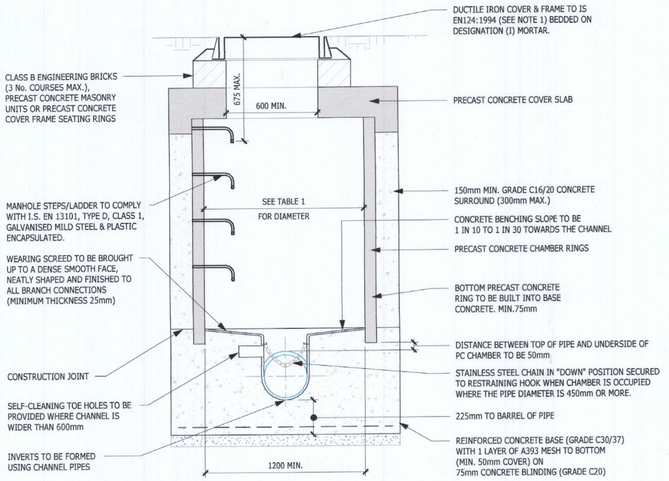
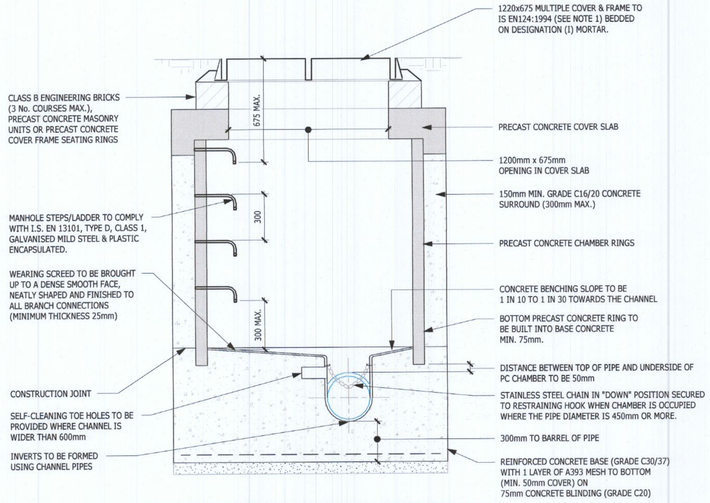


TYPICAL PRECAST MANHOLE TYPE PC-1

(DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE LESS THAN 1.0m)

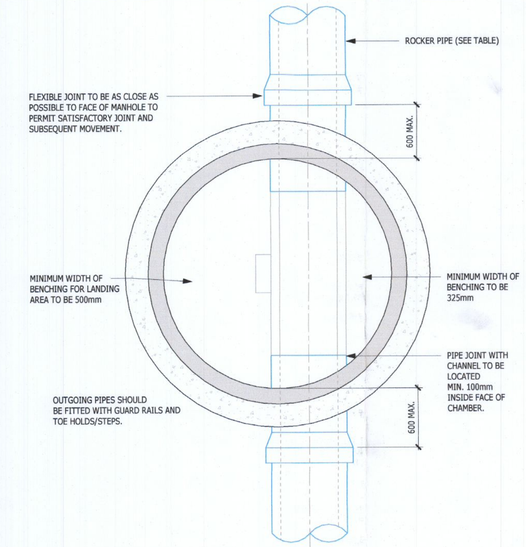
SCALE 1:20



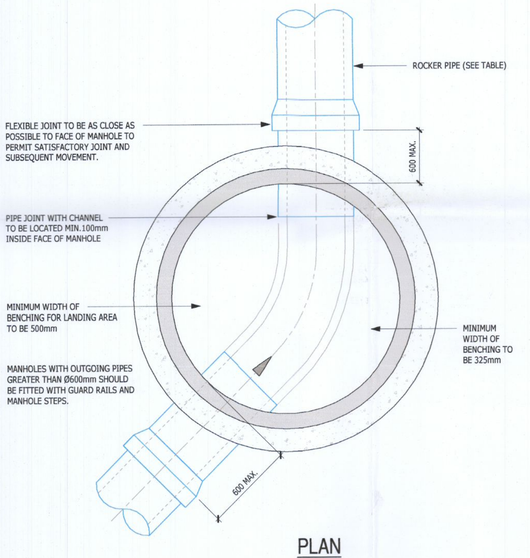
TYPICAL PRECAST MANHOLE TYPE PC-2

(DEPTH FROM GROUND LEVEL TO SOFFIT OF PIPE 1.0m - 1.45m)

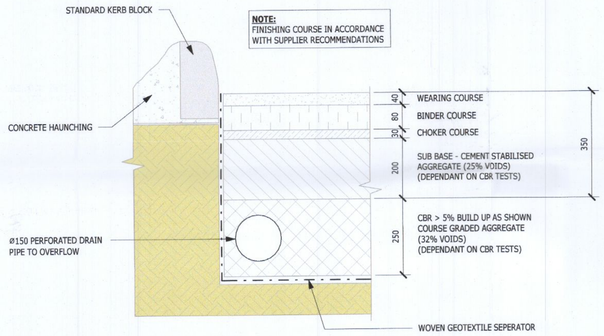
SCALE 1:20



PLAN

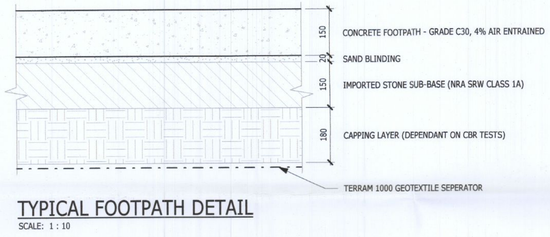


PLAN



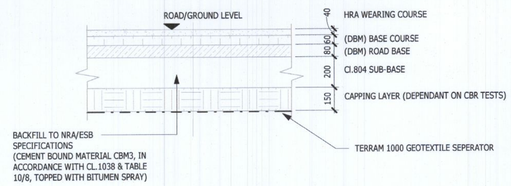
TYPICAL PERMEABLE ASPHALT ROAD DETAIL

SCALE: 1 : 10



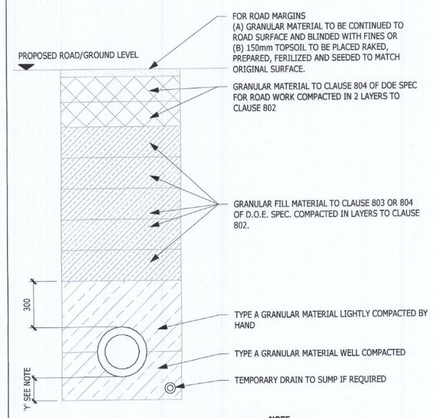
TYPICAL FOOTPATH DETAIL

SCALE: 1 : 10

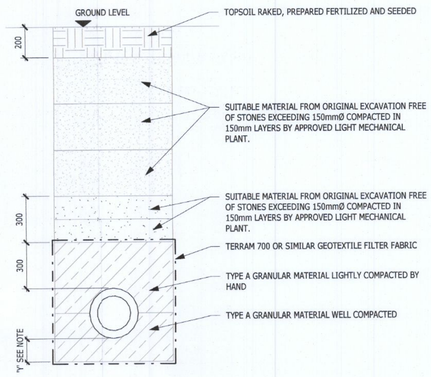


TYPICAL EXISTING ROAD BUILD UP (RETAINED)

SCALE: 1 : 20



TRENCH IN ROAD AND ROAD MARGINS



FIELDS

(WHERE REQUIRED BY POOR GROUND CONDITIONS

NOTE
'Y'=150 FOR PIPES UP TO 300mmØ
'Y'=200 FOR PIPES FROM 375mmØ TO 1200mmØ
IN ROCK OR MIXED SOILS CONTAINING BOULDERS OR HARD SPOTS DIMENSION 'Y' SHALL BE INCREASED BY 100

TYPICAL TRENCH BEDDING DETAIL

SCALE: 1 : 20

TYPICAL TRENCH WIDTHS		
NOMINAL PIPE Ø (mm)	MIN. TRENCH WIDTH (mm)	MAX. TRENCH WIDTH (mm)
100	430	630
150	490	690
225	580	780
300	680	880
375	950	1150
450	1030	1230
525	1120	1320
600	1240	1440
675	1330	1530
750	1400	1600
900	1920	2120
1050	2100	2300

TABLE 1 - MINIMUM MANHOLE DIAMETERS

DIAMETER OF LARGEST PIPE IN MANHOLE (mm)	MIN. INTERNAL DIAMETER OF MANHOLE (mm)
LESS THAN 375	1200
375-450	1350
500-700	1500
750-900	1800
900 AND OVER	TO APPROVAL OF COUNCIL/AUTHORITY

ROCKER PIPE LENGTH

PIPE DIAMETER (mm)	ROCKER PIPE LENGTH (mm)
150 TO 600	600
600-750	1000
GREATER THAN 750	1250

NOTES

GENERAL:

1. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METRES. ALL LEVELS & DIMENSIONS TO BE CHECKED ON SITE BY CONTRACTOR.
2. THIS DRAWING IS TO BE READ IN CONJUCTION WITH RELEVANT ENGINEERS DRAWINGS AND SPECIFICATIONS.
3. DO NOT SCALE FROM THIS DRAWING, FIGURED DIMENSIONS TO BE CHECKED WITH ENGINEER. ALL SITE DIMENSIONS TO BE CONFIRMED.
4. ANY DISCRAPANCIES BETWEEN DRAWINGS, SPECIFICATION, SKETCHES & SITE CONDITIONS TO BE REFERRED TO THE DESIGN TEAM BEFORE WORK COMMENCES.

COVERS:

1. COVERS AND FRAMES TO BE DUCTILE IRON (TO IS EN124:1994)
   - FRAMES TO BE 150mm DEEP FOR ROADS & 100mm DEEP FOR FOOTPATHS AND GREEN AREAS.
   - IN CARRIAGEWAYS SHALL BE CLASS D400
   - IN HEAVILY TRAFFICKED MAIN ROADS SHALL BE CLASS E600
   - IN VERGES & FOOTWAYS SHALL BE CLASS B125 (IN VERGES COVERS SHALL BE POSITIONED ON THE SIDE FURTHEST FROM THE CARRIAGEWAY)
   - IN AREAS INACCESSABLE TO MOTORVEHICLES COVERS SHALL BE CLASS A15
2. IN GREEN AREAS PROVIDE 200mm WIDE x 100mm DEEP CONCRETE PLINTH ALL AROUND COVER.
3. MANHOLE OPENINGS TO BE SITUATED FURTHEST FROM THE NEAREST CARRIAGEWAY. MANHOLE STEPS/ACCESS TO BE POSITIONED TO ALLOW VIEWING OF ONCOMING TRAFFIC.
4. EACH COVER AND FRAME SHALL HAVE CLEARLY MARKED THEREON:
   - I.S./EN 124:1994 - CLASS D400 OR E600
   - THE NAME AND/OR IDENTIFICATION MARK OF THE MANUFACTURER AND THE PLACE OF MANUFACTURE.
   - YEAR OF MANUFACTURE
   - MARK OF THE CERTIFICATION BODY.
   - MANHOLE COVERS AND FRAMES TO BE SUPPLIED BY AN APPROVED MANUFACTURER AND BE TO THE SATISFACTION OF THE LOCAL AUTHORITY DRAINAGE DIVISION.

MANHOLE CONSTRUCTION:

5. PRECAST CONCRETE MANHOLES, CHAMBER WALLS AND COVER SLABS SHALL BE CONSTRUCTED OF PRECAST UNITS COMPLYING WITH I.S. 420:2004 AND I.S. EN 1917, AND SHALL BE OF THE DIMENSIONS SHOWN ON THE DRAWING.
6. A SHAFT OF AT LEAST 450mm DEPTH MUST BE PROVIDED BETWEEN THE COVER SLAB AND THE MANHOLE COVER SO THAT THE COVER SLAB IS INDEPENDENT OF THE ROAD CONSTRUCTION.
7. FOR BEDDING AND SEALING OF CHAMBER RINGS, THE TOP RING (TO PRECAST COVER SLAB) AND BOTTOM RING TO BE BEDDED WITH CEMENT MORTAR. FOR INTERMEDIATE RINGS, JOINTS TO BE SEALED WITH ELASTOMERIC JOINT SEALANT TO EN 681.
8. THE MANHOLE BASE SLAB AND BENCHING SHALL BE FORMED IN-SITU OF GRADE C30/37 CONCRETE.
9. THE MANHOLE BASE SLAB SHALL BE MIN. 225mm THICK, WITH 1 LAYER A393 FABRIC MESH IN BOTTOM, AND THE CHANNEL BE PURPOSE MADE HALF-ROUND CHANNELS.
10. THE PRECAST RINGS SHALL BE SURROUNDED IN MIN. 150mm THICK GRADE C16/20 CONCRETE.
11. A FLEXIBLE JOINT SHALL BE PROVIDED TO EACH PIPE WITHIN 500mm OF THE INNER FACE OF THE MANHOLE WALL.
12. PROJECTING PIPES SHALL BE SURROUNDED WITH GRADE C16/20 CONCRETE WITH THE BASE CAST MONOLITHICALLY WITH THE MANHOLE BASE. A FURTHER "ROCKER" PIPE SHALL BE PROVIDED AS PER ROCKER PIPE TABLE.

BENCHING:

13. BENCHING IS TO BE FORMED IN GRADE C30/37 CONCRETE AND SHOULD RISE VERTICALLY FROM THE TOP EDGE OF THE CHANNEL TO A HEIGHT NOT LESS THAN THAT OF THE SOFFIT OF THE OUTLET AND SLOPE UPWARDS TO MEET THE WALL OF THE MANHOLE AT A GRADIENT OF 1:30 (MIN. RISE 25mm).
14. BENCHING SHOULD BE FLOATED WITH A STEEL FLOAT TO A SMOOTH HARD SURFACE WITH A 25mm THICK WEARING SCREED OF 1:3 CEMENT:SAND MORTAR (1 PART CEMENT, 1 PART NATURAL SAND AND 2 PARTS SINGLE SIZED COARSE AGGREGATE) LAID WHILE THE BENCHING CONCRETE IS STILL GREEN, i.e. WITHIN 3 HOURS OF BEING PLACED & SET BUT NOT APPRECIABLY HARDENED.
15. TOE HOLES OF 230mm MINIMUM DEPTH AND GALVANIZED STEEL SAFETY RAILINGS TO BE PROVIDED IN BENCHING OF SEWERS GREATER THAN 600mm DIAMETER AND DEPTH TO INVERT >3m FOR ACCESS TO INVERT.
16. PREFORMED HALF CIRCLE CHANNEL PIPES. THE PIPELINE MAY, WHERE PRACTICABLE, BE LAID THROUGH THE MANHOLE AND THE CROWN CUT OUT TO HALF DIAMETER, PROVIDED FLEXIBLE JOINTS ARE SITUATED ON EACH SIDE NO FUTHER THAN 600mm FROM THE INNER FACE OF MANHOLE WALL.

ACCESS LADDERS/STEPS:

17. MANHOLE STEPS/LADDER TO COMPLY WITH I.S. EN 13101, TYPE D, CLASS 1, GALVANISED MILD STEEL & PLASTIC ENCAPSULATED.
18. STEPS ARE REQUIRED IN MANHOLES UP TO A GROUND TO PIPE SOFFIT DEPTH OF LESS THAN 3.0m. MANHOLE LADDERS ARE REQUIRED FOR MANHOLES WITH A DEPTH IN EXCESS OF 3.0m & ARE TO COMPLY WITH I.S. EN 14396.
19. LADDER STRINGERS SHOULD BE ADEQUATELY SUPPORTED FROM THE MANHOLE WALL AT INTERVALS OF NOT MORE THAN 2.0m. STRINGERS SHOULD BE BOLTED TO CLEATS TO FACILITATE RENEWAL.

GENERAL NOTES

20. BRICKWORK SHALL BE IN CLASS 'B' ENGINEERING BRICKS TO BS 3921 IN ENGLISH BOND SET IN MORTAR TO DESIGNATION (1). BLOCKWORK SHALL BE DENSE CONCRETE BLOCKS MIN 10N/mm2 SET IN MORTAR DESIGNATION (1).
21. CEMENT - SHALL BE SULPHATE RESISTING CEMENT TO BS4027:1991. SHALL BE USED IN ALL CASES (INCLUDING PRECAST CONCRETE PRODUCTS)
22. CONCRETE SHALL HAVE A MINIMUM CEMENT CONTENT OF 330KG/m3, A MAXIMUM FREE WATER/CEMENT RATIO OF 0.50 AND 20mm NOMINAL MAXIMUM SIZE AGGREGATE.
23. CHAMBERS WITH OUTGOING PIPES GREATER THAN 600mmø SHALL BE FITTED WITH GUARD RAILS.
24. MINIMUM CLEAR ACCESS TO BE IN ACCORDANCE WITH LOCAL COUNCIL / AUTHORITY SPECIFICATIONS.
25. ALL ADOPTABLE WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL COUNCIL / AUTHORITY.

REV	DATE	DESCRIPTION	DRN	DES	CHKD	APPR
B	13.JUL.22	ISSUED FOR PLANNING	JK	JK	SH	EF
A	02.JUN.22	ISSUED FOR INFORMATION	JK	JK	SH	EF

STATUS PLANNING

CLIENT Takeda

DPS

PROJECT TAKEDA VOC ABATEMENT SYSTEM

TITLE CIVIL DETAILS
TYPICAL DRAINAGE DETAILS

PROJECT No.	A1 SCALE	DISCIPLINE		
A21DB035	As indicated	CIVIL		
CLIENT DRAWING NO.	DRAWING NO.	SHT	REV
1022429	A21DB035-CV-500	1/1	B