GENERAL

1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE TWEED SHIRE COUNCIL (TSC) DEVELOPMENT DESIGN SPECIFICATION D12 - SEWERAGE SYSTEM, WSA 02 - 2014, WSA 04 - 2005 AND WSA 07-2007.
2. MATERIALS AND WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS, TOGETHER WITH THE REQUIREMENTS OF ALL APPLICABLE CODES OF PRACTICE, AUSTRALIAN STANDARDS AND STATUTORY AUTHORITIES.
3. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS SHOWN OTHERWISE.
4. INTERNAL SURFACES OF WET WELL AND COLLECTOR MANHOLE TO BE COATED WITH SIKAGARD 62 OR FOSROC NITOMORTAR ELS.
5. THE ACCESS DRIVEWAY SHALL CONSIST OF 200mm GRAVEL TO NGB20-2d TO TSC CONSTRUCTION SPECIFICATION C242 - FLEXIBLE PAVEMENTS OVERLAID BY A TACK COAT AND 25mM FGG7 ASHPHALTIC CONCRETE IN ACCORDANCE WITH TSC CONSTRUCTION SPECIFICATION C245 - ASPHALTIC CONCRETE.
6. TO AVOID FLOTATION, WET WELL FULL WALL HEIGHT (TO UNDERSIDE OF TOP SLAB LEVEL) TO BE CAST AND SUNK PRIOR TO CONSTRUCTING MASS CONCRETE PLUG.

ELECTRICAL

1. THE CLEAR DISTANCE BETWEEN ADJACENT CONDUITS SHALL BE AT LEAST 80mm. THE CLEAR DISTANCE BETWEEN THE CONDUITS AND THE CABINET SHALL BE AT LEAST 100mm. THE CLEAR DISTANCE BETWEEN THE CONDUITS AND CONCRETE FOUNDATIONS SHALL BE AT LEAST 200mm.
2. ONLY CONDUIT BENDS (LONG RADIUS) SHALL BE USED.
3. THE SWITCHGEAR CABINET AND ELECTRICAL EQUIPMENT SHALL BE IN ACCORDANCE WITH STANDARD DRAWINGS.
4. THE EARTH STAKE BOX SHALL BE CAST INTO A 300 SQUARE CONCRETE SLAB POSITIONED AGAINST THE PUMP SLAB.
5. TOP OF CONCRETE PLINTH FOR THE ELECTRICAL CABINET TO BE AT LEAST 300mm ABOVE THE 1 IN 100 YEAR FLOOD LEVEL.
6. CONDUITS NEAR THE LID OPENING TO BE HELD IN PLACE USING STAINLESS STEEL HOLDING STRAP.

PIPES & FITTINGS

1. ALL PIPE LENGTHS SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO ORDERING.
2. ALL FLANGES SHALL BE DRILLED TO AS 4087, FIGURE B5.
3. PIPES AND FITTINGS INSIDE THE PUMP WELL AND VALVE PIT SHALL BE FBN COATED INTERNALLY & EXTERNALLY.
4. BURIED DICL PIPES SHALL BE WRAPPED WITH POLYETHYLENE SLEEVE.
5. ALL ANCHOR BOLTS AND MECHANICAL ANCHORS SHALL BE SS TYPE 316. ALL NUTS & WASHERS SHALL BE SS TYPE 316. ANTI-SEIZE PASTE TO BE APPLIED TO ALL THREADS.
6. SEWER RISING MAINS TO BE TESTED TO 1200 KPa. FOR THRUST B LOCK SIZES REFER WSA DRAWINGS WAT 1205/1207.

PUMPS

1. UNLESS APPROVED OTHERWISE, ALL SUBMERSIBLE PUMPS SHALL BE OF FLYGT, KSB, GRUNDFOS OR ABS/MONO MANUFACTURE.
2. PUMP NUMBERING SHALL BE SUCH THAT WHEN LOOKING IN THE DIRECTION OF SRM FLOW, PUMP (1) IS ON THE LHS AND PUMP (2) IS ON THE RHS. BRASS PUMP NUMBERING TAGS TO BE ATTACHED TO THE CONCRETE LID AND FINISHED FLUSH WITH THE CONCRETE SURFACE.
3. PUMP (2) SHALL BE PROVIDED WITH A FLYGT FLUSH VALVE, DIRECTED TOWARDS THE CENTER OF THE WELL. MINIMUM 150mm CLEAR SPACING TO BE PROVIDED BETWEEN FLUSH VALVE AND ADJACENT PUMP.
4. PUMP GUIDE RAILS SHALL BE FABRICATED FROM SS 316. MINIMUM TUBE THICKNESS TO BE 1.6mm.
5. ONE CERTIFIED STAINLESS STEEL 316 (7mm, 1.2 Ton) LIFTING CHAIN PER PUMP SHALL BE INSTALLED.
6. LIFTING CHAINS AND CABLE SUPPORT STOCKINGS TO BE CONNECTED TO VERTICAL FACE OF ACCESS OPENING USING 8mm DIA SS J-BOLTS. BOLTS TO BE MAX 100 mm BELOW COVER LEVEL. J-BOLT POSITIONS TO BE CONFIRMED BY COUNCIL PRIOR TO FIXING.
7. ONE ELECTRONIC COPY AND THREE HARD COPIES OF THE O&M MANUALS AND ONE SET OF SPARE PUMP & MOTOR TAGS SHALL BE PROVIDED AT COMMISSIONING.

VALVES

1. ALL VALVES SHALL BE FLANGED TO AS 4087, FIGURE B5.
2. SLUICE VALVES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF AS2638 AND SHALL BE RESILIENT SEATED, CLOCKWISE CLOSING WITH NON-RISING SPINDLES AND FBN COATED.
3. NON-RETURN VALVES SHALL BE OF THE TYCO OR VAL-MATIC FULL BODY SWING FLEX TYPE WITH A DOMED ACCESS COVER, AVK BALL CHECK VALVE, OR APPROVED EQUIVALENT.
4. THE GRADIENT OF THE INLET PIPE SHALL NOT EXCEED 1:100.
5. THE INLET VALVE EXTENSION SPINDLE SHALL BE 50mm DIA x 1.6mm THICK SS 316 TUBE WITH CAST IRON STEM CAPS WELDED TOP AND BOTTOM. BOTTOM STEM CAP TO BE BOLTED WITH 10mm SS 316 BOLT AND SS 304 WASHER AND NYLOCK NUT. UNIVERSAL JOINTS WILL NOT BE PERMITTED.

ACCESS COVERS

1. ALUMINIUM GAS AND WATER TIGHT CLASS B MULTI PART ACCESS COVERS AND FALL ARREST SYSTEM SHALL BE USED FOR PUMP WELL AND VALVE PIT. ALUMINIUM HAND RAIL AND KICK BOARD WITH SELF CLOSING GATE SHALL BE PROVIDED AROUND PUMP WELL ACCESS OPENING.
2. PUMP WELL ACCESS OPENING POSITIONS TO ENSURE EASY REMOVAL OF THE PUMPS.
3. VALVE PIT ACCESS OPENINGS SHALL EXTEND THE FULL WIDTH OF THE VALVE PIT AND SHALL BE SUFFICIENTLY LONG TO ALLOW VERTICAL REMOVAL OF ALL VALVES.
4. TWO PART OR MULTI PART ACCESS COVERS SHALL HAVE LIDS OF EQUAL SIZE. (MAX LID WEIGHT TO BE 56KG)

CONCRETE & REINFORCEMENT

1. MATERIALS AND CONSTRUCTION TO AS 3600, AS 3610 STEEL REINFORCEMENT MATERIALS: TO AS 4671
2. PUMP STATION CONCRETE SHALL BE SPECIAL CLASS IN ACCORDANCE WITH WSA 114-2002: INDUSTRY STANDARD FOR CONCRETE SPECIAL CLASS.
3. CONCRETE QUALITY: TO AS 1379 READY MIX CONCRETE: TO AS 1379 - CEMENT: TYPE 'SR' TO AS 3972. MAXIMUM SIZE OF COARSE AGGREGATE: 20mm.
4. CONCRETE SHALL BE AS SHOWN IN THE FOLLOWING TABLE. WHERE IN CONFLICT WITH WSA 114-2002, THIS TABLE SHALL TAKE PRECEDENCE.

ELEMENT	MIN CONTENT CEMENT	AGG SIZE mm	ADMIXTURE	SLUMP mm	MIN CONC. GRADE MPa	MAX WATER CEMENT RATIO
PUMP WELL, SLAB & VALVE PIT	360kg/m³	20	CONCRETE MIX TO BE SUBMITTED FOR APPROVAL	70	40	0.45
BENCHING, MASS CONC. & PLUG	300kg/m³	20		50	20	0.55
CONTROL BUILDING FOUNDATIONS	360kg/m³	20		80	32	0.45
CONTROL BUILDING SLAB	360kg/m³	20		80	32	0.45

5. CLEAR CONCRETE COVER TO REINFORCEMENT SHALL BE AS PER THE FOLLOWING TABLE, UNLESS NOTED OTHERWISE (U.N.O.)

MIN CONC. GRADE MPa	32MPa	40MPa
PUMP WELL AND VALVE PIT SURFACES IN CONTACT WITH SEWAGE / SEWAGE GAS OR CAST AGAINST AGGRESSIVE SOILS (INCLUDING ACID SULFATE SOIL)		70mm
VALVE PIT AND SLAB SURFACES WITHIN 1km OF THE COAST, NOT CAST AGAINST GROUND OR IN CONTACT WITH SEWAGE / SEWAGE GAS	65mm	45mm
VALVE PIT AND SLAB SURFACES NOT CAST AGAINST GROUND OR IN CONTACT WITH SEWAGE / SEWAGE GAS	40mm	30mm
SURFACE CAST AGAINST NON AGRESSIVE SOILS	25mm	20mm

CONCRETE & REINFORCEMENT (CONT.)

6. ALL PIPES THROUGH CONCRETE WALLS TO HAVE PUDDLE FLANGES CAST CENTRALLY IF THEY REQUIRE THRUSTING OR IF NOTED IN DESIGN. WHERE PENETRATIONS ARE CORED, INSIDE SURFACES ARE TO BE SCABBLED AND COATED WITH BOND CRETE OR A NEAT CEMENT SLURRY PRIOR TO GROUTING UP. CORE DIAMETER TO ALLOW 80mm TO FLANGE.
7. VERIFY STRENGTH BY PRODUCTION CONTROL TESTING TO AS 1379.
8. REINFORCEMENT SPLICE LOCATIONS: REFER DETAIL DRAWINGS. DO NOT VARY SPLICE LOCATIONS WITHOUT WRITTEN APPROVAL FROM THE SUPERINTENDENT (SUPERVISING OFFICER).
9. NO UNSPECIFIED HOLES, DUCTING OR CHASES ARE PERMITTED WITHOUT APPROVAL FROM THE SUPERINTENDENT (SUPERVISING OFFICER).
10. STRUCTURAL DIMENSIONS DO NOT INCLUDE TOPPINGS OR FINISHES.
11. FORM CONSTRUCTION JOINTS ONLY AT LOCATIONS SHOWN ON DRAWINGS. DO NOT VARY.
12. CHAMFERS OR FILLETS: 20mm TO EXPOSED FORMED EDGES U.N.O.
13. SUPPORT ALL REINFORCEMENT ON PLASTIC CHAIRS OR CONCRETE BLOCKS OF SUITABLE STRENGTH AT 800mm MAXIMUM SPACING.
14. LAP REINFORCING MESH 2 CROSS WIRES PLUS 25mm.
15. REINFORCEMENT SYMBOLS USED IN THESE DRAWINGS: ALL OTHER REINFORCEMENT DESIGNATIONS TO COMPLY WITH AS 4671.

	SYMBOLS USED	AS 4671 DESIGNATION	LEGEND
BARS	a-Nb-c a-Rb-c	a-D500Nb-c a-R250Nb-c	a - NUMBER OF BARS IN THE GROUP (OPTIONAL). b - NOMINAL BAR DIAMETER (mm). c - MAXIMUM CENTRE TO CENTRE BAR SPACING (OPTIONAL).
MESH	SLde RLfgh	D500SLde D500RLfgh	d - NOMINAL BAR DIAMETER FOR SQUARE MESH (mm). e - SQUARE MESH STEEL SPACING divided by 100 (mm). f - NOMINAL BAR DIAMETER FOR LONGITUDINAL STEEL (mm). g - LONGITUDINAL STEEL SPACING DIVIDED BY 100 (mm). h - NOMINAL BAR DIAMETER FOR TRANSVERSE STEEL (mm).
EXAMPLE: THE SYMBOL 10-N16-200 DENOTES 10 BARS WITH 16mm NOMINAL DIAMETER PLACED AT 200mm MAXIMUM CENTRE TO CENTRE SPACING.			

16. PREPARE COLD JOINTS BY LIGHT SCABBLING, REMOVAL OF DEBRIS AND WASHING WITH CLEAN WATER.
17. DO NOT PLACE CONCRETE UNTIL REINFORCEMENT AND FORMWORK ARE INSPECTED BY THE SUPERINTENDENT (SUPERVISING OFFICER).
18. THOROUGHLY CLEAN OUT ALL FORMWORK PRIOR TO POURING.
19. VIBRATE CONCRETE DURING PLACEMENT TO GIVE MAXIMUM COMPACTION WITHOUT SEGREGATION.
20. SURFACE FINISH: LIGHT BROOM SLAB SURFACE PERPENDICULAR TO TRAFFIC DIRECTION TO PRODUCE AN EVEN NON-SLIP FINISH.
21. COMMENCE CURING OF ALL CONCRETE SURFACES IMMEDIATELY ON FINISHING AND CONTINUE FOR 7 DAYS MINIMUM. WET CURE UNDER SEALED PLASTIC SHEETS.
22. FORMWORK TO WALLS AND SUSPENDED SLABS MUST REMAIN IN POSITION IN ACCORDANCE WITH A.S.3600.

ODOUR CONTROL & VENTILATION

1. WHERE A SEWERAGE PUMP STATION, COLLECTION MANHOLE OR RISING MAIN DISCHARGE MANHOLE RECEIVES FLOWS FROM A RISING MAIN HAVING A DETENTION TIME GREATER THAN FOUR HOURS FROM THE SOURCE (BASED ON ADWF), THEN AN ODOUR CONTROL MANAGEMENT PLAN IS TO BE SUBMITTED AS PART OF THE DEVELOPMENT APPROVAL PROCESS. THIS MANAGEMENT PLAN WOULD NORMALLY BE EXPECTED TO PROVIDE ODOUR CONTROL FACILITIES, WHICH HAVE ONGOING OPERATIONAL COSTS MINIMISED, AS OPPOSED TO MINIMISED UPFRONT CAPITAL COSTS.
2. VENT PIPES AND ODOUR CONTROL SYSTEMS SHALL BE SPECIFICALLY DESIGNED TO SUIT THE LOCATION OF THE PUMP STATION AND THE ANTICIPATED SEWAGE SEPTICITY. WHERE NECESSARY, SPECIALIST DESIGNED ODOUR CONTROL SYSTEMS SHALL BE PROVIDED.
3. MINIMUM ODOUR CONTROL SHALL CONSIST OF A REPLACEABLE TSC APPROVED ODOUR FILTER CONNECTED TO A VENT PIPE, AS DETAILED IN TSC STANDARD DRAWING S.D.277, COMPLETE WITH A NON-METALLIC VENTILATOR AT THE END. THE MINIMUM HEIGHT OF THE VENT PIPE SHALL BE 10 METRES ABOVE THE SPS SLAB LEVEL AND SHALL EXTEND AT LEAST 1.0m ABOVE THE TOPS OF SURROUNDING ROOFS WITHIN A RADIUS OF 50m. VENT PIPE DESIGN SHALL ALSO BE SUBJECT TO AESTHETIC CONSIDERATIONS.

SITE WORKS

1. ALL SOILS CONTAINING ORGANIC MATTER (E.G. ROOTS, GRASS ETC.) MUST BE STRIPPED FROM THE BUILDING SITE PRIOR TO SLAB CONSTRUCTION AND MUST NOT BE USED AS FILL MATERIAL.
2. CUT SLOPES MUST BE LIMITED TO 2:1 (HORIZONTAL:VERTICAL). THE SLOPE SHOULD THEN BE GRASSED OR PAVED TO PREVENT SCOUR AND EROSION DAMAGE.
3. THE FILL PLATFORM SHOULD EXTEND AT LEAST 1.0m BEYOND THE BUILDING. REFER TO THE DESIGN ENGINEER FOR POSSIBLE PIERING OF ADJACENT PERIMETER FOOTING. FILL BATTERS AT 2:1 (HORIZONTAL:VERTICAL) SLOPE, OR LESS, MUST BE FORMED TO THE NATURAL GROUND, AND ANTI-SCOUR AND EROSION MEASURES TAKEN. A SLOPE STEEPER THAN 2:1 WILL REQUIRE RETAINING.
4. ALL OVERSIZED MATERIAL, WHICH MAY IMPEDE COMPACTION, MUST BE REMOVED FROM THE BUILDING PLATFORM.
5. FILL IS TO BE UNIFORMLY COMPACTED IN UP TO 200-300mm HORIZONTAL LAYERS AND MUST ACHIEVE A MINIMUM STANDARD OF COMPACTION OF GREATER THAN 95% STANDARD COMPACTION TO AS 1289 FOR COHESIVE SOILS, OR A DENSITY INDEX OF GREATER THAN 65% FOR COHESIONLESS SOILS. BENCHING OF THE NATURAL GROUND WILL BE REQUIRED ON SLOPING GROUND PRIOR TO COMMENCEMENT OF FILL OPERATIONS.
6. CLAYS OF HIGH PLASTICITY OR HIGH IN-SITU MOISTURE CONTENT ARE NOT TO BE USED AS FILL.
7. AN IMPORTED GRANULAR FILL WITH A PLASTICITY INDEX PREFERRABLY LESS THAN 15%, WITH NO EXCESSIVE OVERSIZED MATERIAL, MAY BE USED.
8. FIELD DENSITY TESTS, OR EQUIVALENT, SHOULD BE CARRIED OUT TO VERIFY THAT THE STANDARD OF COMPACTION IS ACHIEVED. FIELD DENSITY TESTS ARE TO BE TAKEN OVER THE FULL DEPTH OF THE LAYER OR FROM THE BOTTOM OF THE LAYER.

DRAINAGE

1. THE TOP SURFACE OF THE BUILDING FLOOR SLAB (IF THERE IS A BUILDING REQUIRED) SHALL BE AT A HEIGHT OF AT LEAST 300mm ABOVE FINAL GROUND LEVEL OR THE 100 YEAR FLOOD LEVEL.
2. SITE DRAINAGE IS TO BE MAINTAINED AT ALL TIMES, BOTH DURING AND AFTER CONSTRUCTION. AT NO TIME DURING CONSTRUCTION, OR SUBSEQUENTLY, SHOULD THE WATER BE ALLOWED TO POND ON OR NEAR THE FOOTINGS.
3. TO ENSURE ADEQUATE DRAINAGE FOR THE FOUNDATIONS ON SLOPING SITES, DRAINS SHOULD BE PROVIDED AT THE BOTTOM OF EMBANKMENTS CLEAR OF THE FOUNDATION. IF THE SURFACE FLOW IS LIKELY TO BE LARGE, DRAINS SHOULD ALSO BE PROVIDED AT THE TOP OF ANY CUTTING TO AVOID SCOURING OF THE FACE.
4. SURFACE RUNOFF SHOULD BE COLLECTED AND DRAINED AWAY FROM THE BUILDING. DOWNPIPES FROM ROOFS SHOULD NOT BE ALLOWED TO DISCHARGE ON THE GROUND SURFACE NEAR THE BUILDING, EVEN FOR SHORT PERIODS DURING CONSTRUCTION. THE GROUND SURFACE ALL AROUND THE BUILDING SHOULD BE SLOPED AWAY FROM THE BUILDING AT A MINIMUM SLOPE OF 1 IN 20, FOR A MINIMUM DISTANCE OF 900mm, AND TO THE POINT WHERE PONDING WILL NOT OCCUR NEAR THE BUILDING.
5. SERVICES RUNNING PARALLEL TO THE FOOTINGS SHOULD NOT BE LOCATED CLOSER THAN 1.0m TO THE FOOTINGS.
6. ENSURE THAT TREES, EXISTING OR FUTURE, ARE LOCATED NOT CLOSER THAN 0.8m TIMES THE MATURE HEIGHT OF THE TREE TO THE BUILDING, OR AS OTHERWISE DIRECTED.

FLOWMETER

1. UNLESS APPROVED OTHERWISE THE ELECTROMAGNETIC FLOWMETER SHALL BE OF 'ABB' OR 'ENDRESS & HAUER' MANUFACTURE SUITABLE FOR SEWERAGE APPLICATIONS & INSTALLATION IN AN OUTSIDE PIT SUBJECT TO INUNDATION OR DIRECT BURIED

WATER SUPPLY

1. A METERED WATER SUPPLY, COMPLETE WITH RPZ IS TO BE PROVIDED (BY TSC).
2. IF NECESSARY, PROVIDE A 50 DIA CONDUIT TO ALLOW INSTALLATION OF THE WATER SERVICE BELOW ACCESS ROADS.

EXISTING SERVICES

1. THE CONSTRUCTOR SHALL BE RESPONSIBLE FOR THE LOCATION OF EXISTING SERVICES PRIOR TO COMMENCING WITH THE WORKS.
2. THE CONSTRUCTOR SHALL BE RESPONSIBLE FOR THE REPLACEMENT OF ANY EXISTING SERVICES DAMAGED DURING CONSTRUCTION WITH NEW SERVICES OF EQUIVALENT TYPE AND SPECIFICATIONS.

ISSUE	AMENDMENT DETAILS	INITIALS	DATE
G	PUMPS, ACCESS COVER AND FLOWMETER NOTES AMENDED	J.S.H	09.2021
F	GENERAL NOTES AND ACCESS COVERS NOTES AMENDED	S.K.J	03.2019
E	ACCESS COVERS NOTES AMENDED	A.K.R.	09.2015
D	CONCRETE & REINFORCEMENT NOTES AMENDED & FLOWMETER NOTE ADDED	G.P.C.	06.2015
C	PLAN FORM UPGRADED	G.P.C.	08.2014

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DESIGN ENGINEER	DATE 14.09.15	PROJECT: SEWERAGE WORKS STANDARDS	DRAWING NUMBER: S.D.220-02
DESIGN MANAGER	DATE 14.09.15	PLAN TITLE: 2.0m DIAMETER PUMP STATION (SHEET 2 OF 6 SHEETS) NOTES	SEP 2021
DRAWN	ENGINEERING & OPERATIONS DESIGN UNIT		
SCALE		ACAD FILE No: G:_AAA TSC STANDARD DRAWINGS\200 SEWERAGE WORKS\S.D.220-02 (Aug-21 Rev G)	

0 10 20 30 40 50 100 150 200 250 mm