

INSTRUCTIONS NOTES FOR USE OF DEEMED TO COMPLY
DRAWINGS FOR PRE-CAST MAINTENANCE HOLES:

- 1) THE DESIGN IS BASED ON USE OF MODULAR PRECAST CONCRETE COMPONENTS ALLOWING ASSEMBLY TO SUIT A VARIETY OF APPLICATIONS.THE DRAWINGS PROVIDE DEEMED TO COMPLY (DTC) SOLUTIONS FOR VARIOUS COMPONENTS, AND ASSEMBLY DETAILS FOR THE COMPONENTS REQUIRED TO CONSTRUCT A DN1050 OR DN1200 PRECAST MAINTENANCE HOLE.
- COMPONENTS MAY BE CONSTRUCTED IN ACCORDANCE WITH THE SW REFERENCE DESIGN, OR AN APPROVED EQUIVALENT 'OFF THE SHELF' PRODUCT. SUPPLIERS OF PRECAST COMPONENTS ARE ENCOURAGED TO SUBMIT DETAILS OF THEIR PRODUCT FOR ASSESSMENT AND LISTING IN THE DRAWINGS, WHERE ACCEPTED.
- 2) THE USER SHOULD NOTE THAT USE OF STANDARD DESIGN COMPONENTS MAY INTRODUCE UNINTENDED SAFETY RISKS FOR SPECIFIC APPLICATION. THE USER SHALL ADDRESS SAFETY RISKS THROUGH SITE SPECIFIC ASSESSMENT.
- 3) LIMITATIONS ON THE NUMBER AND SIZES OF SEWERS AND MAINTENANCE HOLE DEPTH ARE GIVEN IN THE TABLE BELOW.

NOMINAL INTERNAL DIA (mm)	DRG. NO.	MIN. DEPTH (m)	MAX. DEPTH (m)	OUTLET SEWER MAIN SIZE (DN)	MAX NUMBER INLETS
1050	DTC/2252	1.45	6.00	150-225	2
1200	DTC/2253	0.85	6.00	150-225	3
1200	DTC/2254	2.05	6.00	300-450	2

- 4) EACH PRECAST MAINTENANCE HOLE ASSEMBLY IS MADE UP OF FIVE BASIC COMPONENTS AS FOLLOWS.
- i) A BASE UNIT
- ii) SHAFT RINGS (HEIGHT AND NUMBER SELECTED TO FORM THE REQUIRED MAINTENANCE HOLE HEIGHT)
- iii) A STRAIGHT BACK TAPER RING (DN1050 MH) OR ROOF CONVERTER SLAB (DN1200 MH)
- iv) A MAXIMUM OF ONE SPACER RING.
- v) A DN600 ACCESS COVER WITH CONCRETE SURROUND.
- 5) MAINTENANCE HOLES SHALL BE FORMED WITH THE MINIMUM NUMBER OF COMPONENTS TO MINIMISE THE NUMBER OF JOINTS.
- 6) FOR THE SW REFERENCE DESIGN, BASE UNIT PENETRATIONS SHALL BE LOCATED TO SUIT SITE SPECIFIC GEOMETRY AS DETERMINED BY THE USER IN ACCORDANCE WITH THE FOLLOWING:
- i) DN150 SEWERS SHALL BE CONNECTED THROUGH Ø200 HOLE CORED THROUGH THE PRECAST BASE UNIT WALL.
- ii) DN225 SEWERS SHALL BE CONNECTED THROUGH Ø300 HOLE CORED THROUGH THE PRECAST BASE UNIT WALL.
- iii) DN300 TO DN450 SEWERS SHALL BE CONNECTED THROUGH A Ø650-700 TAPERED BLOCKOUT PROVIDED FOR DURING FABRICATION OF THE BASE UNIT.
- 8) THE DESIGN INCLUDES A MINIMUM 50 DROP ACROSS THE BASE UNITS. GREATER DROPS AS REQUIRED BY WSA 02-2002-2.2 SHALL BE ACHIEVED BY RAISING THE INLET INVERT POSITION OF UPSTREAM AND DOWNSTREAM PIPES WITHIN IN THE CORE OR BLOCKOUT.
- 9) HIGH LEVEL CONNECTIONS TO MAINTENANCE HOLES (EG, VENT LINE, EXTERNAL DROP)
- i) MAXIMUM SIZE SHALL BE DN225 WITH A DN300 CORED HOLE.
- iii) LOCATED IN SHAFT RINGS WITH HEIGHTS OF 900 OR GREATER
- 10) FLOTATION OF STRUCTURES BELOW GROUND
- i) MAINTENANCE HOLES HAVE BEEN DESIGNED TO RESIST BUOYANCY FORCES DUE TO EXTERNAL GROUNDWATER BY ENGAGING THE SURROUNDING SOIL THROUGH THE OVERSIZED BASE SLAB. APPLICATION OF THIS METHOD ASSUMES ANY SHORING OR SHEET PILING IS REMOVED AS PART OF CONSTRUCTION.

REFERENCE DRAWINGS:

DTC/2251	MAINTENANCES HOLES - PRECAST - DN1050 - DN1200 - NOTES, INSTRUCTIONS & DRAWING LIST
DTC/2252	DN1050 MAINTENANCES HOLES - PRECAST - FOR DN150 - DN225 SEWERS, <6 m DEEP - GENERAL ARRANGEMENT
DTC/2253	DN1200 MAINTENANCES HOLES - PRECAST - FOR DN150 - DN225 SEWERS, <6 m DEEP - GENERAL ARRANGEMENT
DTC/2254	DN1200 MAINTENANCES HOLES - PRECAST - FOR DN300 - DN450 SEWERS, <6 m DEEP - GENERAL ARRANGEMENT
DTC/2255	MAINTENANCES HOLES - PRECAST - RING SPACERS AND DN1050 STRAIGHT BACK TAPER - PLAN AND REINFORCEMENT DETAILS
DTC/2256	MAINTENANCES HOLES - PRECAST - DN1050 AND DN1200 SHAFT RING - DETAILS
DTC/2257	DN1050 & DN1200 MAINTENANCES HOLES - PRECAST - BASE SLAB FOR DN150 - DN225 SEWERS - GENERAL PLAN AND REINFORCEMENT
DTC/2258	DN1200 MAINTENANCES HOLES - PRECAST - BASE SLAB FOR DN300 - DN450 SEWERS - GENERAL PLAN AND REINFORCEMENT
DTC/2259	MAINTENANCES HOLES - PRECAST - PIPEWORK PENETRATION - DETAILS
DTC/2260	MAINTENANCES HOLES - PRECAST - PRECAST COMPONENTS - MISCELLANEOUS DETAILS
DTC/2261	MAINTENANCES HOLES - PRECAST - EXTERNAL DROP FOR DN150 - DN225 - DETAILS
DTC/2262	MAINTENANCES HOLES - PRECAST - DN1050 AND DN1200 SHAFT RING - SCHEDULE

SUPPORT DRAWINGS:

DTC/2220	MAINTENANCE HOLES - DETAILS - SHEET 1
DTC/2222	MAINTENANCE HOLES - DETAILS - SHEET 3
DTC/2223	DN1200 MAINTENANCE HOLES - ROOF SLAB DETAILS

NOTES:
GENERAL

- G1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE FOLLOWING:
- SEWAGE PUMPING CODE OF AUSTRALIA WSA 04-2005-2.1 SYDNEY WATER EDITION 2012
- SYDNEY WATER TECHNICAL SPECIFICATIONS PART 1 CIVIL WORKS, PART 2 MECHANICAL WORKS AND PART 3 ELECTRICAL WORKS
-WSAA MANUAL FOR SELECTION AND APPLICATION OF PROTECTIVE COATINGS WSA 201-2013-1.1 AND SYDNEY WATER SUPPLEMENT
-SYDNEY WATER LIST OF ACCEPTABLE PRODUCT SPECIFICATIONS.
-WSA 114-2002 INDUSTRY STANDARD FOR CONCRETE SPECIAL CLASS
- G2. STRUCTURAL CRITERIA
- i) STRUCTURAL WORK SHOWN ON THESE DRAWINGS HAS BEEN DESIGNED FOR THE FOLLOWING LOADING CONDITIONS:-
- ACCESS COVER/ROOF CONVERTER SLAB

TYPE 1 - CLASS B (AS 3996)
TYPE 2 - W80 (AS 5100.2)

TAPER RING, SHAFT RINGS AND BASE

INTERNAL HYDROSTATIC PRESSURE
FLUID DENSITY (y) = 15kN/m³

EXTERNAL EARTH PRESSURE
SOIL - ϕ' = 30°, DENSITY (y) = 20kN/m³, K_o = 0.5

EXTERNAL SURCHARGE LOAD
20 kPa

GROUNDWATER TABLE AT SURFACE LEVEL
- ii) DN1050 MH - CONCRETE EXPOSURE CLASSIFICATION - B2 (AS3735)
ij) DN1200 MH - CONCRETE EXPOSURE CLASSIFICATION - D (AS3735)
- G3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ANY TEMPORARY WORKS.
- G4. WHERE PROPRIETARY ITEMS HAVE BEEN SPECIFIED, A SUITABLE EQUIVALENT MAY BE USED IF APPROVED BY SYDNEY WATER. PROPRIETARY ITEMS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- G5. COMPLIANCE TESTING AND COMMISSIONING SHALL BE UNDERTAKEN AS PER THE SEWAGE PUMPING STATION CODE OF AUSTRALIA WSA04- SYDNEY WATER EDITION. SYDNEY WATER TECHNICAL SPECIFICATION AND APPROVED SITE SPECIFIC COMMISSIONING PLAN PREPARED TO SYDNEY WATER STANDARD.
- G6. THIS DESIGN IS NOT SUITABLE FOR UNSTABLE GROUND, CONTAMINATED GROUND OR MINE SUBSIDENCE AREAS
- G6. DIMENSIONS ARE IN MILLIMETRES U.N.O. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.

CONCRETE

- C1. WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS 3600-2001 AND AS 3735:2001.
- C2. STRUCTURAL CONCRETE SHALL BE GRADE SCC50 FOR PRECAST CONCRETE ELEMENTS AND GRADE SCC40 FOR INSITU CONCRETE ELEMENTS IN ACCORDANCE WITH WSA 114-2001 EXCEPT AS VARIED BELOW:

SECTION 4 - MIX DESIGN - SCC50
(FOR SW REFERENCE DESIGN ONLY - N/A FOR SUPPLIER LISTED PRODUCTS)

MINIMUM F'c AT 28 DAYS	50MPa
MINIMUM BINDER CONTENT	500kg/m³
MAXIMUM 56 DAY DRYING SHRINKAGE STRAIN	600 x 10 ⁻⁶
MAXIMUM WATER : CEMENT RATIO	0.40
SLUMP	80 - 120

SECTION 4 - MIX DESIGN - SCC40

MINIMUM F'c AT 28 DAYS	40MPa
MINIMUM BINDER CONTENT	450kg/m³
MAXIMUM 56 DAY DRYING SHRINKAGE STRAIN	600 x 10 ⁻⁶
MAXIMUM WATER : CEMENT RATIO	0.45
SLUMP	80 - 120

SECTION 6 - SUPPLEMENTARY CEMENTITIOUS MATERIALS

THE TOTAL AMOUNT OF SUPPLEMENTARY CEMENTITIOUS MATERIALS SHALL NOT BE MORE THAN 60% BY WEIGHT OF THE TOTAL CEMENT MATERIAL.

SECTION 6.2 - FLY ASH

THE MAXIMUM AMOUNT OF FLY ASH SHALL BE 25% BY WEIGHT OF THE TOTAL CEMENT MATERIAL.

SECTION 6.3 - SLAG

THE MAXIMUM AMOUNT OF SLAG SHALL BE 50% BY WEIGHT OF THE TOTAL CEMENT MATERIAL.

SECTION 6.5 - AGGREGATES

THE MAXIMUM NOMINAL SIZE OF AGGREGATE SHALL BE 20. RECYCLED MATERIAL OR SLAG PRODUCTS SHALL NOT BE USED AS AGGREGATES.

SECTION 6.7 - CHEMICAL ADMIXTURES

WHERE TWO OR MORE ADMIXTURES ARE PROPOSED FOR INCORPORATION INTO A CONCRETE MIX THE MANUFACTURERS SHALL CERTIFY THE COMPATIBILITY OF THE ADMIXTURES.

- C3. DRY CAST MANUFACTURE OF PRECAST CONCRETE ELEMENTS SHALL NOT BE USED
- C4. CURING OF ALL CONCRETE SHALL BE ACHIEVED BY KEEPING THE SURFACES CONTINUOUSLY WET FOR A PERIOD OF 7 DAYS. POLYETHYLENE SHEETING OR WET HESSIAN MAY BE USED. POLYETHYLENE AND HESSIAN SHALL BE ADEQUATELY SECURED TO RESIST WIND AND TRAFFIC FORCES. ALTERNATIVE CURING MAY BE ACHIEVED BY APPLYING SKIA ANTISOL WB CURING COMPOUND OR APPROVED EQUIVALENTS TO ALL SURFACES IN ACCORDANCE WITH THE MANUFACTURE'S REQUIREMENTS FOR A PERIOD OF 14 DAYS
- C5. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 32 MPa PRIOR TO BACKFILLING OR TESTING
- C6. SIZES OF CONCRETE MEMBERS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES.
- C7. 25 CHAMFER FOR ALL EXPOSED CONCRETE EDGES AND 20 FILLET FOR ALL RE-ENTRANT CORNERS SHALL BE PROVIDED U.N.O.
- C8. SURFACE FINISHES SHALL BE IN ACCORDANCE WITH AS3610:1995
EXPOSED FORMED - CLASS 2. CONCEALED FORMED - CLASS 3 , UNFORMED - CLASS 4.
- C9. THE DESIGN, CONSTRUCTION AND PERFORMANCE OF ALL FORMWORK AND FALSEWORK SHALL BE CERTIFIED BY A QUALIFIED STRUCTURAL ENGINEER.

FOUNDATION:

- F1. THE MINIMUM ALLOWABLE BEARING PRESSURE SHALL BE 100 KPA ALLOWABLE BEARING.
- F2. THE SAND LAYER BENEATH EACH MAINTENANCE HOLE BASE SHALL BE PLACED TO THE FOUNDATION DESIGN LEVEL ON THE SAME DAY AS THE FINAL EXCAVATION . FOUNING STRATA SHALL BE INSPECTED BY THE PROJECT ENGINEER BEFORE PLACEMENT OF THE SAND LAYER.
- F3. ANY OVER-EXCAVATION OR CAVITIES IN THE FOUNDATION SHALL BE FILLED WITH NORMAL CLASS N15 MASS CONCRETE TO WSA PS-357.

EARTHWORKS AND BACKFILLING:

- B1. BACKFILL SHALL BE PLACED AND COMPACTED EVENLY AROUND EACH MAINTENANCE HOLE IN LAYERS NOT EXCEEDING 300 LOOSE THICKNESSES.
- i) WHERE EXTERNAL CLEARANCE AT THE TIME OF BACKFILL IS <500. BACKFILL STRUCTURE WITH 20:1 SAND TO GP CEMENT STABILISED SAND TO WSA PS-352.
- ii) WHERE EXTERNAL CLEARANCE AT THE TIME OF BACKFILL IS >500 EXCAVATED MATERIAL MAY BE USED AS BACKFILL. SOIL MATERIAL THAT HAS A PLASTICITY INDEX HIGHER THAN 30 SHALL NOT PERMITTED FOR USE AS BACKFILL MATERIAL. BACKFILL MATERIAL SHALL BE FREE OF ROCKS, CEMENT LUMPS AND CLAY CLODS LARGER THAN 75 IN SIZE AND BE FREE OF PLASTICS, METALS AND ORGANIC MATTER, SUCH AS GRASS, ROOTS, BRUSH AND OTHER VEGETATION.

THIS DRAWING MAY ONLY BE USED IN THE COURSE OF AND FOR THE PURPOSE OF CREATING SYDNEY WATER ASSETS. USE THIS DRAWING WITH CARE. THE USER IS RESPONSIBLE FOR THE CORRECT APPLICATION OF THIS DRAWING.

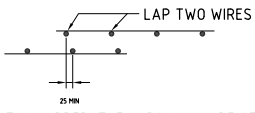
- B2. AT NO STAGE SHALL THERE BE A DIFFERENCE IN THE HEIGHT OF BACKFILL ACROSS A MAINTENANCE HOLE OF MORE THAN 500.
- B3. BACKFILLING AROUND EACH MAINTENANCE HOLE SHALL BE STAGED IF THE DEPTH OF THE MAINTENANCE HOLE IS GREATER THAN 2.5m AT NO STAGE SHALL THE HEIGHT OF THE TOP OF A PARTIALLY COMPLETED MAINTENANCE HOLE BE MORE THAN 2.5m ABOVE THE LEVEL OF COMPACTED BACKFILL AROUND THE MAINTENANCE HOLE.
- B4. COHESIVE BACKFILL MATERIALS SHALL BE COMPACTED TO A DRY DENSITY RATIO OF NOT LESS THAN 95%. TESTED IN ACCORDANCE WITH AS 1289.5.4.1 AND AS 1289.5.1.1.
- B5. NON-COHESIVE (GRANULAR) BACKFILL MATERIALS SHALL BE COMPACTED TO A DENSITY INDEX OF NOT LESS THAN 70%. TESTED IN ACCORDANCE WITH 1289.5.6.1.

REINFORCEMENT

- R1. REINFORCEMENT BARS AND MESH SHALL COMPLY WITH AS/NZS 4671. REINFORCEMENT SYMBOLS:
N - DENOTES GRADE 500N DEFORMED BARS
R - DENOTES GRADE 250N ROUND BARS
SL - DENOTES GRADE 500L DEFORMED SQUARE FABRIC
RL - DENOTES GRADE 500L DEFORMED RECTANGULAR FABRIC
- R2. CLEAR CONCRETE COVER TO REINFORCEMENT SHALL BE AS FOLLOWS UNLESS OTHERWISE SHOWN:-
- PRECAST CONCRETE ELEMENTS - RIGID FORMWORK / INTENSE COMPACTION TO AS 3735 45 ALL SURFACES
- CAST INSITU CONCRETE ELEMENTS - STANDARD FORMWORK/COMPACTION TO AS 3735 75 LIQUID RETAINING SURFACES
75 SURFACES IN CONTACT WITH GROUND
50 SURFACES IN CONTACT WITH GROUND PROTECTED BY BLINDING CONCRETE
50 SURFACES ABOVE GROUND
- R3. LOAD BEARING WELDED JOINTS FOR THE TRANSMISSION OF LOADS BETWEEN REINFORCEMENT IS NOT PERMITTED. NON LOAD BEARING WELDED JOINTS (TACK WELDS) TO KEEP REINFORCEMENT IN POSITION DURING FABRICATION, TRANSPORT & CONCRETING, IS PERMITTED WHERE WELDING WILL NOT IMPACT DUCTILITY OF REINFORCEMENT. WELDING SHALL BE IN ACCORDANCE WITH AS 1554.3. LAP LENGTHS SHALL NOT BE REDUCED DUE TO WELDING.

- R4. PIPES OR CONDUITS SHALL NOT BE PLACED WITHIN THE CONCRETE COVER TO REINFORCEMENT.
- R5. REINFORCEMENT IS SHOWN DIAGRAMMATICALLY ON THE DRAWINGS AND THEREFORE DOES NOT DEPICT THE EXACT POSITION OF THE BARS.
- R6. REINFORCEMENT ANCHORAGE, COGS AND LAP LENGTHS SHALL BE AS FOLLOWS UNLESS NOTED OTHERWISE.

BAR SIZE (GRADE 500N)	N12	N16
ANCHORAGE AND LAP LENGTH	400	600
COG LENGTH	200	250

- R7. MESH LAP DETAIL :
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- R8. WHERE REINFORCEMENT IS LAPPED, THE LAPS SHALL BE STAGGERED AND NO MORE THAN 50% OF THE REINFORCEMENT SHALL BE LAPPED AT ANY ONE SECTION UNLESS OTHERWISE SPECIFIED. SPLICE LENGTHS GIVEN ABOVE SHALL BE INCREASED BY 33% AT LOCATIONS OF MAXIMUM STRESS OR WHERE MORE THAN ONE HALF OF THE BARS ARE SPLICED AT ANY ONE LOCATION.
- R9. ALL HOOKS AND COGS SHALL BE IN ACCORDANCE WITH AS 5100.
- R10. TT - DENOTES TOP LAYER LAID SECOND.
T - DENOTES TOP LAYER LAID FIRST.
BB - DENOTES BOTTOM LAYER LAID FIRST.
B - DENOTES BOTTOM LAYER LAID SECOND.
EF - DENOTES EACH FACE.
- R11. REINFORCEMENT SHALL BE SUPPORTED ON PLASTIC CHAIRS AT NOT GREATER THAN 1 METRE CENTRES BOTH WAYS.
- R12. NO HOLES OR CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE STRUCTURAL DESIGNER.

<div>Sydney WATER</div>	APPROVED <div>KEN WIGGINS MANAGER, E & ES</div>	A	ORIGINAL ISSUE	KW	22/06/15	DEEMED TO COMPLY DRAWINGS		DTC 2251	
	ENGINEERING & ENVIRONMENTAL SERVICES					MAINTENANCE HOLES - PRECAST DN1050 - DN1200		ISSUE	DATE
NOTES, INSTRUCTIONS & DRAWING LIST						A	22/06/15		
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