

**GENERAL**

1. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH THE HUME CITY COUNCILS STANDARD DRAWING AND COUNCIL'S CONSTRUCTION SPECIFICATION.
2. ALL CONSTRUCTION WORK SHALL BE RESTRICTED TO THE HOURS OF 7.00am TO 5.00pm MONDAY TO FRIDAY AND 7.00am TO 1.00pm SATURDAYS. NO WORK SHALL TAKE PLACE ON SUNDAYS OR PUBLIC HOLIDAYS UNLESS OTHERWISE APPROVED BY COUNCIL.
3. THE CONTRACTOR SHALL NOT ENTER OR WORK IN ADJOINING PROPERTIES WITHOUT WRITTEN PERMISSION FROM THE PROPERTY OWNERS OR RESPONSIBLE AUTHORITIES.
4. EXISTING SERVICES SHOWN ON THESE PLANS ARE NOT GUARANTEED COMPLETE OR CORRECT AND HAVE BEEN SOURCED FROM INFORMATION SUPPLIED BY THE RELEVANT AUTHORITIES AND/OR FIELD INVESTIGATIONS. THE CONTRACTOR IS TO CONFIRM THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO COMMENCING CONSTRUCTION AND MAKE ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE OR ADJUST IF NECESSARY.
5. COUNCIL'S TREE PRESERVATION ORDER MUST BE OBSERVED AND NO TREE IS TO BE FELLED, LOPPED OR REMOVED WITHOUT THE PRIOR WRITTEN CONSENT OF COUNCIL. TREES TO REMAIN ARE TO BE APPROPRIATELY PROTECTED DURING CONSTRUCTION USING PARAWEBB FENCING.
6. THE CONTRACTOR SHALL CONTROL SEDIMENTATION, EROSION AND POLLUTION DURING CONSTRUCTION IN ACCORDANCE WITH THE REQUIREMENTS OF THE CURRENT EDITION OF THE 'SOILS AND CONSTRUCTION - MANAGING URBAN STORMWATER, HANDBOOK (OTHERWISE REFERRED TO AS THE 'BLUE BOOK'), COUNCIL AND THE APPROVED SOIL AND WATER MANAGEMENT PLAN.
7. ALL NEW WORKS TO MAKE A SMOOTH JUNCTION WITH EXISTING WORK
8. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE REPAIR OF ANY DAMAGE TO COUNCIL'S INFRASTRUCTURE. SUCH REPAIR OR REINSTATEMENT IS TO BE CARRIED OUT IMMEDIATELY TO THE SATISFACTION OF COUNCIL.
9. TRAFFIC CONTROL MEASURES ARE TO BE IMPLEMENTED AT ALL TIMES IN ACCORDANCE WITH AS1743 AND HP81.1-2003. A SITE SAFETY PLAN (INCLUDING A TRAFFIC MANAGEMENT PLAN) IS TO BE PREPARED BY THE CONTRACTOR IN ACCORDANCE WITH THE RELEVANT STANDARDS.
10. ALL EXCAVATED MATERIAL IS TO BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR.
11. ALL DRAINAGE BACKFILL OUTSIDE THE RAINGARDENS IS TO COMPLY WITH COUNCIL STANDARD DRAWING DS13 FOR TYPE "A" BACKFILL.

**CONCRETE**

1. ALL CONCRETE SHALL BE SUPPLIED, PLACED AND TESTED IN ACCORDANCE WITH AS3600-2001 'CONCRETE STRUCTURES CODE'.
2. CONCRETE TO BE SUPPLIED BY AN APPROVED PRE-MIX ORGANISATION.
3. CONCRETE QUALITIES SHALL BE:
  - 3.1. MINIMUM COMPRESSIVE STRENGTH F<sub>c</sub> - 32 MPa
  - 3.2. AT MINIMUM STRENGTH DEVELOPMENT TIME (DAYS) - 28
  - 3.3. WATER CEMENT RATIO (MAXIMUM) - 0.55
  - 3.4. SLUMP (MAXIMUM) - 80mm
  - 3.5. AGGREGATE SIZE (MAXIMUM) - 20mm
  - 3.6. CEMENT SHALL BE SULPHATE RESISTANT CEMENT, WATER TO BE CLEAN AND POTABLE
  - 3.7. AGGREGATE TO BE SHARP, CLEAN AND CONTINUOUSLY GRADED. ALTERNATIVELY AN APPROVED WATER REDUCING AGENT MAY BE USED AND THE SLUMP INCREASED TO 120mm. HOWEVER THE CEMENT CONTENT SHALL NOT BE REDUCED.
4. ADDITIVES SHALL NOT BE USED WITHOUT WRITTEN APPROVAL FROM THE SUPERINTENDENT.
5. ALL CONCRETE SHALL BE THOROUGHLY COMPACTED. ALL SURFACE TREATMENT OF CONCRETE SHALL BE A SMOOTH TROUGHED FINISH.
6. ALL CONCRETE SHALL BE CURED BY KEEPING MOIST FOR A MINIMUM PERIOD OF SEVEN (7) DAYS AFTER PLACING OR BY APPLICATION OF AN APPROVED CURING COMPOUND. IMMEDIATELY AFTER SURFACE HARDENING APPLY WATER TO THE SURFACE AND THEN COVER THE WHOLE SURFACE WITH P.V.C SHEETING. EXTEND THE SHEETING BEYOND THE EDGES OF THE NEW CONCRETE AND SEAL THE P.V.C. TO THE OLD CONCRETE AND ALONG THE EDGES AND ALL JOINTS IN THE P.V.C. TO PREVENT ANY LOSS OF MOISTURE.
7. REINFORCING BARS TO BE SUPPLIED, PLACED, FIXED AND SUPPORTED IN ACCORDANCE WITH AS3600-2001 CONCRETE STRUCTURES CODE AND THE SPECIFICATION WITH SUPPORTS AT 600mm CENTRES UNLESS SPECIFIED OTHERWISE WITHIN THE DRAWINGS.
8. COVER TO REINFORCING SHALL BE MINIMUM 50mm TOP AND BOTTOM. ALL SPLICES IN REINFORCEMENT SHALL BE LAPPED TO DEVELOP FULL TENSILE STRENGTH IN ACCORDANCE WITH AS3600-2001 CONCRETE STRUCTURES CODE.
9. FORM UP CONTRACTION AND EXPANSION JOINTS TO ALLOW JOINTS TO THOROUGHLY DRY OUT AND SEAL USING AN APPROVED JOINT SEALANT AS SHOWN IN STRICT ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
10. ALL EXPOSED STEEL SECTIONS CAST INTO CONCRETE SHALL BE HOT DIP GALVANISED.
11. ALL EXPOSED CONCRETE CORNERS TO HAVE 25mm CHAMFER.
12. ALL CONSTRUCTION JOINTS SHALL BE THOROUGHLY SCABBLED AND CLEANED BEFORE CONCRETE PLACEMENT AND IN ACCORDANCE WITH SPECIFICATION.

**BIORETENTION MATERIAL SPECIFICATION**

**MULCH LAYER (VEGETATED BIORETENTION AREA ONLY)**  
 THE TOP LAYER OF THE FILTER SHOULD BE COVERED WITH LAYER OF SCREENED NO FINES STONE AGGREGATE MULCH. 100% OF THE PARTICLES SHOULD BE IN THE SIZE RANGE 10-20MM. MULCH SHALL BE RAKED EVEN AND KEPT CLEAR OF PLANT STEMS TO AVOID COLLAR ROT. THE FINISH LEVEL IS CRITICAL FOR EXTENDED DETENTION STORAGE VOLUME. A SAMPLE IS TO BE PROVIDED TO THE SUPERINTENDENT FOR APPROVAL PRIOR TO INSTALLATION.

**FILTER LAYER**  
 THE FILTER MATERIAL SHALL PREFERABLY BE A "WASHED SAND" OF SILICEOUS OR CALCAREOUS ORIGIN, ONE THAT HAS BEEN MINED AND PROCESSED. NATURAL SOILS OR TOPSOILS ARE NOT USUALLY SUITABLE. USE BURDETTE'S TURF 200 OR SIMILAR AND AMMEND TO SUIT THE FOLLOWING PROPERTIES:

1. SATURATED HYDRAULIC CONDUCTIVITY (HC) - FILTER MEDIA SHALL HAVE A HC IN THE RANGE OF 150 - 250MM/H. THIS CRITICAL ELEMENT IS TO BE DEMONSTRATED THROUGH LAB TESTING USING ASTM F1815-06.
2. PARTICLE SIZE DISTRIBUTION (PSD) - COMPOSITION (W/W) REQUIREMENTS:
 

DESCRIPTION	PROPORTION	GRADING
CLAY & SILT	<3%	<0.05 MM
VERY FINE SAND	5-30%	0.05-0.15 MM
FINE SAND	10-30%	0.15-0.25 MM
MEDIUM TO COARSE SAND	40-60%	0.25-1.0 MM
COARSE SAND	7-10%	1.0-2.0 MM
FINE GRAVEL	<3%	2.0-3.4 MM
3. pH - FILTER MEDIA IS TO HAVE A pH 6.2-6.8 BEFORE DELIVERY TO SITE, ADD DOLOMITE AS REQUIRED.
4. ELECTRICAL CONDUCTIVITY (EC) - FILTER MEDIA EC TO BE <1.2 dS/M

**UPPER FILTER MEDIA (VEGETATED BIORETENTION ONLY)**  
 UPPER 150MM OF FILTER MEDIA LAYER TO BE MIXED WITH FOLLOWING TO SUPPORT PLANT GROWTH:

- SUPERPHOSPHATE AT 300 GRAMS/CUBIC METRE
- POTASSIUM NITRATE 300 GRAMS/CUBIC METRE
- TRACE ELEMENT MIX (MICROMAX OR EQUIVALENT APPROVED) 300 GRAMS/CUBIC METRE

**TESTING REQUIREMENTS**  
 THE FOLLOWING TESTS ARE TO BE UNDERTAKEN ON ALL FILTER MEDIA PRIOR TO ITS DELIVERY:

- SATURATED HYDRAULIC CONDUCTIVITY (HC) IN ACCORDANCE WITH ASTM F1815-06.
- PARTICLE SIZE DISTRIBUTION (PSD) IN ACCORDANCE WITH AS1141.11

THE CONTRACTOR MUST PROVIDE SATURATED HYDRAULIC CONDUCTIVITY TESTING OF THE FILTER MEDIA DELIVERED ON SITE AND SUBMIT THE RESULTS TO THE SUPERINTENDENT. ANY UNSATISFACTORY MEDIA WILL NEED TO BE REMOVED FROM SITE AND REPLACED WITH THE SPECIFIED AND APPROVED MEDIA.

**BIORETENTION MATERIAL SPECIFICATION (cont)**

**TRANSITION LAYER**  
 A TRANSITION LAYER IS REQUIRED WHEN THE DRAINAGE LAYER IS FINE GRAVEL. IT IS RECOMMENDED WHEN THE DRAINAGE LAYER IS COARSE SAND. THE TRANSITION LAYER SHOULD BE A SAND/COARSE SAND MATERIAL, GENERALLY APPLIED IN A 100MM LAYER. A SUITABLE PRODUCT IS WASHED A3 FILTER SAND (VIC ROADS) WITH 90% PARTICLES RETAINED ABOVE 0.25MM.

THE SUPERINTENDENT MAY REQUIRE THE TRANSITION LAYER TO BE TESTED TO DETERMINE ITS HYDRAULIC CONDUCTIVITY AND PARTICLE SIZE DISTRIBUTION.

**DRAINAGE LAYER**  
 THE DRAINAGE LAYER IS NORMALLY BETWEEN 100 - 150MM THICK. SUITABLE MATERIALS INCLUDE COARSE SAND (COARSER THAN TRANSITION LAYER) OR FINE GRAVEL IN THE RANGE 4MM - 7MM. SCORIA IS NOT AN ACCEPTABLE MATERIAL FOR THIS APPLICATION.

ACCEPTABLE PARTICLE SIZE DISTRIBUTION:

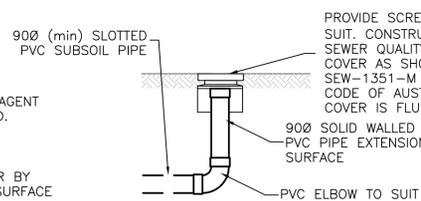
PARTICLE SIZE (MM)	% RETAINED
GREATER THAN 7.0	0
4.0 - 7.0	GREATER THAN 70
2.0 - 4.0	LESS THAN 20
LESS THAN 2.0	0

THE SUPERINTENDENT MAY REQUIRE THE DRAINAGE LAYER TO BE TESTED TO DETERMINE ITS HYDRAULIC CONDUCTIVITY AND PARTICLE SIZE DISTRIBUTION.

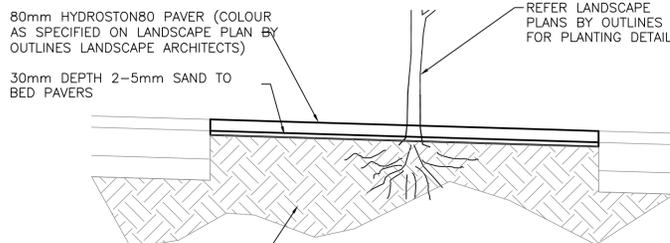
**CONSTRUCTION HOLD POINTS**  
 THE CONTRACTOR IS TO SEEK APPROVAL OF THE SUPERINTENDENT BEFORE PROCEEDING WITH THE CONSTRUCTION AT THE FOLLOWING STAGES OF IMPLEMENTATION:

- PROVISION OF SAMPLES AND SPECIFIED TEST RESULTS FOR ALL MATERIALS (MULCH, FILTER, TRANSITION AND DRAINAGE MEDIA) PRIOR TO DELIVERY TO SITE AND INSTALLATION
- CONNECTION TO STORMWATER SYSTEM AND PLACEMENT OF DRAINAGE LAYER
- INSTALLATION OF FILTER MEDIA BEFORE PLACEMENT OF MULCH OR PAVING.
- COMPLETION OF BIORETENTION INCLUDING PLANTS AND MULCHING

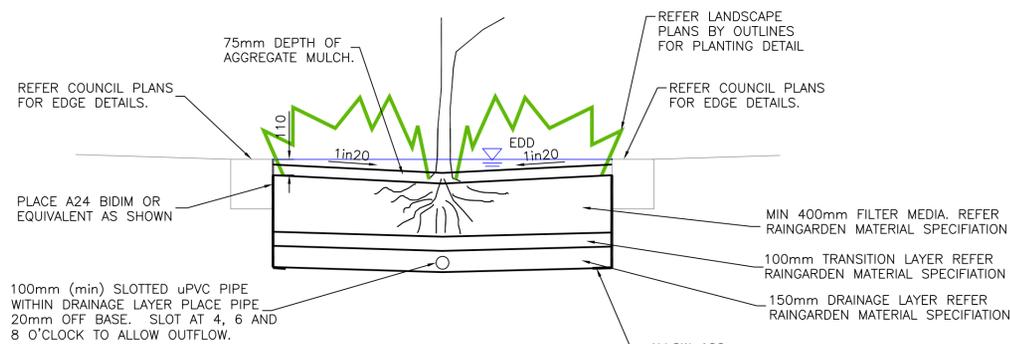
**NOTE:**  
 IF POURED BY HAND THEN REO WILL BE REQUIRED. DETAILS TO BE APPROVED BY SUPERINTENDENT.



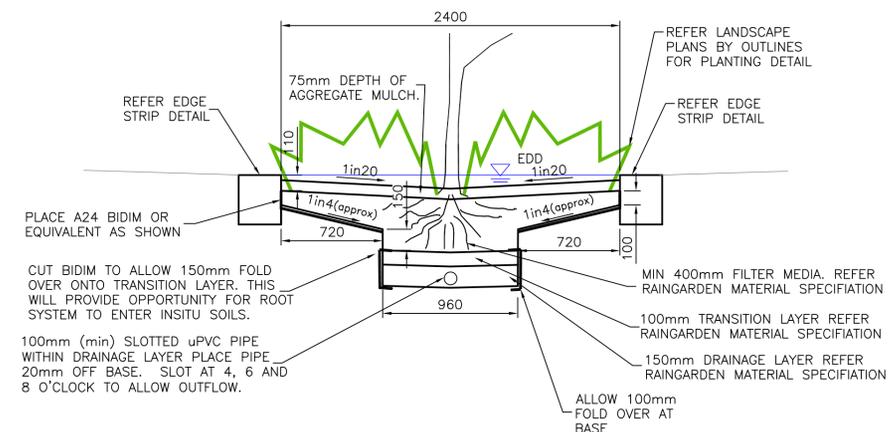
**SUBSOIL INSPECTION OPENING DETAIL**  
 DO NOT SCALE



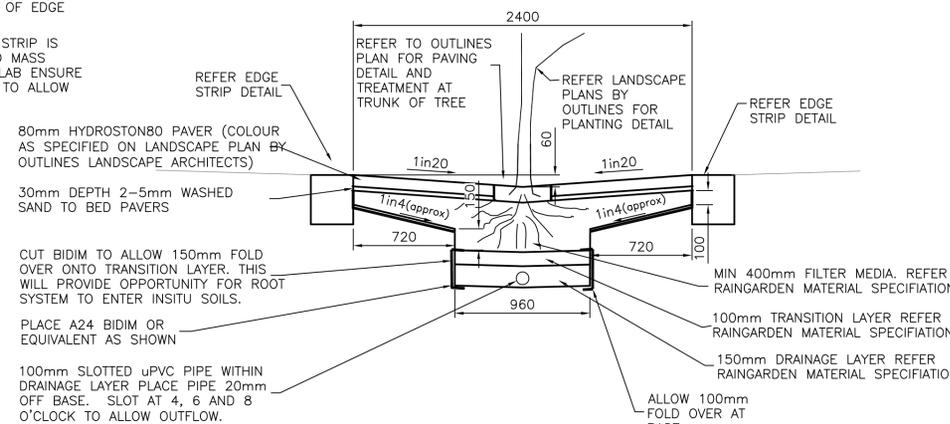
**INFILTRATION PAVEMENT DETAIL**  
 SCALES 1:25



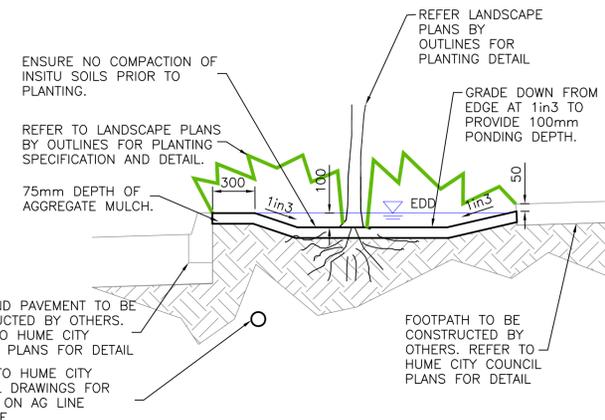
**TYPICAL BIORETENTION DETAIL**  
 SCALES 1:25



**VEGETATED BIORETENTION DETAIL**  
 SCALES 1:25



**PAVED BIORETENTION DETAIL**  
 SCALES 1:25



**INFILTRATION GARDEN DETAIL**  
 SCALES 1:25

Designed:	J.Tainton	Authorised:	R.Wiese
Checked:	R.Wiese	Approved:	Pending
Rev.	Revision Description	Designed	Date
A	REMOVE 150mm WIDE EDGE STRIP DETAIL, UPDATE BIORETENTION DETAILS, ADD 300MM BUFFER	JT	23.12.08

**Advanced Copy - Not for Construction**

STORM CONSULTING authorise the use of this drawing only for the purpose described by the status stamp shown above. This drawing should be read in conjunction with all relevant contracts, specifications, reports & drawings.



**MELBOURNE**  
 SYDNEY  
 EUROBOODALLA  
 MID NORTH COAST  
 CAD FILE: 786 00 DP.dwg

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 PO BOX 193, PYMBLE, NSW 2073  
 PO BOX 96, MORUYA NSW 2537  
 SUITE 3, 60 CLARENCE ST, PORT MACQUARIE NSW 2444.

P 03 9208 0111  
 P 02 9499 4333  
 P 02 4474 5573  
 P 02 6584 6470

CLIENT: HUME CITY COUNCIL  
 1079 PASCOE VALE ROAD  
 BROADMEADOWS, VIC 3047  
 03 9205 2200

**MAIN ST, BROADMEADOWS**  
 FROM PEARCEDEALE PDE TO DIMBOOLA ROAD  
 WATER SENSITIVE URBAN DESIGN  
 Specification and Edge strip, bioretention strip, infiltration zone, bioretention pavement, and infiltration pavement details.



1. Vegetation
2. Concrete edge strip
3. Mulch layer
4. Sandy filter layer
5. Transition Layer
6. Drainage layer
7. Slotted PVC pipe
8. Geotextile wrap