

Specification for Roadworks and Drainage associated with subdivision or other development

Policy No. 4-515

Specification for Roadworks and Drainage associated with Subdivision or other Development

Adopted and Effective: 13 September 2011

Ref: OBJ ID A155585

CONTENTS	Page
1.0 GENERAL CONDITIONS	4
1.0 General	4
1.1 List of Definitions and Abbreviations	4
1.2 Inspections	4
1.3 Provision for Traffic	5
1.4 Protection of Adjoining Property	6
1.5 Damage or Alteration to Existing Services etc	6
1.6 Existing Vegetation	6
1.7 Removal of Existing Dams	7
1.8 Bush Fire Protection	7
1.9 Maintenance of Works – Security Deposit	7
1.10 Works-as-executed drawings	7
1.11 Survey Marks	8
1.12 Hours of Work	8
1.13 Suspension of Works	8
1.14 Safety	8
1.15 Private Accredited Certifier's Responsibilities	8
2.0 ROADS	9
2.1 Pavement Thickness Design	9
2.1.1 Design Procedures	9
2.1.2 Sampling and Testing	9
2.1.3 Traffic Classification	11
2.1.4 Pavement Components	11
2.1.4.1 Pavement Structure	12
2.1.5 Surfacing	12
2.1.6 Reporting	12
2.2 General Construction	13
2.2.1 Site Filling	13
2.2.1.1 General	13
2.2.1.2 Road Embankment Filling	14
2.2.1.3 Lot Filling	14
2.2.2 Clearing and Grubbing	14
2.2.3 Shaping of Earthworks	14
2.2.4 Erosion and Sediment Control	15
2.2.5 Boxing for Pavements	15
2.2.6 Compaction of Sub-Grade	15
2.2.7 Subsoil Drains	15
2.2.8 Filter Material	16
2.2.8.1 General	16
2.2.8.2 Requirements	16
2.2.8.3 Application	16
2.2.9 Service Conduits	17
2.2.9.1 Water Service Conduits	17
2.2.9.2 Telstra and Integral Energy Conduits	17
2.2.10 Sub Mains	17

2.3	Crushed Stone Pavement Materials	17
	2.3.1 Crushed Sandstone Specification	17
	2.3.2 Crushed Rock Specification	19
	2.3.3 Material Specification	19
	2.3.4 Spreading	21
	2.3.5 Compaction	21
	2.3.6 Summary of Minimum Compaction Requirements	22
	2.3.7 Tolerances	22
2.4	Pavement Surface Course	22
	2.4.1 Preparation of Base for Surfacing	22
	2.4.2 Surface Treatment	23
	2.4.2.1 Two Coat Bitumen Emulsion Seal	23
	2.4.2.2 Tar Primer and Hot Bitumen Seal	23
	2.4.2.3 Asphaltic Concrete Surfacing	24
	2.4.2.4 Asphalt – Road Restorations	24
3.0	CONCRETE STRUCTURES	25
3.1	General	25
3.2	Foundation	25
3.3	Formwork	25
3.4	Samples for Testing	25
3.5	Access Corridors to Hatchet Shaped Allotments	26
3.6	Concrete – Vehicular Crossings	26
3.7	Kerb and Gutter	26
3.8	Drainage Holes	27
3.9	Concrete Footpaths	27
3.10	Concrete – Cycle Ways	28
3.11	Roundabout	28
3.12	Splitter and Traffic Islands	28
3.13	Placing and Finishing	28
3.14	Nature Strip	29
4.0	DRAINAGE STRUCTURES	29
4.1	Description	29
	4.1.1 Gully Pits	29
	4.1.2 Structures and Associated Works	29
4.2	Drainage Pipes	30
	4.2.1 Road Drainage	30
	4.2.2 Excavations	30
	4.2.3 Method of Laying Pipes	30
	4.2.4 Jointing	31
	4.2.5 Backfilling of Trenches	31
4.3	Interallotment Drainage	31
4.4	Drainage under RTA Control	32
4.5	Water Sensitive Urban Design	32
5.0	STREET FURNITURE	32
5.1	Street Name Plates	32
6.0	BLOCKS PAVINGS	33
6.1	General	33
6.2	Service Authorities	34
6.3	Pattern	34
6.4	Sub-Base	34

6.5	Mortar	35
6.6	Bedding	35
6.7	Expansion Joints	35
6.8	Grades	35
6.9	Renewal of Service Lids and Surrounds	35
6.10	Stormwater Outlets	36
6.11	Pedestrian Access	36
6.12	Completion of Work	36

APPENDIX A Reference and Source Documents 37

Australian Standards	37
AUSTROADS Documents	38
RTA DCM Specifications	38
RTA Test Methods	38

APPENDIX B Standard Drawings 39

Drawing No.	Description
S – 1 (sheet 1 of 2)	Typical Cross-section Path Paving
S – 1 (sheet 2 of 2)	Typical Driveway
S – 501	Cycle Way
S – 215	Standard Kerb and Gutter
S – 8 (sheet 1 of 2)	Standard Kerb Ramp in Roadways
S – 8 (sheet 2 of 2)	Standard Kerb Ramp in Roadways
S – 12	Dish Crossing (draining from left)
S – 13	Dish Crossing (draining from right)
S – 14	Subsoil Drainage
P – 1	Paving Details
S – 216 (sheet 1 of 2)	Typical Details for Roundabouts
S – 216 (sheet 2 of 2)	Typical Details for Roundabouts
S – 2	Standard Gully Pit for Roads
S – 202	Junction Pit Type “A” (Light Duty)
S – 209	Junction Pit Type “B” on/off Road Usage
S – 210	Saddle Type Gully Pit Details
S – 211	Saddle Type Gully Pit Under Skew
S – 56	Standard Letterbox Pit
S – 228	Pollution Control
T – 001	Typical Details for Tree Planting

TABLE

1.0	Traffic Design - Equivalent Standard Axles (ESAs)	11
2.0	Material Grading Curves	16
3.0	Grading Limits Crushed Sandstone Materials	18
4.0	Property Limits	18
5.0	Traffic Category	19
6.0	Acceptable Material	19
7.0	Unbound Material – Specification Requirements	20
8.0	Density Ratio	22
9.0	Concrete Finish	28

1.0 GENERAL

Any errors or omissions in the plans and/or specifications shall not relieve the Developer of the responsibility of executing all works to the entire satisfaction of Council's Engineers.

1.1 List of Definitions and Abbreviations

DEFINITIONS

Engineer	Shall mean the Executive Manager – Environmental Standards of Fairfield City Council or their representative.
Approved Material	Shall mean approved by the Engineer before use in, or on, the work site.
Council	Shall refer to Fairfield City Council.
RTA	Shall refer to the Roads and Traffic Authority, New South Wales.
Developer	Shall mean the applicant or his authorised contractor.
Experienced soils technician	A soils technician employed by a NATA registered testing authority who has the necessary qualifications and experience to perform the required tests and procedures
NATA registered testing Authority	A laboratory that has been registered by NATA to perform the required testing. The laboratory shall only perform tests or procedures that are covered by the terms of their registration by NATA.
Surveyor	A surveyor who is endorsed in the Register of Surveyors as a Consulting Surveyor.

ABBREVIATIONS

ARRB	Australian Road Research Board
AS	Australian Standard
Austroads	National Association of Road Transport and Traffic Authorities in Australia
CBR	California Bearing Ratio
NAASRA	National Association of Australian State Road Authorities
NATA	National Association of Testing Authorities
SAA	Standards Association of Australia

1.2 Inspection

The Developer shall give the Engineer the following notices and comply with the following requirements. All notices for inspections shall be directed to the Engineering Assessment Branch at the Administration Centre, Avoca Road Wakeley, telephone 9725-0250.

Prior to the commencement of work – 7 days notice shall be given.

At least 24 hours clear notice to be given for the inspection of the following stages of construction:

- i) Stormwater pipes laid and jointed (prior to backfilling);
- ii) Conduits laid and jointed (prior to backfilling);
- iii) Kerb and gutter formed (prior to pouring);
- iv) Gully pits formed (prior to pouring);
- v) Subsoil drains laid:
 - a. Trench excavated;
 - b. Pipes laid;
 - c. Filter material placed;
- vi) Boxing completed and subgrade compacted;
- vii) Placing of sub-base course;
- viii) Placing of base course;
- ix) Pavement ready for surfacing;
- x) Surfacing of pavement;
- xi) Concrete footpaths formed (prior to pouring).
- xii) Concrete Cycle ways formed and reinforcement placed (prior to pouring).

Sections of work completed to the above stages may be notified to the Engineer in order to proceed with the work in sections, but notices shall be given to enable the whole of the work to be inspected at each of these stages.

The Developer, when required by the Engineer, shall submit samples and details of the source of supply and manufacture of any materials used in construction, or of any materials which are intended to be used.

The cost of all material testing required shall be borne by the Developer.

1.3 Provision for Traffic

In respect of construction work adjoining an existing road, the Developer is responsible for the provision, implementation and maintenance of traffic control measures to ensure safe passage of vehicles and pedestrians through, around or past the work site. The existing road shall be maintained to the satisfaction of the Engineer.

Appropriate warning signs, fencing, barricades, lighting for all works, temporary roadways, footways, as maybe necessary for the convenience and protection of all persons and all forms of traffic shall be provided, erected and properly maintained by the Developer in accordance with the requirements of the Roads and Traffic Authority's Traffic Control at Work Sites Version 3.1 manual and to the Australian Standard No 1742 – 2009.

The general method of providing for traffic shall be to the approval of the Engineer. If, in the opinion of the Engineer, the provisions made by the Developer are such that the inconvenience caused to traffic is unreasonable; the Engineer shall have the power, after having given 24 hours notice, or in the case of an emergency without prior notice, to carry out, or have carried out by others, any work which he deems necessary to provide for the adequate passage of traffic and all costs and expenses thereby incurred shall be charged to the Developer.

Where appropriate RTA accredited Traffic Control Personnel shall be employed. Council reserves the right to inspect the accreditation of each Traffic Control Personnel on site at any time.

Special care shall be taken to ensure that vehicles and pedestrians are not sprayed or splashed with hot bitumen/emulsion, concrete etc at any time during construction and that

entry to areas treated with tack coat, hot asphaltic concrete mixture, wet concrete, etc is prevented.

1.4 Protection of adjoining property

The Developer is responsible for ensuring existing property and structures (including but not limited to footpath, kerb and gutter, drainage infrastructure and the road pavement), landforms, vegetation and anything else surrounding the site is maintained in good order during the course of carrying out the works.

Where the construction work causes or is likely to cause any damage or nuisance of the ponding of water on adjoining property, the Developer shall provide any additional drainage lines, construct any necessary retaining walls, supply any necessary filling, re-erect any fences and carry out any remedial work required by the Engineer to the satisfaction of the owner of the adjoining property and the Engineer.

Before the subdivision plan is signed by the Executive Manager of Environmental Standards or a delegate of Fairfield City Council, the Developer shall furnish Council with a Statutory Declaration, if requested by the Engineer, stating that all claims for damage arising from the work by any property owners and/or Public Authorities have been satisfied, or where claims have not been satisfied that the Developer will indemnify the Council against any such claims.

1.5 Damage or Alteration to Existing Pipes, Sewers, Conduits, or other Public Utility Works or Services

The Developer is responsible for determining the location of all public utilities, both above and below ground that might be encountered within the work site and its immediate surrounds.

The Developer shall exercise all possible care during the progress of the work to avoid damage to any utility service – gas, water, sewer, electric power, telephone etc and will be held responsible for any damage caused by him or his agents directly or indirectly.

In the event of any services being damaged or interrupted, the Developer shall forthwith notify the appropriate authorities and take all necessary steps to minimise further damage, to provide for the safety of the public and to have the damage repaired as quickly as possible. All costs associated with such damage shall be borne by the Developer.

If as a result of the works of the development any alteration to an existing utility service is considered necessary by the Engineer or the Public Utility Authority concerned, it will be the responsibility of the Developer to make the necessary arrangements with that Authority for the alteration to be carried out at the Developer's cost.

1.6 Existing Vegetation

No trees or other vegetation is to be pruned, cut down or removed without the consent of Council in accordance with Council's Tree Preservation order.

Any person, who disregards, the provisions of a Tree Preservation Order, shall be guilty of an offence. Fines for offences under the Environmental Planning and Assessment Act 1979 can exceed \$100,000.00.

1.7 Removal of Existing Dams

Where a dam exists within the boundaries of the development, it shall be removed by the Developer and the water course or surface shall be re-instated to the satisfaction of the Engineer.

The dam shall be drained and all deleterious material removed prior to any filling being placed. Approved filling shall be placed as stated in Section 2.2.1.

1.8 Bush Fire Protection

Access to Public Reserves shall be provided from both existing and proposed public roads. Such access shall be available at intervals of not more than 300 metres, shall have a minimum width of 6 metres and shall be cleared and rendered trafficable for fire fighting vehicles.

Where any residential commercial or industrial area adjoins a proposed Public Reserve in the subdivision, a fire break 6 metres wide shall be cleared within the Reserve along the boundary of any such area.

1.9 Maintenance of Works – Security Deposit

Prior to the acceptance of the constructed works, the Developer shall lodge with Council a cash security deposit which shall be refunded, providing that the work shows no defects at the end of the maintenance period.

The maintenance period shall be twelve (12) months unless otherwise notified by the Engineer and shall commence on the date of certificate by Council's Engineer that the work has been satisfactorily completed.

If the Developer fails to maintain the works to the satisfaction of the Engineer, then the security deposit may be used to render the works satisfactory to the Engineer and any unexpended balance refunded.

In the event that the security deposit is insufficient to meet the maintenance cost, the difference shall become a charge on the Developer which may be recovered by the Council.

1.10 Works-As-Executed Drawings

On completion of road and drainage construction and associated construction, and before the final inspection, Works-As-Executed drawings prepared and certified by a registered surveyor shall be submitted by the developer.

The drawings shall show:

- (i) Any departures from the approved plans;
- (ii) Longitudinal section – centreline levels as constructed;
- (iii) Cross section – levels on centreline and top of each kerb and any alteration to footpath widths or levels;
- (iv) Drainage – pipe sizes and invert levels of all pipes at each pit and surface levels of each pit. A Registered Surveyor shall certify that all pipes have been laid within the easements provided;
- (v) Inter-allotment drainage – pipe sizes and location of each inlet provided;
- (vi) Location and description of all conduits laid within the subdivision;
- (vii) Extent of all site filling operations carried out, including levels on fill area when stripped of all unsuitable material prior to filling operation and levels on finished surface.

All alterations or variations to the approved plans shall be shown in red ink.

1.11 Survey Marks

The Developer is responsible for preserving all survey marks in their true position. If a State Survey Mark (SSM) or Permanent Mark (PM) is disturbed the developer is responsible for re-establishing the SSM or PM. A registered surveyor must be employed to reinstate any disturbed mark. All costs shall be paid by the Developer at no cost to Council.

The Council's Engineer shall be notified should any survey mark be disturbed.

1.12 Hours of Work

Work may be carried out on site between the hours of 7.00am to 5.00pm Monday to Friday and 8.00am to 1.00pm Saturday only.

No work shall be carried out on site outside these hours or on Sundays or Public Holidays without prior approval from Council's Engineer.

1.13 Suspension of Works

The Council's Engineer may suspend work on site if it is determined that work is not being undertaken in accordance with the requirements of this Specification or not in accordance with directions given by the Council's Engineer. The developer is to rectify any unsatisfactory work and obtain Council's approval prior to continuing with the remaining works. Failure to rectify any unsatisfactory work will result in Council carrying out the works required at the Developer's expense. The amount invoiced for works carried out by Council will be in accordance with Council's adopted Fees and Charges current at the time.

1.14 Safety

The developer shall comply with all the requirements and responsibilities under:

- i) Occupational Health and Safety Act (2000).
- ii) Occupational Health and Safety Regulations (2001).
- iii) And respective Codes of Practice(s).
- iv) Respective Australian Standards.
- v) Respective National Standards.

1.15 Private Accredited Certifiers' Responsibilities

Private Accredited Certifiers may issue Construction and Compliance Certificates for subdivision and development works in accordance with the requirements of the EP&A Act 1979.

Private Accredited Certificates do not have any authority to issue Engineering Approvals or carry out inspections for works on Public Roads under the Roads Act 1993, unless Fairfield City Council's approves otherwise.

2.0 ROADS

2.1 Pavement Thickness Design

A pavement thickness design shall be carried out and submitted to Council for all new roadworks. The design shall be accompanied by a report and recommendation by a Chartered/Qualified Engineer or Authorised Representative of a laboratory registered by the National Association of Testing Authorities.

2.1.1 Design Procedure

The pavement thickness shall be designed in accordance with the procedures detailed in "AUSTROADS Pavement Structural Design - Guide to Pavement Technology and the following parameters:

- a) California Bearing Ratio (CBR) is the measure of subgrade support which is to be used in all pavement thickness designs.
- b) For each section of road the lowest CBR value for any representative subgrade material shall be adopted as the Design CBR.
- c) The design CBR value shall not be greater than 10%.
- d) A design moisture content can be determined in accordance with the procedure outlined in AUSTROADS Design Guide. However, in the absence of any of the information required for the above procedures, determination of Design CBR shall be obtained directly from the CBR tests on specimens compacted at optimum moisture content and soaked for four (4) days prior to testing.
- e) Where localised filling is required, the proposed fill material shall be tested to determine the CBR value (at design moisture content) in accordance with AS 1289.6.1.1-1989.
- f) The proposed fill material will be approved only if it is clean and free organic matter and the above test results indicate a CBR value equal to or greater than the design CBR.
- g) The minimum equivalent pavement thickness shall not be less than 245 mm (in residential areas – refer Section 2.1.4) and 300mm in Industrial areas of approved material.
- h) The pavement design shall include all considerations for environmental factors and assumptions made that would reduce or increase design subgrade strength, or affect the choice of pavement and surfacing materials. The environmental factors which significantly affect pavement performance are moisture and temperature. Both these factors must be considered at the design stage of the pavement.

2.1.2 Sampling and Testing

- (i) **Terrain Evaluation** - The location of boreholes/test pits shall be determined by an Engineer or Geotechnician who is experienced in terrain evaluation, as is outlined in AS 1726 – Geotechnical Site Investigations, with particular consideration to the following:
 - (a) Bore holes must be selected to represent each terrain unit.
 - (b) Additional boreholes may be required to determine the extent of any unsuitable material encountered (eg drainage patterns, liability to flood, location of dams, creeks etc).

(ii) Subsurface Investigation

- (a) Boreholes shall be excavated to a minimum depth of 1.0 metre below the design road surface (invert of gutter level) or 0.5 metre below the estimated subgrade level, whichever is the greater. The total pavement thickness may be governed by the presence of weak layers below the design subgrade". Therefore, where the materials encountered indicated possible construction problems (eg soft, wet subgrade, loose fill etc) further excavation, inspection and logging shall be carried out. A Dynamic Cone Penetrometer may be used to indicate the presence and depth of weak layers and the possible need for further excavation.
- (b) The testing authority responsible for the design must be fully satisfied that the material sampled represents that which is critical to the pavement thickness design (ie that the location and depth of the sample have been accurately surveyed to ensure that the sample represents a material which will remain in place in a layer of significant thickness when the subgrade is exposed).

To this end, location, identification sampling of subgrade materials shall be carried out by, or under the supervision of, an experienced, trained supervisor, in accordance with AS 1726.

- (c) Sampling in relatively similar subgrade conditions shall be carried out at intervals not greater than 50 metres and testing at intervals not greater than 100 metres. Where subgrade conditions are found to be variable, the above intervals will need to be reduced accordingly. Sufficient soil sampling and testing must be undertaken to ensure that all soil types represented in the subgrade are properly identified and tested for pavement depth requirements. At least 2 samples shall be taken from each road subgrade unless directed otherwise by the Engineer.
- (d) Details of subsurface moisture conditions (eg presence of groundwater, depth to water table etc, if relevant) shall be recorded on the bore hole logs so that the need for subgrade and pavement drains, alternative construction materials/methods etc can be assessed.

Consultants and relevant parties should ensure that the laboratory providing their soil analysis is accredited with the National Association of Testing Authorities (NATA) and using the approved methods, otherwise the credibility of the report may be jeopardised and not accepted.

(iii) Laboratory Testing

The following laboratory tests shall be carried out on samples which are considered by the Testing Authority to represent homogenous sections of subgrade.

- (a) Field moisture content as per AS 1289.2.1.1.
- (b) Determination of the dry density/moisture content relation of a soil using standard compaction in accordance with AS 1289.5.1.1.
- (c) Determination of the California Bearing Ratio of a soil – standard laboratory method for a remoulded specimen. (AS 1289.6.1.1) – compacted to 100% of standard maximum dry density at optimum moisture content, after a 4 day soaking period under a 4.5kg surcharge.

2.1.3 Traffic Classification - Equivalent Standard Axles (ESAs)

The Engineer shall nominate the Traffic Classification for each section of road to be designed. This will be based on the expected usage and life of the road, and may be weighted to allow for the effects of exceptionally heavy traffic soon after completion.

Design traffic shall be calculated in equivalent standard axles (ESAs) for the applicable design life of the pavement. The design traffic/equivalent standard axles must be confirmed and approved by Council prior to their use in design.

In absence of other traffic data, Table 1.0 gives traffic values (in ESA's) that may be taken as a guide to the design traffic, but shall be subject to variation depending on the circumstances for the particular project.

Table 1.0 Traffic Design - Equivalent Standard Axles (ESAs)

Zone	Street Type	Design ESA's – 20 year Design Life
Urban Residential	State Roads	1×10^7
	Regional	8×10^6
	Collector	2×10^6
	Local	5×10^5
Rural Residential	Collector	2×10^6
	Local	5×10^5
Industrial	Regional	5×10^6

2.1.4 Pavement Components

The type of pavement, choice of base and sub-base materials, and the type of surfacing adopted shall comply with Councils specifications and approved by Council.

Pavement materials can be classified into essentially four categories according to their fundamental behaviour under the effects of applied loadings:

- Unbound granular materials, including modified granular materials
- Bound (cemented) granular materials
- Asphaltic Concrete
- Cement Concrete

The minimum road pavement shall consist of the following thicknesses of approved materials, unless otherwise directed by the Engineer.

A. Residential Areas:

- (i) Wearing course 45mm thickness asphaltic concrete;
- (ii) Base course – 100 thickness of DGB20 (approved sources only)
- (iii) Sub-base course – 100mm thickness of DGS40 or 150mm thickness of 75mm crushed sandstone (from approved sources only);
- (iv) Lower sub-base course – as required by pavement design;
- (v) Subgrade.

B. Industrial Areas:

- (i) Wearing course – 50 mm thickness asphaltic concrete;
- (ii) Base course – 150 mm thickness of DGB20 (from approved sources only)

- (iii) Sub-base course – 100mm thickness of DGS40 or 150mm thickness of 75mm crushed sandstone; (from approved sources only)
- (iv) Lower sub-base course – as required by pavement design;
- (v) Subgrade.

2.1.4.1 Pavement Structure

Subbase extent - The subbase layer shall extend a minimum of 150 mm behind the back of the kerb and compacted as required for the selected sub- base layer.

Base extent. - Where the top surface of the subbase layer is below the level of the underside of the kerbing and/or guttering, the base layer shall also extend a minimum of 150 mm behind the back of the kerb.

Unkerbed roads - For unkerbed roads, the subbase and base layers shall extend at least to the nominated width of shoulder.

Carparks - The pavement designer shall make specific allowance for traffic load concentrations within carpark areas (eg entrances/exits).

Drainage - The pavement designer shall make provision for pavement layer drainage on the assumption that during the service life of the pavement ingress of water will occur.

2.1.5 Surfacing

Surfacing materials can also be classified into essentially five categories or types:

- Sprayed bituminous seals (flush seals)
- Asphaltic concrete and bituminous microsurfacing (cold overlay)
- Cement concrete
- Concrete segmental pavers
- Clay segmental pavers

The pavement design should take into account Council's requirements for surfacing:

- i) **In residential areas:** The Developer shall provide a 25mm thick asphaltic concrete (AC10) surface over the whole of the road pavement and pay to Council a sum, determined by the Engineer, to cover the cost of a final asphaltic concrete surface 20mm thick (AC5) to be laid by Council at a later time.
- ii) **In industrial areas:** The Developer shall provide a 30mm thick asphaltic concrete (AC14) layer over the whole of the road pavement followed by a 20mm thick asphaltic concrete (AC10) layer over the whole of the road pavement.

2.1.6 Reporting

All pavement thickness evaluation reports submitted to Council shall include the following.

- (i) An introduction including a description of the proposed development, the locality, the length or road sampled and tested and a general summary of the purpose of the report.
- (ii) Field investigation summary.
- (iii) Site Geology and subsurface conditions summary.
- (iv) Design Traffic Classification and Design CBR.
- (v) Pavement Thickness Design Recommendation based on Council's specification requirements.

- (vii) Recommendations, for Council's consideration, of alternative pavement designs and/or treatments where the testing authority considers that such alternatives may be beneficial.
- (viii) All tests and Borehole Log reports, indicating sampling location within soil profile and relative to design road surface.
- (ix) All CBR Reports.
- (x) A plan indicating sampling locations together with given road chainages, estimated extent of each soil type and the associated recommended pavement thicknesses.
- (xi) Recommendations for the use of sub-soil drainage where necessary.

2.2 General Construction

All roads shall be constructed in strict conformity with the engineering plans approved by Council and these specifications.

Where the proposed works adjoin existing sealed roadworks and/or where directed by the Engineer, the edge of the existing seal shall be saw-cut for the full length of the proposed works.

The 25mm thick layer of asphaltic concrete seal laid by the Developer shall be extended to overlap all adjoining existing seal by 300mm longitudinal and 600mm transversing the pavement (trench across the road).

2.2.1 Site filling

2.2.1.1 General

All areas designated for site filling on the approved plans shall be stripped of all unsuitable materials, trimmed and compacted in accordance with clause 2.3.5 of this specification. The compacted base shall then be inspected and proof rolled (if required) by the Engineer for any yielding material which, if found, shall be reworked or replaced.

Material shall be deemed unsuitable if it contains any of the following:

- i) organic material
- ii) toxic substances
- iii) silt or silt-like substances
- iv) high moisture content such that adequate compaction or serviceability cannot be attained
- v) wood, metal, plastic or other deleterious material
- vi) rocks/rock spalls larger than 200 mm in diameter.

All site filling shall be compacted in horizontal layers of not greater than 150mm in thickness compacted measurement. Each layer shall be spread over the whole extent of the fill area and compacted by an approved method prior to placement of the next layer. The fill shall be compacted so as to obtain a dry density not less than the minimum compaction requirements as set out in clause 2.3.5 of Council's specification (as determined by the sand replacement method – Australian Standard No 1289.5.3.1 and AS 1289.5 3.2).

When filling is partly comprised of stone, the materials shall be carefully placed and all large stones shall be distributed such that the interstices can be completely filled with small stones, earth, etc and thoroughly compacted. Any large stones shall not be placed such that cover from the finished surface levels is less than 600 mm.

All soil erosion and sediment control devices as shown on the approved engineering plans and/or as directed by the Engineer shall be erected prior to commencement of any site works and maintained until a full ground cover has been re-established to the satisfaction of the Engineer.

2.2.1.2 Road Embankment Filling

During construction of an embankment, the sides of the top surface of the bank shall be kept lower than the centre and the surface maintained so as to insure adequate drainage without concentrating the flow so as to cause scouring of the embankment.

Testing to establish the field dry density shall be carried out every 300mm rise in vertical height of the embankment and shall be randomly located across the full width of the embankment and at longitudinal intervals not greater than 50 metres with a minimum of two (2) tests per road per fill layer.

2.2.1.3 Lot Filling

During lot filling operations, the surface shall be maintained such that no localised depressions are created.

Testing to establish the field dry density shall be carried out every 300mm rise in vertical height of the fill. Tests sites shall be located randomly across the fill site with 1 test per 500m² (min 1 test per 300mm layer) or as directed by the Engineer.

2.2.2 Clearing and Grubbing

For the full width of the road shown in the drawings, all stumps, boulders, roots and scrub shall be grubbed out to a depth of 300mm below the sub-grade, and together with all rubbish of every description shall be removed from the site. On no account shall logs be placed near the toe of an embankment to act as retaining walls.

Grub holes shall be left open for inspection by the Engineer and when approved, filled with suitable material and compacted to specification.

2.2.3 Shaping of Earthworks

When embankments have been compacted to the satisfaction of the Engineer, the centre-line of the finished subgrade shall be evenly graded in accordance with the longitudinal section. The cross section of the earthworks shall be as shown on the cross section drawings with surfaces and side slopes neatly and evenly trimmed and graded.

Any soft or yielding material shall be removed and replaced, irregularities corrected and compacted in accordance with clause 2.3.5 (see table 6.0) before placing of the pavement commences.

The sides of cuttings shall, unless otherwise shown on the drawings or unless the Engineer directs otherwise, be trimmed to batters having a ratio of one and one half (1.5) horizontal to one (1) vertical.

The sides of embankments shall be regulated similarly to cuttings and be trimmed to batters having a ratio of two (2) horizontal to one (1) vertical.

In residential zones, batters shall be trimmed to a slope of six (6) horizontal to one (1) vertical, where directed by the Engineer.

Where shown on design cross sections a berm 600mm wide shall be provided outside the street alignment.

Allotments sloping towards a road and which are below footpath level shall be filled to above the footpath level and graded so that surface water can flow from the allotment to the road.

2.2.4 Erosion and Sediment Control

All disturbed areas shall be protected from erosion as shown on the approved engineering plans or as deemed necessary by the Engineer. The design of erosion and sediment control structures shall generally be in accordance with the Institution of Engineers, Australia Publication – Soil Erosion and Sediment Control.

2.2.5 Boxing for Pavements

The formation shall be finished with a boxing for the reception of the pavement material.

Boxing in cuttings shall be formed by excavation from the solid. Boxing in embankments shall be formed by building up the outside edges with approved material, as compacted layers. The Developer shall ensure that the water does not pond on the boxed out subgrade.

Where, as a result of the boxing or excavation operation, a depth greater than that necessary for the pavement is obtained, correction shall be effected by either:-

- (i) placing additional base material as specified herein; or
- (ii) placing and compacting, to the satisfaction of the Engineer, good quality material which is free of lumps and foreign material and has a CBR value at least, equal to the design CBR.

The finished subgrade after compaction for road pavement and shoulders shall, as specified, be graded parallel to the finished surface of roadway and at a depth below grade line equal to thickness of the pavement for the required widths. Shoulders shall be true to profile.

2.2.6 Compaction of Sub-Grade

The subgrade shall be trimmed and thoroughly compacted by rolling with a roller of compactive effort not less than ten (10) tonnes, and a drum diameter of not less than 1.2m. Alternatively, an approved sheepsfoot, rubber-tyred or vibrating roller may be used providing adequate compaction can be achieved after first obtaining the approval of the Engineer.

The surface shall be tested by template or stringline to ensure accuracy, and any irregularities made good by the addition of sound material or the removal of material and further rolling, alternate filling and rolling shall be carried out until thorough compaction and the desired cross-section is obtained.

Any soft or unstable patches which may develop shall be removed and refilled with sound material and rammed or rolled until the whole of the subgrade is thoroughly compacted to give a dry density of not less than that specified in clause 2.3.5 of this specification. The tolerance on the subgrade level shall be minus no limit, plus 10mm.

2.2.7 Subsoil Drains

Where indicated on the drawings or requested by the Engineer after site inspection, subsoil drains shall be laid after the completion of the kerb and gutter construction. All subsoil drains shall be constructed in accordance with the RTA's specifications. and be laid behind the kerb

and gutter, or as directed by the Engineer. Standard depth of excavation shall be 1m below the finished surface of the pavement, ie below invert levels of the gutter. Filter materials shall comply with Section 2.2.8 of Council's Specification and shall be placed to the level of the invert of gutter. All subsoil drains are to be sleeved with geotextile fabric. See Council's Standard Drawing S – 214 in Annexe B.

Inspections are required after:

- (i) trench excavated;
- (ii) pipes laid;
- (iii) filter material and geotextile fabric placed.

2.2.8 Filter Material

2.2.8.1 General

All filter material shall consist of clean, hard, tough, durable and uncoated particles of igneous rock of uniform quality.

Materials of other than igneous origin shall be subject to testing in accordance with Roads and Traffic Authority test method T103 and/or T102a. Results of such testing carried out by NATA registered laboratory shall be submitted to the Engineer for approval and be approved prior to use of the material.

2.2.8.2 Requirements

All filter material shall comply with the following grading curves as appropriate.

Table 2.0 Material Grading Curves

Test Method	Property	Sub-base Material Requirements		
	A.S. Sieve Size mm	DGS20	DGS40	CSS75
AS1289.3.6.1	106.00			100
	75.00			90-100
	53.00		100	75-95
	37.50		95-100	60-90
	26.50	100	75-95	55-85
	19.00	95-100	64-90	50-80
	13.20	70-90	53-84	
	9.50	58-80	42-78	37-75
	6.70	49-72	35-71	
	4.75	40-65	27-60	27-65
	2.36	30-55	20-50	20-55
	1.18	21-45	14-35	15-55
	425µm	10-30	10-26	10-30
	75µm	4-17	4-15	5-15
	13.5µm	2-10	2-9	

2.2.8.3 Application

- (i) Concrete Lined Channels – 20mm Filter Material.
- (ii) Subsoil Drains – 10mm or Roads and Traffic Authority Type A filter Material.

2.2.9 Service Conduits

In all subdivision where service conduits are laid within the roadway, a sign or signs shall be erected at the entrances of the subdivision bearing the following wording:

"Service Conduits Laid. Opening of Road Surface Prohibited".

The lettering shall be at least 50mm high and red in colour on a white background.

The positions of all conduits or service pipes shall be marked on the kerb with the appropriate letter (ie. "E" for Electricity Conduits and "W" for Water Conduits) 75mm high, recessed 7mm into the face of the kerb and painted with bright paving paint.

2.2.9.1 Water Service Conduits

Water service conduits shall consist of 100mm internal diameter fibre reinforced cement or class 6, 125mm dia. UPVC pressure pipe to AS 1477 or other approved material and shall be provided across the road at the common boundary line of each pair of lots. The conduits shall be laid prior to completion of the subgrade with a minimum ultimate cover of 500mm and a minimum fall of 50mm to the low side of the road.

Conduits shall extend 500mm behind face of kerb and shall be capped or plugged to prevent the ingress of material. The conduits shall be laid on a 75mm sand or metal dust bed to straight line and grade and shall be joined with a 3:1 cement mortar or other approved material. The trench shall be backfilled with sand or approved material to subgrade level.

2.2.9.2 Telstra and Electricity Service

Telstra and Electricity service conduits shall be laid in accordance with the standard specifications of the relevant service authority.

The Developer shall ensure that the conduits are laid in the correct locations and that all requirements of the relevant service authority have been satisfied.

2.2.10 Stub Mains

Stub mains for water and sewer services shall if required be placed prior to laying of initial 25mm thick asphaltic concrete seal.

2.3 Crushed Stone Pavement Materials

2.3.1 Crushed Sandstone Specification

General

The crushed sandstone material shall be derived from sound, clean well cemented Hawkesbury sandstone and shall be strictly free from overburden, clay seams, shale and other deleterious materials. The delivered crushed sandstone shall be sufficiently moist to minimise segregation during transit but the moisture content shall not exceed the optimum moisture content as determined by the modified compaction test.

Materials Acceptance

The specification allows for acceptance of two (2) grades of crushed sandstone which will be restricted to the following usage within the pavement construction:

Grade A: Crushed sandstone materials meeting specification requirements for Grade A material is acceptable for use in the pavement up to 145mm below the finished surface level of the pavement. An exception to this is on road pavements with a design traffic in excess of 1×10^6 equivalent standard axles. In these cases, the crushed sandstone material is restricted to 195mm below the finished surface level of the pavement to allow increased thickness of a DGB base course.

Grade B: Crushed sandstone materials meeting specification requirements for Grade B material is acceptable for use in the pavement up to a point 295mm below the finished surface level of the pavement.

Materials Requirements

The crushed sandstone sub-base material shall be minus 75mm having the following properties:

(a) **Grading** - The crushed sandstone material shall be uniformly graded from coarse to fine. The table below sets out the acceptable grading limits for both Grade A and Grade B crushed sandstone materials.

Table 3.0 Grading Limits Crushed Sandstone Materials

AS Sieve Size (mm)	Percentage Passing (%)	AS Sieve Size (mm)	Percentage Passing (%)
75	95-100	2.36	20-55
53	75-96	1.18	15-46
37.5	65-90	425µm	10-32
26.5	57-87	75µm	5-15
19	50-82		
9.5	37-74		
4.75	27-66		

(b) Laboratory Test Requirements

Table 4.0 Property Limits

Test	Grade A	Grade B
CBR: 4 day soak: Note 1(min.)	45%	30 %
Wet/dry strength variation: Note 2 (min.)	60%	70%
Liquid Limit (max)	21%	23%
Linear Shrinkage (max)	3%	4%

NOTE 1: The reported CBR values shall be based on minus 19mm material which has been compacted to 100% standard compaction and tested after a 4 day soak period. A minimum of two representative samples shall be tested and reported.

NOTE 2: The test portion for the wet/dry strength variation shall be minus 26.5mm plus 19mm material.

Sampling and Testing

- All quarry sources intending initial supply within the City of Fairfield will be required to undergo an inspection of the quarry site and quarrying operations by Council's representative.
- The crushed sandstone materials proposed for supply will be sampled by Council's officer and forwarded to an approved external laboratory and/or Council's Materials Testing laboratory for testing. All costs incurred for sampling, testing and reporting shall be at the expense of the applicant quarry.

- (c) All pavement materials and their sources of supply must be approved in writing by Council prior to use.

Conformity with Specifications

- (a) Continued supply of materials from approved quarry sources is subject to continued compliance of materials with Council's specification.
- (b) Material which does not meet Council's specified requirements shall, on receipt of written instructions from Council, be removed from the pavement at no expense to Council.
- (c) Council may, at any time during delivery of construction require further sampling and testing of materials. The cost of sampling and testing shall be at the expense of the supplying quarry.

2.3.2 Crushed Rock Specification

General - This specification covers the supply of broken stone crushed from tough durable rock, and where the run of crushed rock is deficient in fine binding material, shall include such added quantity of gritty cementations binder as is necessary for the combined materials to meet the undermentioned requirements.

The added binder, if required, shall be mixed by blending uniformly with the fine crushed rock at the crushing plant. All broken stone and added binder (if any) shall conform to any approved sample lodged with the Council.

The mixture of broken stone and binding material shall be sufficiently damp to minimise segregation during transit, but the moisture content shall not exceed 5% by weight.

Materials which petrographic analysis, weathering tests, or past experience has suggested may break down within the pavement shall not be used without the Engineer's approval.

Before any stabilised material (eg cement or lime) is used, the Engineer's approval shall be obtained.

2.3.3 Material Specification

Pavement Material Traffic Categories

For the purposes of this specification, base and sub-base materials are specified in terms of the following Traffic Categories.

Table 5.0 Traffic Category

Traffic Category	ESA
1	$10^7 \bigcirc N$
2(a)	$4 \times 10^6 < N < 10^7$
2(b)	$10^6 < N \bigcirc 4 \times 10^6$
2(c)	$10^5 < N \bigcirc 10^6$
2(d)	$N \bigcirc 10^5$

Table 6.0 Acceptable Material

Traffic Category	Acceptable Sub-base Material	Acceptable Base Material
1	DGS20, DGS40	DGB20
2(a)	DGS20, DGS40	DGB20
2(b)	DGS20, DGS40	DGB20
2(c)	DGS20, DGS40, CSS75	DGB20
2(d)	DGS20, DGS40, CSS75	DGB20

Unbound Material – Specification Requirements

Material for base course and sub-base course shall comply with the technical requirements of the RTA Specification DCM 3051 - Unbound and Modified Base and Sub-Base Materials for Surfaced Road Pavements.

Table 7.0 Unbound Material – Specification Requirements

Test Method	Property	Traffic Category	DGB20	DGS20	DGS40	CSS75
			Base	Sub-Base	Sub-Base	Sub-Base
RTA T106 Particle Size Distribution passing AS Sieve (% by mass) AS 1289.3.6.1	106.00mm					100
	75.00mm					90-100
	53.00mm				100	75-95
	37.50mm				95-100	60-90
	26.50mm		100	100	75-95	55-85
	19.00mm		95-100	95-100	64-90	50-80
	13.20mm		70-90	70-90	53-84	
	9.50mm		58-80	58-80	42-78	37-75
	6.70mm		49-72	49-72	35-71	
	4.75mm		40-65	40-65	27-60	27-65
	2.36mm		30-55	30-55	20-50	20-55
	1.18mm		21-45	21-45	14-35	15-55
	425µm		10-30	10-30	10-26	10-30
	75µm		4-17	4-17	4-15	5-15
	13.5µm		2-10	2-10	2-9	
Liquid Limit LL (non-plastic) RTA T108 AS 1289.3.1.1	Natural or Manufactured	1,2(a) & 2(b) 2(c) & 2(d)	max. 20 LL max. 23 LL	max. 20 LL max. 23 LL	max. 20 LL max. 23 LL	max. 20 LL max. 23 LL
	Recycled Material		max. 27 LL	max. 27 LL	max. 27 LL	Max. 27 LL
Plastic Limit PL RTA T109 AS 1289.3.3.1			max. 20 PL	max. 20 PL	max. 20 PL	Max. 20 PL
Plasticity Index PI RTA T109 AS 1289.3.3.1		1,2(a) & 2(b) 2(c) & 2(d)	Max. 6 Min. 2 Max. 8 PI	max. 10 PI max. 12 PI	max. 10 PI max. 12 PI	Max. 12 PI max. 12 PI
Maximum Dry Compressive Strength (MPa) RTA T114	on fraction passing 19mm sieve		Min 1.7MPa	Min 1.0MPa	Min 1.0MPa	
Aggregate Wet Strength (kN) AS 1141.22 RTA T215		1 or 2(a) 2(b) or 2(c) 2(c) or 2(d)	Min. 80 kN Min. 70 kN Min. 60 kN	Min. 70 kN Min. 70 kN Min. 70 kN	Min. 70 kN Min. 70 kN Min. 70 kN	

Test Method	Property	Traffic Category	DGB20	DGS20	DGS40	CSS75
			Base	Sub-Base	Sub-Base	Sub-Base
Particle Shape by Proportional Calliper mis-shapen (2:1) RTA T215	%		Max .35%	Max 35%	Max 35%	
Wet/Dry Strength RTA T215 AS 1141.22	Dry-Wet% Dry	1 or 2(a) 2(b) or 2(c) 2(c) or 2(d)	Max. 35% Max. 35% Max. 40%	Max. 35% Max. 35% Max. 35%	Max. 35% Max. 35% Max. 35%	
RTA 219	Soluble Sulphate		Max. 0.6%	Max. 0.6%	Max. 0.6%	

DGB20	20mm nominal sized densely graded base produced from either crushed rock or crushed recycled concrete or their blends.
DGS20	20mm nominal sized densely graded sub-base produced from either crushed rock or crushed recycled concrete or their blends.
DGS40	40mm nominal sized densely graded sub-base produced from either crushed rock or crushed recycled concrete or their blends.
CSS75	75mm nominal size crushed sandstone

2.3.4 Spreading

Pavement materials shall not be placed until compaction testing results on the proceeding layer have been supplied in writing certifying compliance with Clause 2.3.6 of this specification and have been approved by the Engineer.

The material shall **NOT** be spread upon a wet subgrade.

The materials shall be spread on the sub-base/sub-grade in layers in a damp condition, each layer having a compacted thickness of not more than 150mm and not less than 100mm. The pavement material shall be kept at optimum moisture content and the Developer shall exercise particular care to ensure segregation thereof does not occur.

2.3.5 Compaction

After accurate shaping, each course (or layer) of crushed stone shall be thoroughly compacted by a roller of compactive effort not less than ten (10) tonnes, in conjunction with watering and continual blading of the surface with a power grader. Water shall be controlled so that it does not penetrate to the subgrade. Each course shall be compacted at optimum moisture content as determined by the modified compaction test AS 1289.5.2.1 to give a dry density as determined by the Sand Replacement Method in accordance with AS 1289.5.3.1 not less than that specified in Clause 2.3.6 of this specification.

Rolling shall begin at the sides and progress to the centre parallel with the centre-line of the roadway uniformly lapping each proceeding track and covering thoroughly the entire surface. Where it is necessary to add material, the surface shall be scarified sufficiently to provide adequate bond.

Where tests are required, by the Engineer, to determine the density of each layer, the procedure of Australian Standard No. 1289.5.3.1 or 5.3.2 shall be used and tests, at the Developer's expense, shall be taken at points indicated by the Engineer or not more than 50m apart, with a minimum of two samples per road.

These tests shall be randomly located across the width of the road. At least one test in three shall be taken within 1.0 metres of the outer edges(s) of construction.

2.3.6 Summary of Minimum Compaction Requirements

Table 8.0 Density Ratio

Location	Requirements
Fill	Density Ratio – 95% std
Selected Sub-Grade Layer	Density Ratio – 100% std.
Sub-Base Course	Density Ratio – 98% mod.
Base Course	Density Ratio – 98% mod.
Density Ratio	$\frac{\text{Field Dry Density}}{\text{Maximum Dry Density}} \times 100\%$

Field Dry Density to be determined by the sand replacement method – Australian Standard No 1289.5.3.1 and 1289.5.3.2 - 2004.

Maximum Dry Density to be determined in accordance with Australian Standard No 1289.5.1.1 or 1289.5.2.1 as appropriate.

2.3.7 Tolerances

The finished level of the sub-base course shall not deviate more than 10mm from the bottom of a three (3) metre straight edge laid in any direction. The finished level of the base course shall not deviate more than 5 mm when similarly tested.

Any irregularities in excess of such tolerances shall be corrected by loosening the course, removing or adding material as required and trimming and compacting the relevant area to the required dry density cross-section profile and longitudinal grade. Added material shall have similar properties to the material in the course so adjusted.

2.4 Pavement Surface Course

2.4.1 Preparation of Base for Surfacing

All dust, debris and foreign matter shall be removed from the pavement and for a distance 300mm on either side of the pavement, by an approved method, immediately before applying the first coat of bitumen, bitumen emulsion, tack coat or primer.

Any "boney" or loose patches of surface shall be remedied by the addition of metal dust which shall be thoroughly watered and rolled into the surface. Brooming shall again be carried out.

This process shall be continued until the surface is to the satisfaction of the Engineer. The supply and spraying of bitumen shall in accordance with the RTA's Specification DCM 3253 – Bitumen for Pavements.

All spoil removed from the site shall be at developer's expense. All materials are to be disposed of in a lawful manner that complies with the requirements of the POEO Act 1997, with particular attention being paid to disposal of any contaminated material encountered. Where ever possible waste materials shall be sorted and recycled through appropriate recycling channels.

2.4.2 Surface Treatment

The Council Engineer's approval of the area to be surfaced shall be obtained immediately before the application of the surfacing material. Where specified, surfacing shall not be carried out until all service mains have been laid.

- (i) In residential, commercial or industrial subdivisions this shall consist of hot laid asphaltic concrete paving mix in accordance with the following specification.
- (ii) In rural, green belt and non-urban areas this shall consist of two coat bitumen emulsion seal, a primer and hot bitumen seal or a hot laid asphaltic paving mix as may be required by Council in accordance with the following specification.

2.4.2.1 Two Coat Bitumen Emulsion Seal

Firstly – Bitumen Emulsion shall be applied at the rate of 1.1 litres per square metre, followed by an application of 14mm aggregate at the rate of one (1) cubic metre per sixty five (65) square metres.

Rolling shall be carried out immediately after spreading the aggregate and shall be continued until the stone particles have been pushed through the bitumen and rest on the surface of the pavement below.

If a steel tyred roller is used, its weight shall be such that no crushing of the aggregate occurs and shall be not greater than eight (8) tonnes.

All dust or loose material shall be broomed off the road surface before continuing with the next application.

Secondly – Bitumen Emulsion shall be applied at the rate of 1.6 litres per square metre, followed by an application of 10mm aggregate at the rate of one (1) cubic metre per one hundred and thirty (130) square metres and then rolled as for the first application.

Bitumen Emulsion is to conform to RTA's Specification DCM 3254 and DCM R111. The aggregate shall be evenly distributed over the entire surface and shall also conform to the RTA's DCM 3151.

2.4.2.2 Tar Primer and Hot Bitumen Seal

This method shall not be used during the months of May, June, July, August and September. At any time, when it is proposed to use this method, the consent of the Engineer shall first be obtained.

When using this method of sealing, the RTA's specifications DCM 3254 and DCM R111 shall be followed wherever applicable.

Firstly – an approved Petroleum Tar Primer shall be applied at the rate of 1.1 litres per square metres.

Secondly – at least 24 hours later, R90 bitumen complying with Australian Standard No 2008 shall be applied at the rate of 1.6 litres per square metre followed by an application of twenty (20) mm aggregate at the rate of one (1) cubic metre per sixty five (65) square metres and then rolled. This shall then be followed by an application of ten (10) mm aggregate at the rate of one (1) cubic metre per two hundred and sixty (260) square metres and then rolled. Rolling shall conform to that specified for a two coat Bitumen Emulsion Seal. The aggregate shall be evenly distributed over the entire surface and shall confirm to RTA's specification DCM 3151.

2.4.2.3 Asphaltic Concrete Surfacing

Where an asphaltic concrete paving mix surfacing is required, it shall consist of a hot laid asphaltic concrete paving mixture supplied and laid in accordance with the RTA's specification DCM R116.

The thickness of asphaltic concrete required is as follows:

(A) Residential Areas

- i) 25 mm compacted thickness of 10mm gauge spread at a rate of not less than 60kg/square metre to be placed by the Developer and finished flush with lip of gutter.
- ii) 20 mm compacted thickness of 5 mm gauge to be laid by Council. Council requires the Developer to pay a sum determined by the Engineer to cover the cost of this final 20 mm thick surface.

(B) Industrial Areas

- i) 30 mm compacted thickness of 14 mm gauge spread at a rate of not less than 72kg/square metre.
- ii) 20 mm compacted thickness of 10 mm gauge spread of a rate of not less than 48kg/square metre to be finished flush with lip of gutter.

Should the mix as laid be found to have voids outside the specified range, but be otherwise satisfactory, consideration will be given by the Engineer to the acceptance of the material subject to the payment to Council of an amount equal to the deduction from the tendered rate of supplying and laying as set out by the RTA Specification DCM R116.

2.4.2.4 Asphalt – Road Restorations

Adjacent to all new concrete gutter a minimum 300mm wide asphalt road restoration is required, unless otherwise specified in Council's design. All saw cuts within the roadway are to be cut square with the new gutter.

Excavation for asphalt restorations shall be a minimum depth of 150mm below the finished road level. A 100mm thick base layer consisting of 20mm DGB or other approved recycled material, compacted with a vibrating plate in *two* layers, is required. Asphalt shall not be laid in wet conditions or when rain is imminent. The final wearing course shall be a 30mm thick layer of AC14, followed by 20mm thick of AC5 compacted using a vibrating plate. Under NO circumstances shall cold mix asphalt be used. The finished level of the asphalt shall match the level of the new concrete lip and the adjacent road pavement.

3.0 CONCRETE STRUCTURES

3.1 General

All concrete structures shall be constructed in strict conformity with the engineering plans approved by Council and these specifications.

All materials shall conform to the relevant Australian and/or roads and Traffic Authority's Standards. Cement shall be Type A Portland Cement and aggregate shall have a minimum size of 20 mm unless noted otherwise.

All reinforcing steel shall be free from millscale, rust, greases and paint and shall have a minimum cover of 40 mm when embedded in concrete, unless otherwise shown on approved plans.

Ready mixed concrete shall comply with the **Specifications of the Australian Standards Association** and be delivered by a supplier approved by the Engineer.

All concrete shall have a minimum strength of 20MPa at 28 days except where otherwise specified. Council reserves the right to inspect all concrete delivery dockets for verification of concrete strength.

3.2 Foundation

All soft or yielding foundation material shall be removed and the area filled. The filling material used shall be metal dust, road-base or good quality loam which is free from lumps and clay. Such material shall be placed in layers not exceeding 150mm depth and shall be thoroughly compacted. Precautions shall be taken to prevent the removal of this material by water scouring, or otherwise, prior to construction of the adjoining pavement.

Where concrete is to be placed and the foundation is dry, it shall be sprinkled with as much water as it will readily absorb before the concrete is placed.

3.3 Formwork

Formwork shall be rigid and or an approved pattern and interior surfaces shall be adequately oiled, greased or soaked to ensure non-adhesion of concrete.

3.4 Samples for Testing

The Developer shall at no cost to the Council, supply to the Engineer such quantities of concrete as this officer may require for test purposes of NATA laboratory testing as required.

The total amount which shall be taken from testing any batch shall be sufficient to take three (3) test cylinders of 150mm diameter and 300mm in height and to carry out a slump test.

Where the average test strength of cylinders taken is less than the specified strength, the concrete of which the test sample is representative shall be removed and replaced by fresh concrete of the correct strength.

3.5 Access Corridors to Hatchet Shaped Allotments

For 2 to 3 lots serviced off an access handle, a 3 metre wide concrete strip 150mm in thickness shall be placed centrally within the access corridor or as required for servicing the allotments.

The concrete strip shall be reinforced with SL82 mesh with 40mm top cover and placed on a bed of sand or other approved material 50mm compacted thickness.

3.6 Concrete – Vehicular Crossings

The type of vehicular crossing required will be confirmed with Council's Engineer prior to commencement of work on site. All vehicular crossings are to be constructed as per the detail shown on **Council's Standard Drawings No's S-1**.

Bituminous mastic construction joints shall be provided at the property boundary and adjacent to any existing concrete structures. A tooled expansion joint is required at the back of footpath 600mm off the boundary and the front of footpath 1.8m off the boundary.

Residential Type Vehicular Crossings

- (i) Minimum concrete thickness – 125mm.
- (ii) SL72 mesh on 100mm bar chairs. Minimum 40mm top cover.
- (iii) Sub-base – 100mm thick layer of 20mm D.G.B which is to be compacted using a vibrating plate or other approved compaction methods prior to placement of concrete.

Rural Residential Type Vehicular Crossings

- (i) Minimum concrete thickness – 150mm.
- (ii) SL82 mesh on 100mm bar chairs. Minimum 40mm top cover.
- (iii) Sub-base – 100mm thick layer of 20mm D.G.B which is to be compacted using a vibrating plate or other approved compaction methods prior to placement of concrete.

Light Industrial Type Vehicular Crossings

- (i) Minimum concrete thickness – 150mm
- (ii) SL82 mesh on 100mm bar chairs. Minimum 40mm top cover.
- (iii) Sub-base – 100mm thick layer of 20mm D.G.B which is to be compacted using a vibrating plate or other approved compaction methods prior to placement of concrete.

Heavy Industrial Type Vehicular Crossings

- (i) Minimum concrete thickness – 200mm
- (ii) layers of SL82 mesh on bar chairs. Minimum 40mm top cover.
- (iii) Sub-base – 150mm thick layer of 20mm D.G.B which is to be compacted using a vibrating plate or other approved compaction methods prior to placement of concrete.

3.7 Kerb and Gutter & Vehicular Layback

All standard 150 mm kerb and gutter, short vehicle crossings (layback), dish crossings and concrete footpaths shall have the dimensions and specifications given in **Council's Standard Drawings No's S-1**.

A sub-base or base course layer at least 125 mm thick under the kerb and gutter and for 150 mm behind the back of the kerb shall be compacted as required for the selected sub-base layer prior to pouring any concrete.

Vehicular openings (laybacks) shall be provided to all vacant allotments in locations approved by the Engineer. Laybacks shall be constructed generally on the low side of each allotment unless otherwise determined in conjunction with building plans. Laybacks shall be provided for access to developed lots opposite the vehicular gateway. The position of all laybacks to be constructed shall be shown on engineering plans.

Industrial vehicular Laybacks

In general vehicular laybacks may not be provided in industrial subdivisions except as follows:

- i) Where the subdivider has development proposals prepared to indicate the required width locations of access points to each allotment.
- ii) In the case of small allotments and where the subdivider does not have development proposals prepared but where the subdivider requests approval to provide laybacks that they be provided generally in the centre of each allotment having regard to the likely use of the site.
- iii) Where vehicular laybacks are intended to be provided that the locations be determined in conjunction with assessment and approval of engineering plans for the subdivision at the discretion of the Coordinator Engineering Assessment.

Perambulator ramps shall be constructed in conjunction with kerb and gutter construction. These ramps shall be constructed in accordance with **Council Standard S - 8**.

3.8 Drainage Holes

Opposite the low side of each allotment or where directed by the Engineer a drainage hole for the discharge of roof water shall be left in the kerb. Such holes shall consist of 100mm x 50mm rectangular converters with the invert 10mm above the invert of the gutter.

3.9 Concrete Footpaths (Where Required By Council)

Concrete footpath paving shall be provided 1.2m wide on both sides of the subdivision roadways unless otherwise approved by Council and 2.5m wide through all laneways and reserves used as pathways. All path paving shall comply with **Council's Specification Drawing S-1**.

Concrete footpath paving shall be provided 1.2m wide for any development in residential and Industrial areas in accordance with Council's specifications. Where instructed by Council the footpath thickness shall be increased to 125mm with SL72 Mesh.

Concrete path paving shall extend across footpaths at intersections to the line of the back of the kerb as detailed in Council's standard drawing S-8.

The design of pathways shall comply with the requirements of the current Australian Standard AS1428 Design for Access and Mobility where practical.

3.10 Concrete Cycleways

Concrete cycleways shall be 2.5m wide unless otherwise approved by Council. The design and construction of the proposed cycleway is to be in accordance with Council's Standard Drawing No. S-501. The Developer's Designers and or Landscape Architects must consult with Council, and relevant authorities prior to and during the preparation of the cycleway design.

The Designer shall provide adequate signposting design for the cycleway. Signs and pavement marking will provide for the safe and convenient use of the facility. The signs and pavement marking will comply with AS 1742.9 Bicycle facilities.

3.11 Roundabout

The design of roundabouts shall be carried out in accordance with the current AUSTROADS publication (Guide to Traffic Engineering Practice Part 6 Roundabouts). See Council's Standard Drawings No.s S-216.

Consultants are to obtain preliminary approval of the design criteria applicable to each roundabout (e.g. design speed, sight distance, type of vehicle catered for, number of lanes, radius of central island etc), prior to submitting completed design drawings for approval.

3.12 Splitter and Traffic Islands

Consultants are to obtain preliminary approval of the design criteria applicable to each Splitter and Traffic Island prior to submitting completed design drawings for approval.

Note: If coloured/patterned concrete is proposed as an infill material on trafficable areas, then colouring is to extend for the full depth of the concrete. If landscaping/plantings are proposed within medians/central islands then an appropriate landscaping plan is to be submitted for written approval.

3.13 Placing and Finishing

Concrete shall be deposited in the forms without segregation of the aggregates and thoroughly compacted by continuous tamping, spading or slicing.

After removal of the forms, any rough or porous surfaces or holes shall be thoroughly scabbled and dressed up with a two (2) to one (1) cement mortar and rubbed with steel trowel and clean water to leave surfaces plane and smooth.

Surface finishes are to comply with table 6.0. Any deviations are to be approved by Council's Engineer prior to construction. Non-complying work is to be removed at Council's direction and reconstructed so as to comply with the required standard. Exposed surface of concrete shall be struck off and finished as below:

Table 9.0 Concrete Finish

Type of Structure	Finish
Gutter	Steel Trowel
Kerb Top only	Wooden Float or Steel Float
Footpath Paving and Gully Pit Lids	Wooden Float or Broom Finish
Back of Laybacks	Wooden Float
Dish Crossings	Steel Float
Gully Pits, etc (other than Lids)	Steel Float

3.14 Nature Strip

Minimum 100mm compacted thickness of approved topsoil shall be placed over the balance areas of all footpaths and cycle ways. These areas are then to be grassed and are to be properly established and maintained during the maintenance period.

The finished grade of the grass verge shall be 3%, sloping down toward the kerb. The grass verge must be laid in such a way to ensure the finished level of the grass after settlement is not below the finished level of the adjacent footpath and/or kerb. There shall be no localised depressions.

4.0 DRAINAGE STRUCTURES

4.1 Description

All drainage structures shall be constructed in strict conformity with the engineering plans approved by Council and these specifications.

The minimum pipe size laid within roadways shall be 375mm diameter. Minimum cover to pipes shall be 600mm in roadways and 450mm in other locations. All pipe lines shall be designed in accordance with Australian Rainfall and Runoff and shall be laid in accordance with this specification.

The Developer shall be responsible for complying with the requirements of the Workcover Authority of NSW regulations and shall lodge all necessary forms and pay any fees required.

Where indicated on the drawings, drainage lines shall be laid and shall consist of truly circular pipes complete with headwalls, gully pits, junction boxes or sumps, etc, in accordance with the approved plans and these specifications.

Pipe lines running parallel to the roadways shall be laid so that no portion of any pipe extends further under the footpath than the back of the kerb.

Where the Engineer decides that it is not practical to lay pipes, a suitable box section may be used. The specifications for such box sections shall be drawn up by the Developer and submitted for Council's approval. No box sections shall be laid until such approval has been granted.

4.1.1 Gully Pits - Gully pits and junction boxes shall conform to Council's Standard Drawings No S-2, S-202 and S-209 modified as necessary, in respect of junction boxes to meet the Engineer's approval. All gully pits shall be provided with a precast extended kerb inlet 1m long on the higher side or on both sides of pits in sags unless a larger extended inlet is shown on the plans.

When a gully or junction pit has an inlet pipe, the upstream trench shall be drained to the pit by laying a 4m length of perforated or slotted agriculture pipe of minimum diameter 100mm adjacent to the concrete drainage pipe and through the wall of the pit. The end of the pipe in the trench shall be capped to prevent the ingress of sand and the invert of the pipe shall not be greater than 75mm above the invert of the concrete drainage pipe. For pipe greater than 750mm in diameter, both sides of inlet pipes shall be so drained.

4.1.2 Other Structures and Associated Works

Pipe headwalls shall be constructed in accordance with the relevant plans of the RTA.

Open earth drains leading to and/or from pipe drains shall be cut with one (1) horizontal to one (1) vertical side batters to have a discharge capacity equal to that of the pipe and shall be so placed that run-off waters can freely enter or leave the pipeline. Spalls, broken concrete, stone mattresses, turf and/or gabions shall be laid in the bed and on the sides of earth channels downstream of headwalls to prevent scour or erosion if so required by the Engineer. Where so shown, old pipes shall be lifted and re-laid and extended if necessary in accordance with this specification and such relaying shall include the replacement of all damaged pipes, whether damaged in lifting or otherwise.

4.2 Drainage Pipes

4.2.1 Road Drainage

All pipes shall conform to the requirements of Australian Standard No AS 4058-2007. The Engineer reserves the right to carry out any of the therein specified tests.

All pipes shall have a minimum length of 1.2m unless approval from the Engineer is sought and given prior to construction.

4.2.2 Excavation

Trenches shall be excavated to receive the stormwater drains shown on the drawings. Each trench shall be of sufficient width to allow for backfilling firmly around the pipe and clearance on each side of the pipe shall be equal to at least one sixth ($\frac{1}{6}$) of the internal diameter of pipe but no less than 150mm.

4.2.3 Method of Laying Pipes

Pipes shall be laid:

- a) in trenches in solid ground or in drainage depressions in such manner that the pipe is bedded in well compacted granular backfill for at least one third ($\frac{1}{3}$) of its circumference and unless otherwise approved at such depth that there is a minimum total cover of 600mm thickness over the top of the pipe at any point in its length, (450mm for inter-allotment drainage), and
- b) true to grade and alignment on a firm, well rammed bedding material consisting of 75mm thickness of clean sand or granular material. Any soft or yielding materials shall be removed or replaced with sound material and well compacted.

Any rock shall be excavated to a depth not less than 150, below bottom of pipe and the excavation re-filled with sound earth and well compacted; alternatively on rock foundation and at the discretion of the Engineer, the pipe may be bedded for at least one third ($\frac{1}{3}$) of its circumference in an approved concrete cradle. The space between abutting ends of pipes shall not exceed one half percent (0.5%) of the diameter of pipe. Where socket pipes are used, small recesses shall be left under the pipe joints to allow the barrels to bear evenly on foundations for their full length.

Where two (2) or more lines of pipes are to be laid side by side, the space between the external surfaces of the pipes shall be a width not less than one third ($\frac{1}{3}$) of the diameter of the pipe or 300mm whichever is the greater. Any pipe which is not in true alignment or grade or which shows any settlement after laying or which is damaged or faulty shall be taken up and replaced by the Developer to the satisfaction of the Engineer.

4.2.4 Jointing

Pipe shall be jointed as follows:

Mortar shall consist of two (2) parts of sand to one (1) part of cement. The faces of the pipes to be jointed shall be thoroughly wetted, and then the face of the already laid pipe shall be coated with a uniform layer of not more than 7mm of mortar. The pipe to be laid should be butted tightly against the former pipe and the joint shall then be filled up with mortar. Pipes with diameters in excess of 525mm shall be jointed from the inside whilst those of 525mm and less shall be jointed from the outside. The joints shall give neat, smooth surfaces uniform with the inside and outside surfaces of the pipes.

Spigot and socket pipes shall be laid so that all socket ends are at the upstream end of each pipe.

UPVC pipes shall be jointed in accordance with the manufacturer's specifications.

4.2.5 Backfilling of Trenches

After laying and jointing of pipes has been carried out and passed by the Engineer, backfilling of the trenches shall proceed.

Trenches shall be filled with sand, gravel or metal dust to at least the level of the horizontal diameter of the pipes, filling being placed evenly on both sides of pipes and thoroughly compacted. Where the pipeline crosses any carriageway, footpath, pathway or road shoulder or is laid in the line of the kerb and gutter, the remainder of the trench shall be backfilled with sand, and thoroughly compacted. Where a pipeline is laid under an existing road, restoration of the road pavement and surfacing shall be made to the Engineer's requirements.

At other locations, the remainder of the trench shall be carefully filled with approved filling, free from large stones, or sods, well rammed and watered, if necessary. Filling shall be moulded up over the position of the pipe trenches and well compacted. Any subsidence shall be rectified to the Engineer's satisfaction.

Sand or other approved granular material used for filling shall contain not more than 5% by weight of particles passing a 0.075mm sieve and shall be placed in layers not thicker than 225mm loose. The material shall be compacted to at least 70% relative density as determined from tests AS 1289.5.5.1-1998 of the SAA Code Methods of Testing Soils for Engineering Purposes, AS 1289 as amended.

4.3 Inter-Allotment Drainage

A drainage pit shall be provided to each lot serviced by an inter-allotment drainage line.

All inter-allotment drainage pits shall be constructed in accordance with Council's Standard Drawing S202. Alternatively, precast drainage pits from an approved source may be used.

All inter-allotment drainage lines shall be constructed from fibre reinforced cement (class x), reinforced concrete (class x) or UPVC (sewer class) pipes.

Inter-allotment drainage shall be contained within an easement and the easement shall be in favour of the upstream properties/allotments.

4.4 Drainage Under RTA Control

Where it is proposed to connect stormwater to the street gutter or underground drainage system of a road under RTA control, the applicant should submit written evidence to Council of the RTA's approval for this work, prior to final approval being given by Council.

4.5 Water Sensitive Urban Design

Water Sensitive Urban Design aims to protect waterway health by implementing appropriate treatments; such as minimising rainwater runoff, reducing water demand through reuse and maximising recycling opportunities.

A Water Sensitive Urban Design (WSUD) specialist is to be engaged by the developer to integrate and configure WSUD elements into the development plan.

Water Sensitive Urban Design (WSUD) can be integrated into the development footprint as landscaped vegetated areas, which double as treatment elements. For more information on WSUD elements please refer to Council's Natural Resources.

5.0 STREET FURNITURE

5.1 Street Name Plates

The street names, as approved, shall be exhibited at each end of the new roads in the manner herein described. The name plate shall be in accordance with Australian Standards No's 1742-2009, 1743-2001 and 1744-1975.

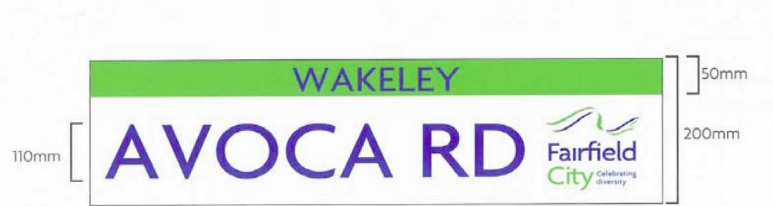
The blade shall be 6mm thick solid Aluminium Plate, 200mm high and no more than 1m across. The background should be 3M class 2 reflective vinyl. The strip should be PMS 376 non-reflective vinyl. The lettering should be Agenda Medium typeface, uppercase, Reflex Blue non-reflective vinyl, with the logo screened on in the two corporate colours as required.

The blade should be connected to the post by mounting brackets of an approved material which does not promote electrolytic corrosion.

The sign shall be erected at a height of 2.5m from the ground to the underside of the blade on a 50mm internal diameter galvanised pipe post. A Downee cap shall be fitted to the top of the post and an anti-twist bar shall be fitted to the bottom of the post.

The hole for the post shall be 230mm minimum diameter and 600mm minimum depth and shall be backfilled with concrete.

The location of the sign shall be in accordance with Australian Standard No 1742-2009.



Street Name Blades - The blade should be 6mm thick solid Aluminium plate, 200mm high and no more than 1m across. The background should be 3M class 2 reflective vinyl. The strip should be PMS 376 non-reflective vinyl. The lettering should be Agenda Medium typeface, uppercase, Reflex Blue non-reflective vinyl, with the logo screened on in the two corporate colours as required.

6.0 BLOCK PAVING

6.1 General

Fairfield City Council has adopted a suite of paving treatments as the standard for footway upgrades in the major CBD precincts' of the Fairfield Local Government Area.

When selecting a paver the Applicant/Developer is to ensure that the unit chosen matches the product currently being used by Council.

The treatments currently used by Council are as follows:-

Cabramatta CBD

Product: Pebblecrete Reconstituted Granite Paver
Colours: Grey PPX: 49
Red PPX: 298.45
Size: 300x300x32mm
Finish: Honed, Bevelled edge

Canley Heights CBD - As per Cabramatta

Canley Vale CBD

Product: Austral Brick Clay Paver: - Classic Range
Colours: Victoria Red
Size: 230x114x50mm

Fairfield CBD

Two treatments depending upon location within the CBD

1. Primary Treatment – Paving

Product: Pebblecrete Reconstituted Granite – Paver
Colours: Beige/Red PPX: 877.5
Charcoal Banding PPX: 1241
Size: 300x300x32mm
600x300x32mm
Finish: Honed, Bevelled edge
Shot Blast

2. Secondary Treatment – Asphalt with Paver Banding

Colours: Charcoal PPX: 1241
Size: 300x300x32mm
Finish: Honed, Bevelled edge

6.2 Service Authorities

The applicant shall notify in writing the following public utility authorities of its intention to lay paving.

- (i) Jemena
PO Box 287
Unanderra NSW 2526
- (ii) Telstra
PO Box 102
Toormina NSW 2452
- (iii) Endeavour Energy
PO Box 6366
BLACKTOWN NSW 2148
- (iv) Sydney Water
PO Box 557
LIVERPOOL NSW 2170

Arrangements should be made for the various authorities to carry out and complete any repairs or adjustments necessary before any paving works begin.

It is required that a copy of all correspondence to the authorities and replies be referred to the Environmental Standards Department, Engineering Assessment Branch for perusal prior to the commencement of work.

6.3 Pattern

Pavers shall be laid in a stretcher bond pattern running longitudinally from the back of the kerb to the boundary line.

A full header course shall be laid at the back of the kerb and gutter and at 4.0 metre intervals and at 90° to the kerb line, and building line. A half header course shall be laid surrounding all pits, boxes, etc, in the pavement over 300 mm x 300 mm in surface areas.

6.4 Sub-Base

- (a) **Pedestrian Traffic** - The base coarse shall be 100 mm thickness of 20 MPA concrete with SL72 Top reinforcing mesh laid on a compacted sub-base. The sub-base compaction to be to the satisfaction of the Engineer.
- (b) **Vehicular Traffic Areas** - Driveways shall be 175mm thickness of 25 MPA concrete with one layer of SL82 reinforcing mesh laid with 40mm cover from the top of the slab. This shall be laid on a compacted sub-base to the satisfaction of the Engineer.

The surface of the driveway shall be finished with a coloured coating, Metal Grey, as per the driveways in Harris Street, between Ware Street and William Street Fairfield.

6.5 Mortar

The pavers shall be laid on a damp bed eight (8) parts by volume clean sand to one (1) part by volume of fresh approved Portland cement, 50mm thick in quantities sufficient for one hour's work at a time. Area of paving laid shall be lightly hosed and vibrated within two hours of commencement of laying using a flat plate vibrator.

6.6 Bedding

Pavers shall be bedded firmly without air pockets occurring beneath. The maximum permissible difference in level shall be 2mm.

Cut edges against service authority covers and existing edges shall be carried out by using a masonry saw and should provide a gap sufficient only to allow an approved expansion jointing material to be placed between the paver and the particular service authority cover.

6.7 Expansion Joints

An approved jointing material shall be placed:

- a) In the base slab:
 - i at back of kerb and gutter;
 - ii at building line;
 - iii around service authority pits, holes and surrounds.
- b) In the paving:
 - i at back of kerb and gutter;
 - ii at building line;
 - iii around service authority lids, poles and surrounds.

6.8 Grades

All paving shall be laid at a minimum grade of 1% and a maximum grade of 3%.

In cases where there proves to be a problem the applicant shall liaise within Council's Engineer to determine an amicable solution. Pavers shall be laid to provide good surface drainage. "Bird baths" and low areas ponding water will not be permitted.

In cross-section the pavers shall be laid of a straight grade between the building line and the top kerb. If an obstruction is caused by a service authority lid or similar, the Developer shall arrange and be responsible for the cost of adjusting any service covers.

6.9 Renewal of Service Lids and Surrounds

It is required that all existing concrete Telstra lids and surrounds be replaced by the Developer with an approved steel lid and surround and lid.

The Applicant/Developer is to liaise directly with Telstra regarding the replacement of pit lids and surrounds.

Telstra's current policy is that it develops the scope of works, seeks quotations and nominates an accredited contractor to carry out works on its infrastructure which includes the supply and installation of steel lids and surrounds.

The local Telstra representative who can assist with this component of the project is Mr Peter Wilson – Mosey Tel 8851 3615.

Once the new lid and surround is installed by an approved Telstra contractor the developer is to then provide a temporary lid within the new surround and arrange for the new lid to be infilled with an aggregate or paver to match the surrounding paving.

6.10 Stormwater Outlets

All existing stormwater pipes between the building line and the kerb line shall be replaced with a galvanised steel channel section with a cross-section area equivalent or greater than the existing pipe diameter and to be of a depth that will allow a full paver to be laid in 15mm of wet concrete mortar above the channel section.

A suitable adaptor shall be installed at the building line between the downpipe and the channel section.

6.11 Pedestrian Access

The area shall be constructed in sections so as to avoid inconvenience to pedestrians and to provide a safe access to shops where required.

Barriers in the form of barricades and barrier mesh should be placed to provide protection for pedestrians. The applicant shall meet all conditions set out in the Fairfield City Council's Road Opening Permit.

The applicant/developer shall provide Council with a Traffic Control Plan indicating the management of both pedestrian and vehicular traffic whilst the works are in progress.

The applicant shall accept all responsibility for all claims that might be received during the construction of the footway.

6.12 Completion of Work

On completion of all works, paving shall be cleaned to remove all foreign matter, stains or marks. Any damaged or faulty material shall be replaced.

APPENDIX A

REFERENCED DOCUMENTS

Australian Standards

AS 1289.2.1.1-2005	Methods of testing soils for engineering purposes - Soil moisture content tests - Determination of the moisture content of a soil - Oven drying method (standard method)
AS 1289.5.1.1-2003	Methods of testing soils for engineering purposes - Soil compaction and density tests - Determination of the dry density/moisture content relation of a soil using standard compactive effort
AS 1289.5.2.1-2003	Methods of testing soils for engineering purposes - Soil compaction and density tests - Determination of the dry density or moisture content relation of a soil using modified compactive effort
AS 1289.5.3.1-2004	Methods of testing soils for engineering purposes - Soil compaction and density tests - Determination of the field density of a soil - Sand replacement method using a sand-cone pouring apparatus
AS 1289.5.3.2-2004	Methods of testing soils for engineering purposes - Soil compaction and density tests - Determination of the field dry density of a soil - Sand replacement method using a sand pouring can, with or without a volume displacer
AS 1289.6.1.1-1998	Methods of testing soils for engineering purposes - Soil strength and consolidation tests - Determination of the California Bearing Ratio of a soil - Standard laboratory method for a remoulded specimen.
AS 1477 – 2006	PVC pipes and fittings for pressure applications
AS 1726 – 1993	Geotechnical site investigations
AS 1726.6 – 1993	Methods of Investigations – Recommended Laboratory Tests
AS 1742 Set-2009	Manual of uniform traffic control devices Set
AS 1743-2001	Road signs - Specifications
AS 1744-1975	Forms of letters and numerals for road signs (known as Standard alphabets for road signs)
AS 2008	Residual Bitumen for Pavements
AS 4058 – 2007	Precast Concrete Pipes

AUSTROADS Documents

AGPT02/2008	Pavement Structural Design - Guide to Pavement Technology
PART 6	Roundabouts
PART 10	Local Area Traffic Management
PART 14	Bicycles

RTA DCM Specifications

DCM 3051	Unbound and Modified Base and Sub-Base Materials for Surfaced Road Pavements.
DCM 3151	Cover Aggregate for Sprayed Bituminous Surfacing
DCM 3253	Bitumen for Pavements
DCM 3254	Bitumen Emulsion
DCM R111	Sprayed bituminous surfacing (with bitumen emulsion)
DCM R116	Asphalt (Dense graded and Opened graded)

RTA Test Methods

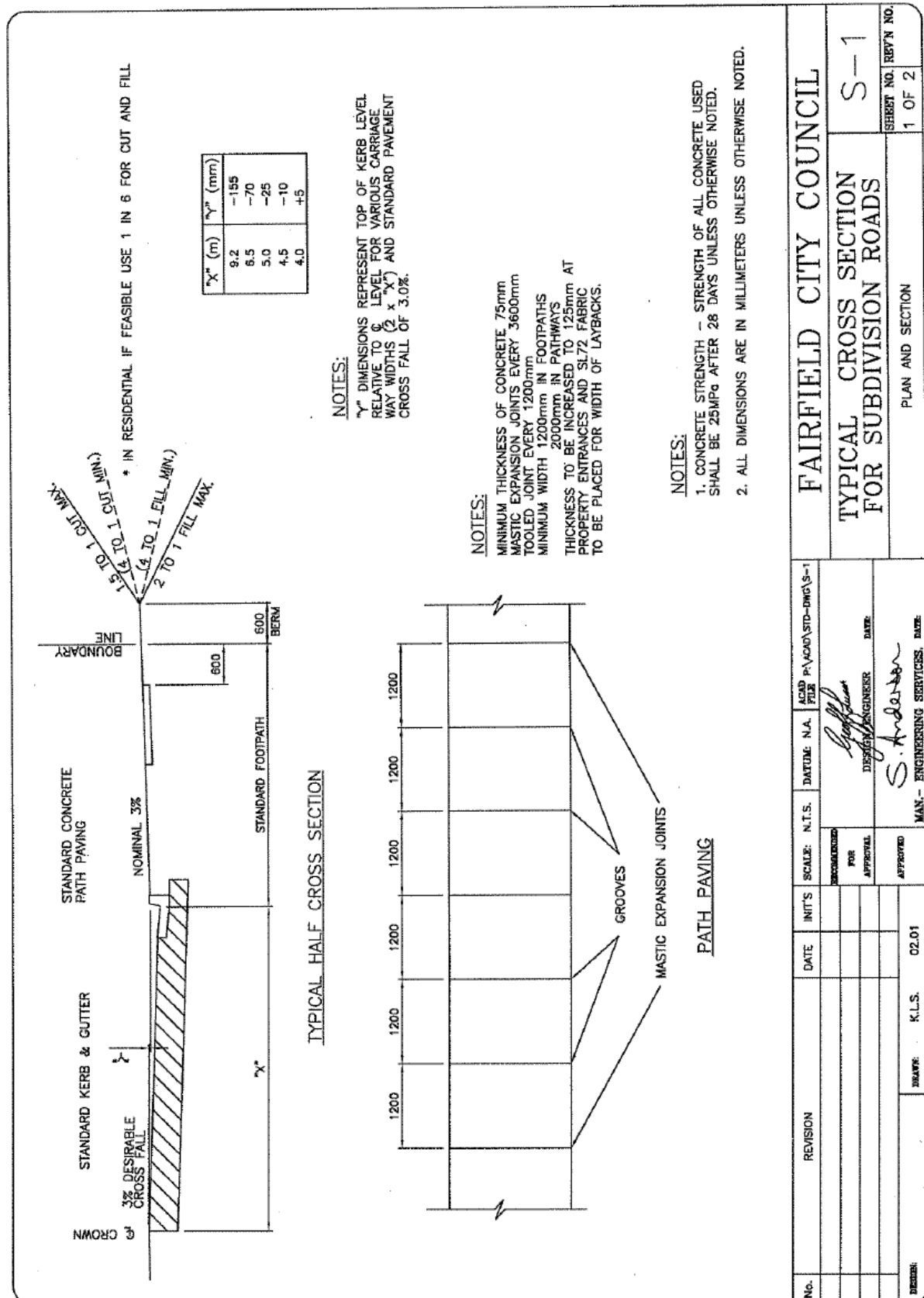
RTA T102	Pre-treatment of Road Construction Materials by Compaction
RTA T103	Pre-treatment of Road Construction Materials by Artificial Weathering

APPENDIX B

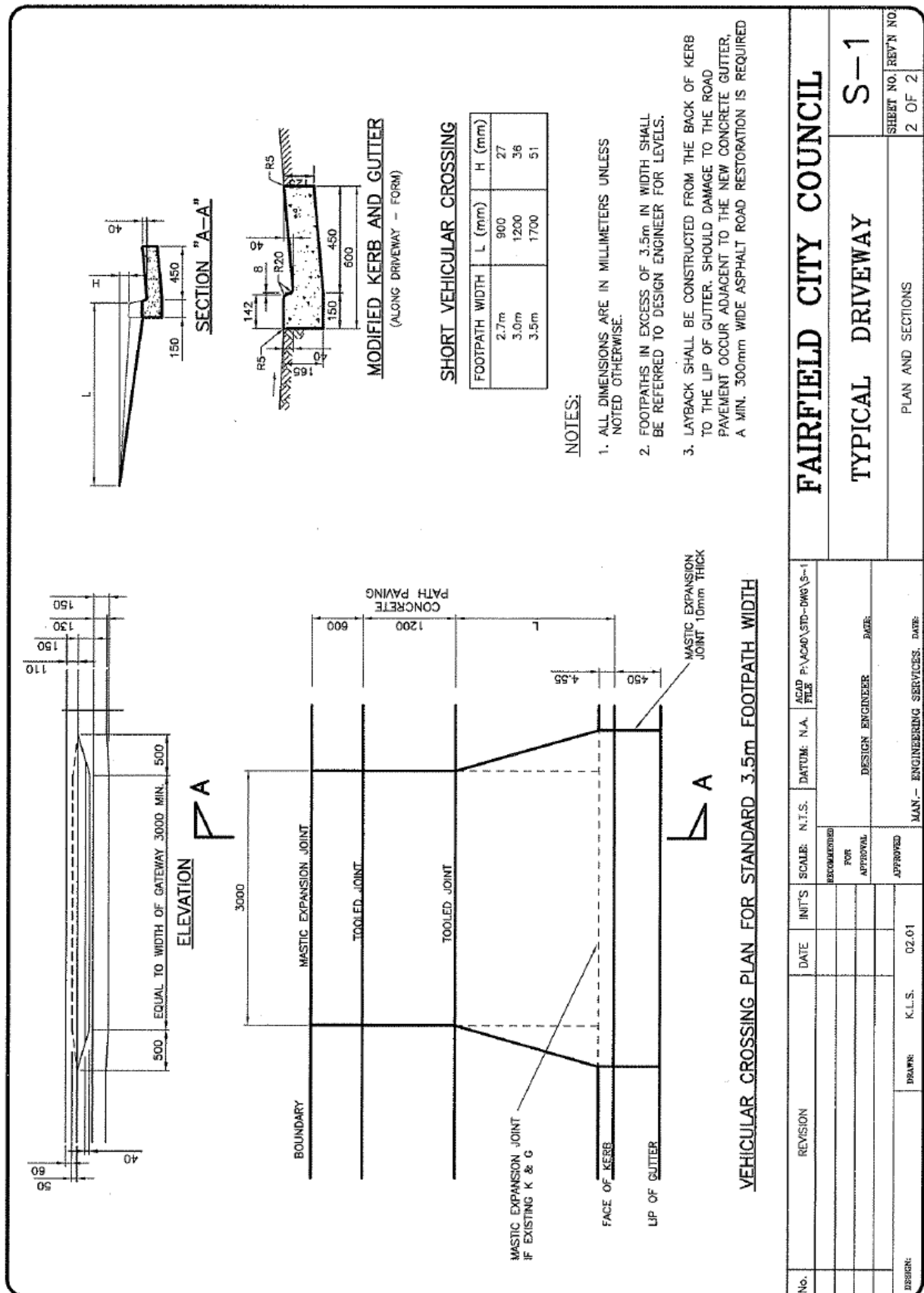
Standard Drawings

- 1) Typical cross section for subdivision roads: S-1
- 2) Typical Driveway: S-1
- 3) Cycleway: S-501
- 4) Standard kerb details: S-215
- 5) Standard kerb ramp in roadways: S-8 Sheet 1
- 6) Standard kerb ramp in roadways: S-8 Sheet 2
- 7) Standard Dish Crossing: S-12
- 8) Standard Dish Crossing: S-13
- 9) Subsoil drainage: S-214
- 10) Paving Details: P-1
- 11) Typical details for roundabouts: S-216 Sheet 1
- 12) Typical details for roundabouts: S-216 Sheet 2
- 13) Standard Gully Pit for Roads: S-2
- 14) Junction Pit Type "A" (Light Duty): S-202
- 15) Junction Pit Type "B" On/Off Road Usage: S-209
- 16) Standard Saddle Type Gully Pit Details: S-210
- 17) Standard Saddle type Gully Pit under Skew: S-211
- 18) Standard Letterbox Pit: S-56
- 19) Pollution Controls: S-228
- 20) Tree Planting Details: T-001

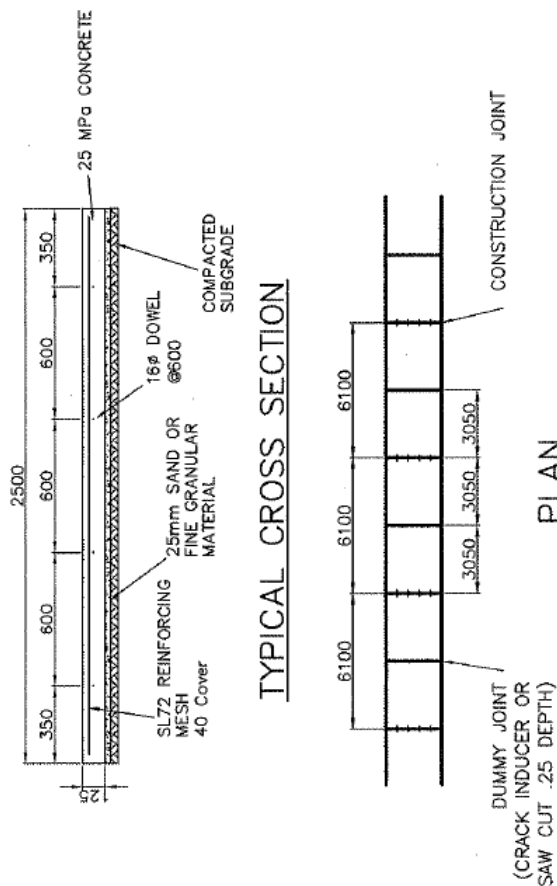
Typical cross section for subdivision roads: S-1



Typical Driveway: S-1



Cycleway: S-501



16 ϕ DOWEL
@600
456mm LONG
SL72 MESH
40 Cover
APPROVED EXPANSION JOINT

Construction Joint Detail

No.	REVISION	DATE	INIT'S	SCALE:	N.T.S.	DATE:	N.A.	ACAD FILE:	U:\500\610\500-006\5501
				RECOMMENDED					
				FOR					
				APPROVAL					
				APPROVED					
DESIGNER:	P.F.	04.03	DIA WKS	K.L.S.	04.03			MANAGER - ENGINEERING SERVICES DATE	
								S-501	
				CYCLEWAY					
								PAVING DETAILS	
								SHEET NO.	REV'N NO.
								1 OF 1	

Standard kerb details: S-215

150mm KERB AND GUTTER
(FORM)

MODIFIED KERB AND GUTTER
(ALONG LOADING BAY - FORM)

PATHWAY KERB & GUTTER

ROLL KERB AND GUTTER
(ONLY IF SPECIFIED IN DRAWINGS)

150mm KERB AND GUTTER
(MACHINE)

MOUNTABLE KERB
(FORM)

DISH CROSSING

KERB ONLY
(FORM)

NOTE :

1. ROAD BASECOURSE TO BE EXTENDED BENEATH AND 150mm BEYOND THE REAR FACE OF KERBS AND GUTTERS, APRONS, AND CROSSINGS.
2. CONCRETE TO BE OF 25 MPa COMPRESSIVE STRENGTH (f_c) AT 28 DAYS.
3. REINFORCING FABRIC TO A.S. 1304/1991 WELDED WIRE REINFORCING FABRIC FOR CONCRETE.
4. CONDUITS SHALL BE MARKED ON KERBS FOR LOCATION WITH AN APPROVED TOOL OR AS DIRECTED BY THE SUPERINTENDENT.
5. ALL DIMENSIONS SHOWN ARE IN MILLIMETRES.

No.	REVISION	DATE	INT'S	SCALE	N.T.S.	DATE	N.A.	ACAD FILE : P:\ACAD\STD-DWG\S-215
				FOR APPROVAL				
				APPROVED				

DESIGNER

DATE

10.00

K.I.S.

DRIVER

MAX. - ENGINEERING SERVICES DATE

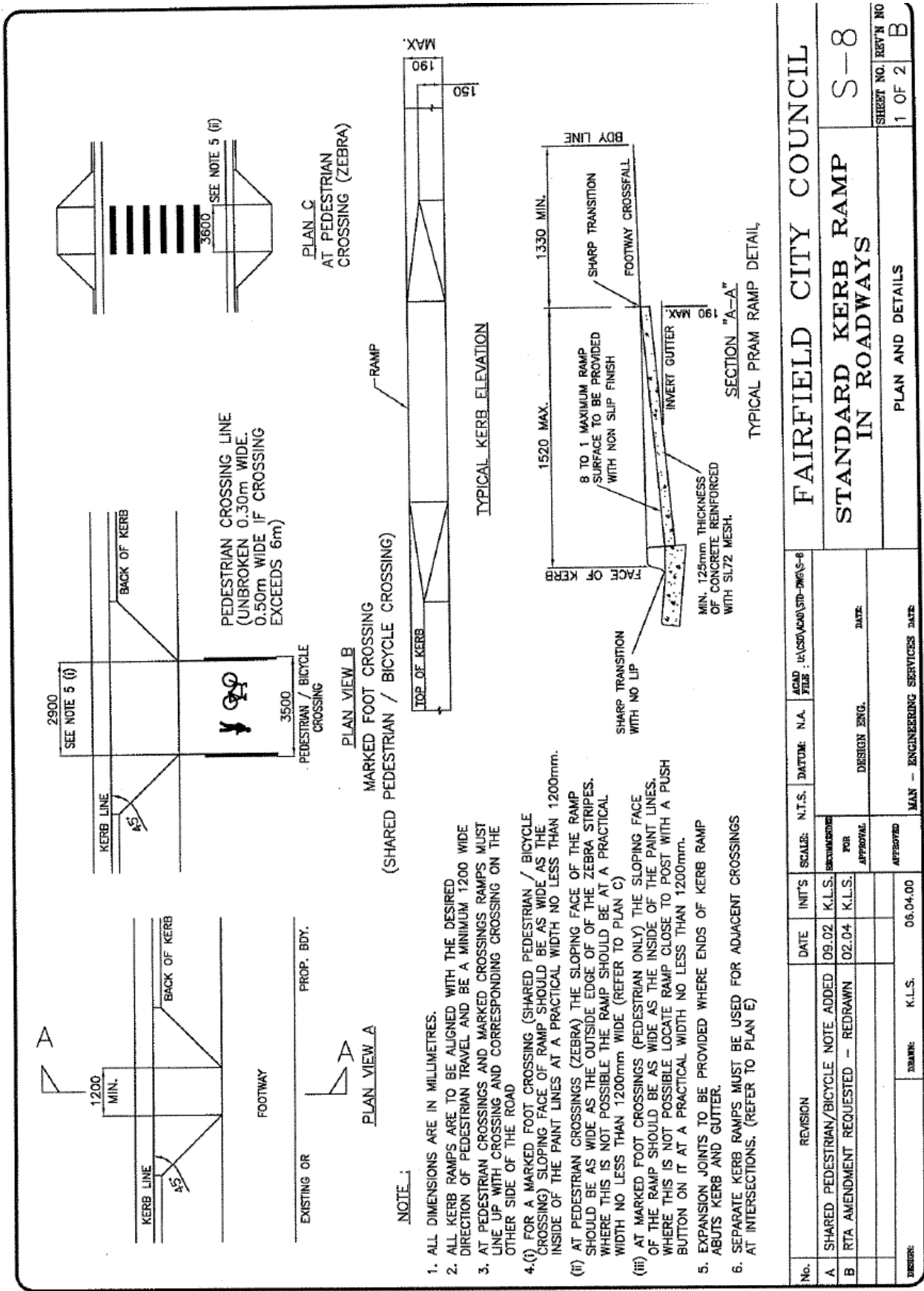
FAIRFIELD CITY COUNCIL

STANDARD KERB DETAILS S-215

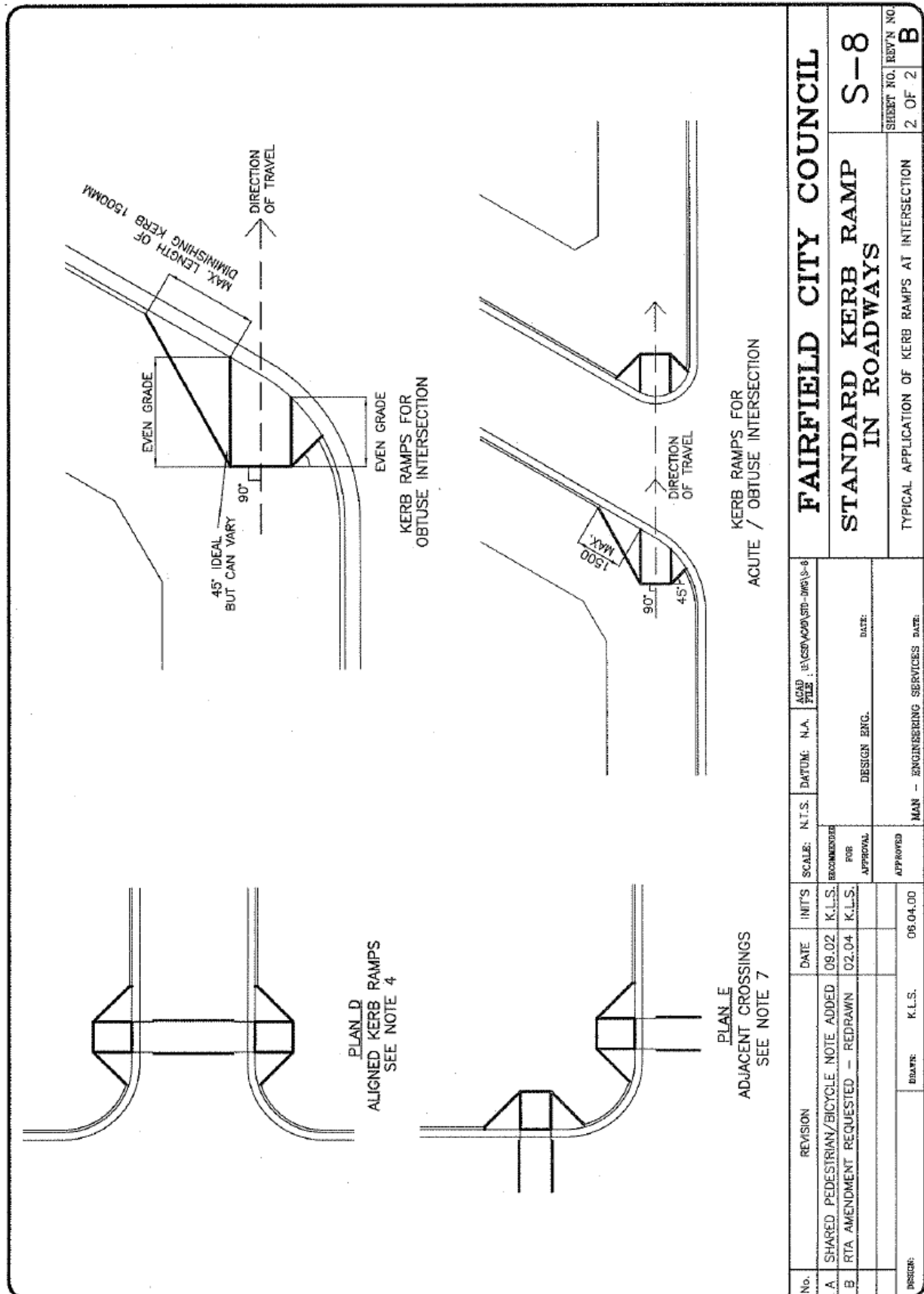
USE IN CONJUNCTION WITH APPROVED DRAWINGS

SHEET NO. REV'N NO
1 OF 1

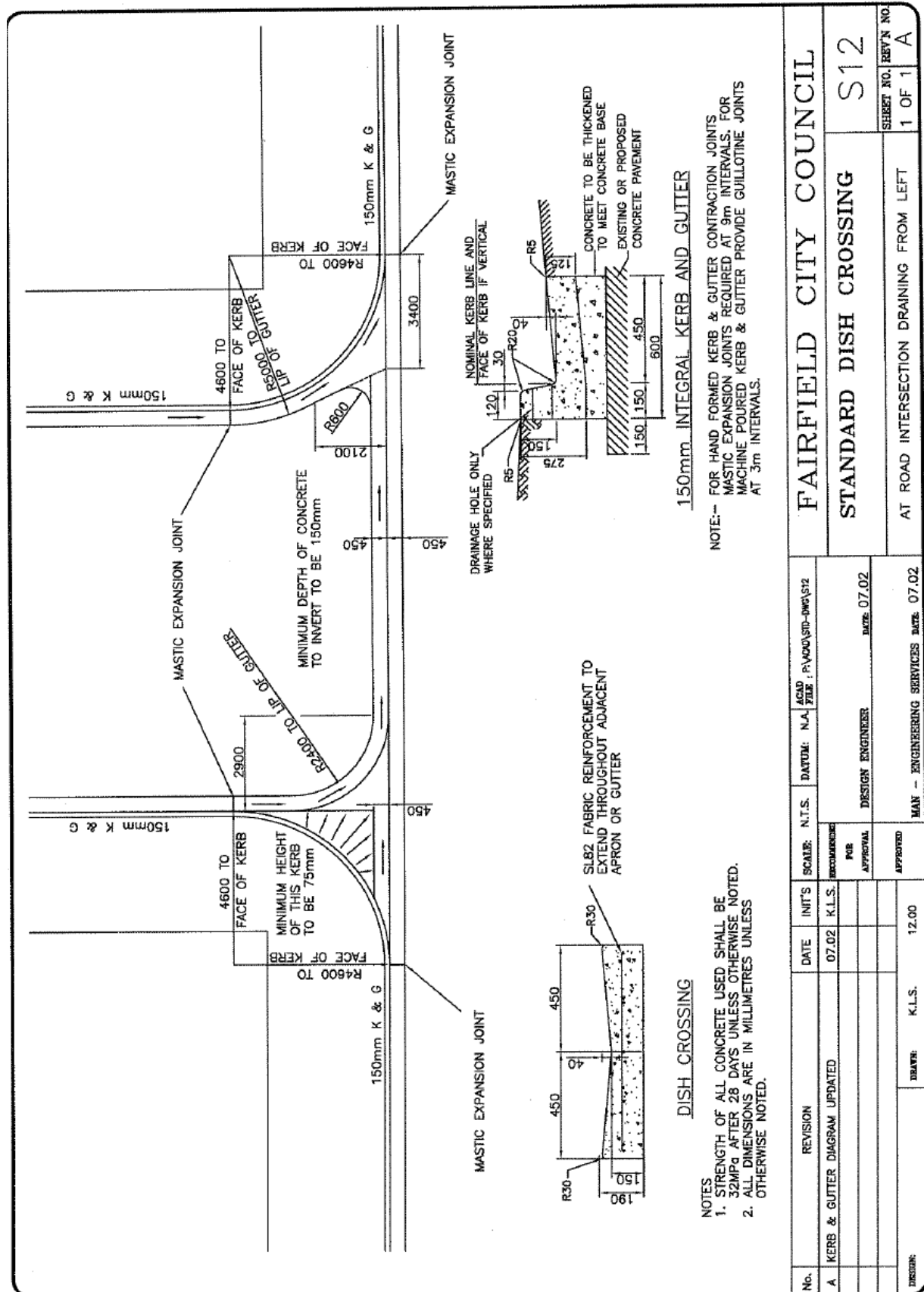
Standard kerb ramp in roadways: S-8 Sheet 1



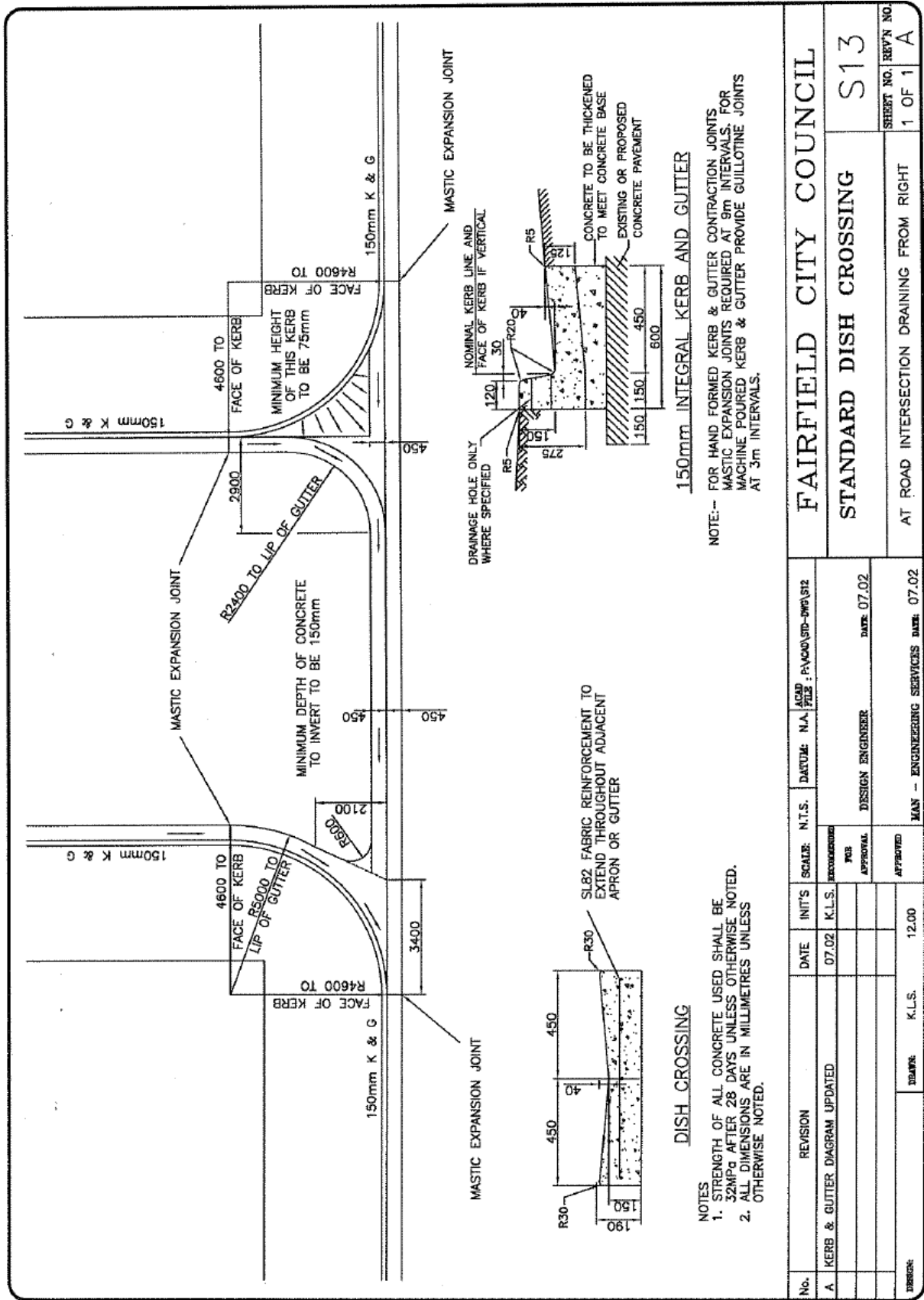
Standard kerb ramp in roadways: S-8 Sheet 2



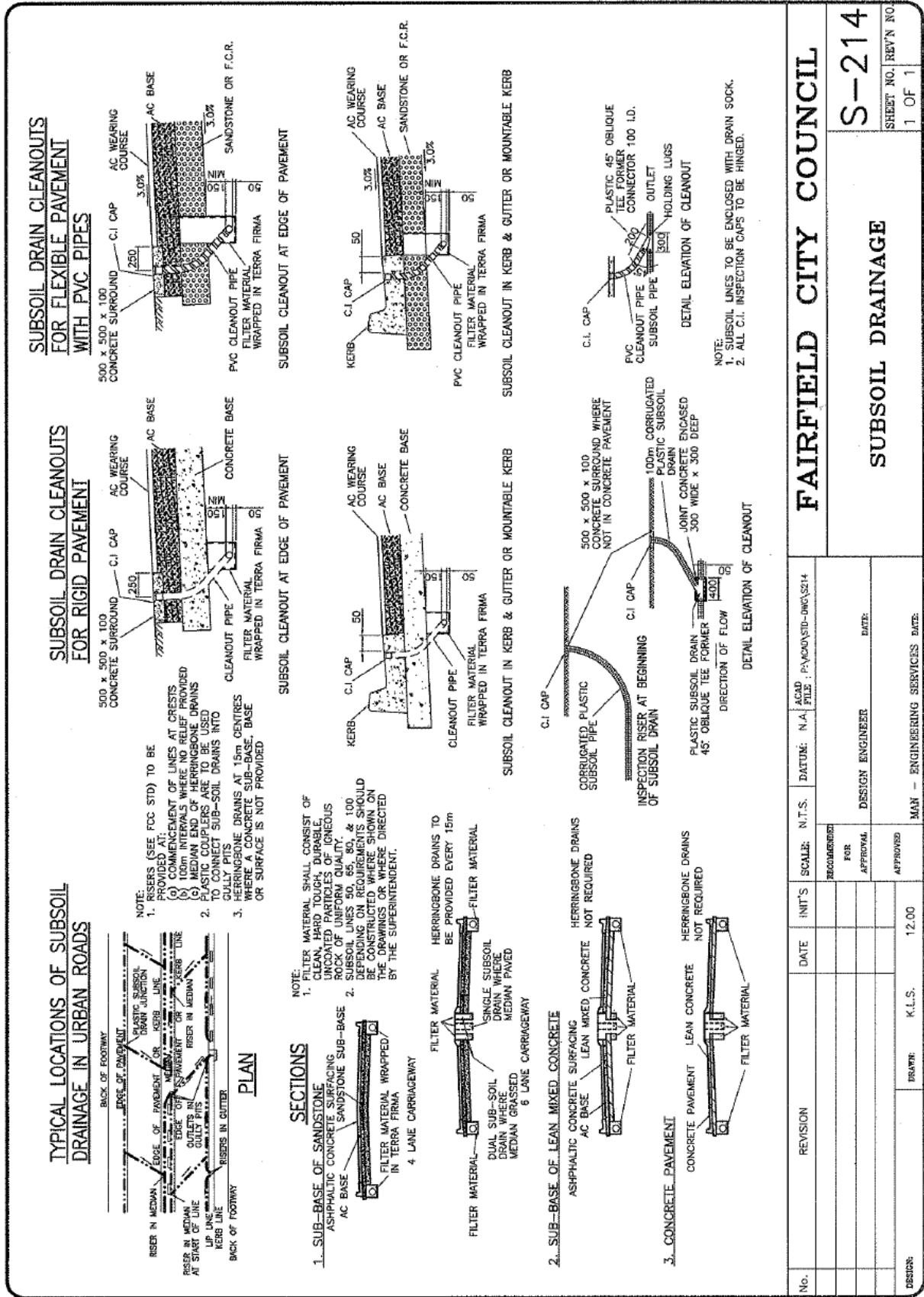
Standard Dish Crossing: S-12



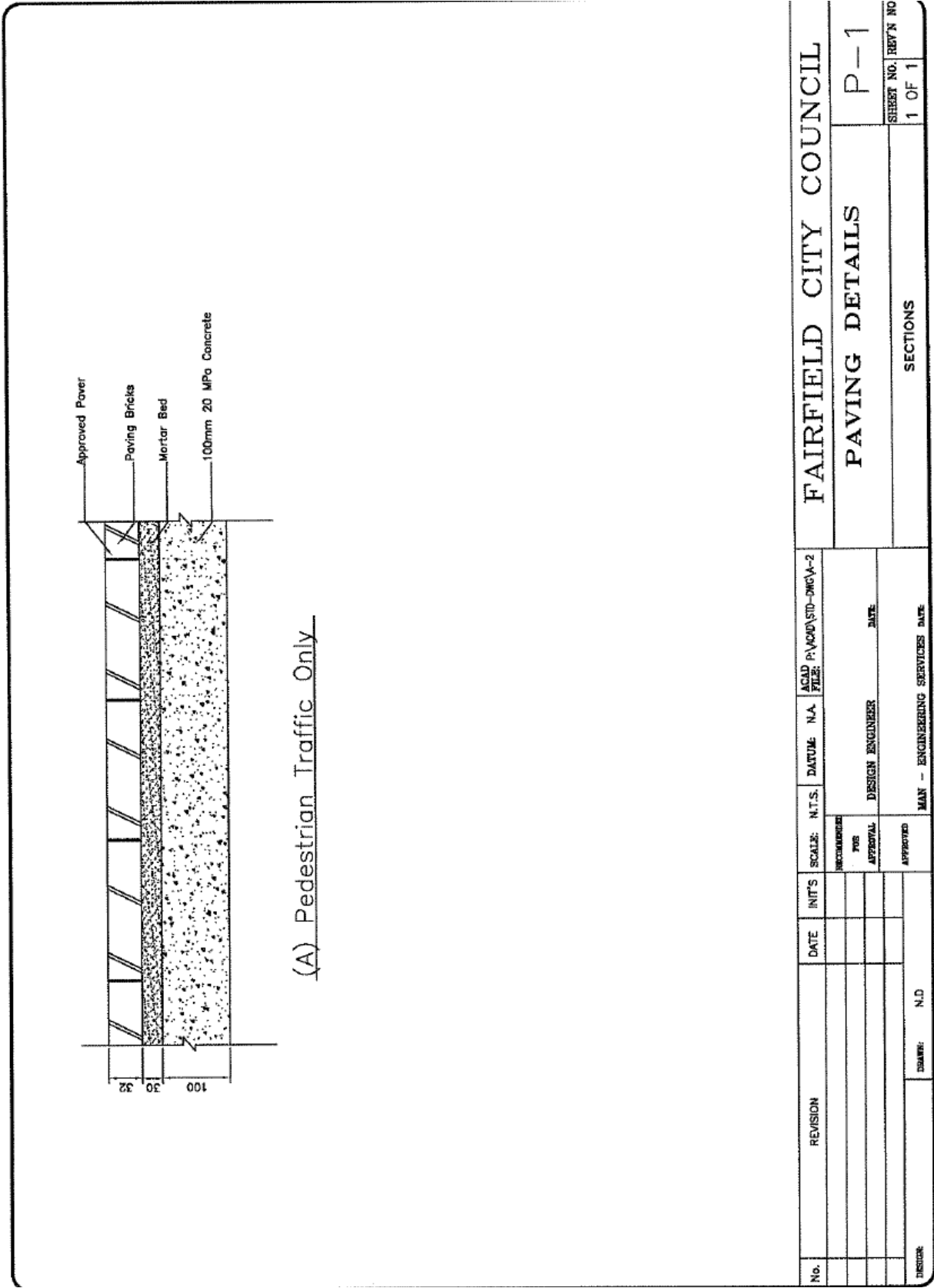
Standard Dish Crossing: S-13



Subsoil drainage: S-214

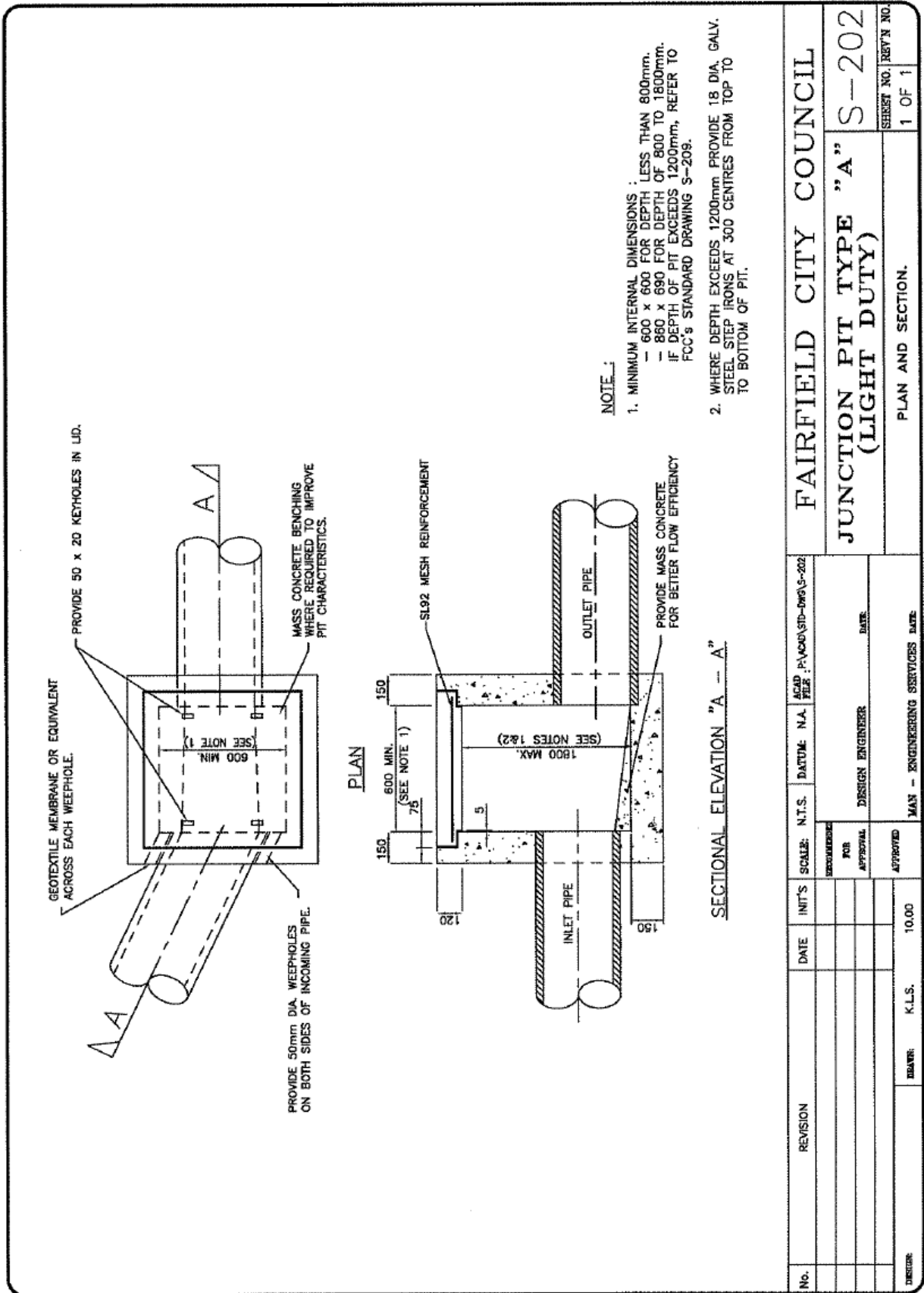


Paving Details: P-1



No.		REVISION		DATE	INIT'S	SCALE:	N.T.S.	DATUM:	N.A.	ACAD FILE: P:\A000\STD-DWG-A-2	FAIRFIELD CITY COUNCIL	
						RECOMMENDED					P-1	
						FOR					PAVING DETAILS	
						APPROVAL		DESIGN ENGINEER		DATE	SHEET NO. REV'N NO	
						APPROVED		MAN - ENGINEERING SERVICES		DATE	1 OF 1	
DESIGNER		DRAWN:		N.D		SECTIONS						

Junction Pit Type "A" (Light Duty": S-202



FAIRFIELD CITY COUNCIL									
JUNCTION PIT TYPE "A" (LIGHT DUTY)									
S-202									
SHEET NO. REV'N NO.									
1 OF 1									
PLAN AND SECTION.									
MAN - ENGINEERING SERVICES DATE									
DESIGN ENGINEER DATE									
FOR APPROVAL									
APPROVED									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									
K.L.S.									
DEALER									
10.00									

Junction Pit Type "B" On/Off Road Usage: S-209

SECTION ELEVATION "A-A"

COVER TO SUIT REQUIRED (SEE NOTE 2&3)

AS SPECIFIED IN TABLE BELOW

3-N16 TRIMMER BARS AS SPECIFIED IN TABLE BELOW

MASS CONCRETE BENCHING WHERE REQUIRED

400 LAP

50 DIA. WEEP HOLES ADJACENT TO EACH PIPE

910 MINIMUM (W)

150 (T)

150 (T)

WHERE DEPTH EXCEEDS 1200, PROVIDE 18 DIA. G.I. STEEL STEP IRONS AT 300 CRS. FROM TOP TO BOTTOM OF PIT.

DEPTH AS REQUIRED (D)

F_c TO BE 20 MPa @ 28 DAYS

AS SPECIFIED IN TABLE BELOW

380

220

690

220

150

150

250

C.J.

C.J.

C.J.

PLAN

NOTE:

1. MINIMUM 30 mm COVER.
2. WALL THICKNESS IN CHIMNEY TO BE ADJUSTED TO SUIT TYPE OF PIT LID.
3. COVER LIDS TO BE USED AS FOLLOW :
i - WITHIN ROAD - MAXIMUM LOADING
ii - ELSE - MINIMUM LOADING
4. SUBSOIL DRAINS TO BE PLACED FOR A DISTANCE OF 4 METRES FROM EACH WEEPHOLE.
5. ALL DIMENSIONS SHOWN ARE IN MILLIMETRES.

AS SPECIFIED IN TABLE BELOW

220

150

860

150

220

N16 200 E.F.

CLEAR OPENING 860 x 690

SPACING OF N 16 WALL & BASE REINFORCEMENT					
DEPTH TO INVERT "D"	WALL & BASE THICKNESS "T"	MAXIMUM INTERNAL PLAN DIMENSION "W"			
		0 - 1190	1200 - 1790	1800 - 2390	2400 - 2690
0 - 1990	150	NIL REINF.	250 CP	250 CP	250 CP
2000 - 2490	200	250 CP	250 CP	200 CP	200 CP
2500 - 2990		250 CP	200 CP	150 CP	140 CP

No.		REVISION	DATE	INIT'S	SCALE	N.T.S.	DATE	N.A.	ASAP FILE	P:\ADOC\STD-060\5-209
DESIGN		DRAWER		K.L.S.	10.00	APPROVED		MAN - ENGINEERING SERVICES		DATE:
DESIGN		DRAWER		K.L.S.	10.00	APPROVED		MAN - ENGINEERING SERVICES		DATE:

FAIRFIELD CITY COUNCIL

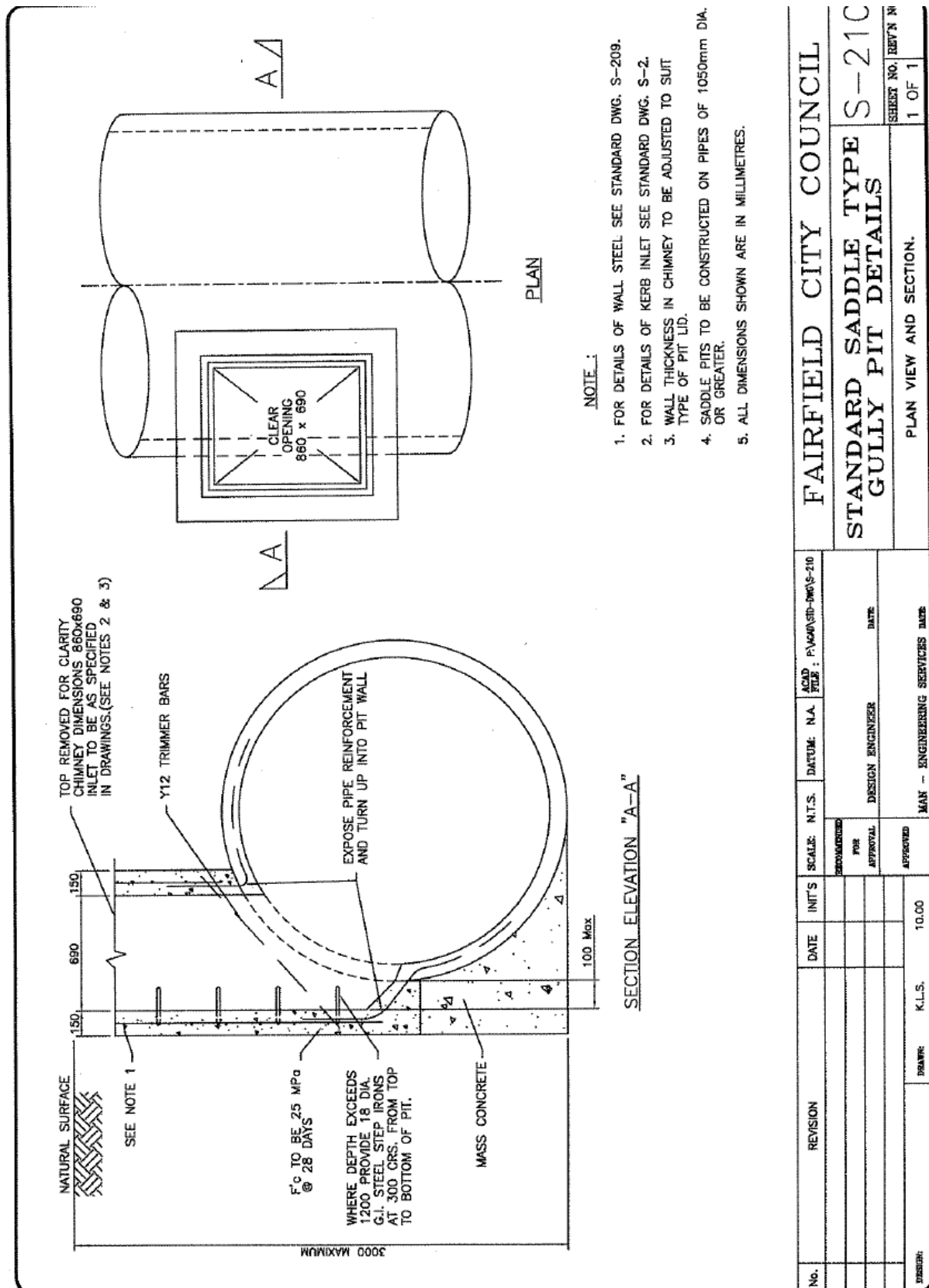
JUNCTION PIT TYPE "B" ON/OFF ROAD USAGE

S-209

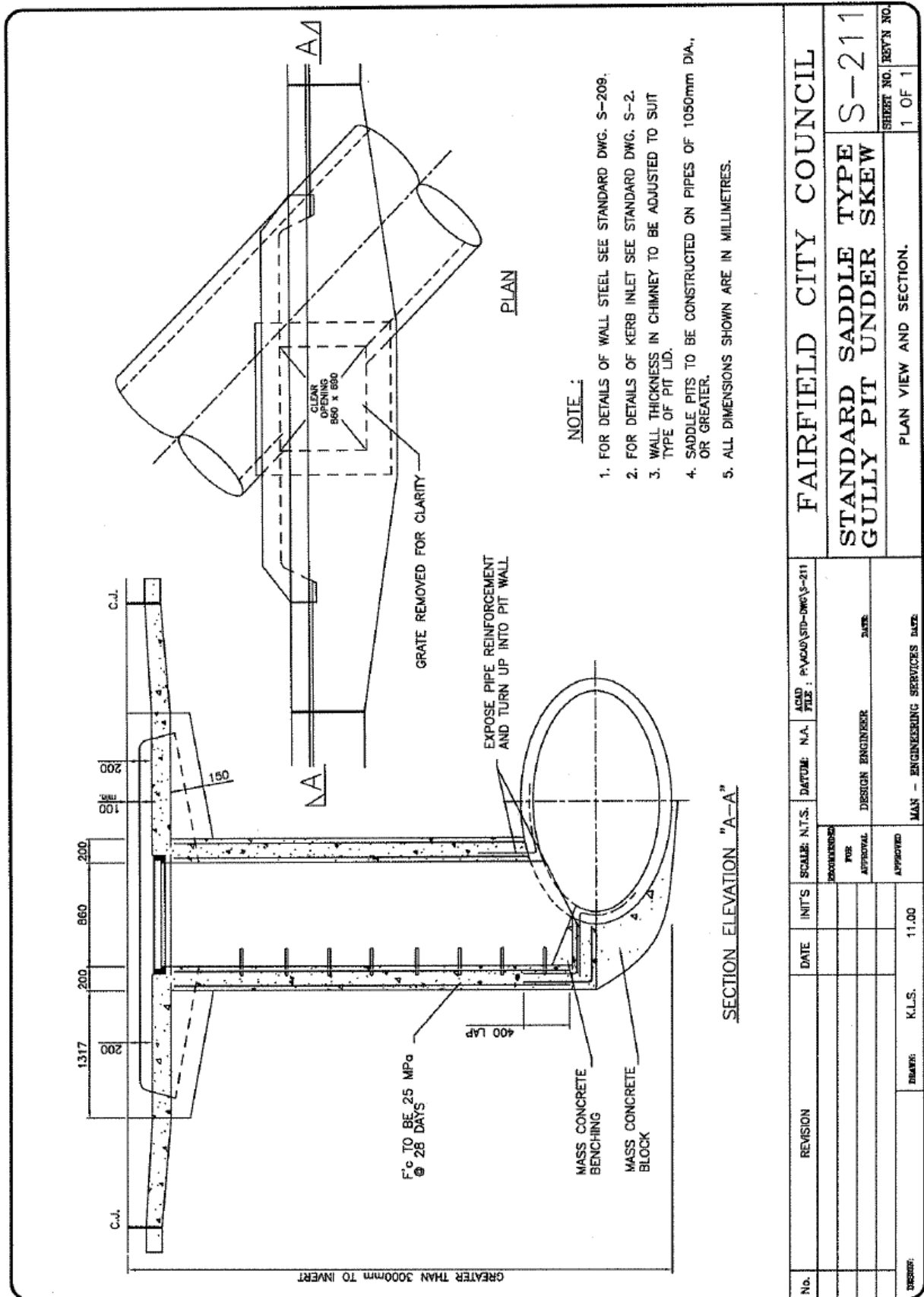
PLAN VIEW AND SECTION.

1 OF 1

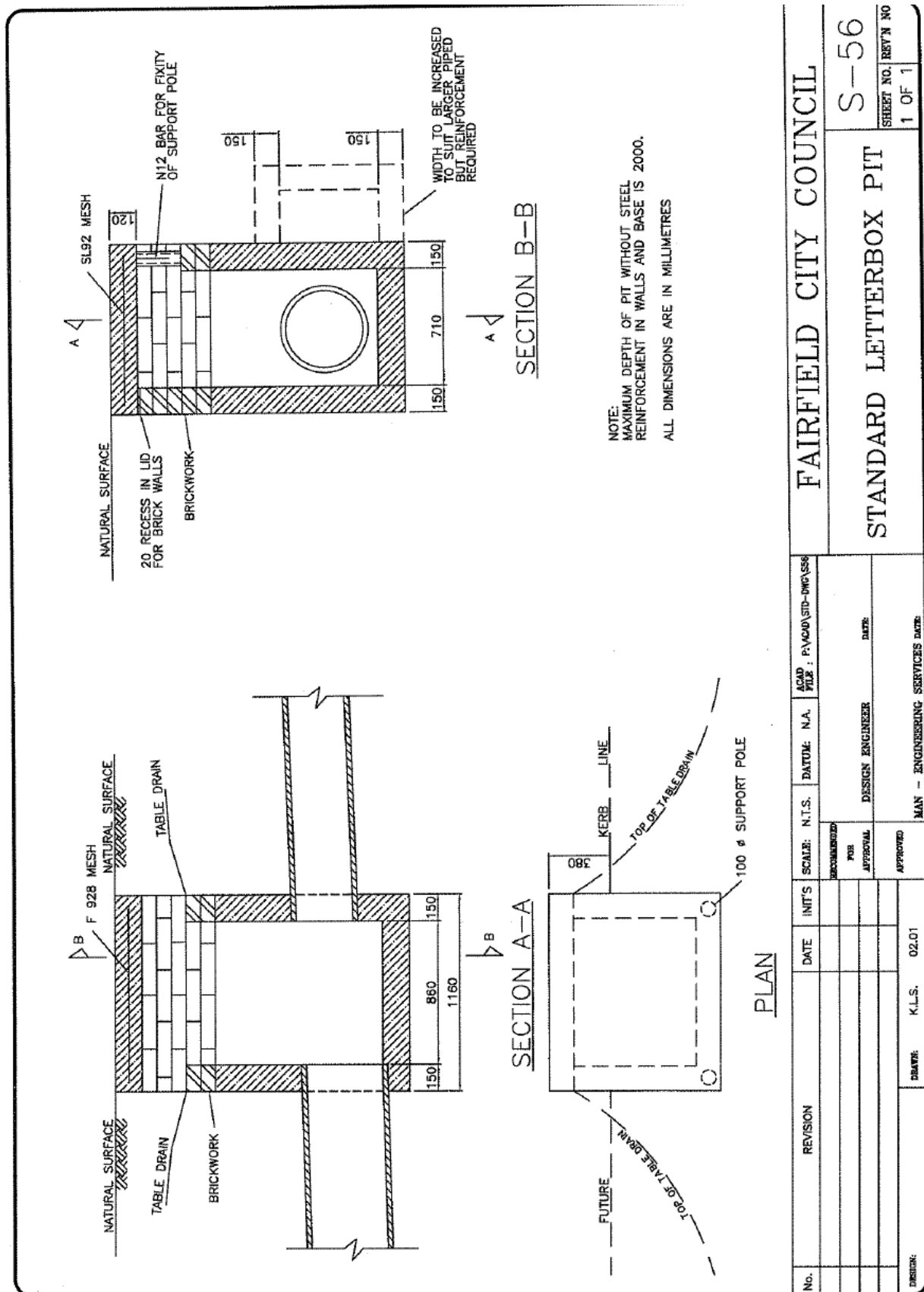
Standard Saddle Type Gully Pit Details: S-210



Standard Saddle type Gully Pit under Skew: S-211



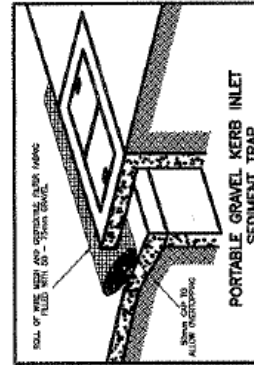
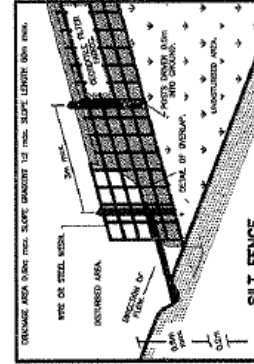
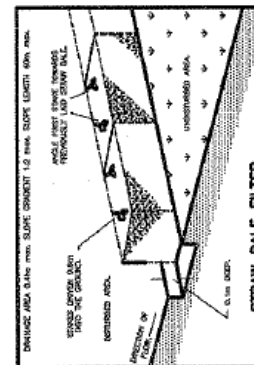
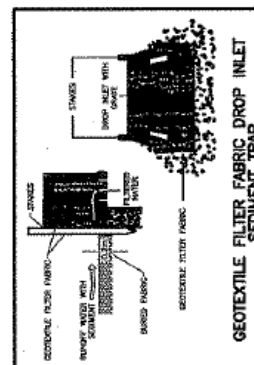
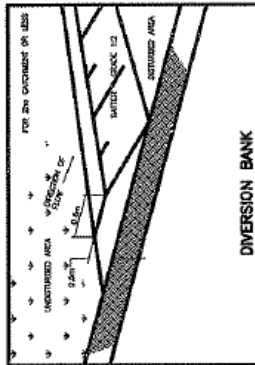
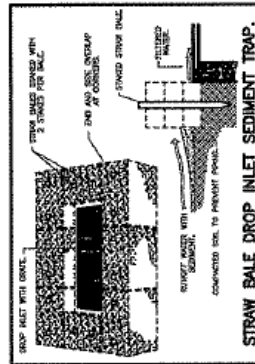
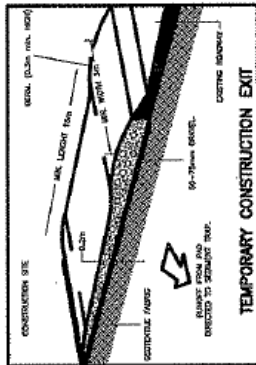
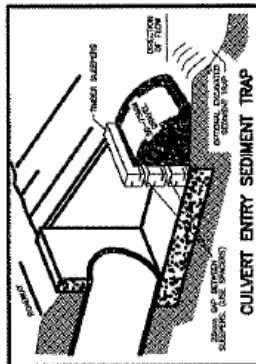
Standard Letterbox Pit: S-56



Pollution Controls: S-228

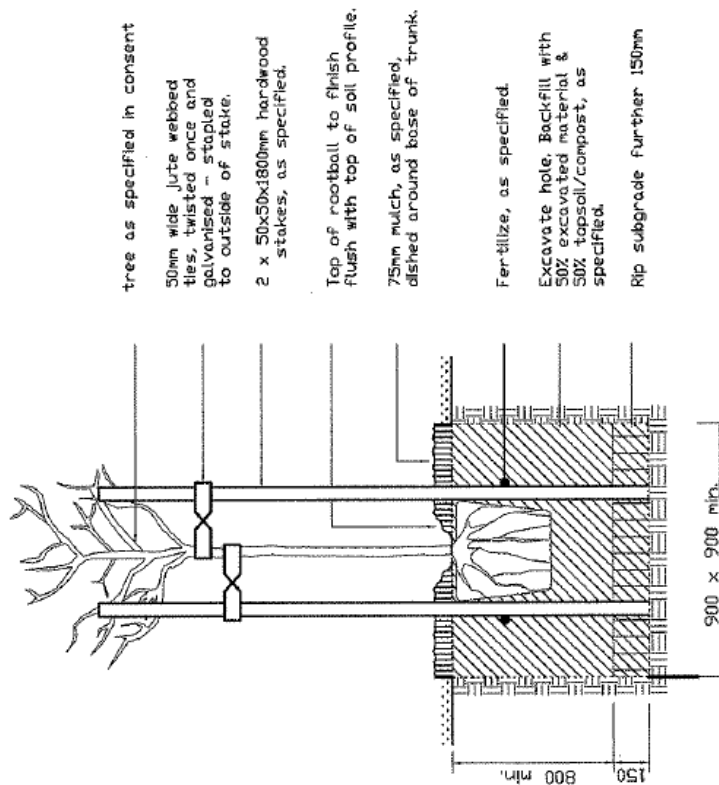
EROSION CONTROL NOTES:

1. ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH FAIRFIELD CITY COUNCIL'S STANDARD SPECIFICATIONS AND TO THE SATISFACTION OF COUNCIL'S ENGINEER.
2. EROSION AND SEDIMENTATION CONTROLS SHALL BE CONSTRUCTED AS SHOWN ON THIS PLAN AND/OR WHERE DIRECTED BY COUNCIL'S ENGINEER.
3. SEDIMENTATION AND EROSION CONTROL DEVICES SHALL BE IMPLEMENTED PRIOR TO OR IN CONJUNCTION WITH THE FIRST PHASE OF EARTHWORKS AND SHALL BE REMOVED ONLY WHEN THE AREAS ABOVE IT HAVE BEEN STABILISED. EACH SEDIMENTATION AND EROSION CONTROL DEVICE SHALL BE INSPECTED AFTER EACH STORM FOR STRUCTURAL DAMAGE OR CLOGGING BY SILT AND OTHER DEBRIS AND PROMPTLY DESILTED, REPAIRED OR REPLACED IF REQUIRED.
4. TOPSOIL STOCKPILES SHALL BE LOCATED OUTSIDE HAZARD AREAS SUCH AS DRAINAGE DEPRESSIONS.
5. ALL AREAS NOT SUBJECT TO CONSTRUCTION WORKS SHALL BE RETAINED FREE FROM DISTURBANCE OR DAMAGE FOR THE DURATION OF THE WORKS.
6. TREES TO BE RETAINED SHALL BE PROTECTED DURING SITE WORKS AND CONSTRUCTION BY THE ERECTION OF SOLID BARRICADES AT THE DRIP LINE OR AS SPECIFIED BY COUNCIL'S ENGINEER.
7. THE DEVELOPER OR CONTRACTOR WILL TAKE ALL MEASURES TO PREVENT DAMAGE TO TREES AND ROOT SYSTEMS DURING SITE WORKS AND CONSTRUCTION ACTIVITIES INCLUDING THE PROVISION OF WATER, SEWERAGE AND STORMWATER DRAINAGE SERVICES. IN PARTICULAR, WORKS IN ERECTION OF STRUCTURES, EXCAVATION OR CHANGES TO SOIL LEVELS WITHIN 4 METRES OF THE TRUNKS OF TREES TO BE RETAINED ARE NOT PERMITTED UNLESS PART OF THE DEVELOPMENT AS APPROVED, AND THE STORAGE OF SPOIL, BUILDING MATERIALS, SOILS OR THE DRIVING OR PARKING OF ANY VEHICLE OR MACHINERY WITHIN 4 METRES OF THE TRUNK OF A TREE TO BE RETAINED, IS NOT PERMITTED.
8. WEETING OF THE SITE SHOULD BE CARRIED OUT AS OFTEN AS NECESSARY AS A FORM OF DUST CONTROL.
9. SILT FENCES TO BE CONSTRUCTED WHERE EVER NATURAL SURFACE SLOPES AWAY FROM DISTURBED AREAS OR WHERE DIRECTED BY THE ENGINEER.
10. FILTER SILT FENCES SHOWN



No.	REVISION	DATE	INIT'S	SCALE: N.T.S.	DRAWING N.A.	APP. BY	P. ACAD. STD-DWG. (SEDMEN)
A	DETAILS AND TITLE BLOCK UPDATED	03.01	G.L.	FOR		<i>[Signature]</i>	
				APPROVAL	DESIGN ENGINEER	<i>[Signature]</i>	
				APPROVED		<i>[Signature]</i>	
DESIGN:	DRAWER: BEATA POSTLEP				MAN - ENGINEERING SERVICES	DATE: 03.01	

Tree Planting Details: T-001



TREE PLANTING DETAILS

NOT TO SCALE

NO.	REVISION	DATE	INIT'S	SCALE: N.T.S.	DATE: N.A.	ACAD FILE: PACAD-STD-DWG-T-001
				RECOMMENDING		
				FOR	DESIGN ENGINEER	DATE
				APPROVAL		
A		07/09	ND	APPROVED		DATE
DESIGN:		DRAWN:		CROSS SECTIONS AND DIMENSIONS.		
				TYPICAL DETAILS FOR TREE PLANTING		T-001
				FAIRFIELD CITY COUNCIL		SHEET NO. REV'TN NO. 1 OF 1