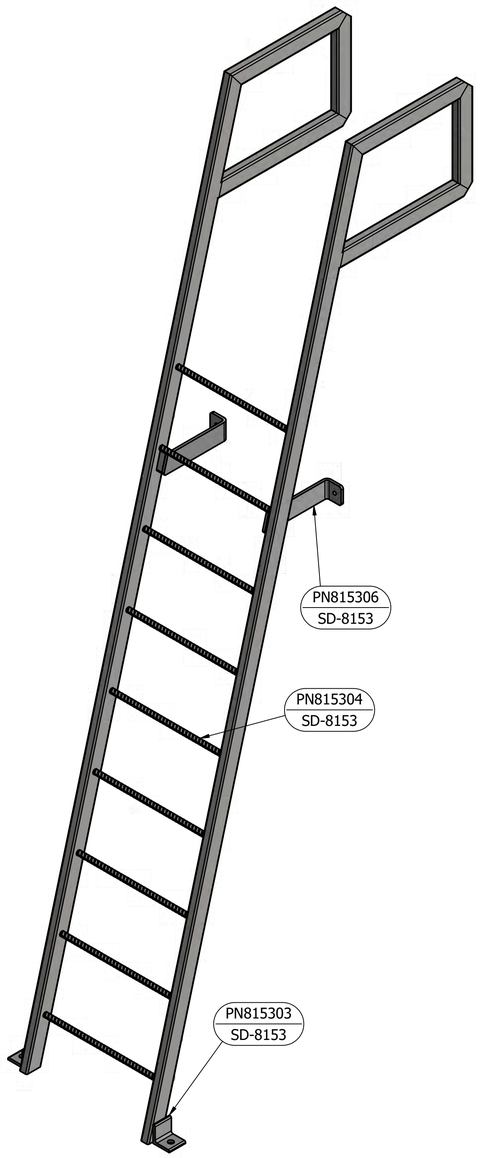
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
FIXED VERTICAL RUNG LADDER WITH PULL-UP STANCHIONS
ASSEMBLY AND DETAILS

DRAWING STATUS: Current

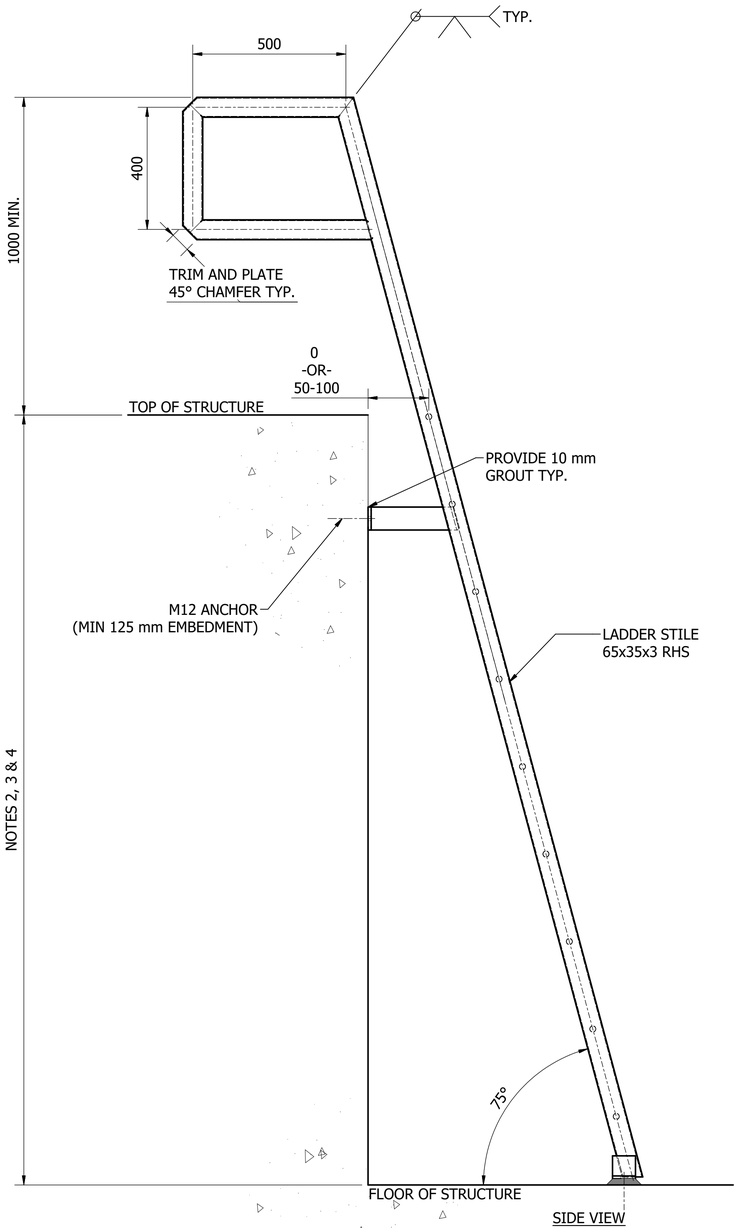
SD-8102-D

A1

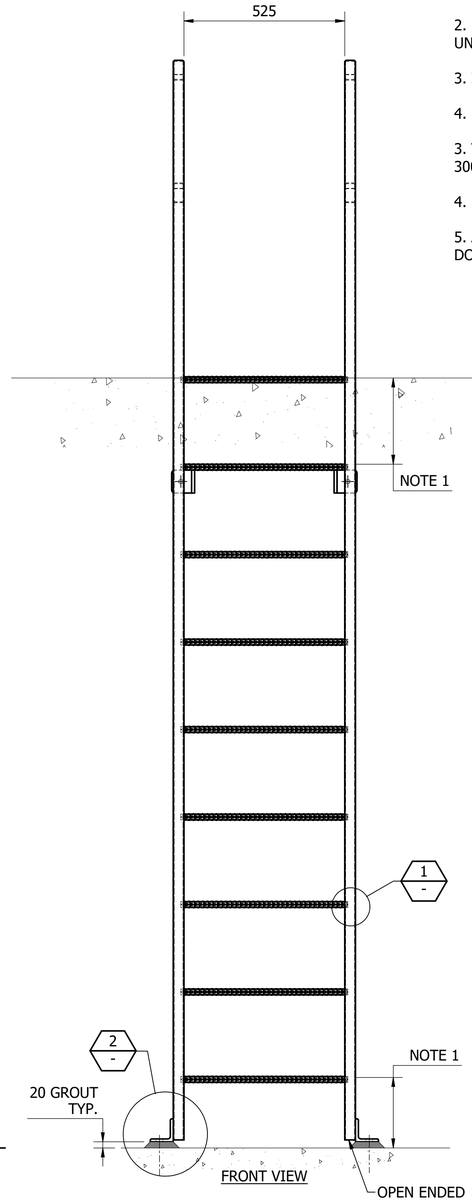
ISSUE: A



ISOMETRIC VIEW



SIDE VIEW



FRONT VIEW

OPEN ENDED

NOTES:

1. RUNG SPACING TO BE BETWEEN 250 AND 300 ENSURING A CONSISTENT SPACING WHEN STEPPING ON AND OFF THE LADDER. RUNG SPACING TOLERANCE TO BE ± 5.

2. LADDER HEIGHTS ABOVE THE FLOOR OF THE STRUCTURE SHALL NOT EXCEED 6 m UNLESS FITTED WITH A LADDER CAGE.

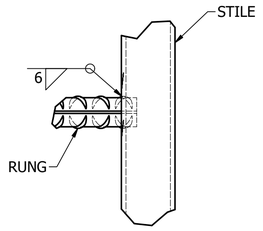
3. INDIVIDUAL LADDER LENGTHS SHALL NOT EXCEED 6 m.

4. DESIGNER TO SPECIFY OVERALL LADDER LENGTH ON PROJECT DRAWING(S).

3. THE QUANTITIES AND MASSES SHOWN ARE BASED ON A LADDER 3000 LONG APPROX.

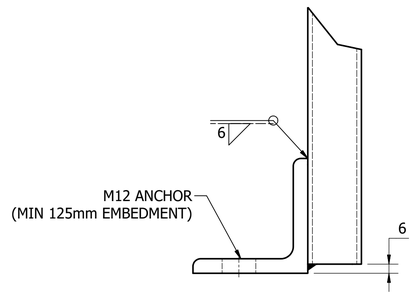
4. REFER TO DRAWING SD-9100 FOR STEELWORK NOTES.

5. ALL WORKS SHALL COMPLY WITH AS 1657 AND ICON WATER SUPPPLEMENT DOCUMENTS STD-SPE-G-008 AND 009.



DETAIL 1

RUNG WELD DETAIL TYP.
SCALE: 1 : 2



DETAIL 2

FLOOR CONNECTION DETAIL
SCALE: 1 : 2

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
N/A	LADDER STILES	2	22.1 kg	SD-8103
PN815304	LADDER RUNG	9	1.2 kg	SD-8153
PN815306	WALL BRACKET	2	2.2 kg	SD-8153
PN815303	FLOOR BRACKET	2	.8 kg	SD-8153

FIXED INCLINED RUNG LADDER
WITH FIXED STANCHIONS - TYPICAL ASSEMBLY
SCALE : 1 : 10

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 60 kg

ITEM	AMDT.
PN810301	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	RES	SPS
BWS	WAT	STP
WTP	SEW	
WPS	REC	

ASSET AREA APPLICABILITY

icon WATER

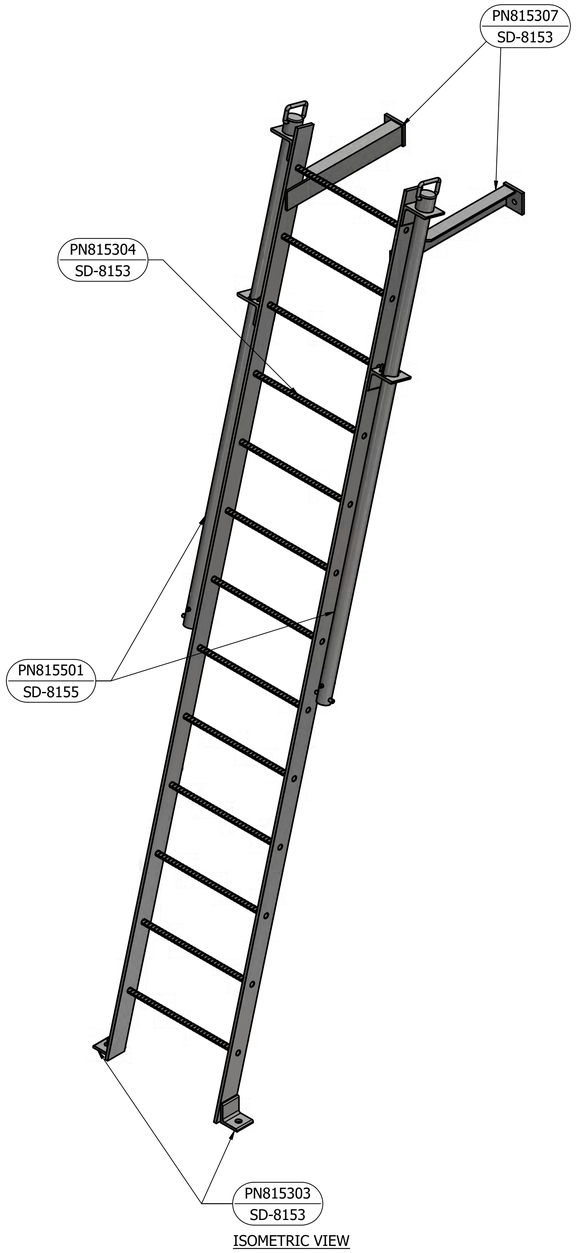
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
FIXED INCLINED RUNG LADDER WITH FIXED STANCHIONS
ASSEMBLY AND DETAILS

DRAWING STATUS: Current

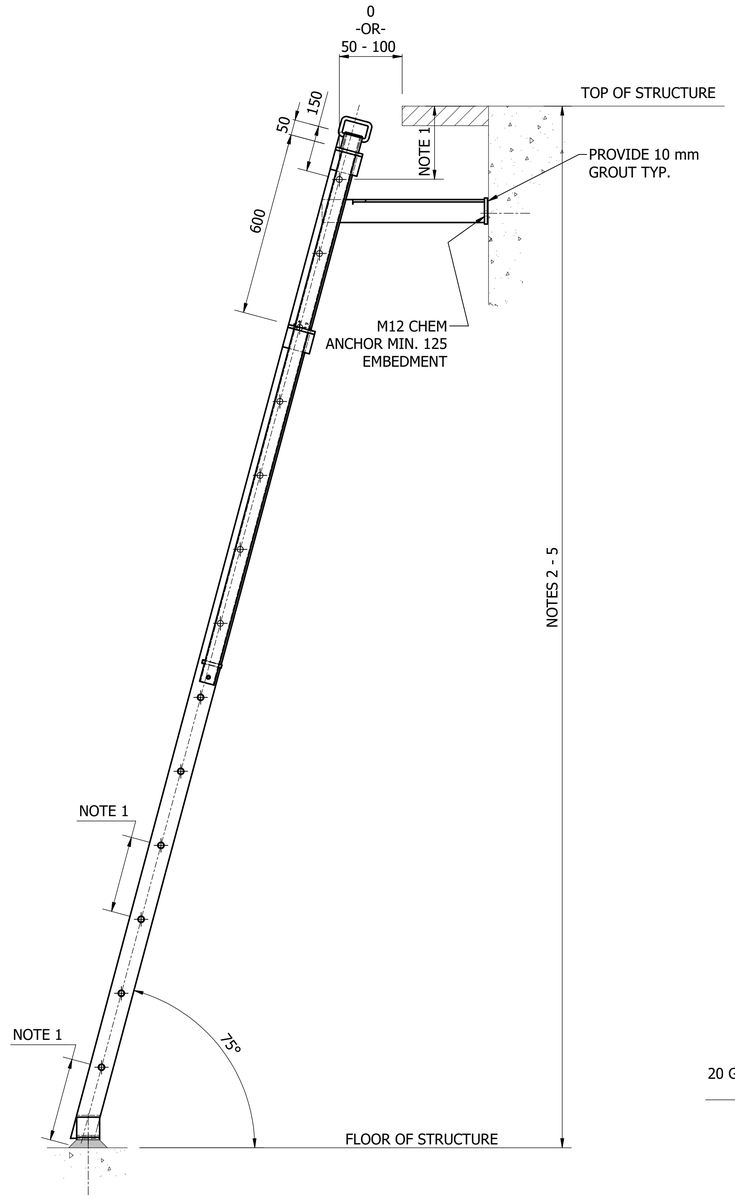
SD-8103-D

A1

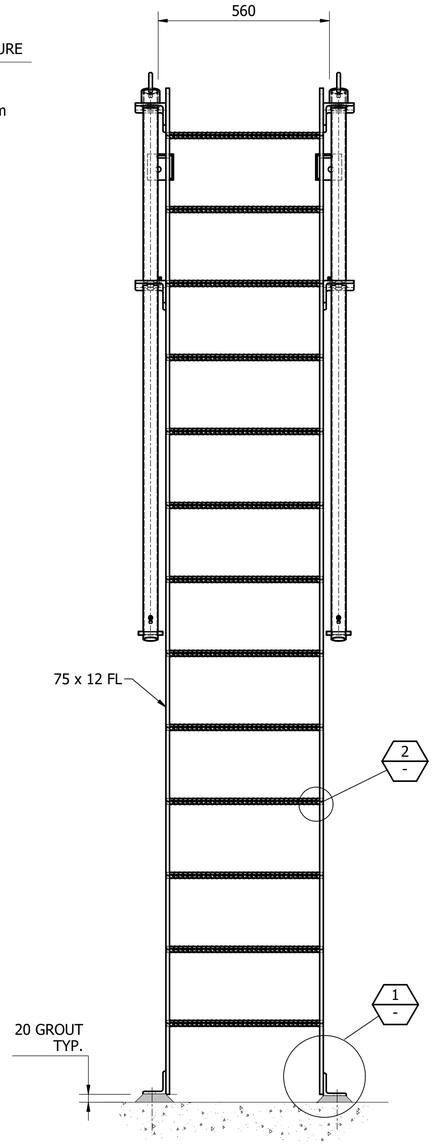
ISSUE A



ISOMETRIC VIEW



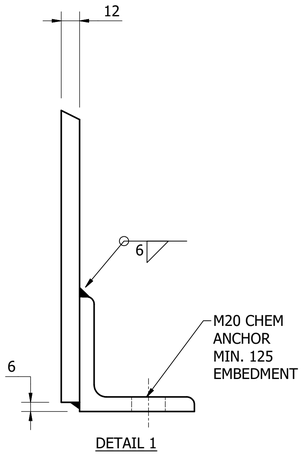
SIDE VIEW



FRONT VIEW

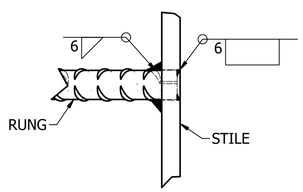
NOTES:

1. THE DESIGNER SHALL NOMINATE AN EVEN RUNG PITCH BETWEEN 250 AND 300 ENSURING A CONSISTENT PITCH WHEN STEPPING ON & OFF THE LADDER. RUNG PITCH TOLERANCE SHALL BE ±5.
2. LADDER HEIGHTS ABOVE THE FLOOR OF THE STRUCTURE SHALL NOT EXCEED 6 m UNLESS FITTED WITH A LADDER CAGE.
3. INDIVIDUAL LADDER LENGTHS SHALL NOT EXCEED 6 m.
4. THE QUANTITIES AND MASSES SHOWN ARE BASED ON A LADDER 3000 LONG.
5. DESIGNER TO SPECIFY OVERALL LADDER LENGTH ON PROJECT DRAWING(S).
6. THIS LADDER IS COMPATIBLE WITH THE ACCESS HATCHES SHOWN ON SD-8201, SD-8211 AND SD-8234.
7. REFER TO DRAWING SD-9100 FOR STEELWORK NOTES.
8. ALL WORKS SHALL COMPLY WITH AS 1657 AND ICON WATER SUPPPLEMENT DOCUMENTS STD-SPE-G-008 AND 009.



DETAIL 1

FLOOR CONNECTION DETAIL
SCALE: 1 : 2



DETAIL 2

RUNG WELD DETAIL TYP.
SCALE: 1 : 2

INCLINED RUNG LADDER WITH PULL-UP STANCHIONS TYPICAL ASSEMBLY

SCALE : 1 : 10

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN815304	LADDER RUNG	13	1 kg	SD-8153
PN815501	EXTENDABLE STANCHIONS	2	10 kg	SD-8155
PN815303	FLOOR BRACKET	2	1 kg	SD-8153
PN815307	WALL BRACKET	2	2 kg	SD-8153

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: DESIGNER TO PROVIDE PROJECT SPECIFIC DETAILS

ITEM	AMDT.
PN810401	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

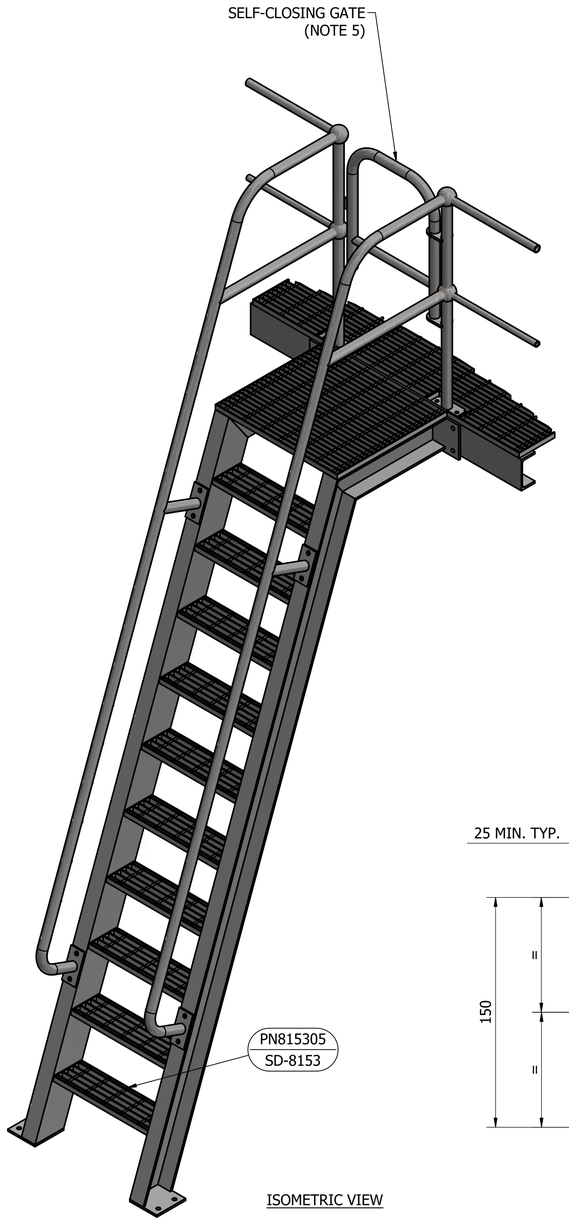
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
FIXED INCLINED RUNG LADDER WITH PULL-UP STANCHIONS
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

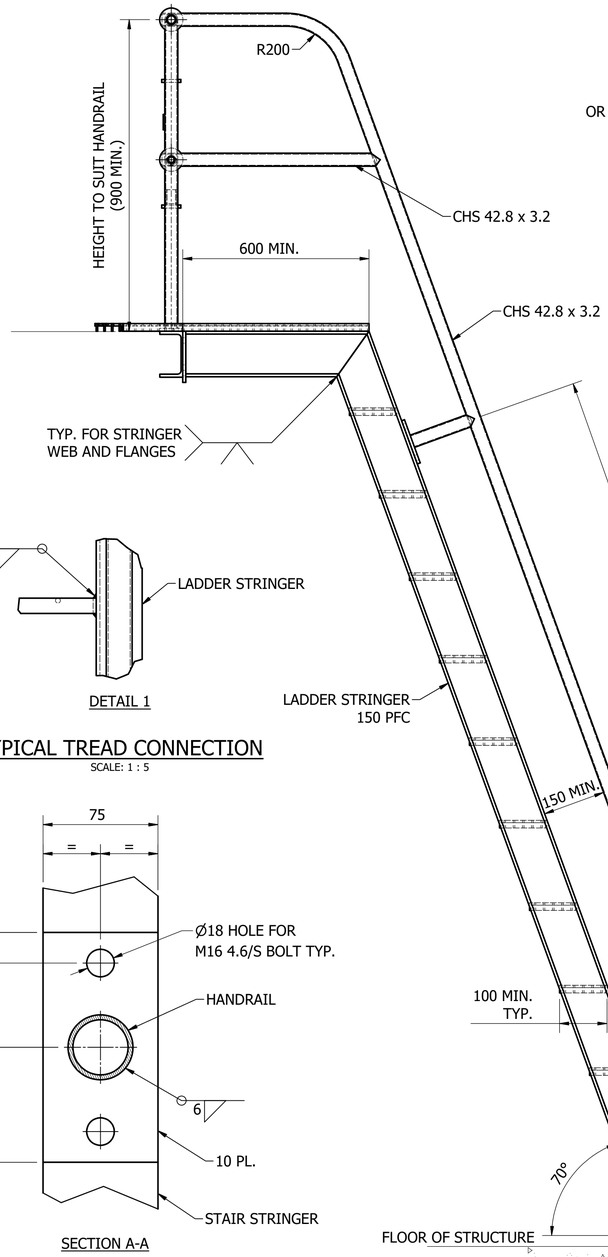
SD-8104-D

A1

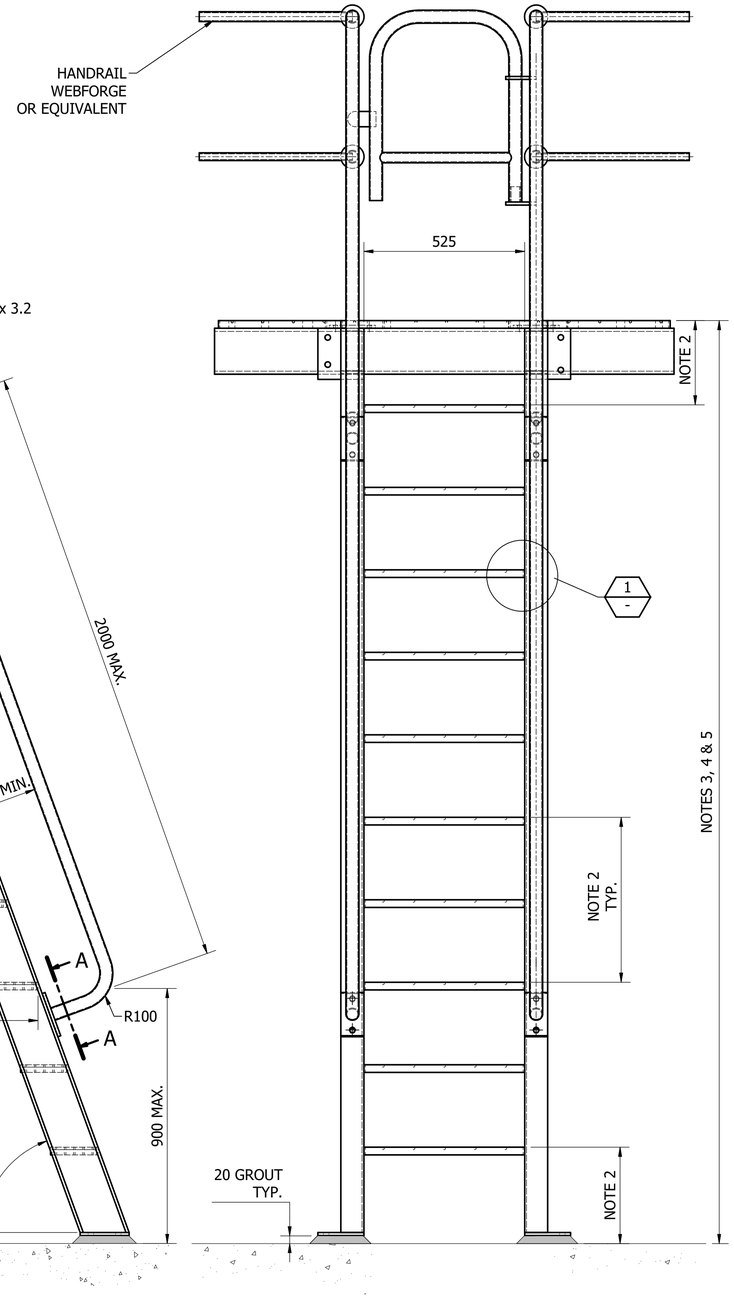
ISSUE: A



ISOMETRIC VIEW



SIDE VIEW



FRONT VIEW

DETAIL 1

LADDER STRINGER

TYPICAL TREAD CONNECTION

SCALE: 1 : 5

SECTION A-A

STEP LADDER HANDRAIL CONNECTION

SCALE: 1 : 2

NOTES:

1. REFER TO DRAWING SD-9100 FOR STEELWORK NOTES.

2. TREAD SPACING TO BE BETWEEN 200 AND 300 ENSURING A CONSISTENT SPACING WHEN STEPPING ON & OFF THE STEP LADDER. TREAD SPACING TOLERANCE SHALL BE ± 5.

3. LADDER HEIGHTS ABOVE THE FLOOR OF THE STRUCTURE SHALL NOT EXCEED 6 m UNLESS FITTED WITH A LADDER CAGE.

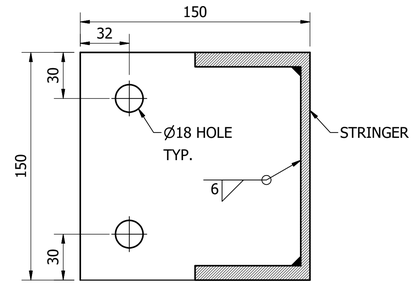
4. INDIVIDUAL LADDER LENGTHS SHALL NOT EXCEED 6 m.

5. THE LADDER ANGLE, NUMBER OF RUNGS AND OVERALL LADDER LENGTH ETC. SHALL BE NOMINATED BY THE DESIGNER SPECIFICALLY FOR THE PROJECT APPLICATION.

6. THE QUANTITIES AND MASSES SHOWN ARE BASED ON A LADDER 3000 LONG.

7. SELF CLOSING GATE TO BE "WEBFORGE" MONOWILLS OR APPROVED EQUIVALENT. GATE TO OPEN AWAY FROM LADDER. SPECIFY SWING DIRECTION, CLEAR OPENING AND LOCKING REQUIREMENTS AS PER "WEBFORGE" CATALOGUE.

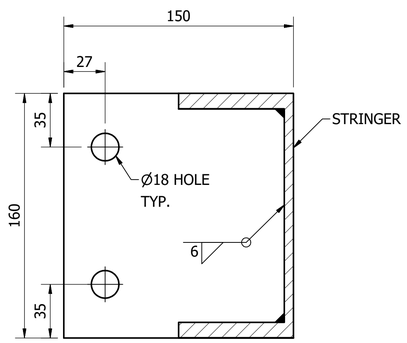
8. ALL WORKS SHALL COMPLY WITH AS 1657 AND ICON WATER SUPPLEMENT DOCUMENTS STD-SPE-G-008 AND 009.



DETAIL

TOP BRACKET

SCALE: 1 : 2



DETAIL

BOTTOM BRACKET

SCALE: 1 : 2

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
N/A	LADDER STRINGER	2	64 kg	
PN815305	LADDER TREAD	11	4.1 kg	SD-8153
N/A	HANDRAIL	2	12 kg	

INCLINED STEP LADDER WITH FIXED STANCHIONS
TYPICAL ARRANGEMENT

SCALE : 1 : 10

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 200 kg @ 3 m LENGTH

ITEM	AMDT.
PN810501	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

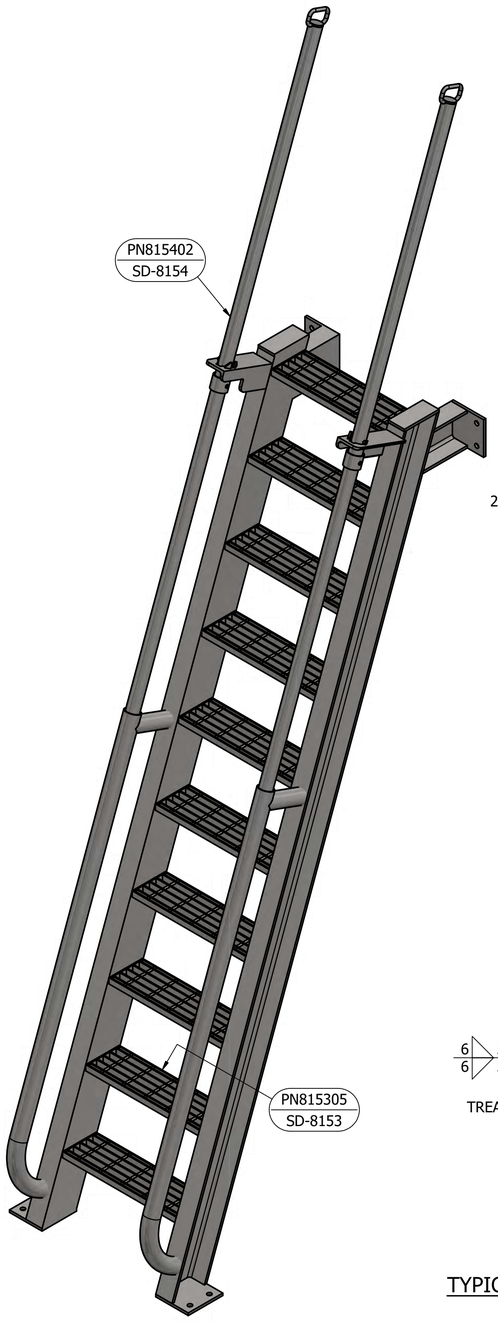
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
FIXED INCLINED STEP LADDER
FIXED STANCHIONS
ARRANGEMENTS AND DETAILS

DRAWING STATUS: Current

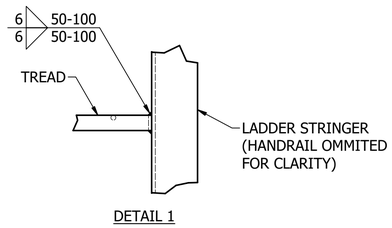
SD-8105-D

A1

ISSUE: A



ISOMETRIC VIEW

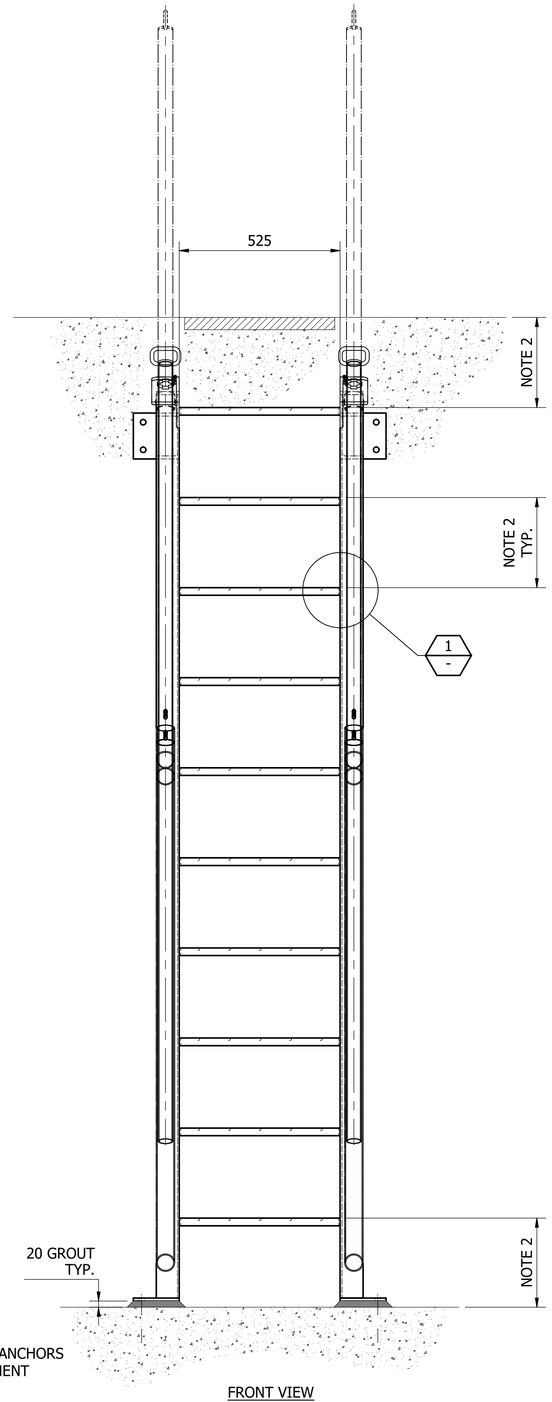


DETAIL 1

TYPICAL TREAD CONNECTION

SCALE: 1 : 5

SIDE VIEW



FRONT VIEW

INCLINED STEP LADDER WITH EXTENDABLE STANCHIONS
TYPICAL ARRANGEMENT

SCALE: 1 : 10

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 200 kg @ 3 m LENGTH

NOTES:

1. REFER TO DRAWING SD-9100 FOR STEELWORK NOTES.

2. TREAD SPACING TO BE BETWEEN 200 AND 300 ENSURING A CONSISTENT SPACING WHEN STEPPING ON & OFF THE STEP LADDER. TREAD SPACING TOLERANCE SHALL BE ± 5.

3. THE LADDER ANGLE, NUMBER OF RUNGS, SPACING OFF WALL AND OVERALL LADDER LENGTH ETC. SHALL BE NOMINATED BY THE DESIGNER SPECIFICALLY FOR THE PROJECT APPLICATION.

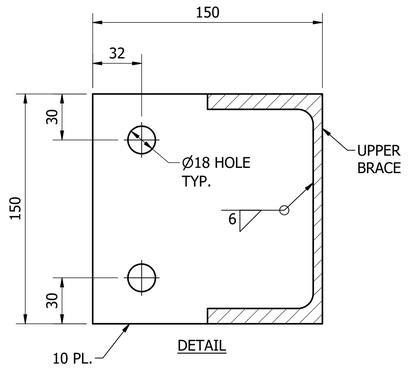
4. LADDER HEIGHTS ABOVE THE FLOOR OF THE STRUCTURE SHALL NOT EXCEED 6 m UNLESS FITTED WITH A LADDER CAGE.

5. INDIVIDUAL LADDER LENGTHS SHALL NOT EXCEED 6 m.

6. THIS LADDER IS COMPATIBLE WITH THE ACCESS HATCH SHOWN ON SD-8234.

7. QUANTITY AND MASS BASED ON A LADDER APPROX 3000 IN LENGTH.

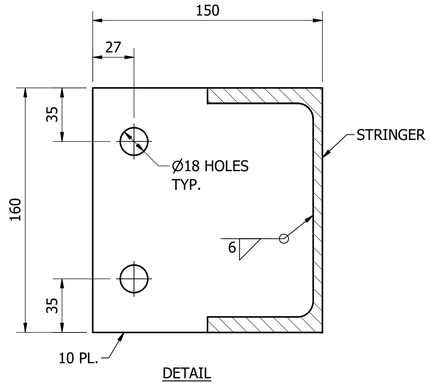
8. ALL WORKS SHALL COMPLY WITH AS 1657 AND ICON WATER SUPPLEMENT DOCUMENTS STD-SPE-G-008 AND 009.



DETAIL

TOP BRACKET

SCALE: 1 : 2



DETAIL

BOTTOM BRACKET

SCALE: 1 : 2

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
N/A	LADDER STRINGER	2	64 kg	SD-8106
PN815305	LADDER TREAD	10	4.1 kg	SD-8153
PN815402	EXTENDABLE STANCHION	2	22.7 kg	SD-8154

ITEM	AMDT.
PN810601	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW			
WPS	X	REC	X		

ASSET AREA APPLICABILITY

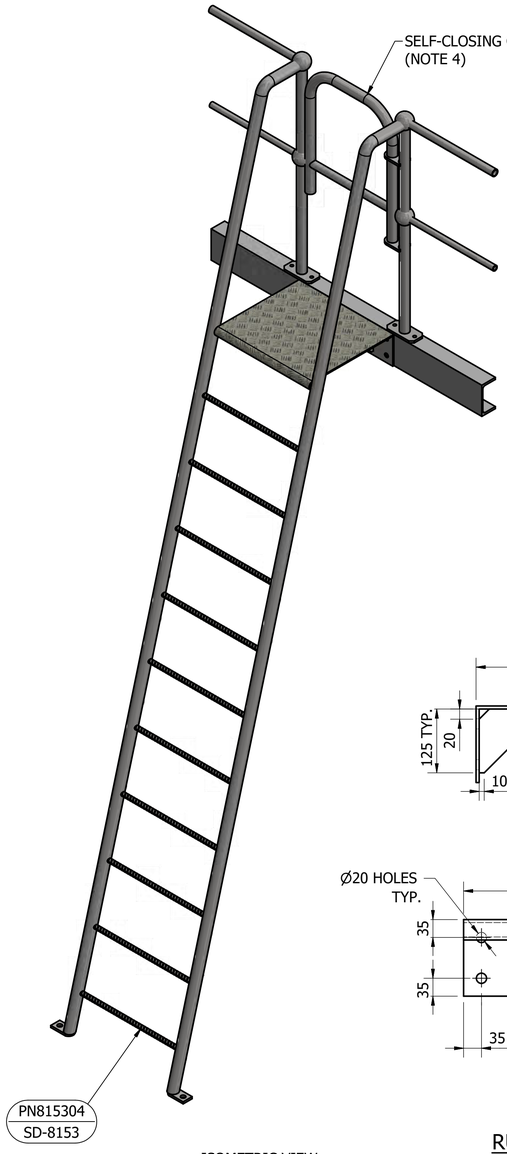
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
FIXED INCLINED STEP LADDER - EXTENDABLE STANCHIONS
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

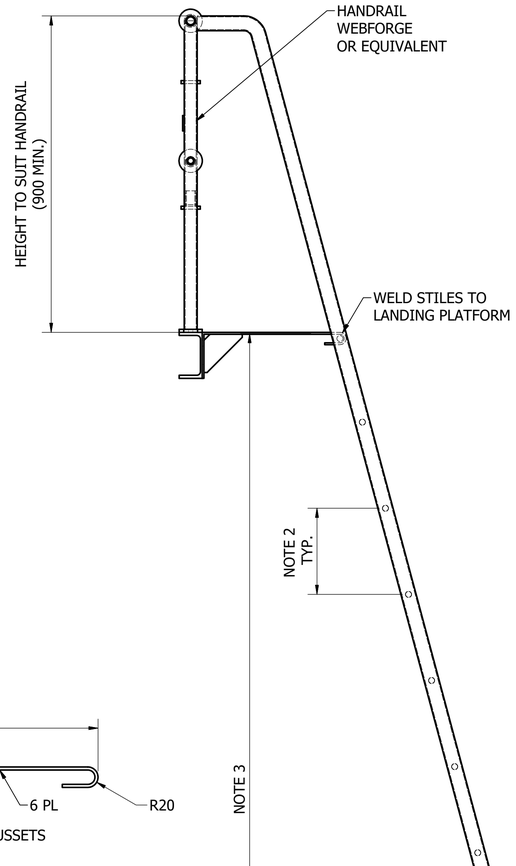
SD-8106-D

A1

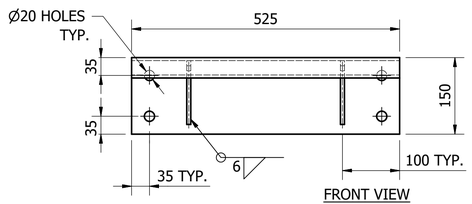
ISSUE: A



ISOMETRIC VIEW



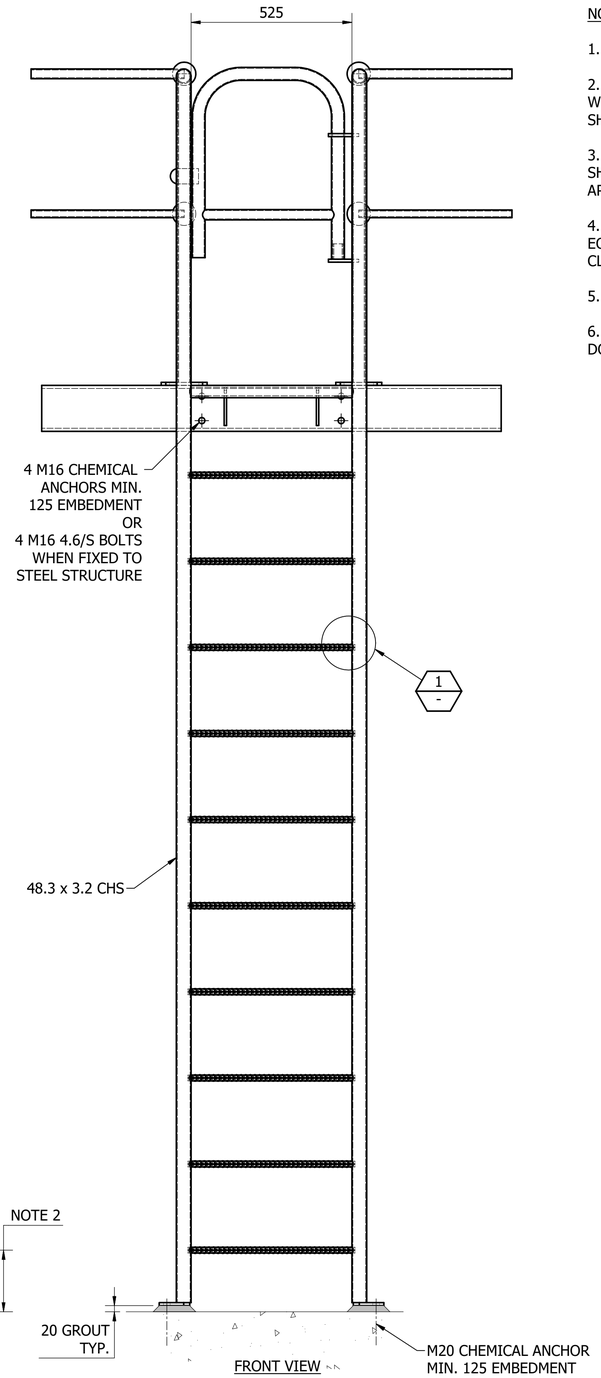
SIDE VIEW

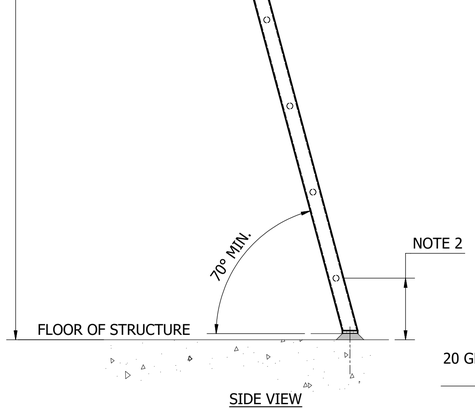


FRONT VIEW

RUNG LADDER LANDING

SCALE: 1 : 6





SIDE VIEW

FRONT VIEW

INCLINED RUNG LADDER
TYPICAL ASSEMBLY AND ARRANGEMENT

SCALE: 1 : 10

NOTES :

1. REFER TO SD-9100 FOR STEELWORK NOTES.

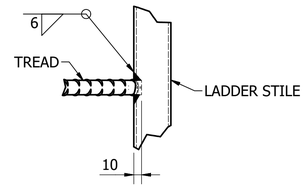
2. RUNG SPACING BETWEEN 250 AND 300 ENSURING A CONSISTENT SPACING WHEN STEPPING ON & OFF THE RUNG LADDER. TREAD SPACING TOLERANCE SHALL BE ±5.

3. THE LADDER ANGLE, NUMBER OF RUNGS AND OVERALL LADDER LENGTH ETC. SHALL BE NOMINATED BY THE DESIGNER SPECIFICALLY FOR THE PROJECT APPLICATION, BUT THE LADDER SHALL NOT EXCEED 3.0 m.

4. SELF CLOSING GATE TO BE "WEBFORGE" MONOWILLS OR APPROVED EQUIVALENT. GATE TO OPEN AWAY FROM LADDER. SPECIFY SWING DIRECTION, CLEAR OPENING AND LOCKING REQUIREMENTS AS PER "WEBFORGE" CATALOGUE.

5. QUANTITY AND MASS BASED ON A LADDER APPROX 3000 IN LENGTH.

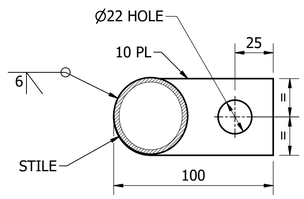
6. ALL WORKS SHALL COMPLY WITH AS 1657 AND ICON WATER SUPPLEMENT DOCUMENTS STD-SPE-G-008 AND 009.



DETAIL 1

TYPICAL TREAD CONNECTION

SCALE: 1 : 2



BOTTOM BRACKET

SCALE: 1 :2

PARTS LIST				
PART NUM	DESCRIPTION	QT	MASS	REFERENCE
N/A	LADDER STILE	2	31.2 kg	
N/A	LANDING PLATE	1	19.8 kg	
PN815304	LADDER RUNG	11	1.2 kg	SD-8153

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 65 kg @ 3 m LENGTH

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X	
BWS	X	WAT	X	STP	X	
WTP	X	SEW	X			
WPS	X	REC	X			

ASSET AREA APPLICABILITY

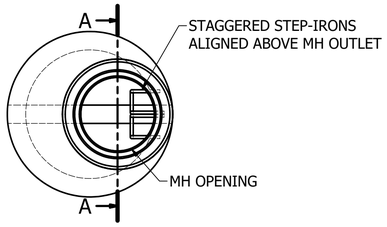
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
FIXED INCLINED RUNG LADDER WITH FIXED STANCHIONS
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

SD-8107-D

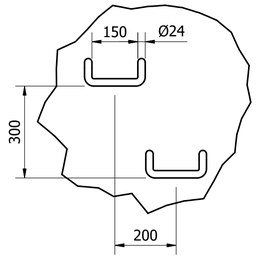
A1

ISSUE: A



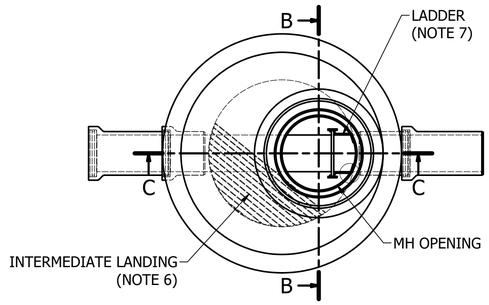
PLAN - TYPICAL Ø1050 MAINTENANCE HOLE
WITH STAGGERED STEP-IRONS

SCALE: 1 : 25



DETAIL 1

STEP-IRON SET-OUT



PLAN - TYPICAL Ø1200 AND Ø1500 MAINTENANCE HOLE
WITH FIXED VERTICAL LADDER AND
INTERMEDIATE LANDING

SCALE: 1 : 25

NOTES:

1. REFER TO SD-9100 SERIES FOR STEELWORK FABRICATION NOTES.

2. FOR SEWERAGE APPLICATIONS, ONLY STAINLESS STEEL GRADE 316L OR HOT DIP GALVANISED CARBON STEEL SHALL BE USED FOR LADDERS, RUNGS, LANDINGS AND FASTENINGS ETC. OTHER CORROSION RESISTANT MATERIALS (e.g. POLY-COATED STEP-IRONS) SHALL NOT BE USED UNLESS APPROVAL IN WRITING IS RECEIVED FROM THE ICON WATER PRINCIPAL ENGINEER.

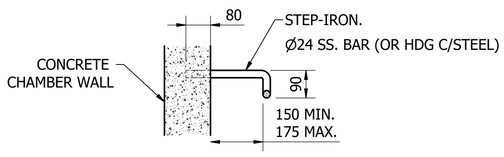
3. ALL LADDERS, LANDINGS, HANDRAILS, STANCHIONS AND STEP-IRONS ETC. SHALL BE DESIGNED, FABRICATED AND INSTALLED IN ACCORDANCE WITH AS 1657, AS MODIFIED BY ICON WATER IN SPECIFICATION STD-SPE-G-008 AND 009.

4. STEP-IRONS AND LADDER FIXINGS SHALL BE FIXED A MINIMUM DISTANCE OF 100 mm FROM A CONSTRUCTION JOINT.

5. WHERE THE CLEAT IS POSITIONED IN THE TAPERED PART OF THE CHAMBER, THE LENGTH AND ANGLE OF CLEAT SHALL BE CALCULATED TO SUIT THE TAPER.

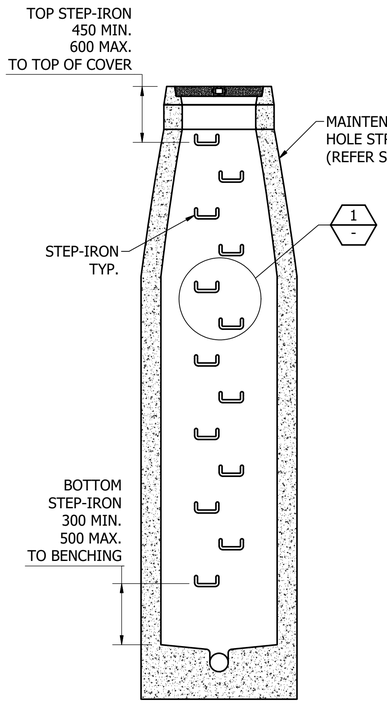
6. WHERE DEPTH TO BENCHING IS > 6000 mm AN INTERMEDIATE LANDING SHALL BE INSTALLED. REFER TO SD-2203 FOR DETAILS.

7. FOR SEWERS < DN600 LADDER TO BE LOCATED OVER OUTLET PIPE. FOR SEWERS ≥ DN600 LADDER TO BE LOCATED OVER BENCHING. WHERE LADDER IS LOCATED OVER BENCHING, MAINTENANCE HOLE TO BE OFFSET TO PROVIDE 150 mm BENCH WIDTH ON SIDE OPPOSITE LADDER.



DETAIL - STEP-IRON FIXING (NOTE 4)

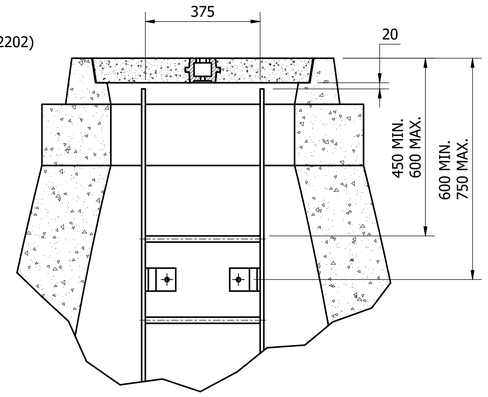
SCALE: 1 : 10



SECTION A-A

TYPICAL FRONT VIEW

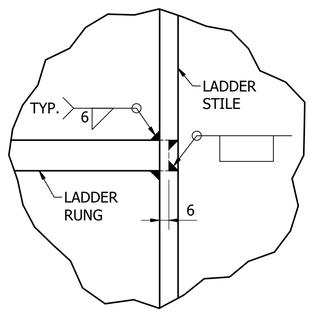
SCALE: 1 : 25



DETAIL 2

LADDER SET-OUT TO TOP OF MH

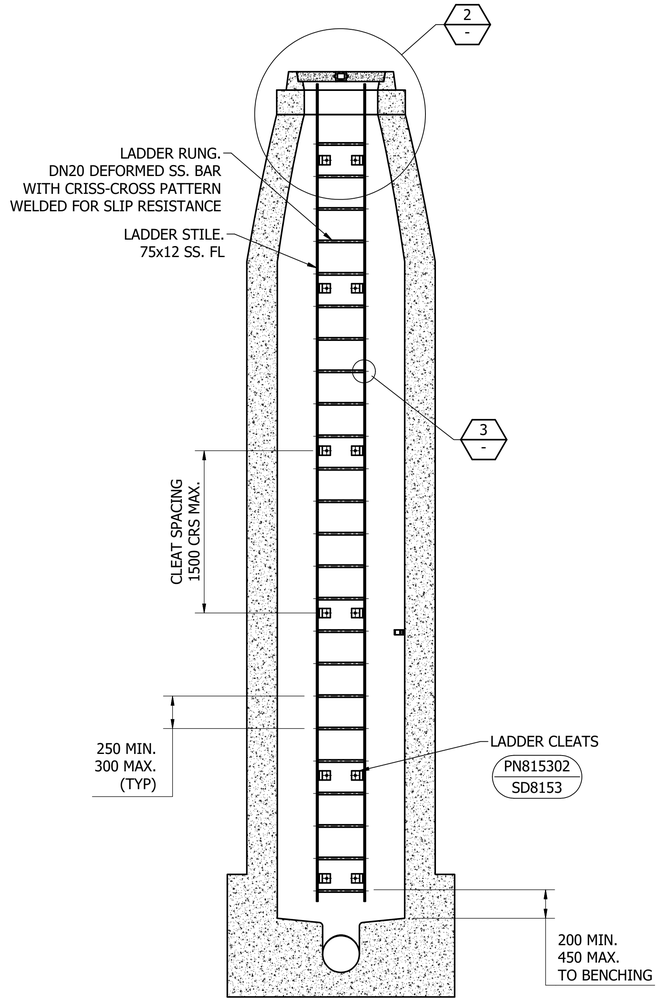
SCALE: 1 : 10



DETAIL 3

TYPICAL TREAD CONNECTION

SCALE: 1 : 2

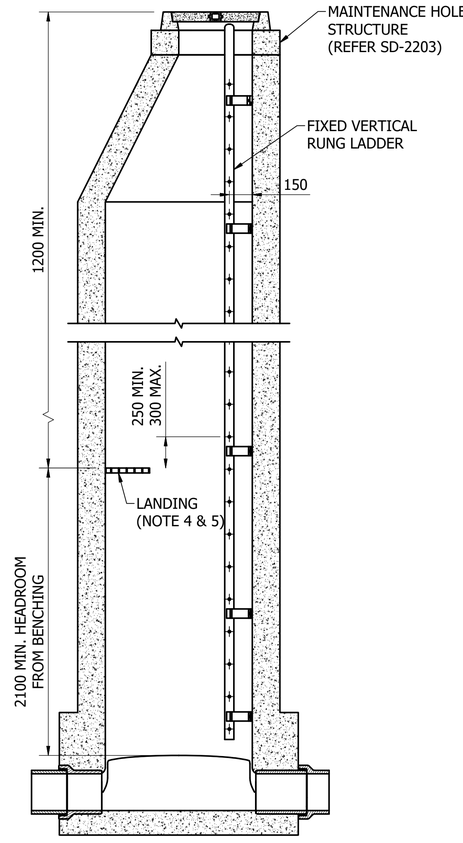


SECTION B-B

TYPICAL FRONT VIEW

(LANDING OMITTED FOR CLARITY)

SCALE: 1 : 25



SECTION C-C

TYPICAL SIDE VIEW

(SHOWN WITH LANDING)

SCALE: 1 : 25

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	STEP-IRON MATERIAL & NOTE 2 UPDATED. DRAWING NOW -D	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM		RES		SPS	X				
BWS		WAT		STP	X				
WTP		SEW	X						
WPS		REC							

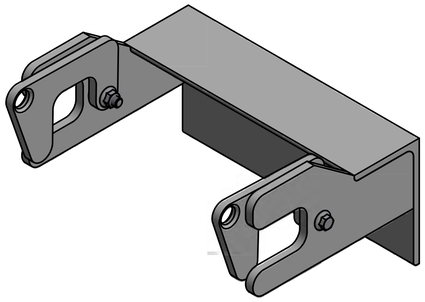
ASSET AREA APPLICABILITY

STANDARD DRAWING
ACCESS LADDERS (FIXED VERTICAL)
AND STAGGERED STEP-IRONS FOR MAINTENANCE HOLES
DETAILS

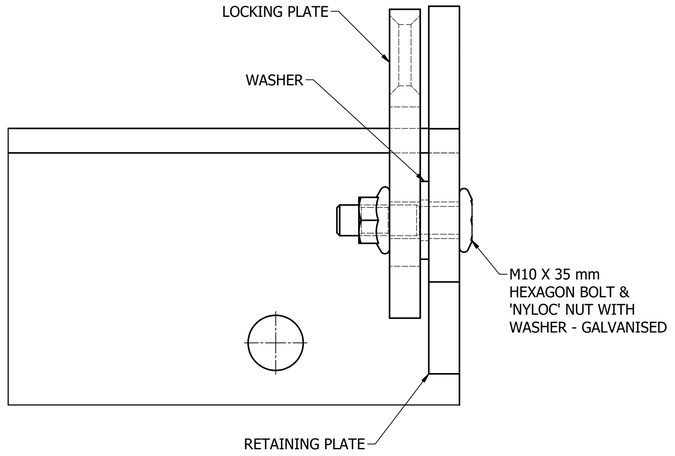
DRAWING STATUS: Current

SD-8108-D

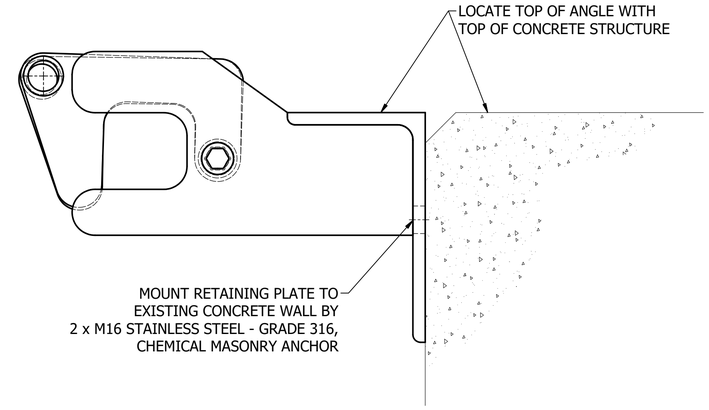
ISSUE B



ACCESS LADDER RETAINING PLATE ASSEMBLY ISOMETRIC VIEW



RETAINING PLATE CONNECTION FIXING DETAIL
SCALE: 1 : 1



INSTALLATION DETAIL
SCALE: 1 : 2

NOTES:

1. ALL STEELWORK SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH AS/NZS 4680.

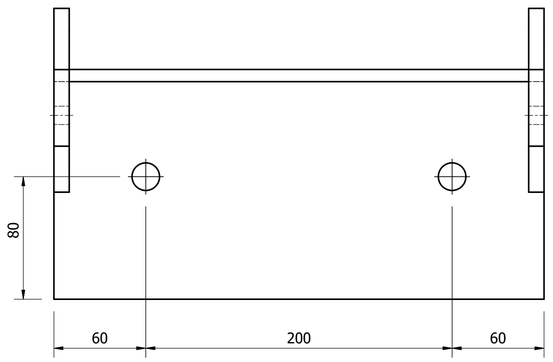
2. ALL WELDS SHALL BE 6 CONTINUOUS FILLET UNLESS NOTED OTHERWISE. ALL WELDS SHALL BE IN ACCORDANCE WITH AS/NZS 1554.

3. ALL STEELWORK SHALL BE FREE OF DIRT, BURRS, SHARP EDGES OR OTHER SHARP PROJECTIONS.

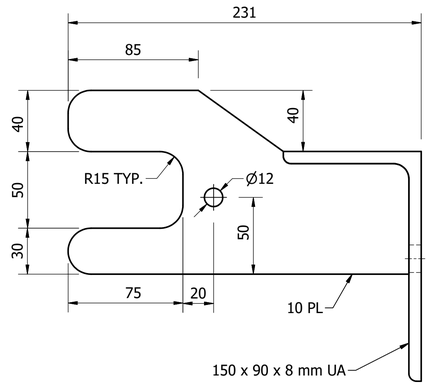
4. INSULATING MATERIAL TO BE INSTALLED BETWEEN STAINLESS STEEL AND OTHER METALLIC COMPONENTS.

5. MINIMUM 20 THICKNESS NON-SHRINK GROUT SHALL BE PROVIDED FOR ALL SUPPORT BASE PLATES.

ACCESS LADDER RETAINING PLATE ASSEMBLY



FRONT VIEW

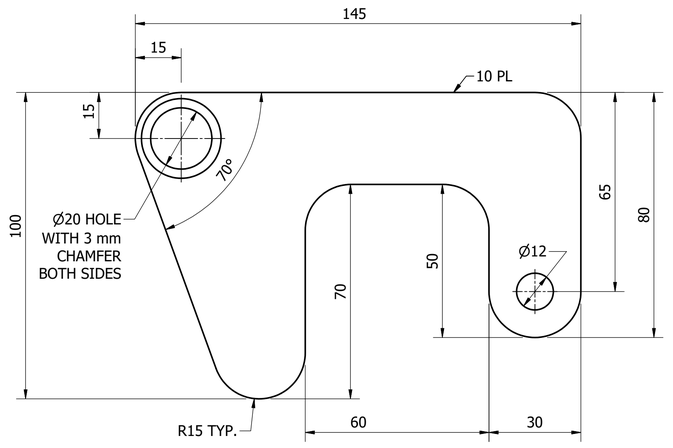


SIDE VIEW

RETAINING PLATE

SCALE: 1 : 2

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 10 kg APPROX.



SIDE VIEW

LOCKING PLATE

SCALE: 1 : 1

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 5 kg APPROX.

ITEM	AMDT.
PN815101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

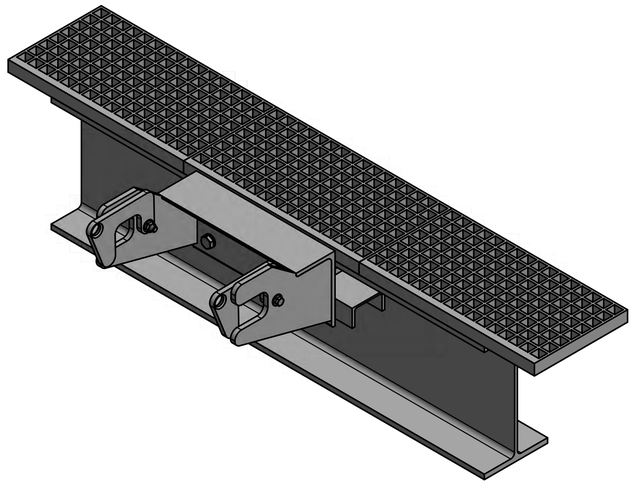
STANDARD DRAWING
LADDER LOCKS FOR PORTABLE LADDERS
RETAINING PLATE - CONCRETE STRUCTURE MOUNTED
ASSEMBLY AND DETAILS

DRAWING STATUS: Current

SD-8151-D

A1

ISSUE: A



ACCESS LADDER RETAINING PLATE ASSEMBLY ISOMETRIC VIEW
SCALE: 1 : 5

NOTES:

1. ALL STEELWORK SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH AS/NZS 4680.

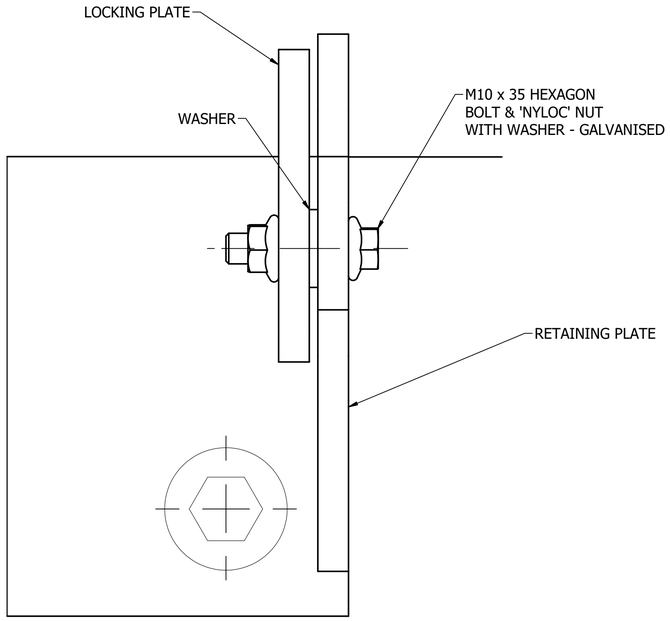
2. ALL WELDS SHALL BE 6 mm CONTINUOUS FILLET UNLESS NOTED OTHERWISE. ALL WELDS SHALL BE IN ACCORDANCE WITH AS/NZS 1554.

3. ALL STEELWORK SHALL BE FREE OF DIRT, BURRS, SHARP EDGES OR OTHER SHARP PROJECTIONS.

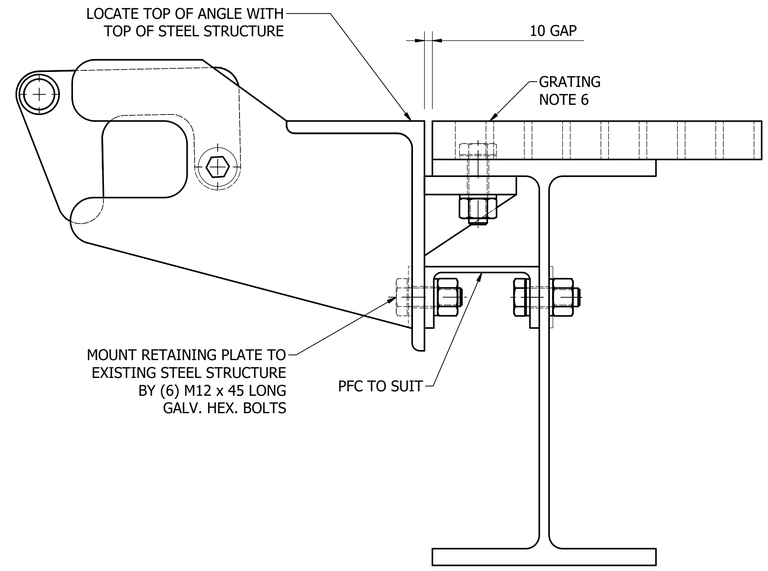
4. INSULATING MATERIAL TO BE INSTALLED BETWEEN STAINLESS STEEL AND OTHER METALLIC COMPONENTS.

5. MATERIAL TO BE STRUCTURAL STEEL, WELDED FABRICATION, HOT DIP GALVANISED.

6. GRATING TO BE CLEAR OF BOLT HEADS.

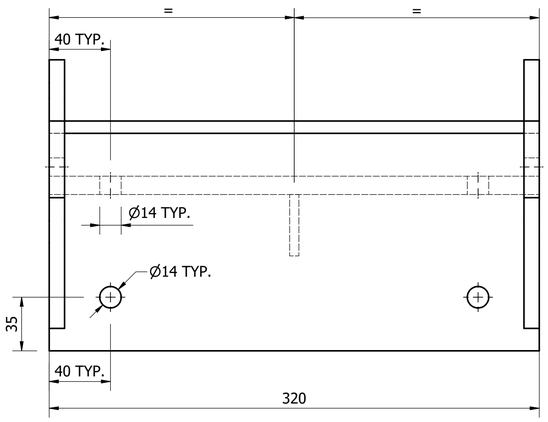


RETAINING PLATE CONNECTION FIXING DETAIL
SCALE: 1 : 1

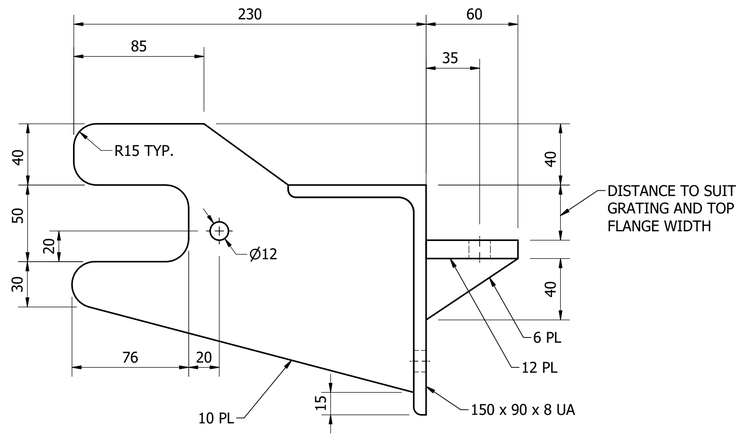


INSTALLATION DETAIL
SCALE: 1 : 2

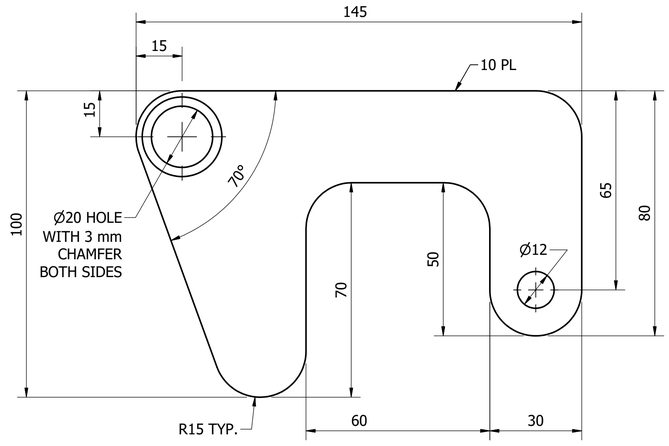
ACCESS LADDER RETAINING PLATE ASSEMBLY



FRONT VIEW



SIDE VIEW



SIDE VIEW

ACCESS LADDER RETAINING PLATE
SCALE: 1 : 2

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 10 kg APPROX.

LOCKING PLATE
SCALE: 1 : 1

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 5 kg APPROX.

ITEM	AMDT.
PN815201	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	RES	SPS			
BWS	WAT	STP			
WTP	SEW				
WPS	REC				

ASSET AREA APPLICABILITY

icon WATER

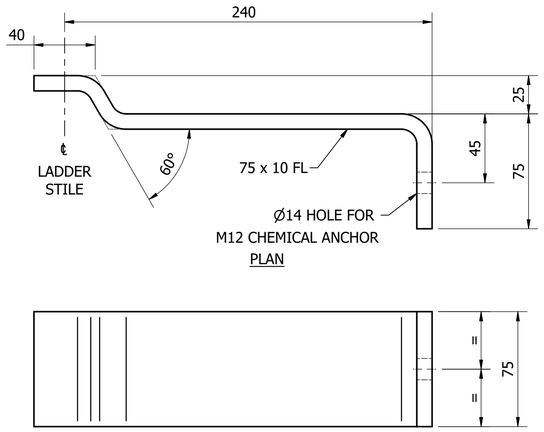
STANDARD DRAWING
LADDER LOCKS FOR PORTABLE LADDERS
RETAINING PLATE - STEEL STRUCTURE MOUNTED
ASSEMBLY AND DETAILS

DRAWING STATUS: Current

SD-8152-D

A1

ISSUE: A

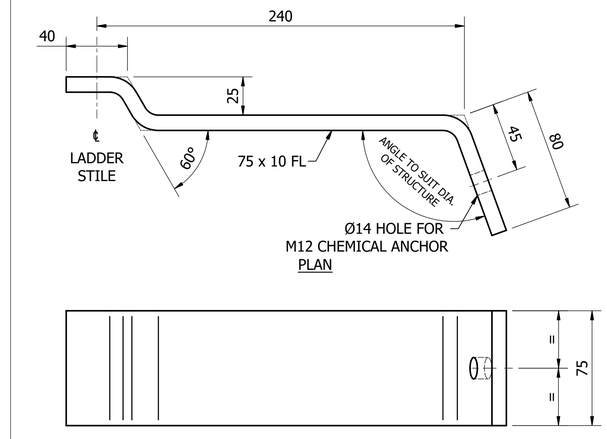


WALL BRACKET - VERTICAL RUNG LADDER

SCALE: 1 : 2

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF LADDER ASSY.)
FINISH COLOUR: N/A
MASS: 2 kg

ITEM	AMDT.
PN815301	



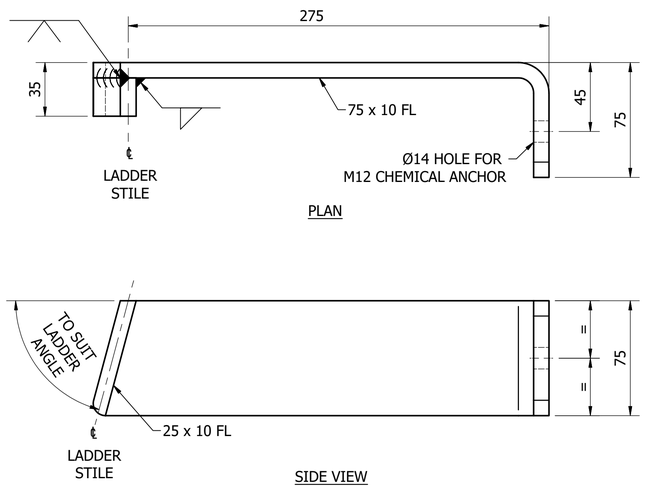
WALL BRACKET - VERTICAL RUNG LADDER

(INSTALLED IN ROUND STRUCTURE)

SCALE: 1 : 2

MATERIAL: CARBON STEEL / STAINLESS STEEL G316L FOR USE IN MH's
COATING: HOT DIP GALVANISED (AS PART OF LADDER ASSY.)
FINISH COLOUR: N/A
MASS: 2 kg

ITEM	AMDT.
PN815302	

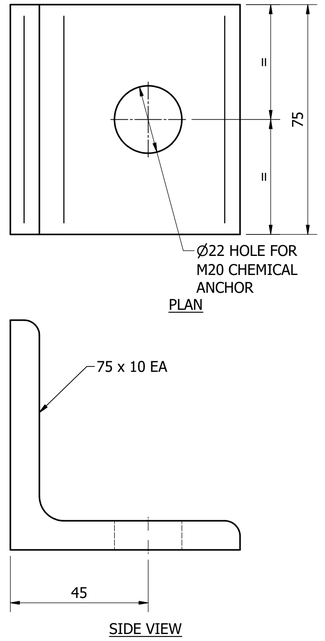


WALL BRACKET - INCLINED RUNG LADDER

SCALE: 1 : 2

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF LADDER ASSY.)
FINISH COLOUR: N/A
MASS: 2 kg

ITEM	AMDT.
PN815306	

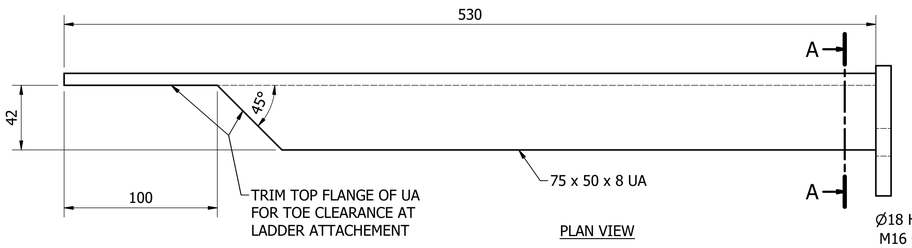


FLOOR BRACKET - INCLINED RUNG LADDER

SCALE: 1 : 1

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF LADDER ASSY.)
FINISH COLOUR: N/A
MASS: 1 kg

ITEM	AMDT.
PN815303	



WALL BRACKET (LONG) - INCLINED RUNG LADDER

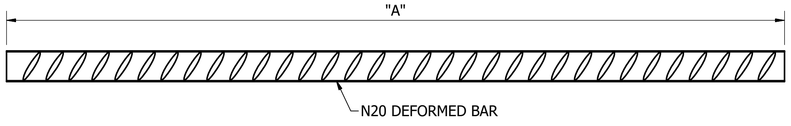
(FOR USE WITH INCLINED RUNG LADDER WITH EXTENDABLE STANCHIONS)

SCALE: 1 : 2

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF LADDER ASSY.)
FINISH COLOUR: N/A
MASS: 5 kg

ITEM	AMDT.
PN815307	

RUNG DIMENSIONS	
LADDER TYPE	DIMENSION "A"
VERTICAL RUNG WITH EXTENDABLE STANCHIONS	467
VERTICAL RUNG LADDER FOR >= 1200 SEWER MH	387
INCLINED RUNG LADDER WITH EXTENDABLE STANCHIONS	508
INCLINED RUNG LADDER WITH FIXED STANCHIONS	545

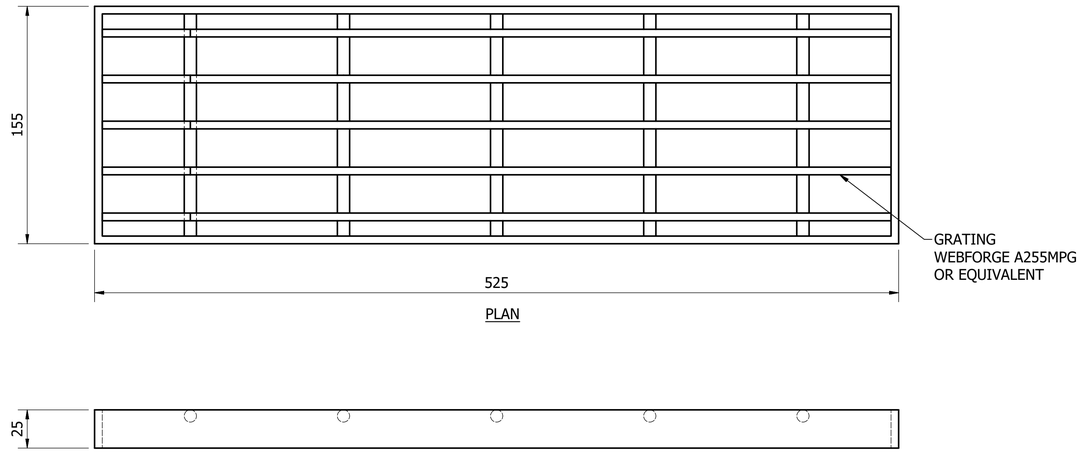


RUNG - VERTICAL AND INCLINED RUNG LADDER

SCALE: 1 : 2

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF LADDER ASSY.)
FINISH COLOUR: N/A
MASS: 1.5 kg @ 545 LONG

ITEM	AMDT.
PN815304	



TREAD - INCLINED STEP LADDER

SCALE: 1 : 2

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF LADDER ASSY.)
FINISH COLOUR: N/A
MASS: 4 kg

ITEM	AMDT.
PN815305	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

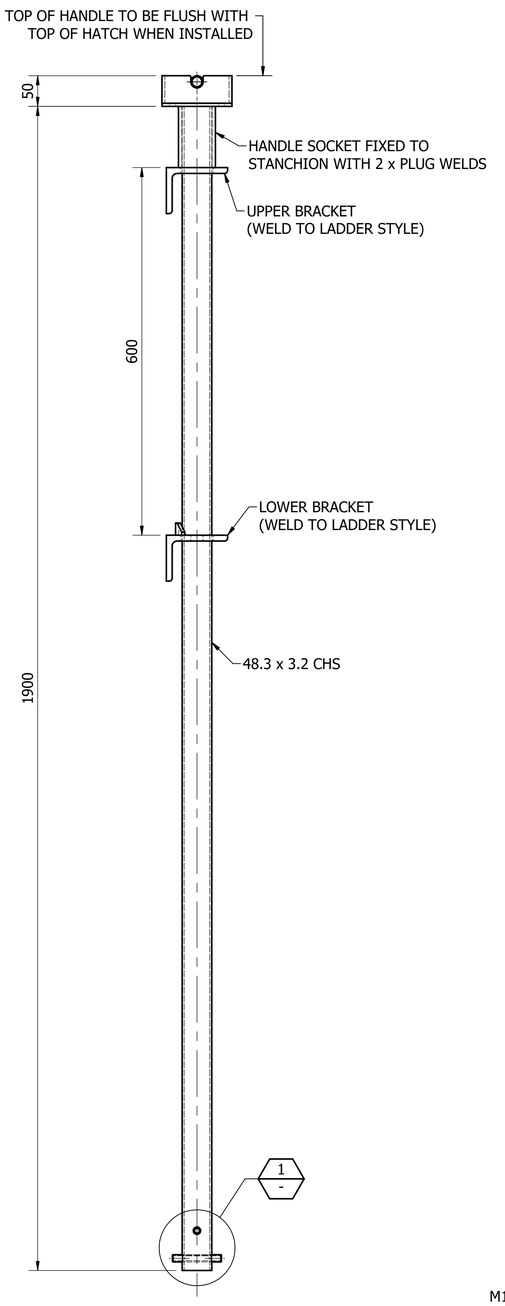
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
BRACKETS, RUNGS, TREADS AND FITTINGS
DETAILS

DRAWING STATUS: Current

SD-8153-D

A1

ISSUE: A

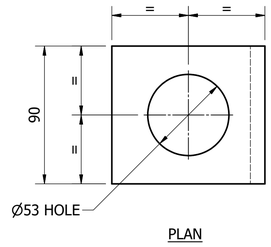


EXTENDABLE STANCHION FOR VERTICAL LADDERS

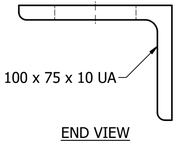
(2 OFF REQ'D PER LADDER)

SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 11 kg



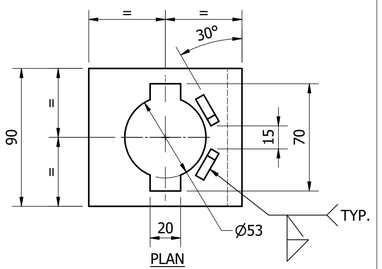
PLAN



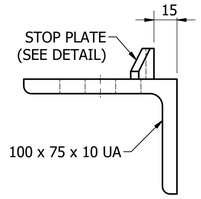
END VIEW

UPPER BRACKET

SCALE: 1 : 2



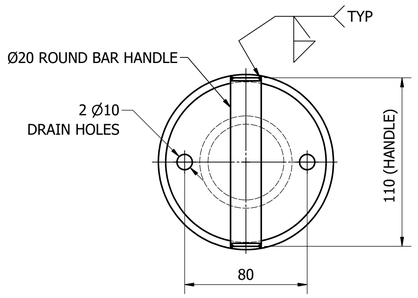
PLAN



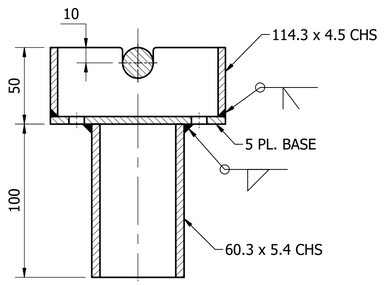
END VIEW

LOWER BRACKET

SCALE: 1 : 2



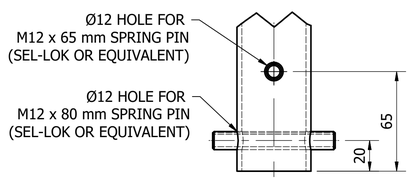
PLAN



SECTION

LIFTING HANDLE

SCALE: 1 : 2

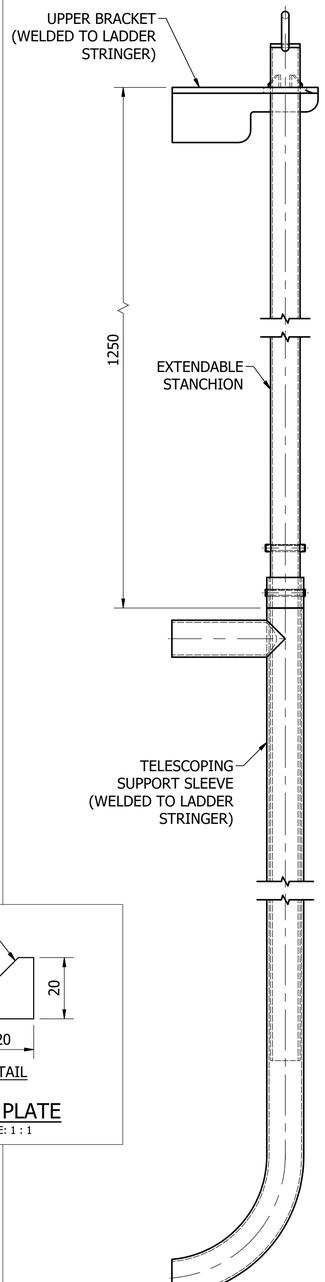


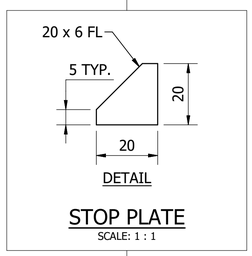
DETAIL 1

RETAINING PINS

SCALE: 1 : 2

ITEM	AMDT.
PN815401	





DETAIL

STOP PLATE

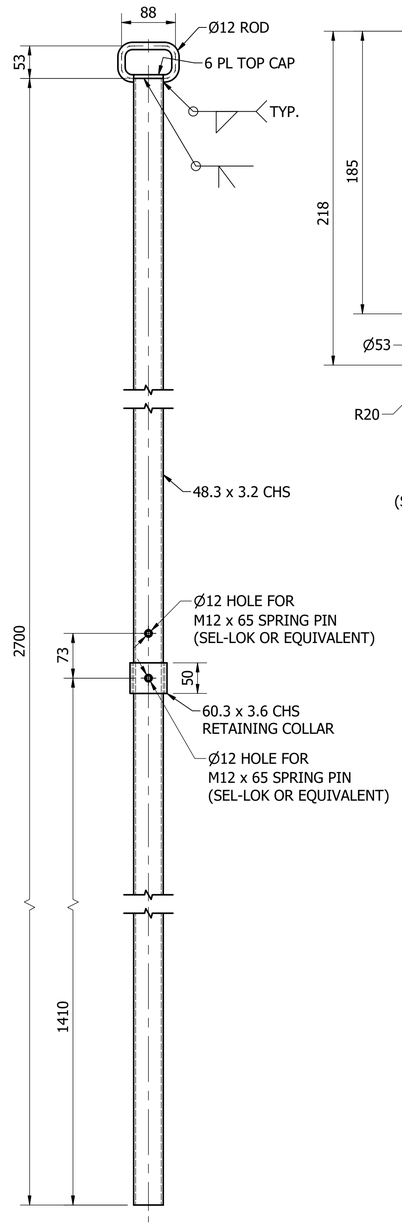
SCALE: 1 : 1

EXTENDABLE STANCHION FOR INCLINED STEP LADDERS

(2 OFF REQ'D PER LADDER)

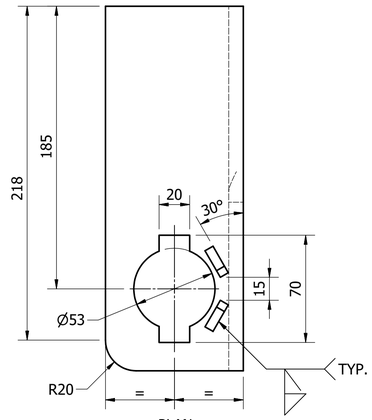
SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 22 kg

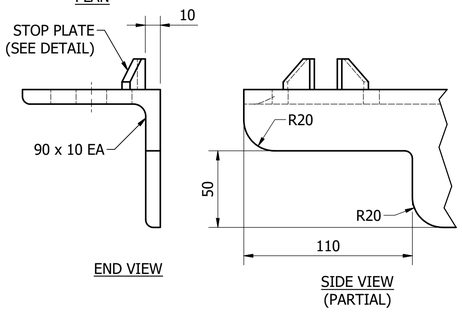


STANCHION

SCALE: 1 : 5



PLAN



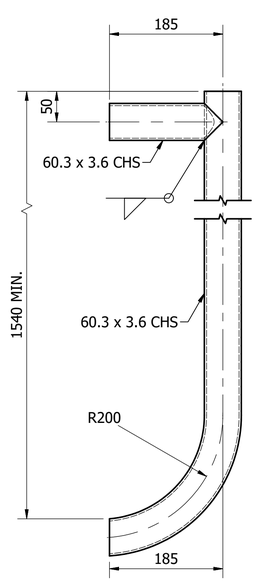
END VIEW

SIDE VIEW
(PARTIAL)

UPPER BRACKET

(LEFT HAND SIDE SHOWN AS
VIEWED WHEN STANDING ON LADDER
RIGHT HAND SIDE IS MIRRORED)

SCALE: 1 : 2



TELESCOPING SUPPORT SLEEVE

SCALE: 1 : 5

ITEM	AMDT.
PN815402	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

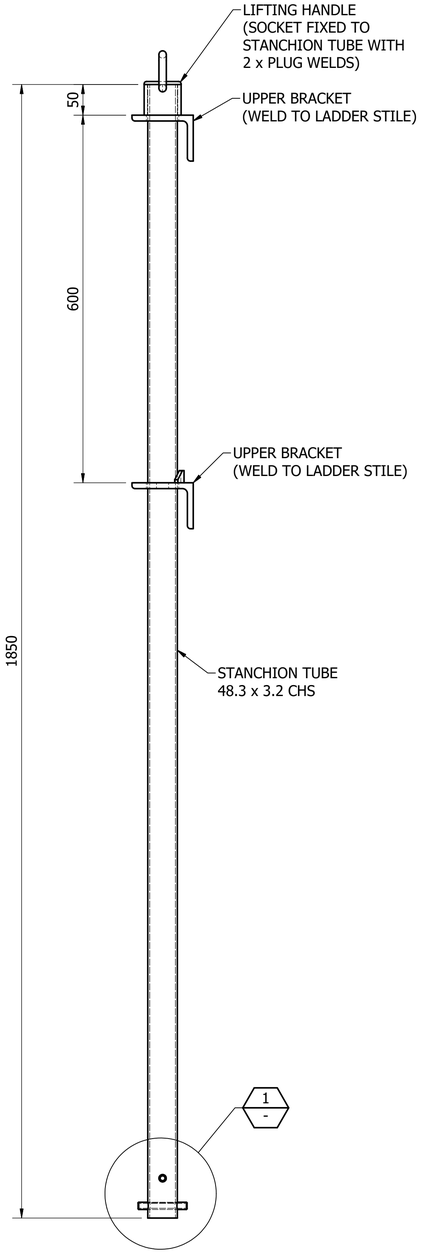
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
STANCHIONS - EXTENDABLE
DETAILS
SHEET 1 OF 2

DRAWING STATUS: Current

SD-8154-D

A1

ISSUE: A

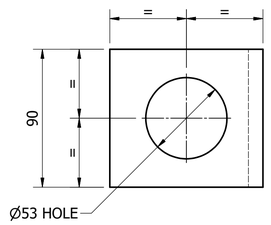


EXTENDABLE STANCHION FOR INCLINED RUNG LADDERS

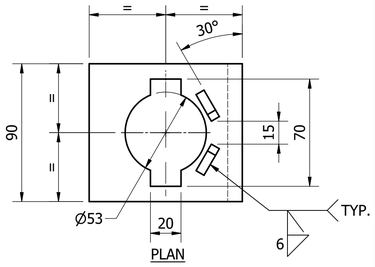
(2 OFF REQ'D PER LADDER)

SCALE: 1 : 5

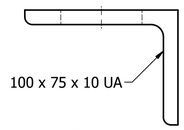
MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 10 kg



PLAN



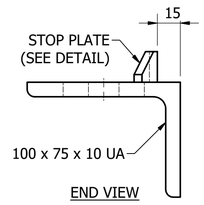
PLAN



END VIEW

UPPER BRACKET

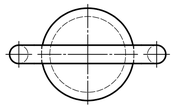
SCALE: 1 : 2



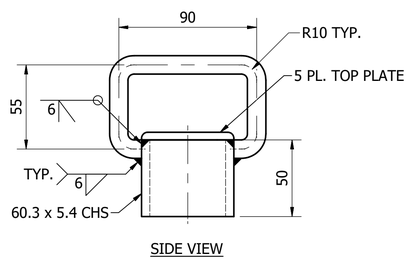
END VIEW

LOWER BRACKET

SCALE: 1 : 2



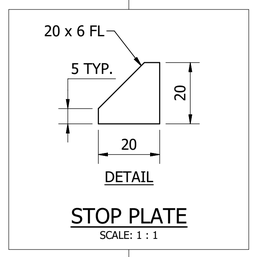
PLAN



SIDE VIEW

LIFTING HANDLE

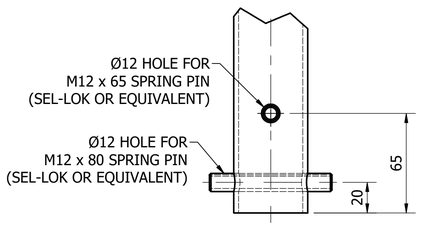
SCALE: 1 : 2



DETAIL

STOP PLATE

SCALE: 1 : 1



DETAIL 1

RETAINING PINS

SCALE: 1 : 2

ITEM	AMDT.
PN815501	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

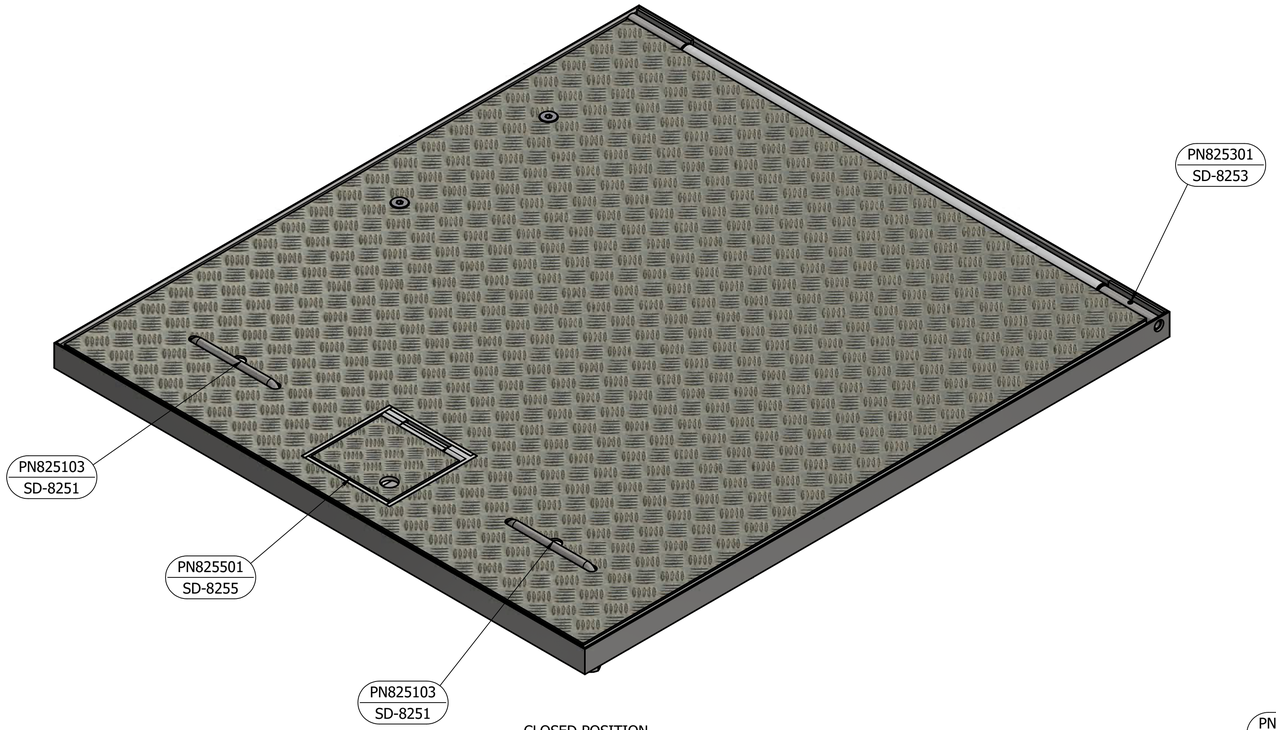
STANDARD DRAWING
HOT DIP GALVANISED STEEL LADDERS
STANCHIONS - EXTENDABLE
DETAILS
SHEET 2 OF 2

DRAWING STATUS: Current

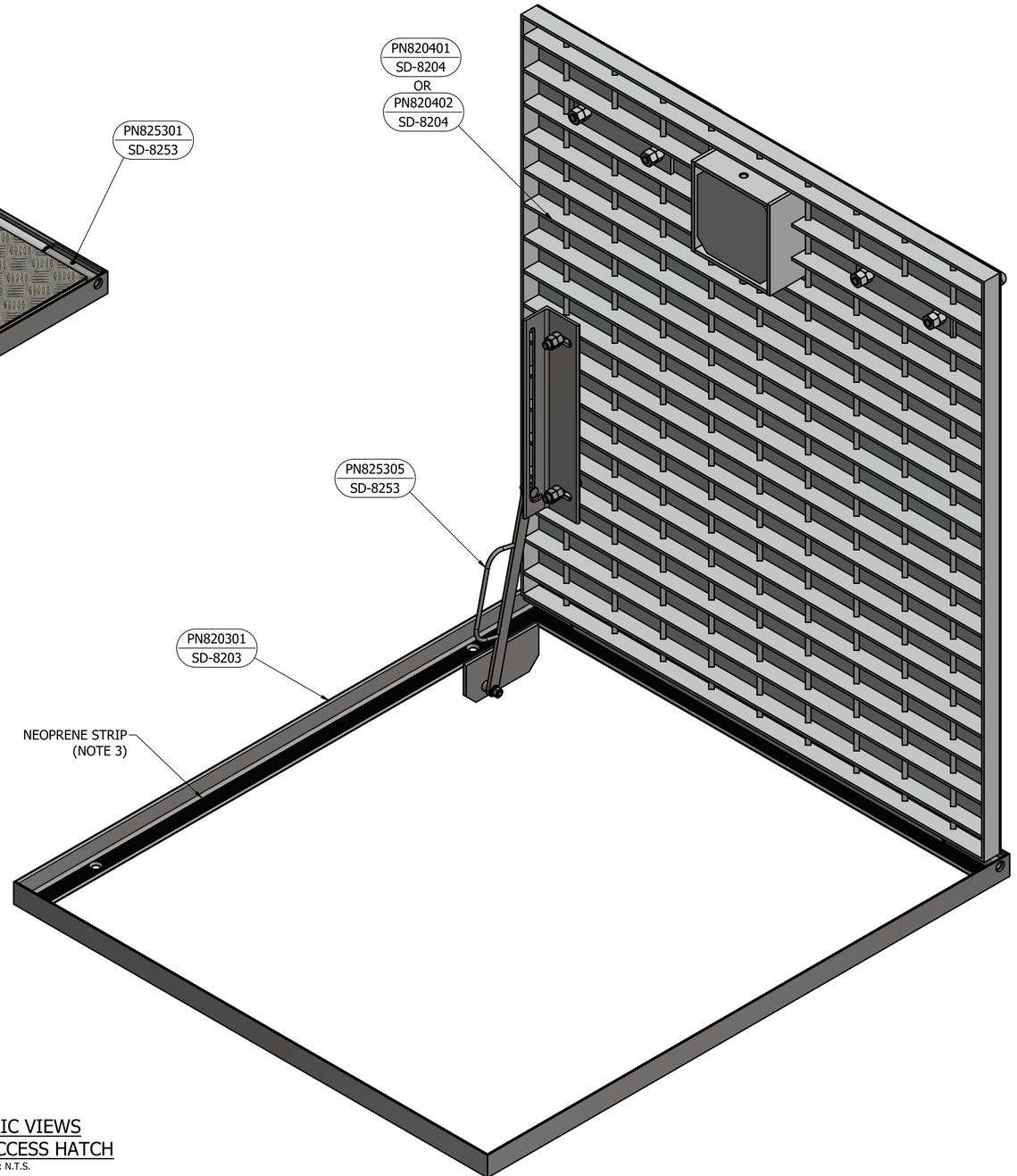
SD-8155-D

A1

ISSUE: A



CLOSED POSITION



OPEN POSITION

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN820301	HATCH FRAME	1	12 kg (14 kg)	SD-8203
PN820402	HATCH COVER (WEBGRATE STYLE)	1	19 kg (21 kg)	SD-8204
PN820401	HATCH COVER (STIFFENED PLATE STYLE)	1	19 kg (21 kg)	SD-8204
PN825501	LOCK BOX (SLIDE BOLT TYPE)	1	2 kg	SD-8255
PN825103	LIFTING HANDLE (FLUSH FIT TYPE)	2	1 kg	SD-8251
PN825301	HINGE	1	1 kg	SD-8253

MASS SHOWN IN BRACKETS () IS FOR HATCH WITH 900 x 1300 OPENING

NOTES:

1. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.

2. FLUSH FIT ACCESS COVERS ARE AVAILABLE IN TWO STANDARD SIZES TO SUIT ICON WATER'S PORTABLE LIMITED FREE FALL ARREST AND EDGE PROTECTION EQUIPMENT. THESE ARE 900 x 900 C/O AND 900 x 1300 C/O.

3. PROVIDE NEOPRENE STRIP BETWEEN HATCH FRAME AND COVER TO ISOLATE DISSIMILAR METALS.

4. INSTALLERS TO PROVIDE Ø16 HOLE INTO FRAME SUPPORT STRUCTURE FOR LOCKING PIN.

ISOMETRIC VIEWS
FLUSH FIT ACCESS HATCH

SCALE: N.T.S.

MATERIAL: ALUMINIUM / MILD STEEL
COATING: GALVANISED (MILD STEEL PARTS ONLY)
FINISH COLOUR: N/A
MASS: 36 kg (40 kg) INCL. FRAME

ITEM	AMDT.
PN820101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP	X			
WTP	X	SEW	X					
WPS	X	REC	X					

ASSET AREA APPLICABILITY

icon WATER

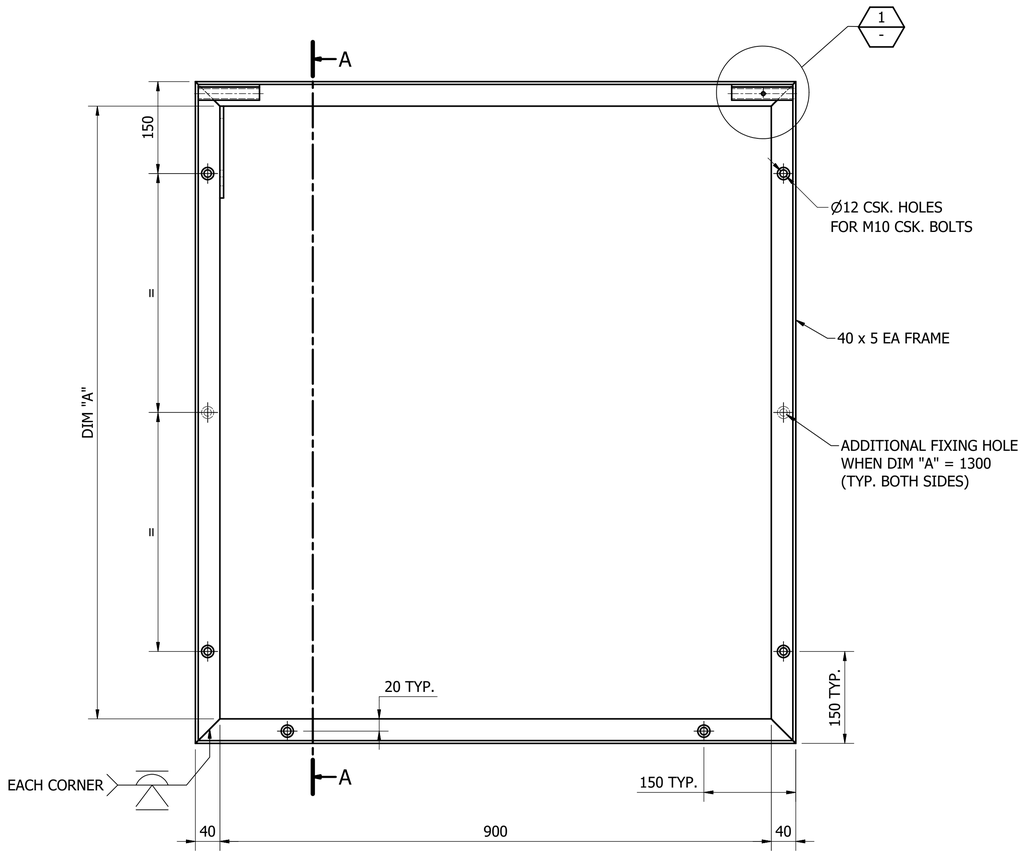
STANDARD DRAWING
FLUSH FIT ACCESS COVERS
ALUMINIUM, HINGED
GENERAL ARRANGEMENT

DRAWING STATUS: Current

SD-8201-D

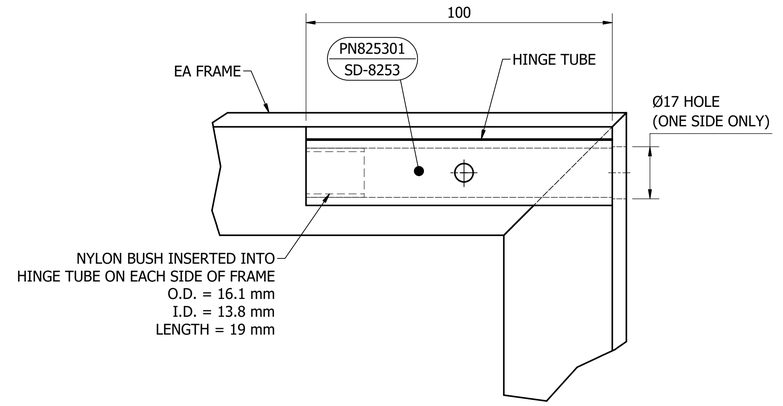
A1

ISSUE: A



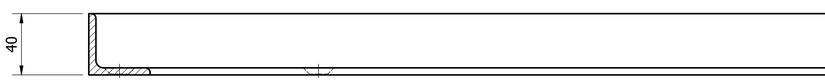
PLAN
COVER FRAME
SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 12 kg (14 kg)

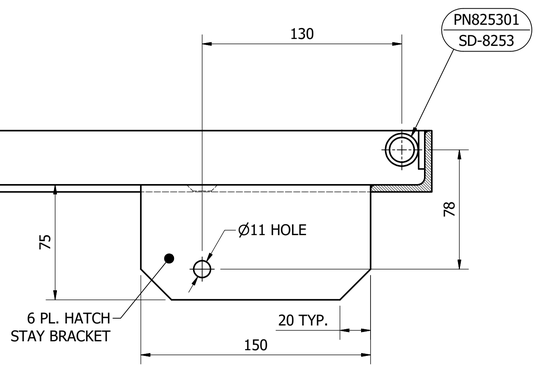


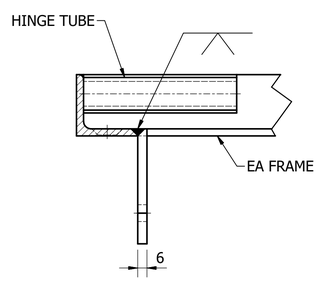
DETAIL 1
SCALE: 1 : 1

DIMENSION VARIABLES		
DIMENSION	VERTICAL RUNG LADDER	INCLINED RUNG LADDER
A	1000	1300



SECTION A-A
SCALE: 1 : 2





END VIEW
HATCH STAY BRACKET
SCALE: 1 : 2

NOTES:

1. FOR STEELWORK NOTES REFER TO DRAWING SD-9100.
2. MASS SHOWN IN BRACKETS () REFERS TO THE LARGER INCLINED RUNG LADDER HATCH.

ITEM	AMDT.
PN820301	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

icon WATER

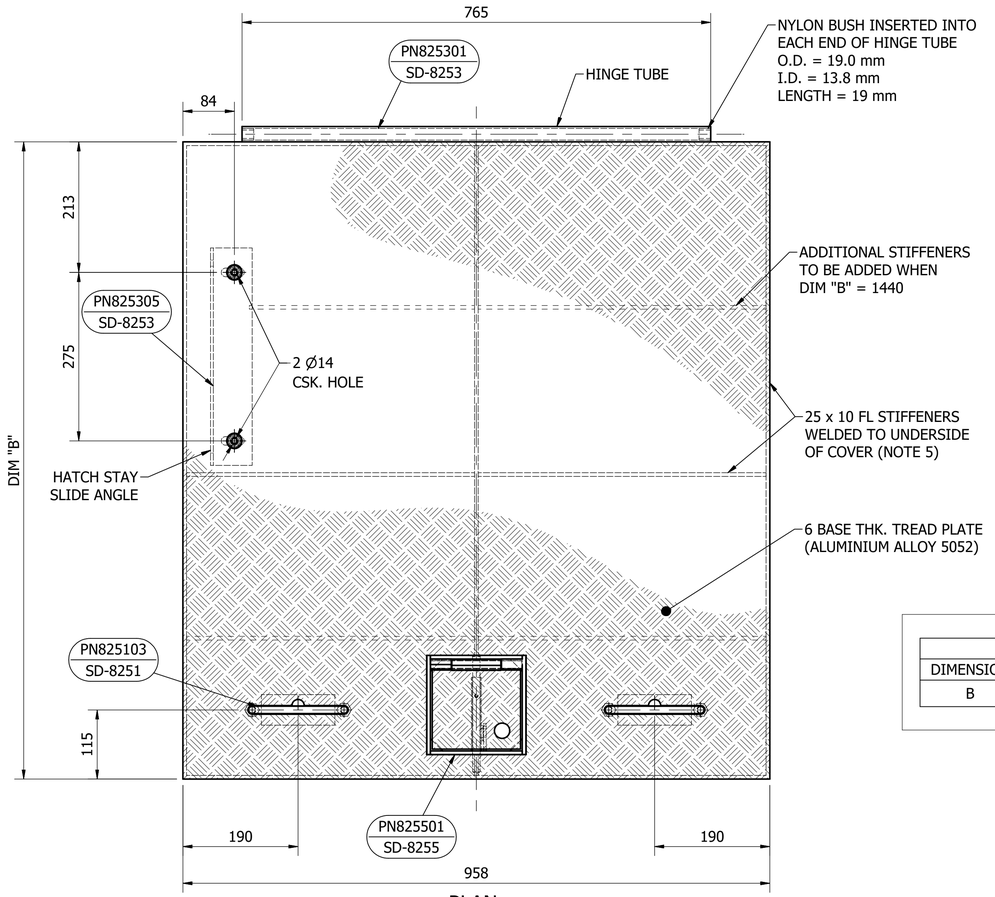
STANDARD DRAWING
FLUSH FIT ACCESS COVERS
ALUMINIUM, HINGED
BOLT-IN FRAME DETAILS

DRAWING STATUS: Current

SD-8203-D

A1

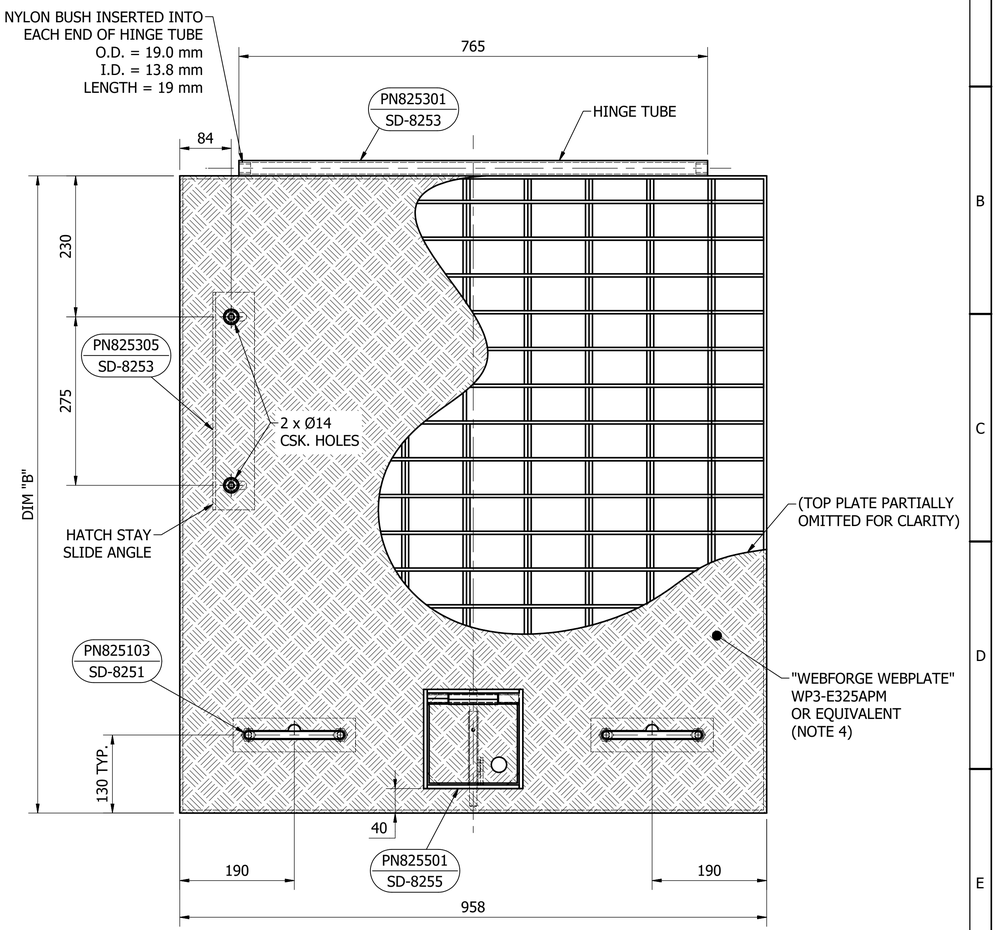
ISSUE: A



PLAN
ACCESS COVER
STIFFENED PLATE STYLE
SCALE: 1 : 5

MATERIAL: ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 19 kg (21 kg)

DIMENSION VARIABLES		
DIMENSION	VERTICAL RUNG LADDER	INCLINED RUNG LADDER
B	1040	1440



PLAN
ACCESS COVER
WEBPLATE STYLE
SCALE: 1 : 5

MATERIAL: ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 19 kg (21 kg)

ITEM	AMDT.
PN820402	

NOTES:

1. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.
2. ALL STAINLESS STEEL FIXTURES INTO ALUMINIUM TO BE SEPARATED WITH INSULATING BUSHES AND RETAINING RINGS OR WASHERS.
3. MASS SHOWN IN BRACKETS () REFERS TO THE LARGER INCLINED RUNG LADDER HATCH.
4. CARE TO BE TAKEN TO ALIGN WEBPLATE LOAD BARS AND CROSS RODS AS TO NOT INTERFERE WITH LIFTING HANDLES AND HATCH STAY.
5. INSTALL NEOPRENE STRIP AS ISOLATION BETWEEN STIFFENER BARS AND ALUMINIUM PLATE.

ITEM	AMDT.
PN820401	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

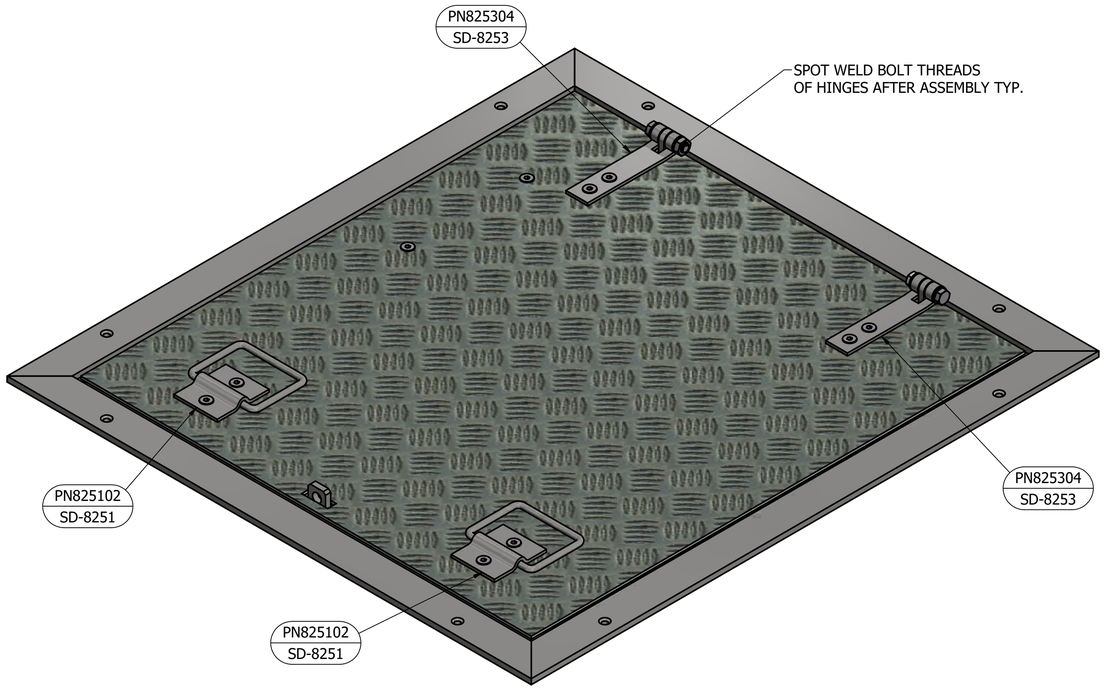
STANDARD DRAWING
FLUSH FIT ACCESS COVERS
ALUMINIUM, HINGED
COVER DETAILS

DRAWING STATUS: Current

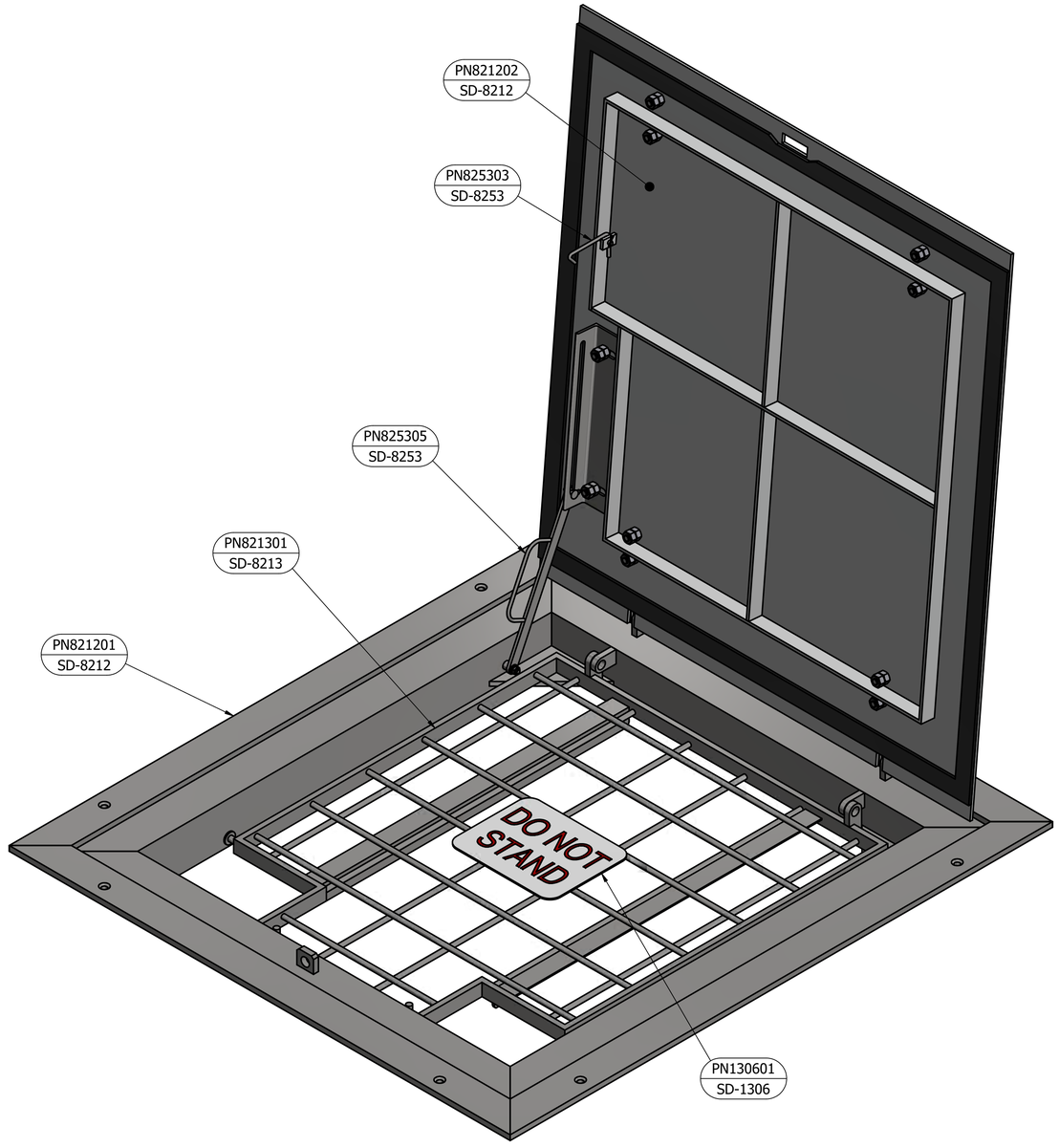
SD-8204-D

A1

ISSUE: A



CLOSED POSITION



OPEN POSITION

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN821201	HATCH FRAME	1	95 kg (110 kg)	SD-8212
PN821202	HATCH COVER	1	25 kg (30 kg)	SD-8212
PN821301	SAFETY GRATE	1	20 kg (30 kg)	SD-8213
PN825304	HINGE	2	1 kg	SD-8253
PN825102	LIFTING HANDLE	2	1 kg	SD-8251
PN825305	HATCH STAY	1	2 kg	SD-8253
PN825303	HATCH CATCH PIN	1	0.1 kg	SD-8253
PN130601	"DO NOT STAND" SIGN	1	2 kg	SD-1306

MASS SHOWN IN BRACKETS () IS FOR HATCH WITH 900 x 1300 OPENING

NOTES:

1. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.

2. GAS-TIGHT ACCESS COVERS ARE AVAILABLE IN TWO STANDARD SIZES TO SUIT ICON WATER'S PORTABLE LIMITED FREE FALL ARREST AND EDGE PROTECTION EQUIPMENT. THESE ARE 900 x 1000 C/O AND 900 x 1300 C/O.

ISOMETRIC VIEWS
GAS-TIGHT ACCESS HATCH

SCALE: N.T.S.

MATERIAL: STAINLESS STEEL / ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: APPROX. 125 kg (145 kg) (INCL. FRAME)

ITEM	AMDT.
PN821101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

ICON WATER ACKNOWLEDGES SYDNEY WATER CORPORATION IN THE DEVELOPMENT OF THIS DRAWING

DAM		RES		SPS	X		
BWS		WAT		STP	X		
WTP		SEW	X				
WPS		REC					

ASSET AREA APPLICABILITY

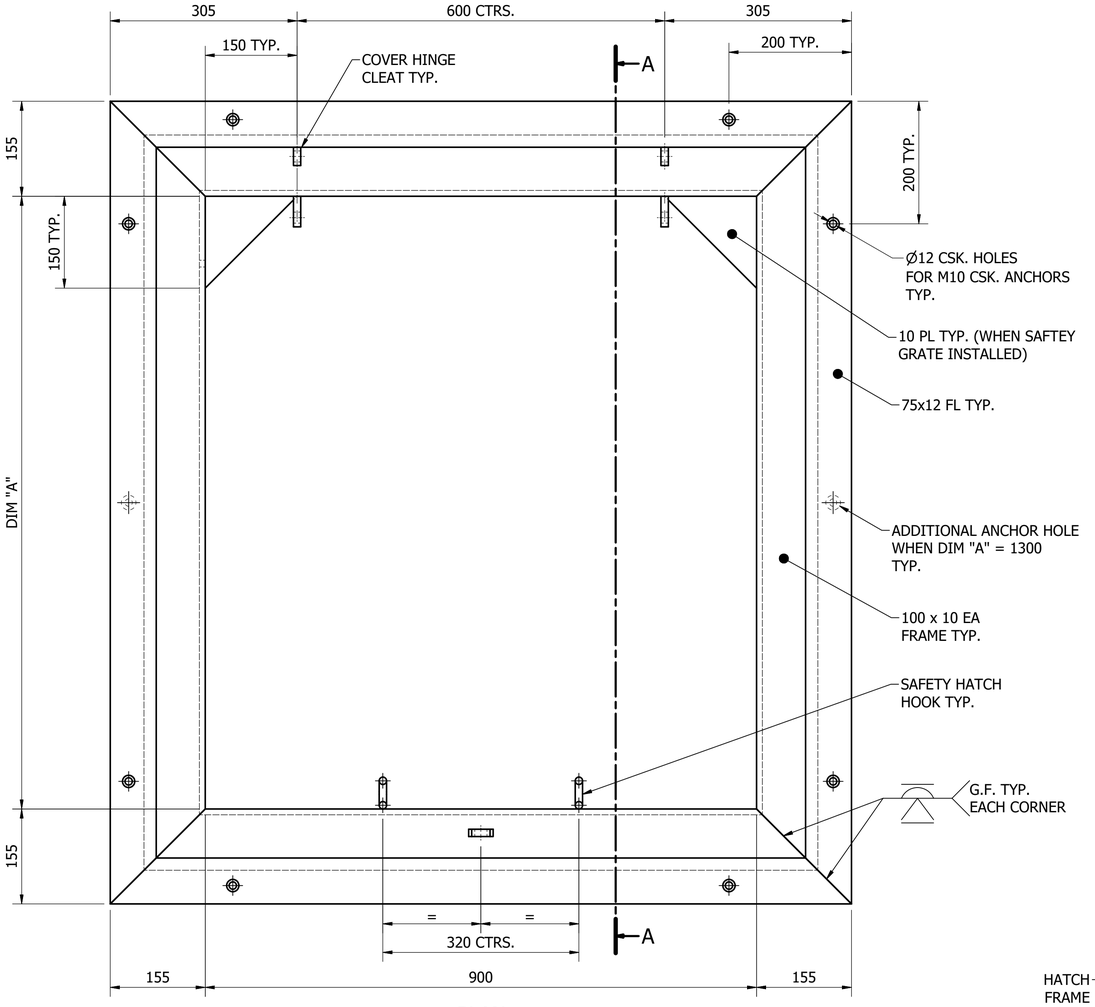
STANDARD DRAWING
GAS-TIGHT ACCESS COVERS
ALUMINIUM, HINGED
GENERAL ARRANGEMENT

DRAWING STATUS: Current

SD-8211-D

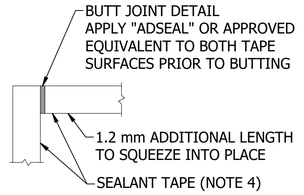
A1

ISSUE: A

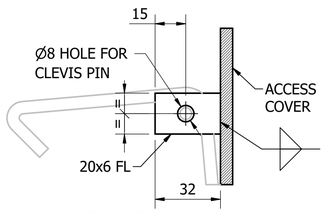


PLAN
COVER FRAME
SCALE: 1 : 5

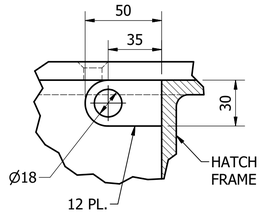
MATERIAL: STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 95 kg (110 kg)



TYPICAL SEALING TAPE CORNER DETAIL
SCALE: N.T.S.

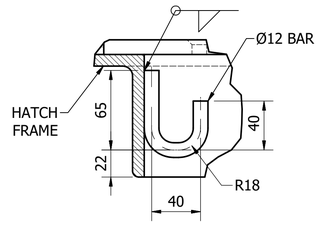


CATCH PIN LUG
SCALE: N.T.S



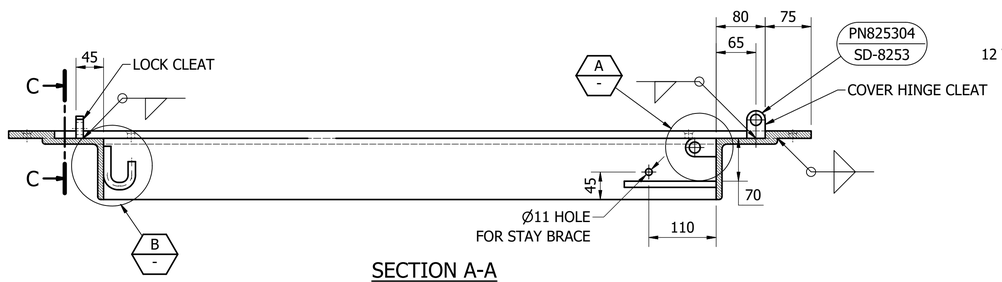
DETAIL A

SAFETY HATCH HINGE
SCALE: 1 :2

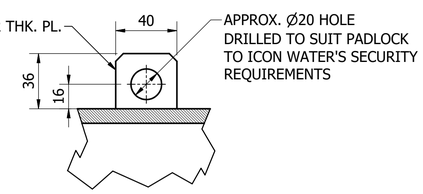


DETAIL B

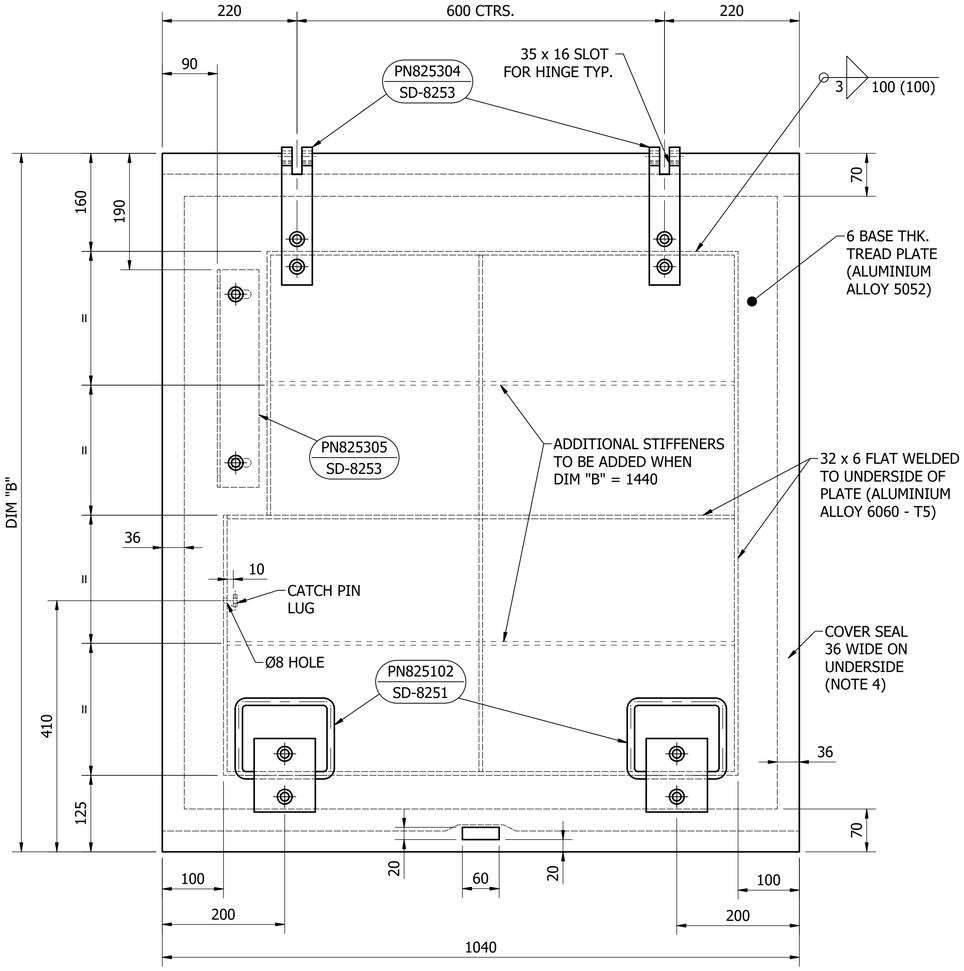
SAFETY HATCH HOOK
SCALE: 0.40 : 1



SECTION A-A
SCALE: 1 : 5



SECTION C-C
LOCK CLEAT
SCALE: 1 : 2



PLAN
ACCESS COVER
SCALE: 1 : 5

MATERIAL: ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 30 kg (35 kg)

ITEM	AMDT.
PN821202	

NOTES:

1. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.

2. TREAD TEXTURE TO BE GROUND FLAT UNDER HINGES AND HANDLES. STAINLESS STEEL AND ALUMINUIM TO BE INSULATED WITH "DENSO" PRIMER D AND DENSOPOL 60 TAPE OR APPROVED EQUIVALENT.

3. ALL STAINLESS STEEL FIXTURES INTO ALUMINIUM TO BE SEPARATED WITH INSULATING BUSHES AND RETAINING RINGS OR WASHERS.

4. WIPE HATCH COVER WITH A CLEAN, LINT-FREE, DRY CLOTH TO ENSURE ABSENCE OF GREASE, DIRT OR MOISTURE PRIOR TO APPLICATION OF TAPE. REFER TO DRAWING SD-8214 WHICH DETAILS TAPE TYPE AND ADDITIONAL INSTALLATION REQUIREMENTS.

5. MASS SHOWN IN BRACKETS () REFERS TO THE LARGER INCLINED RUNG LADDER HATCH.

6. REFER TO DRAWING SD-8214-C FOR HATCH CONNECTION TO CONCRETE DETAILS.

DIMENSION VARIABLES		
DIMENSION	VERTICAL RUNG LADDER	INCLINED RUNG LADDER
A	1000	1300
B	1140	1440

ITEM	AMDT.
PN821201	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

ICON WATER ACKNOWLEDGES SYDNEY WATER CORPORATION IN THE DEVELOPMENT OF THIS DRAWING

DAM		RES		SPS	X
BWS		WAT		STP	X
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
GAS-TIGHT ACCESS COVERS ALUMINIUM, HINGED ASSEMBLY AND DETAILS

DRAWING STATUS: Current

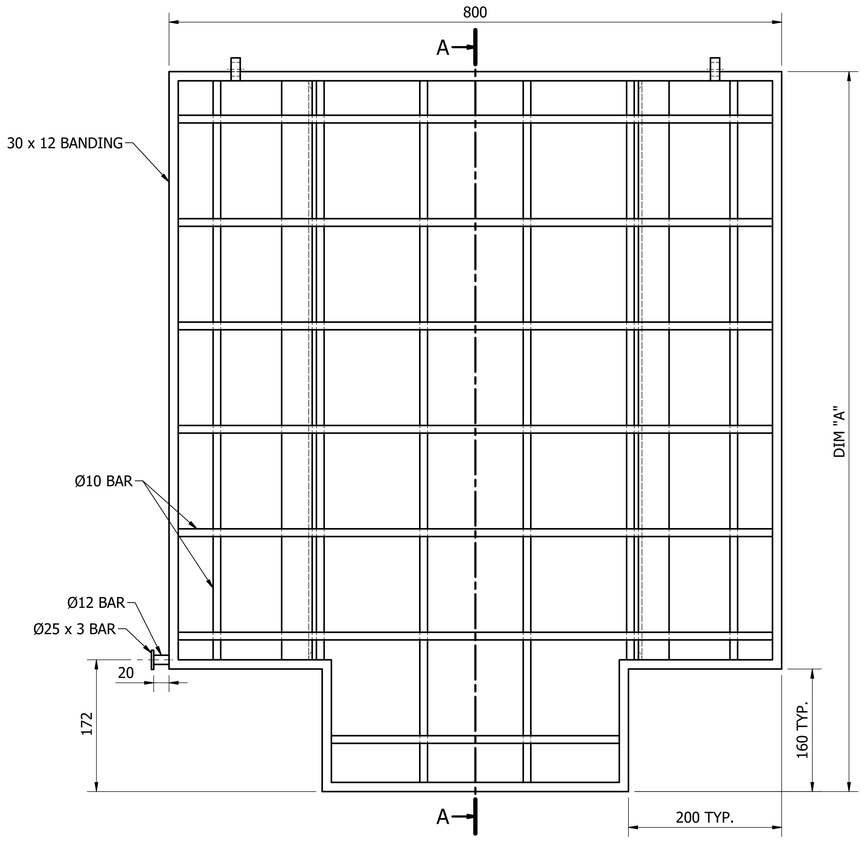
SD-8212-D

A1

ISSUE A

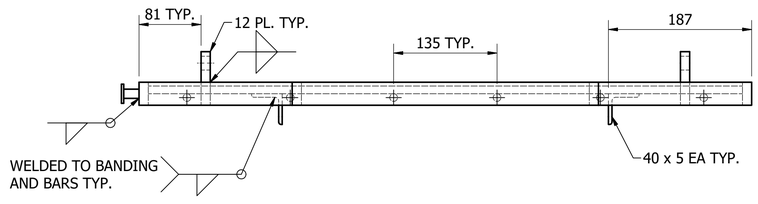
NOTES:

1. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.

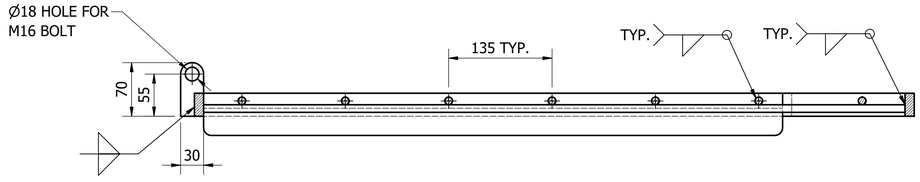


PLAN VIEW

DIMENSION VARIABLES		
DIMENSION	VERTICAL RUNG LADDER	INCLINED RUNG LADDER
A	940	1240



FRONT VIEW



SECTION A-A

SAFETY GRATE

SCALE: 1 : 4

ITEM	AMDT.
PN821301	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	DRAWING NOW -D	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES SYDNEY WATER CORPORATION IN THE DEVELOPMENT OF THIS DRAWING

DAM		RES		SPS	X			
BWS		WAT		STP	X			
WTP		SEW	X					
WPS		REC						

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
GAS-TIGHT ACCESS COVERS ALUMINIUM, HINGED
GRATE INSERT DETAILS

DRAWING STATUS: Current

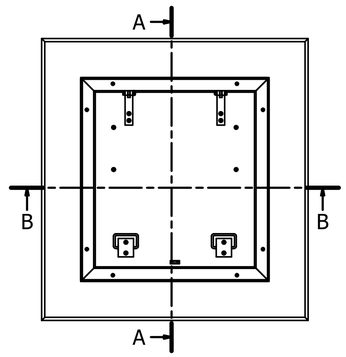
SD-8213-D

A1

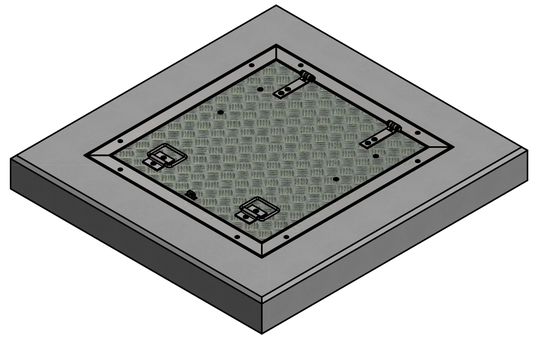
ISSUE: B

NOTES:

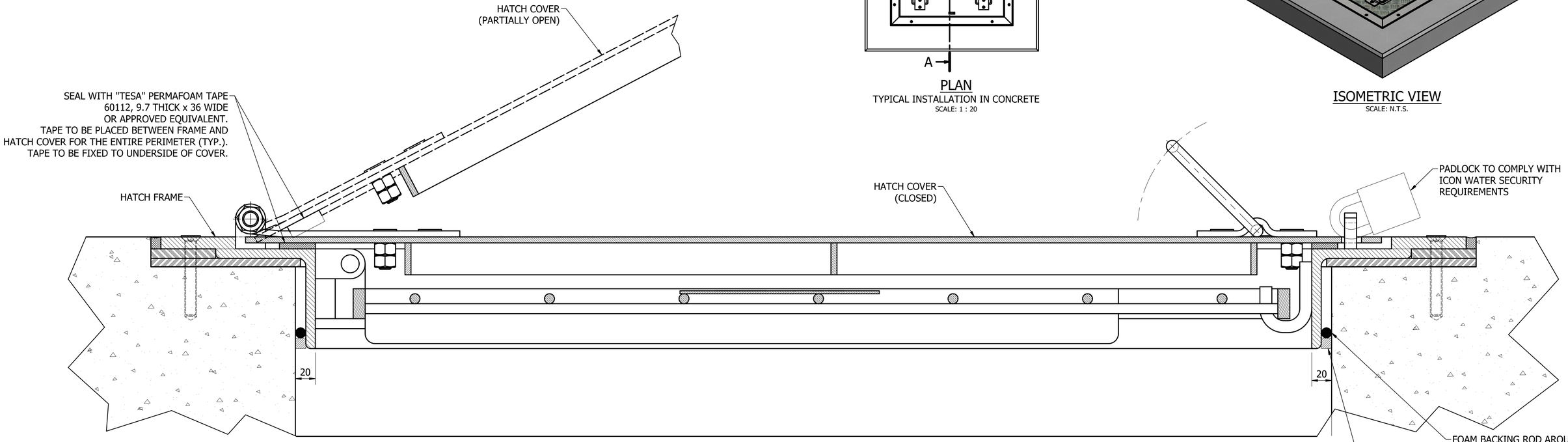
1. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.



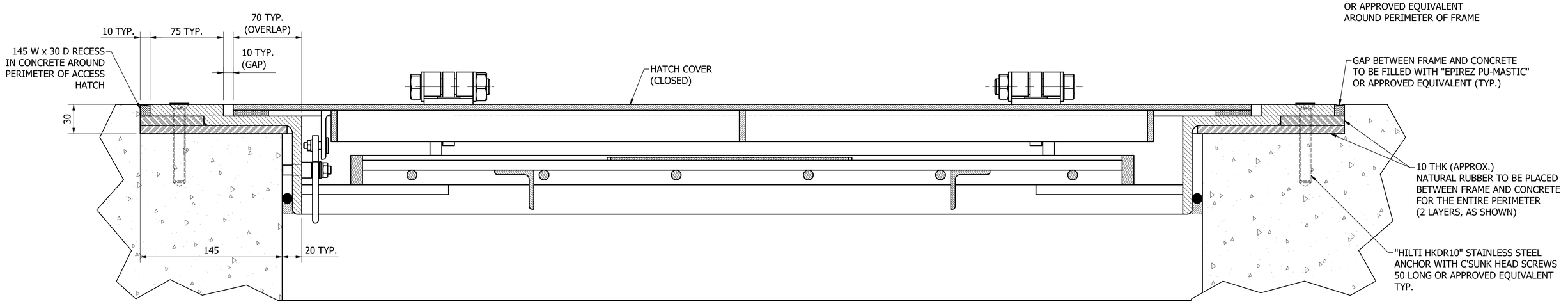
PLAN
TYPICAL INSTALLATION IN CONCRETE
SCALE: 1 : 20



ISOMETRIC VIEW
SCALE: N.T.S.



SECTION A-A
SCALE: 1 : 2



SECTION B-B
SCALE: 1 : 2

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DRAWING NOW -D	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES SYDNEY WATER CORPORATION
IN THE DEVELOPMENT OF THIS DRAWING

DAM		RES		SPS	X				
BWS		WAT		STP	X				
WTP		SEW	X						
WPS		REC							

ASSET AREA APPLICABILITY

icon WATER

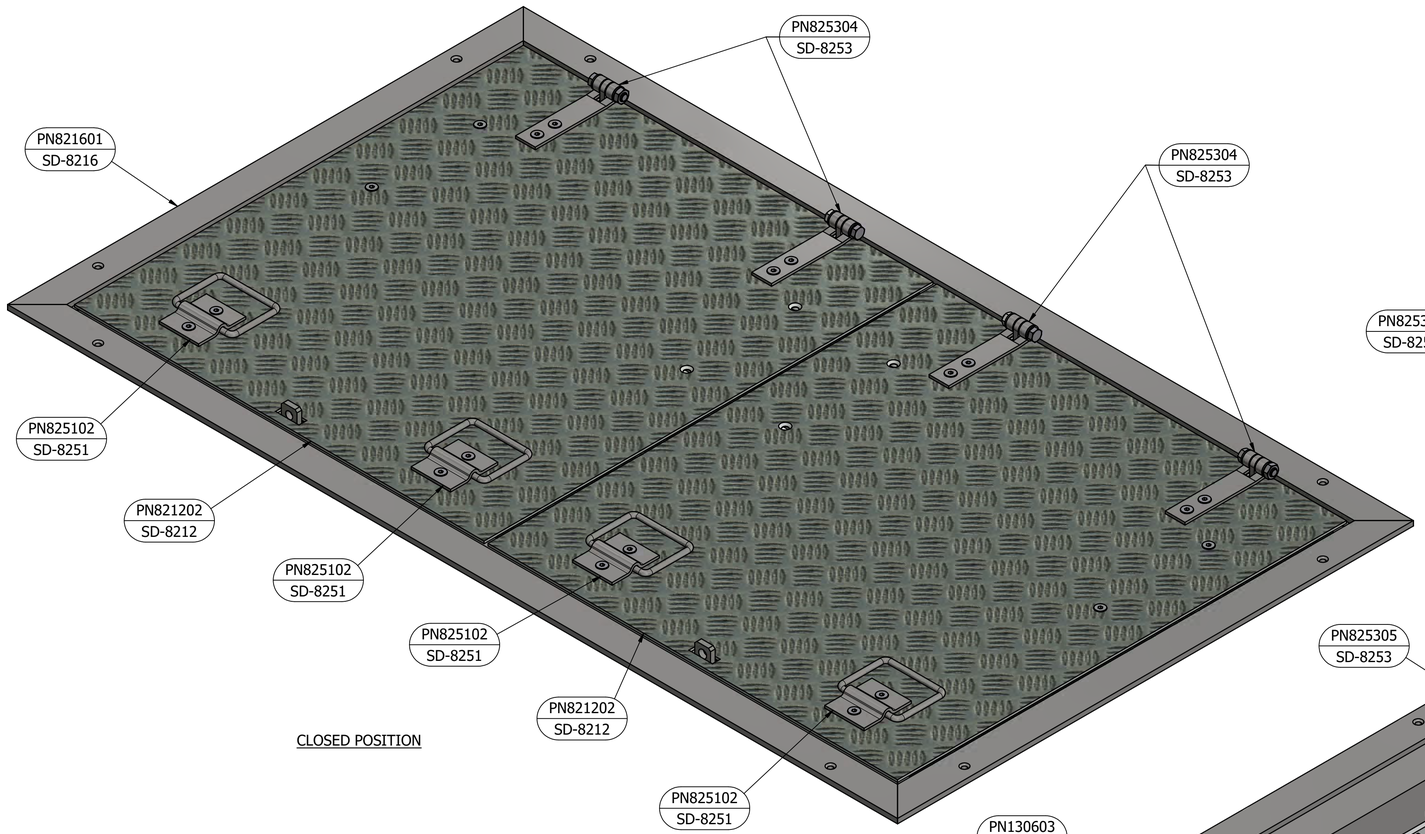
STANDARD DRAWING
GAS-TIGHT ACCESS COVERS ALUMINIUM, HINGED
TYPICAL INSTALLATION

DRAWING STATUS
Current

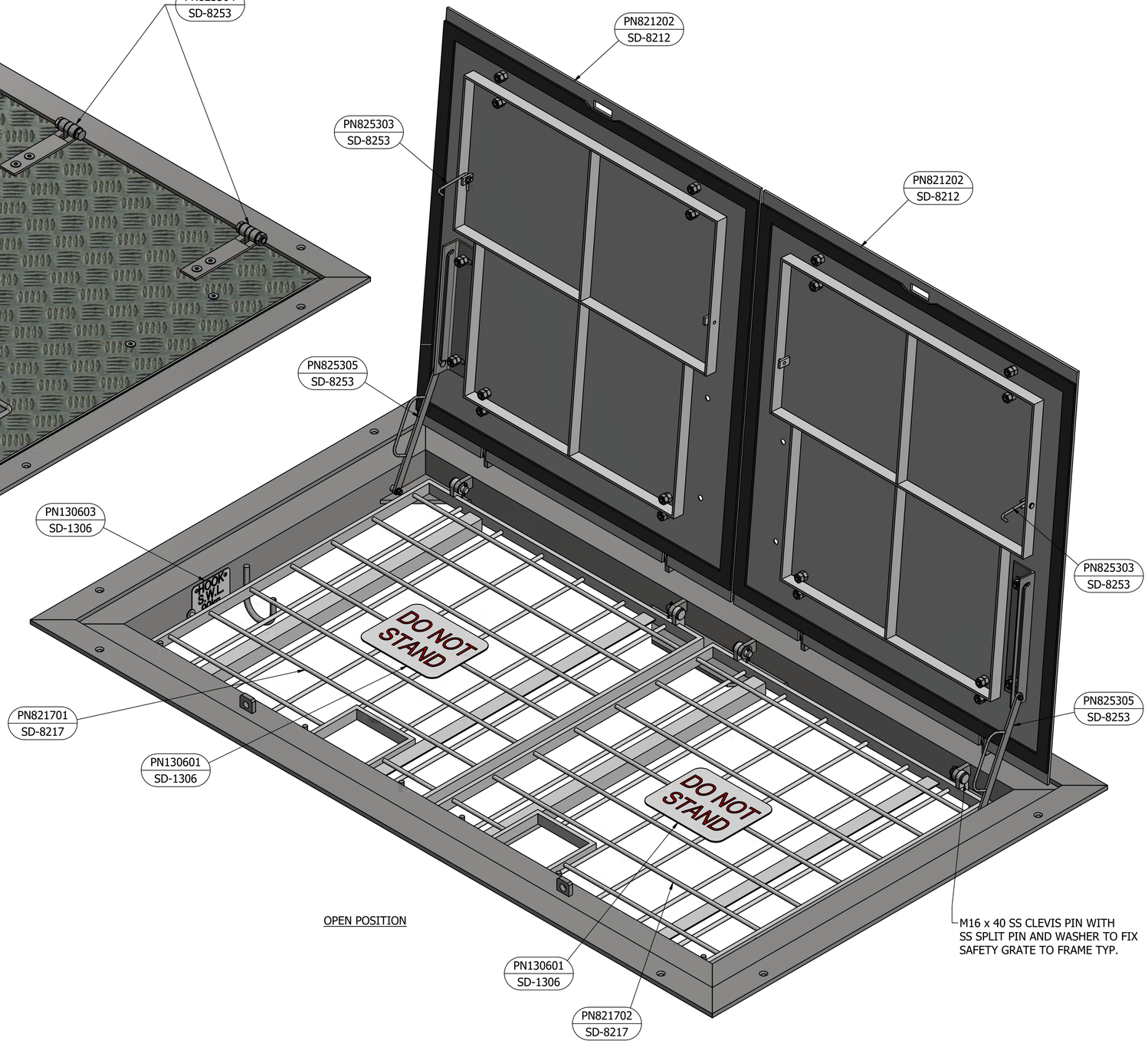
SD-8214-D

A1

ISSUE B



CLOSED POSITION



OPEN POSITION

M16 x 40 SS CLEVIS PIN WITH SS SPLIT PIN AND WASHER TO FIX SAFETY GRATE TO FRAME TYP.

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN821601	HATCH FRAME	1	150 kg	SD-8216
PN821202	MAIN HATCH COVER	2	25 kg	SD-8212
PN825303	SAFETY GRATE CATCH PIN	2	0.25 kg	SD-8253
PN821701	SAFETY GRATE (LEFT HAND SIDE)	1	10 kg	SD-8217
PN821702	SAFETY GRATE (RIGHT HAND SIDE)	1	10 kg	SD-8217
PN825304	HINGE	4	1 kg	SD-8253
PN825102	LIFTING HANDLE	4	1 kg	SD-8251
PN825305	HATCH STAY	2	2 kg	SD-8253
PN130601	SAFETY SIGN (DO NOT STAND)	2	1.5 kg	SD-1306
PN130603	SAFETY SIGN (HOOK SWL) SMALL	1 PER HOOK	0.2 kg	SD-1306

NOTES:

1. THIS HATCH DESIGN IS ONLY APPLICABLE TO SEWAGE PUMPING STATION WET WELL ACCESS. REFER "SD-4100" SERIES OF DRAWINGS FOR ADDITIONAL DETAILS.

2. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.

3. FOR STEEL FABRICATION NOTES REFER TO DRAWING SD-9100

ITEM	AMDT.
PN821501	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	8/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES SYDNEY WATER CORPORATION IN THE DEVELOPMENT OF PARTS OF THIS DRAWING

DAM		RES		SPS	X			
BWS		WAT		STP				
WTP		SEW						
WPS		REC						

ASSET AREA APPLICABILITY

icon WATER

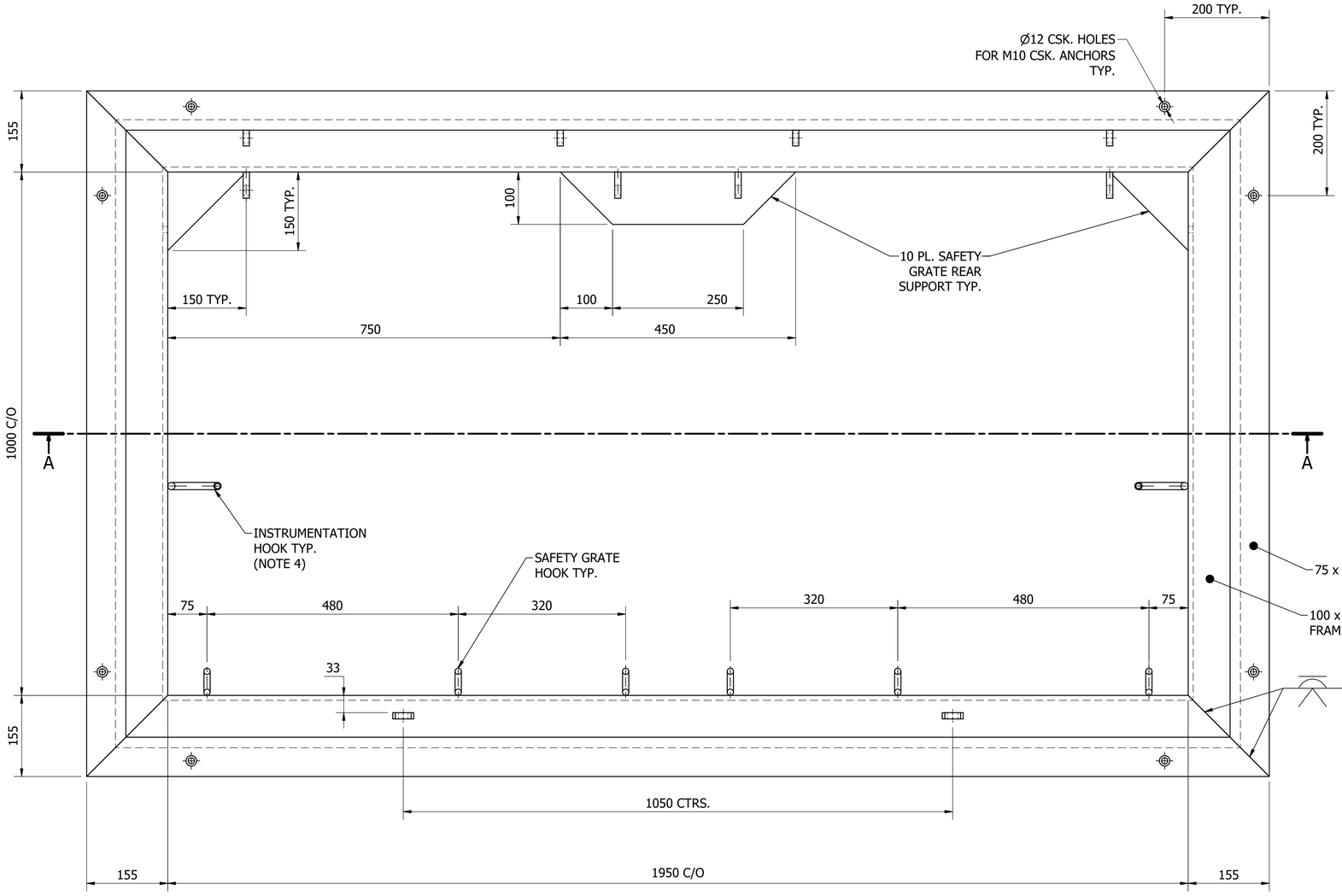
STANDARD DRAWING
ACCESS COVERS
ALUMINIUM, HINGED
SEWAGE PUMPING STATIONS, WET WELL ACCESS
ARRANGEMENT

DRAWING STATUS: Current

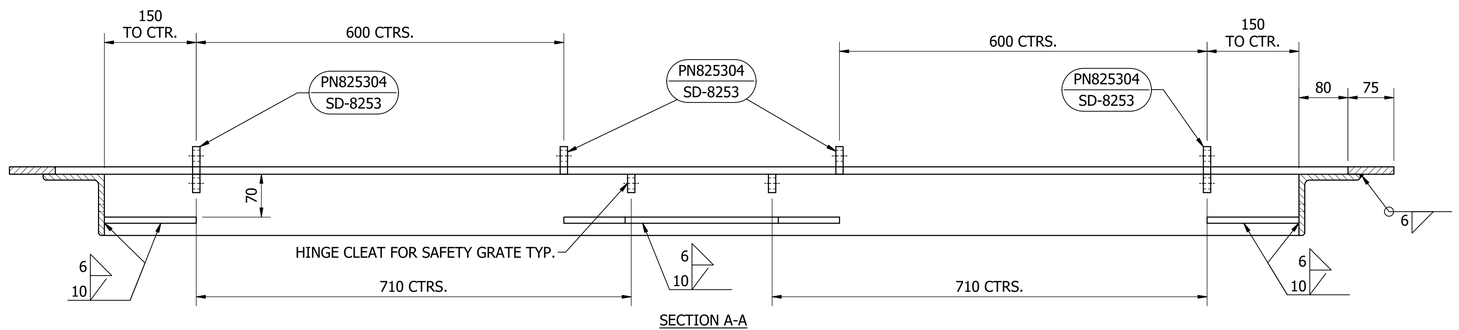
SD-8215-D

A1

ISSUE A



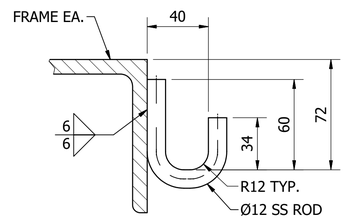
PLAN



SECTION A-A

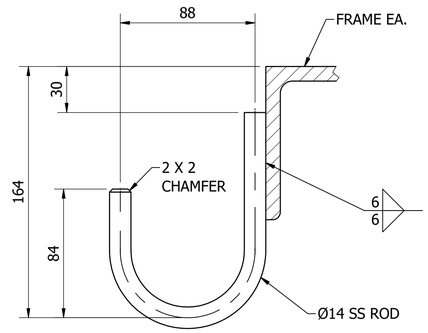
COVER FRAME
SCALE: 1 : 5

MATERIAL: STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 150 kg



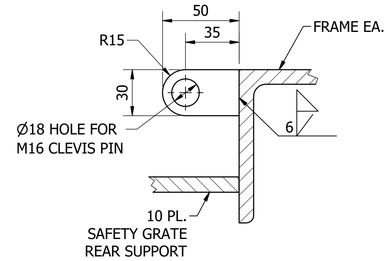
DETAIL

SAFETY GRATE HOOK
SCALE: 1 : 2



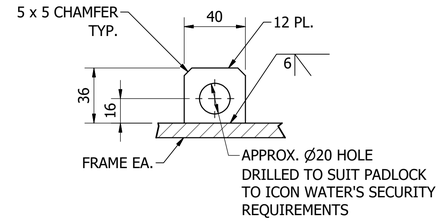
DETAIL

INSTRUMENTATION HOOK
SCALE: 1 : 2



DETAIL

HINGE CLEAT - SAFETY GRATE
SCALE: 1 : 2



DETAIL

LOCK CLEAT
SCALE: 1 : 2

NOTES:

1. THIS HATCH DESIGN IS ONLY APPLICABLE TO SEWAGE PUMPING STATION WET WELL ACCESS. REFER "SD-4100" SERIES OF DRAWINGS FOR ADDITIONAL DETAILS.

2. FOR STEEL FABRICATION NOTES REFER TO DRAWING SD-9103.

3. REFER TO DRAWING SD-8214-C FOR HATCH CONNECTION TO CONCRETE DETAILS.

4. INSTRUMENTATION HOOK LOCATIONS ARE INDICATIVE. NUMBER OF HOOKS AND FINAL LOCATIONS TO BE DETERMINED FOR SPECIFIC SITE/PROJECT REQUIREMENTS.

ITEM	AMDT.
PN821601	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	8/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES SYDNEY WATER CORPORATION IN THE DEVELOPMENT OF PARTS OF THIS DRAWING

DAM		RES		SPS	X
BWS		WAT		STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

icon WATER

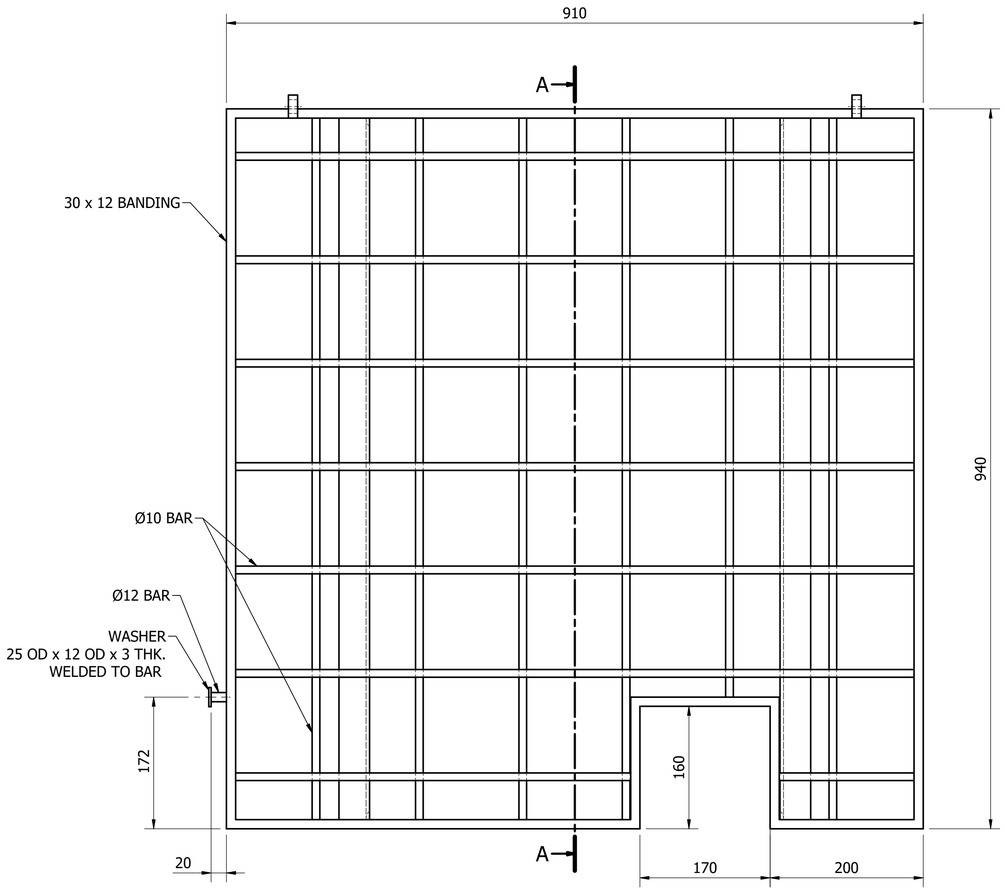
STANDARD DRAWING
ACCESS COVERS
ALUMINIUM, HINGED
SEWAGE PUMPING STATIONS, WET WELL ACCESS
FRAME DETAILS

DRAWING STATUS: Current

SD-8216-D

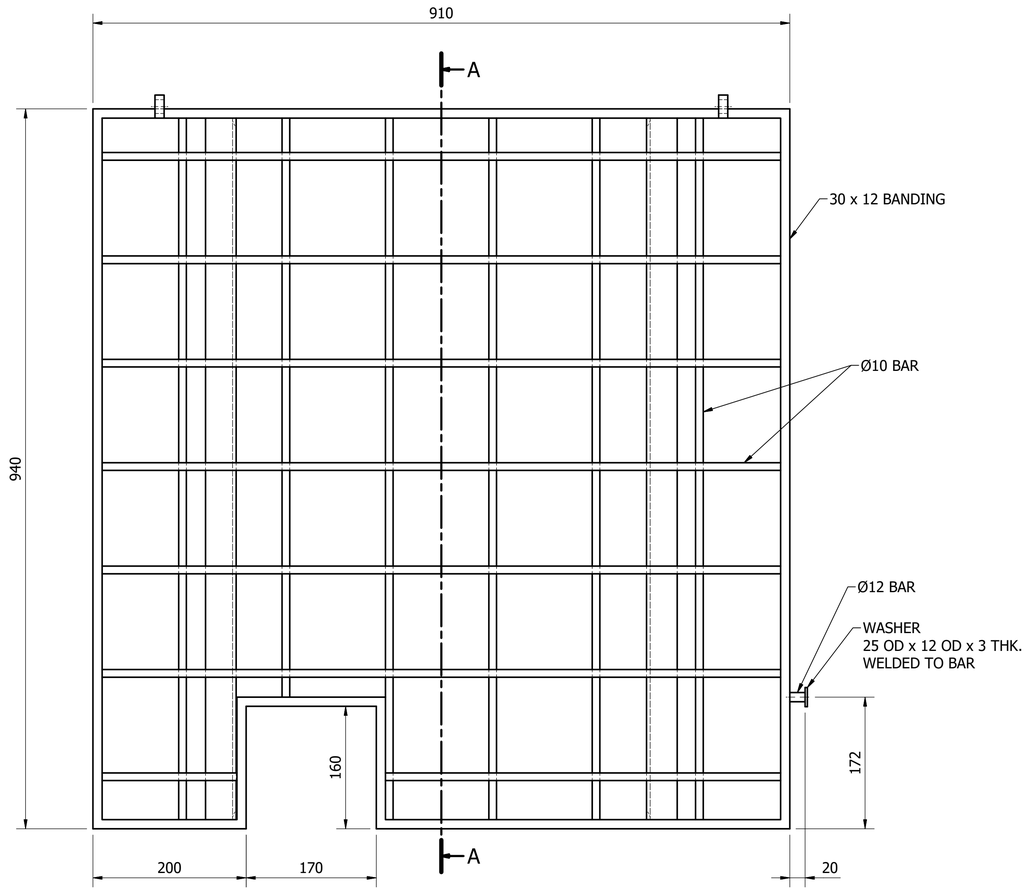
A1

ISSUE: A



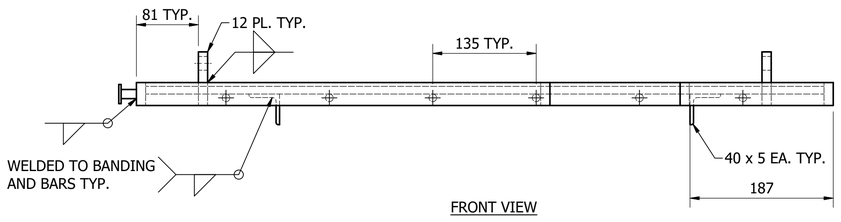
PLAN VIEW
(LEFT HAND GRATE)

ITEM	AMDT.
PN821701	

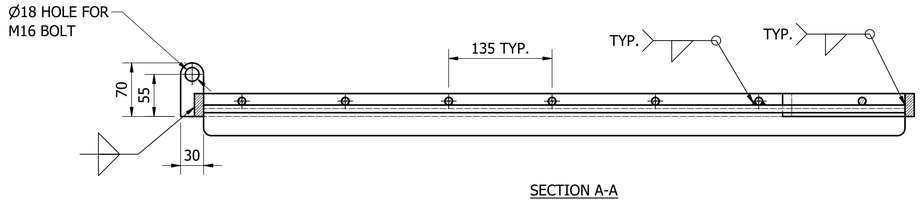


PLAN VIEW
(RIGHT HAND GRATE)

ITEM	AMDT.
PN821702	



FRONT VIEW



SECTION A-A

SAFETY GRATE

SCALE: 1 : 4

MATERIAL: ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 10 kg

NOTES:

1. THIS HATCH DESIGN IS ONLY APPLICABLE TO SEWAGE PUMPING STATION WET WELL ACCESS. REFER "SD-4100" SERIES OF DRAWINGS.
2. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.
3. ALL STAINLESS STEEL AND ALUMINIUM INTERFACES TO BE SEPARATED WITH INSULATING BUSHES AND RETAINING RINGS OR WASHERS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	8/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES SYDNEY WATER CORPORATION IN THE DEVELOPMENT OF THIS DRAWING

DAM		RES		SPS	X
BWS		WAT		STP	
WTP		SEW			
WPS		REC			

ASSET AREA APPLICABILITY

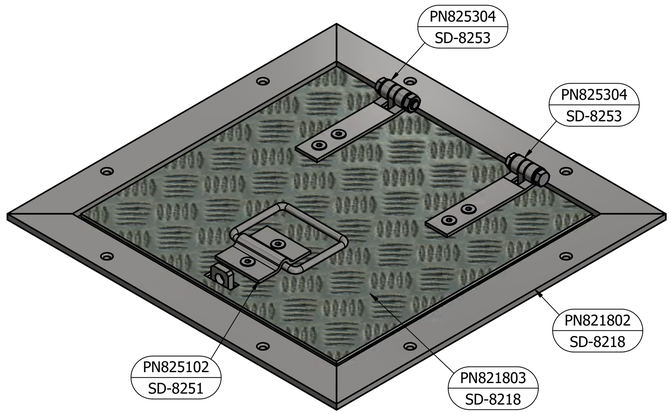
STANDARD DRAWING
ACCESS COVERS
ALUMINIUM, HINGED
SEWAGE PUMPING STATIONS, WET WELL ACCESS
SAFETY GRATE DETAILS

DRAWING STATUS: Current

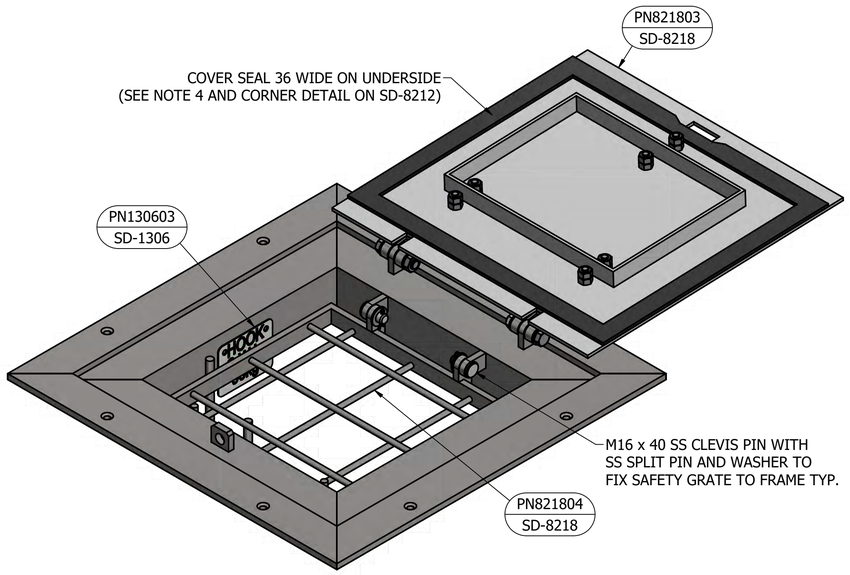
SD-8217-D

A1

ISSUE: A



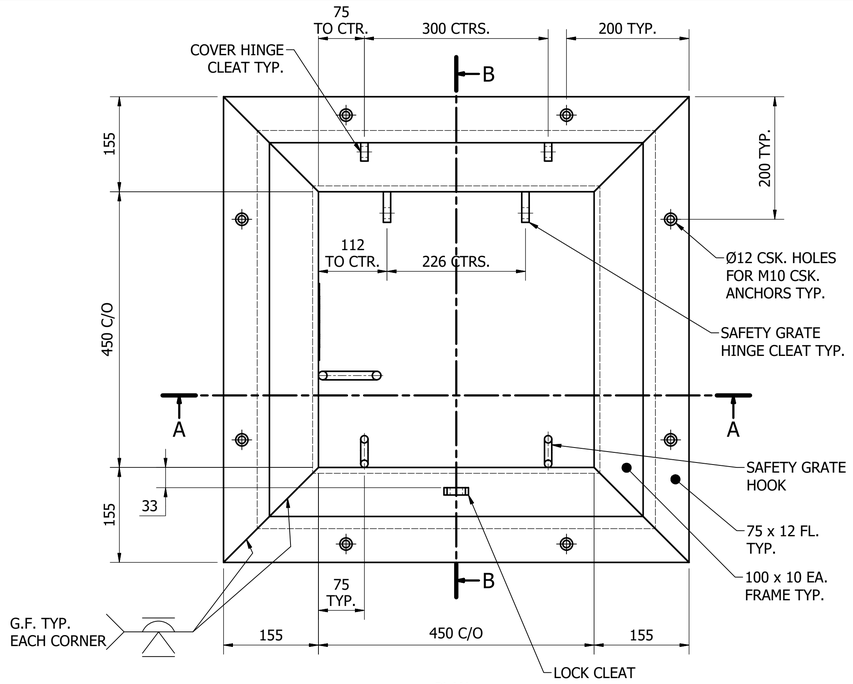
CLOSED POSITION



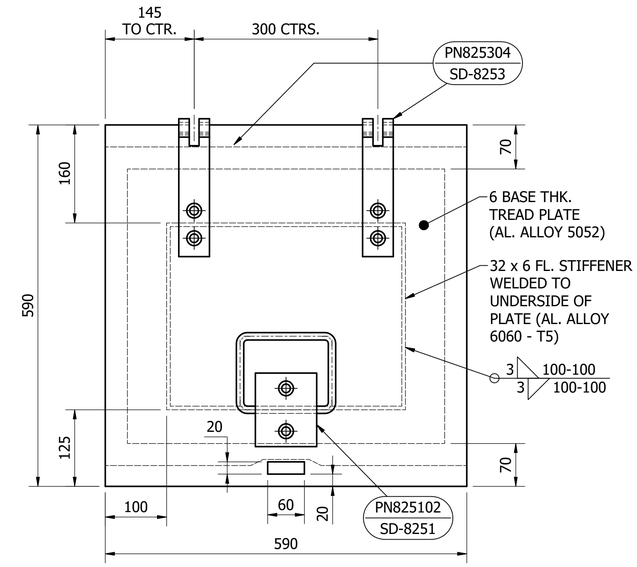
OPEN POSITION
(SAFETY GRATE CLOSED)

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN821802	HATCH FRAME	1	55 kg	SD-8218
PN825304	HINGE	2	1 kg	SD-8253
PN821803	HATCH COVER	1	7 kg	SD-8218
PN825102	LIFTING HANDLE	1	1 kg	SD-8251
PN821804	SAFETY GRATE	1	10 kg	SD-8218
PN130603	SAFETY SIGN (HOOK S.W.L.) SMALL	1	0.2 kg	SD-1306

ITEM	AMDT.
PN821801	



PLAN

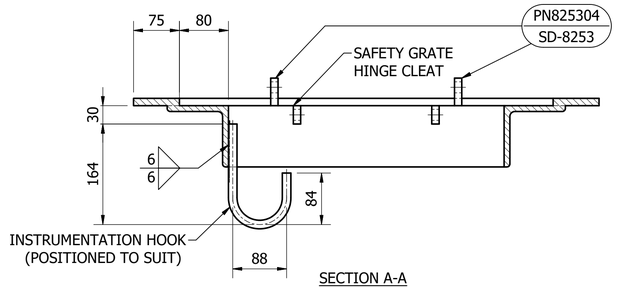


PLAN

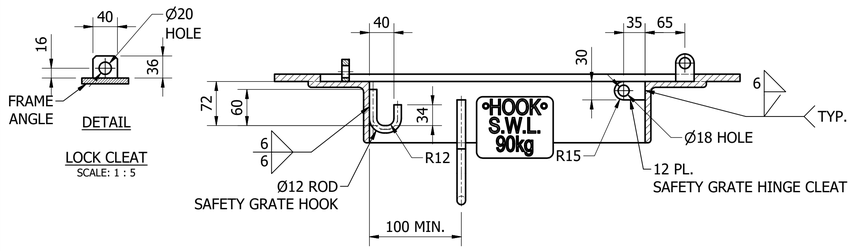
COVER
SCALE: 1 : 5

MATERIAL: ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 11 kg (INCL. HANDLE AND HINGES)

ITEM	AMDT.
PN821803	



SECTION A-A

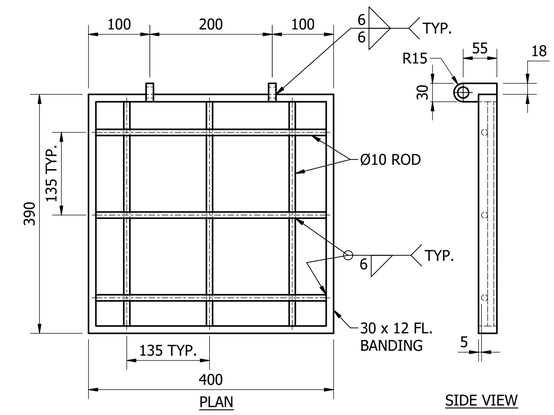


SECTION B-B

COVER FRAME
SCALE: 1 : 5

MATERIAL: STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 55 kg

ITEM	AMDT.
PN821802	



SAFETY GRATE
SCALE: 1 : 5

MATERIAL: STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 10 kg

ITEM	AMDT.
PN821804	

NOTES:

1. THIS HATCH DESIGN IS ONLY FOR INSTRUMENTATION ACCESS (NOT TO BE USED FOR PERSONNEL ACCESS).
2. NOTES ON DRAWING SD-8212 ARE ALSO APPLICABLE TO THIS DRAWING.
3. FOR STEEL FABRICATION NOTES REFER TO DRAWING SD-9103. AND FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.
4. REFER TO DRAWING SD-8214-C FOR HATCH CONNECTION TO CONCRETE DETAILS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	19/06/2018	M. Matusiak	K. Danenbergsons	C. Patrick

ICON WATER ACKNOWLEDGES SYDNEY WATER CORPORATION IN THE DEVELOPMENT OF THIS DRAWING

DAM		RES		SPS	X
BWS		WAT		STP	X
WTP		SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

icon WATER

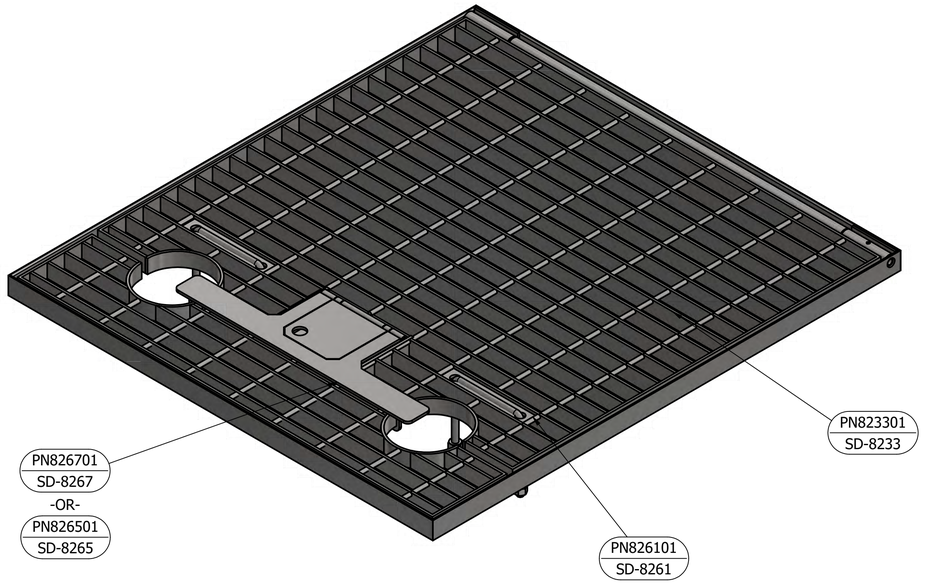
STANDARD DRAWING
GAS-TIGHT ACCESS COVERS
ALUMINIUM, HINGED
INSTRUMENTATION HATCH
ARRANGEMENT AND DETAILS

DRAWING STATUS: Current

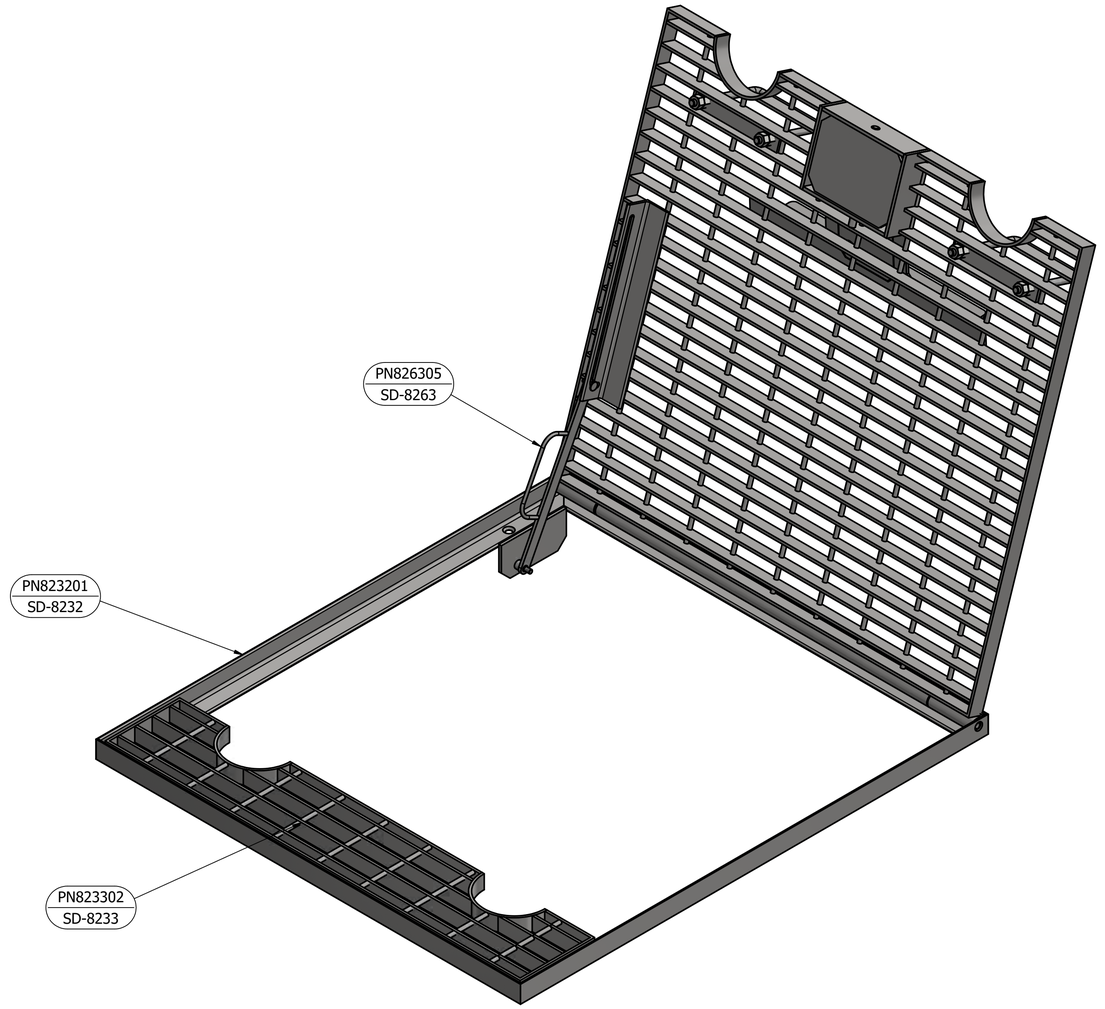
SD-8218-D

A1

ISSUE A



CLOSED POSITION



OPEN POSITION

ISOMETRIC VIEWS
FLUSH FIT ACCESS HATCH
FOR VERTICAL RUNG LADDER

SCALE : NTS

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 60 kg (INCLUDING FRAME)

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN823201	HATCH FRAME	1	12 kg	SD-8232
PN823301	HATCH COVER	1	32 kg	SD-8233
PN823302	FIXED HATCH COVER	1	8 kg	SD-8233
PN826701	LOCK BOX - STANCHION LOCKING TYPE	1	6 kg	SD-8267
PN826101	LIFTING HANDLE	2	1 kg	SD-8261

ITEM	AMDT.
PN823101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

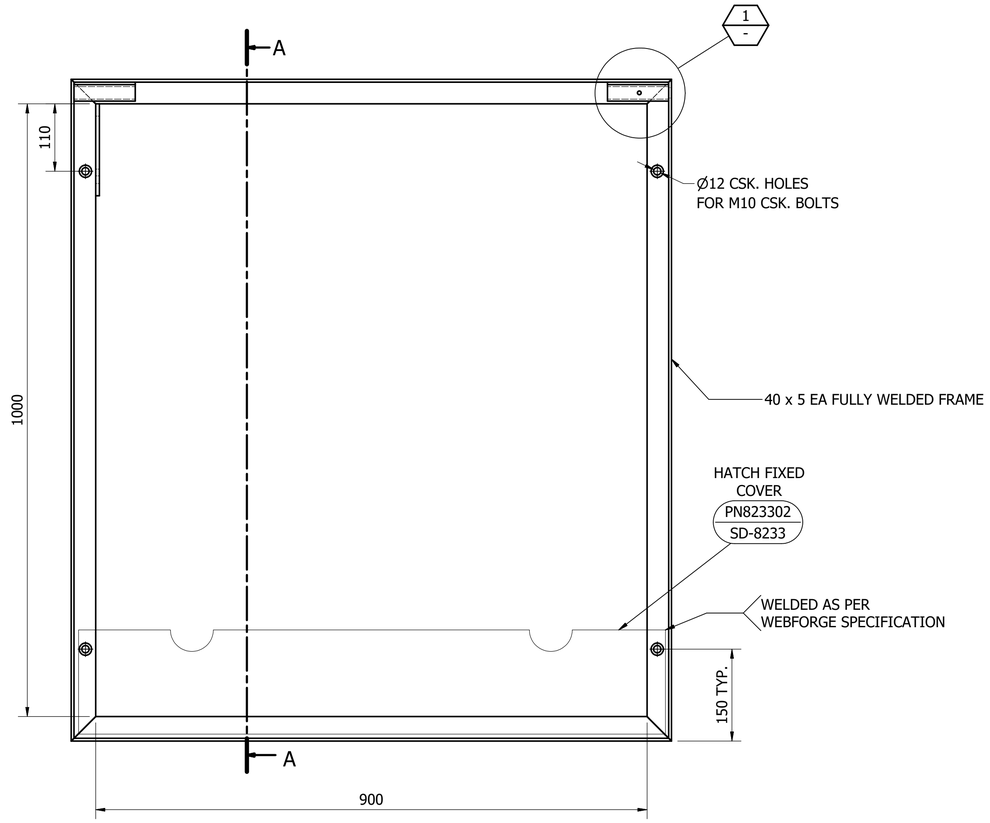
STANDARD DRAWING
FLUSH FIT ACCESS COVERS - HOT DIP GALVANISED STEEL HINGED FOR VERTICAL RUNG LADDERS ARRANGEMENT

DRAWING STATUS: Current

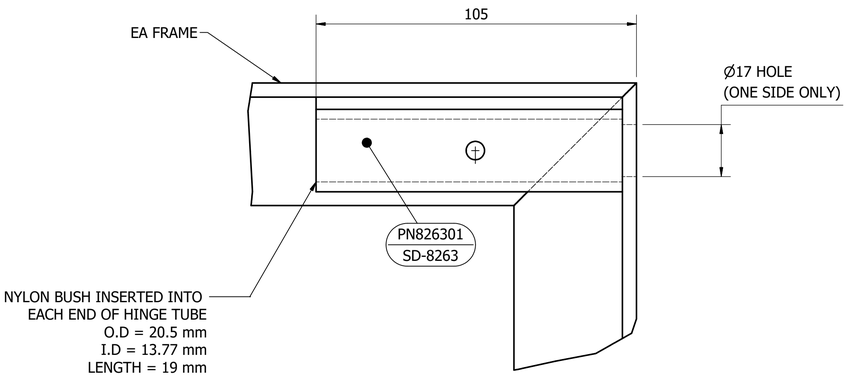
SD-8231-D

A1

ISSUE A



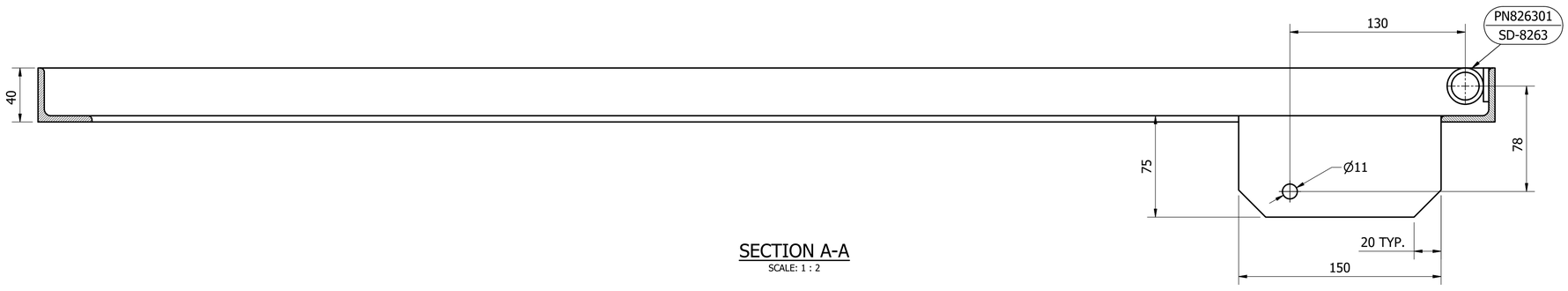
PLAN



DETAIL 1

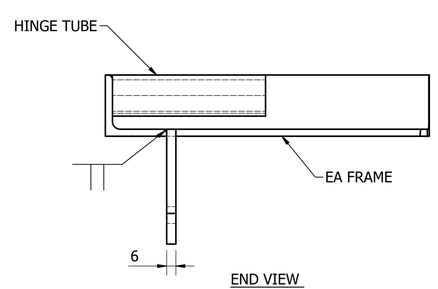
HINGE TUBE

SCALE: 1 : 1



SECTION A-A

SCALE: 1 : 2



END VIEW

HATCH STAY BRACKET

SCALE: 1 : 2

HATCH FRAME

SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 12 kg

ITEM	AMDT.
PN823201	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X				
BWS	X	WAT	X	STP	X				
WTP	X	SEW	X						
WPS	X	REC	X						

ASSET AREA APPLICABILITY

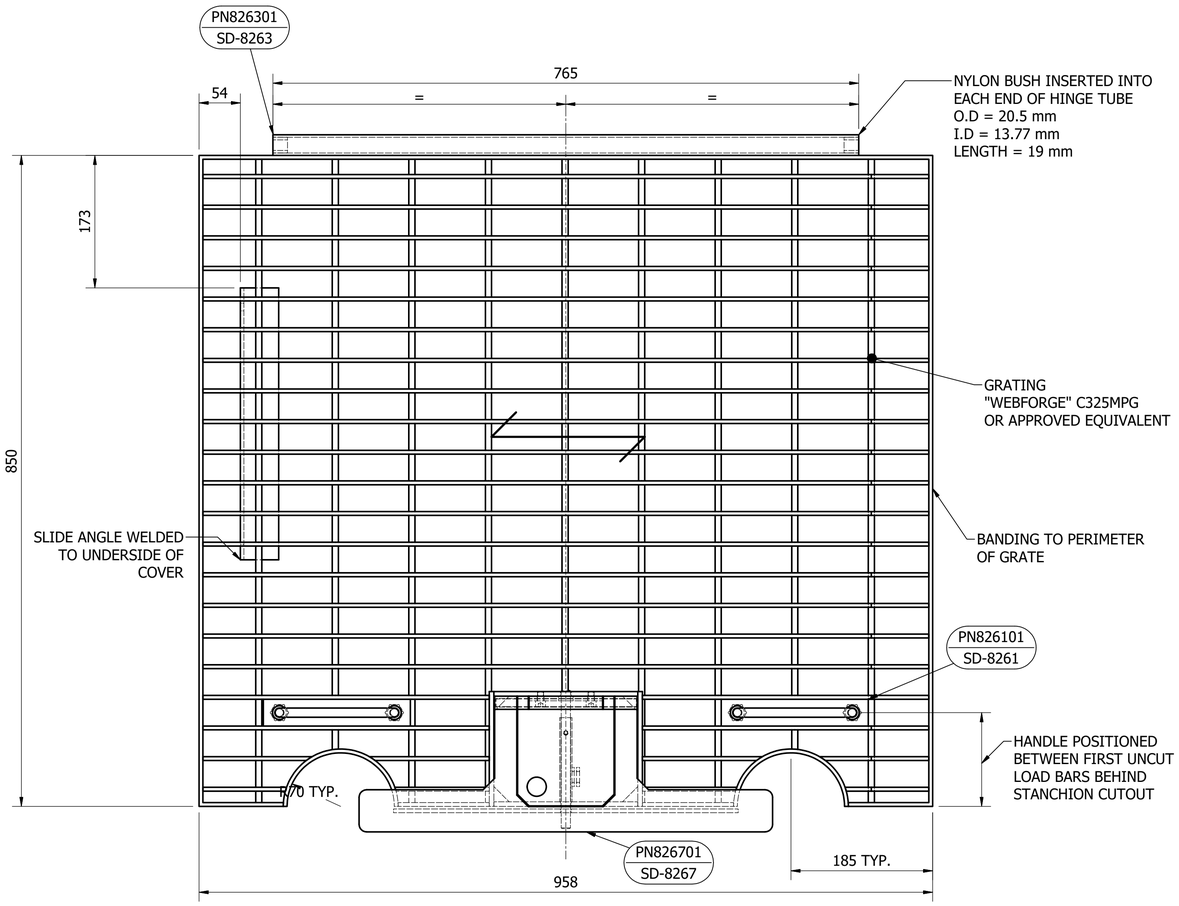
STANDARD DRAWING
FLUSH FIT ACCESS COVERS - HOT DIP GALVANISED STEEL
HINGED FOR VERTICAL RUNG LADDERS
FRAME DETAILS

DRAWING STATUS: Current

SD-8232-D

A1

ISSUE: A

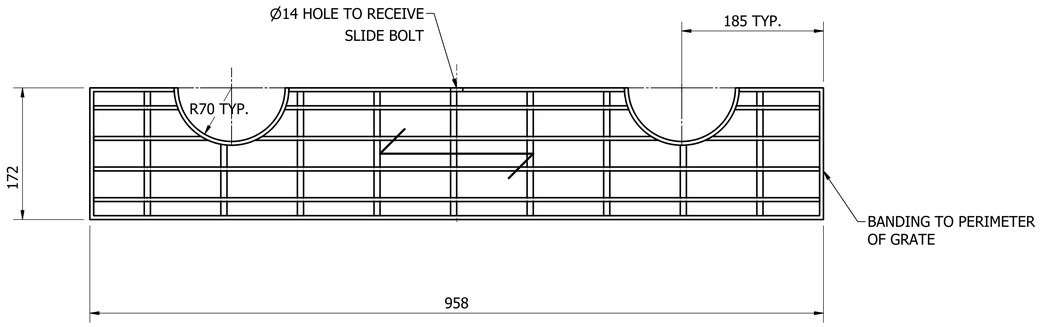


PLAN

HATCH COVER

SCALE: 1 : 4

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 30 kg



PLAN

HATCH FIXED COVER

SCALE: 1 : 4

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 9 kg

NOTES:

1. CARE TO BE TAKEN TO ALIGN WEB GRATE LOAD BARS AND CROSS RODS AS TO NOT INTERFERE WITH THE LIFTING HANDLES AND HATCH STAY.

ITEM	AMDT.
PN823301	

ITEM	AMDT.
PN823302	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X	ASSET AREA APPLICABILITY	
BWS	X	WAT	X	STP	X		
WTP	X	SEW	X				
WPS	X	REC	X				

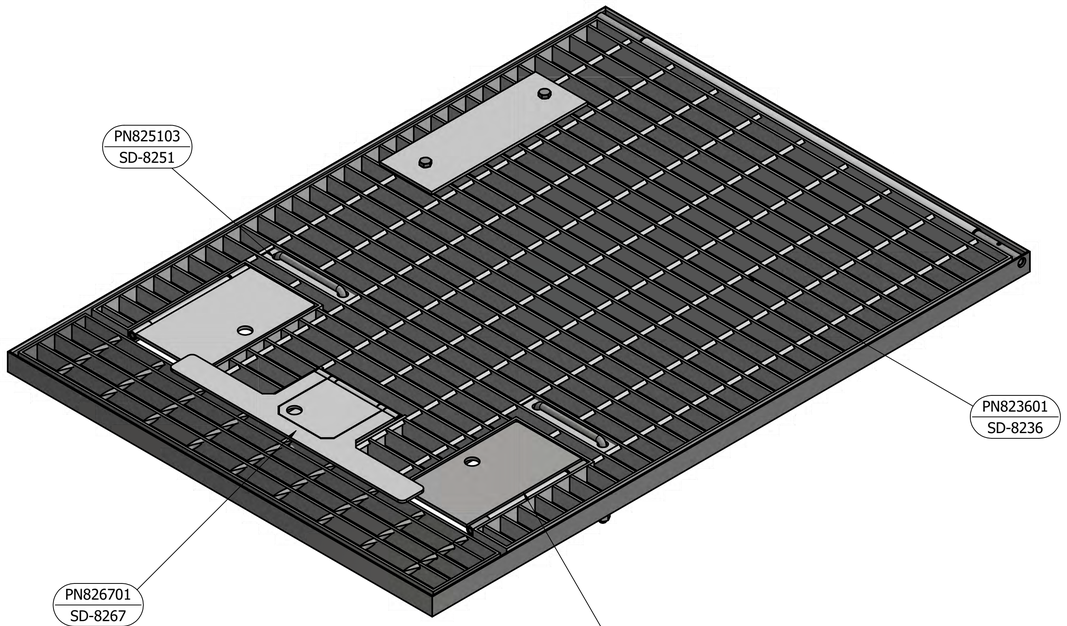
STANDARD DRAWING
FLUSH FIT ACCESS COVERS - HOT DIP GALVANISED STEEL
HINGED FOR VERTICAL RUNG LADDERS
COVER DETAILS

DRAWING STATUS: Current

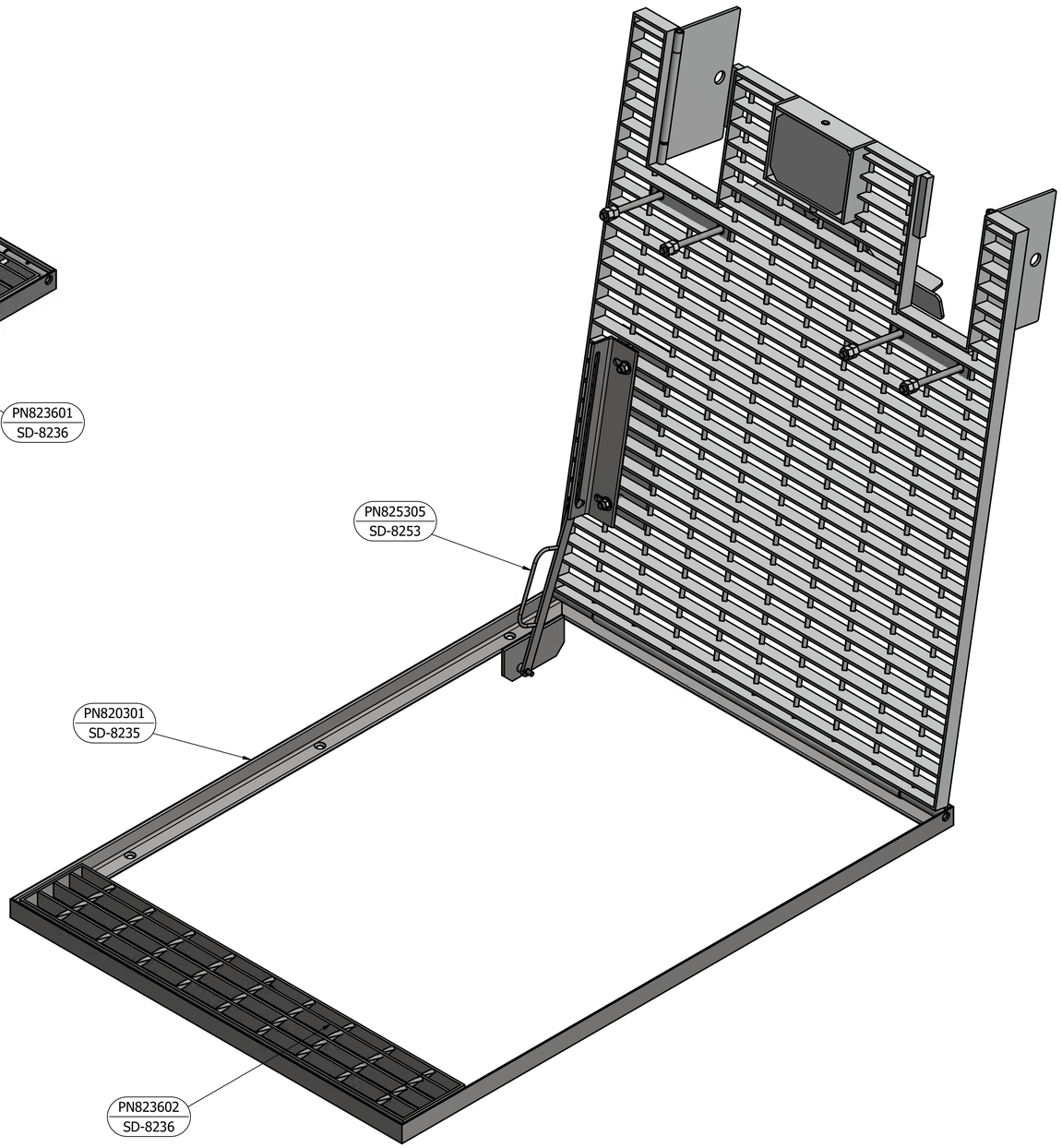
SD-8233-D

A1

ISSUE: A



CLOSED POSITION



OPEN POSITION

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN825301	HATCH FRAME	1	14 kg	SD-8235
PN823601	HATCH COVER	1	22 kg	SD-8236
PN826101	LIFTING HANDLE	2	1 kg	SD-8261
PN826701	LOCK BOX - STANCHION LOCKING TYPE	1	3 kg	SD-8267
PN823602	FIXED HATCH COVER	1	9 kg	SD-8236
PN825305	HATCH SUPPORT STAY	1	2 kg	SD-8253
PN825302	STANCHION ACCESS HATCH	2	1 kg	SD-8253

ISOMETRIC VIEWS
FLUSH FIT ACCESS HATCH
FOR INCLINED RUNG & STEP LADDERS

SCALE : NTS

MATERIAL: ALUMINIUM / GMS
COATING: N/A
FINISH COLOUR: N/A
MASS: 45 kg (INCLUDING FRAME)

ITEM	AMDT.
PN823401	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

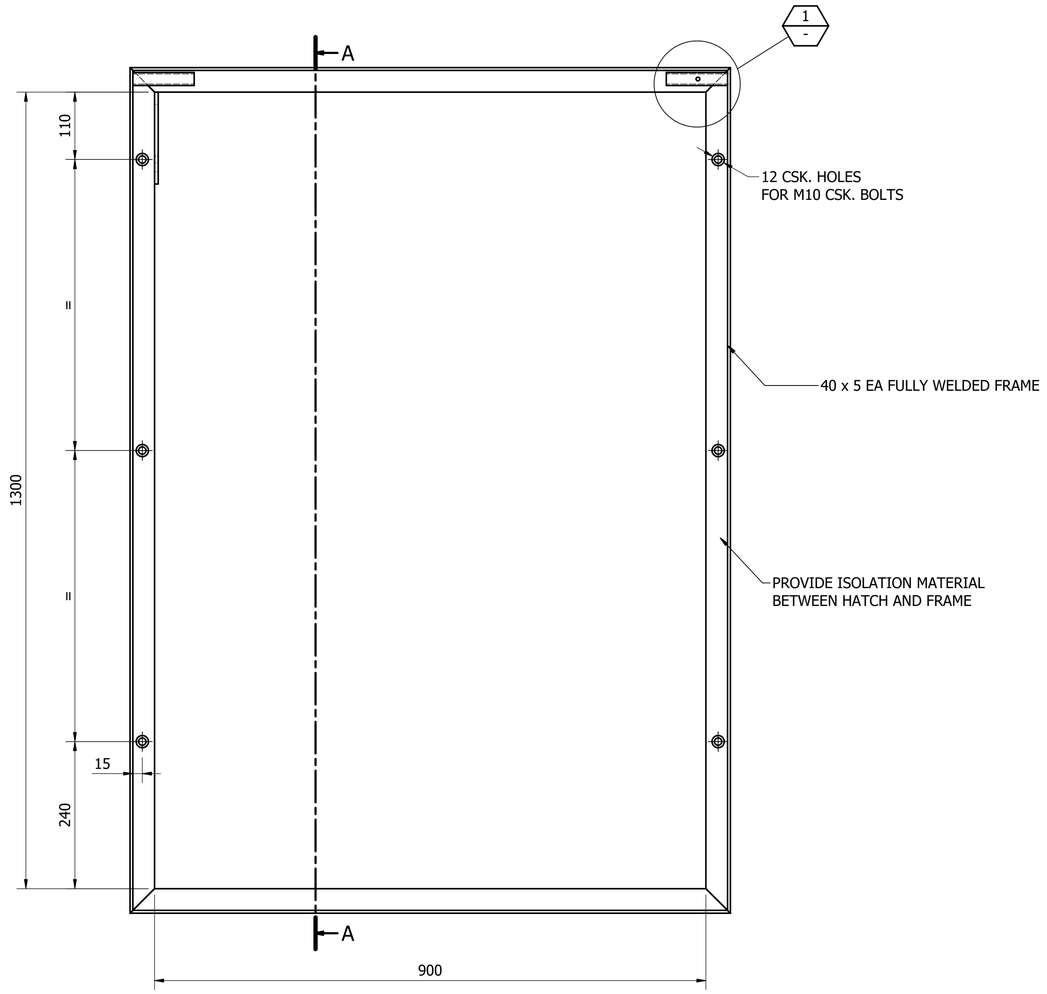
STANDARD DRAWING
FLUSH FIT ACCESS COVERS - HDG AND ALUMINIUM
HINGED FOR INCLINED RUNG AND STEP LADDERS
ARRANGEMENT

DRAWING STATUS: Current

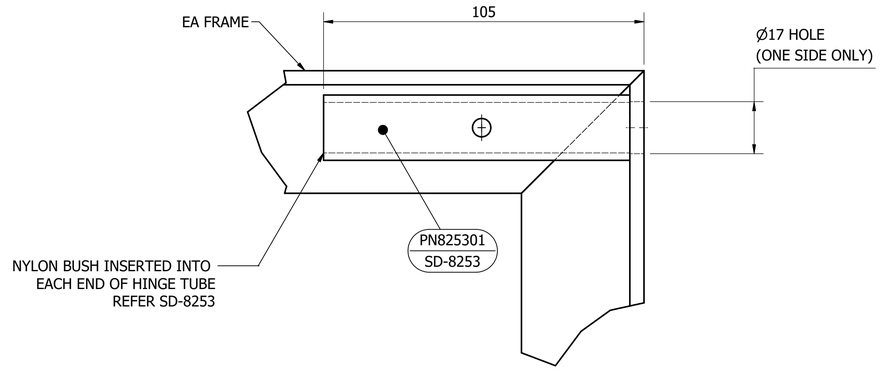
SD-8234-D

A1

ISSUE A

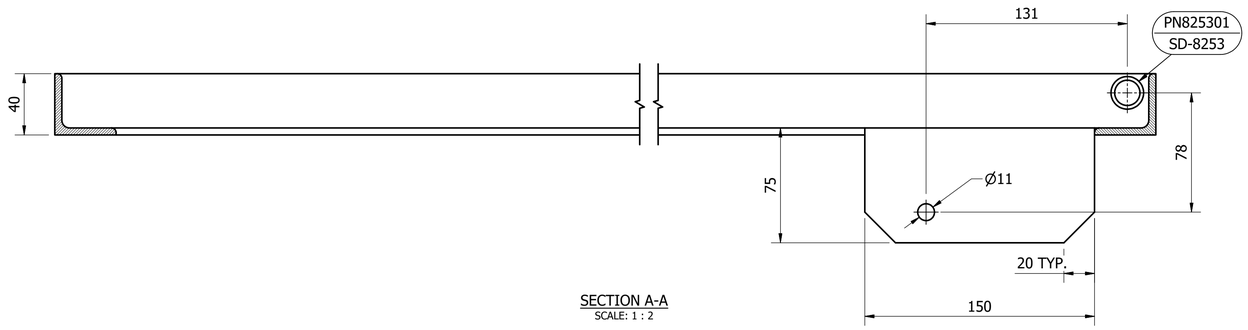


PLAN
SCALE: 1 : 5

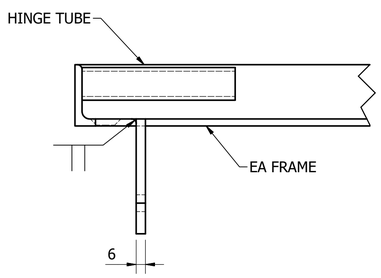


DETAIL 1

HINGE TUBE
SCALE: 1 : 1



SECTION A-A
SCALE: 1 : 2



END VIEW

HATCH STAY BRACKET
SCALE: 1 : 2

HATCH FRAME

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 14 kg

ITEM	AMDT.
PN823501	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

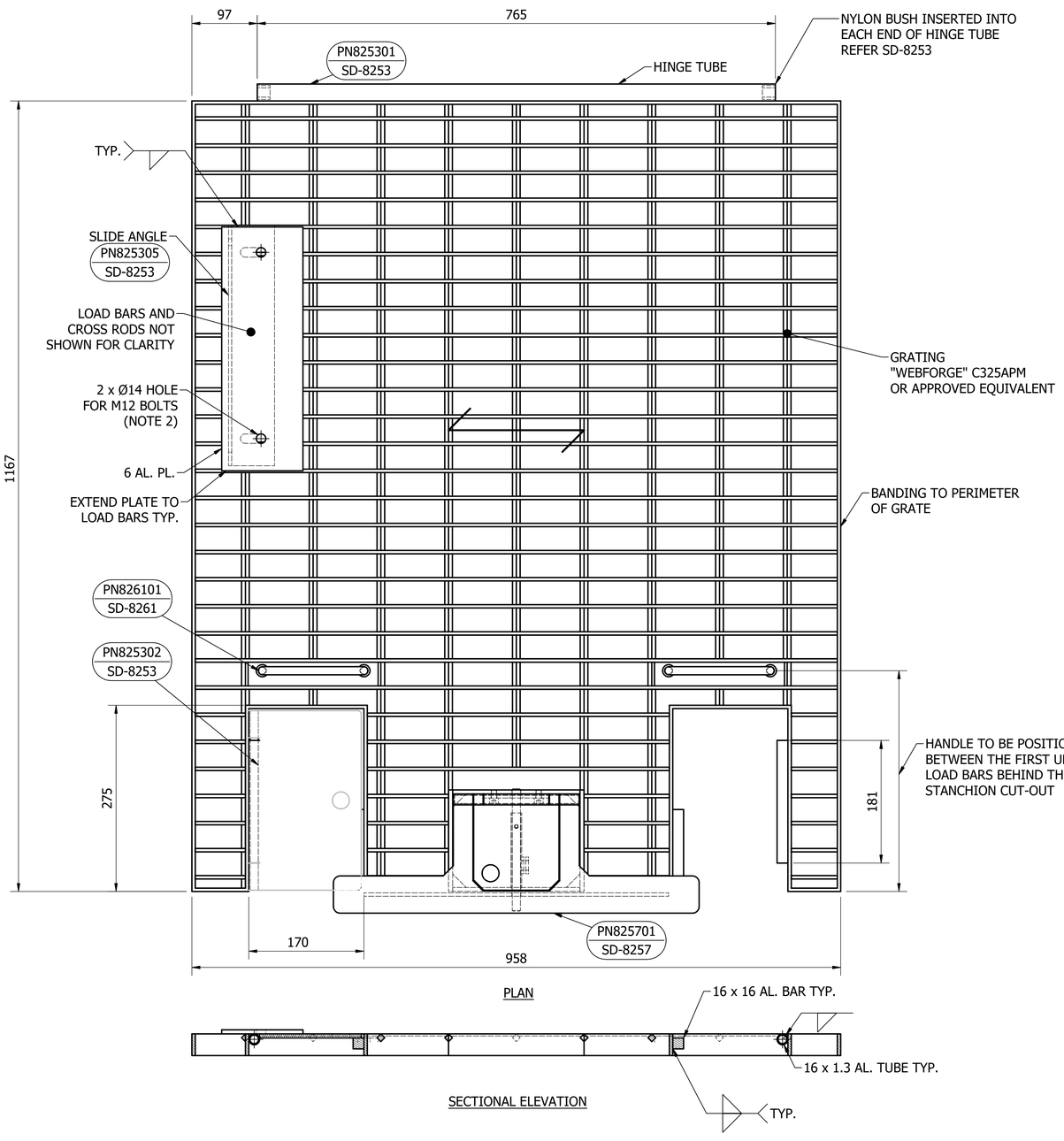
STANDARD DRAWING
FLUSH FIT ACCESS COVERS - HDG AND ALUMINIUM
HINGED FOR INCLINED RUNG AND STEP LADDERS
FRAME DETAILS

DRAWING STATUS: Current

SD-8235-D

A1

ISSUE: A



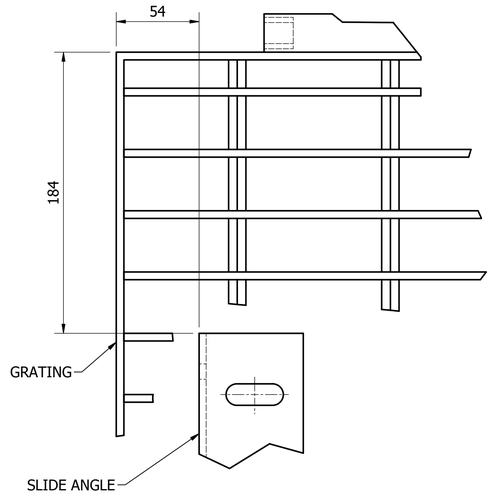
PLAN

SECTIONAL ELEVATION

HATCH COVER

SCALE: 1 : 4

MATERIAL: ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 21 kg



DETAIL - SLIDE ANGLE POSITION

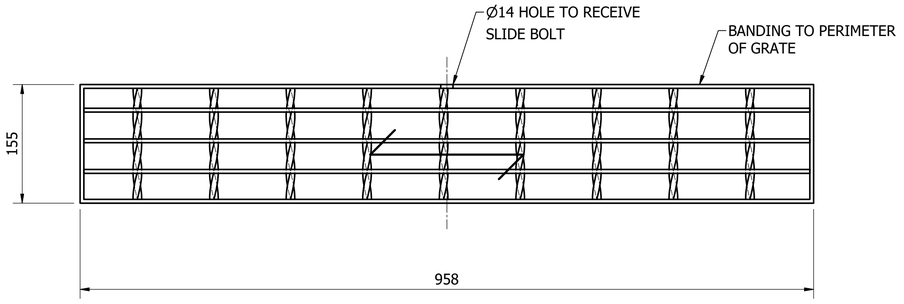
SCALE: 1 : 2

NOTES:

1. CARE TO BE TAKEN TO ALIGN GRATING LOAD BARS AND CROSS RODS AS TO NOT INTERFERE WITH THE LIFTING HANDLES.

2. HOLE PATTERN OF BOLT PLATE TO SUIT SLIDE ANGLE OF THE HATCH STAY ASSEMBLY.

3. PROVIDE A MINIMUM EDGE CLEARANCE OF 2 x BOLT DIAMETER FOR SLIDE ANGLE BOLT HOLES.



PLAN

HATCH FIXED COVER

SCALE: 1 : 4

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 10 kg

ITEM	AMDT.
PN823601	

ITEM	AMDT.
PN823602	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

STANDARD DRAWING
FLUSH FIT ACCESS COVERS - HDG AND ALUMINIUM
HINGED FOR INCLINED RUNG AND STEP LADDERS
COVER DETAILS

DRAWING STATUS: Current

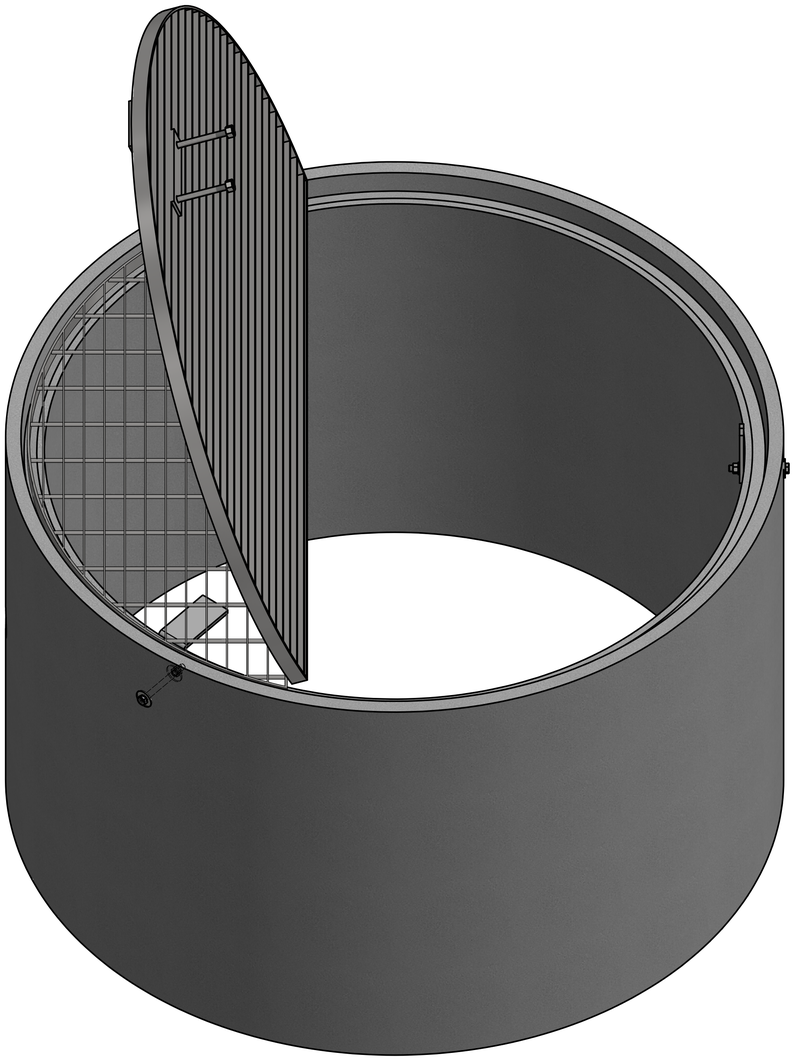
SD-8236-D

A1

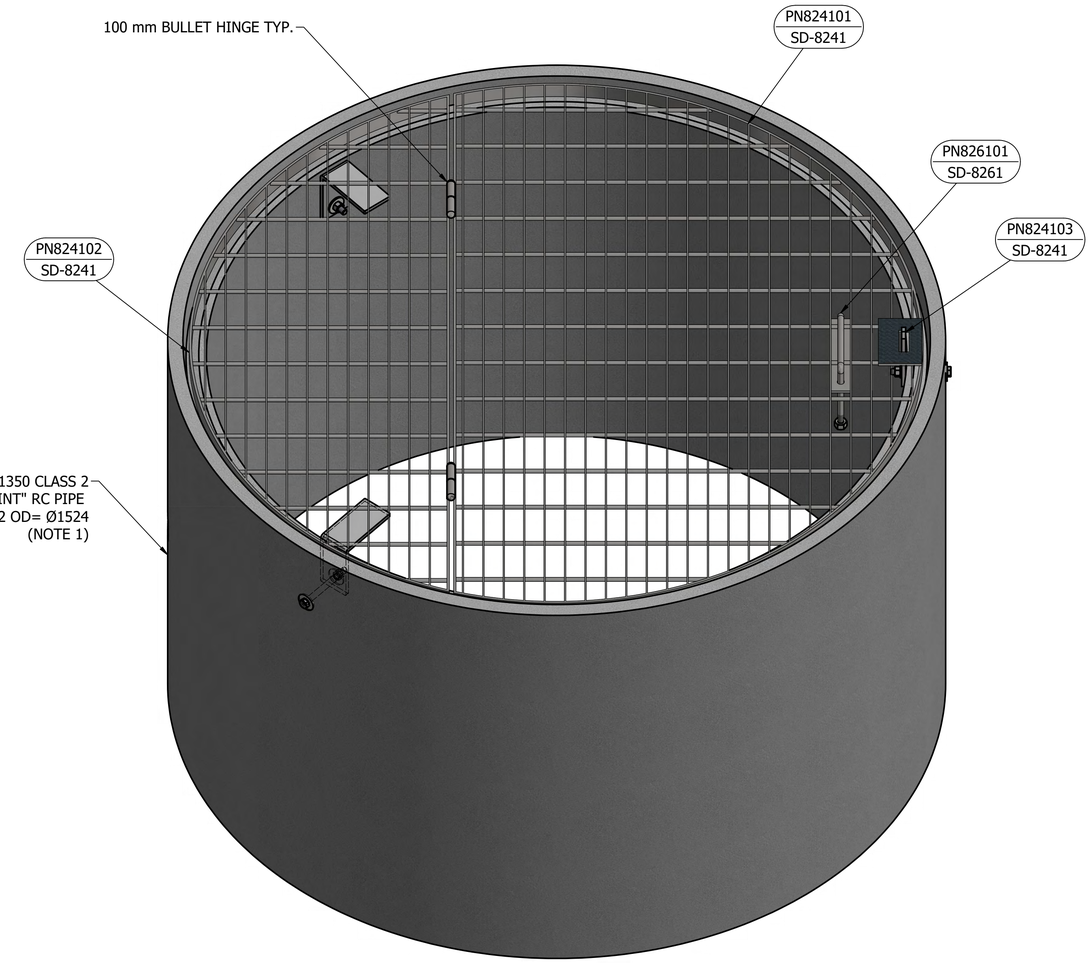
ISSUE: A

NOTES:

1. THE DESIGNER IS TO SHOW THE LENGTH OF RC PIPE ON PROJECT SPECIFIC DRAWINGS. FOR EXAMPLE, THE DESIGNER IS TO USE THE DETAILS DEPICTED ON SD-3210 OR SD-4115 (AS APPROPRIATE) FOR THE BASIS OF SUCH A PROJECT SPECIFIC DRAWING.



OPEN POSITION



CLOSED POSITION

PARTS LIST				
PART NUMBER	DESCRIPTION	QTY	MASS	REFERENCE
PN824101	COVER PANEL 1	1	30 kg	SD-8241
PN824102	COVER PANEL 2	1	15 kg	SD-8241
PN824103	LOCKING TAB	1	2 kg	SD-8241
PN824104	KEEPER BRACKET	2	2 kg	SD-8241
PN826101	LIFTING HANDLE	1	0.5 kg	SD-8261
N/A	100 mm BULLET HINGE	2	0.5 kg	N/A

ITEM	AMDT.
PN824001	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	17/09/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS		REC			

ASSET AREA APPLICABILITY

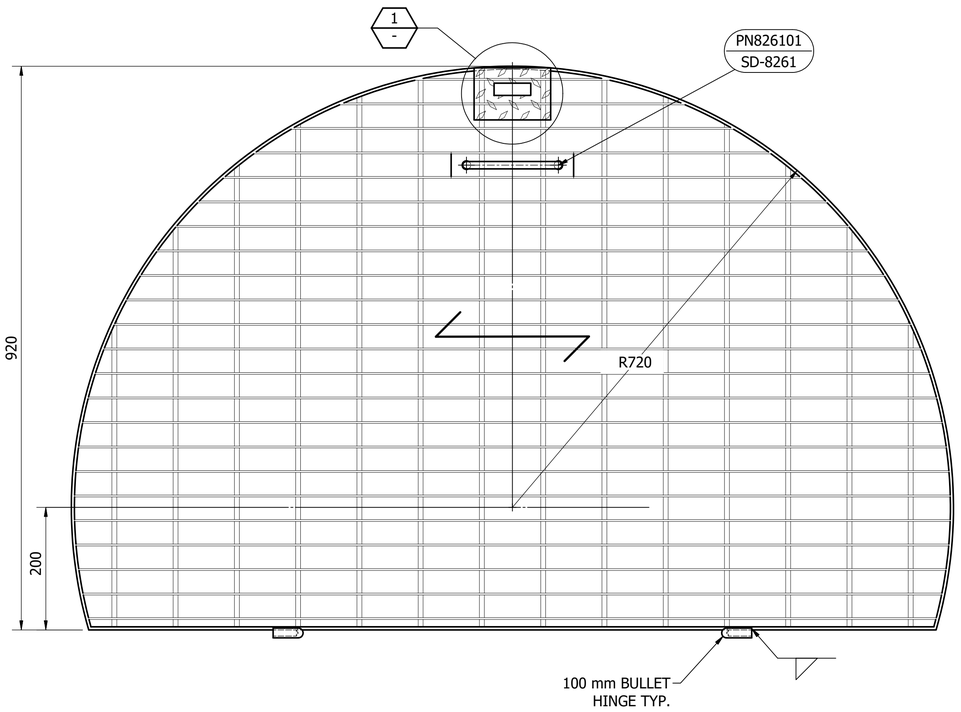
STANDARD DRAWING
ROUND VALVE CHAMBER COVER
ARRANGEMENT

DRAWING STATUS: Current

SD-8240-D

A1

ISSUE: A

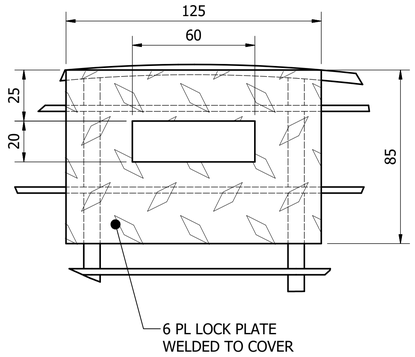


PLAN

COVER PANEL 1

MATERIAL: GMS WEBFORGE C323 MPG BANDED ALL ROUND
MASS: 30 kg

ITEM	AMDT.
PN824101	



DETAIL 1

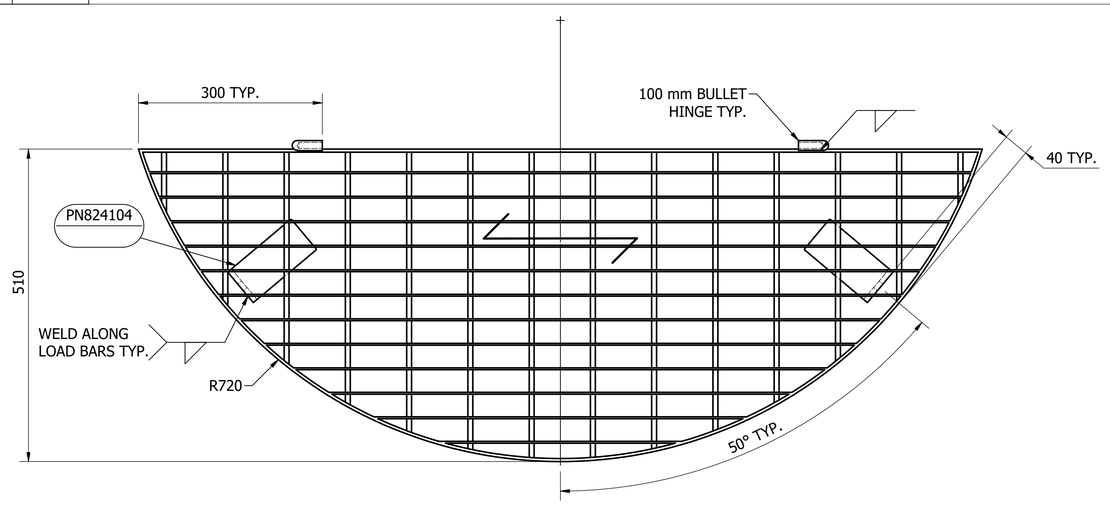
LOCKING PLATE

SCALE: 1 : 2

NOTES:

1. COVER PANELS HAVE BEEN DESIGNED TO BE LESS THAN 32 kg EACH AND CAPABLE OF SUPPORTING A 2.5 kPa UDL WITH A MAX. MIDSPAN DEFLECTION OF 5.0 mm.

2. ALL ITEMS EXCEPT HINGES ARE TO BE HOT DIP GALVANISED AFTER FABRICATION. HINGES ARE TO BE "COLD GALVANISED" IN ACCORDANCE WITH WSA-201 AFTER INSTALLATION ON SITE.

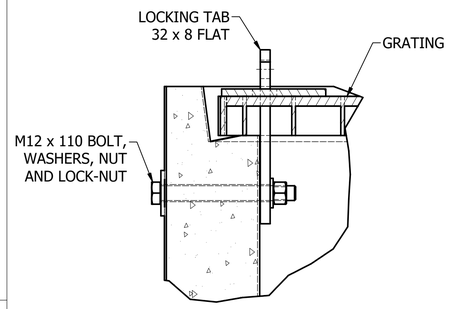


PLAN

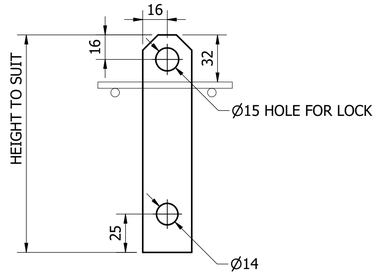
COVER PANEL 2

MATERIAL: AS PER PANEL 1
MASS: 15 kg

ITEM	AMDT.
PN824102	



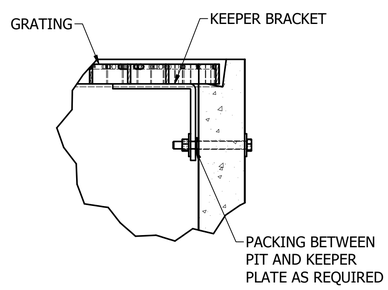
FIXING DETAIL



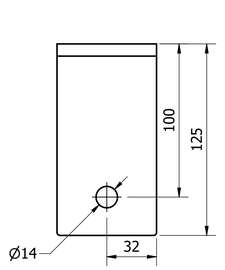
FRONT VIEW

ITEM	AMDT.
PN824103	

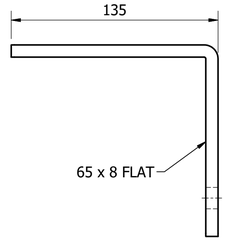
LOCKING TAB



FIXING DETAIL



FRONT VIEW



SIDE VIEW

ITEM	AMDT.
PN824104	

KEEPER BRACKET

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	DRAWING NAME & NUMBER, HINGE, AND KEEPER PLATE UPDATE	17/09/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

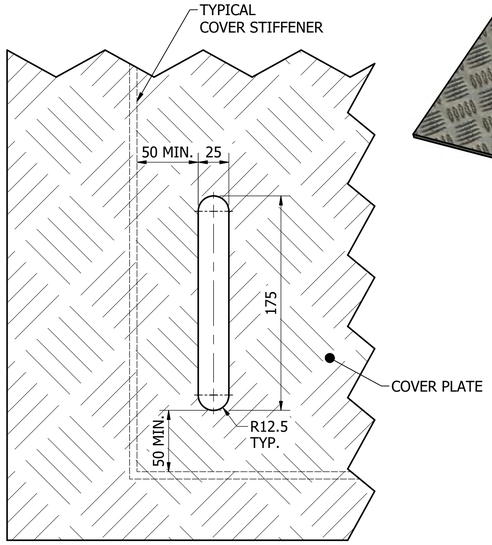
icon WATER

STANDARD DRAWING
ACCESS COVERS
RURAL/SEMI-RURAL ROUND VALVE CHAMBERS
COVER DETAILS

DRAWING STATUS: Current

SD-8241-D

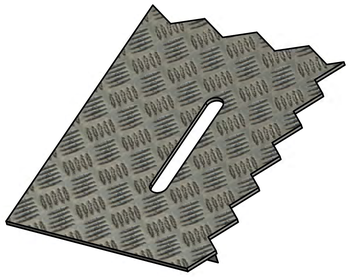
ISSUE: B



HAND SLOT

FOR ACCESS HATCHES WITH A MASS OF ≥10 kg ONLY

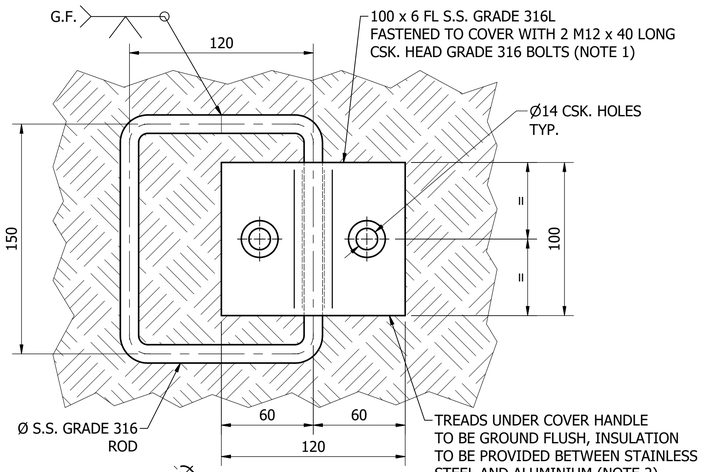
SCALE: 1 : 2.5



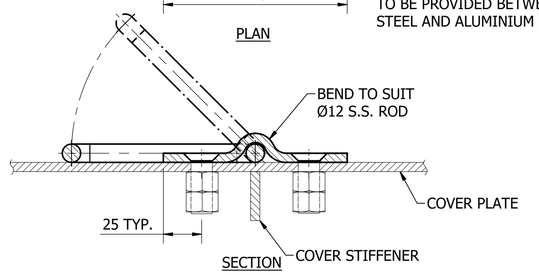
ISOMETRIC

SCALE: N.T.S.

ITEM	AMDT.
PN825101	



PLAN



SECTION

FOLD FLAT HANDLE

SCALE: 1:2

MATERIAL: STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 1 kg

ITEM	AMDT.
PN825102	

NOTES

1. STAINLESS STEEL TO ALUMINIUM CONNECTIONS TO BE INSULATED WITH "DENSO" PRIMER D AND DENSOPOL 60 TAPE OR APPROVED EQUIVALENT.

2. ALL STAINLESS STEEL FIXTURES INTO ALUMINIUM TO BE SEPARATED WITH INSULATING BUSHES AND RETAINING RINGS OR WASHERS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

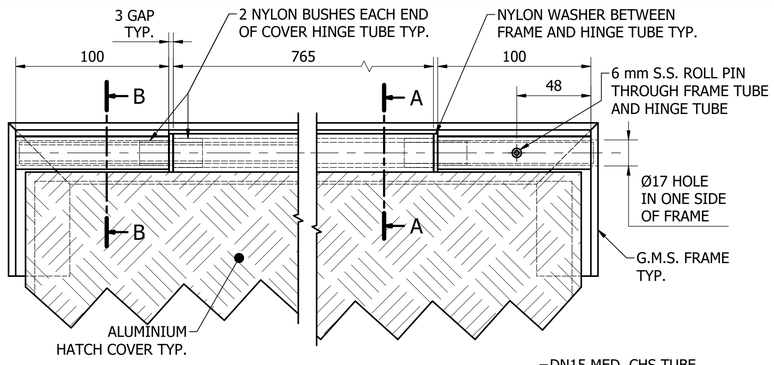
STANDARD DRAWING
ACCESS COVERS - ALUMINIUM, HINGED
HANDLE DETAILS

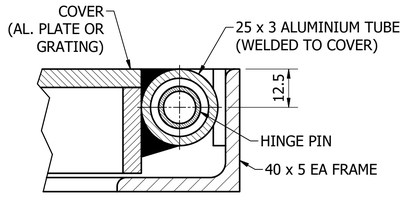
DRAWING STATUS: Current

SD-8251-D

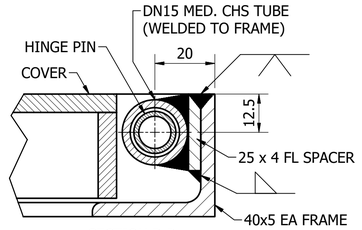
A1

ISSUE: A

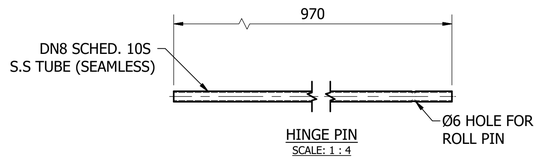




SECTION A-A
HINGE TUBE ATTACHMENT TO COVER
SCALE: 1 : 1



SECTION B-B
HINGE ATTACHMENT TO FRAME (TYP. EACH SIDE) (G.M.S)
SCALE: 1 : 1

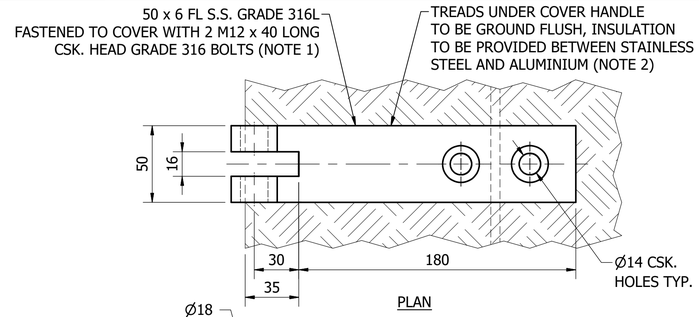


FLUSH FIT HINGE

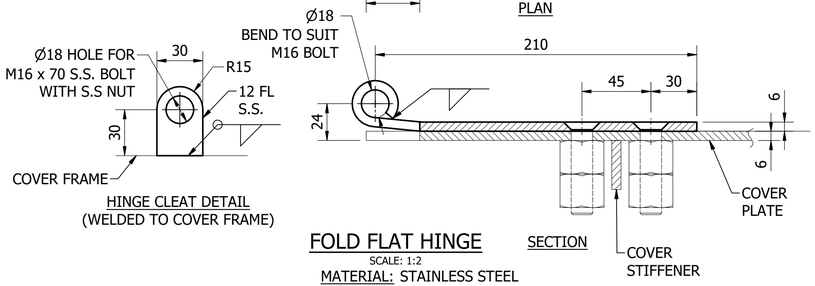
SCALE: 1:2

MATERIAL: AS SHOWN
COATING: N/A
FINISH COLOUR: N/A
MASS: N/A

ITEM	AMDT.
PN825301	



PLAN



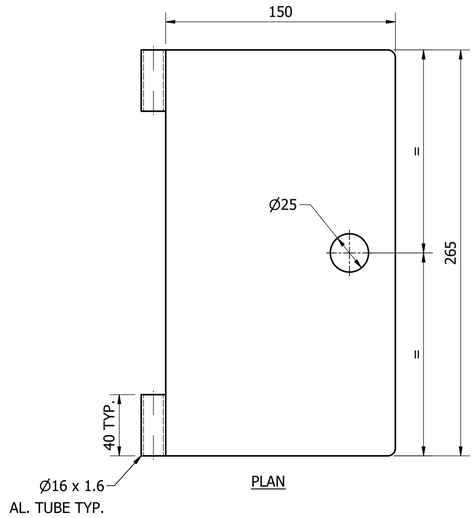
SECTION

FOLD FLAT HINGE

SCALE: 1:2

MATERIAL: STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 1 kg

ITEM	AMDT.
PN825304	



PLAN

ELEVATION

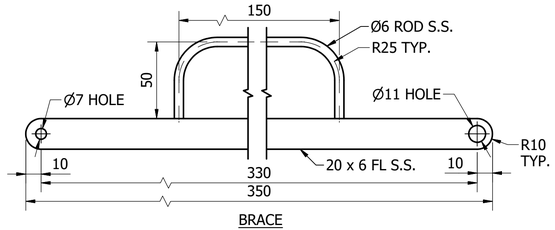
STANCHION ACCESS HATCH

SCALE: 1 : 2

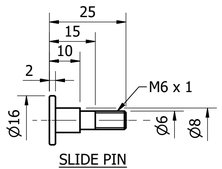
MATERIAL: ALUMINIUM
COATING: N/A
FINISH COLOUR: N/A
MASS: 1 kg

ITEM	AMDT.
PN825302	

SLIDE ANGLE
SCALE: 1 : 2



BRACE
SCALE: 1 : 2



SLIDE PIN
SCALE: 1 : 1

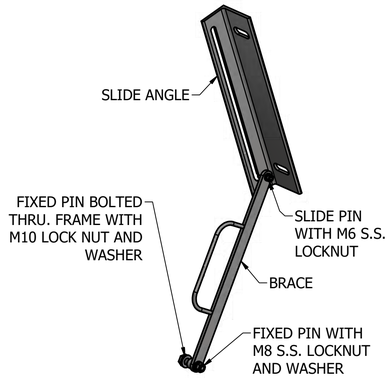
HATCH STAY

MATERIAL: STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 2 kg APPROX.

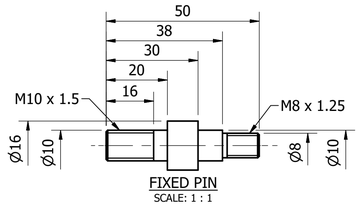
NOTES:

1. HOLE PATTERN TO AVOID GRATING

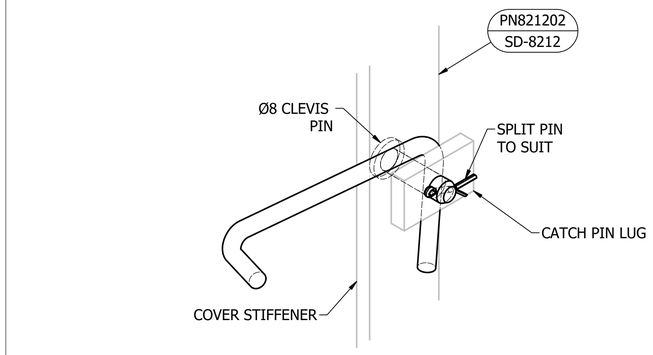
ITEM	AMDT.
PN825305	



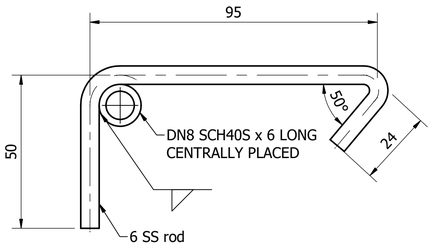
ASSEMBLED



FIXED PIN
SCALE: 1 : 1



INSTALLATION DETAILS
SCALE: N.T.S



CATCH PIN

SCALE: 1:1
MATERIAL: STAINLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: <1 kg

ITEM	AMDT.
PN825303	

NOTES

1. STAINLESS STEEL TO ALUMINIUM CONNECTIONS TO BE INSULATED WITH "DENSO" PRIMER D AND DENSOPOL 60 TAPE OR APPROVED EQUIVALENT.

2. ALL STAINLESS STEEL FIXTURES INTO ALUMINIUM TO BE SEPARATED WITH INSULATING BUSHES AND RETAINING RINGS OR WASHERS.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	RES	SPS			
BWS	WAT	STP			
WTP	SEW				
WPS	REC				

ASSET AREA APPLICABILITY

icon WATER

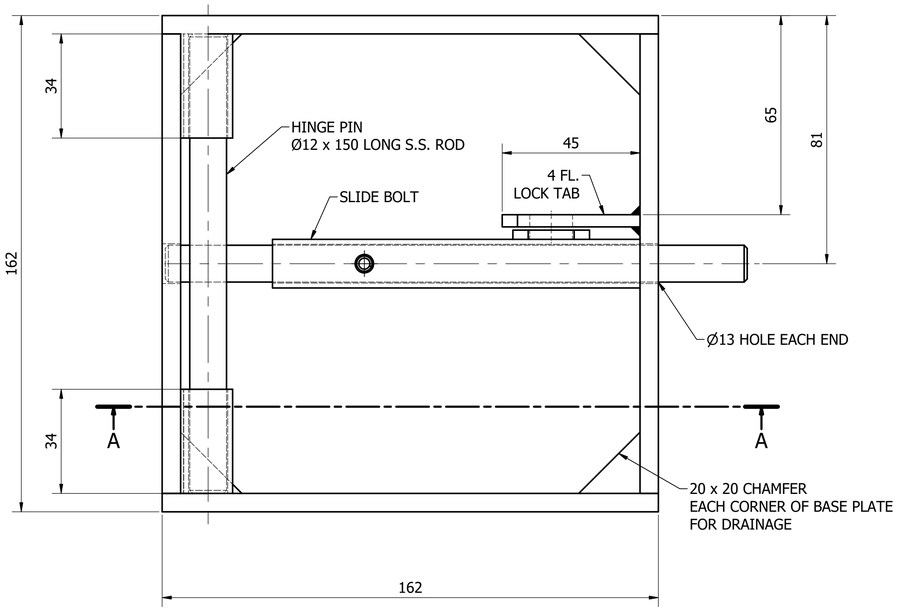
STANDARD DRAWING
ACCESS COVERS - ALUMINIUM, HINGED
HINGE AND STAY DETAILS

DRAWING STATUS: Current

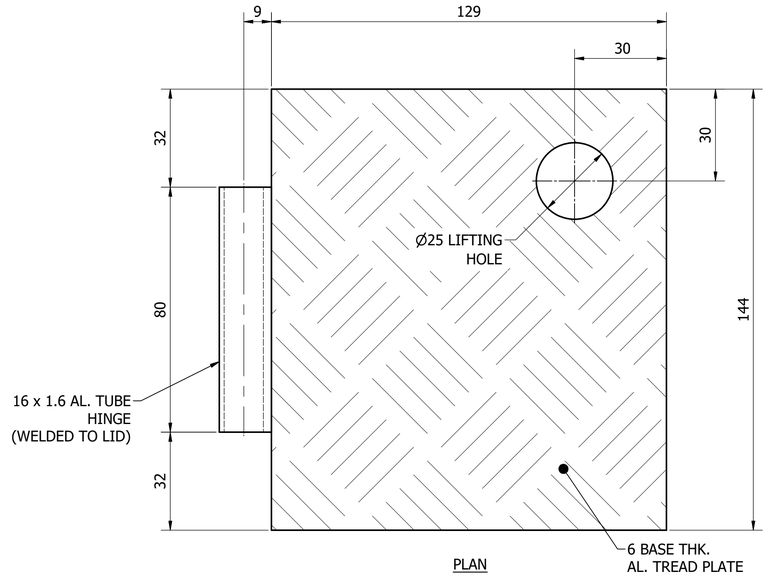
SD-8253-D

A1

ISSUE: A



PLAN
(LID OMITTED FOR CLARITY)

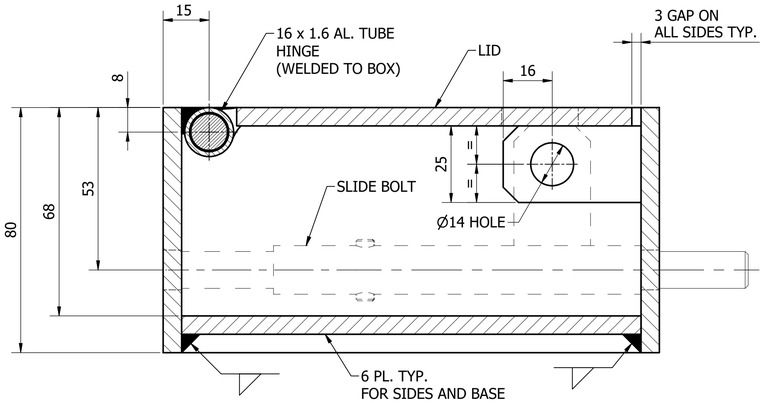


PLAN

SIDE VIEW

LID

SCALE: 1 : 1

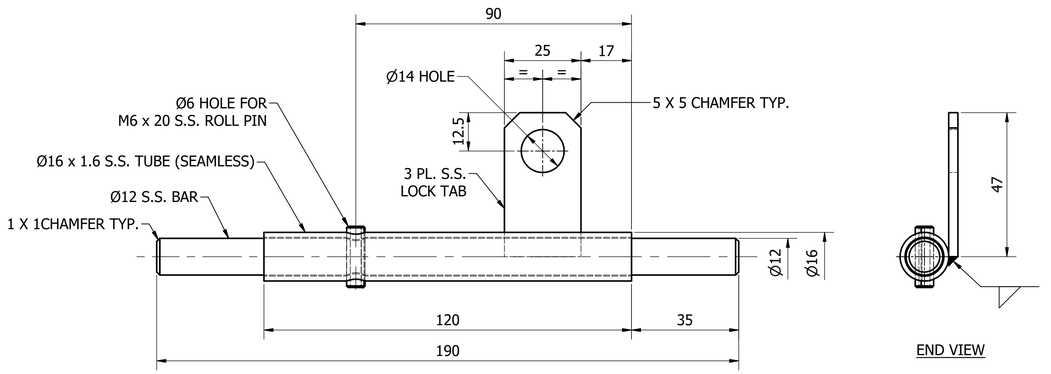


SECTION A-A

LOCK BOX - SLIDE BOLT TYPE

SCALE: 1 : 1

MATERIAL: ALUMINIUM (U.N.O.)
COATING: N/A
FINISH COLOUR: N/A
MASS: 2 kg



SIDE VIEW

END VIEW

SLIDE BOLT

SCALE: 1 : 1

NOTES:

1. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.
2. LID AND HINGE TO BE ASSEMBLED PRIOR TO WELDING TO LOCK BOX.

ITEM	AMDT.
PN825501	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

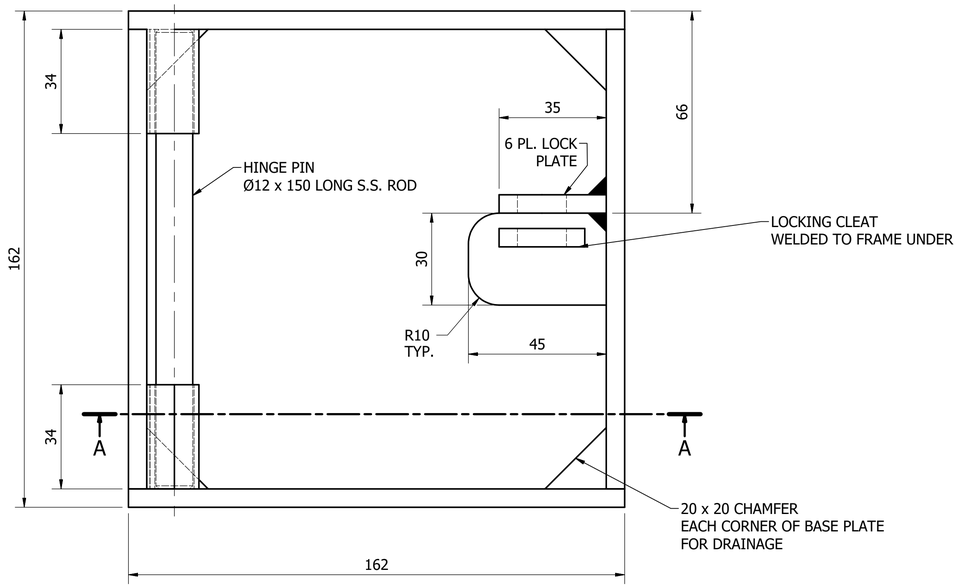
STANDARD DRAWING
ACCESS COVERS - ALUMINIUM, HINGED
LOCK BOX - SLIDE BOLT STYLE
DETAILS

DRAWING STATUS: Current

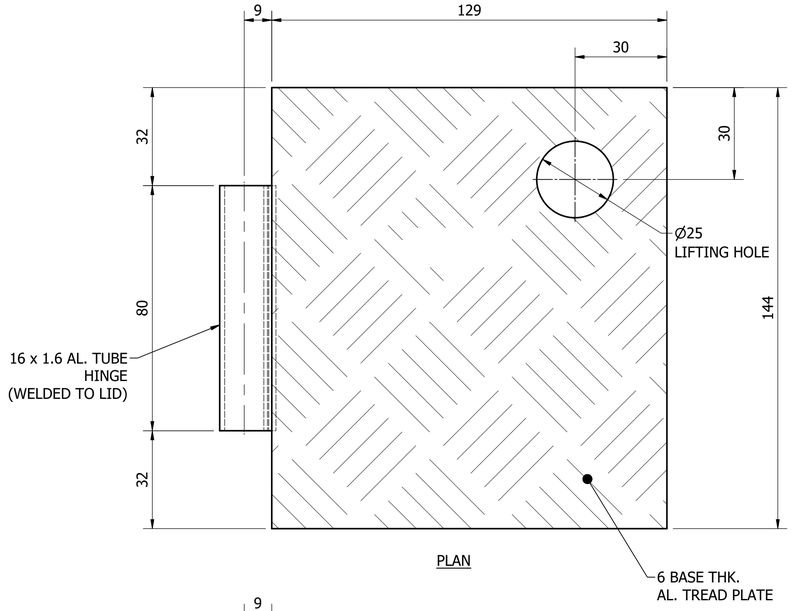
SD-8255-D

A1

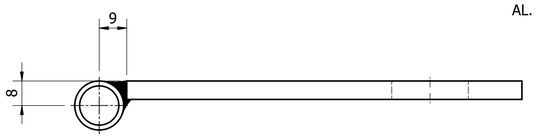
ISSUE: A



PLAN
(LID OMITTED FOR CLARITY)



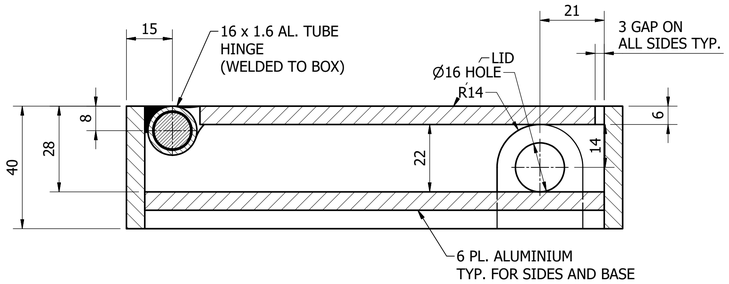
PLAN



SIDE VIEW

LID

SCALE: 1 : 1

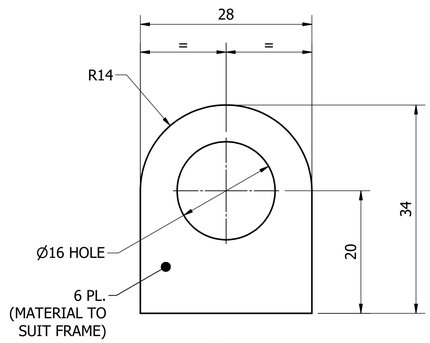


SECTION A-A

LOCK BOX - LOCKING PLATE STYLE

SCALE: 1 : 1

MATERIAL: ALUMINIUM (U.N.O.)
COATING: N/A
FINISH COLOUR: N/A
MASS: 1.5 kg



PLAN

LOCKING CLEAT

SCALE: 2 : 1

NOTES:

1. FOR ALUMINIUM FABRICATION NOTES REFER TO DRAWING SD-9103.
2. LID AND HINGE TO BE ASSEMBLED PRIOR TO WELDING TO LOCK BOX.

ITEM	AMDT.
PN825601	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

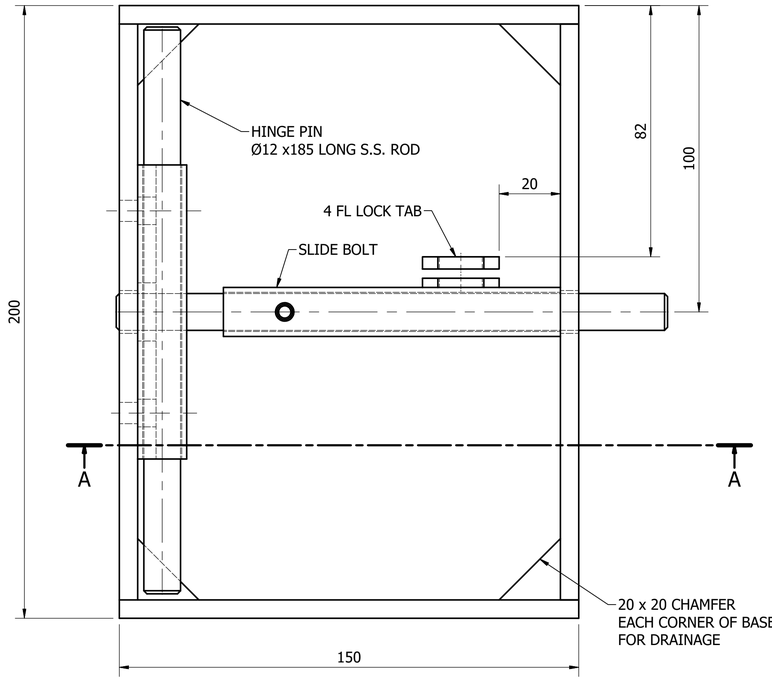
STANDARD DRAWING
ACCESS COVERS - ALUMINIUM, HINGED
LOCK BOX - LOCKING PLATE STYLE
DETAILS

DRAWING STATUS: Current

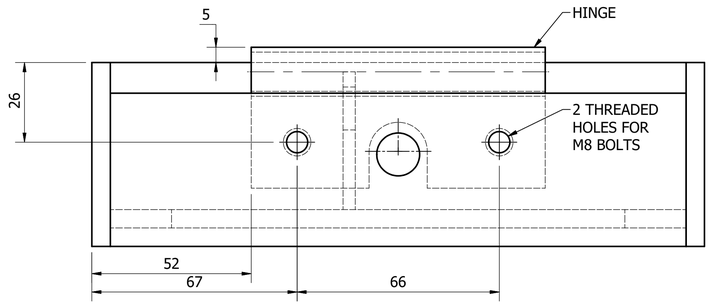
SD-8256-D

A1

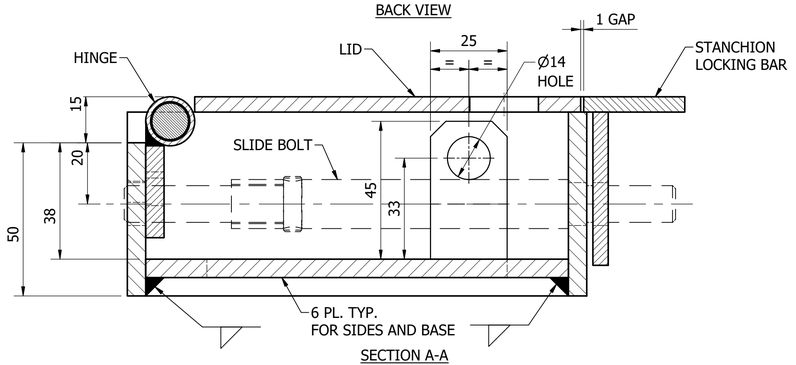
ISSUE: A



PLAN
(LOCKING BAR AND LID OMITTED FOR CLARITY)



BACK VIEW

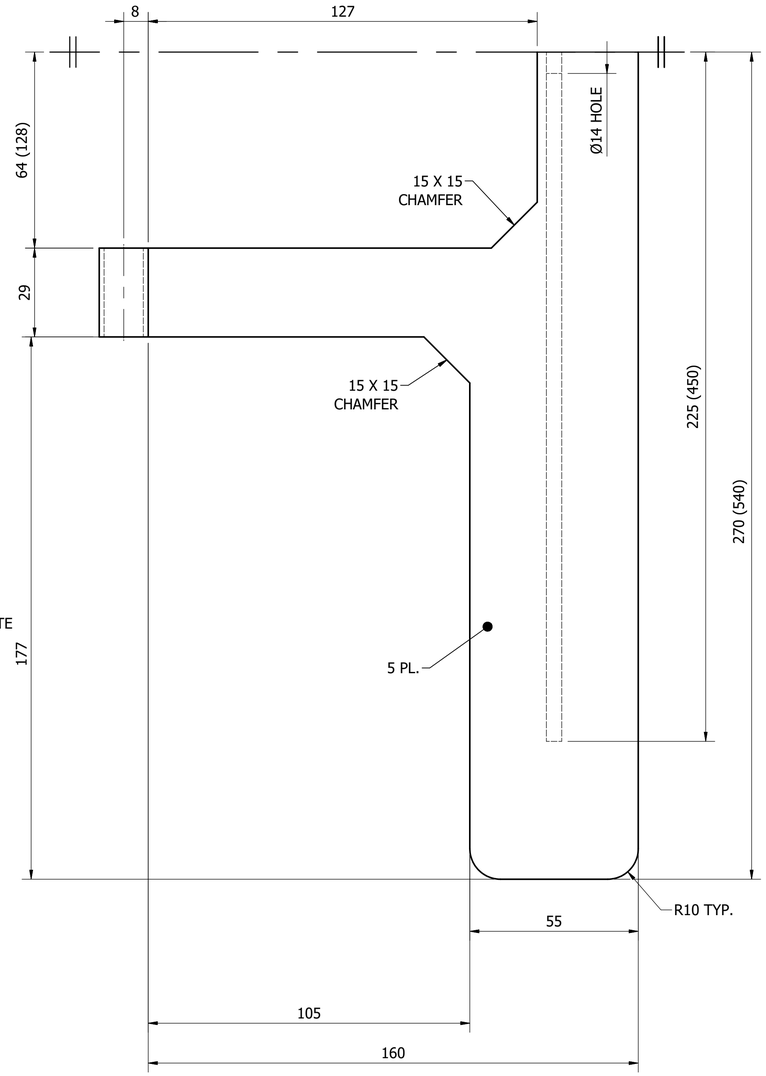


SECTION A-A

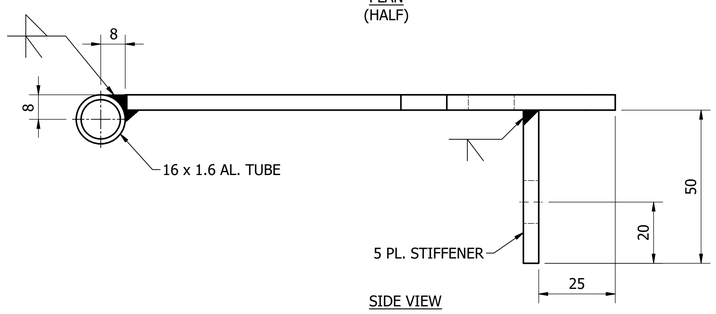
LOCK BOX - STANCHION LOCKING BAR TYPE

SCALE: 1 : 1

MATERIAL: ALUMINIUM / STANLESS STEEL
COATING: N/A
FINISH COLOUR: N/A
MASS: 2.5 kg



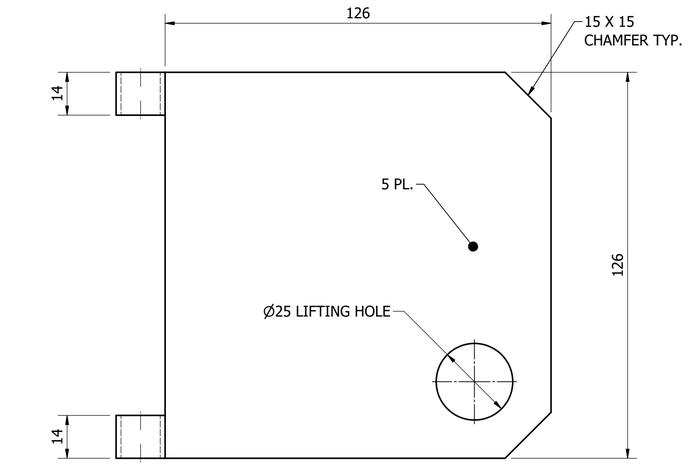
PLAN
(HALF)



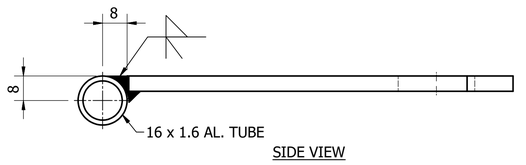
SIDE VIEW

STANCHION LOCKING BAR

SCALE: 1 : 1



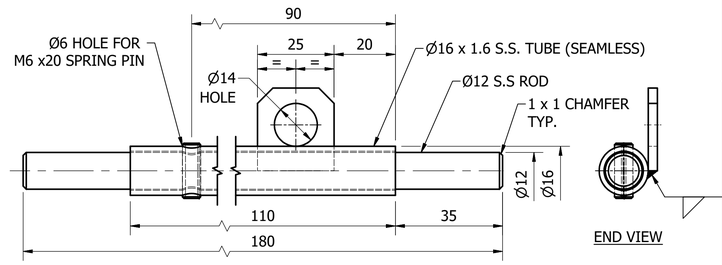
PLAN



SIDE VIEW

LID

SCALE: 1 : 1

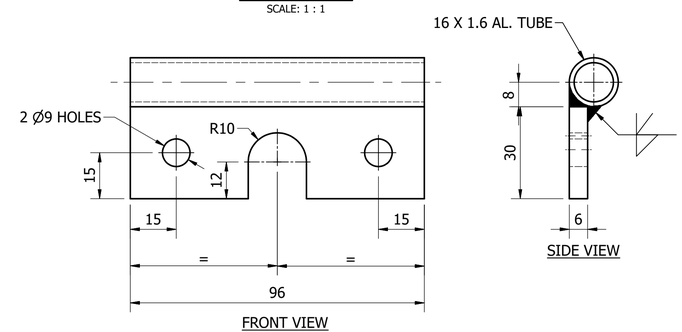


SIDE VIEW

END VIEW

SLIDE BOLT

SCALE: 1 : 1



SIDE VIEW

FRONT VIEW

HINGE

SCALE: 1 : 1

ITEM	AMDT.
PN825701	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

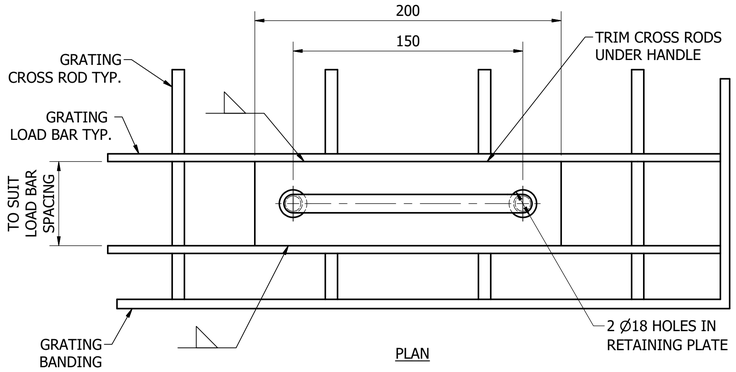
STANDARD DRAWING
ACCESS COVERS - ALUMINIUM, HINGED
LOCK BOX - STANCHION LOCKING BAR TYPE
DETAILS

DRAWING STATUS: Current

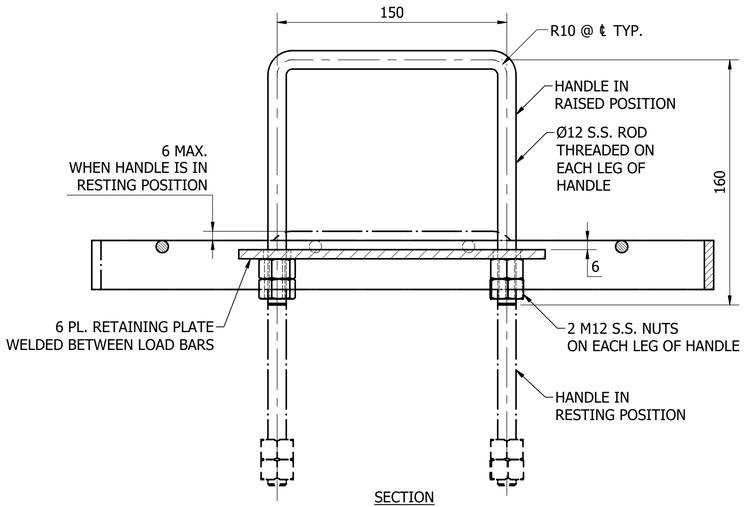
SD-8257-D

A1

ISSUE: A

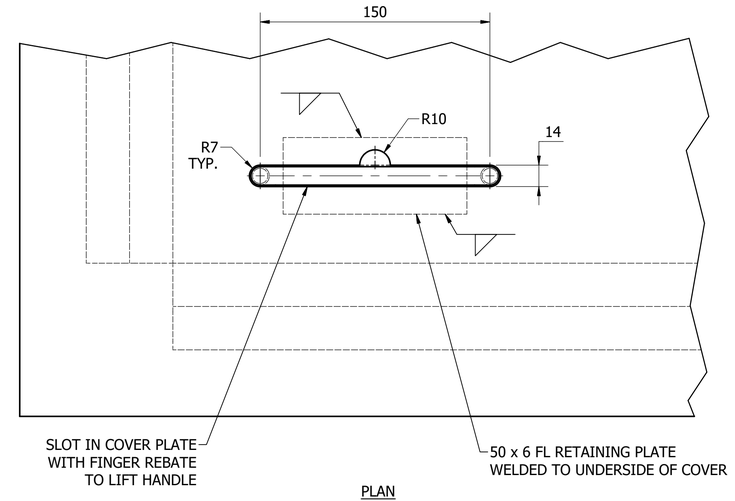


PLAN

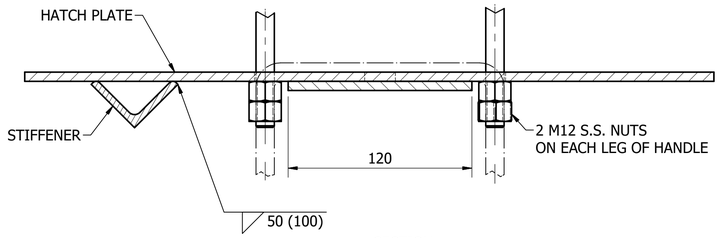


SECTION

WEBGRATE STYLE HATCH



PLAN



SECTION

STIFFENED PLATE STYLE HATCH

RETRACTABLE HANDLE - FLUSH FIT

SCALE: 1 : 2

MATERIAL: STAINLESS STEEL / CARBON STEEL / ALUMINIUM
COATING: HOT DIP GALVANISED (CARBON STEEL PARTS ONLY)
FINISH COLOUR: N/A
MASS: 0.5 kg APPROX. (HANDLE ONLY)

ITEM	AMDT.
PN826101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

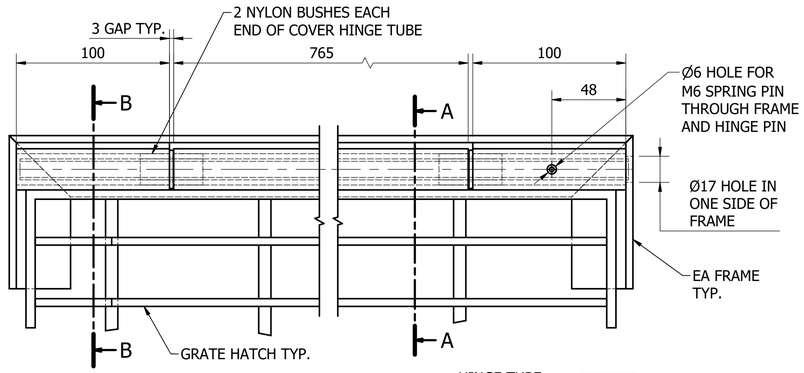
STANDARD DRAWING
ACCESS COVERS - HDG AND ALUMINIUM, HINGED
LIFTING HANDLES
DETAILS

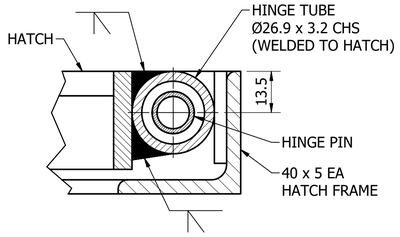
DRAWING STATUS: Current

SD-8261-D

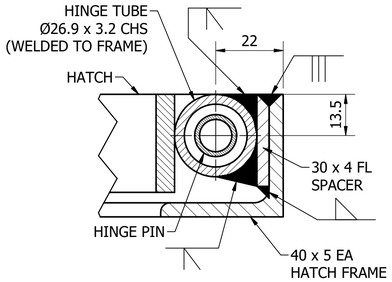
A1

ISSUE: A

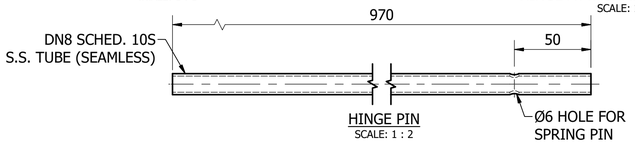




SECTION A-A
HINGE TUBE ATTACHMENT TO COVER
SCALE: 1 : 1



SECTION B-B
HINGE ATTACHMENT TO FRAME
SCALE: 1 : 1



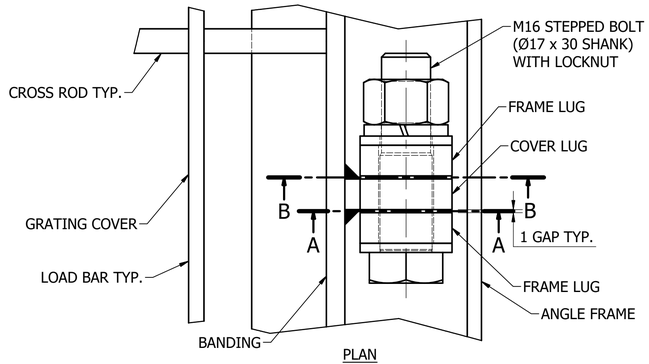
SCALE: 1 : 2

FLUSH FIT HINGE

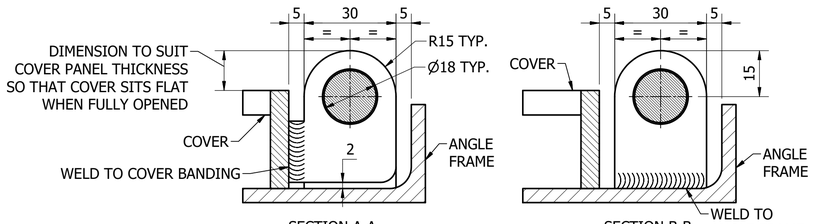
SCALE: 1 : 2

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF FINAL ASSY.)
FINISH COLOUR: N/A
MASS: 2.0 kg

ITEM	AMDT.
PN826301	



PLAN



SECTION A-A
COVER LUG

SECTION B-B
FRAME LUG (TYP.)

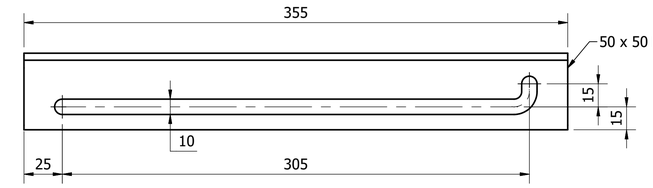
FOLD FLAT HINGE

(MIN 2 PER COVER PANNEL)

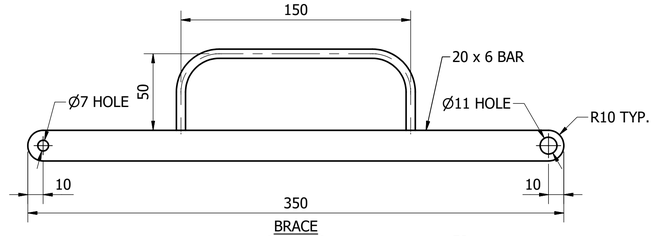
SCALE: 1 : 1

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF FINAL ASSY.)
FINISH COLOUR: N/A
MASS: 1 kg

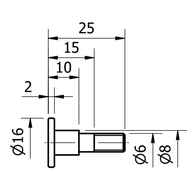
ITEM	AMDT.
PN826302	



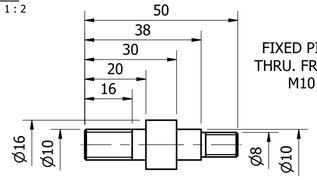
SLIDE ANGLE
SCALE: 1 : 2



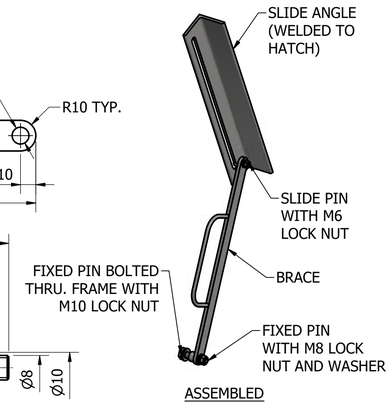
BRACE
SCALE: 1 : 2



SLIDE PIN
SCALE: 1 : 1



FIXED PIN
SCALE: 1 : 1



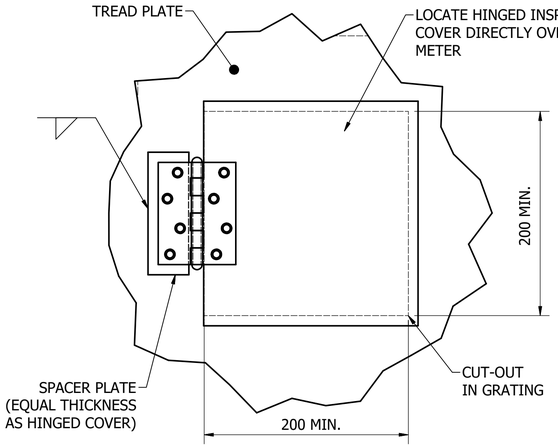
ASSEMBLED

HATCH STAY

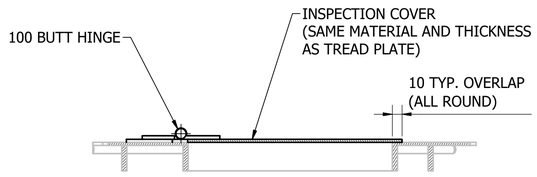
SCALE: AS SHOWN

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 2 kg APPROX.

ITEM	AMDT.
PN826305	



PLAN



SECTIONAL ELEVATION

HINGED INSPECTION COVER

MATERIAL: AS SHOWN
COATING: AS SHOWN
FINISH COLOUR: N/A
MASS: 2 kg

ITEM	AMDT.
PN826303	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

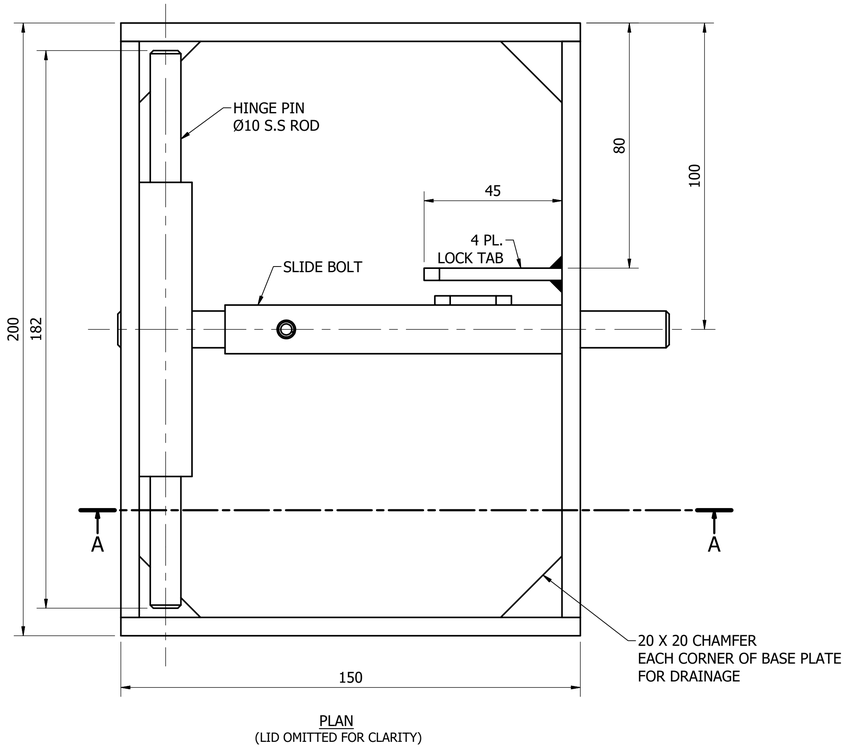
STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL, HINGED
HINGE AND STAY
DETAILS

DRAWING STATUS: Current

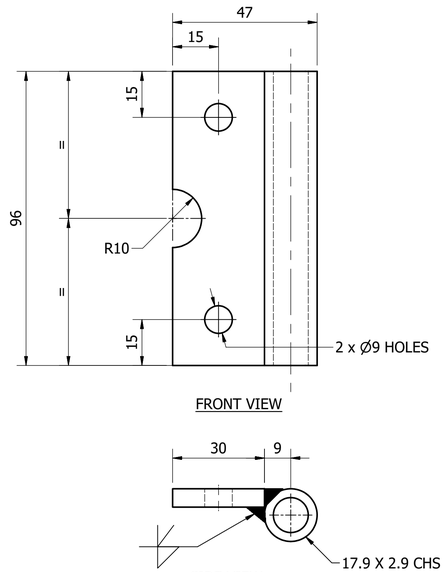
SD-8263-D

A1

ISSUE: A



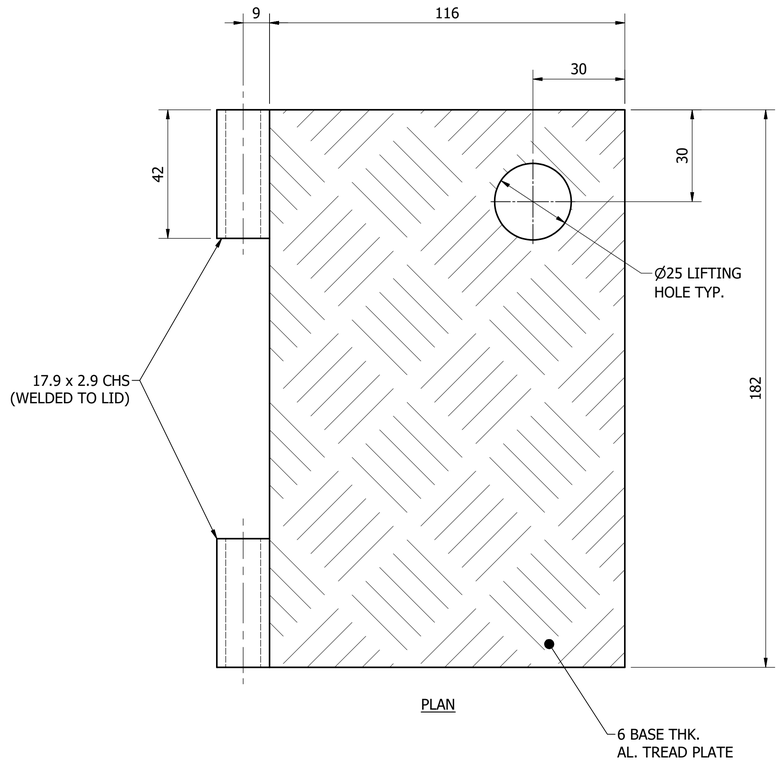
PLAN
(LID OMITTED FOR CLARITY)



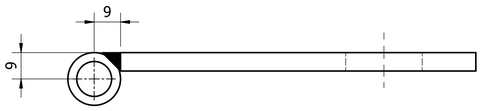
FRONT VIEW

SIDE VIEW

HINGE
SCALE: 1 : 1

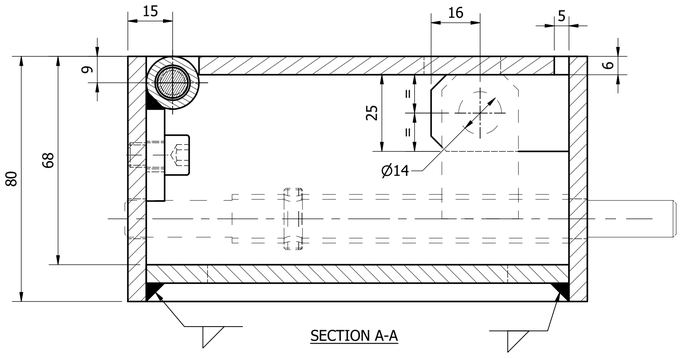


PLAN

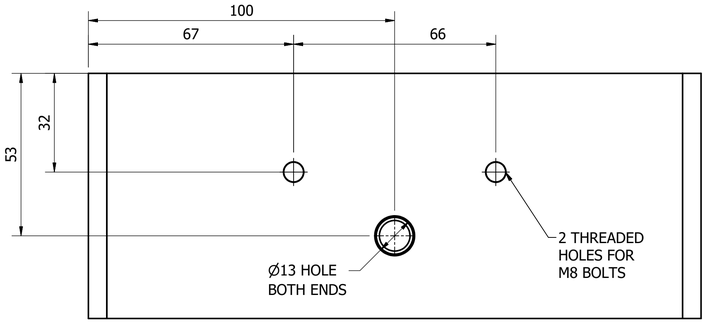


SIDE VIEW

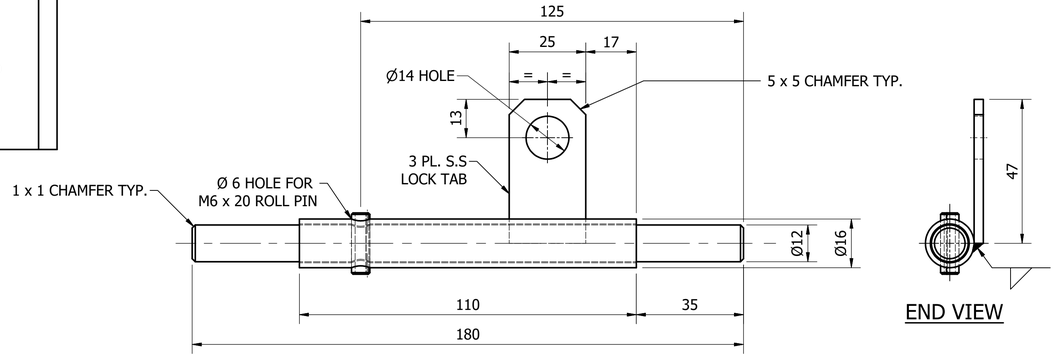
LID
SCALE: 1 : 1



SECTION A-A



BACK VIEW



SIDE VIEW

END VIEW

SLIDE BOLT
SCALE: 1 : 1

LOCK BOX - SLIDE BOLT TYPE
SCALE: 1 : 1

MATERIAL: CARBON STEEL / STAINLESS STEEL
COATING: HOT DIP GALVANISED (CARBON STEEL PARTS ONLY)
FINISH COLOUR: N/A
MASS: 5 kg

ITEM	AMDT.
PN826501	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

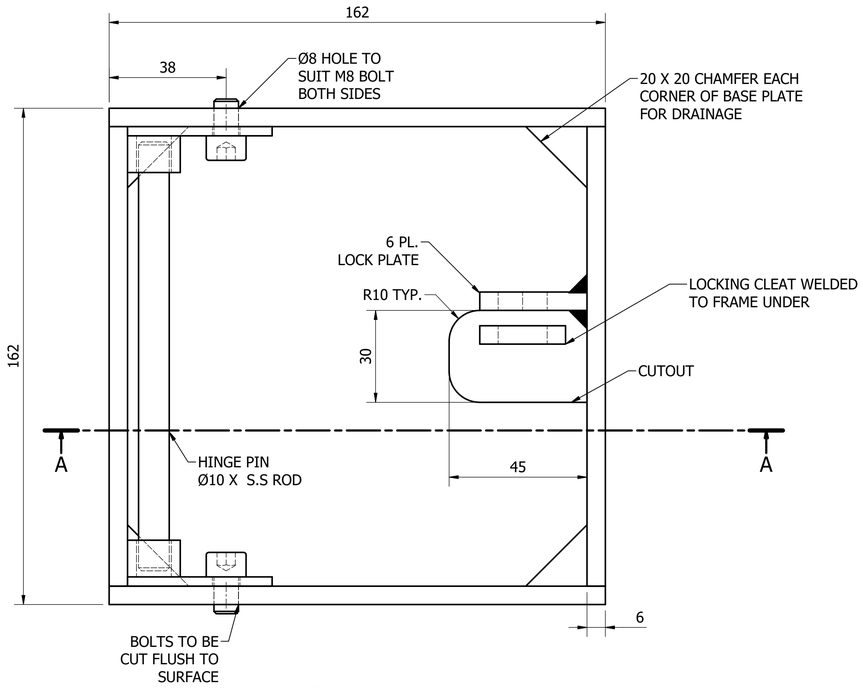
STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL, HINGED
LOCK BOX SLIDE BOLT TYPE
DETAILS

DRAWING STATUS: Current

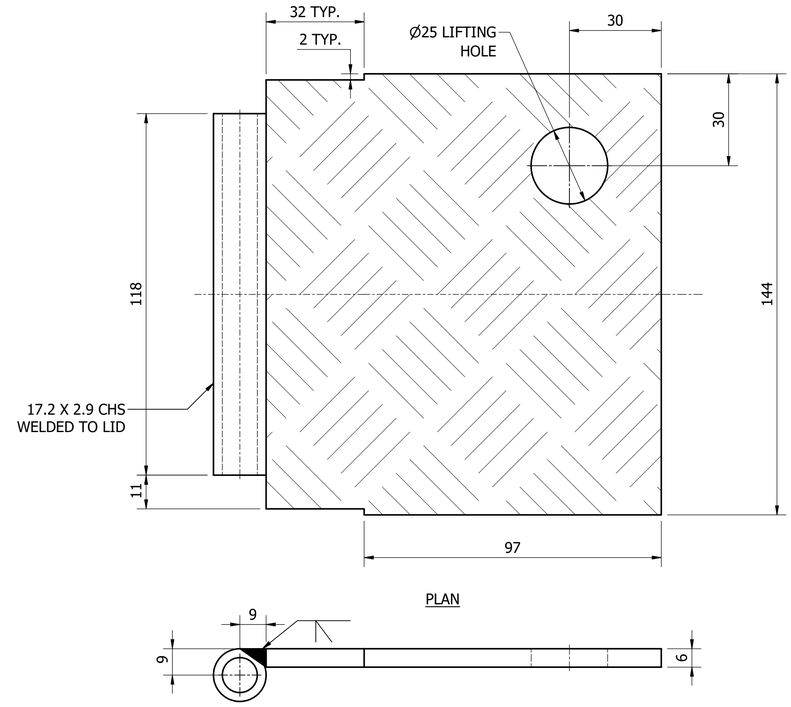
SD-8265-D

A1

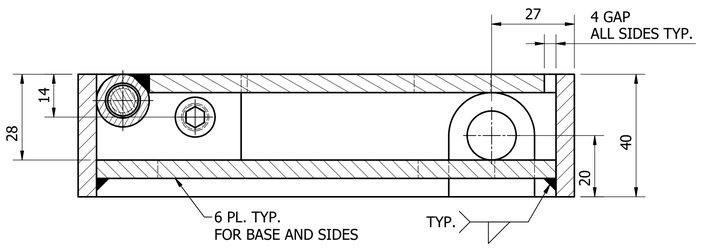
ISSUE: A



TOP VIEW
(LID OMITTED FOR CLARITY)



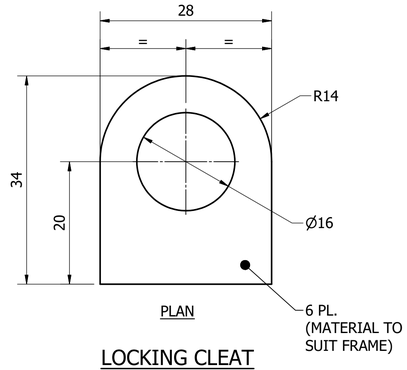
LID
SCALE: 1 : 1



SECTION A-A

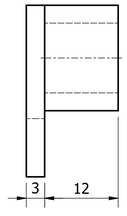
LOCK BOX
LOCKING PLATE STYLE
SCALE: 1 : 1

MATERIAL: CARBON STEEL / STAINLESS STEEL
COATING: HOT DIP GALVANISED (CARBON STEEL ONLY)
FINISH COLOUR: N/A
MASS: 8 kg

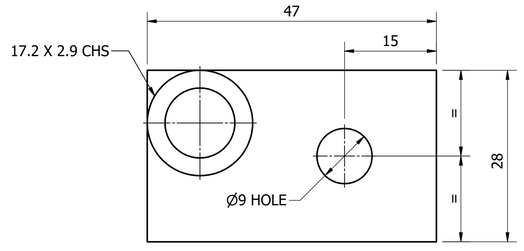


PLAN

LOCKING CLEAT
SCALE: 2 : 1



SIDE VIEW



FRONT VIEW

HINGE BRACKET
(MIRRORED FOR OPP. SIDE)
SCALE: 2 : 1

ITEM	AMDT.
PN826601	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

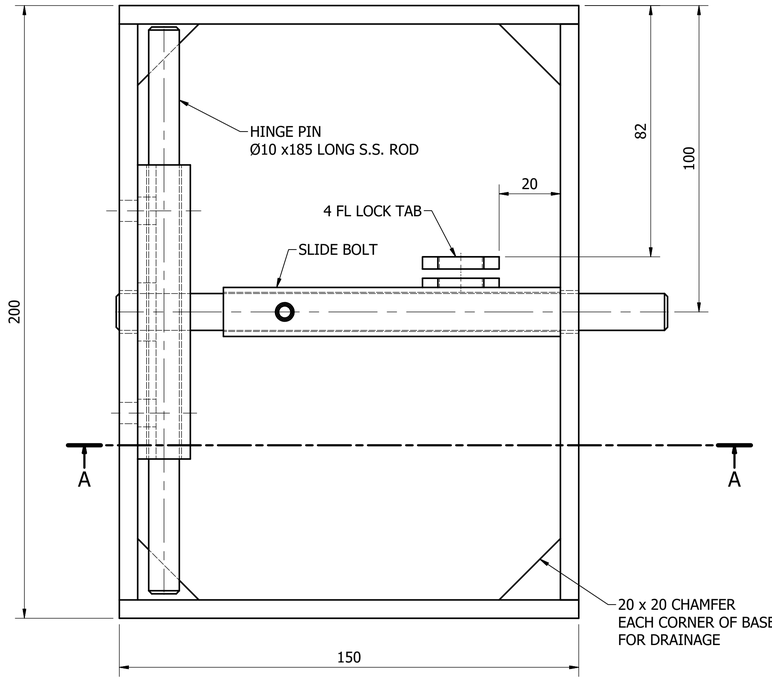
STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL, HINGED
LOCK BOX LOCKING PLATE TYPE
DETAILS

DRAWING STATUS: Current

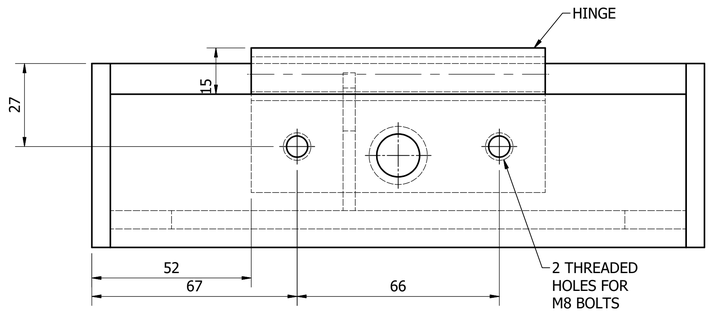
SD-8266-D

A1

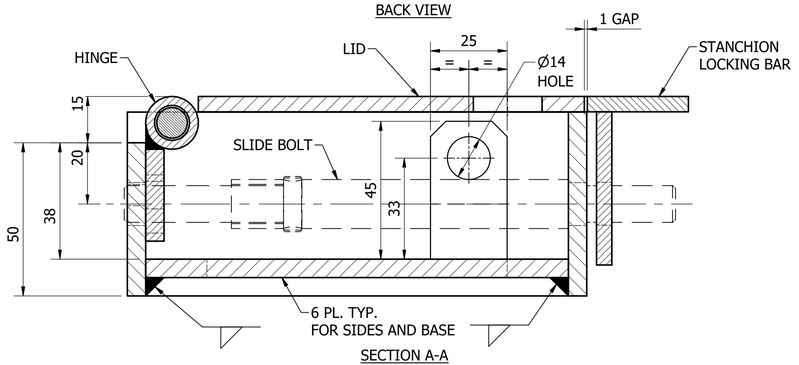
ISSUE: A



PLAN
(LOCKING BAR AND LID OMITTED FOR CLARITY)



BACK VIEW

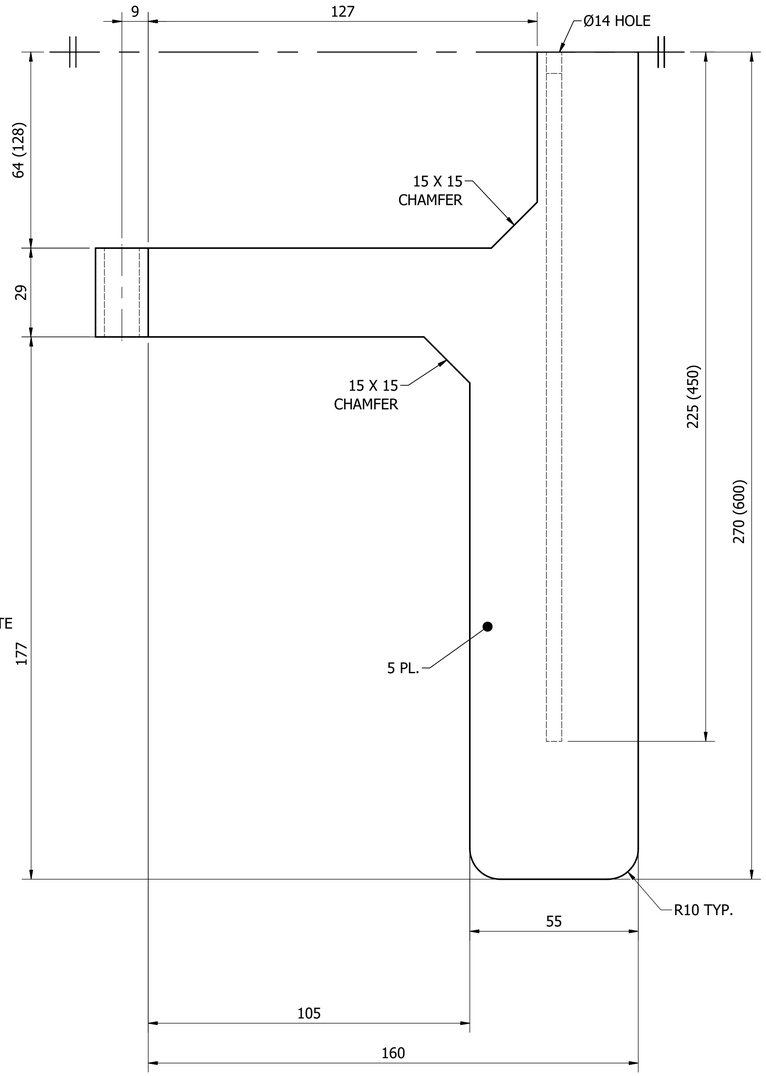


SECTION A-A

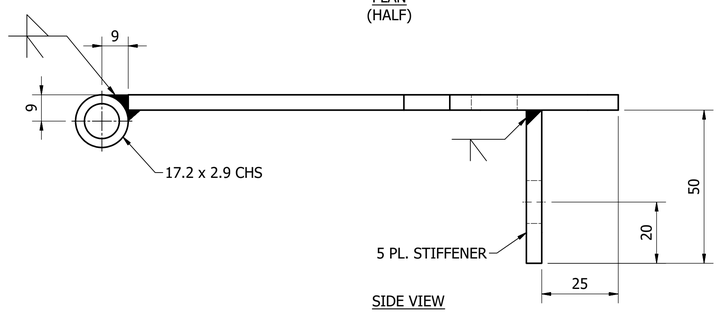
LOCK BOX - STANCHION LOCKING BAR TYPE

SCALE: 1 : 1

MATERIAL: CARBON STEEL / STANLESS STEEL
COATING: HOT DIP GALVANISED (CARBON STEEL PARTS ONLY)
FINISH COLOUR: N/A
MASS: 7 kg



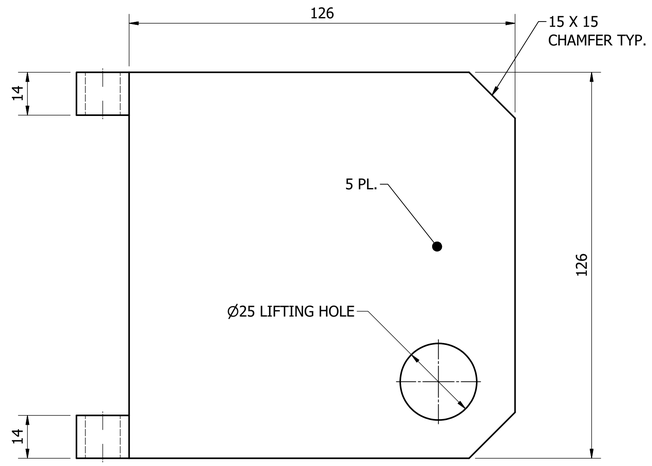
PLAN
(HALF)



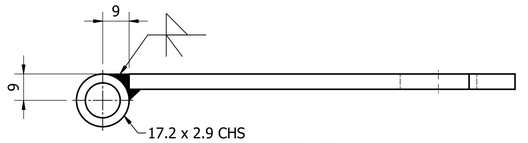
SIDE VIEW

STANCHION LOCKING BAR

SCALE: 1 : 1



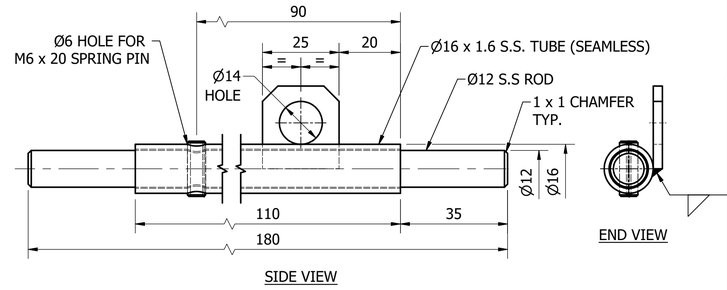
PLAN



SIDE VIEW

LID

SCALE: 1 : 1

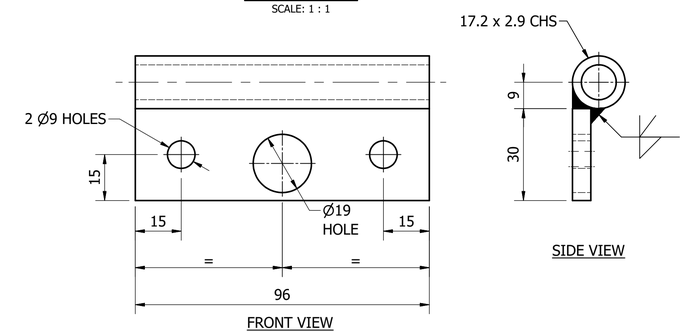


END VIEW

SIDE VIEW

SLIDE BOLT

SCALE: 1 : 1



SIDE VIEW

FRONT VIEW

HINGE

SCALE: 1 : 1

NOTES:

1. FOR GALVANISED STEEL ACCESS COVER NOTES REFER TO DRAWING SD-8230.

ITEM	AMDT.
PN826701	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

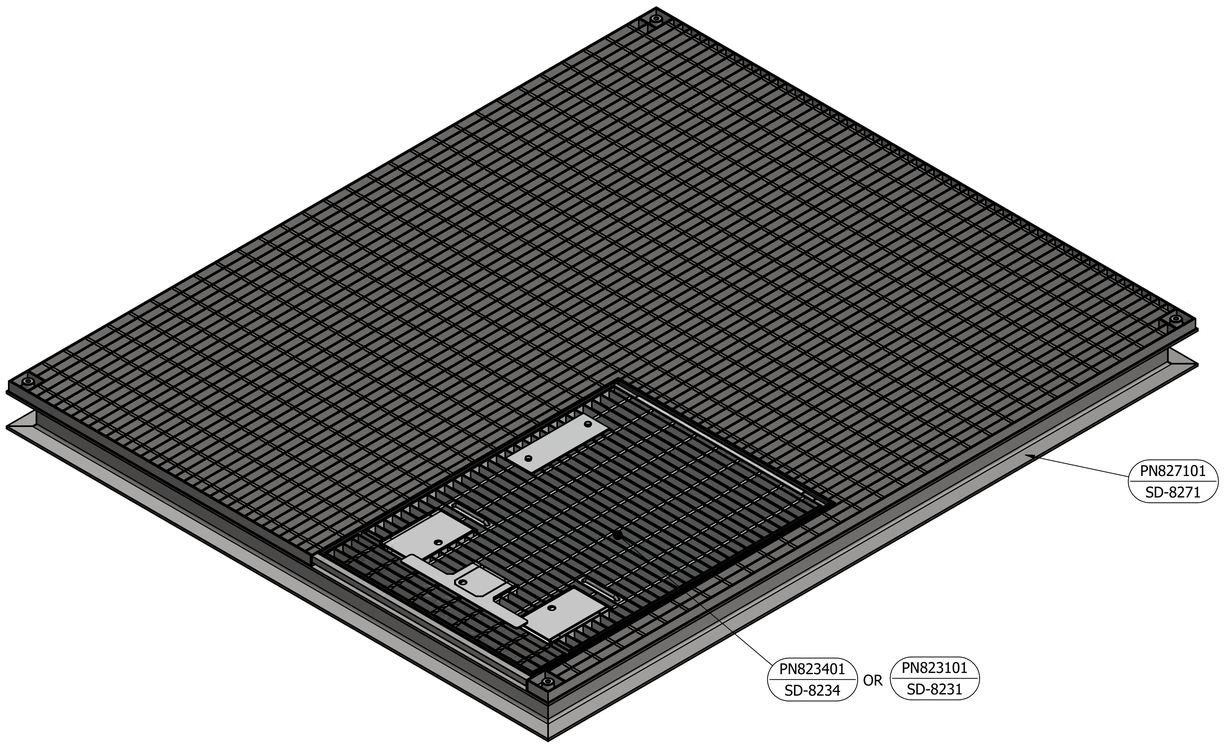
STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL, HINGED
LOCK BOX - STANCHION LOCKING BAR TYPE
DETAILS

DRAWING STATUS: Current

SD-8267-D

A1

ISSUE: A

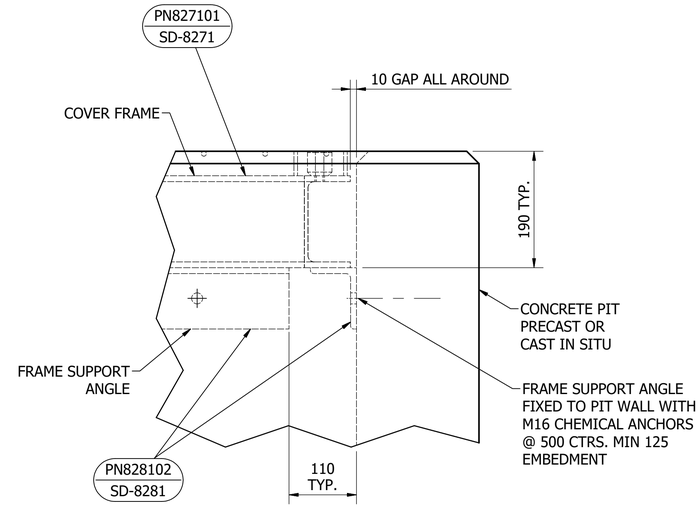


ISOMETRIC VIEW

"DROP-IN" PIT COVER INCL. HINGED ACCESS HATCH

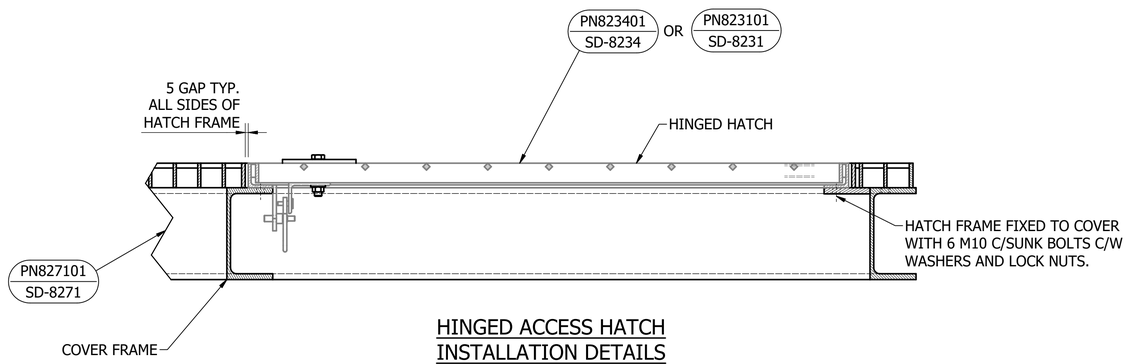
SCALE: 1 : 10

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 600 kg INCL. HATCH (3 m x 2.5 m)



FRAME AND SUPPORT ANGLE INSTALLATION DETAILS

SCALE: 1 : 5



HINGED ACCESS HATCH INSTALLATION DETAILS

SCALE: 1 : 5

NOTES:

1. THE DESIGNER IS TO DETERMINE THE MAXIMUM WIDTH AND LENGTH OF THE "DROP-IN" PIT COVER NOTING THE REQUIRED DESIGN LOADS SPECIFIC TO THE PROJECT.

ITEM	AMDT.
PN827001	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager
B	PIT COVER DIMENSIONS ADDED TO MASS, NOTE 1 ADDED	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	
BWS	X	WAT	X	STP	
WTP	X	SEW			
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

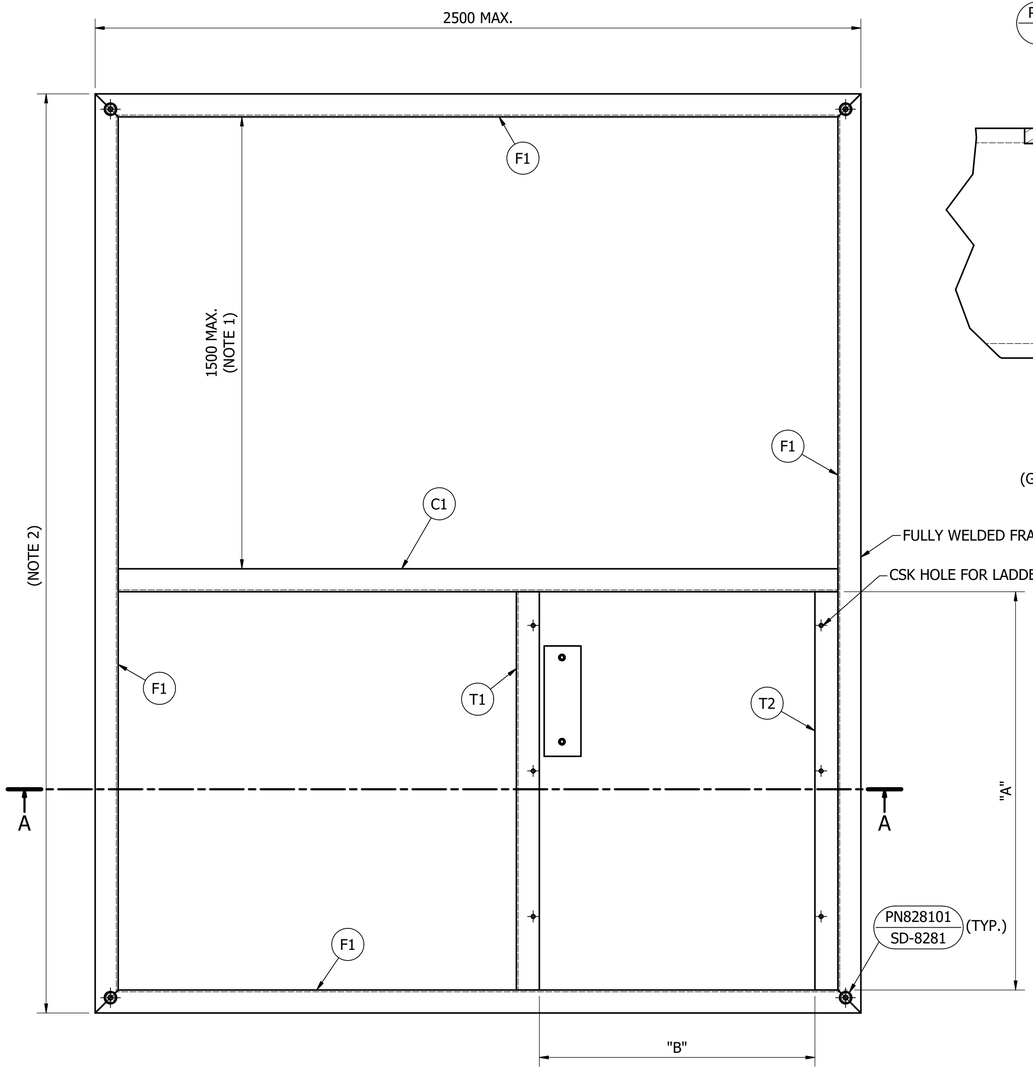
STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL
DROP IN FRAME
TYPICAL ARRANGEMENT

DRAWING STATUS: Current

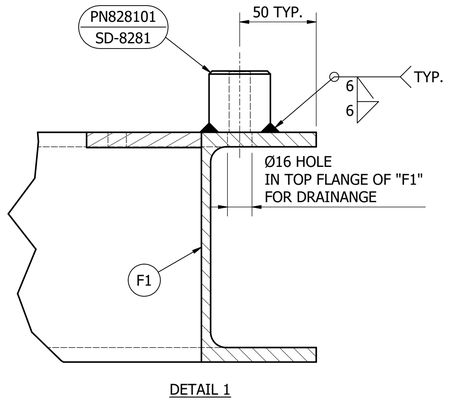
SD-8270-C

A1

ISSUE: B



PLAN

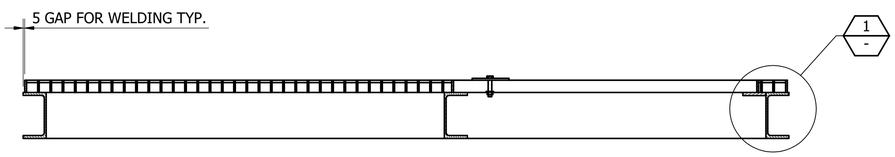


DETAIL 1

EYE BOLT RECIEVER FOR LIFTING

(GRATING OMMITED FOR CLARITY)

SCALE: 1 : 2



SECTION A-A

"DROP IN" PIT COVER - FRAME

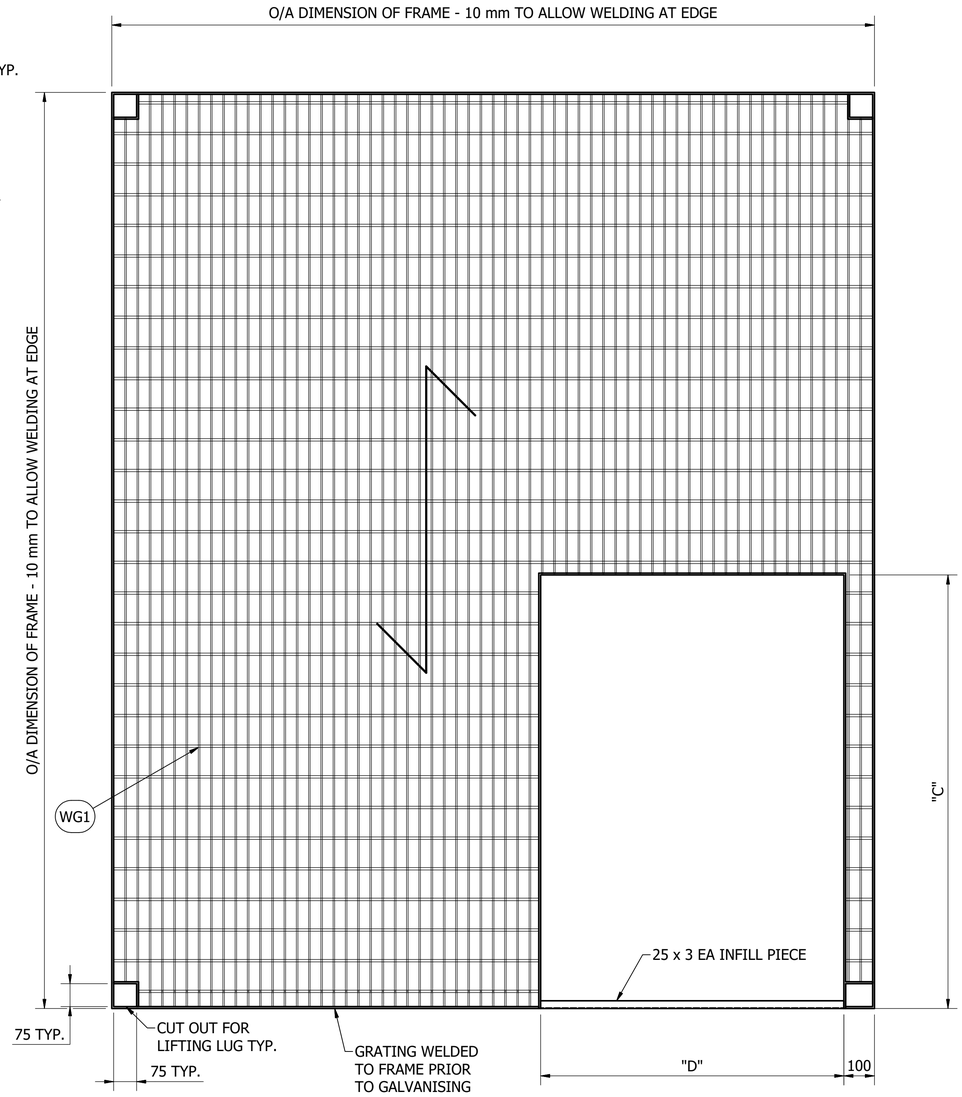
(GRATING OMMITED FOR CLARITY
REFER GRATING DETAIL)

SCALE: 1 : 10

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: 550 kg W/O HATCH

MEMBER SCHEDULE		
MARK	DESCRIPTION	SECTION
F1	OUTER FRAME	150 PFC
C1	CROSS MEMBER	150 PFC
T1	HATCH TRIMMER	150 PFC
T2	HATCH TRIMMER	75 x 10 FL
WG1	WEBFORGE GRATING	C405MPU

DIMENSION VARIABLES		
DIMENSION	INCLINED LADDER	VERTICAL LADDER
A	1300	1000
B	900	900
C	1415	1115
D	990	990



PLAN

GRATING PANNEL

SCALE: 1 : 10

NOTES:

1. MAXIMUM SPAN TO SUIT "WEBFORGE" C405 GRATING, IF DIM IS >1500 mm ADDITIONAL CROSS MEMBER(S) REQURED.

2. MAXIMUM LENGTH TO BE DETERMINED BY DESIGN ENGINEER.

3. LADDER HATCH FIXING HOLE LOCATIONS ARE DEPENDED ON HATCH TYPE. LOCATIONS TO BE CONFIRMED PRIOR TO FABRICATION.

ITEM	AMDT.
PN827101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	RES	SPS
BWS	WAT	STP
WTP	SEW	
WPS	REC	

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL
DROP IN FRAME
DETAILS

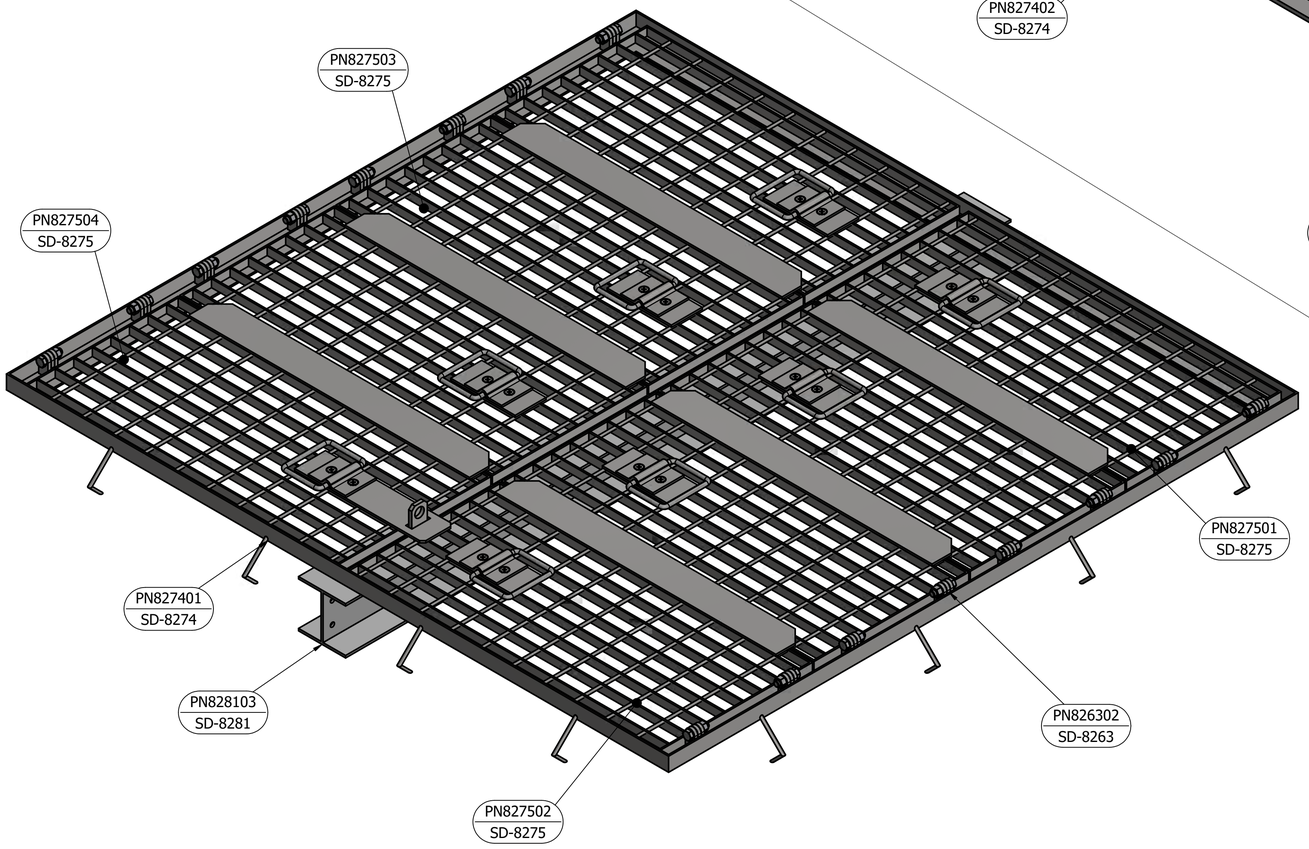
DRAWING STATUS: Current

SD-8271-C

A1

ISSUE: A

PARTS LIST		
PART NUMBER	DESCRIPTION	REFERENCE
PN827401	GRATED HATCH FRAME	SD-8274
PN827501	GRATED HATCH	SD-8275
PN827502	GRATED HATCH W/ KEEPER PLATE RIGHT	SD-8275
PN827503	GRATED HATCH W/ KEEPER PLATE LEFT	SD-8275
PN827504	GRATED HATCH W/ KEEPER PLATE LEFT AND LOCKING LUG	SD-8275
PN828103	CENTRE SUPPORT	SD-8281
PN826302	FOLD FLAT HINGE	SD-8263



GRATED HATCH COVER ASSEMBLY

ITEM	AMDT.
PN827301	

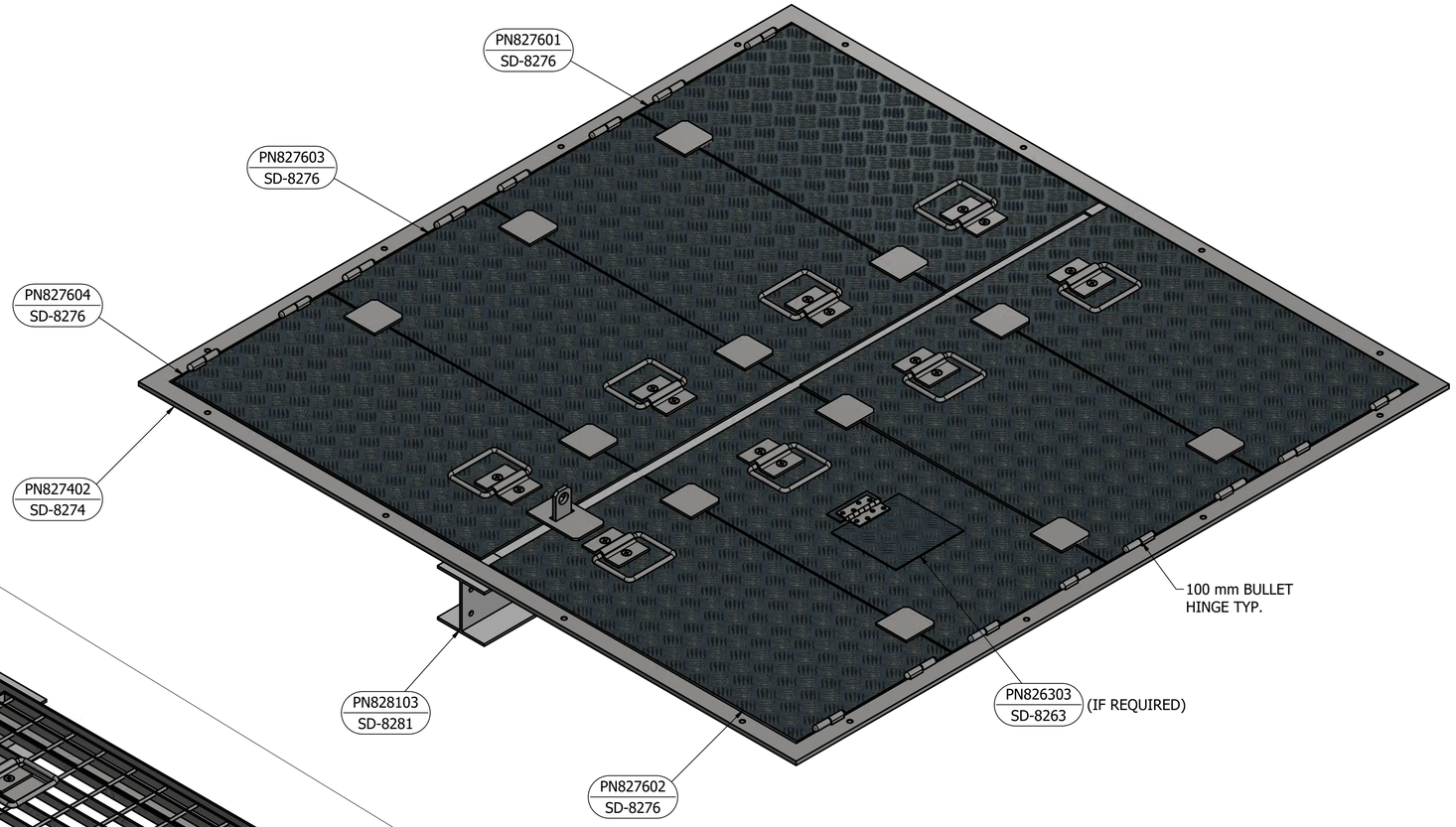


PLATE HATCH COVER ASSEMBLY

PARTS LIST		
PART NUMBER	DESCRIPTION	REFERENCE
PN827402	PLATE HATCH FRAME	SD-8274
PN827601	PLATE HATCH	SD-8276
PN827602	PLATE HATCH WITH KEEPER PLATE RIGHT	SD-8276
PN827603	PLATE HATCH WITH KEEPER PLATE LEFT	SD-8276
PN827604	PLATE HATCH WITH KEEPER PLATE LEFT AND LOCKING LUG	SD-8276
PN828103	CENTRE SUPPORT	SD-8281
PN826303	INSPECTION HATCH	SD-8263

ITEM	AMDT.
PN827302	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

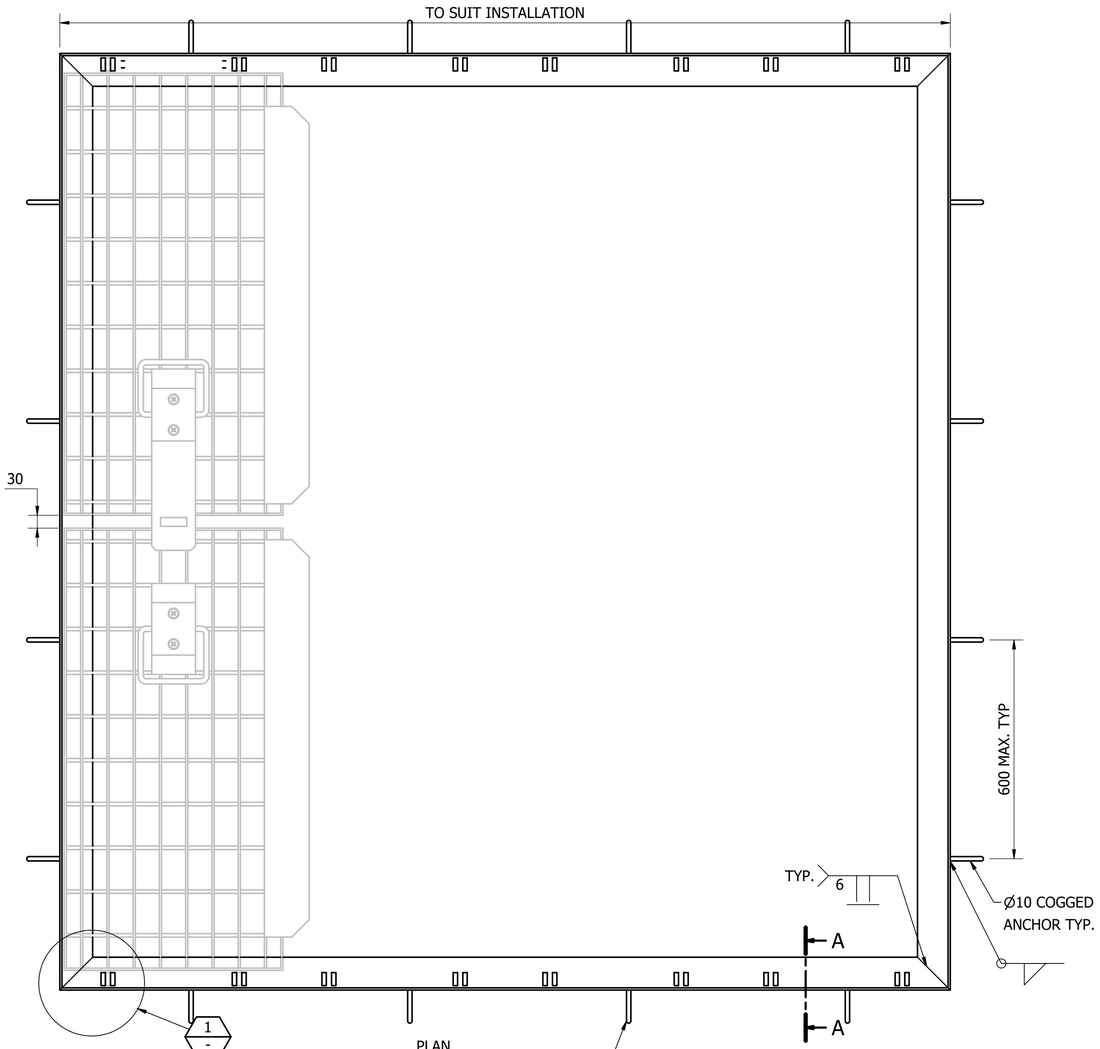
icon WATER

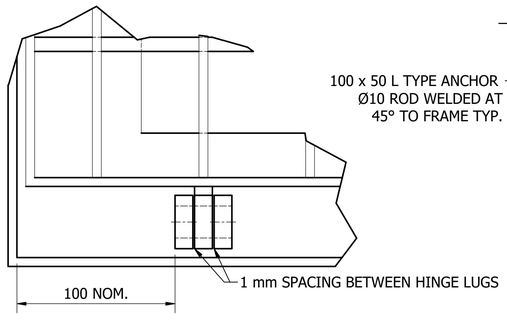
STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL
FIXED FRAME (FOLD FLAT) COVER
TYPICAL ARRANGEMENTS

DRAWING STATUS
Current

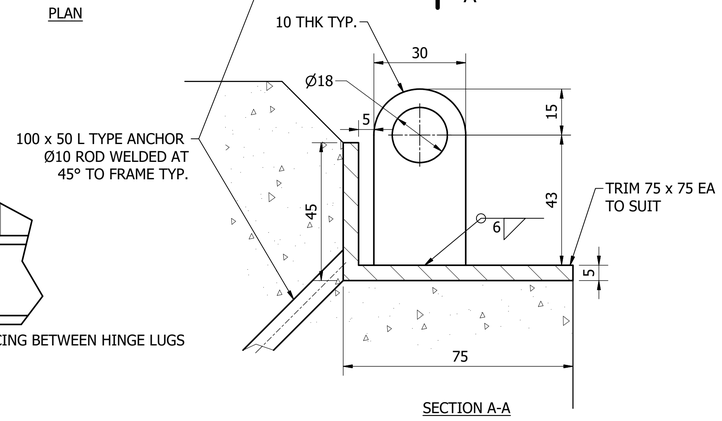
SD-8273-C

ISSUE A





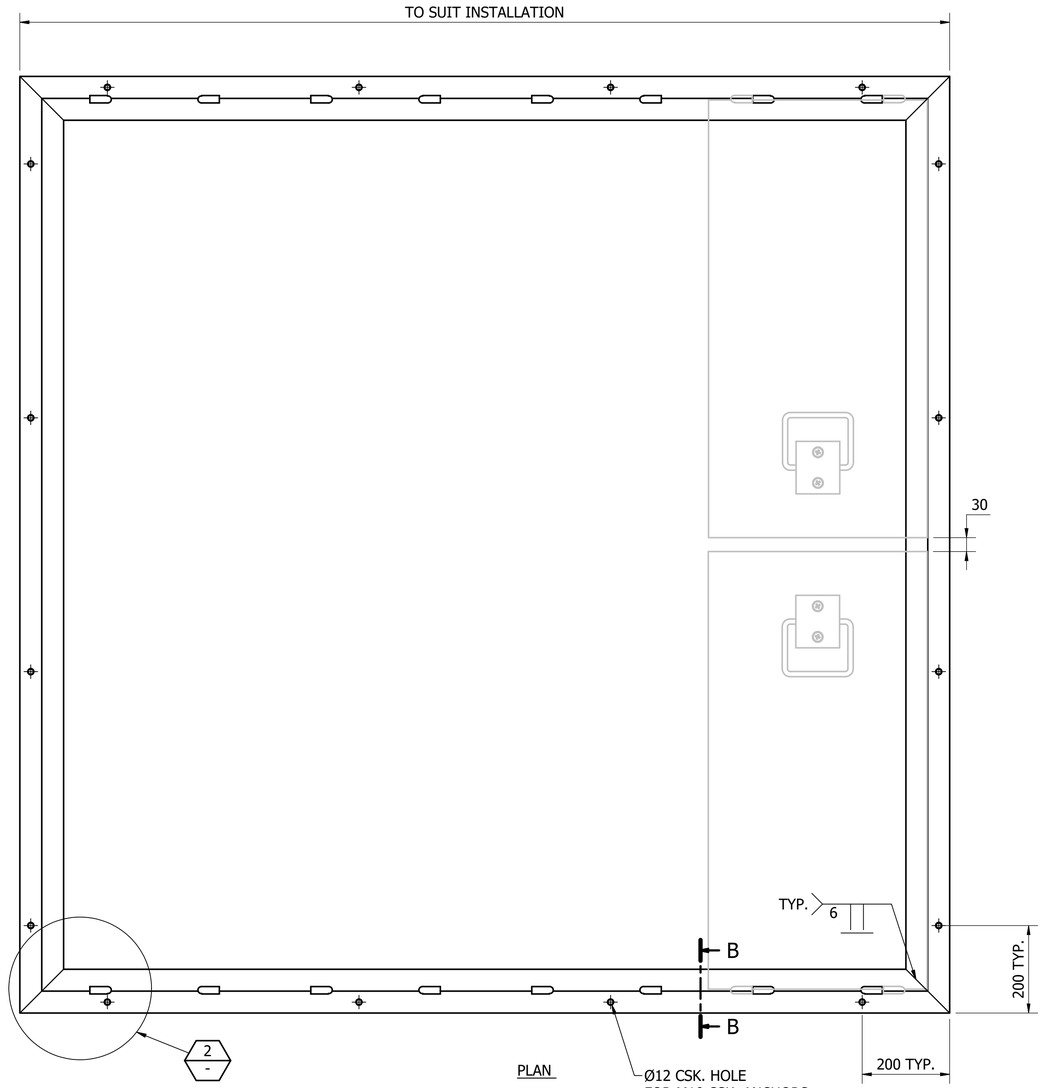
DETAIL 1

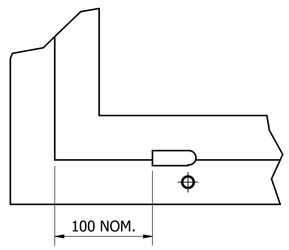


SECTION A-A

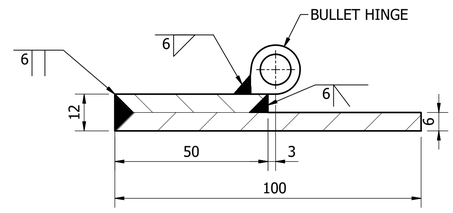
GRATE STYLE HATCH FRAME

HINGE TAB





DETAIL 2



SECTION B-B

PLATE STYLE HATCH FRAME

ITEM	AMDT.
PN827401	

ITEM	AMDT.
PN827402	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	RES		SPS		
BWS	WAT		STP		
WTP	SEW				
WPS	REC				

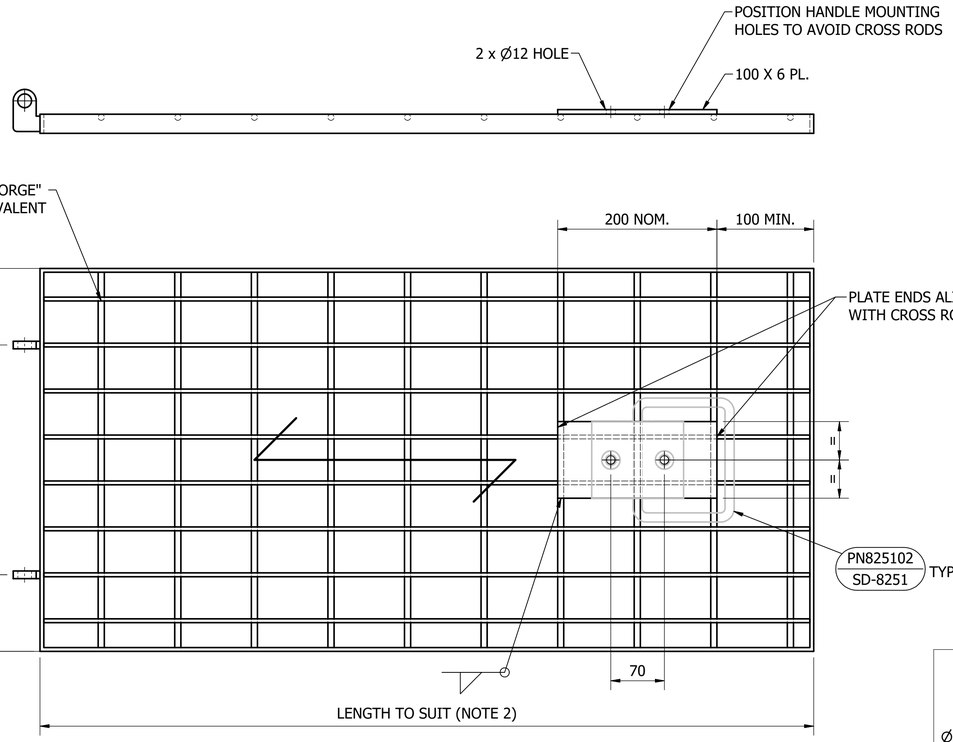
ASSET AREA APPLICABILITY

STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL
FIXED FRAME (FOLD FLAT) COVER
FRAME DETAILS

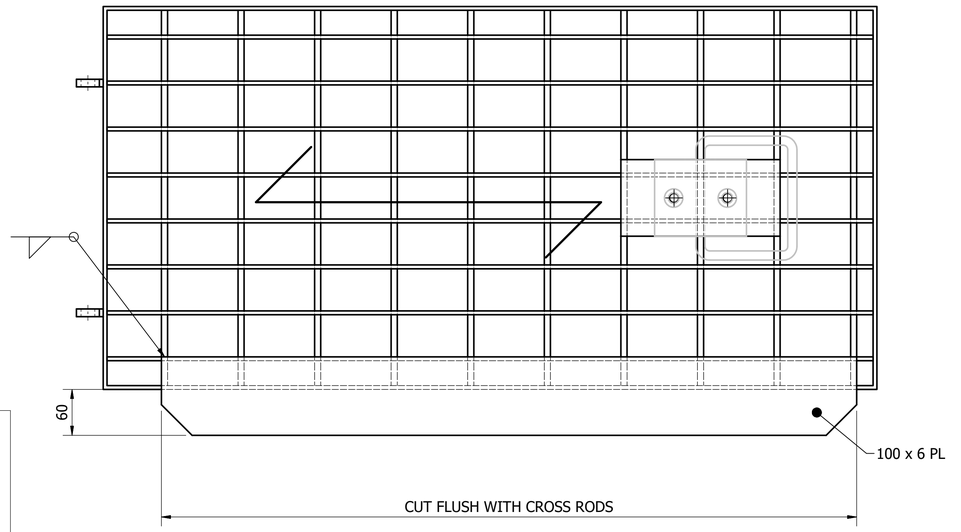
DRAWING STATUS
Current

SD-8274-C

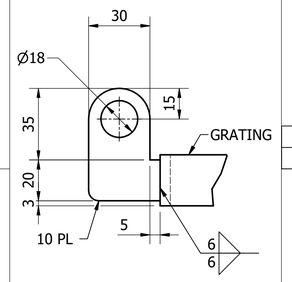
ISSUE A



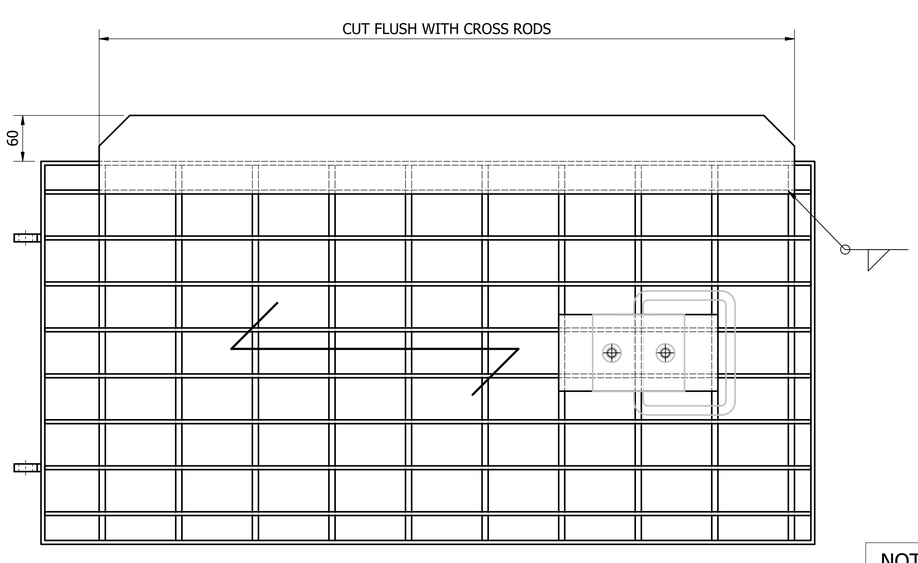
ITEM	AMDT.
PN827501	



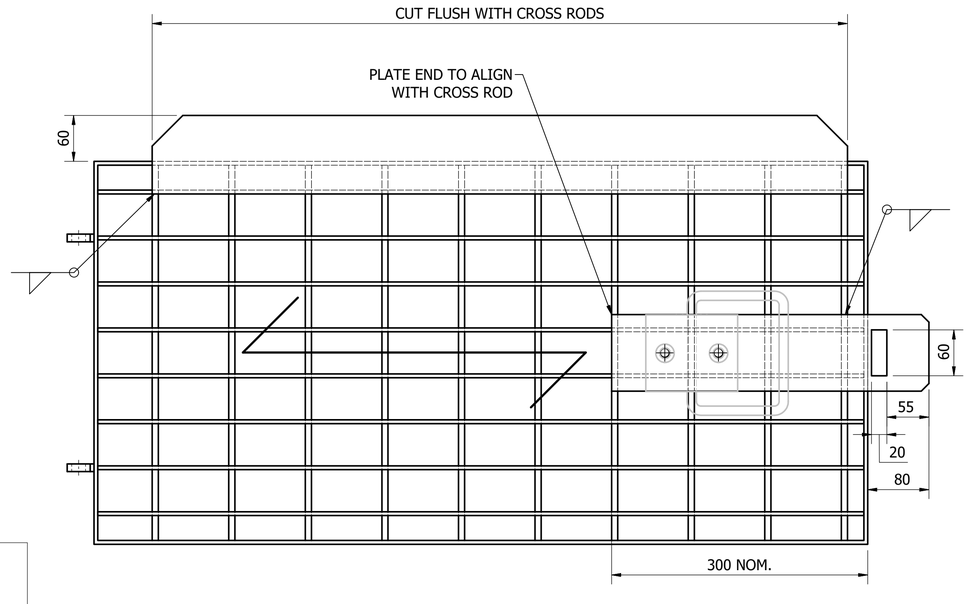
ITEM	AMDT.
PN827502	



HINGE DETAIL TYP.



ITEM	AMDT.
PN827503	



ITEM	AMDT.
PN827504	

NOTES:

1. GRATES TO BE HOT DIP GALVANISED AFTER FABRICATION.

2. MAXIMUM LENGTH OF THE PANEL IS BASED ON THE PANEL WEIGHT, WHICH MUST NOT EXCEED 20 kg.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	PANEL LENGTH NOTE ADDED	10/12/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

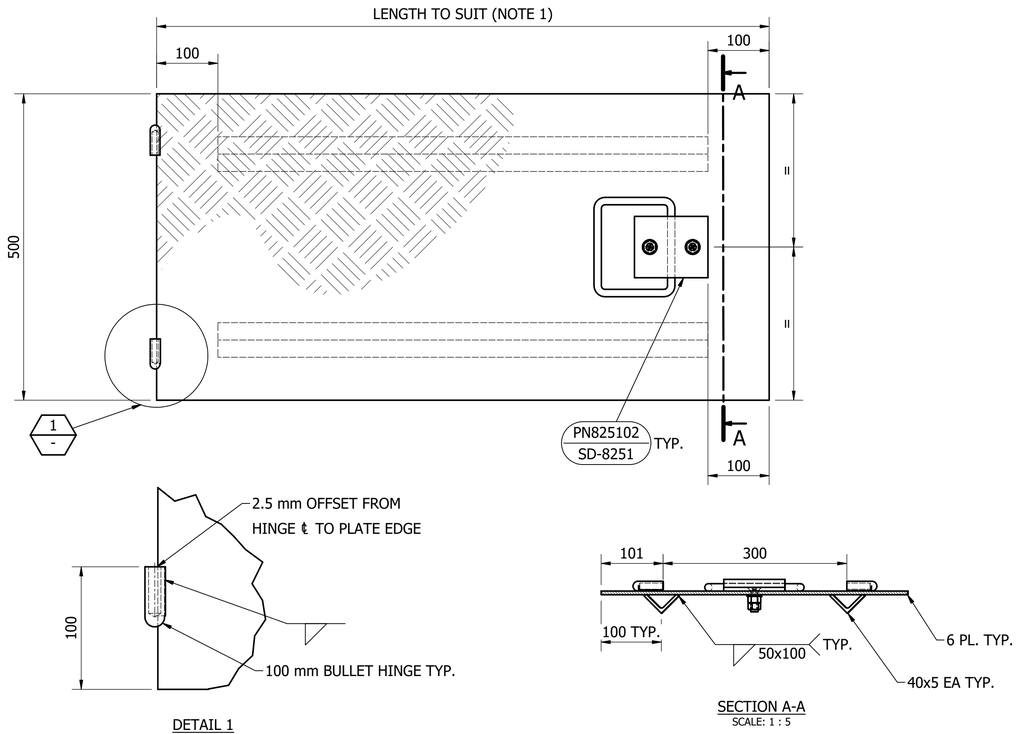
icon WATER

STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL
FIXED FRAME (FOLD FLAT) COVER
HINGED HATCH - GRATED
DETAILS

DRAWING STATUS: Current

SD-8275-C

ISSUE B

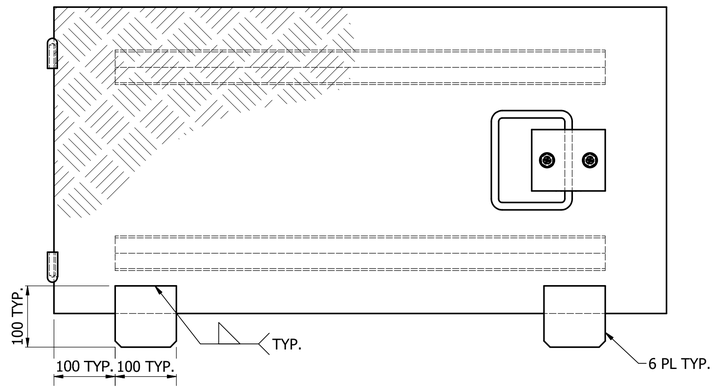


DETAIL 1

SECTION A-A
SCALE: 1 : 5

HINGE

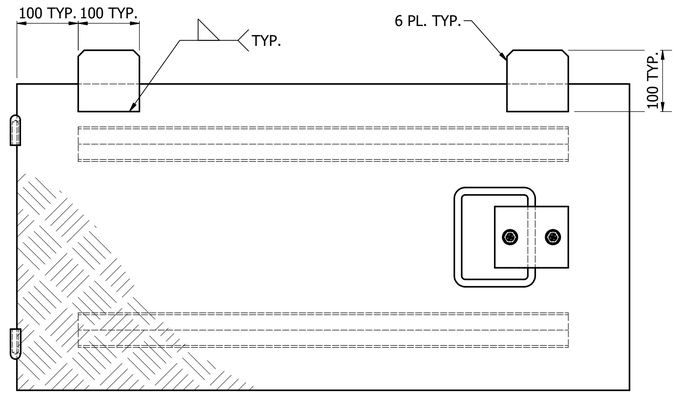
ITEM	AMDT.
PN827601	



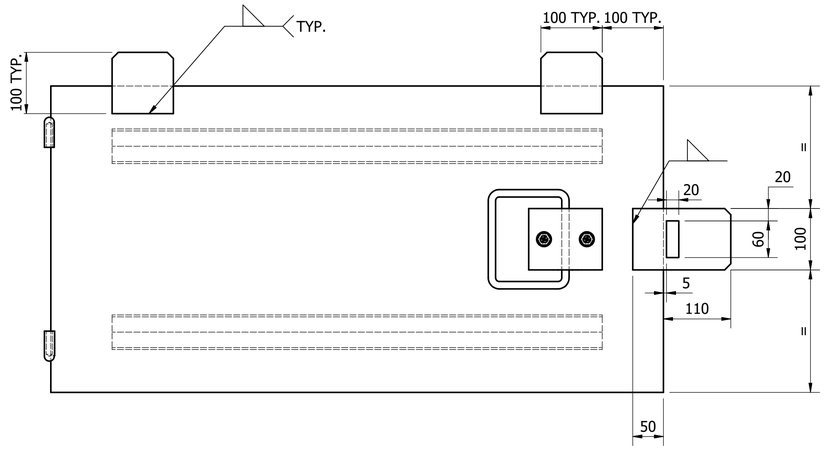
ITEM	AMDT.
PN827602	

NOTES:

1. MAXIMUM LENGTH OF THE PANEL IS BASED ON THE PANEL WEIGHT, WHICH MUST NOT EXCEED 20 kg.



ITEM	AMDT.
PN827603	



ITEM	AMDT.
PN827604	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager
B	PANEL LENGTH NOTE ADDED	10/12/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

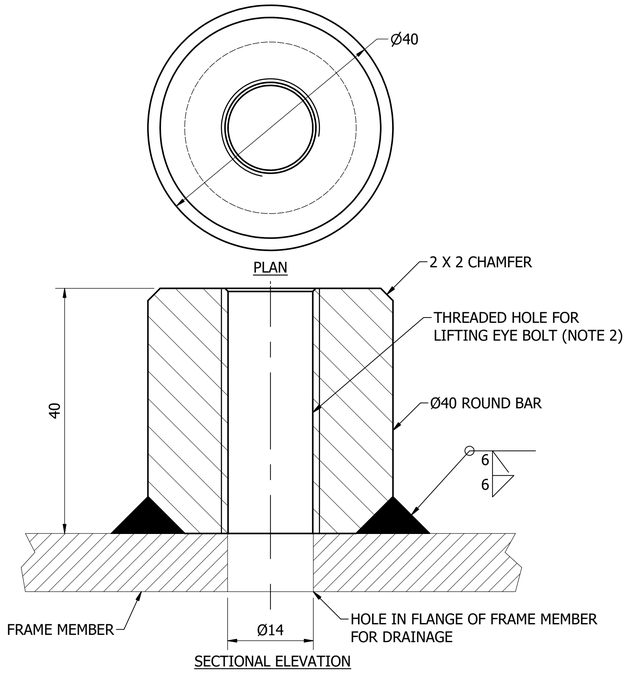
icon WATER

STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL
FIXED FRAME (FOLD FLAT) COVER
HINGED HATCH - PLATE
DETAILS

DRAWING STATUS
Current

SD-8276-C

ISSUE B

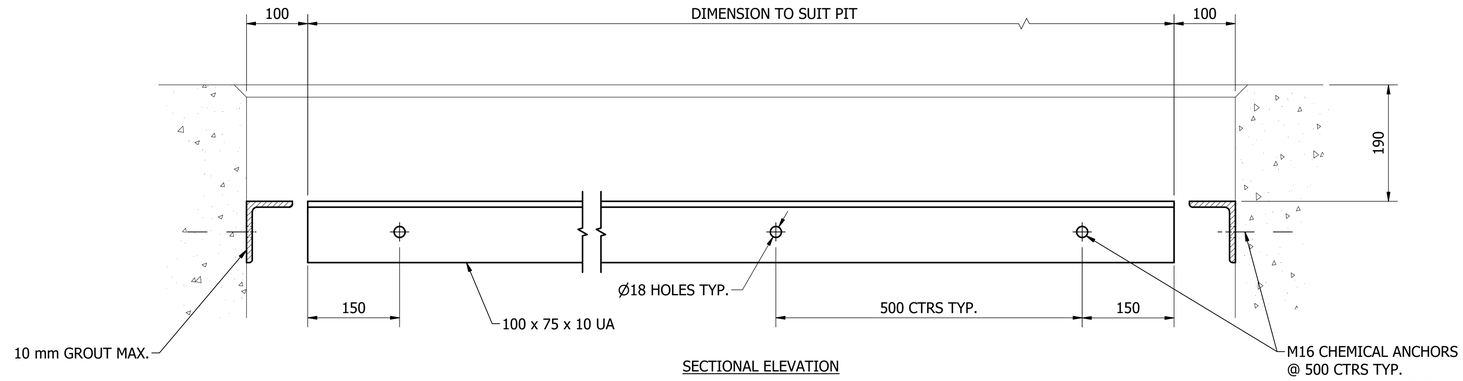


EYE BOLT RECEIVER - LIFTING

SCALE: 2 : 1

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED (AS PART OF FINAL ASSEMBLY)
FINISH COLOUR: N/A
MASS: 0.5 kg

ITEM	AMDT.
PN828101	



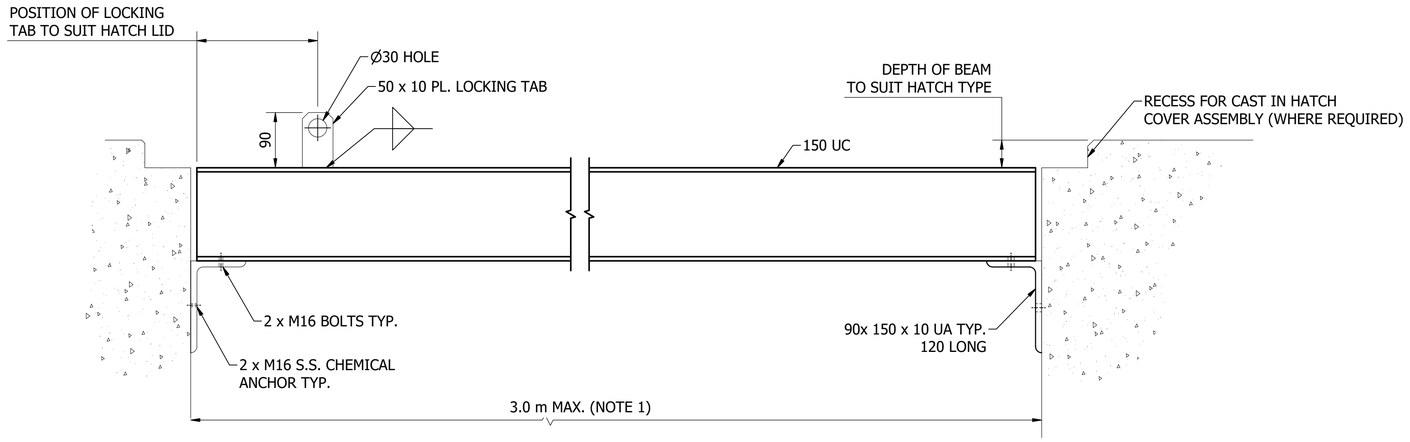
SECTIONAL ELEVATION

DROP-IN COVER - FRAME SUPPORT ANGLE DETAILS AND INSTALLATION

SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: VARIES

ITEM	AMDT.
PN828102	



SECTIONAL ELEVATION

CENTRE SUPPORT BEAM

SCALE: 1 : 5

MATERIAL: CARBON STEEL
COATING: HOT DIP GALVANISED
FINISH COLOUR: N/A
MASS: APPROX. 50 kg @ 2 m LENGTH

ITEM	AMDT.
PN828103	

NOTES:

1. THE CENTRE SUPPORT BEAM AND T-CLEAT DETAIL SHOWN SHALL ONLY BE USED FOR THE MAX. SPAN GIVEN UNLESS PROJECT SPECIFIC DESIGN CALCULATIONS ARE CONDUCTED BY A SUITABLY QUALIFIED/COMPETENT STRUCTURAL OR MECHANICAL ENGINEER.

2. EYE BOLT RECIEVER TO BE M16 COARSE THREAD AND IN ACCORDANCE WITH AS 2317.

3. ALL WELDS TO BE CATEGORY SP TO AS/NZS 1554. ELECTRODES TO BE "E43xx".

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	
BWS	X	WAT	X	STP	
WTP	X	SEW			
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
ACCESS COVERS - HOT DIP GALVANISED STEEL
DROP IN AND FIXED FRAME
STANDARD PARTS
DETAILS

DRAWING STATUS: Current

SD-8281-D

A1

ISSUE: A

GENERAL NOTES:

1. THESE NOTES SHALL BE READ IN CONJUNCTION WITH ICON WATER SPECIFICATIONS: STD-SPE-C-003 AND C-004
2. DRAWINGS IN THIS SET. SD-8400 THROUGH SD-8405 INCLUSIVE (FORMERLY SDG-S001 THROUGH SDG-S006)

DESIGN PARAMETERS AND DESIGN LOADS

3. REGIONAL WIND VELOCITIES
   REGION A3
   V_{500} = 45 m/s
   V_{25} = 37 m/s

4. TERRAIN CATEGORY 2.5
   TOPOGRAPHIC MULTIPLIER
   M_t = 1.3

5. FOUNDATIONS HAVE BEEN DESIGNED FOR AN ALLOWABLE BEARING PRESSURE OF 100 kPa U.N.O.

6. DAVIT ARM MAXIMUM REACH = 1.1 m

7. MAXIMUM VERTICAL LOAD AT DAVIT ANCHOR POINT = (REFER TO LOADING TABLE)

8. ULTIMATE MOMENT AT DAVIT BASE = (REFER TO LOADING TABLE)

9. SHEAR LOAD = (REFER TO LOADING TABLE)

10. A SUITABLY EXPERIENCED STRUCTURAL ENGINEER HOLDING EITHER (i) CHARTERED STATUS WITH IE-AUST, OR (ii) REGISTERED PROFESSIONAL STATUS WITH PROFESSIONALS AUSTRALIA SHALL ASSESS THE SUITABILITY OF EXISTING SUPPORT STRUCTURES PRIOR TO THE DAVIT BASE CERTIFICATION PLATE BEING AFFIXED.

11. EXISTING CONCRETE ASSUMED TO BE CRACKED AND UN-REINFORCED. FOR NEW CONSTRUCTION WITH REINFORCED CONCRETE, THE DESIGNER SHALL MODIFY THE EDGE DISTANCE AND CONCRETE THICKNESS ACCORDINGLY.

CHEMICAL ANCHORS

12. ALL BOLTS SHALL BE M16 HILTI HIT-RE 500 V3 CHEMICAL ANCHORS WITH HIT-VR (UNO) THREADED ROD (STAINLESS STEEL) U.N.O. THE MINIMUM EMBEDMENT LENGTH SHALL BE 200 mm (UNO). ANCHORS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION.

13. ALL BOLTS SHALL BE PROVIDED WITH 5 mm THICK OVERSIZED WASHERS, GRADE 316 STAINLESS STEEL TO ASTM A272.

14. ALL NUTS, WASHERS AND FIXING PLATES SHALL BE GRADE 316 CLASS 70 STAINLESS STEEL TO ASTM A272 (UNO).

15. PROVIDE LOCTITE E-60NC HYSOL EPOXY STRUCTURAL ADHESIVE TO ISOLATE DISSIMILAR METALS.

16. ALL BOLTS SHALL BE FIXED WITH HILTI NUTS & ADDITIONALLY WITH LOCK NUTS.

17. "BOLT ON" DAVIT BASES TO HAVE STUD PROTRUDING ABOVE NUT 1.0D (MIN.) TO 1.5D (MAX.) TO ALLOW FOR BOLT PULL OUT TESTING (WHERE "D" = NOMINAL BOLT DIAMETER).

BOLT THROUGH CONNECTIONS

18. FOUR (4) 18 DIAMETER HOLES SHALL BE FORMED TO INSTALL M16 GRADE 316 STAINLESS STEEL THREADED BARS / BOLTS TO SUIT DAVIT BASE.

19. ALL BACKING PLATES, WASHERS AND NUTS SHALL BE GRADE 316 CLASS 70 STAINLESS STEEL TO ASTM A272 (UNO).

20. ALL BOLTS SHALL BE PROVIDED WITH 5 mm THICK OVERSIZED WASHERS TO THE DAVIT BASE, GRADE 316 STAINLESS STEEL TO ASTM A272.

21. PROVIDE LOCTITE E-60NC HYSOL EPOXY STRUCTURAL ADHESIVE TO ISOLATE DISSIMILAR METALS.

22. ALL BOLTS SHALL BE FIXED WITH HILTI NUTS & ADDITIONALLY WITH LOCK NUTS.

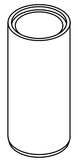
DAVITS

23. ONLY THE DBI SALA MODEL NUMBERS SHOWN SHALL BE INSTALLED. NO OTHER MAKE / MODEL OF DAVIT BASE SHALL BE INSTALLED UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER PRINCIPAL ENGINEER.

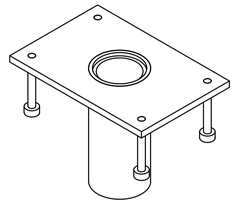
24. FOR INSTALLATION OF DAVIT BASES ON OR INTO STRUCTURAL STEEL, AN INDEPENDENT STRUCTURAL ENGINEER WHO'S QUALIFICATIONS / EXPERIENCE SATISFYING THE REQUIREMENTS OF NOTE 10 SHALL BE ENGAGED TO PROVIDE DESIGN CERTIFICATION TO SUIT THE STRUCTURAL DESIGN REQUIREMENTS. THAT IS, EXISTING INSTALLATIONS SHALL BE CERTIFIED FOR STRUCTURAL DESIGN LOADS BASED ON A 12 kN ANCHOR POINT. NEW INSTALLATIONS SHALL BE CERTIFIED FOR A 15 kN ANCHOR POINT. REFER TO THE LOADING TABLE FOR DETAILS.

25. REFER TO THE ICON WATER "APPROVED PRODUCT LIST" FOR A COMPLETE LIST OF APPROVED DAVIT BASES, DAVIT ARMS AND DAVIT MASTS.

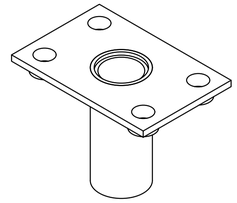
26. ZINC PLATED DAVIT BASES SHALL NOT BE USED. ONLY STAINLESS STEEL (FOR SEWAGE APPLICATIONS) OR GALVANISED STEEL (FOR WATER / GENERAL APPLICATIONS) ARE APPROVED.



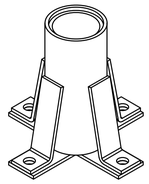
CORE MOUNT SLEEVE
MODEL No. 8510110 (STAINLESS STEEL)



FLUSH MOUNT SLEEVE (CAST IN)
MODEL No. 8512828 (STAINLESS STEEL)
MODEL No. 8510311 (GALV. CARBON STEEL)

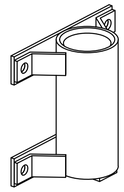


FLUSH MOUNT SLEEVE (BOLT IN)
MODEL No. 8512827 (STAINLESS STEEL)
MODEL No. 8510316 (GALV. CARBON STEEL)



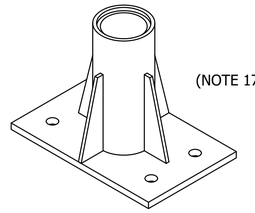
(NOTE 17)

UCL ADVANCED FLOOR MOUNT SLEEVE
MODEL No. 8518347 (STAINLESS STEEL)
MODEL No. 8518503 (GALV. CARBON STEEL)



(NOTE 17)

UCL ADVANCED WALL MOUNT SLEEVE
MODEL No. 8518348 (STAINLESS STEEL)
MODEL No. 8518504 (GALV. CARBON STEEL)



(NOTE 17)

CENTRE MOUNTING SLEEVE
MODEL No. 8516563 (STAINLESS STEEL)

DBI-SALA FIXED DAVIT BASES
ISOMETRIC VIEWS

LOADING TABLE

PRODUCT NAME	STRUCTURAL DESIGN LOAD (12 kN ANCHOR)	STRUCTURAL DESIGN LOAD (15 kN ANCHOR)	PRODUCT RATED LOAD (FROM MANUFACTURER)	PRODUCT PROOF-TESTING LOAD (FROM MANUFACTURER)
CORE MOUNT SLEEVE	ULTIMATE MOMENT = 13.2 kNm ULTIMATE VERTICAL LOAD = 12.0 kN ULTIMATE SHEAR LOAD = 31.0 kN (ONLY APPLICABLE FOR UCL ADVANCED WALL MOUNT SLEEVE)	ULTIMATE MOMENT = 16.5 kNm ULTIMATE VERTICAL LOAD = 15.0 kN ULTIMATE SHEAR LOAD = 38.8 kN (ONLY APPLICABLE FOR UCL ADVANCED WALL MOUNT SLEEVE)	MOMENT LOAD = 8.8 kNm VERTICAL LOAD = 8.0 kN SHEAR LOAD = 18.7 kN (ONLY APPLICABLE FOR UCL ADVANCED WALL MOUNT SLEEVE)	MOMENT LOAD = 4.4 kNm PULLOUT LOAD = N/A
FLUSH MOUNT SLEEVE (CAST-IN)				MOMENT LOAD = 4.4 kNm PULLOUT LOAD = N/A
FLUSH MOUNT SLEEVE (BOLT-IN)				MOMENT LOAD = 4.4 kNm PULLOUT LOAD = 13.3 kN PER BOLT
UCL ADVANCED FLOOR MOUNT SLEEVE				MOMENT LOAD = 4.4 kNm PULLOUT LOAD = 12.4 kN PER BOLT
UCL ADVANCED WALL MOUNT SLEEVE				MOMENT LOAD = 4.4 kNm PULLOUT LOAD = 10.3 kN PER BOLT
CENTRE MOUNTING SLEEVE				MOMENT LOAD = 4.4 kNm PULLOUT LOAD = 14.4 kN PER BOLT

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

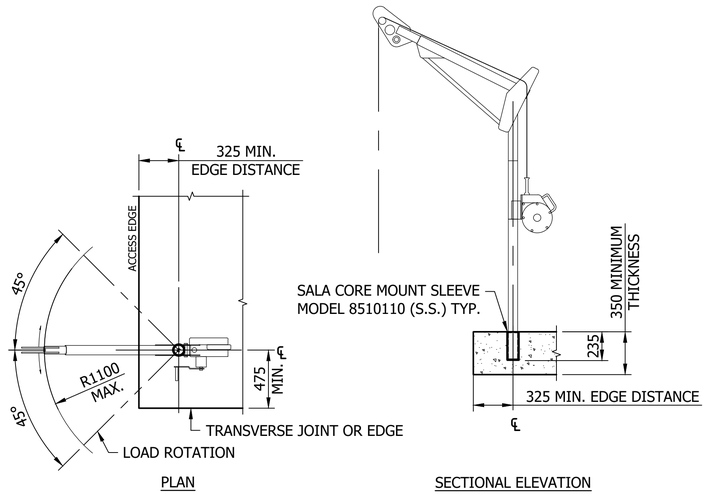
STANDARD DRAWING
PERMANENT DAVIT BASES (DBI SALA)
INSTALLATION INTO / ON UNREINFORCED CONCRETE
GENERAL NOTES

DRAWING STATUS: Current

SD-8400-C

A1

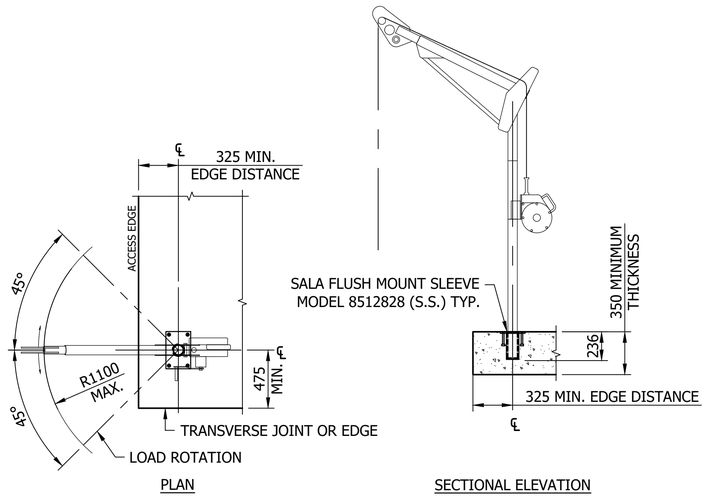
ISSUE: A



PLAN SECTIONAL ELEVATION

TYPE A INSTALLATION - CORE MOUNT SLEEVE

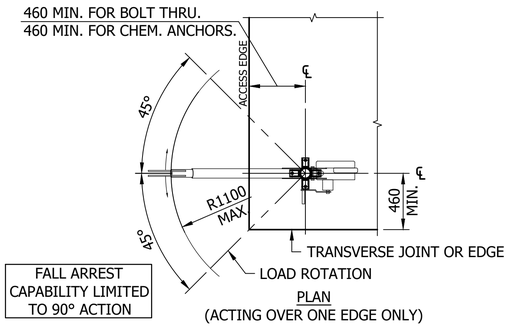
SCALE 1:20



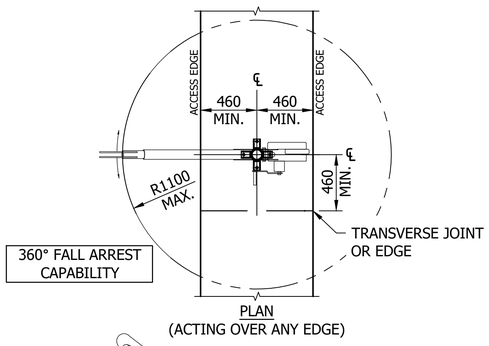
PLAN SECTIONAL ELEVATION

TYPE B INSTALLATION - FLUSH MOUNT SLEEVE

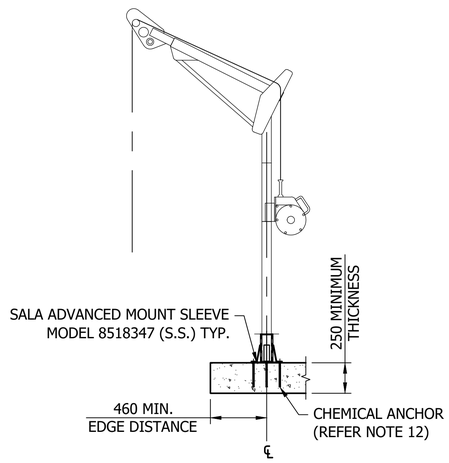
SCALE 1:20



PLAN
(ACTING OVER ONE EDGE ONLY)



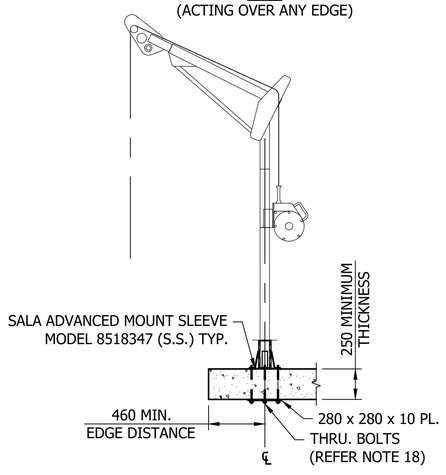
PLAN
(ACTING OVER ANY EDGE)



SECTIONAL ELEVATION

TYPE C INSTALLATION
ADVANCED FLOOR MOUNT SLEEVE
CHEMICAL ANCHOR FIXING

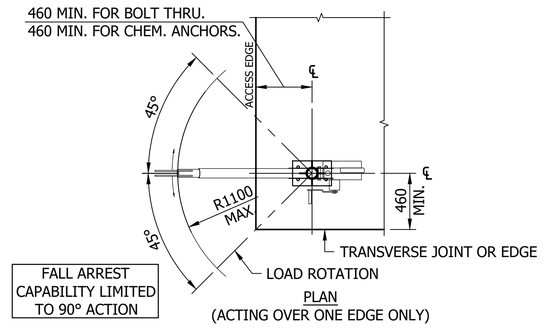
SCALE 1:25



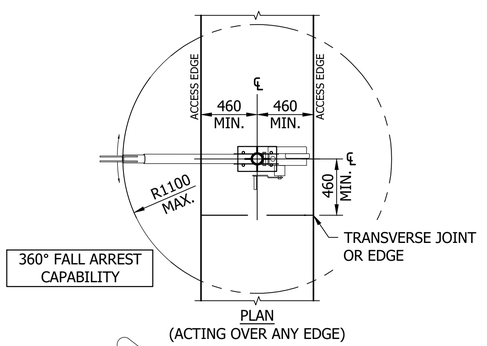
SECTIONAL ELEVATION

TYPE D INSTALLATION
ADVANCED FLOOR MOUNT SLEEVE
BOLTED THROUGH FIXING

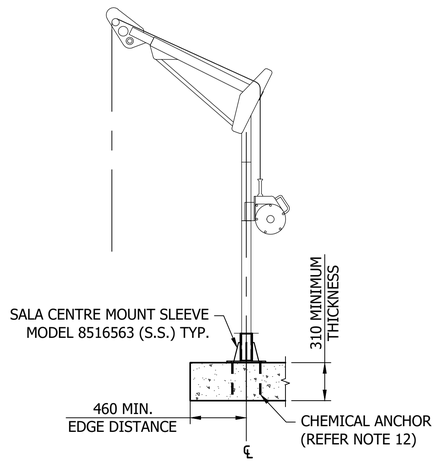
SCALE 1:25



PLAN
(ACTING OVER ONE EDGE ONLY)



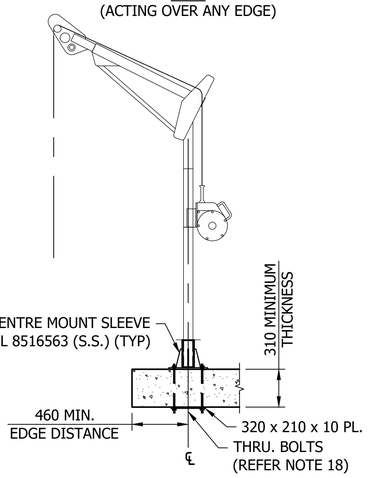
PLAN
(ACTING OVER ANY EDGE)



SECTIONAL ELEVATION

TYPE E INSTALLATION - CENTRE MOUNT SLEEVE
CHEMICAL ANCHOR FIXING

SCALE 1:25



SECTIONAL ELEVATION

TYPE F INSTALLATION - CENTRE MOUNT SLEEVE
BOLTED THROUGH FIXING

SCALE 1:25

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP	X			
WTP	X	SEW	X					
WPS	X	REC	X					

ASSET AREA APPLICABILITY

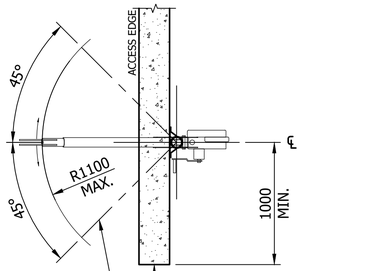
STANDARD DRAWING
PERMANENT DAVIT BASES (DBI SALA)
12 kN INSTALLATION INTO / ON UNREINFORCED CONCRETE
DETAILS SHEET 1 OF 2

DRAWING STATUS: Current

SD-8401-C

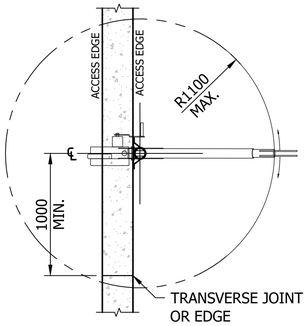
A1

ISSUE: A



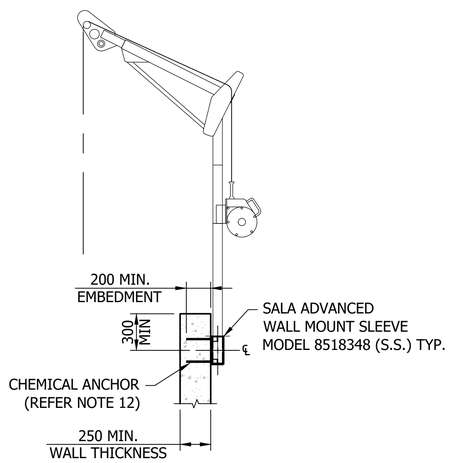
FALL ARREST CAPABILITY LIMITED TO 90° ACTION

PLAN
(ACTING OVER ONE EDGE ONLY)



360° FALL ARREST CAPABILITY

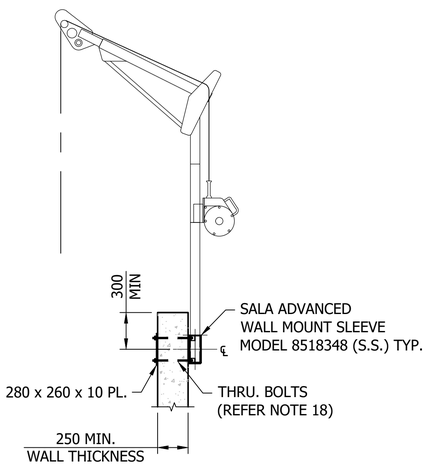
PLAN
(ACTING OVER ANY EDGE)



SECTIONAL ELEVATION

TYPE G INSTALLATION
ADVANCED WALL MOUNT SLEEVE
REAR FACE MOUNTING
CHEMICAL ANCHOR FIXING

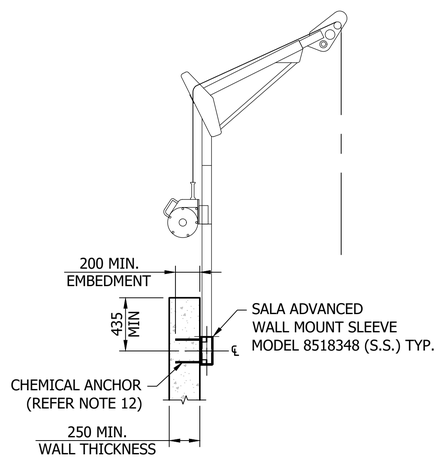
SCALE 1:25



SECTIONAL ELEVATION

TYPE H INSTALLATION
ADVANCED WALL MOUNT SLEEVE
REAR FACE MOUNTING
BOLTED THROUGH FIXING

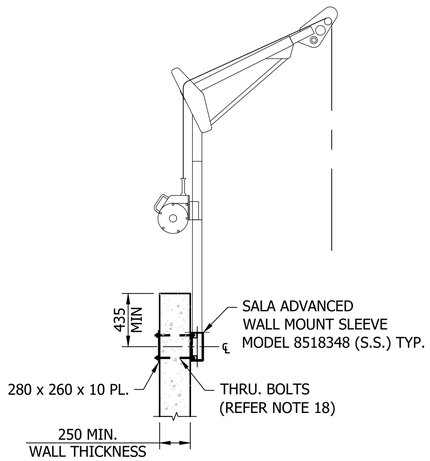
SCALE 1:25



SECTIONAL ELEVATION

TYPE J INSTALLATION
ADVANCED WALL MOUNT SLEEVE
FRONT FACE MOUNTING
CHEMICAL ANCHOR FIXING

SCALE 1:25



SECTIONAL ELEVATION

TYPE K INSTALLATION
ADVANCED WALL MOUNT SLEEVE
FRONT FACE MOUNTING
BOLTED THROUGH FIXING

SCALE 1:25

A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager
No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

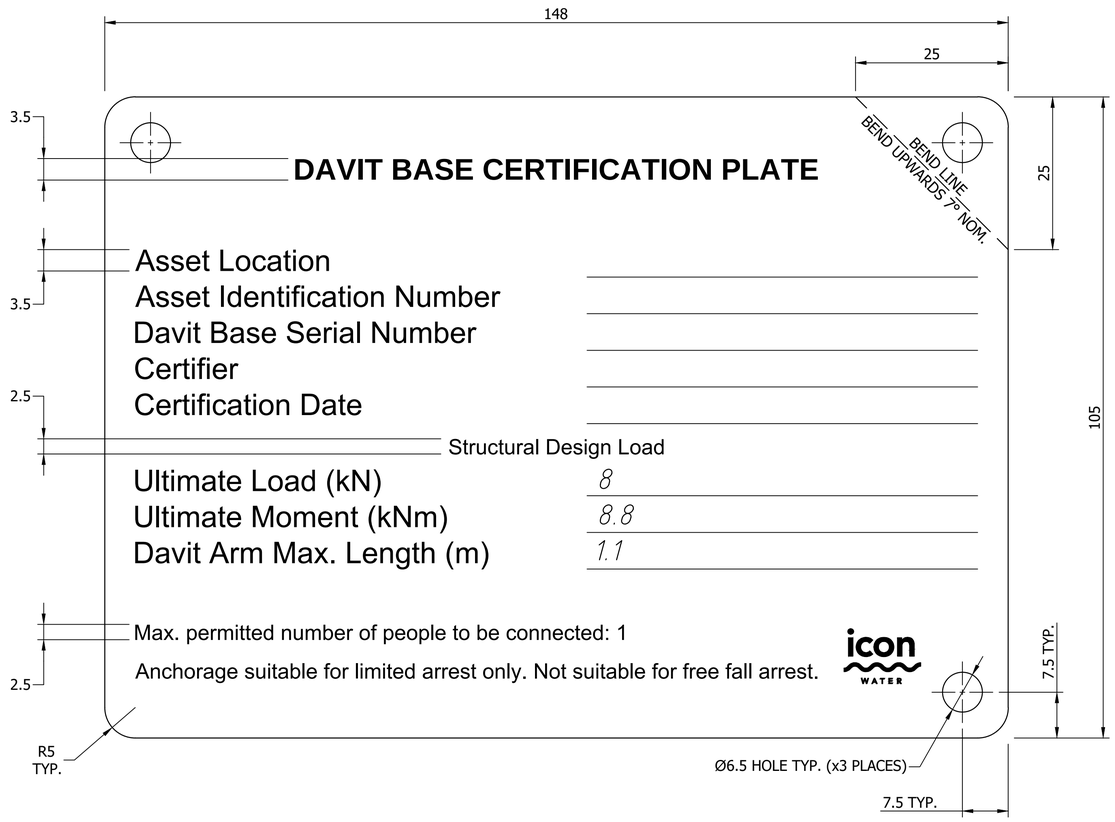
STANDARD DRAWING
PERMANENT DAVIT BASES (DBI SALA)
12 kN INSTALLATION INTO / ON UNREINFORCED CONCRETE
DETAILS SHEET 2 OF 2

DRAWING STATUS: Current

SD-8402-C

A1

ISSUE: A



DAVIT BASE CERTIFICATION PLATE

SCALE 2:1

MATERIAL: 1.6 mm THK. STAINLESS STEEL GRADE 304 PLATE
FINISH: "2B" FINISH
QTY: ONE PER INSTALLED DAVIT BASE

NOTES:

1. CERTIFICATION PLATE TO BE INSTALLED WITHIN 2.0 m OF DAVIT BASE WHEREVER PRACTICABLE. REGARDLESS, INSTALLATION LOCATION SHALL MEET THE REQUIREMENTS OF AS 1891.4.
2. TEXT TO BE ARIAL FONT, TEXT COLOUR TO BE BLACK AND APPLIED THROUGH LASER ENGRAVING OR SIMILAR.
3. FIX TO EXISTING STRUCTURE VIA 2 x M6 S.S. CONCRETE SCREWS OR SIMILAR.
4. REFER TO THE ICON WATER INTEGRATED MANAGEMENT SYSTEM IN CONJUNCTION WITH WORK INSTRUCTION WI05.14.04 "ENGINEERING ASSET IDENTIFICATION" FOR ASSET LOCATION AND IDENTIFICATION NUMBERING. "X" REFERS TO LETTER CHARACTERS: "n" REFERS TO NUMERICAL CHARACTERS.
5. TEXT SHOWN IN *ITALICS* ARE EXAMPLES ONLY AND TO BE ENGRAVED PRIOR TO INSTALLATION.
6. THE ⌀6.5 HOLE ABOVE THE BEND LINE IS FOR ATTACHMENT OF THE INSPECTION TAG.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager
B	DRAWING NOW -D	19/06/2019	S. Essery	K. Danenbergsons	C. Patrick

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

icon WATER

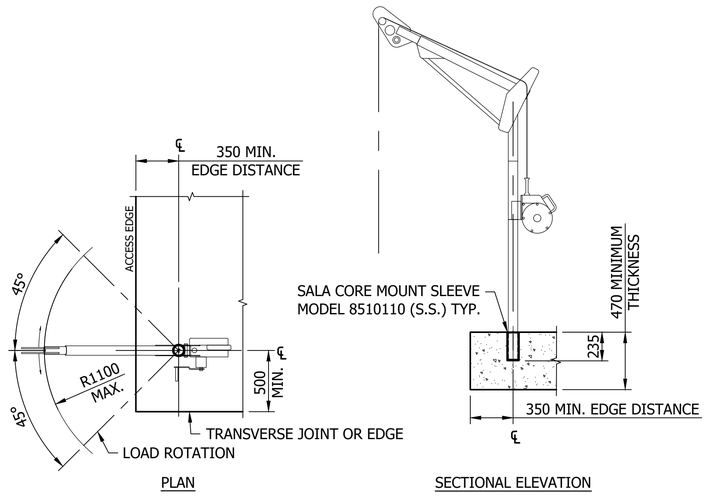
STANDARD DRAWING
PERMANENT DAVIT BASES (DBI SALA)
CERTIFICATION PLATE

DRAWING STATUS: Current

SD-8403-D

A1

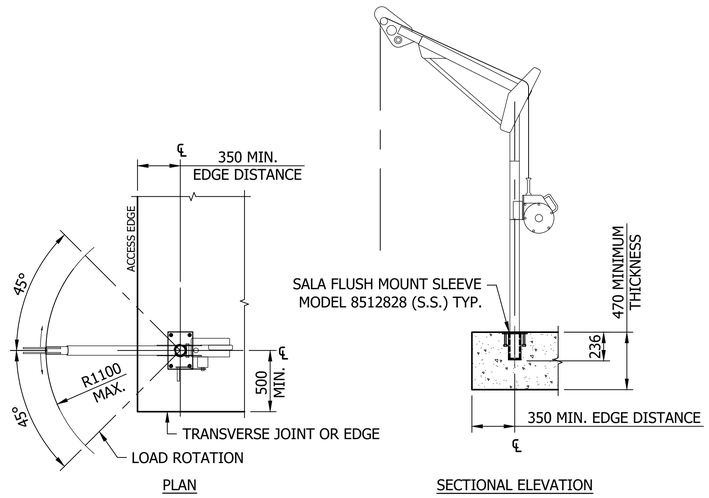
ISSUE B



PLAN SECTIONAL ELEVATION

TYPE A INSTALLATION - CORE MOUNT SLEEVE

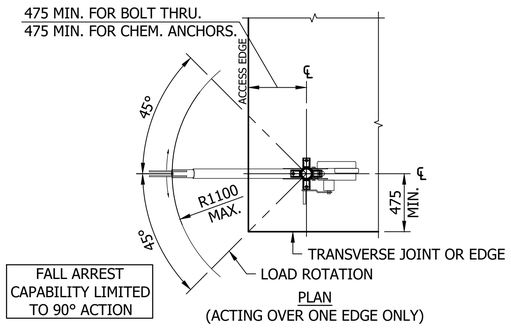
SCALE 1:20



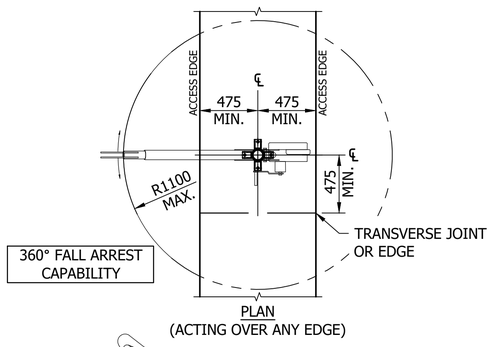
PLAN SECTIONAL ELEVATION

TYPE B INSTALLATION - FLUSH MOUNT SLEEVE

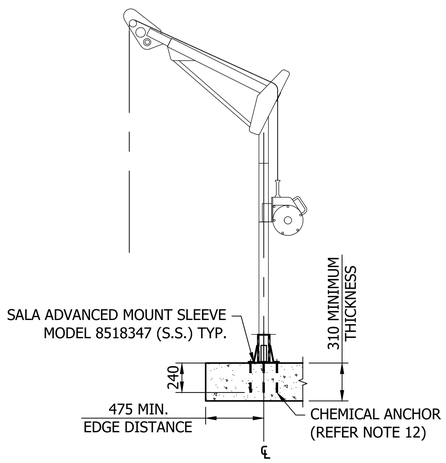
SCALE 1:20



PLAN
(ACTING OVER ONE EDGE ONLY)



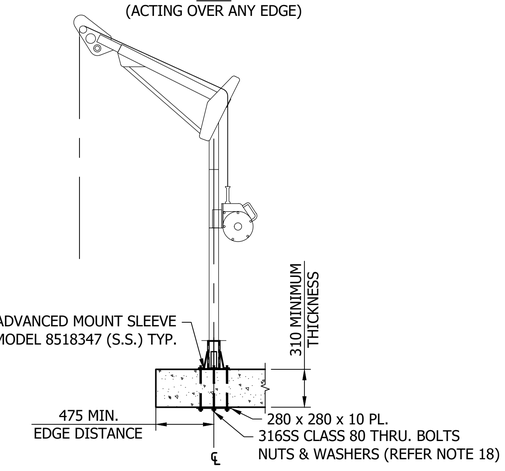
PLAN
(ACTING OVER ANY EDGE)



SECTIONAL ELEVATION

TYPE C INSTALLATION
ADVANCED FLOOR MOUNT SLEEVE
CHEMICAL ANCHOR FIXING

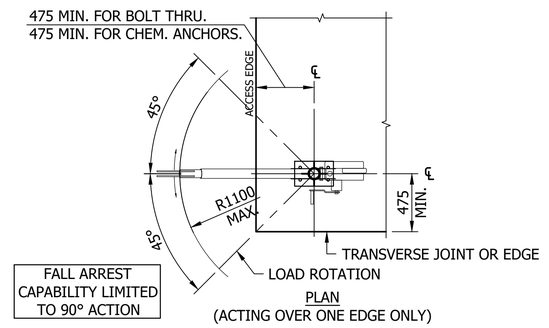
SCALE 1:25



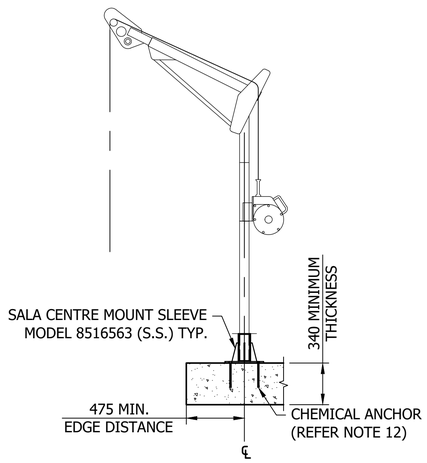
SECTIONAL ELEVATION

TYPE D INSTALLATION
ADVANCED FLOOR MOUNT SLEEVE
BOLTED THROUGH FIXING

SCALE 1:25



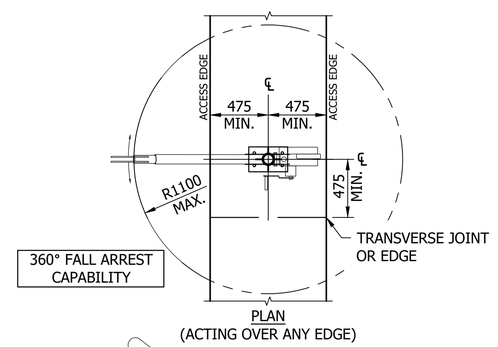
PLAN
(ACTING OVER ONE EDGE ONLY)



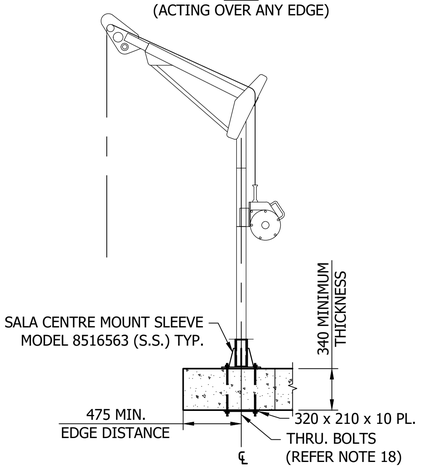
SECTIONAL ELEVATION

TYPE E INSTALLATION - CENTRE MOUNT SLEEVE
CHEMICAL ANCHOR FIXING

SCALE 1:25



PLAN
(ACTING OVER ANY EDGE)



SECTIONAL ELEVATION

TYPE F INSTALLATION - CENTRE MOUNT SLEEVE
BOLTED THROUGH FIXING

SCALE 1:25

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP	X			
WTP	X	SEW	X					
WPS	X	REC	X					

ASSET AREA APPLICABILITY

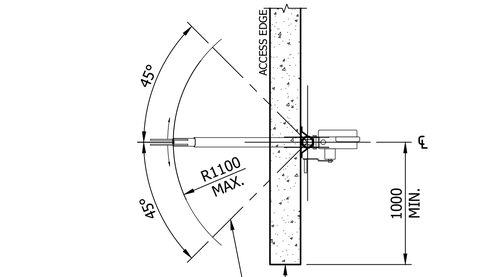
STANDARD DRAWING
PERMANENT DAVIT BASES (DBI SALA)
15 kN INSTALLATION INTO / ON UNREINFORCED CONCRETE
DETAILS SHEET 1 OF 2

DRAWING STATUS: Current

SD-8404-C

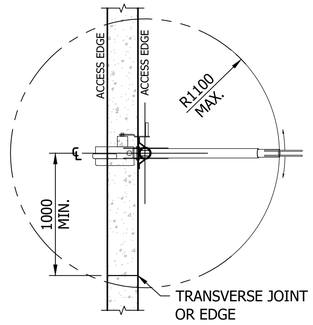
A1

ISSUE A



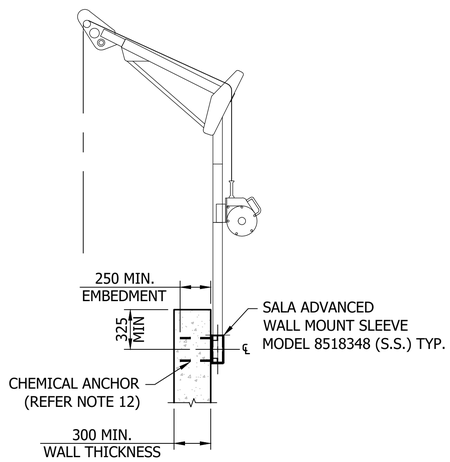
FALL ARREST CAPABILITY LIMITED TO 90° ACTION

PLAN
(ACTING OVER ONE EDGE ONLY)



360° FALL ARREST CAPABILITY

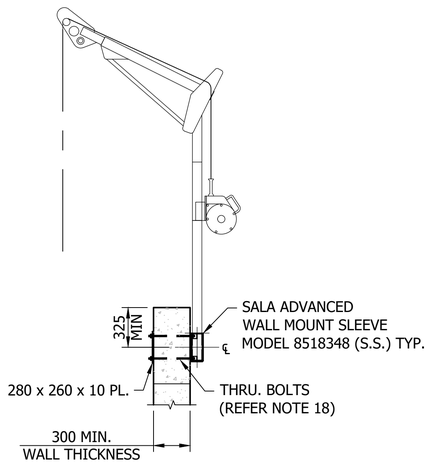
PLAN
(ACTING OVER ANY EDGE)



SECTIONAL ELEVATION

TYPE G INSTALLATION
ADVANCED WALL MOUNT SLEEVE
REAR FACE MOUNTING
CHEMICAL ANCHOR FIXING

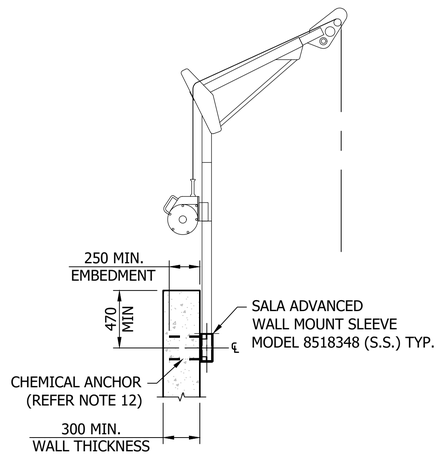
SCALE 1:25



SECTIONAL ELEVATION

TYPE H INSTALLATION
ADVANCED WALL MOUNT SLEEVE
REAR FACE MOUNTING
BOLTED THROUGH FIXING

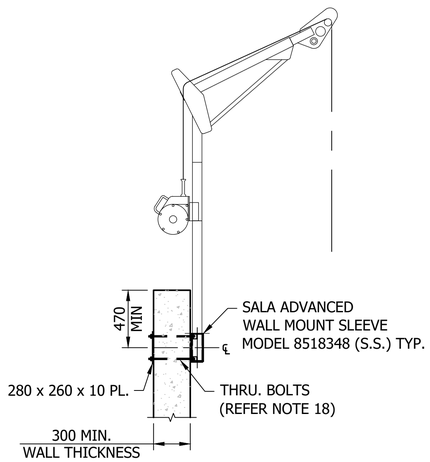
SCALE 1:25



SECTIONAL ELEVATION

TYPE J INSTALLATION
ADVANCED WALL MOUNT SLEEVE
FRONT FACE MOUNTING
CHEMICAL ANCHOR FIXING

SCALE 1:25



SECTIONAL ELEVATION

TYPE K INSTALLATION
ADVANCED WALL MOUNT SLEEVE
FRONT FACE MOUNTING
BOLTED THROUGH FIXING

SCALE 1:25

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X		
BWS	X	WAT	X	STP	X		
WTP	X	SEW	X				
WPS	X	REC	X				

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
PERMANENT DAVIT BASES (DBI SALA)
15 kN INSTALLATION INTO / ON UNREINFORCED CONCRETE
DETAILS SHEET 2 OF 2

DRAWING STATUS: Current

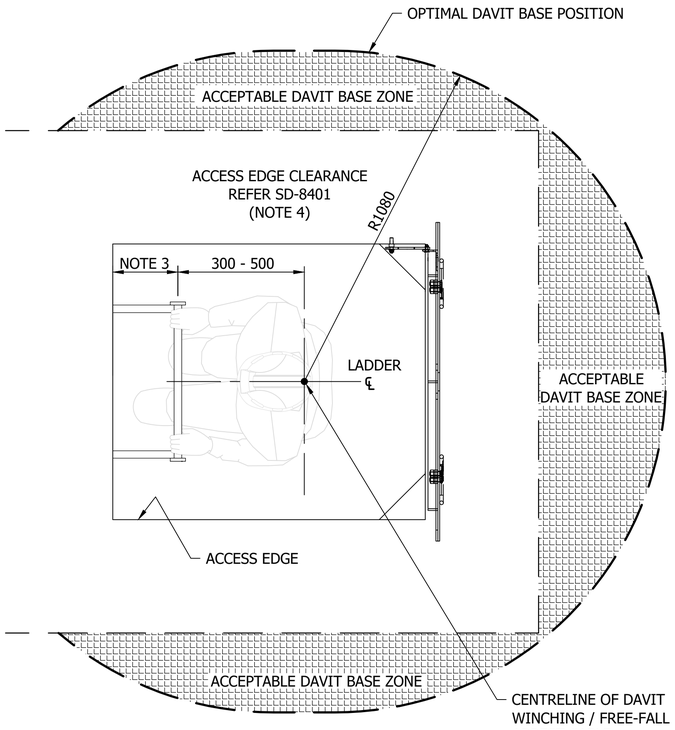
SD-8405-C

A1

ISSUE: A

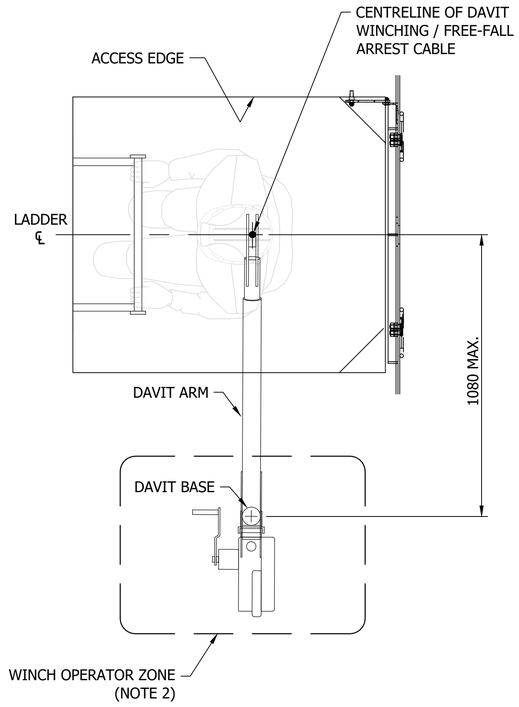
NOTES:

1. PERMANENT DAVIT BASE LOCATION SUITABILITY IS DEPENDENT UPON HATCH SIZE AND COVER DESIGN. THE ACCEPTABLE BASE ZONES SHOWN MAY NOT BE APPLICABLE FOR EVERY CIRCUMSTANCE.
2. ENSURE PERMANENT DAVIT BASE LOCATION ALSO TAKES INTO CONSIDERATION SUFFICIENT SPACE FOR THE WINCH OPERATOR. THIS SPACE MAY VARY DEPENDING UPON THE ACCESS ARRANGEMENTS.
3. RUNG SPACING FROM WALL SHALL BE 200 mm AS PER AS/NZS 1657 FOR ALL NEW VERTICAL LADDER INSTALLATIONS. LEGACY SITES MAY VARY.
4. THE EDGE CLEARANCES SHOWN ON SD-8401 ARE APPLICABLE FOR LEGACY (UNREINFORCED) CONCRETE STRUCTURES. EDGE CLEARANCES FOR NEW STRUCTURES SHALL BE PROJECT SPECIFIC.
5. REFER TO ICON WATER SPECIFICATION STD-SPE-G-008 FOR SPECIFIC DESIGNER (AND DESIGN) REQUIREMENTS FOR PERMANENT DAVIT BASE INSTALLATIONS. COMPLIANCE WITH STD-SPE-G-008 IS A MANDATORY REQUIREMENT.



PLAN

ACCEPTABLE PERMANENT DAVIT BASE INSTALLATION ZONES



PLAN

EXAMPLE DAVIT LOCATION

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	5/09/2018	S. Essery	K. Danenbergsons	C. Patrick

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

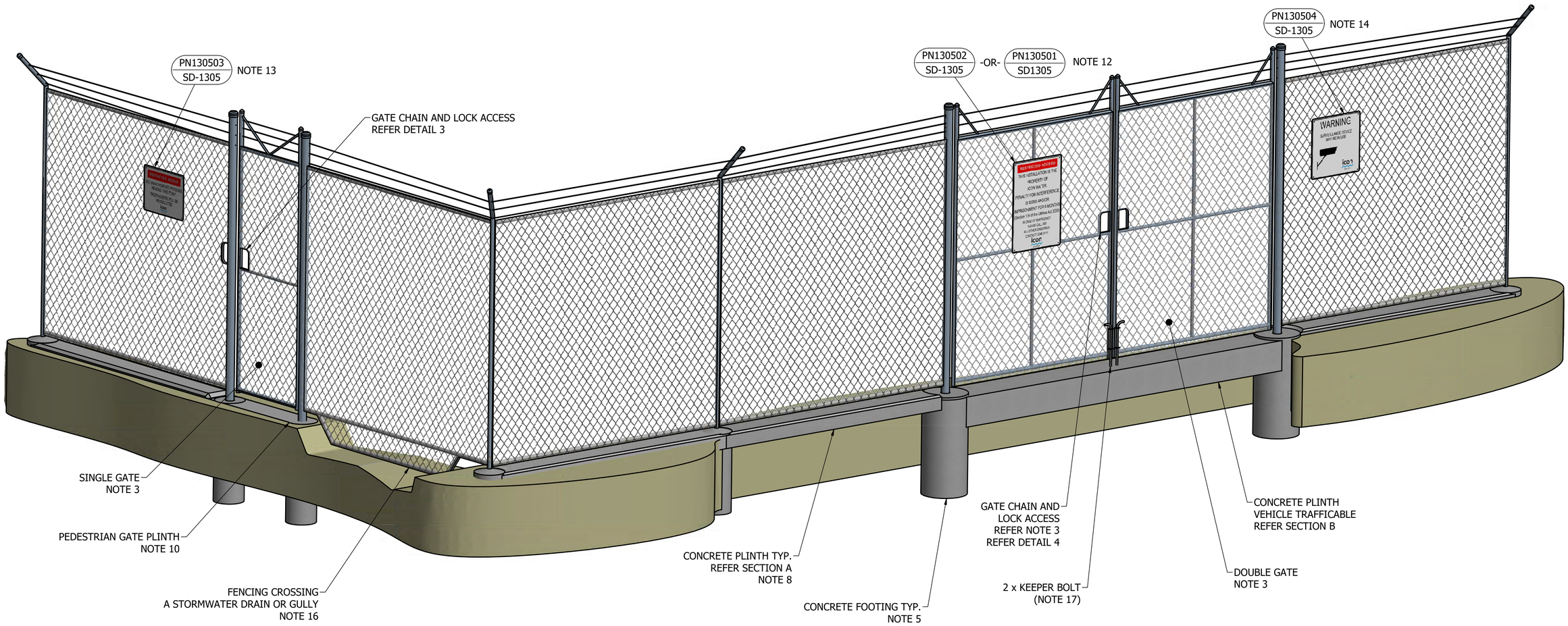
STANDARD DRAWING
PERMANENT DAVIT BASES (DBI SALA)
PREFERRED LOCATIONS AT HATCHES AND COVERS

DRAWING STATUS: Current

SD-8406-C

A1

ISSUE: A



ISOMETRIC VIEW

EXAMPLE FENCING INSTALLATION

SCALE: NTS

TABLE 1 - COMPONENT SELECTION GUIDE		
COMPONENT		DETAILS
FENCE HEIGHT		2400 mm NOMINAL PLUS 3 ROWS OF BARBED WIRE FOR A FINISHED HEIGHT OF 2850 mm NOMINAL
FENCE DESIGN		TYPE 2-T-B/BT, CRANKED EXTENSIONS, AS PER AS 1725 - APPENDIX K
POST TUBE		CLASS 1 MEDIUM AS PER AS/NZS 1163
TUBE AND FITTING COATING		HOT DIP GALVANISED AS PER AS 4792 AND AS 4534
TUBE AND FITTING FINISH		BLACK LOW SHEEN POWDER COATING FINISH AS PER AS/NZS 4506. DRY FILM THICKNESS 60 - 100 µm UNLESS OTHERWISE INDICATED
BARBED WIRE		MANUFACTURED TO AS 2423. HIGH TENSILE 1.6 mm DIA. WIRE. BARB SPACING ≤ 150 mm
CHAIN LINK	GRADE	HEAVY DUTY AS PER AS 2423
	PITCH	50 mm NOMINAL
	SELVEDGE	KNUCKLE - BARB (KB)
	COATING	BLACK PVC COMPLYING WITH AS 2423. BASE METALIC COATING NOT LESS THAN W02Z

NOTES:

1. FOR ALL SECTIONS AND DETAILS, REFER TO DRAWING SD-9001.

2. THE FENCING SYSTEM SHALL BE INSTALLED AS PER AS 1725 AND THE MANUFACTURER'S SPECIFICATIONS UNLESS NOTED OTHERWISE BY ICON WATER ON PROJECT SPECIFIC DRAWINGS.

3. GATE CONFIGURATION AND DESIGN SHALL BE AS PER AS 1725, SPECIFICALLY TABLE E1.

4. DAMAGE TO THE FINISHED COATING OF ANY MATERIALS SHALL BE REPAIRED IN ACCORDANCE WITH WSA 201, OR THE DAMAGED ITEM SHALL BE REPLACED AS APPROPRIATE.

5. CONCRETE POST FOOTINGS SHALL BE SIZED AS PER AS 1725, SPECIFICALLY TABLE B2 FOR GATE POSTS, AND TABLE B3 FOR END POSTS, INTERMEDIATE POSTS, AND CORNER POSTS, UNLESS SHOWN OTHERWISE ON PROJECT SPECIFIC DRAWINGS.

6. THE TOP OF ALL FOOTINGS SHALL BE GRADED TO ALLOW WATER TO RUN OFF, EXCEPT FOR GATE FOOTINGS WHERE APPLICABLE. IF THERE IS A POTENTIAL FOR POOLING, CONDUIT SHALL BE INSTALLED TO ALLOW DRAINAGE.

7. PLINTHS SHALL BE PROVIDED UNLESS NOTED OTHERWISE BY ICON WATER ON PROJECT SPECIFIC DRAWINGS.

8. THE HEIGHT OF THE PLINTH CAN VARY DEPENDING ON VARIATIONS IN THE NATURAL GROUND LEVEL. CONDUITS ARE TO BE INSTALLED IN THE PLINTH TO ALLOW DRAINAGE IF THE PLINTH HEIGHT IS GREATER THAN 50 mm ABOVE FINISHED GROUND LEVEL IF DEEMED NECESSARY BY ICON WATER.

9. INSTALL EXPANSION JOINTS AS REQUIRED, NOMINALLY ONE PER POST, 150 mm - 200 mm FROM THE POST, FULL DEPTH JOINTEX OR EQUIVALENT.

10. PLINTHS UNDER PEDESTRIAN GATES ARE TO BE STEPPED DOWN AND FLUSH WITH GROUND LEVEL TO AVOID TRIP HAZARDS.

11. FOR SIGN DETAILS, REFER TO DRAWING SD-1305.

12. FOR GOOGONG CATCHMENT SITES, MAIN GATE SIGN TO BE PN130501. FOR ALL OTHER SITES, MAIN GATE SIGN TO BE PN130502.

13. SIGN PN130503 (RESTRICTED ACCES) TO BE PLACED AT NO GREATER THAN 25 m INTERVALS AND MUST BE VISIBLE FROM ALL PERIMETER SIDES.

14. SIGN PN130504 (CCTV) WHEN REQUIRED, TO BE PLACED AT NO GREATER THAN 25 m INTERVALS, ALTERNATING WITH SIGN PN130503.

15. SIGNS SHALL BE ATTACHED WITH STAINLESS OR GALVANISED TIE WIRE OR STAINLESS STEEL CABLE TIES, AND SHALL BE AFFIXED TO THE OUTSIDE OF THE FENCE.

16. WHERE FENCING CROSSES A STORMWATER DRAIN, REFER TO DETAIL 1. WHERE FENCING CROSSES A GULLY OR DEPRESSION, REFER TO DETAIL 2.

17. FOR KEEPER BOLT AND KEEPER BOLT FOOTING DETAILS, REFER TO AS 1725, SPECIFICALLY APPENDIX K.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

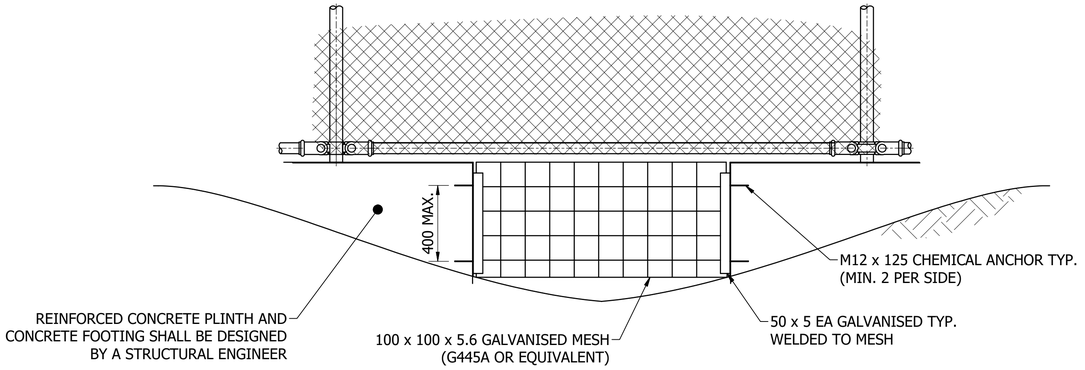
STANDARD DRAWING
SITE SECURITY AND PROTECTION
CHAINLINK FENCE
GENERAL ARRANGEMENT AND NOTES

DRAWING STATUS: Current

SD-9000-D

A1

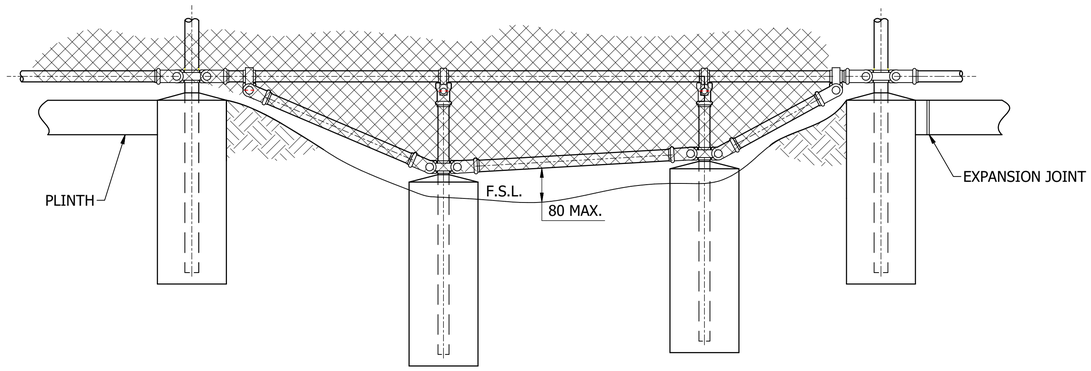
ISSUE: A



FRONT ELEVATION

DETAIL 1 - STORMWATER GRILL DETAILS

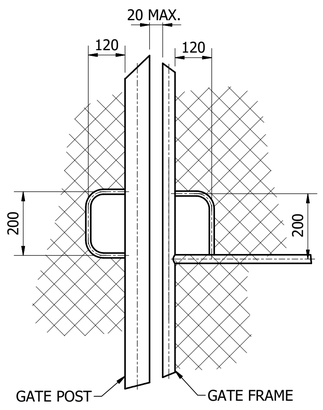
SCALE : NTS



FRONT ELEVATION

DETAIL 2 - CONCEPT DESIGN FOR FENCING CROSSING A GULLY

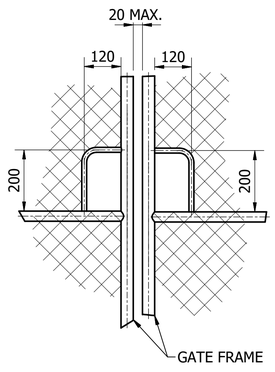
SCALE : NTS



FRONT ELEVATION

DETAIL 3 - GATE CHAIN AND LOCK ACCESS

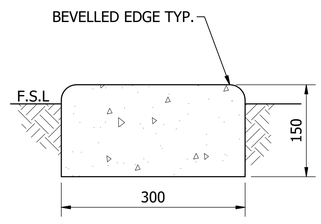
SCALE: 1 : 10



FRONT ELEVATION

DETAIL 4 - DOUBLE GATE CHAIN AND LOCK ACCESS

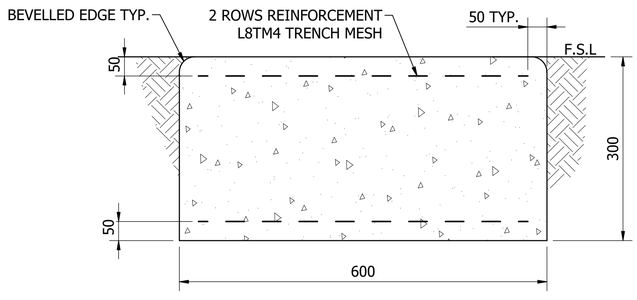
SCALE: 1 : 10



SECTIONAL ELEVATION

SECTION A - TYPICAL CONCRETE PLINTH

SCALE : 1 : 5



SECTIONAL ELEVATION

SECTION B - TYPICAL CONCRETE PLINTH UNDER VEHICLE TRAFFICABLE GATES

SCALE : 1 : 5

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

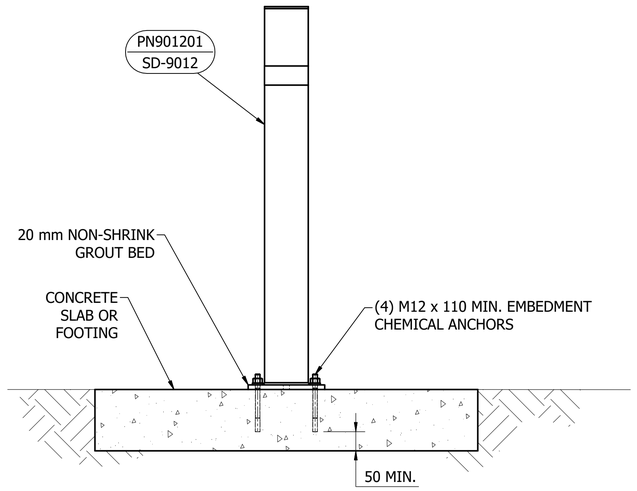
STANDARD DRAWING
SITE SECURITY AND PROTECTION
CHAINLINK FENCE
DETAILS

DRAWING STATUS: Current

SD-9001-D

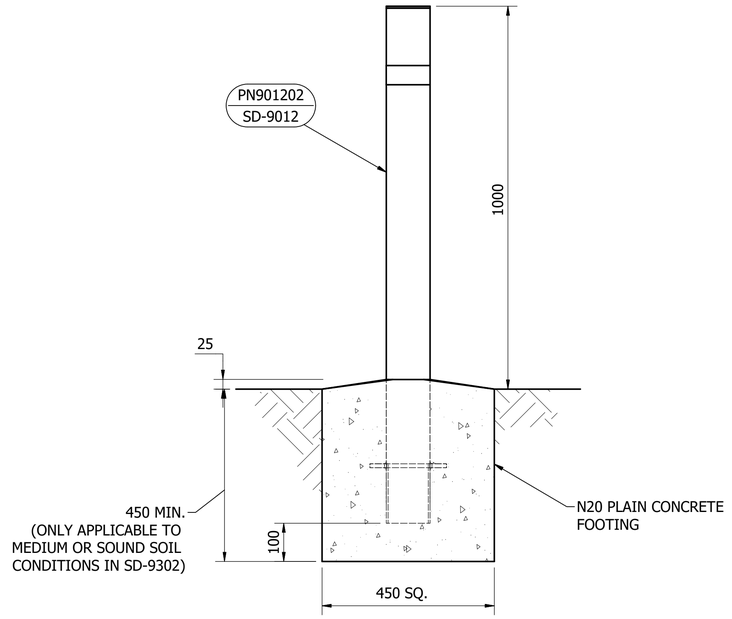
A1

ISSUE: A



DETAIL A

STANDARD DUTY BOLLARD
BOLT-IN TYPE

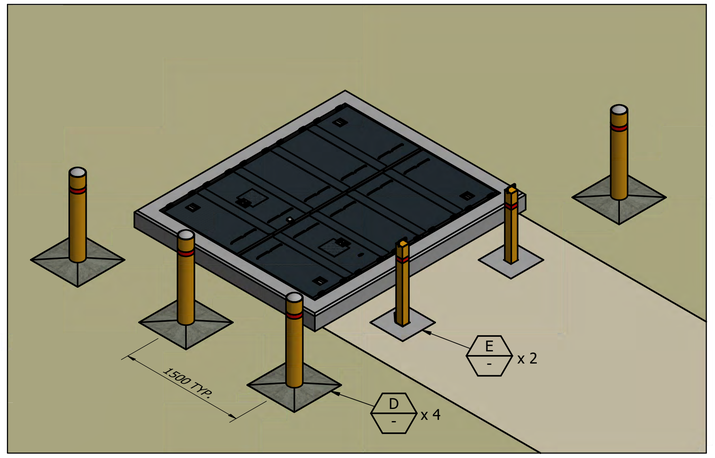


DETAIL B

STANDARD DUTY BOLLARD
IN-GROUND TYPE

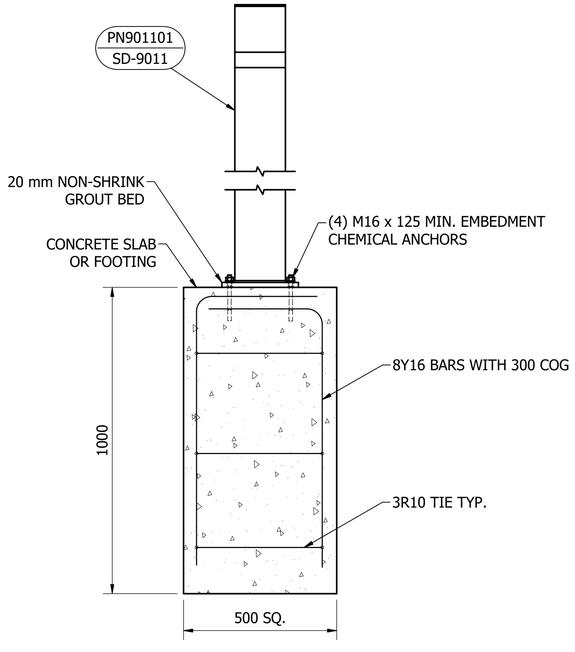
NOTES:

1. HEAVY DUTY BOLLARDS ARE TO BE USED TO PREVENT VEHICLE ACCESS. LIGHT OR STANDARD DUTY BOLLARDS WILL NOT NECESSARILY PREVENT VEHICLES ACCESS BUT WILL ACT AS A DETERENT.



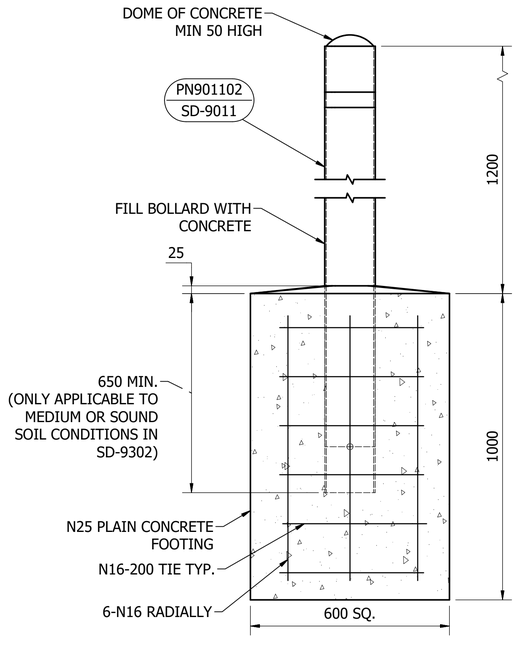
ISOMETRIC VIEW

EXAMPLE APPLICATION
BURIED MAINTENANCE STRUCTURE WITH NON-TRAFFICABLE COVERS BEING PROTECTED BY HEAVY DUTY (IN-GROUND TYPE) AND REMOVABLE BOLLARDS



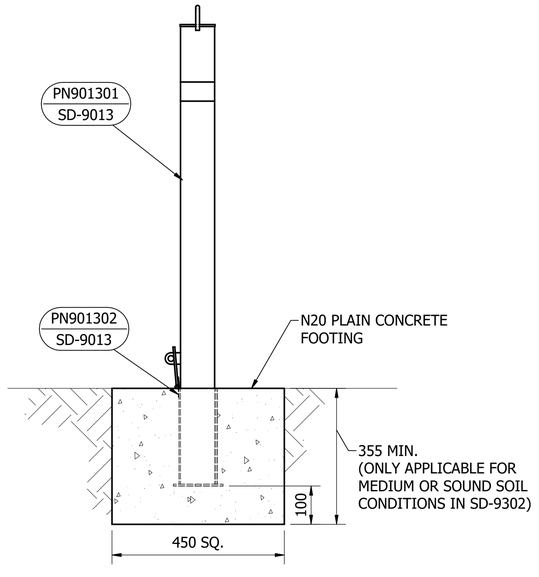
DETAIL C

HEAVY DUTY BOLLARD
BOLT-IN TYPE



DETAIL D

HEAVY DUTY BOLLARD
IN-GROUND TYPE



DETAIL E

REMOVABLE BOLLARD

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	S.Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

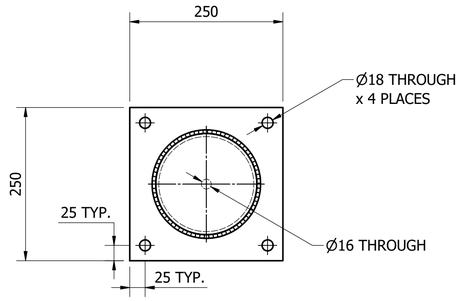
STANDARD DRAWING
SITE SECURITY AND PROTECTION
BOLLARDS
TYPICAL INSTALLATION

DRAWING STATUS: Current

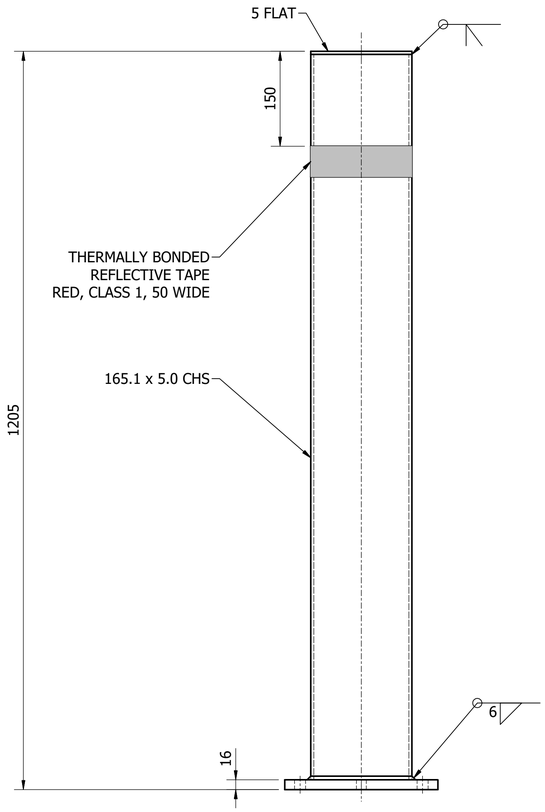
SD-9010-D

A1

ISSUE: A



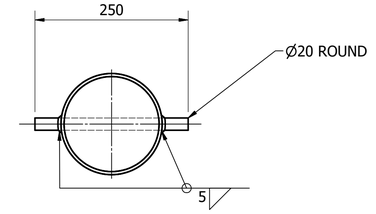
PLAN



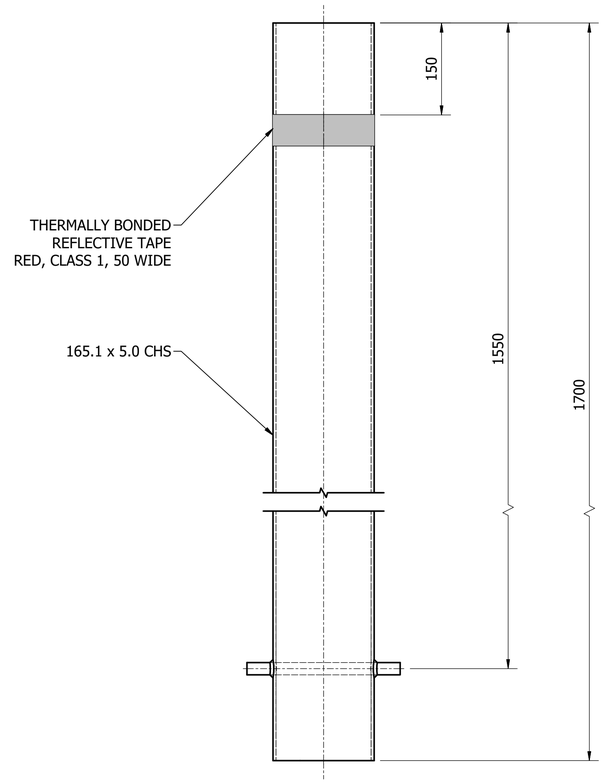
ELEVATION

HEAVY DUTY BOLLARD - BOLT-IN TYPE

MATERIAL: CARBON STEEL
COATING: "GAL" & "POW" TO WSA 201
FINISH COLOUR: "Y14" GOLDEN YELLOW
MASS: 25 kg



PLAN



ELEVATION

HEAVY DUTY BOLLARD - IN-GROUND TYPE

MATERIAL: CARBON STEEL
COATING: "GAL" & "POW" TO WSA 201
FINISH COLOUR: "Y14" GOLDEN YELLOW
MASS: 34 kg

NOTES:

1. REFER TO DRAWING SD-9010 FOR TYPICAL INSTALLATION DETAILS.

2. REFER TO DRAWING SD-9100 FOR STEELWORK AND GENERAL FABRICATION NOTES.

3. THE HEAVY DUTY BOLLARDS INCLUDED IN THE ICON WATER APPROVED PRODUCTS LIST MAY BE SUBSTITUTED IN LIEU OF THE FABRICATED BOLLARD TYPES SHOWN ON THIS DRAWING.

4. HOT DIP GALVANISING TO OCCUR AFTER FABRICATION.

ITEM	AMDT.
PN901101	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

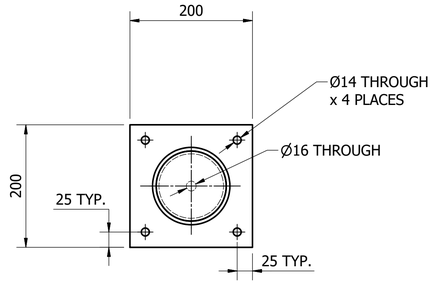
STANDARD DRAWING
SITE SECURITY AND PROTECTION
BOLLARDS
HEAVY DUTY BOLLARDS
GALVANISED MILD STEEL

ITEM	AMDT.
PN901102	

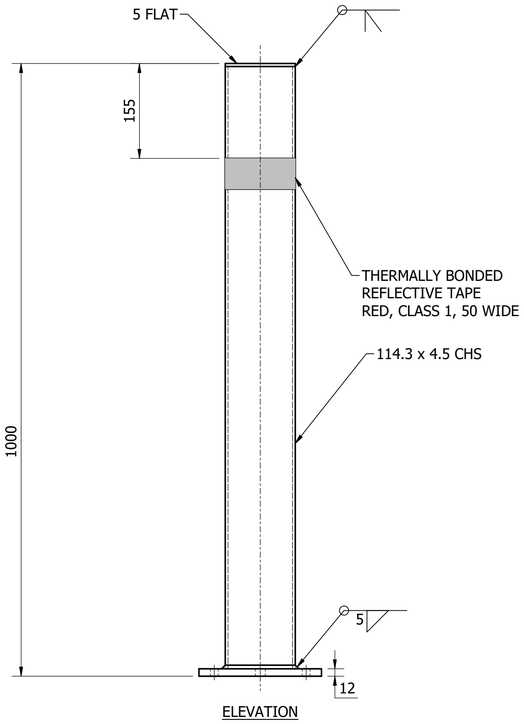
DRAWING STATUS: Current

SD-9011-D

A1 | | ISSUE A



PLAN



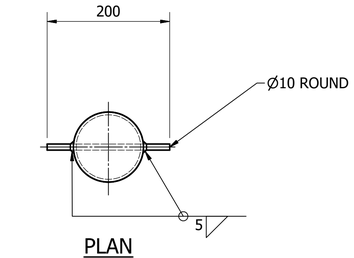
ELEVATION

STANDARD DUTY BOLLARD - BOLT-IN TYPE

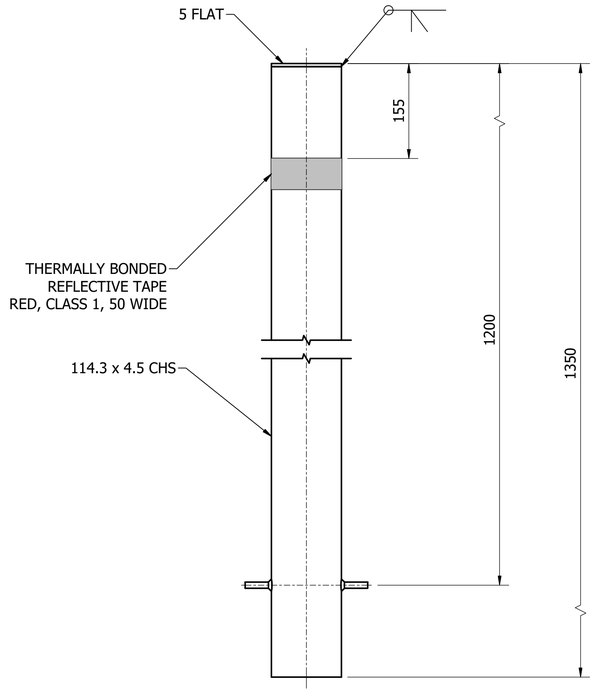
MATERIAL: CARBON STEEL
COATING: "GAL" & "POW" TO WSA 201
FINISH COLOUR: "Y14" GOLDEN YELLOW
MASS: 14 kg

NOTES:

1. REFER TO DRAWING SD-9010 FOR TYPICAL INSTALLATION DETAILS.
2. REFER TO DRAWING SD-9100 FOR STEELWORK AND GENERAL FABRICATION NOTES.
3. THE STANDARD DUTY BOLLARDS INCLUDED IN THE ICON WATER APPROVED PRODUCTS LIST MAY BE SUBSTITUTED IN LIEU OF THE FABRICATED BOLLARD TYPES SHOWN ON THIS DRAWING.
4. HOT DIP GALVANISING TO OCCUR AFTER FABRICATION.



PLAN



ELEVATION

STANDARD DUTY BOLLARD - IN-GROUND TYPE

MATERIAL: CARBON STEEL
COATING: "GAL" & "POW" TO WSA 201
FINISH COLOUR: "Y14" GOLDEN YELLOW
MASS: 17 kg

ITEM	AMDT.
PN901201	

ITEM	AMDT.
PN901202	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

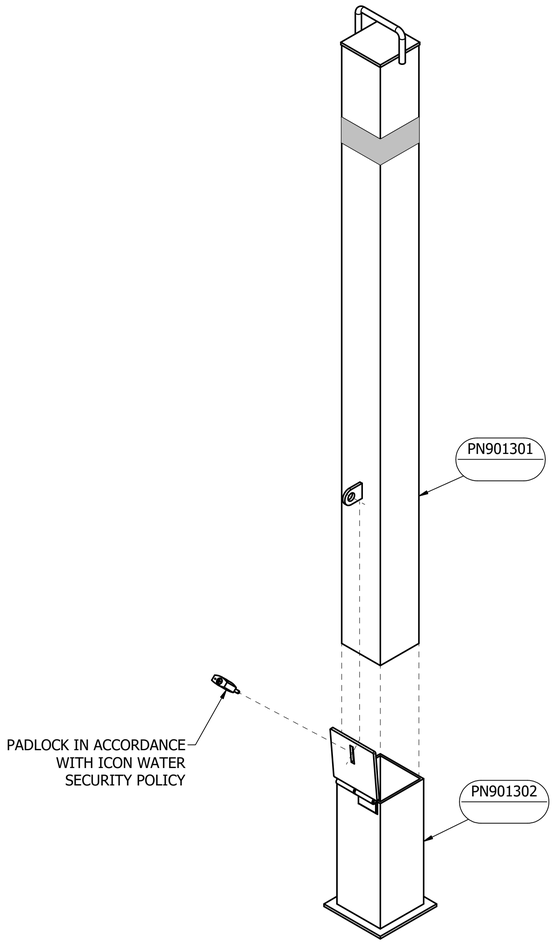
STANDARD DRAWING
SITE SECURITY AND PROTECTION
BOLLARDS
STANDARD DUTY BOLLARDS
GALVANISED MILD STEEL

DRAWING STATUS: Current

SD-9012-D

A1

ISSUE: A

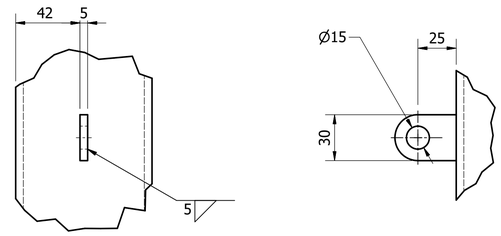


EXPLODED ASSEMBLY

REMOVABLE BOLLARD

NOTES:

1. REFER TO DRAWING SD-9010 FOR TYPICAL INSTALLATION DETAILS.
2. REFER TO DRAWING SD-9100 FOR STEELWORK & GENERAL FABRICATION NOTES.
3. THE REMOVABLE BOLLARDS INCLUDED IN THE ICON WATER APPROVED PRODUCTS LIST MAY BE SUBSTITUTED IN LIEU OF THE FABRICATED BOLLARD SHOWN ON THIS DRAWING.
4. HOP DIP GALVANISING TO OCCUR AFTER FABRICATION.



DETAIL A

REMOVABLE BOLLARD LOCKING LUG

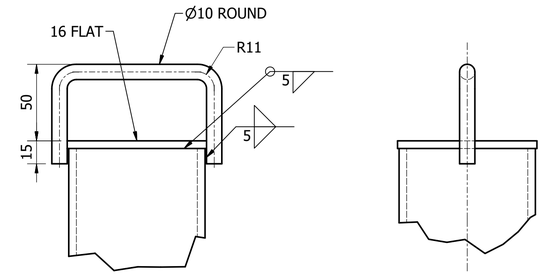
PLAN VIEW

FRONT VIEW SIDE VIEW

REMOVABLE BOLLARD - REMOVABLE SECTION

MATERIAL: CARBON STEEL
COATING: "GAL" & "POW" TO WSA 201
FINISH COLOUR: "Y14" GOLDEN YELLOW
MASS: 15 kg

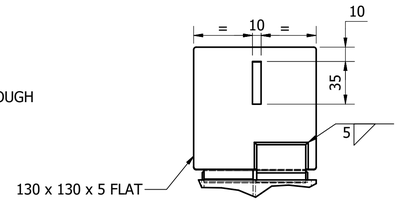
ITEM	AMDT.
PN901301	



DETAIL B

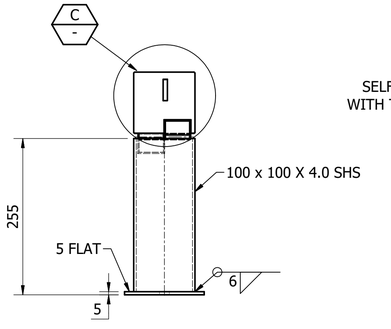
REMOVABLE BOLLARD HANDLE & TOP PLATE

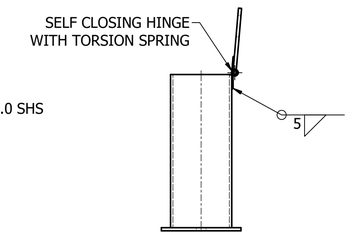
PLAN



DETAIL C

LOCKING PLATE





FRONT VIEW SIDE VIEW

REMOVABLE BOLLARD - BASE SECTION

MATERIAL: CARBON STEEL
COATING: "GAL" & "POW" TO WSA 201
FINISH COLOUR: "Y14" GOLDEN YELLOW
MASS: 5 kg

ITEM	AMDT.
PN901302	

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	K. Patel	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW			
WPS	X	REC	X		

ASSET AREA APPLICABILITY

icon WATER

STANDARD DRAWING
SITE SECURITY AND PROTECTION
BOLLARDS
REMOVABLE BOLLARDS
GALVANISED MILD STEEL

DRAWING STATUS: Current

SD-9013-D

A1

ISSUE: A

STEELWORK NOTES

GENERAL

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL ICON WATER "SD SERIES" DRAWINGS THAT RELATE TO THE SUPPLY AND/OR FABRICATION AND/OR INSTALLATION OF STEELWORK.
2. UNLESS NOTED OTHERWISE, ALL:
   - DIMENSIONS ARE STATED IN MILLIMETRES.
   - REDUCED LEVELS ARE STATED IN METRES REFERENCING AUSTRALIAN HEIGHT DATUM (AHD).
   - COORDINATES ARE STATED IN METRES REFERENCING THE ACT STANDARD GRID.
4. SETTING-OUT DIMENSIONS AND SIZES OF STRUCTURAL MEMBERS SHALL NOT BE OBTAINED BY SCALING DRAWINGS. SETTING-OUT DIMENSIONS AND ALL RELEVANT SITE DIMENSIONS SHALL BE CHECKED BY THE CONSTRUCTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
5. ALL MATERIALS, FABRICATION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH AS/NZS 1554, AS 4100, ICON WATER SPECIFICATION STD-SPE-S-001 AND THE ICON WATER APPROVED PRODUCTS LIST.
6. SHOP DRAWINGS SHALL BE PREPARED BY THE CONSTRUCTOR FOR ALL STRUCTURAL STEELWORK AND SHALL BE SUBMITTED TO THE ICON WATER REPRESENTATIVE AT LEAST TEN (10) WORKING DAYS PRIOR TO FABRICATION FOR A GENERAL REVIEW. SUCH A GENERAL REVIEW DOES NOT INCLUDE CHECKING OF DIMENSIONS.
7. ALL SHOP DRAWINGS SHALL SPECIFICALLY STATE:
   - THE GRADE OF SANDBLASTING
   - PAINT BRAND, TYPE AND FILM THICKNESS
   - WELD CATEGORY
8. ALL CONNECTION AND STIFFENER PLATES SHALL BE 10 mm THICK UNLESS NOTED OTHERWISE.
9. THE CONSTRUCTOR SHALL PROVIDE ALL CLEATS AND DRILL ALL HOLES NECESSARY FOR FIXING STEEL ELEMENTS, WHETHER OR NOT THESE ARE DETAILED ON THE DRAWINGS.
10. ALL SURFACES SHALL BE FREE OF BURRS AND SHARP EDGES. ALL CUT-EDGES SHALL BE ROUNDED TO A 2 mm RADIUS.
11. DURING TRANSPORT, OFF-LOADING, STORAGE AND ERECTION, ALL COATINGS SHALL BE PROTECTED FROM DAMAGE AND DETERIORATION.
12. DURING CONSTRUCTION, ALL STRUCTURES SHALL BE MAINTAINED IN A SAFE AND STABLE CONDITION AND NO PART SHALL BE OVER-STRESSED. TEMPORARY BRACING SHALL BE PROVIDED BY THE CONSTRUCTOR AS REQUIRED TO KEEP THE WORKS STABLE AT ALL TIMES. THE CONSTRUCTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ANY TEMPORARY WORKS.
13. THE FABRICATION AND ERECTION OF ALL STRUCTURAL STEELWORK SHALL BE SUPERVISED BY AN ENGINEER EXPERIENCED IN SUCH SUPERVISION TO ENSURE THAT ALL REQUIREMENTS OF THE DESIGN ARE MET.

WELDING

14. UNLESS NOTED OTHERWISE, ALL WELDS SHALL BE CATEGORY SP TO AS/NZS 1554 WITH 100% OF ALL WELDS REQUIRING A VISUAL INSPECTION AND 10% OF ALL WELDS REQUIRING ULTRASONIC TESTING.
15. ALL FILLET WELDS SHALL BE 6 mm CONTINUOUS FILLET WELDS UNLESS NOTED OTHERWISE.
16. ALL BUTT WELDS SHALL BE COMPLETE PENETRATION BUTT WELDS.
17. WELDING ELECTRODES SHALL BE E48XX/W50X TO AS/NZS 1553 UNLESS NOTED OTHERWISE.
18. ALL STAINLESS STEEL WELDS SHALL BE PICKLED AND PASSIVATED IN ACCORDANCE WITH ASTM A380 AFTER FABRICATION AND PRIOR TO INSTALLATION.

CORROSION PROTECTION AND COATINGS

19. WHERE CARBON STEEL ITEMS HAVE BEEN INDICATED AS "GALVANISED", "GALV", "HDG" OR HOT DIP GALVANISED", SUCH ITEMS SHALL BE HOT DIP GALVANISED IN ACCORDANCE WITH AS/NZS 4680 AFTER FABRICATION. THE USE OF "COLD GALVANISING" IS PROHIBITED UNLESS WRITTEN APPROVAL IS PROVIDED BY THE ICON WATER REPRESENTATIVE.
20. HOT DIP GALVANISED STRUCTURES SHALL BE FREE OF EXCESSIVE BUILD-UP OF GALVANISING AND SHALL BE FREE OF SHARP FORMATIONS. THE GALVANISING THICKNESS SHALL BE UNIFORM. STEELWORK TO BE GALVANISED SHALL HAVE DRAIN HOLES AND BREATHER HOLES TO ALLOW ACCESS AND EGRESS OF MOLTEN ZINC ALLOY AND AIR. ALL HOLES SHALL BE HERMETICALLY SEALED BY RUBBER STOPPER.
21. ALL STEELWORK COATINGS, INCLUDING REPAIR OR TOUCH-UP COATINGS, SHALL BE IN ACCORDANCE WITH WSA 201 AS AMENDED BY ICON WATER SPECIFICATION STD-SPE-G-005.
22. ALL STAINLESS STEEL THREADED FASTENERS SHALL BE COATED WITH AN APPROVED NICKEL-BASED ANTI-SIEZE COMPOUND PRIOR TO ASSEMBLY (TO PREVENT GALLING). ALTERNATIVELY, MOLYBDENUM COATED BOLTS AND NUTS MAY BE USED.
23. STAINLESS STEEL ITEM FINISH SHALL BE SUCH THAT FORMS GRAIN MARKS IN THE DIRECTION OF FALL/SLOPE.
24. INSULATING MATERIAL SHALL BE PLACED BETWEEN ALL DISSIMILAR METALS (INCLUDING BOLTED JOINTS). FOR EXAMPLE, NEOPRENE RUBBER STRIPS, NON-FIBRE TYPE INSULATING WASHERS, SLEEVES AND FERRULES, "DENSO" TAPE etc.

BOLTING, BASE PLATES AND CHEMICAL ANCHORS

25. GRADE 316 STAINLESS STEEL BOLTS, STUDS AND ANCHORS SHALL BE USED FOR ENVIRONMENTS DEEMED TO BE "HIGH", "IMMERSION" OR "EXTREME" IN ACCORDANCE WITH TABLE 2.1 OF WSA 201. OTHERWISE, HOT-DIPPED GALVANISED BOLTS, STUDS AND ANCHORS MAY BE USED.
26. BLACK BOLTS SHALL ONLY BE INSTALLED WHEN REPLACING EXISTING LIKE-FOR-LIKE ITEMS. THE EXISTING CORROSION PREVENTION SYSTEM SHALL BE MADE GOOD.
27. ZINC-COATED BOLTS AND NUTS SHALL NOT BE USED FOR STRUCTURAL STEELWORK AND SHALL ONLY BE LIMITED TO INDOOR ENVIRONMENTS FOR APPLICATIONS DEEMED TO BE NON-STRUCTURAL.
28. ALL BOLTS, WASHERS AND NUTS SHALL BE ISO METRIC COARSE PITCH SERIES STRUCTURAL GRADE: A4-70 FOR 316 STAINLESS STEEL; PROPERTY CLASS 8.8 (WITH CLASS 8 NUTS) FOR HOT DIP GALVANISED STEEL (TO AS/NZS 1214 AND AS/NZS 1252) UNLESS OTHEWISE NOTED.
29. A HARDENED AND TEMPERED STRUCTURAL WASHER (TO AS/NZS 1252) SHALL BE PROVIDED UNDER EVERY NUT. A WASHER SHALL ALSO BE PROVIDED UNDER EACH BOLT HEAD WHEN A PROTECTIVE SURFACE COATING (OTHER THAN GALVANISING) HAS BEEN PROVIDED ON THE BOLTED MEMBER OR BOLTED COMPONENT.
30. THE BOLTING CATEGORY SHALL BE 8.8/S (SNUG TIGHT) AS PER AS 4100 UNLESS NOTED OTHERWISE.
31. EACH CONNECTION SHALL HAVE A MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
32. COMMERCIAL GRADE BOLTS AND NUTS CONFORMING TO AS 1110, AS 1111 AND AS 1112 SHALL NOT BE USED FOR STRUCTURAL STEEL BOLTING.
33. GRADE 8.8 BOLTS SHALL NOT BE WELDED UNDER ANY CIRCUMSTANCES.
34. CLEARANCE HOLES FOR STRUCTURAL BOLTING PURPOSES SHALL HAVE A 2 mm DIAMETRAL CLEARANCE WITH THE EXCEPTION OF HOLDING DOWN AND ANCHOR BOLTS WHICH SHALL HAVE A 4 mm DIAMETRAL CLEARANCE. BOLTS LARGER THAN 24 mm TO HAVE 3 mm DIAMETRAL CLEARANCE.
35. HOLD DOWN ANCHOR BOLT HOLES MUST BE LESS THAN 6 mm GREATER THAN BOLT SIZE. 4 mm PLATE WASHER IS TO BE INSTALLED UNDER ALL ANCHOR BOLTS.
36. UNLESS NOTED OTHERWISE (e.g. DAVIT BASE HOLD DOWN BOLTS) ALL BOLTS SHALL EXTEND A MINIMUM OF TWO THREADS PAST THE NUT BUT NO MORE THAN FIVE FULL THREADS PAST THE NUT.
37. ALL BASE PLATES SHALL HAVE A MINIMUM OF 20 mm OF HIGH STRENGTH NON-SHRINK GROUT PROVIDED BETWEEN THE UNDERSIDE OF THE BASE PLATE AND THE CONCRETE. THE GROUT SHALL BE INSTALLED SO THAT AIR-POCKETS AND VOIDS DO NOT OCCUR.
38. ALL STRUCTURAL BOLTS, NUTS AND WASHERS MUST BE ACCOMPANIED WITH COMPLIANCE CERTIFICATES TO SHOW THAT THEY ARE IN ACCORDANCE WITH AS/NZS 1252 AND AS/NZS 4291. SUCH CERTIFICATES SHALL BE ISSUED BY A NATA CERTIFIED TESTING AGENCY.
39. IF NOT SPECIFICALLY STATED ON THE DRAWINGS, REFER TO THE ICON WATER APPROVED PRODUCTS LIST FOR ACCEPTABLE CHEMICAL ANCHOR MAKES AND PART NUMBERS. ALL CHEMICAL ANCHORS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. WELDING AND HOT WORK ON INSTALLED CHEMICAL ANCHORS ARE NOT ALLOWED.

PLATFORMS, WALKWAYS, STAIRWAYS, LADDERS AND HANDRAILS

40. ALL STEELWORK RELATING TO FIXED PLATFORMS, WALKWAYS, STAIRWAYS AND LADDERS SHALL BE IN ACCORDANCE WITH AS 1657 AS AMENDED/SUPPLEMENTED BY ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009.
41. ALL HANDRAILS SHALL BE FULLY WELDED "MONOWILLS" TUBULAR HANDRAIL AND STANCHION SYSTEMS OR APPROVED EQUIVALENT. THE INSTALLATION OF ON-SITE CLAMP OR BOLT-TOGETHER HANDRAIL SYSTEMS IS PROHIBITED UNLESS WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER REPRESENTATIVE OR SUCH SYSTEMS ARE CURRENTLY LISTED IN THE ICON WATER APPROVED PRODUCTS LIST.
42. UNLESS NOTED OTHERWISE, STRUCTURAL STEEL GRATING SHALL BE WEBFORGE PATTERN C, BANDED ALL-ROUND.

APPROVED STRUCTURAL STEEL PRODUCTS

43. UNLESS NOTED OTHERWISE, STRUCTURAL STEEL PLATE, BAR, ROD AND SECTIONS SHALL BE IN ACCORDANCE WITH THE FOLLOWING AUSTRALIAN STANDARDS:
   - PLATE: GRADE 250 TO AS 3678
   - HOT ROLLED SECTIONS: 300 PLUS TO AS 3679
   - FLAT BARS AND RODS: GRADE 300 TO AS 3679
44. STAINLESS STEEL GRADE 316L TO ASTM: A480/M, A167, A176 ABD A666 PLATE, HOT ROLLED SECTIONS, FLAT BAR AND ROD SHALL BE USED FOR ENVIRONMENTS DEEMED TO BE "HIGH", "IMMERSION" OR "EXTREME" IN ACCORDANCE WITH TABLE 2.1 OF WSA 201. DESIGN AND CONSTRUCTION SHALL BE IN CONFORMANCE WITH AS/NZS 4673 AND EUROCODE3: EN1993-1-4.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

STANDARD DRAWING
STEELWORK
NOTES

DRAWING STATUS: Current

SD-9100-D

A1

ISSUE: A

ALUMINIUM WORK NOTES

GENERAL

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL ICON WATER "SD SERIES" DRAWINGS THAT RELATE TO THE SUPPLY AND/OR FABRICATION AND/OR INSTALLATION OF ALUMINIUM WORK.
2. UNLESS NOTED OTHERWISE, ALL DIMENSIONS ARE STATED IN MILLIMETRES.
3. MEMBER OR COMPONENT SIZES SHALL NOT BE OBTAINED BY SCALING DRAWINGS. ALL RELEVANT DIMENSIONS SHALL BE CHECKED BY THE FABRICATOR AND/OR CONSTRUCTOR PRIOR TO THE COMMENCEMENT OF FABRICATION AND CONSTRUCTION ACTIVITIES.
4. ALL MATERIALS, FABRICATION AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH AS/NZS 1665, ICON WATER SPECIFICATION STD-SPE-S-001, THE ICON WATER APPROVED PRODUCTS LIST AND EITHER AS/NZS 1664.1 OR AS/NZS 1664.2.
5. ALL SURFACES SHALL BE FREE OF BURRS AND SHARP EDGES. ALL CUT-EDGES SHALL BE ROUNDED TO A 2 mm RADIUS.
6. WHEN TREADPLATE (AKA "CHEQUERPLATE") IS SPECIFIED FOR ACCESS HATCHES, ALL TREADS UNDER THE HATCH COVER HINGES, FIXING PLATES AND THE LIKE SHALL BE GROUND FLUSH. INSULATING MATERIAL SHALL BE INSTALLED BETWEEN ANY ALUMINIUM AND STEEL COMPONENT.

WELDING

7. ALL WELDS SHALL BE IN ACCORDANCE WITH AS/NZS 1665.
8. ALL FILLET WELDS SHALL BE 6 mm CONTINUOUS FILLET WELDS UNLESS NOTED OTHERWISE.
9. ALL BUTT WELDS SHALL BE COMPLETE PENETRATION BUTT WELDS.

CORROSION PROTECTION AND COATINGS

10. ALUMINIUM COMPONENTS AND FABRICATIONS SHALL NOT BE PAINTED UNLESS NOTED OTHERWISE ON THE PROJECT SPECIFIC DESIGN DRAWINGS.
11. INSULATING MATERIAL SHALL BE PLACED BETWEEN ALL DISSIMILAR METALS (INCLUDING BOLTED JOINTS). FOR EXAMPLE, NEOPRENE RUBBER STRIPS, NON-FIBRE TYPE INSULATING WASHERS, SLEEVES AND FERRULES, "DENSO" TAPE etc.

BOLTING

12. GRADE 316 STAINLESS STEEL (i.e. A4-70) BOLTS, NUTS, STUDS AND ANCHORS SHALL BE USED FOR ALL APPLICATIONS. ALL BOLTS AND NUTS SHALL BE ISO METRIC COARSE PITCH SERIES.
13. ALL STAINLESS STEEL THREADED FASTENERS SHALL BE COATED WITH AN APPROVED NICKEL-BASED ANTI-SEIZE COMPOUND PRIOR TO ASSEMBLY (TO PREVENT GALLING). ALTERNATIVELY, MOLYBDENUM COATED BOLTS AND NUTS MAY BE USED.

PLATFORMS, WALKWAYS, STAIRWAYS, LADDERS AND HANDRAILS

14. ALL ALUMINIUM WORK RELATING TO FIXED PLATFORMS, WALKWAYS, STAIRWAYS AND LADDERS SHALL BE IN ACCORDANCE WITH AS 1657 AS AMENDED/SUPPLEMENTED BY ICON WATER SPECIFICATIONS STD-SPE-G-008 AND 009.
15. UNLESS NOTED OTHERWISE, ALUMINIUM GRATING SHALL BE WEBFORGE PATTERN C, BANDED ALL-ROUND.

APPROVED ALUMINIUM PRODUCTS

16. UNLESS NOTED OTHERWISE, ALUMINIUM PLATE, BAR, ROD, GRATING AND SECTIONS SHALL BE IN ACCORDANCE WITH THE RELEVANT AUSTRALIAN STANDARDS AND SHALL BE OF THE FOLLOWING GRADES:
    - FLAT PLATES (MILL FINISH): ALUMINIUM ALLOY 5083-H116
    - FLAT BAR (MILL FINISH): ALUMINIUM ALLOY 6060-T5 AND 6063-T6
    - TREADPLATE (5 BAR PATTERN): ALUMINIUM ALLOY 5052-H114
    - EXTRUDED SECTIONS (MILL FINISH): ALUMINIUM ALLOY 6060-T5, 6063-T6 OR 6082-T5
    - GRATING: ALUMINIUM ALLOY 6063-T6

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

STANDARD DRAWING
ALUMINIUM WORK
NOTES

DRAWING STATUS: Current

SD-9103-D

A1

ISSUE: A

CONCRETE WORK NOTES

GENERAL

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL ICON WATER "SD SERIES" DRAWINGS THAT RELATE TO THE SUPPLY OF CONCRETE AND THE CONSTRUCTION OF CONCRETE STRUCTURES.
2. UNLESS NOTED OTHERWISE, ALL:
   - DIMENSIONS ARE STATED IN MILLIMETRES.
   - REDUCED LEVELS ARE STATED IN METRES REFERENCING AUSTRALIAN HEIGHT DATUM (AHD).
   - COORDINATES ARE STATED IN METRES REFERENCING THE ACT STANDARD GRID.
3. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING DRAWINGS. ALL RELEVANT DIMENSIONS SHALL BE CHECKED BY THE CONSTRUCTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
4. UNLESS NOTED OTHERWISE, THE CONCRETE DIMENSIONS SHOWN DO NOT INCLUDE THE THICKNESS OF ANY APPLIED SURFACE COATINGS / FINISHES.
5. ALL MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH AS 1379, AS 1478, AS 2159, AS 3582, AS 3600, AS 3610, AS 3972, AS 3735, AS 5100.5 AND ICON WATER SPECIFICATION STD-SPE-C-003.
6. CONSTRUCTION TOLERANCES AND SURFACE FINISHES SHALL BE IN ACCORDANCE WITH AS 3610 AND ICON WATER SPECIFICATION STD-SPE-C-003.
7. NO ADMIXTURES ARE TO BE USED UNLESS PRIOR WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER REPRESENTATIVE.
8. UNLESS NOTED OTHERWISE, ALL EXPOSED EDGES AND CORNERS SHALL BE PROVIDED WITH 25 mm FILLETS OR CHAMFERS (EXCEPT AT ACCESS COVERS).
9. NO HOLES, CHASES, EMBEDMENT OF PIPES OR CONDUITS OTHER THAN THOSE SHOWN ON EITHER THE ICON WATER "SD SERIES" DRAWINGS OR PROJECT SPECIFIC DRAWINGS ARE ALLOWED IN CONCRETE MEMBERS OR STRUCTURES WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ICON WATER REPRESENTATIVE.
10. CONSTRUCTION JOINTS SHALL ONLY BE FORMED WHERE SPECIFICALLY SHOWN ON THE ICON WATER "SD SERIES" DRAWINGS OR PROJECT SPECIFIC DRAWINGS.
11. ANY HARDENED CONCRETE SURFACE AGAINST WHICH FRESH CONCRETE IS TO BE PLACED SHALL BE CLEAN, FREE FROM LAITANCE AND ROUGHENED TO EXPOSE AGGREGATE TO A DEPTH OF 5 mm. COAT THE EXISTING CONCRETE SURFACE WITH NEAT CEMENT SLURRY PRIOR TO PLACING NEW CONCRETE CEMENT SLURRY. THE NEAT CEMENT SLURRY COATING SHALL BE APPLIED NO MORE THAN 15 MINUTES PRIOR TO PLACING THE NEW (FRESH) CONCRETE.
12. FINISHED CONCRETE SHALL BE A DENSE, HOMOGENEOUS MASS WHICH SHALL COMPLETELY FILL THE FORMWORK, THOROUGHLY EMBED THE REINFORCEMENT AND BE FREE OF STONE POCKETS.
13. MECHANICAL COMPACTORS SHALL ONLY BE USED FOR COMPACTION PURPOSES AND NOT FOR THE SPREADING OF CONCRETE.
14. CURING OF ALL CONCRETE SHALL BE ACHIEVED BY KEEPING ALL SURFACES THOROUGHLY WET FOR A PERIOD OF 7 DAYS. CURING COMPOUNDS MAY BE USED WHERE NO FLOOR FINISH IS PROPOSED IF PRIOR WRITTEN APPROVAL IS OBTAINED FROM THE ICON WATER REPRESENTATIVE. POLYETHYLENE SHEETING OR WET HESSIAN MAY BE USED ON THE CONDITION THAT IT IS PROTECTED FROM WIND AND TRAFFIC.
15. THE DESIGN, CONSTRUCTION AND PERFORMANCE OF ALL FORMWORK AND FALSEWORK SHALL BE CERTIFIED BY A SUITABLY QUALIFIED AND COMPETENT STRUCTURAL ENGINEEER.
16. CONSTRUCTION SUPPORT PROPPING SHALL BE LEFT IN PLACE WHERE NEEDED TO AVOID OVERSTRESSING THE STRUCTURE AND UNDUE EARLY AGE CONCRETE DEFLECTION DUE TO CONSTRUCTION LOADING.
17. CONCRETE QUALITY CONTROL TESTING SHALL BE IN ACCORDANCE WITH ICON WATER SPECIFICATION STD-SPE-C-003 AND THE PROJECT SPECIFIC DOCUMENTATION.
18. NO CONCRETE, MORTAR OR GROUT SHALL BE SUPPLIED/DELIVERED BEFORE THE CONFORMANCE OF ALL CONSTITUENT MATERIALS IS VERIFIED BY TEST CERTIFICATES FROM A NATA REGISTERED LABORATORY AND THE ICON WATER REPRESENTATIVE HAS PROVIDED APPROVAL.
19. ALL WATER USED FOR MIXING CONCRETE, GROUT AND MORTAR SHALL MEET THE REQUIREMENTS OF AS 1379 SECTION 2.4.
20. CONCRETE ENCASEMENT OF A MINIMUM OF 100 mm COVER SHALL BE PROVIDED ON BOTH SIDES OF PUDDLE/THRUST FLANGES WHEN PIPEWORK IS EMBEDDED THROUGH CONCRETE STRUCTURES UNLESS NOTED OTHERWISE ON THE PROJECT SPECIFIC DRAWINGS.

PROTECTION AND COATINGS

21. PROTECTIVE COATINGS SHALL BE IN ACCORDANCE WITH WSA 201 AS AMENDED/SUPPLEMENTED BY ICON WATER SPECIFICATION STD-SPE-G-005.

REINFORCEMENT

22. ALL REINFORCEMENT SHALL BE SECURED IN POSITION TO PREVENT DISPLACEMENT DURING POURING AND OTHER CONSTRUCTION ACTIVITIES AND IT SHALL BE PLACED SUCH THAT THE PROJECT SPECIFIC CONCRETE COVER REQUIREMENT IS MET. APPROVED CHAIRS, SPACERS, LIGATURES AND TIES SHALL BE USED TO ACHIEVE THIS.
23. ALL STEEL REINFORCING MATERIALS (INCLUDING FABRIC) SHALL COMPLY WITH THE REQUIREMENTS OF AS/NZS 4671.
24. REINFORCEMENT IS REPRESENTED DIAGRAMMATICALLY IN THE DRAWINGS AND NOT NECESSARILY SHOWN IN TRUE PROJECTION.
25. ALL COG LENGTHS AND HOOK DIAMETERS SHALL BE IN ACCORDANCE WITH AS 3600 UNLESS NOTED OTHERWISE.
26. ALL REINFORCEMENT SHALL BE INSPECTED AND APPROVED BY THE ICON WATER REPRESENTATIVE PRIOR TO PLACING CONCRETE.
27. SPLICE REINFORCEMENT ONLY AT LOCATIONS SHOWN ON THE PROJECT SPECIFIC DRAWINGS OR AS APPROVED BY THE ICON WATER REPRESENTATIVE. STAGGER LAPS WHERE POSSIBLE. LAP SPLICE LENGTHS SHALL COMPLY WITH AS 3600. THE CLEAR SPACING BETWEEN LAPPED BARS SHALL BE LESS THAN 3 x BAR DIAMETER.
28. JOGGLE TO BARS TO BE 1 BAR DIAMETER OVER A LENGTH OF 12 BAR DIAMETERS UNLESS NOTED OTHERWISE.
29. WELDING OF REINFORCEMENT IS ONLY PERMITTED WHERE SHOWN ON THE PROJECT SPECIFIC DRAWINGS OR OTHERWISE AS APPROVED BY THE ICON WATER REPRESENTATIVE. WHERE WELDING OF REINFORCEMENT IS APPROVED, IT SHALL BE CARRIED OUT IN ACCORDANCE WITH AS 1554 PART 3.
30. REFER TO THE PROJECT SPECIFIC DRAWINGS FOR ELECTRICAL BONDING REQUIREMENTS.
31. THE USE OF PROPRIETARY REBAR COUPLERS IS ONLY PERMITTED UPON APPROVAL OF ICON REPRESENTATIVE.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	M. Matusiak	K. Danenbergsons	D. Eager

ASSET AREA APPLICABILITY					
DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

STANDARD DRAWING
CONCRETE WORK
NOTES

DRAWING STATUS: Current

SD-9300-D

A1

ISSUE: A

TABLE 1 : SOIL CLASSIFICATION VERSUS BEARING CAPACTIES FOR THRUST BLOCK AND ANCHOR BLOCK DESIGN

SOIL CLASSIFICATION (NOTE 4)		FIELD IDENTIFICATION TEST (NOTE 6)	QUALITY DESCRIPTOR (NOTE 3)	AHBP kPa (NOTE 1)
CLAY SOILS	VERY SOFT	EASY PENETRATED 40 mm WITH FIST	POOR	< 50 (NOTE 2)
	SOFT	EASILY PENETRATED 40 mm WITH THUMB	POOR	< 50 (NOTE 2)
	FIRM	MODERATE EFFORT NEEDED TO PENETRATE 30 mm WITH THUMB	POOR	< 50 (NOTE 2)
	STIFF	READILY INDENTED WITH THUMB BUT PENETRATED ONLY WITH GREAT EFFORT	POOR / MEDIUM	50
	VERY STIFF	READILY INDENTED WITH THUMBNAIL	MEDIUM	100
	HARD	INDENTED WITH DIFFICULTY BY THUMBNAIL	SOUND	200
SANDS	LOOSE CLEAN SAND	TAKES FOOTPRINT MORE THAN 10 mm DEEP	POOR	< 50 (NOTE 2)
	MEDIUM-DENSE CLEAN SAND	TAKES FOOTPRINT 3 mm TO 10 mm DEEP	POOR / MEDIUM	50
	DENSE CLEAN SAND OR GRAVEL	TAKES FOOTPRINT LESS THAN 3 mm DEEP	MEDIUM	100
ROCK	BROKEN OR DECOMPOSED ROCK	DIGGABLE. HAMMER BLOW "THUDS". JOINTS (BREAK IN ROCK) SPACED AT LESS THAN 300 mm APART	MEDIUM	100
	SOUND ROCK	NOT DIGGABLE WITH PICK. HAMMER BLOW "RINGS" JOINTS (BREAK IN ROCK) SPACED MORE THAN 300 mm APART	SOUND	≥200
UNCOMPACTED FILL DOMESTIC REFUSE		OBSERVATION AND KNOWLEDGE OF THE SITE HISTORY	POOR	< 50 (NOTE 2)

NOTES :

1. "AHBP" = ALLOWABLE HORIZONTAL BEARING PRESSURE FOR :
   - A. 10 mm MOVEMENT.
   - B. CENTRE OF THRUST 800 mm BELOW THE NATURAL SURFACE LEVEL.
   - C. HIGH WATER TABLE.
2. WHEN THE AHBP < 50 kPa, A SPECIAL GEOTECHNICAL ASSESSMENT IS REQUIRED FOR THE DESIGN OF ANCHORS AND THRUST BLOCKS.
3. THE "QUALITY DESCRIPTORS" USED CORRESPOND TO TRANSPORT CANBERRA AND COMMUNITY SERVICES (TCCS) CONVENTIONS. TCCS USE THE FOLLOWING DEFINITIONS:

   POOR: SOFT CLAY, SILT, POORLY COMPACTED SOILS, LOCATIONS WHICH MAY BE SATURATED FOR PART OF THE YEAR.

   MEDIUM: COMPACTED MEDIUM PLASTICITY CLAY, WELL BONDED SANDY SOIL, BONDED SAND AND GRAVEL WITH REASONABLE SURFACE WATER DRAINAGE.

   SOUND: HARD LOW PLASTICITY CLAY, WELL COMPACTED ROCKY SOIL, WELL BONDED SAND AND GRAVEL WITH GOOD SURFACE AND SUBSURFACE WATER DRAINAGE.

   TECHNICAL NOTE : THESE VALUES ARE A GUIDE ONLY - SOIL CONDITIONS FOR EACH FOOTING ARE TO BE ASSESSED BY SUITABLY QUALIFIED PERSONNEL.

4. THE "SOIL CLASSIFICATIONS" USED ARE AS PER WSAA DRAWING WAT-1200.
5. WHEN DESIGNING FOR BUILDING FOOTINGS AND BURIED MAINTENANCE STRUCTURES SUCH AS WET WELLS, VALVE CHAMBERS, STORAGE TANKS AND THE LIKE, A DETAILED GEOTECHNICAL INVESTIGATION SHALL ALWAYS BE CONDUCTED AND THE DESIGN SHALL BE PROVIDED BY A SUITABLY COMPETENT CIVIL/STRUCTURAL ENGINEER HOLDING CHARTERED (CPENG.) STATUS WITH ENGINEERS AUSTRALIA OR REGISTERED (RPENG.) STATUS WITH PROFESSIONALS AUSTRALIA.
6. THE FIELD IDENTIFICATION TEST DETAILS PROVIDED ON TABLE 1 ARE BASED ON THE FOLLOWING TESTING GUIDANCE :

PREPARING THE TEST AREA :
CONDUCT ALL NATIVE SOIL IDENTIFICATION TESTS ON A FRESHLY EXPOSED, DAMP, HAND-TRIMMED AREA OF THE TRENCH WALL IN THE PIPE EMBEDMENT ZONE. TAKE CARE THAT THE SOIL IN THE EXPOSED TEST AREA IS NOT COMPACTED OR LOOSENED DURING TRENCH EXCAVATION. IF THE SOIL IN THE TRENCH FLOOR AND WALL IS VERY DRY AT THE TIME THE TRENCH IS OPENED, THEN DRENCH THE TEST AREA AND ALLOW TIME FOR THE WATER TO BE ABSORBED BY THE SOIL BEFORE IT IS TRIMMED AND TESTED.

IDENTIFYING CLAY SOILS :
A LUMP OF CLAY SOIL WILL BE DIFFICULT TO BREAK WHEN DRY. IT WILL BE STICKY AND NEED SOME EFFORT TO MOULD WITH THE FINGERS WHEN WET. CLAY WILL NOT WASH OFF EASILY. INDIVIDUAL CLAY PARTICLES ARE HARD TO SEE.

TESTING CLAY SOILS :
CLAY SOILS ARE BEST TESTED IN THE WALL OF THE TRENCH. THE FIST, THE THUMB OR THE THUMBNAIL ARE USED TO DETERMINE THE CONSISTENCY (STRENGTH) OF THE CLAY (REFER TABLE 1).

IDENTIFYING CLEAN SAND SOILS :
THE INDIVIDUAL GRAINS OF SAND WILL BE VISIBLE TO THE EYE. A LUMP OF CLEAN SAND, IF IT CAN BE PICKED UP AT ALL, WILL CRUMBLE WITH VERY LITTLE EFFORT. CLEAN SAND WASHES OFF EASILY.

TESTING CLEAN SAND SOILS :
CLEAN SAND SOILS ARE BEST TESTED IN THE FLOOR OF THE TRENCH BY PUSHING WITH THE WHOLE BODY WEIGHT ON ONE FOOT. THE DEPTH OF THE DEPRESSION LEFT BY THE FLAT SOLE OF THE BOOT IS RELATED TO THE DENSITY OF THE SAND (REFER TABLE 1) TAKE CARE TO ENSURE THAT THE SAND IN THE TRENCH FLOOR WAS NOT COMPACTED OR LOOSENED DURING THE EXCAVATION OF THE TRENCH OR THE TRIMMING OF THE TEST AREA .

TESTING ROCK :
THE RECOMMENDED FIELD IDENTIFICATION TESTS FOR ROCK RELY ON OBSERVING THE EASE WITH WHICH THE ROCK CAN BE DUG WITH A PICK, AND ESTIMATING THE SPACING OF THE JOINTS IN THE ROCK. (JOINTS ARE COMMONLY CALLED CRACKS OR BREAKS). THE SPACING BETWEEN JOINTS IS IMPORTANT BECAUSE THE ALLOWABLE BEARING PRESSURE ON ROCK IS USUALLY CONTROLLED BY THE JOINTS IN IT, RATHER THAN THE INHERENT STRENGTH OF A FRAGMENT OF ROCK. JOINTS MAY BE TIGHTLY CLOSED (LIKE HAIRLINE CRACKS), BUT CAN ALSO BE OPEN (VOID SPACE) OR FILLED WITH SOFT CLAY OR OTHER SOIL.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/06/2018	C. Dickson	K. Danenbergsons	D. Eager

ICON WATER ACKNOWLEDGES WATER SERVICES ASSOCIATION OF AUSTRALIA IN THE DEVELOPMENT OF THIS DRAWING. IN PARTICULAR, DRAWING WAT - 1200

DAM	X	RES	X	SPS	X
BWS	X	WAT	X	STP	X
WTP	X	SEW	X		
WPS	X	REC	X		

ASSET AREA APPLICABILITY

STANDARD DRAWING
CIVIL WORKS
SOIL CLASSIFICATION GUIDELINES

DRAWING STATUS: Current

SD-9302-C

A1

ISSUE A

PIPEWORK NOTES

GENERAL

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE ICON WATER APPROVED PRODUCTS LIST AND ALL ICON WATER "SD SERIES" DRAWINGS THAT RELATE TO THE MANUFACTURE, FABRICATION, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF PIPEWORK.
2. UNLESS NOTED OTHERWISE, ALL:
   - DIMENSIONS ARE STATED IN MILLIMETRES.
   - REDUCED LEVELS ARE STATED IN METRES REFERENCING AUSTRALIAN HEIGHT DATUM (AHD).
   - COORDINATES ARE STATED IN METRES REFERENCING THE ACT STANDARD GRID.
3. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING DRAWINGS. ALL RELEVANT DIMENSIONS SHALL BE CHECKED BY THE CONSTRUCTOR PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
4. PIPEWORK SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:
   - IF FORMING PART OF THE WATER SUPPLY NETWORK, IT SHALL COMPLY WITH THE REQUIREMENTS OF WSA 03 AS AMENDED/SUPPLEMENTED BY ICON WATER SPECIFICATION STD-SPE-G-012.
   - IF FORMING PART OF THE GRAVITY SEWERAGE NETWORK, IT SHALL COMPLY WITH THE REQUIREMENTS OF WSA 02 AS AMENDED/SUPPLEMENTED BY ICON WATER SPECIFICATION STD-SPE-G-011.
   - IF FORMING PART OF A SEWAGE FLOWPATH WITHIN A SEWAGE PUMPING STATION OR RISING MAIN, IT SHALL COMPLY WITH THE REQUIREMENTS OF WSA 04 AS AMENDED/SUPPLEMENTED BY ICON WATER SPECIFICATION STD-SPE-G-010.
   - IF A BULK WATER SUPPLY MAIN (NOT COVERED BY THE SCOPE OF WSA 03) IT SHALL COMPLY WITH THE REQUIREMENTS OF ICON WATER SPECIFICATION STD-SPE-C-005.
   - OTHERWISE, ALL PIPEWORK SHALL COMPLY WITH THE REQUIREMENTS OF ICON WATER SPECIFICATIONS STD-SPE-M-002 AND 004.
5. ONLY PRODUCTS AND MATERIALS LISTED IN THE ICON WATER APPROVED PRODUCTS LIST AND/OR SPECIFICALLY DETAILED ON THE PROJECT SPECIFIC DRAWINGS SHALL BE INSTALLED. NO OTHER PRODUCTS AND MATERIALS SHALL BE USED WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ICON WATER REPRESENTATIVE.
6. UNLESS NOTED OTHERWISE IN PROJECT SPECIFIC CONSTRUCTION DOCUMENTATION, ALL WELDS AT PIPE JOINTS SHALL BE FULL PENETRATION WELDS AND DETAILED WELDING PROCEDURES SHALL BE SUBMITTED TO THE ICON WATER REPRESENTATIVE FOR APPROVAL PRIOR TO THE COMMENCEMENT OF FABRICATION ACTIVITIES. NO WELDING SHALL OCCUR WITHOUT THE WRITTEN APPROVAL OF THE SUBMITTED WELDING PROCEDURES BY THE ICON WATER REPRESENTATIVE.

PROTECTION AND COATINGS

7. PROTECTIVE COATINGS SHALL BE IN ACCORDANCE WITH WSA 201 AS AMENDED/SUPPLEMENTED BY ICON WATER SPECIFICATION STD-SPE-G-005.

No.	ISSUE	DATE	DRAWN	CHECKED	AUTHORISED
A	INITIAL ISSUE	15/12/2017	S. Essery	K. Danenbergsons	D. Eager

DAM	X	RES	X	SPS	X			
BWS	X	WAT	X	STP	X			
WTP	X	SEW	X					
WPS	X	REC	X					

ASSET AREA APPLICABILITY

STANDARD DRAWING
PIPEWORK
NOTES

DRAWING STATUS: Current

SD-9410-D

A1

ISSUE A