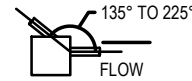


GENERAL

- THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE ASSOCIATED DESIGN PACKAGE DRAWINGS.
- THE DOCUMENTED DRAINAGE SYSTEM IS DETAILED ONLY FOR THE PERMANENT ROAD CONFIGURATION UNLESS NOTED OTHERWISE. CONSTRUCTION REQUIREMENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
- PIPES THROUGH PITS ARE TO BE ALIGNED WITH UPSTREAM PIPE CENTRELINE TO OUTLET PIPE CENTRELINE AT DOWNSTREAM PIT FACE AS SHOWN.



LONGITUDINAL PAVEMENT AND TRANSVERSE DRAINAGE

- ALL PIPES ARE TO BE STEEL REINFORCED CONCRETE UNLESS NOTED OTHERWISE. ALL CONCRETE PIPES SHALL HAVE HS3 TYPES INSTALLATION AS PER TCCS SPECIFICATION MITS 03A AND AS/NZS 3725:2007.
- CONCRETE PIPE CLASS IS TO BE A MINIMUM OF CLASS 4. TYPE HS3 SUPPORT AND TRENCH CONDITION INSTALLATION TO AS3725 AND SPECIFICATION UNLESS OTHERWISE NOTED. CONCRETE PIPES ARE TO BE RUBBER RING JOINT SPIGOT AND SOCKET TYPE UNLESS NOTED OTHERWISE. THERMAL ENVIRONMENT CONDITION OF TABLE 3.1 OF AS/NZS 4058:2007 APPLIES.
- CONNECTIONS BETWEEN PIPES AND STRUCTURES TO BE UNDERTAKEN IN ACCORDANCE WITH TCCS SPECIFICATION MITS 03A AND 03B AND 03C.

SERVICES

- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL EXISTING UTILITIES ARE ACCURATELY LOCATED, IDENTIFIED, CHECKED AGAINST ALL DESIGN DRAWINGS AND PROTECTED OR RELOCATED AS REQUIRED PRIOR TO CONSTRUCTION WORKS.
- REQUIRED CONDITIONS TO BE OBTAINED FROM RELEVANT AUTHORITIES WHILE WORKING IN THE VICINITY OF UTILITIES PRIOR TO CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN SUCH CONDITIONS.

CHANNELS

- CHANNEL LININGS ARE TO BE IN ACCORDANCE WITH THE LP LANDSCAPING DRAWING PACKAGE AND THE DD DRAINAGE DRAWING PACKAGE.
- DRAINAGE OPEN CHANNEL LOCATIONS ARE SHOWN ON THE PLAN DRAWINGS.
- FOR CONCRETE CHANNELS WITH A SIDE SLOPE STEEPER THAN 1 IN 2 AND CHANNELS DEPTH EXCEEDS 0.9m STEP IRONS TO BE SPACED AT 0.3m VERTICAL INTERVALS. THE MAXIMUM LONGITUDINAL SPACING BETWEEN STEP IRONS SHOULD NOT EXCEED 60m

SCOUR PROTECTION

- RIP RAP STONE SHALL BE REASONABLY WELL GRADED IN ACCORDANCE WITH THE FOLLOWING TABLE:

ROCK SIZE	% PASSING (BY WEIGHT)
2 x D50	100%
D50	40-60%
0.3 x D50	10-20%

- THE ROCK SHALL BE WELL GRADED THROUGHOUT THE RIP RAP LAYER. STONE SIZES SHALL BE DEPENDENT ON THE D50 VALUE SPECIFIED ON THE DRAWINGS. D10 SHALL BE 0.5 x D50 AND D90 SHALL BE 1.35 x D50. STONES SMALLER THAN THE SPECIFIED D10 ARE NOT TO EXCEED 20% BY WEIGHT OF EACH LOAD.
- ROCK IS TO BE HARD, DENSE, DURABLE, RESISTANT TO WEATHERING AND ANGULAR IN SHAPE. IT SHALL BE FREE FROM OVERBURDEN, SPOIL, SHALE AND ORGANIC MATTER. ROCK THAT IS LAMINATED, FRACTURED, POROUS OR OTHERWISE PHYSICALLY WEAK WILL BE UNACCEPTABLE.
- ROCK SOURCING AND SUITABILITY TO BE APPROVED BY THE PRINCIPAL.
- GEOTEXTILES FOR THE PROJECT ARE TO BE IN ACCORDANCE WITH TCCS SPECIFICATION MITS 03K AND TYPE SHOWN ON THE DRAWINGS.

EXISTING STORMWATER PITS AND PIPES

- EXISTING STORMWATER DRAINAGE PIPE AND PIT LAYOUTS SHOWN ON THE DRAWINGS ARE INDICATIVE ONLY. ALL LOCATIONS, ORIENTATION AND LEVELS OF EXISTING SHALL BE VERIFIED BY THE CONTRACTOR ON SITE BEFORE COMMENCING ANY WORK.
- LAYOUTS OF EXISTING STORMWATER DRAINAGE HAVE BEEN PREPARED BASED ON A COMBINATION OF SURVEY DATA AND AVAILABLE TCCS GIS DATA.
- EXISTING STORMWATER DRAINAGE PIPES AND MANHOLES WITHIN THE LIMITS OF WORK SHALL BE DECOMMISSIONED OR RETAINED WHERE SPECIFIED WITHIN THE DESIGN PACKAGES.
- EXISTING STORMWATER DRAINAGE PIPES AND CULVERTS THAT ARE IDENTIFIED TO BE DECOMMISSIONED OR ABANDONED SHALL BE IN ACCORDANCE WITH TCCS SPECIFICATION MITS 03A AND CCTV FOR ASSESSMENT OF THE APPROPRIATE TREATMENT IN REFERENCE TO DURABILITY REQUIREMENTS. TREATMENTS INCLUDE:
 - REMOVE AND BACKFILL - EXISTING PIPES / PITS TO BE REMOVED WITH TRENCH BACKFILLED AND COMPACTED IN ACCORDANCE WITH TCCS STANDARD SPECIFICATIONS.
 - SEAL AND GROUT - PIPE ENDS TO BE CAPPED AND PIPES TO BE INFILLED WITH GROUT, 'TEREFIL MAINMARK' OR APPROVED EQUIVALENT (BY PRINCIPAL).
- WHERE PIPES ARE INDICATED TO BE RETAINED, IT IS EXPECTED CONTRACTORS TO CLEAN OUT PIPE AND PIT INLETS AFTER COMPLETION OF CONSTRUCTION.
- EXISTING PIPES TO BE RETAINED SUBJECT TO ONSITE CONDITION ASSESSMENT. CLASS AND DURABILITY TO BE CONFIRMED ONSITE. ALL PIPES TO BE RETAINED ASSUMED TO HAVE PIPE CLASS 4 STRENGTH. CONSTRUCTION TEAM TO CONFIRM STRENGTH ONSITE.

DRAINAGE STRUCTURES

- DRAINAGE STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND PROVISION OF ANY TEMPORARY BRACING, PROPPING, ETC. REQUIRED DURING CONSTRUCTION IN ACCORDANCE WITH TCCS MITS 03 UNDERGROUND SERVICES SPECIFICATIONS STRUCTURES SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED.
- EQUIVALENT PRECAST HEADWALLS / PITS MAY BE USED THAT SATISFY TCCS MITS 03 UNDERGROUND SERVICES SPECIFICATIONS, SUBJECT TO THE PRINCIPAL'S APPROVAL.
- INADEQUATE FOUNDATION MATERIAL FOR PIPES AND STRUCTURES SHALL BE REMOVED OR IMPROVED IN ACCORDANCE WITH MITS 03A TRENCHING FOR UNDERGROUND SERVICES.
- SUITABILITY OF THE FOUNDING MATERIAL SHALL BE ASSESSED AND CONFIRMED ON SITE BY THE CONTRACTORS GEOTECHNICAL ENGINEER
- TCCS STANDARD DETAILS TO BE ADOPTED ONLY WHERE REFERENCED / APPROVED. WHERE USED THEY MUST BE IN CONJUNCTION WITH DRAINAGE STRUCTURES DURABILITY REQUIREMENTS.
- STEEL GRATES AND FRAMES ARE TO BE FABRICATED FROM MILD STEEL AND HOT DIP GALVANISED. ALL GRATES ARE TO BE CLASS D U.N.O. GRATES AND FRAMES WITHIN THE PAVEMENT SURFACE (INCLUDES ADJOINING SO GUTTER) ARE TO BE BICYCLE SAFE IN ACCORDANCE WITH AS 3996.
- ALL WELDS TO COMPLY WITH AUSTRALIAN STANDARD AS 1554. FILLET WELDS TO BE NOT LESS THAN 6mm.
- ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS 4671 GRADE D500L (FITMENTS) AND D500N (TYPICAL).
- ALL GALVANISING TO BE IN ACCORDANCE WITH AS/NZS 2312 AND AS/NZS 4680. GALVANISING TO THREADED FASTENERS TO BE IN ACCORDANCE WITH AS 1214. MINIMUM GALVANISING 600g/sqm OTHER THAN FASTENERS.
- ALL DRAINAGE PIT GRATES TO BE BOLTED (HEX BOLT) TO THE FRAME.
- PITS GREATER THAN 900mm TO BE FITTED WITH STEP IRONS TO TCCS STANDARD DRAWING ACTSD-0830. STEP IRONS TO BE INSTALLED IN ACCORDANCE WITH UNDERGROUND SERVICES SPECIFICATIONS MITS 03D DRAINAGE STRUCTURES.

CONCRETE

- CONCRETE GRADE, EXPOSURE CLASSIFICATION AND MIN COVER AS SHOWN:

CONCRETE	ELEMENT	CONCRETE (GRADE MPa)	EXPOSURE CLASSIFICATION	CHARACTERISTIC COMPRESSIVE STRENGTH AT 28 DAYS (MPa)	MINIMUM COVER (mm) EXPOSURE CLASSIFICATION		
					CAST AGAINST FOTCCS	CAST AGAINST BLINDINGS	CAST AGAINST GROUND
CAST INSITU CONCRETE	ROUND BOTTOM CHANNEL	20	B1	20	N/A	N/A	N/A
	BOX CULVERT BASE SLAB	32	B1	32	45	N/A	N/A
	RECTANGULAR AND TRAPEZOIDAL CHANNEL	32	B1	32	45	N/A	N/A
	GRADED DRAIN CONCRETE ENCASEMENT	40	B1	40	45	45	45
BLINDING CONCRETE	-	20	-	20	N/A	N/A	N/A
PRECAST	OTHER	40	B1	40	45	N/A	N/A

- ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH TCCS MITS 03 UNDERGROUND SERVICES SPECIFICATIONS INCLUDING AMENDMENTS, EXCEPT WHERE VARIED BY PROJECT SPECIFICATIONS.
- CONCRETE SHALL BE FROM AN APPROVED SOURCE AND SHALL COMPLY WITH THE REQUIREMENTS OF THE FOLLOWING STANDARDS UNLESS VARIED BY THE PROJECT SPECIFICATION
- UNLESS VARIED BY THE PROJECT SPECIFICATION ALL CEMENT SHALL BE "GP" GENERAL PURPOSE OR "GB" GENERAL PURPOSE BLENDED CEMENT OR "SR" SULPHATE RESISTANT CEMENT, AS REQUIRED AND SHALL COMPLY WITH AS 3972.
- NO PENETRATIONS, RECESSES OR CHASES OTHER THAN THOSE SHOWN ON THE DRAWINGS SHALL BE MADE IN THE CONCRETE MEMBERS WITHOUT APPROVAL OF THE PRINCIPAL.
- ALL CONCRETE SURFACE FINISHES ARE TO BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

FORMWORK

- THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN, PRECAST, CAST INSITU, PROOF ENGINEERING, CERTIFICATION, CONSTRUCTION, INSPECTION AND PERFORMANCE OF THE FORMWORK AND FALSEWORK.
- DURING CONSTRUCTION, SUPPORT PROPPING IS REQUIRED WHERE LOADS FROM STACKED MATERIALS, FORMWORK AND OTHER SUPPORTED SLABS INDUCE LOADS IN A SLAB OR BEAM WHICH EXCEED THE DESIGN LOAD FOR STRENGTH AND SERVICEABILITY AT THAT AGE OR WHERE THE STRUCTURE IS INCOMPLETE ONCE THE NOMINATED 28 DAY STRENGTH HAS BEEN ATTAINED.
- THE FORMWORK SHALL NOT BE DESIGNED TO RELY ON RESTRAINT OR SUPPORT FROM THE PERMANENT STRUCTURE WITHOUT PRIOR APPROVAL FROM THE PRINCIPAL.
- ALL FORMED EXPOSED EDGES AND RE-ENTRANT CORNERS SHALL BE CHAMFERED OR FILLETED 20 x 20 mm, UNLESS NOTED OTHERWISE.

REINFORCEMENT

- ALL REINFORCEMENT SHALL COMPLY WITH AS/NZS 4671 GRADE D500N (BARS).
- REINFORCEMENT SHOWN ON THE DRAWINGS IS REPRESENTED DIAGRAMMATICALLY AND NOT NECESSARILY SHOWN IN TRUE PROJECTION. FOR CLARITY, BAR LOCATIONS MAY BE EXAGGERATED.
- UNLESS OTHERWISE SPECIFIED, THE MINIMUM DEVELOPED LENGTHS AND LENGTHS OF LAPS SHALL BE AS FOLLOWS:

MINIMUM DEVELOPMENT & LAP LENGTHS

BAR SIZE	CONCRETE GRADE (40 MPa)						
	N12	N16	N20	N24	N28	N32	N36
a) HORIZONTAL BARS WITH >300mm OF CONCRETE CAST BELOW THE BAR	450	620	800	1100	1410	1650	1950
b) OTHER BARS	350	500	650	850	1090	1250	1500

- WELDING OF REINFORCEMENT IS NOT PERMITTED UNLESS SHOWN ON THE DRAWINGS OR APPROVED BY THE PRINCIPAL.
- ALL REINFORCEMENT SHALL BE SECURELY TIED WITH WIRE TIES AND ALL TIE ENDS SHALL BE TURNED INTO THE MEMBER CLEAR OF THE COVER ZONE.
- REINFORCEMENT SHALL NOT BE CUT OR BENT ON SITE UNLESS APPROVED BY THE PRINCIPAL.
- THE TOLERANCE ON THE NOMINAL COVERS FOR FIXING THE REINFORCEMENT SHALL BE AS NOTED IN THE PROJECT SPECIFICATION.
- SPACING OF REINFORCEMENT SHALL BE TAKEN AS EQUAL UNLESS NOTED OTHERWISE ON THE DRAWINGS OR VARIED BY THE PROJECT SPECIFICATION.

SUBSURFACE DRAINAGE

- FOR SUBSURFACE DRAINAGE DETAILS REFER TO PACKAGE 10 PAVEMENTS DRAWING SET.

DURABILITY

- PITS:
 - EXPOSURE CLASSIFICATION SHALL BE B1.
 - CONCRETE SHALL HAVE A 28 DAY COMPRESSIVE STRENGTH OF 50 MPa, WITH A NOMINAL COVER OF 35mm OR MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 40 MPa WITH A NOMINAL COVER OF 45mm.
- PIPES:
 - CONCRETE GRADE AND COVER SHALL BE IN ACCORDANCE WITH THE PROVISIONS IN AS 4058 FOR "NORMAL" EXPOSURE ENVIRONMENT.

150 mm ON ORIGINAL
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

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EXTERNAL REFERENCE FILES		REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.
		A	19.06.2020	PRELIMINARY SKETCH PLAN	0007
		B	08.10.2020	PRELIMINARY SKETCH PLAN	0014
		C	13.11.2020	PRELIMINARY SKETCH PLAN SUBMISSION	0015
		D	15.03.2024	DRAFT DOCUMENT READINESS (DR) SUBMISSION	0036
		APPROVAL	TITLE	NAME	
		DK	DRAFTER	N. BROOKE-TAYLOR	
		DK	DRAFTING CHECK	X. SECUBAN	
		DK	DESIGNER	M. RAHMAN	
		T.VN	DESIGN CHECK	D. DONGOL	
			PROJECT MANAGER	K. DECANHA	
			PROJECT DIRECTOR	T. VAN NIEKERK	
SCALES AT A1 SIZE DRAWING		DESIGNER		<p>Member of the Surbana Jurong Group ABN 47 065 475 149</p>	
		CLIENT		<p>Transport Canberra & City Services</p>	
		PROJECT TITLE		WILLIAM HOVELL DRIVE DUPLICATION	
				DRAINAGE NOTES	
SCALE	PHASE	PROJECT / DRAWING No.		REVISION	
AS SHOWN	DETAIL DESIGN	3002750-DD-1401		D	

DR