

ASSET MANAGEMENT PLAN
Transport

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1.0 Introduction

1.1 Background

The Adelaide Plains Council has worked on the development of this Asset Plan based on the asset register as at June 2020.

The transport network comprises:

- Sealed Roads
- Unsealed Roads
- Kerbs and Watertables
- Pram Ramps
- Footpaths
- Bridges
- Car Parks
- Traffic Control

The infrastructure assets included in this plan have a total replacement value of $105,618,397 at 2020 valuation.

This plan outlines the requirements for the Council to continue to plan and deliver on the demands to maintain its road infrastructure to prescribed service levels and the expenditure demand and proposed budget is presented below.

The renewal expenditure presented has been established through on-site inspections to verify asset information, delivering a significant 4 year rolling works program with targeted expenditure provided over a 10 year period.

Some adjustments to the works program generated from the asset register have been made to even out the annual expenditure requirements by deferring or bringing forward certain road segments for treatment to assist works expediency.

Council plans to provide transport asset services for the following:

Operation, maintenance and renewal of sealed roads, unsealed roads, kerbs and watertables, footpaths, bridges and pram ramps, car parks and traffic controls to meet service levels set by Council in annual budgets.

Council is committed to maintaining and renewing the existing transport assets to required service level standards. Additionally, Council will continue planning to upgrade transport assets, however commitment to internal funding and external funding is yet to be determined and accordingly is not included in the expenditure profile and will form part of the annual budgeting process.

Adelaide Plains Council own and manage an extensive rural sheeted road network and a smaller rural sealed network throughout the council area. Council also own and manage a township road network across numerous towns with mainly sealed and some sheeted road surfaces.

Council's rural and township unsealed road surfaces Categories 1, 2, 3-A, 3-B and 3-C sheeted surfaces are treated as capital expenditure. Category 4-A formed natural roads are funded entirely under maintenance.

Asset groups included within the transport infrastructure group include sealed road, unsealed roads, kerbing, channel & spoon drains, footpaths, pram ramps, bridges, car parks and traffic control.

This Asset Management Plan communicates the requirements for the sustainable delivery of services through management of assets, compliance with regulatory requirements, and required funding to provide the appropriate levels of service over the planning period.

The Asset Management Plan is to be read with Asset Management Policy and Asset Management Strategy, where developed, along with other key planning documents:

- Strategic Plan
- Annual Business Plan
- Long Term Financial Plan

The Adelaide Plains Council contains approximately 142km of rural sealed roads, 39km of township sealed roads, 541km of sheeted roads and 235km natural formed roads. Also within the IAMP, four Bridges, 19.2km of footpaths, 184 Pram Ramps and 63.7km of kerb, channel and spoon drains. Only sealed and sheeted roads are treated as capital expenditure, natural formed roads are funded under maintenance.

This Transport Infrastructure Asset Management Plan provides for Councils road network and has been developed using an asset register which was digitised using historical plans and field collection during 2020. The register was valued as at 30 June 2020 and has been updated with 2021/2022 capital works to the value of $2,357,850.

Asset	Quantity	Renewal Value	Total Value
Sealed Roads	181,728 Length (m) 1,407,552 m2	$71,466,451	$71,466,451
Sheeted Roads	541,218 Length (m) 3,839,977 m2	$18,489,371	$18,489,371
Bridges	4 No.	$4,935,627	$4,935,627
Sealed Footpaths Block Paving, Concrete, Hotmix, Spray Seal Unsealed Footpaths Rubble Walkway/Shared Path	19,186 Length (m) 61 Length (m)	$3,182,193	$3,182,193
Pram Ramps	184 No.	$270,480	$270,480
Kerb and Watertable	63,778 Length (m)	$7,274,275	$7,274,275
Total			**$105,618,397**

Key stakeholders in the preparation and implementation of this AM Plan are shown in Table 1.1.1

Table 1.1.1: Key Stakeholders in the AM Plan

Key Stakeholder	Role in Asset Management Plan
Residents and Ratepayers	■ Ultimate beneficiaries of the AMP process ■ Feedback collected throughout the year ■ Annual satisfaction survey undertaken
Insurers	■ Local Government Mutual Liability Scheme
Lessees	■ Leases operating who provide feedback on services, and have a range of maintenance responsibilities.

Key Stakeholder	Role in Asset Management Plan
State & Federal Government	■ Responsible for awarding grants to Council
Department for Infrastructure and Transport (DiT)	■ Liaison with DiT, discuss future Works Programs
Visitor / Tourists	■ Regular satisfaction surveys undertaken, and feedback collected
Council	■ To act as custodians of community assets ■ To set Asset Management Policy and vision ■ Allocate resources to meet Council objectives in providing services while managing risks
Executive Management Team	■ Responsible for the development, management and review of an Asset Management Strategy, associated plans, practices and reporting on the status and effectiveness of Council's asset management ■ To monitor and review the performance of employees in achieving the asset management strategy, plans and practices ■ To ensure sufficient resources are applied to manage the assets to legislative requirements; and ■ Accountable for the management of assets within their areas of responsibility
Asset Manager and Staff	■ To lead the development of the Asset Management Plans ■ To develop and implement maintenance, renewal and capital works programs in accordance with the Asset Management Policy, Strategy, Plans, as well as budget allocations ■ Develop Specific Management Plans (upgrade, renewal, maintenance, operations, disposal) ■ To deliver levels of service to agreed risk and cost standards and expectations ■ To report asset related risk and damage ■ To establish and monitor asset compliance and risk inspection regimes ■ To manage asset condition assessments ■ To provide technical expertise to the Executive Management Team

1.2 Goals and Objectives of Asset Ownership

Our goal for managing infrastructure assets is to meet the defined level of service (as amended from time to time) in the most cost effective manner for present and future consumers. The key elements of infrastructure asset management are:

- Providing a defined level of service and monitoring performance,
- Managing the impact of growth through demand management and infrastructure investment,
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined level of service,

- Identifying, assessing and appropriately controlling risks, and
- Linking to a Long-Term Financial Plan which identifies required, affordable forecast costs and how it will be allocated.

Key elements of the planning framework are:

- Levels of service – specifies the services and levels of service to be provided,
- Risk Management,
- Future demand – how this will impact on future service delivery and how this is to be met,
- Lifecycle management – how to manage its existing and future assets to provide defined levels of service,
- Financial summary – what funds are required to provide the defined services,
- Asset management practices – how we manage provision of the services,
- Monitoring – how the plan will be monitored to ensure objectives are met,
- Asset management improvement plan – how we increase asset management maturity.

Other references to the benefits, fundamentals principles and objectives of asset management are:

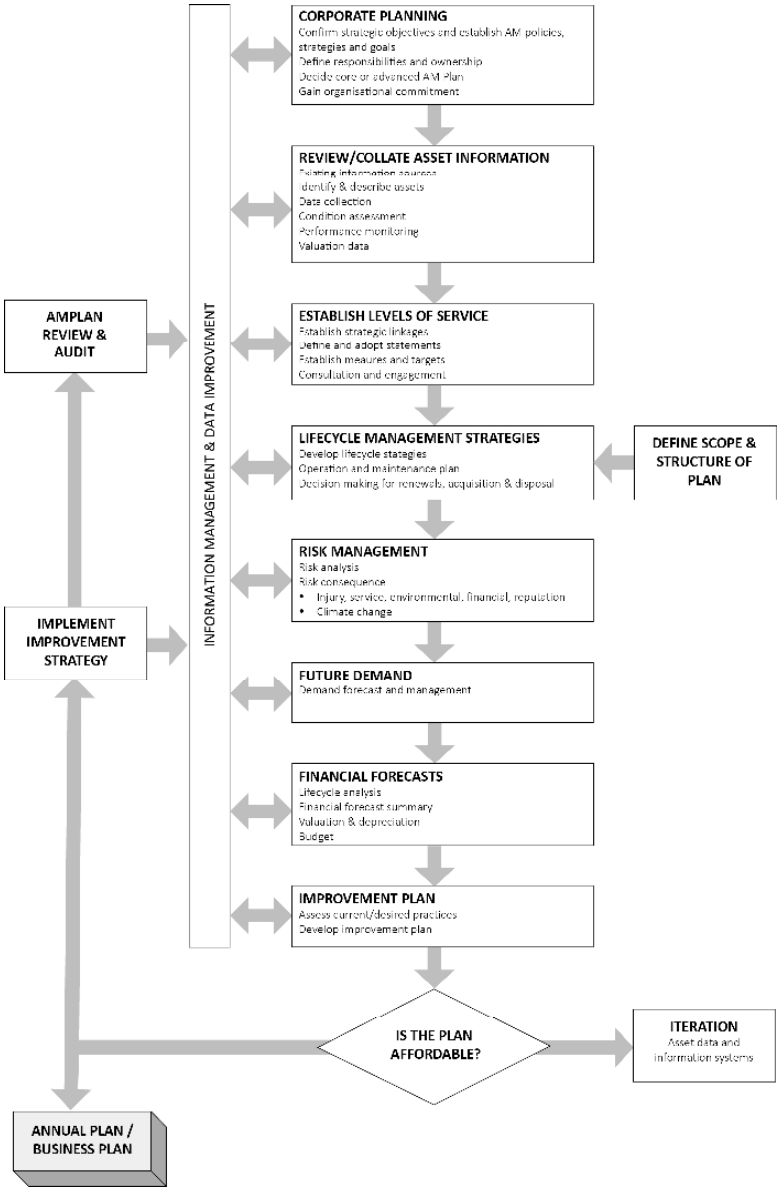
- International Infrastructure Management Manual 2015 [1]
- ISO 55000[2]

A road map for preparing an AM Plan is shown below.

[1] Based on IPWEA 2015 IIMM, Sec 2.1.3, p 2| 13
[2] ISO 55000 Overview, principles and terminology

Road Map for preparing an Asset Management Plan

Source: IPWEA, 2006, IIMM, Fig 1.5.1, p 1.11



2.0 LEVELS OF SERVICE

Current and Desired Levels of Service

Levels of Service define the asset performance targets, in relation to reliability, quantity, quality, responsiveness, safety, capacity, environmental impacts, comfort, cost/affordability and legislative compliance. One of the key objectives in developing IAMP has been to match the level of service provided by Adelaide Plains Council to the expectations of the users (i.e. the community) within available resources.

This requires a clear understanding of the user needs, expectations and preferences. To achieve and sustain acceptable standards of service for Council's asset network requires an annual commitment of funds. These funds provide for regular and responsive maintenance and for timely renewal or replacement of the asset. The provision of adequate financial resources ensures that the Infrastructure Assets network are appropriately managed and preserved. Funding below requirement impacts directly on community development and if prolonged will result in the need for "catch up" expenditure imposed on ratepayers in the future. Additionally, deferred renewal results in increased and escalating reactive maintenance as aged assets deteriorate at increasing rates. No authority can deliver everything all the time. In fact, in line with good practice and affordable service delivery, it may not be practical or cost effective to deliver the same level of service across the entire asset portfolio.

Some of Councils IAMP provides different maintenance interventions, inspection frequencies and response times for each asset classification. In accordance with the International Infrastructure Management Manual, Council acknowledges that the primary purpose of an asset hierarchy is to ensure that appropriate management, engineering standards and planning practices are applied to the asset based on its function. It also enables more efficient use of limited resources by allocating funding to those assets that are in greater need and the costs are better justified. The community generally expect that Council will provide an effective method for its asset management which meets the required Australian and State legislative regulations.

Council has defined service levels in two terms and provides the level of key performance measure, level of service objective, performance measure process, current level of service and desired level of service.

Community Levels of Service

Community Levels of Service relate to the service outcomes that the community wants in terms of reliability, responsiveness, amenity, safety and cost.

Community levels of service measures used in the asset management plan are:

- Quality: How good is the service?
- Function: Does the service meet users' needs?
- Responsiveness: How quickly are problems attended to and resolved?
- Capacity/Utilisation: Is the service over or under used?
- Safety: Does the service achieve appropriate levels of public and environmental safety?

Table 2.1.1 Community Levels of Service

Key Performance Measure	Level of Service Objective	Performance Measure Process	Current Level of Service	Desired Level of Service
CUSTOMER (COMMUNITY) LEVEL OF SERVICE				
Quality	All weather access for all sealed and gravel resheeted roads	Council maintains a conditions-based road register and rolling 4 year renewal plan to manage reseals and resheeting	Plan and budgets match to deliver required levels of service	Plan and budgets match to deliver required levels of service
	Footpaths provide safe access for higher pedestrian areas	Number customer complaints	Establish annual reporting and number of complaint's trending down	Establish annual reporting and number of complaint's trending down
	Smooth and safe transition from road across the bridge structure	Develop a plan and budget allocation	Undertake when resheeting unsealed roads	Meet planned targets
	Roads will be progressively upgraded from unsealed to sealed where justified and in-line with Councils road matrix and budget.	Developed roads matrix	Need and budget allocation for approval	Meets targets – require budget allocation for approval
Function/Capacity /Utilisation	Roads suitable for road user needs	Road use are categorised based on utilisation and are fit for purpose	Road categories are defined and reviewed	Road categories are defined and reviewed
Safety	Provide safe and suitable roads free from hazards	Number of accidents reported and customer service requests	Reduce accidents and request caused by road conditions	Reduce accidents and request caused by road conditions

Technical Levels of Service

Technical Levels of Service support the community service levels and are operational or technical measures of performance. These technical measures relate to the allocation of resources to service activities that the Council undertakes to best achieve the desired community outcomes

Table 2.1.2 Technical Levels of Service

Key Performance Measure	Level of Service Objective	Performance Measure Process	Current Level of Service	Desired Level of Service
TECHNICAL LEVEL OF SERVICE				
Operations	Efficiently utilise assets which will consume resources such as human resources, energy and materials	Resource/Expertise/Capacity System/Process	Tonkin Consulting – software conquest	Information is reliable for decision making i.e. roads based software
Maintenance	Retain assets in a suitable condition to meet it original service potential in line expected life	Routine Maintenance performed as set out in road categories Perform reactive maintenance as required	Based on categories Demand is met when required	Based on categories Demand is met when required
Renewal	Replace existing assets with assets of equivalent capacity or performance capability	Asset Renewal is planned and occurs in line with established standards and timeframes	Annual works program is delivered	Annual works program is delivered
New/Upgrade	Upgrades are cost effective, meet end user's needs, are affordable and are in line with council policies and road matrix	Developed roads matrix. Roads will be progressively upgraded from unsealed to sealed where justified and in-line with councils road matrix and budget	Need and budget allocation for approval	Meets targets – require budget allocation for approval

Table 2.1.3 Sheeted Road Design Elements

Street Type	Unsealed **Category 1** Collector Rd	Unsealed **Category 2** Collector Rd	Unsealed **Category 3-A** Local Rd	Unsealed **Category 3-B** Local Rd	Unsealed **Category 3-C** Local Rd	Unsealed **Category 4-A** Natural Formed Rd
Road Width	9m	8m	7m	6m	6m	Variable
Road Usage	High Use	Medium to High Use	Medium Use	Medium to Low Use	Low Use	Very Low Use
Sheeting Thickness (Compacted)	150mm	100mm	100mm	100mm	100mm	NA
Cross fall	6%	6%	6%	6%	6%	Minimum
Material	40mm crushed rock	40mm crushed rock	40mm crushed rock	40mm crushed rock	40mm crushed rock	NA
Maintenance Patrol Grading	Graded when required. Minimum of 3 grades per year	Graded when required. Minimum of 3 grades per year	Graded when required. Minimum of 2 grades per year	Graded when required. Minimum of 2 grades per year	Graded when required. Minimum of 2 grades per year	0 or 1 grade per year
Patching	Patching when required to maintain safety	Patching when required to maintain safety	Patching when required to maintain safety	Patching when required to maintain safety	Patching when required to maintain safety	Regulatory and warning signs replaced as required
Stormwater	Side drains and culverts cleaned as required	Side drains and culverts cleaned as required	Side drains and culverts cleaned as required	Side drains and culverts cleaned as required	Side drains and culverts cleaned as required	Side drains and culverts cleaned as required
Signage	Regulatory and warning signs replaced as required	Regulatory and warning signs replaced as required	Regulatory and warning signs replaced as required	Regulatory and warning signs replaced as required	Regulatory and warning signs replaced as required	Regulatory and warning signs replaced as required

Table 2.1.4 Sealed Road Residential & Rural Road Design Elements

Street Type	Access Road (Residential)	Local Road (Residential)	Collector Road (Residential)	Rural Road

Reference Document	Drawing No. 18-1983-001 June 2019 DWG No. D1	Drawing No. 18-1983-002 June 2019 DWG No. D2	Drawing No. 18-1983-003 June 2019 DWG No. D3	Drawing No. 18-1983-004 July 2021 DWG No. D0
Reserve Width	13.5m	15m	Min 20m	Min 20m
Road Clear Zone	1.5m	1.5m	1.5m	1.5m
Traffic Catchment (max)	10 lots	200 lots	N/A	N/A
Traffic volume	15-40 vpd	40-800 vpd	800 + vpd	500 + vpd
Design speed	30 km/h	50 km/h (max)	50 km/h (max)	100 km/h (max)
Carriageway Width (minimum) Lanes – moving Parking	6m Two Lane 1	7.6m Two Lane 2 or 1	11.0m-13.4m (with cycle lanes) Two Lane 2 (indented bays accepted)	9.2m (bitumen seal width 7.2m min) Two Lane
Constructed footpaths (with a one side path – preference is to be located on low side and above common services trench)	One side – width 1.5m	One side - width 1.5m	Both sides – width 1.8m to 2.5m at bus stops, seating and sheltered areas to be provided.	NA
Cycle provision	On carriageway	On carriageway	Shared path on verge or cycle lane on carriageway.	NA
Grade Desirable	2.5%-3%	2.5%-3%	2.5%-3%	3%
Public Transport	NA	NA	Indented bus stops, seating and sheltered area.	NA
Individual Lot access	Yes	Yes	Yes	Yes
Sight distance (general) Reference Standards and Codes	As per AUSTROADS, AS2890, AS1428 Aust Model Code & Services in Streets Code	As per AUSTROADS, AS2890, AS1428 Aust Model Code & Services in Streets Code	As per AUSTROADS, AS2890, AS1428 Aust Model Code & Services in Streets Code	As per AUSTROADS, AS2890, AS1428 Aust Model Code & Services in Streets Code
Drainage	Underground drainage network where practical	Underground drainage network where practical	Underground drainage network where practical	Underground drainage network where practical
Potholes Maintenance	Pothole repair as required to maintain safety	Pothole repair as required to maintain safety	Pothole repair as required to maintain safety	Pothole repair as required to maintain safety
Heavy Patch Maintenance	Heavy patch as required to maintain safety	Heavy patch as required to maintain safety	Heavy patch as required to maintain safety	Heavy patch as required to maintain safety
Linemarking Maintenance	Linemarking in accordance with	Linemarking in accordance with	Linemarking in accordance with	Linemarking in accordance with

	Australian Standards	Australian Standards	Australian Standards	Australian Standards
Kerb & Watertables Maintenance	Kerb watertables cleaned twice per year minimum	Kerb watertables cleaned twice per year minimum	Kerb watertables cleaned twice per year minimum	Kerb watertables cleaned twice per year minimum
Kerb & Watertables Maintenance	Kerb watertables and kerbs repaired as required	Kerb watertables and kerbs repaired as required	Kerb watertables and kerbs repaired as required	Kerb watertables and kerbs repaired as required
Weed Spraying Maintenance	Weed spraying and slashing as required (property owners encouraged to maintain road verges adjacent to their properties). Any landscaping, paving or tree planting requires Council approval.	Weed spraying and slashing as required (property owners encouraged to maintain road verges adjacent to their properties). Any landscaping, paving or tree planting requires Council approval.	Weed spraying and slashing as required (property owners encouraged to maintain road verges adjacent to their properties). Any landscaping, paving or tree planting requires Council approval.	Weed spraying and slashing as required (property owners encouraged to maintain road verges adjacent to their properties). Any landscaping, paving or tree planting requires Council approval.
Regulatory	Regulatory, warning and advisory signs maintained to Australian Standards. Street name signage.	Regulatory, warning and advisory signs maintained to Australian Standards. Street name signage.	Regulatory, warning and advisory signs maintained to Australian Standards. Street name signage.	Regulatory, warning and advisory signs maintained to Australian Standards. Street name signage.

Construction, Renewal and Maintenance Standards for Roads

SEALED ROADS

This plan has been developed based on assumptions related to the construction and renewal standards set out in the following sections for the seal and unsealed road network. Council owns and maintains a sealed road network totalling approximately 181.7km in length, this made up of rural roads 142.4km and townships 39.3km.

The Sealed road network is classified as follows:

- High Use – Rural & Township
- Standard Use – Rural & Township
- Intersections – Rural & Township
- Land Divisions - Township
- On-Road Car Parks - Township

For sealed surfaces the type of seal, whether it be Hotmix or spray seal, the speed environment (high use, standard use, intersection, land division or on-road car parks), performance (standard or nonstandard) and underlying pavement (<300mm pre 2004 or >300mm post 2004) are the predominate factors affecting useful life. Performance (standard or non-standard) has been determined by two factors, the history of last date of sealing stored within Conquest and condition scores (including photographs) collected during field inspections. Standard surfaces are expected to have limited preparation work when resurfaced, while non-standard show higher levels of cracking and deformation requirements and other preparation works. The area of sealed road surface is determined from road segment lengths and measured seal width.

Rural spray seal surfaces have been further classified based on their construction date, namely pre 2004 and post 2004. The spray seal surfaces applied pre 2004 have proven to last longer than those applied post 2004 and as such the pre 2004 surfaces have a longer useful life.

Table 2.1.5 provides a breakdown of the various sealed surface types in the network.

Table 2.1.5 Sealed Surfaces Network

Surface Type	Length (m)	Surface Area (m2)	Approximate % of Sealed Road Network (Area)
TOWNSHIP SEALED			
Hotmix Bitumen (Standard Use)	1,758	14,662	1%
Hotmix Bitumen (Land Division)	9,010	69,736	5%
Hotmix Bitumen (Intersection)	29	286	<1%
Hotmix Bitumen (On-Road Car Park)	1,490	6,301	<1%
Spray Seal (High Use)	5,068	60,326	4%
Spray Seal (Standard Use)	21,510	171,392	12%
Spray Seal (Land Division)	430	3,869	<1%
Sub Total	*39,293*	*326,572*	*23%*
RURAL SEALED			
Hotmix Bitumen (Standard Use)	841	7,220	1%
Hotmix Bitumen (Intersection)	1,024	8,187	1%
Spray Seal (High Use pre 2004)	21,535	159,068	11%
Spray Seal (High Use post 2004)	79,335	613,843	44%
Spray Seal (Standard Use pre 2004)	10,544	75,128	5%
Spray Seal (Standard Use post 2004)	29,156	217,535	15%
Sub Total	*142,435*	*1,080,980*	*77%*
TOTAL Sealed Surfaces	**181,728**	**1,407,552**	**100%**

Township Sealed Roads - Service Level Standards

Construction Method	
Seal Width:	**Standard Access Road**: 6.0m width, however, dependant on location & available road reserve width, consideration to incorporate on-street

	parking, lighting, nature strips/verges and footpaths. Consideration also given to incorporate bike lanes. **Local Street**: 7.6m width, however, dependant on location & available road reserve width, consideration to incorporate on-street parking, lighting, nature strips/verges and footpaths. Consideration also given to incorporate bike lanes. **Standard Collector Road**: 11.0 – 13.4m width, however, dependant on location & available road reserve width, consideration to incorporate on-street parking, lighting, nature strips/verges and footpaths. Consideration also given to incorporate bike lanes.
Seal Types:	Spray seal 2 coat seal or hotmix bitumen seal.
Pavement Width:	Same as seal width.
Pavement Depth:	Details subject to geotechnical investigations report, traffic volumes and class.
Renewal Method	
Reseal:	Single coat spray seal (spray seal 7 or 10mm) with an ongoing reseal plan of 2 coat/1 coat/2 coat. Two coat is 10/5 or 14/7mm aggregate size. Roads with high deformation and cracking have been identified as non-standard based on the condition assessment at inspection.
Pavement:	Township roads, rework existing pavement, may need to import 150mm QG, moisture at OMC, compact and prime surface (AMCO) prior to placing bitumen. Note: Details subject to geotechnical investigations report, traffic volumes and class of vehicles.
Formation:	Details subject to geotechnical investigations report, traffic volumes and class of vehicles.
Seal Life:	20 to 25 years for the upper seal layer depending on usage and 60 to 75 years for the longer life seal layer.
Pavement Life:	60 to 80 years for the pavement depending on usage.
Maintenance Method	
Maintenance:	Preventative edge patching, pothole repairs, crack sealing and pavement repairs. Side drains cleaned and in good working order. Ensure that no surface water lays or ponds on the sealed surface.

Rural Sealed Roads - Service Level Standard

Figure 1 shows a typical construction cross section to illustrate standard for new construction. It is noted that this is not always achievable due to native vegetation clearance restrictions and undulating terrain.

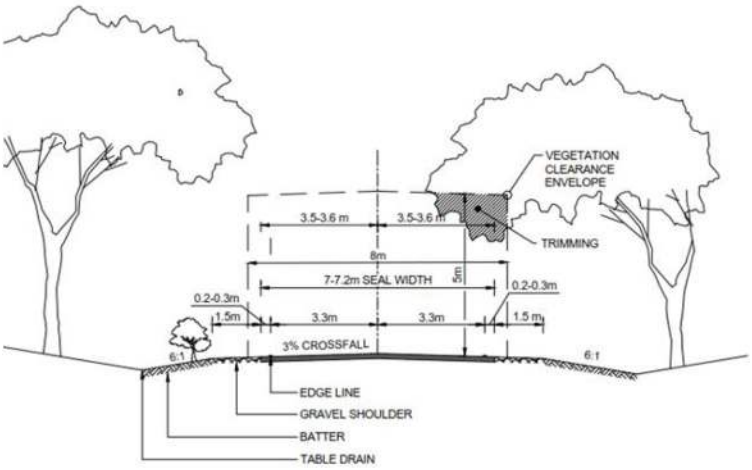


Figure 1 Rural Sealed Road Construction Cross Section

Construction Method	
Seal Width:	9.2m Refer to Figure 1
Seal Types:	14 / 7 mm Double Bitumen Seal
Pavement Width:	10.2m Refer to Figure 1
Pavement Depth:	Details subject to geotechnical investigations report, traffic volumes and class.
Renewal Method	
Reseal:	Single coat spray seal (spray seal 7 or 10mm) with an ongoing reseal plan of 2 coat/1 coat/2 coat. Two coat 10/5 or 14/7mm aggregate size. Roads with high deformation and cracking have been identified as non-standard based on the condition assessment at inspection.
Pavement:	Rework existing pavement if material is suitable, may need to import PM2/20 QG for sub base, base course 175mm PM1/20 QG, moisture at OMC, compact and prime surface (AMCO) prior to placing bitumen. Note: Details subject to geotechnical investigations report, traffic volumes and class of vehicles.
Formation:	Details subject to geotechnical investigations report, traffic volumes and class of vehicles.
Seal Life:	Varies on category
Maintenance Method	
Maintenance:	Road maintenance for seal roads is managed to maintain service levels within the network. Maintenance works are undertaken as per planned maintenance schedules and in reaction to justified

	public complaints and any defects identified by staff. Works consist of filling potholes, edge repairs, dig outs and crack sealing. A budget has been set based on historical spending and on the assumption the seal program will be funded to ensure roads do not deteriorate beyond a reasonable intervention level. Budgets will be set to maintain vegetation clearance envelope.

UNSEALED ROADS

Council owns and maintains an unsealed sheeted road network totalling approximately 541.2km in length, this made up of rural roads 530.1km and townships 11.1km. The unsealed road network has been segmented and digitised in the Council's GIS system. Unsealed Roads within the Adelaide Plains Council serve the community in a wide range of ways from farm gate access, single and multiple residential dwelling access to tourism and freight access and routes for transportation goods like grain, fruit, vegetables, stock and hay. They play a critical role in supporting the local economy and rural communities.

The development on the road categorises has been undertaken in an initial attempt to allow Council to apply different renewal and construction standards across the road network in an affordable way, rather than having one standard for all unsealed roads. Unsealed sheeted roads have been categorised as follows:

Sheeted Surface

The sheeted road network is classified according to its usage and are grouped as follows:

- Category 1
- Category 2
- Category 3-A
- Category 3-B
- Category 3-C
- Category 4-B

Surface Type	Length (m)
Township Sheeted	
Category 1	338
Category 3-A	6,712
Category 3-B	4,056
Sub Total	*11,106*
Rural Sheeted	
Category 1	105,497
Category 2	104,627
Category 3-A	59,197
Category 3-B	229,697
Category 3-C (Long Haul)	31,094
Sub Total	*530,112*
TOTAL Sheeted Surfaces	**541,218**

In addition to the above categories sheeted roads been further classified based on their distance from Councils quarry site located on Carslake Road. Roads were separated into two groups <15km and >=15km, the average distance from the first group was 9km and classified as Short Haul with the second group 19km and classified Long Haul. The haulage classification is reflected in the current replacement costs for sheeted surfaces, it does not have any impact on useful life. The useful life has been defined based on the response traffic loading for the defined road category. Table 2.1.6 provides a breakdown of the various categories in the network.

Table 2.1.6 Sheeted Surfaces Network

Surface Type	Length (m)	Surface Area (m2)	Approximate % of Sheeted Road Network (Area)

TOWNSHIP SHEETED			
Category 1 (Short Haul)	338	3,041	<1%
Category 3-A (Long Haul)	926	6,483	<1%
Category 3-A (Short Haul)	5,786	40,504	1%
Category 3-B (Long Haul	2,377	14,261	<1%
Category 3-B (Short Haul)	1,679	10,075	<1%
Sub Total	*11,106*	*74,364*	*2%*
RURAL SHEETED			
Category 1 (Long Haul)	27,133	244,193	6%
Category 1 (Short Haul)	78,364	705,280	18%
Category 2 (Long Haul)	30,879	247,031	6%
Category 2 (Short Haul)	73,748	589,985	15%
Category 3-A (Long Haul)	28,389	198,726	5%
Category 3-A (Short Haul)	30,808	215,656	6%
Category 3-B (Long Haul)	78,607	471,640	12%
Category 3-B (Short Haul)	151,090	906,541	24%
Category 3-C (Long Haul)	11,308	67,847	2%
Category 3-C (Short Haul)	19,786	118,714	3%
Sub Total	*530,112*	*3,765,612*	*98%*
TOTAL Sheeted Surfaces	**541,218**	**3,839,977**	**100%**

Natural Formed Roads

Natural formed roads require no road base material to provide a surface. Hence there are no recurring capital works costs, there is however regular maintenance costs.

Township & Rural Sheeted Roads - Service Level Standards

Construction Method	
Sheeted Width:	Category 1: 9m Category 2: 8m Category 3-A: 7m Category 3-B: 6m Category 3-C: 6m Category 4-B: Form existing natural surface
Sheeted Depth:	Category 1: 150 PM2/40QG Category 2: 100mm PM2/40QG Category 3-A: 100mm PM2/40QG Category 3-B: 100mm PM2/40QG Category 3-C: 100mm PM2/40QG Category 4-A: NA

Formation Width:	Varies to suit road reserve width
Renewal Method	
Resheet:	Supply, place and compact quarry gravel to restore the sheeted wearing surface including minor reshaping of existing formation and reinstatement of cut-out drains.
Formation:	6% cross fall
Maintenance, Patrol Grading: Heavy Patching – As Required Potholing – As Required Regulatory and warning signs replaced – As Required	**Category 1** Graded when required. Minimum of 3 grades per year. **Category 2** Graded when required. Minimum of 3 grades per year. **Category 3-A** Graded when required. Minimum of 2 grades per year. **Category 3-B** Graded when required. Minimum of 2 grades per year. **Category 3-C** Graded when required. Minimum of 2 grades per year. **Category 4-A** 0 or 1 grade per year Category 1 Category 2 Category 3-A Category 3-B Category 3-C as required

KERB AND WATERTABLE

Adelaide Plains Council is responsible for maintaining the kerb, channel and spoon drains on Council roads as well as Department for Infrastructure and Transport roads, this contains approximately 64km of kerb and watertable assets contained within the townships.

Kerb and Watertable Type	Length (m)	Approximate % of Network (length)
Kerb and Watertable	25,917	41%
Mountable Kerb and Watertable	32,382	51%
Barrier/Plinth Kerb	742	1%
Median Kerb	1,016	2%

Spoon Drain	3,722	6%
TOTAL Kerb and Watertable	**63,778**	**100%**

BRIDGES

The condition data shown in Section 4.3 Asset Condition, Figure 6 Summary Bridges Condition Profile Condition 1-5 indicates the condition of the bridges. Council is currently undertaking a Level 2 Assessment of the bridges within the register.

Bridge – Location	Bridge No.	Replacement Value
Wasleys Bridge (State Heritage) Light River	BRG1	$2,542,130
Old Port Wakefield Road Salt Creek	BRG2	$451,023
Old Port Wakefield Road Gawler River	BRG3	$1,153,184
Bakers Road Ford Gawler River	BRG4	$789,290.30
TOTAL Bridges	**4**	**$4,935,627.30**

3.0 FUTURE DEMAND

3.1 Demand Forecasts

The demand on Council that would result in change to the way the road assets are maintained, renewed or upgraded in the future is more generally related to ongoing growing expectations from the community to have some roads changed to a higher category.

Factors affecting demand include changes in demographics, customer preferences & expectations and economic factors, etc. Demand factor trends and impacts on service delivery are summarised in Table 3.1.1.

Table 3.1.1 Demand Factors, Projections and Impact on Services

Demand Driver	Present Position	Projection	Impact of Services
Sealing some higher use unsealed roads and town roads	105km length, category 1 roads	Develop priority approach to seal high use roads in accordance with the Legatus 2030 Regional Transport Plan for regionally significant roads which attracts 50% funding. Develop priority approach for any potential township seal upgrades where justified.	Potential increase in sealed network.
Consider the extent of all-weather rural roads	Rural formed graded roads that are not all weather, where property access is required.	Develop priority approach to provide all weather access roads.	Potential increase in the rural sheeted network.
Multiple all weather access roads to rural residential properties	Single all weather access to residential properties.	Increase in requests for providing alternative all weather access to some residential properties.	Potential increase in sheeted road network.

3.2 Demand Impact and Demand Management Plan

Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Council will determine the ability of the existing assets to manage increased usage for new and housing developments as well as demand for wider agricultural vehicular movements. Developers may be required to provide additional infrastructure for the existing network and upgrade where necessary to ensure adequate transportation. Further opportunities will be developed in future revisions of this asset management plan. Opportunities identified to date for demand management are shown in Table 3.1.2.

Table 3.1.2 Demand Management Plan

Service Activity	Demand Management Plan
Change in services	Further analysis of providing the service at current and target service levels.
	Managing existing assets through planned maintenance, renewal and upgrade.
	Providing new assets to meet demand.
	Communicate service levels to the community measured against current funding capacity.
	Disposal of assets determined surplus to requirements.
	Council growth to meet existing and new legislative demands.
Rural and township sealed roads	Review higher use roads and town unsealed roads. Establish traffic counts and establish criteria for assessing the merit of sealing any more unsealed roads. Review Roads Matrix

4.0 LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the Council plans to manage and operate the assets at the agreed levels of service (Refer to Section 2) while managing life cycle costs.

4.1 Background Data

Adelaide Plains Council Transport assets are in both rural areas and townships within the Council and the assets covered by this asset management plan. The transport assets consumption is measured by condition at time of inspection. The condition at time of inspection is used to calculate the estimated condition at time of valuation for each asset.

The renewal of surface assets is determined through use of a modelling program called the Road Surface Manager (RSM). The renewal of surface assets is determined by age, condition rating, visual inspections, risks and ongoing maintenance. The treatment selected for a road surface is determined by the condition at inspection, the treatments include preventative resealing (sealed roads) and resheeting (unsealed sheeted roads), if roads fall into poor condition then rehabilitation is considered and then reconstruction, the cost of the treatments increases as it they include pavement (sealed roads) or lower base (unsealed sheeted roads) works.

4.2 Asset Capacity and Performance

Council's services are generally provided to meet design standards where these are available. Locations where deficiencies in service performance are known are detailed in Table 4.2.1

Table 4.2.1: Known Service Performance Deficiencies

Assets	Service Deficiency
All Weather Access	Farming community unable to access paddocks during period of wet weather.
Rural Freight Routes	Known rural freight routes which are unsealed roads and do not perform well under heavy freight traffic.
Rural Road Drainage	Insufficient or in effective cut out and cut off drainage in certain locations in the network.
Change in Services	Further analysis of providing the service at current and target service levels.
Rural and Town Sealed Roads	Review higher use roads and town unsealed roads. Establish traffic counts and establish criteria for assessing the merit of sealing any more unsealed roads. Review of Roads Matrix
Bridges	Level 2 assessments and ongoing inspections.

The above service deficiencies were identified and are being considered and prioritised. Refer to above Demand Management Plan.

4.3 Asset Condition

Condition is currently monitored via field collection of roads, bridges, footpaths, pram ramps, kerbs and watertables at the time of asset revaluation.

Condition is measured using a 1 – 5 grading system[3] as detailed in Table 4.3.1. It is important that a consistent approach is used in reporting asset performance enabling effective decision support. A finer grading system may be used at a more specific level, however, for reporting in the AM plan results are translated to a 1 – 5 grading scale for ease of communication. Illustration showing the overall asset condition Figure 7.

[3] IPWEA, 2015, IIMM, Sec 2.5.4, p 2|80.

Table 4.3.1: Condition Grading System

Condition Grading	Description of Condition
1	**Very Good**: free of defects, only planned and/or routine maintenance required
2	**Good**: minor defects, increasing maintenance required plus planned maintenance
3	**Fair**: defects requiring regular and/or significant maintenance to reinstate service
4	**Poor**: significant defects, higher order cost intervention likely
5	**Very Poor**: physically unsound and/or beyond rehabilitation, immediate action required

The overall condition score and subsequent consumption of the building assets has been estimated based on a combination of available data such as age and the standard useful life of the asset.

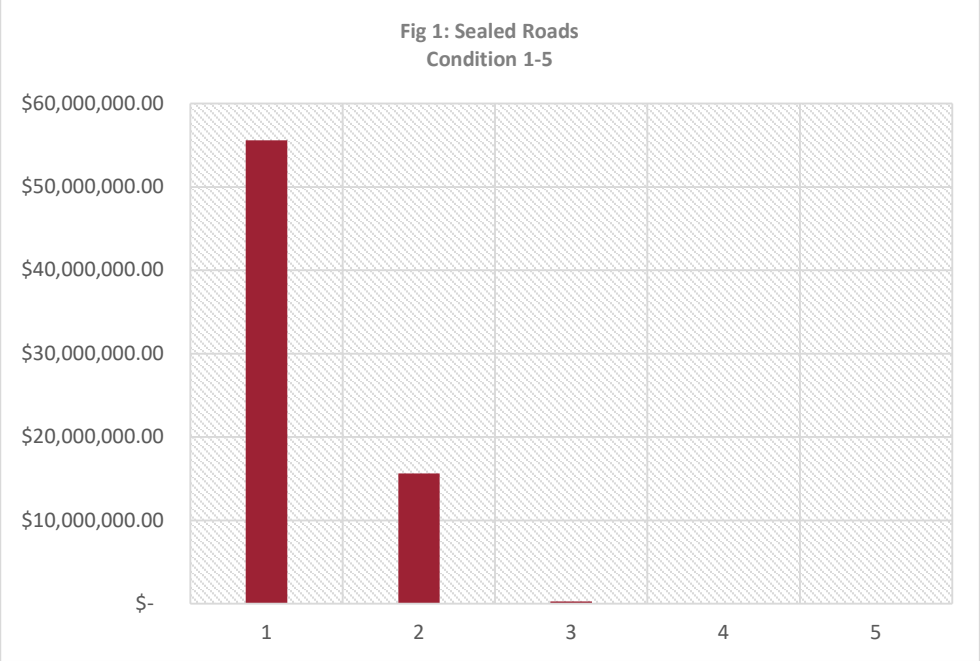


Figure 1 Summary of Sealed Roads Condition Profile 1-5

As shown in Figure 1, approximately 99% of the rural and township road seal and pavement assets have a condition less than 2 with the remaining 1% at condition 3.

The sealed road network is being generally funded maintained through preventative treatments however, in some cases additional funds are required for the rehabilitation of pavement related defects identified in the conditions assessment. The plan is aimed to prevent pavement reconstruction through appropriate sealed road surface management.

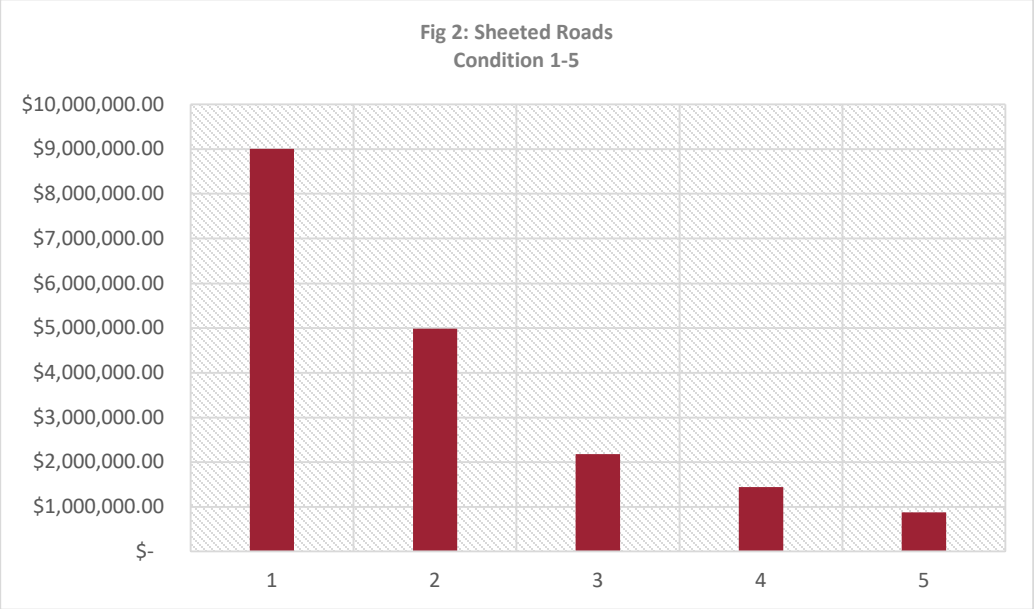


Figure 2 Summary Unsealed Sheeted Roads Condition Profile 1-5

As shown in Figure 2, approximately 75.6% of the rural and township road unsealed sheeted assets have a condition less than 2 with 11.8% at condition 3 the remaining 12.6% at condition 4 & 5.

Unsealed sheeted road network is being generally maintained through preventive treatments. The plan aims to prevent lower base reconstruction through appropriate sheeted road surface management.

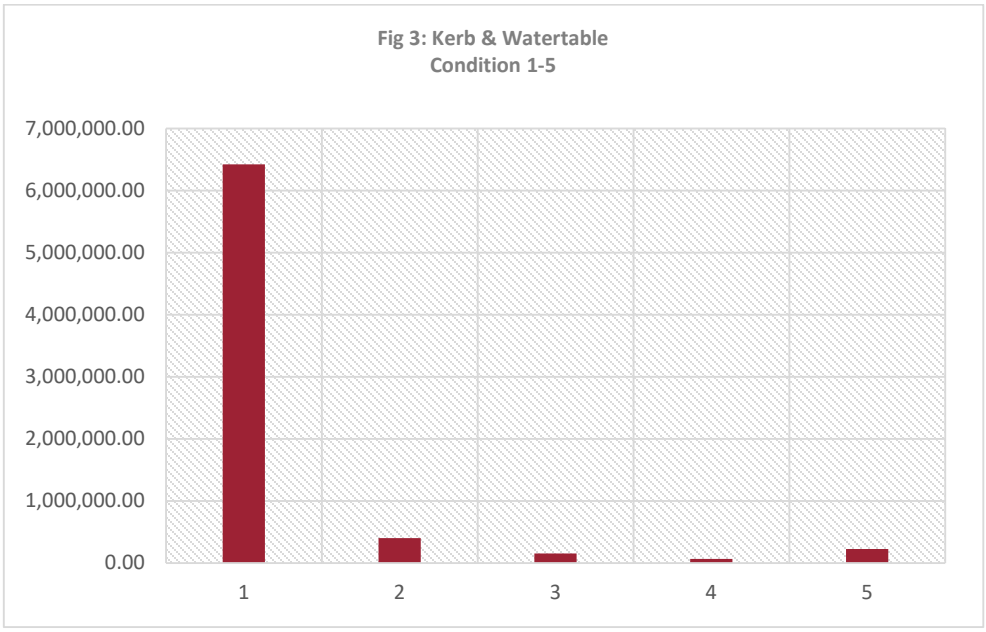


Figure 3 Summary Kerb and Watertable Condition Profile 1-5

As shown in Figure 3, approximately 93.7% of the kerb and watertable have a condition between 1 and 2, 2.1% at condition 3, remaining 4.2% at condition 4 & 5.

As part of the condition assessment lengths of kerb to be replaced through proactive treatments have also been included in the plan to correct issues affecting kerb performance and ensure kerb and watertable can reach their prescribed end of life and still maintain appropriate level of service.

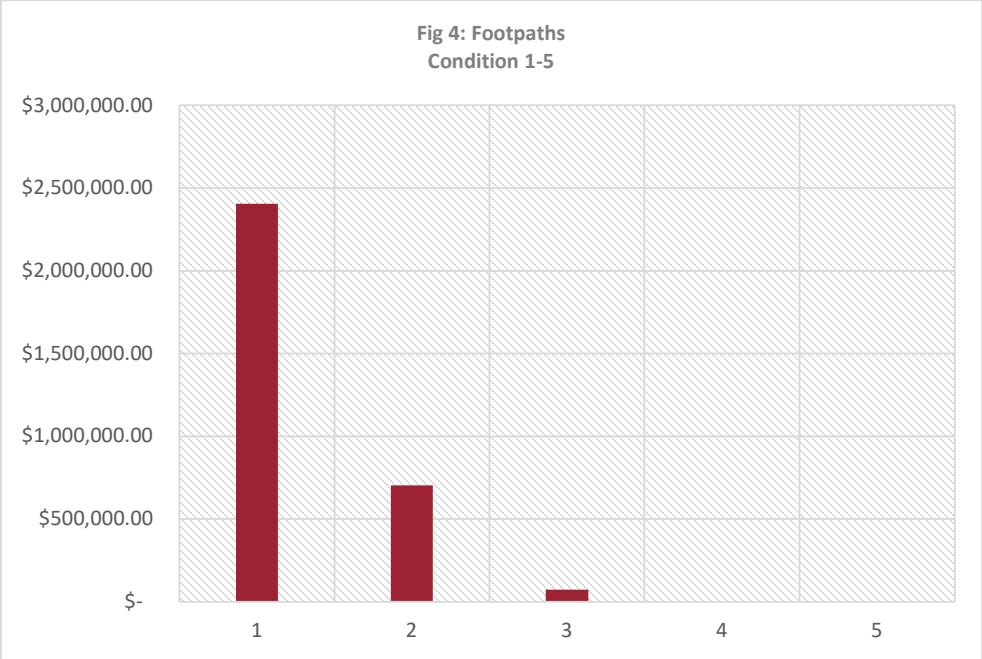


Figure 4 Summary Footpaths Profile Condition 1-5

As shown in Figure 4, approximately 97.7% of the footpath assets have a condition less than 2 with the remaining 2.3% at condition 3.

Review the full footpath network to develop a long term upgrade and renewal strategy to improve connectivity and identify high use footpaths for each town. The remaining asphalt and spray sealed footpaths will be replaced with concrete or block paving type footpath, this represents 3.3% value of the total footpath network.

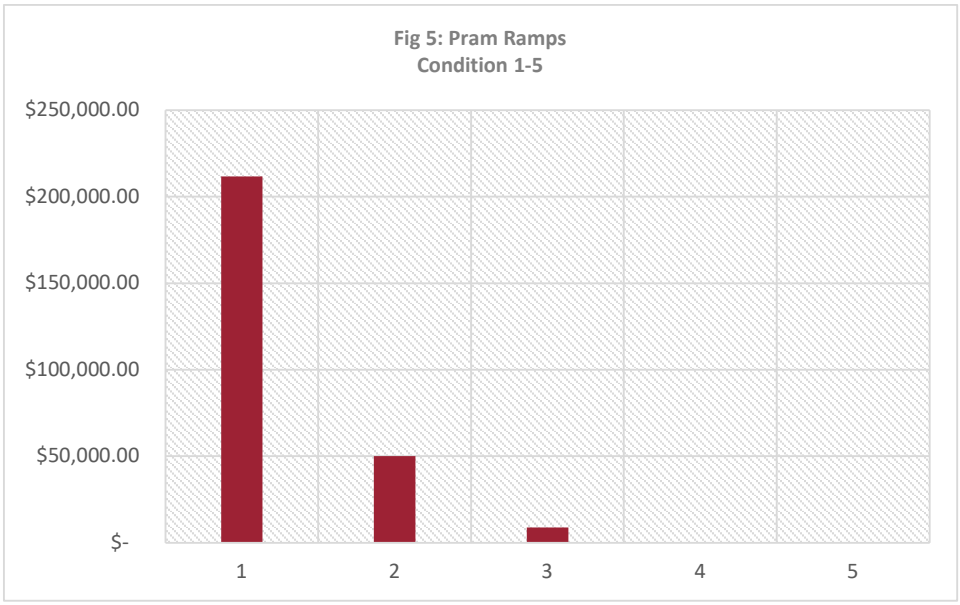


Figure 5 Summary Pram Ramps Profile Condition 1-5

As shown in Figure 5, approximately 96.9% of the pram ramp assets have a condition less than 2 with the remaining 3.1% at condition 3.

Review the pram ramp locations in conjunction with the footpath network, develop a long term upgrade and renewal strategy to improve connectivity and identify high use footpaths, pram ramps for each town.

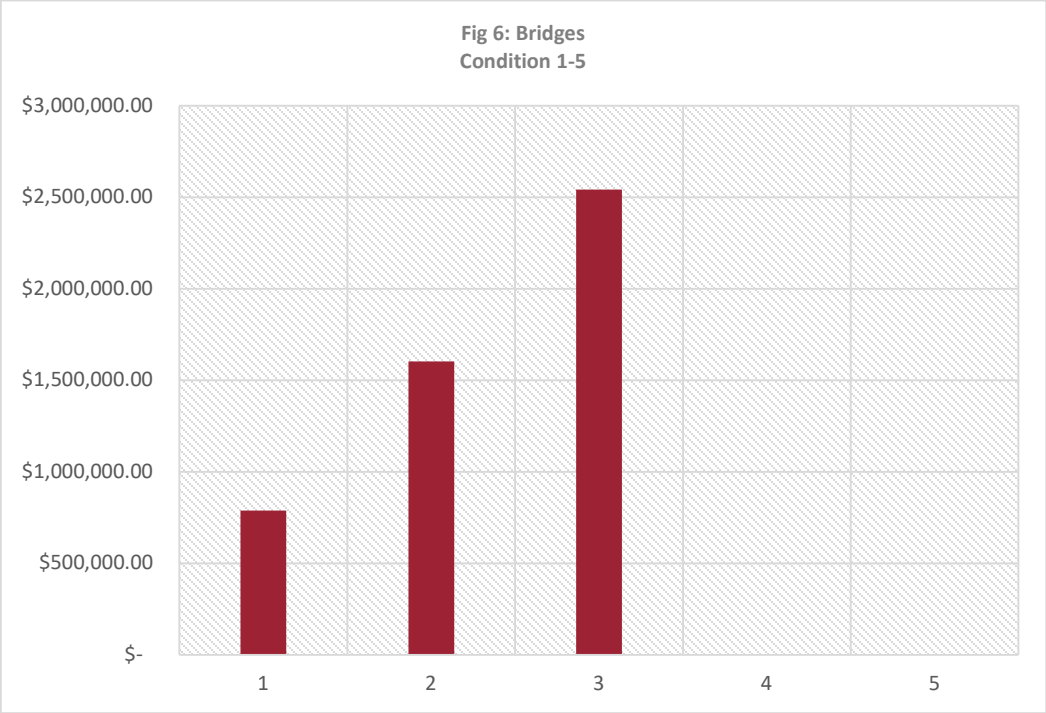


Figure 6 Summary Bridges Condition Profile Condition 1-5

The condition of bridges represents the consumption of asset life as a whole asset when last inspected. The condition data shown in Figure 6 indicates that approximately 48.5% of the bridges have a condition of 1 and 2, the remaining 51.5% at condition 3.

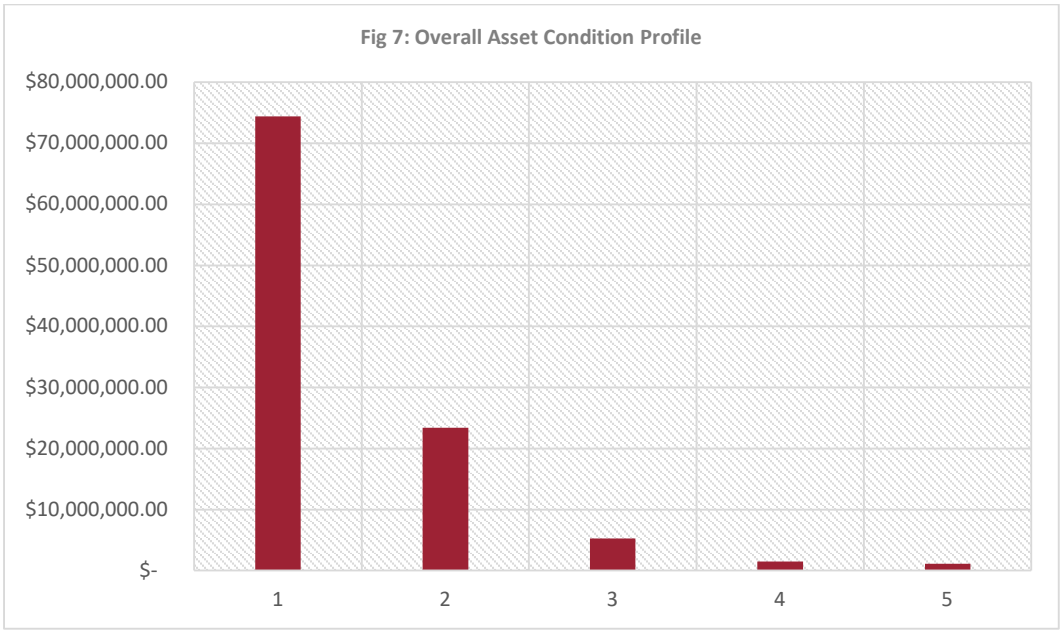


Figure 7 Overall Asset Condition Profile

Table 4.3.2: Asset Standard Useful Lives

Roads Surface Type – Sealed	Standard Useful Life
Township Sealed Upper/Short Life/Single Layer	
Hotmix Bitumen Standard Use Single Layer (Standard Performance)	64 years
Hotmix Bitumen Land Division Single Layer (Standard Performance)	64 years
Hotmix Bitumen Land Division Single Layer 75mm (Standard Performance)	64 years
Hotmix Intersection Single Layer (Standard Performance)	25 years
Hotmix Bitumen On-Road Car Park Single Layer	25 years
Spray Seal High Use Upper (Standard Performance)	20 years
Spray Seal Standard Use Upper (Standard Performance)	25 years
Spray Seal Standard Use Upper (Non-Standard Performance)	25 years
Spray Seal Land Division Upper	25 years
Township Sealed Lower/Long Life Layer	
Spray Seal High Use Lower (Standard Performance)	40 years
Spray Seal Standard Use Lower (<300mm Pavement Standard Performance)	80 years
Spray Seal Standard Use Lower (>300mm Pavement Standard Performance)	64 years
Spray Seal Land Division Surface	64 years
Rural Sealed Upper/Short Life/Single Layer	
Hotmix Bitumen Standard Use Short Life (Standard Performance)	25 years
Hotmix Bitumen Intersection Single Layer (Standard Performance)	25 years
Spray Seal High Use Upper (pre 2004 Standard Performance)	20 years
Spray Seal High Use Upper (post 2004 Standard Performance)	15 years
Spray Seal High Use Upper (post 2004 Non-Standard Performance)	15 years
Spray Seal Standard Use Upper (pre 2004 Standard Performance)	20 years
Spray Seal Standard Use Upper (post 2004 Standard Performance)	15 years
Spray Seal Standard Use Upper (post 2004 Non-Standard Performance)	15 years
Rural Sealed Lower/Long Life	

Hotmix Bitumen Standard Use Long Life (Standard Performance)	75 years
Spray Seal High Use Lower (pre 2004 Standard Performance)	40 years
Spray Seal High Use Lower (post 2004 Standard Performance)	30 years
Spray Seal Standard Use Lower (pre 2004 Standard Performance)	40 years
Spray Seal Standard Use Lower (post 2004 Standard Performance)	30 years

Roads Surface Type – Unsealed	Standard Useful Life
Township Sheeted Surface	
Township (Cat 1) Sheeted (Long Haul)	20 years
Township (Cat 1) Sheeted (Short Haul)	20 years
Township (Cat 2) Sheeted (Long Haul)	24 years
Township (Cat 2) Sheeted (Short Haul)	24 years
Township (Cat 3-A) Sheeted (Long Haul)	28 years
Township (Cat 3-A) Sheeted (Short Haul)	28 years
Township (Cat 3-B) Sheeted (Long Haul)	28 years
Township (Cat 3-B) Sheeted (Short Haul)	28 years
Rural Sheeted Surface	
Rural (Cat 1) Sheeted (Long Haul)	15 years
Rural (Cat 1) Sheeted (Short Haul)	15 years
Rural (Cat 2) Sheeted (Long Haul)	20 years
Rural (Cat 2) Sheeted (Short Haul)	20 years
Rural (Cat 3-A) Sheeted (Long Haul)	28 years
Rural (Cat 3-A) Sheeted (Short Haul)	28 years
Rural (Cat 3-B) Sheeted (Long Haul)	28 years
Rural (Cat 3-B) Sheeted (Short Haul)	28 years
Rural (Cat 3-C) Sheeted (Long Haul)	35 years
Rural (Cat 3-C) Sheeted (Short Haul)	35 years

Footpath Type	Standard Useful Life
Block Paved Footpath	50 years
Concrete Aggregate Footpath	50 years
Rubble Walkway/Shared Path	15 years
Pram Ramps	80 years

Kerb, Channel, Spoon Drains	Standard Useful Life
Spoon Drains	70 years
Kerb & Channel <300mm Pavement	160 years

Kerb & Channel >300mm Pavement	128 years

Sealed Roads

Township Spray Seal
Township spray sealed roads are identified as either standard use, high use or land division roads and performance (standard or non-standard). Township spray sealed surfaces have been separated into two components for upper and lower surface layers.

Township Hotmix Bitumen
Township hotmix bitumen surfaces are identified as standard use, intersection, land division or on-road carpark surfaces and performance (standard or non-standard).

Rural Spray Seal
Rural spray seal road surfaces have been identified as standard or high use, pre 2004 or post 2004 and performance (standard or non-standard). Rural spray seal surfaces have been separated into two components for upper and lower surface layers.

Rural Hotmix Bitumen
Rural hotmix bitumen intersection surface has been valued as a single component.

Unsealed Roads

Supply, haulage of material from pit (short haul 9km & long hall 15km) and placement of new sheeting material (150mm depth for Category 1 Roads, 100mm depth for Category 2 and 3 Roads.

4.4 Operations and Maintenance Plan

Operations include regular activities to provide services. Examples of typical operational activities include cleaning, street sweeping, asset inspection, and utility costs.

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating. Examples of typical maintenance activities include pipe repairs and cleaning.

The trend in operations and maintenance budgets are shown in Tables 4.4.1 and 4.4.2

Table 4.4.1: Maintenance Budget Trends

Year	Maintenance Budget $
2019 - 2020	$1,023,000 (Actual)
2020 - 2021	$1,050,000 (Budget)
2021 - 2022	$1,050,00 (Budget)

Table 4.4.2: Operations Budget Trends

Year	Operations Budget $
2019 - 2020	$000 (Actual)

2020 - 2021	$000 (Budget)
2021 - 2022	$000 (Budget)

Maintenance budget levels are considered to be adequate to meet projected service levels, which may be less than or equal to current service levels. Where maintenance budget allocations are such that they will result in a lesser level of service, the service consequences and service risks have been identified and are highlighted in this AM Plan and service risks considered in the Infrastructure Risk Management Plan.

4.5 Renewal Plan

Renewal is major capital work which does not significantly alter the original service provided by the asset, but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is considered to be an acquisition resulting in additional future operations and maintenance costs.

Assets requiring renewal are identified from one of two approaches in the Lifecycle Model.

- The first method uses Asset Register data to project the renewal costs (current replacement cost) and renewal timing (acquisition year plus updated useful life to determine the renewal year), or
- The second method uses an alternative approach to estimate the timing and cost of forecast renewal work (i.e. condition modelling system, staff judgement, average network renewals, or other).

The typical useful lives of assets used to develop projected asset renewal forecasts are shown in Table 4.5.1. Asset useful lives were last reviewed on 30 June 2020.

Table 4.5.1: Useful Lives of Assets

Roads Surface Type – Sealed	Standard Useful Life
Township Sealed Upper/Short Life/Single Layer	
Hotmix Bitumen Standard Use Single Layer (Standard Performance)	64 years
Hotmix Bitumen Land Division Single Layer (Standard Performance)	64 years
Hotmix Bitumen Land Division Single Layer 75mm (Standard Performance)	64 years
Hotmix Intersection Single Layer (Standard Performance)	25 years
Hotmix Bitumen On-Road Car Park Single Layer	25 years
Spray Seal High Use Upper (Standard Performance)	20 years
Spray Seal Standard Use Upper (Standard Performance)	25 years
Spray Seal Standard Use Upper (Non-Standard Performance)	25 years
Spray Seal Land Division Upper	25 years
Township Sealed Lower/Long Life Layer	
Spray Seal High Use Lower (Standard Performance)	40 years
Spray Seal Standard Use Lower (<300mm Pavement Standard Performance)	80 years
Spray Seal Standard Use Lower (>300mm Pavement Standard Performance)	64 years
Spray Seal Land Division Surface	64 years

Rural Sealed Upper/Short Life/Single Layer	
Hotmix Bitumen Standard Use Short Life (Standard Performance)	25 years
Hotmix Bitumen Intersection Single Layer (Standard Performance)	25 years
Spray Seal High Use Upper (pre 2004 Standard Performance)	20 years
Spray Seal High Use Upper (post 2004 Standard Performance)	15 years
Spray Seal High Use Upper (post 2004 Non-Standard Performance)	15 years
Spray Seal Standard Use Upper (pre 2004 Standard Performance)	20 years
Spray Seal Standard Use Upper (post 2004 Standard Performance)	15 years
Spray Seal Standard Use Upper (post 2004 Non-Standard Performance)	15 years
Rural Sealed Lower/Long Life	
Hotmix Bitumen Standard Use Long Life (Standard Performance)	75 years
Spray Seal High Use Lower (pre 2004 Standard Performance)	40 years
Spray Seal High Use Lower (post 2004 Standard Performance)	30 years
Spray Seal Standard Use Lower (pre 2004 Standard Performance)	40 years
Spray Seal Standard Use Lower (post 2004 Standard Performance)	30 years

Roads Surface Type – Unsealed	Standard Useful Life
Township Sheeted Surface	
Township (Cat 1) Sheeted (Long Haul)	20 years
Township (Cat 1) Sheeted (Short Haul)	20 years
Township (Cat 2) Sheeted (Long Haul)	24 years
Township (Cat 2) Sheeted (Short Haul)	24 years
Township (Cat 3-A) Sheeted (Long Haul)	28 years
Township (Cat 3-A) Sheeted (Short Haul)	28 years
Township (Cat 3-B) Sheeted (Long Haul)	28 years
Township (Cat 3-B) Sheeted (Short Haul)	28 years
Rural Sheeted Surface	
Rural (Cat 1) Sheeted (Long Haul)	15 years
Rural (Cat 1) Sheeted (Short Haul)	15 years
Rural (Cat 2) Sheeted (Long Haul)	20 years
Rural (Cat 2) Sheeted (Short Haul)	20 years
Rural (Cat 3-A) Sheeted (Long Haul)	28 years
Rural (Cat 3-A) Sheeted (Short Haul)	28 years
Rural (Cat 3-B) Sheeted (Long Haul)	28 years
Rural (Cat 3-B) Sheeted (Short Haul)	28 years

Rural (Cat 3-C) Sheeted (Long Haul)	35 years
Rural (Cat 3-C) Sheeted (Short Haul)	35 years

Footpath Type	Standard Useful Life
Block Paved Footpath	50 years
Concrete Aggregate Footpath	50 years
Rubble Walkway/Shared Path	15 years
Pram Ramps	80 years

Kerb, Channel, Spoon Drains	Standard Useful Life
Spoon Drains	70 years
Kerb & Channel <300mm Pavement	160 years
Kerb & Channel >300mm Pavement	128 years

The estimates for renewals in this AM Plan were based on Method 2.

4.4.1 Renewal ranking criteria

Asset renewal is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g. replacing a bridge that has a 5 t load limit), or
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g. condition of a playground).[4]

It is possible to prioritise renewals by identifying assets or asset groups that:

- Have a high consequence of failure,
- Have high use and subsequent impact on users would be significant,
- Have higher than expected operational or maintenance costs, and
- Have potential to reduce life cycle costs by replacement with a modern equivalent asset that would provide the equivalent service.[5]

The ranking criteria used to determine priority of identified renewal proposals is detailed in Table 4.5.2

Table 4.5.2: Renewal Priority Ranking Criteria

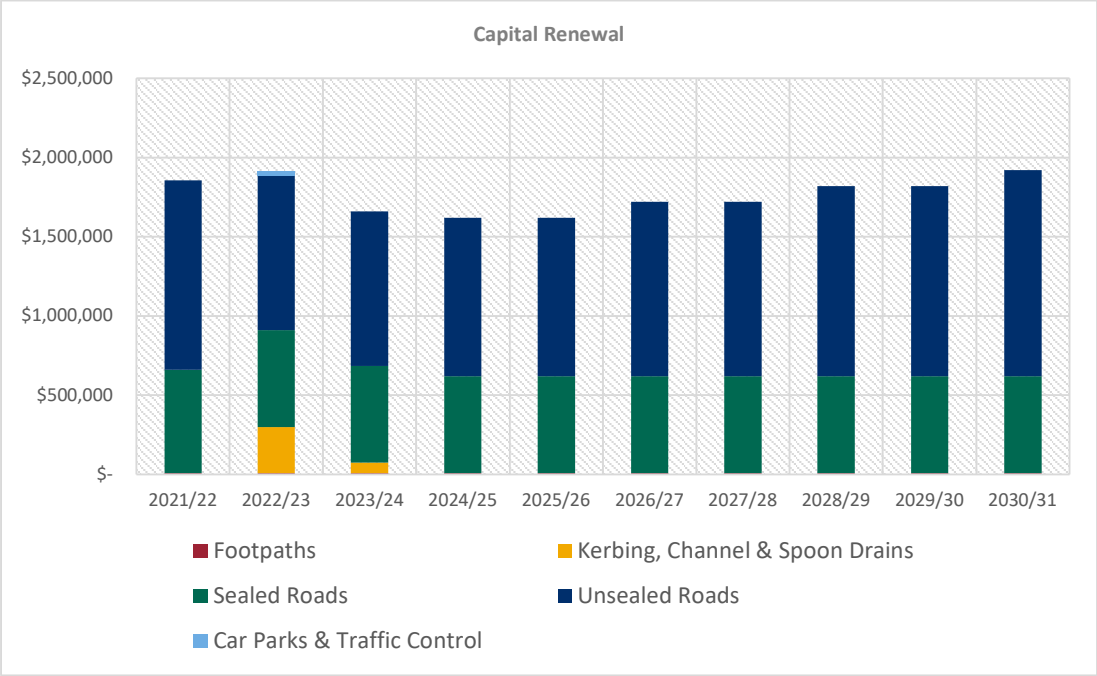
Criteria	Weighting
Asset Condition Rating 4 or 5	20
Risks – Residual risk high or extreme	20
Safety and Compliance	60
Total	**100%**

[4] IPWEA, 2015, IIMM, Sec 3.4.4, p 3|91.
[5] Based on IPWEA, 2015, IIMM, Sec 3.4.5, p 3|97.

4.5 Summary of future renewal costs

Forecast renewal costs are projected to increase over time if the asset stock increases. The forecast costs associated with renewals are shown relative to the proposed renewal budget in Figure 4.5.1. A detailed summary of the forecast renewal costs is shown in Appendix D.

Figure 4.5.1 Forecast Renewal Costs



All figure values are shown in current day dollars.

4.6 Acquisition Plan

Acquisition reflects are new assets that did not previously exist or works which will upgrade or improve an existing asset beyond its existing capacity. They may result from growth, demand, social or environmental needs. Assets may also be donated, gifted to Council.

4.6.1 Selection criteria

Proposed acquisition of new assets, and upgrade of existing assets, are identified from various sources such as community requests, proposals identified by strategic plans or partnerships with others. Potential upgrade and new works should be reviewed to verify that they are essential to the Entities needs. Proposed upgrade and new work analysis should also include the development of a preliminary renewal estimate to ensure that the services are sustainable over the longer term. Verified proposals can then be ranked by priority and available funds and scheduled in future works programmes. The priority ranking criteria is detailed in Table 4.6.1.1

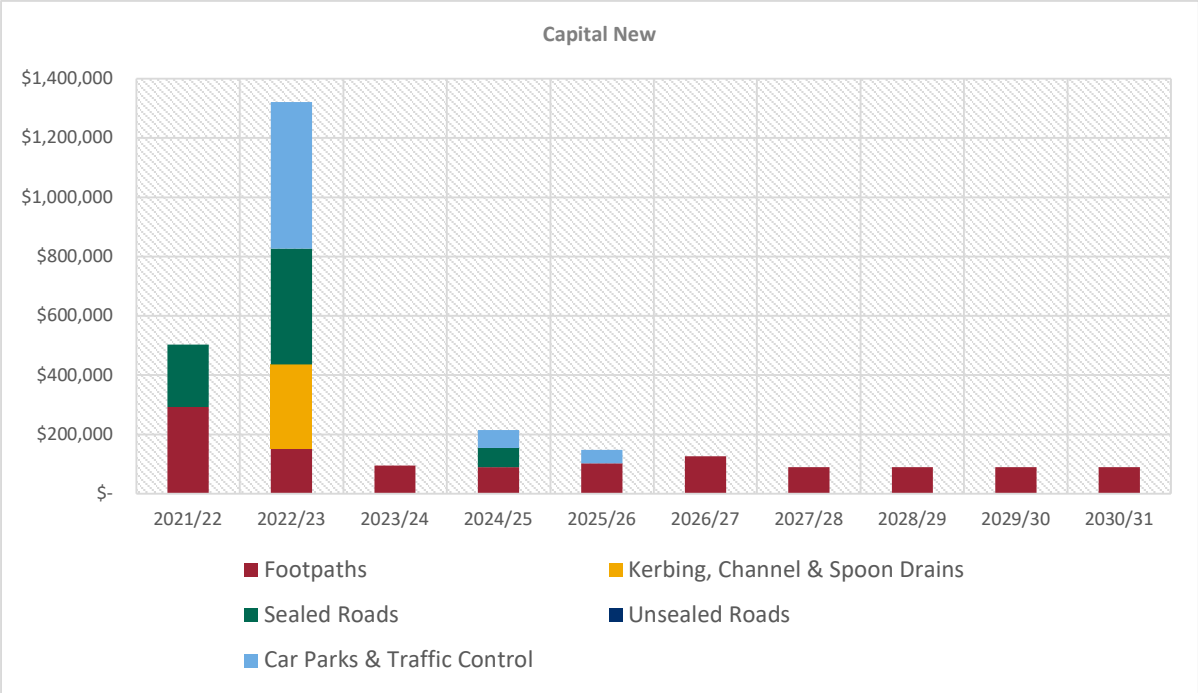
Table 4.6.1.1: Acquired Assets Priority Ranking Criteria

Criteria	Weighting
Safety and Compliance	20
Risks – Residual risk high or extreme	20
Demand	60
Total	**100%**

Summary of future asset acquisition costs

Forecast acquisition asset costs are summarised / summarized in Figure 4.6.1.2 and shown relative to the proposed acquisition budget. The forecast acquisition capital works program is shown in Appendix A.

Figure 4.6.1.2: Acquisition New (Constructed) Summary



All figure values are shown in current day dollars.

4.7 Disposal Plan

Disposal includes any activity associated with the disposal of a decommissioned asset including sale, demolition or relocation. Assets identified for possible decommissioning and disposal are shown in Table 4.7.1. A summary of the disposal costs and estimated reductions in annual operations and maintenance of disposing of the assets are also outlined in Table 4.7.1. Any costs or revenue gained from asset disposals is included in the long-term financial plan.

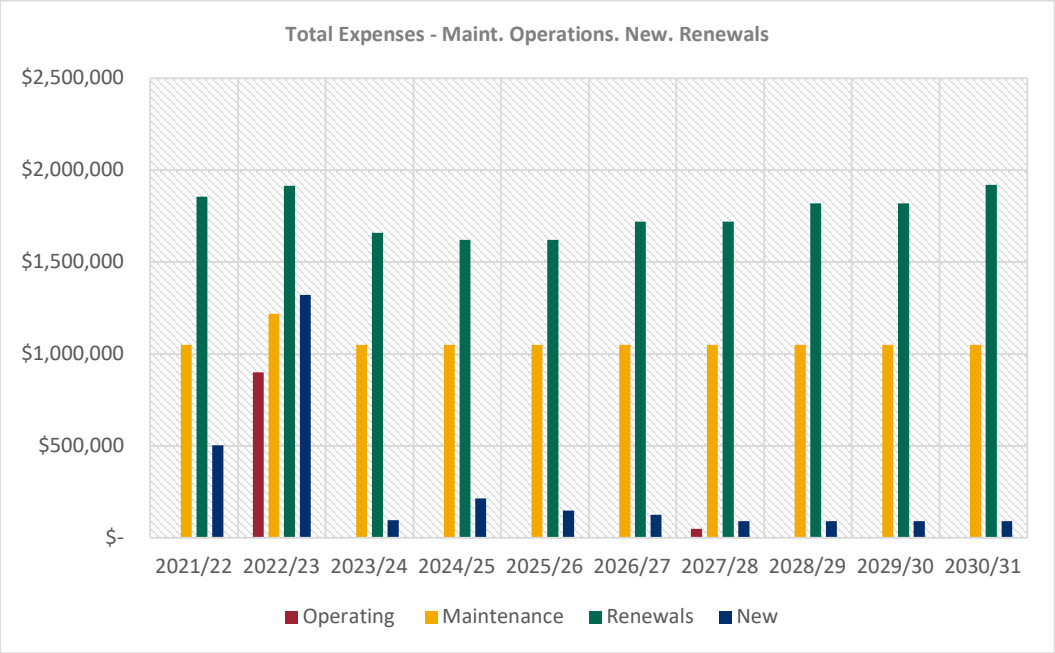
Table 4.7.1: Assets Identified for Disposal

Asset	Reason for Disposal	Timing	Disposal Costs	Operations & Maintenance Annual Savings
None Known	NA	NA	NA	NA
None Known	NA	NA	NA	NA

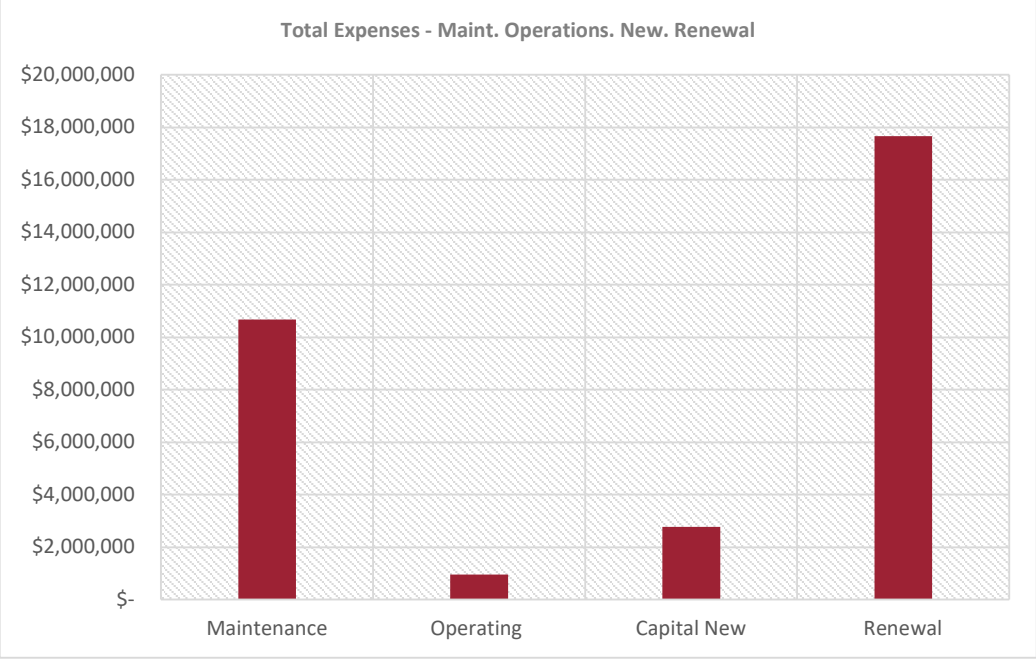
4.8 Summary of asset forecast costs

The financial projections from this asset plan are shown in Figure 4.8.1. These projections include forecast costs for acquisition, operation, maintenance, renewal, and disposal. These forecast costs are shown relative to the proposed budget.

Figure 4.8.1: Lifecycle Summary



All figure values are shown in current day dollars.



All figure values are shown in current day dollars.

5.0 RISK MANAGEMENT PLANNING

The purpose of infrastructure risk management is to document the findings and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure, using the fundamentals of International Standard ISO 31000:2018 Risk management – Principles and guidelines.

Risk Management is defined in ISO 31000:2018 as: 'coordinated activities to direct and control with regard to risk'[6].

An assessment of risks[7] associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, and the consequences should the event occur. The risk assessment should also include the development of a risk rating, evaluation of the risks and development of a risk treatment plan for those risks that are deemed to be non-acceptable.

5.1 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Critical assets have been identified and along with their typical failure mode, and the impact on service delivery, are summarised in Table 5.1.1. Failure modes may include physical failure, collapse or essential service interruption.

Table 5.1.1 Critical Assets

Critical Asset(s)	Failure Mode	Impact
Bridges	Deterioration/Degradation, Load Carrying Capacity Exceeded by Vehicles	Causing High Consequence - Bridge damage, collapse & closure.
Sealed & Sheeted Roads	Stormwater Flooding	Damage to road surface, traffic not being able to use.

By identifying critical assets and failure modes an organisation can ensure that investigative activities, condition inspection programs, maintenance and capital expenditure plans are targeted at critical assets.

5.2 Risk Assessment

The risk management process used is shown in Figure 5.2.1 below.

It is an analysis and problem-solving technique designed to provide a logical process for the selection of treatment plans and management actions to protect the community against unacceptable risks.

The process is based on the fundamentals of International Standard ISO 31000:2018.

[6] ISO 31000:2009, p 2

[7] REPLACE with Reference to the Corporate or Infrastructure Risk Management Plan as the footnote

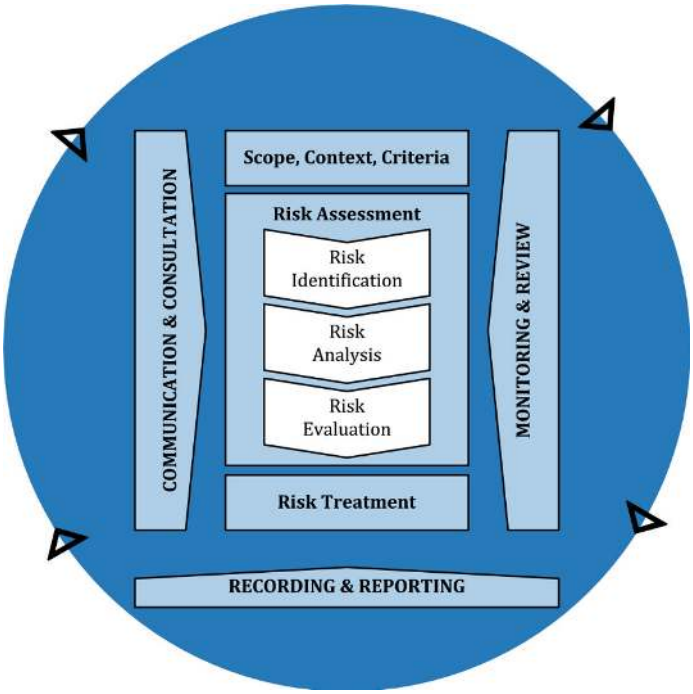


Fig 5.2.1 Risk Management Process – Abridged
Source: ISO 31000:2018, Figure 1, p9

The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, development of a risk rating, evaluation of the risk and development of a risk treatment plan for non-acceptable risks.

An assessment of risks[8] associated with service delivery will identify risks that will result in loss or reduction in service, personal injury, environmental impacts, a 'financial shock', reputational impacts, or other consequences.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High' (requiring corrective action) risk ratings identified in the Infrastructure Risk Management Plan. The residual risk and treatment costs of implementing the selected treatment plan is shown in Table 5.2.2. It is essential that these critical risks and costs are reported to the Executive Management Team.

[8] REPLACE with Reference to the Corporate or Infrastructure Risk Management Plan as the footnote

Table 5.2.2: Risks and Treatment Plans

Service or Asset at Risk	What can Happen	Risk Rating (VH, H)	Risk Treatment Plan	Residual Risk *	Treatment Costs
Sealed & Sheeted Roads	Flooding Damage	High	Early identification of damage, lodge claim to disaster fund, seek state and/or federal funds for improvements	Medium	Recurrent budget requirements for maintenance
Bridges	Bridge Collapse	Very High	Undertake Level 2 Assessments & conduct regular inspections. Carry out identified repairs and maintenance with urgency, report findings immediately to supervisor	High	Unknown costs, require financial year budget for approved works
Footpaths and Pram Ramps	Pedestrian Falls and Trips	High	Upgrade footpaths and provide for pram ramps at strategic sites	Medium	Unknown costs, require financial year budget for approved works
Footpaths	Pedestrian Trips and Falls	High	Upgrade existing hotmix and sealed footpaths with block paving or concrete type. Undertake regular inspections	Low	Unknown costs, require financial year budget for approved works

Note * The residual risk is the risk remaining after the selected risk treatment plan is implemented.

5.3 Forecast Reliability and Confidence

The forecast costs, proposed budgets, and valuation projections in this AM Plan are based on the best available data. For effective asset and financial management, it is critical that the information is current and accurate. Data confidence is classified on a A - E level scale[9] in accordance with Table 5.3.1.

Table 5.3.1: Data Confidence Grading System

Confidence Grade	Description
A. Very High	Data based on sound records, procedures, investigations and analysis, documented properly and agreed as the best method of assessment. Dataset is complete and estimated to be accurate ± 2%

[9] IPWEA, 2015, IIMM, Table 2.4.6, p 2|71.

Confidence Grade	Description
B. High	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate ± 10%
C. Medium	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated ± 25%
D. Low	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete, and most data is estimated or extrapolated. Accuracy ± 40%
E. Very Low	None or very little data held.

The estimated confidence level for and reliability of data used in this AM Plan is shown in Table 5.3.2.

Table 5.3.2: Data Confidence Assessment for Data used in AM Plan

Data	Confidence Assessment	Comment
Demand drivers	Very High	Council trends available, Refer to Council Strategic Plan 2020-2024
Growth projections	Very High	Council trends available, refer to Council Strategic Plan 2020-2024
Acquisition forecast	Very High	Council trends available, refer to Council Strategic Plan 2020-2024. Align to LFTP – Capital Works Program
Operation forecast	High	Extrapolated from previous years
Maintenance forecast	High	Extrapolated from previous years
Renewal forecast - Asset values	Very High	Council trends available, refer to Council Strategic Plan 2020-2024. Align to LFTP – Capital Works Program
- Asset useful lives	Very High	Reviewed in accordance via revaluation schedule
- Condition modelling	Very High	Reviewed in accordance via revaluation schedule and condition ratings
Disposal forecast	N/A	N/A

The estimated confidence level for and reliability of data used in this AM Plan is considered to be Very High.

6.0 PLAN IMPROVEMENT AND MONITORING

6.1 Status of Asset Management Practices[10]

6.1.1 Accounting and financial data sources

This AM Plan utilises accounting and financial data. The source of the data is Authority.

6.1.2 Asset management data sources

This AM Plan also utilises asset management data. The source of the data is Conquest.

6.2 Improvement Plan

It is important that council recognise areas of their AM Plan and planning process that require future improvements to ensure effective asset management and informed decision making. The improvement plan generated from this AM Plan is shown in Table 6.2.1.

Table 6.2.1: Improvement Plan

Task	Tasks	Responsibility	Timeline
1	Annually review 10 year capital works program, renewals and new	Council Administration	October/November each year
2	Review service levels	Council Administration	As required
3	Long Term Financial Plan and Asset Management Plan align	Council Administration	As required
4	Level 2 Bridge Assessment	Council Administration	2020/21FY 2021/22FY
5	Develop footpath/pram ramps strategic plan	Council Administration	2021/22FY 2022/23FY
6	Review & Document Asset Management Plan Risks	Council Administration	Ongoing

6.3 Monitoring and Review Procedures

This AM Plan will be reviewed during the annual budget planning process and revised to show any material changes in service levels, risks, forecast costs and proposed budgets as a result of budget decisions.

The AM Plan will be reviewed and updated annually to ensure it represents the current service level, asset values, forecast operations, maintenance, renewals, acquisition and asset disposal costs and planned budgets. These forecast costs and proposed budget are incorporated into the Long-Term Financial Plan or will be incorporated into the Long-Term Financial Plan once completed.

The AM Plan has a maximum life of 4 years and is due for complete revision and updating within 2 years of each council election.

[10] ISO 55000 Refers to this as the Asset Management System

6.4 Performance Measures

The effectiveness of this AM Plan can be measured in the following ways:

- The degree to which the required forecast costs identified in this AM Plan are incorporated into the long-term financial plan,
- The degree to which the 1-5 year detailed works programs, budgets, business plans and corporate structures consider the 'global' works program trends provided by the AM Plan,
- The Asset Renewal Funding Ratio achieving the Organisational target (this target is often 90 – 110%).

7.0 REFERENCES

- IPWEA, 2006, 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM
- IPWEA, 2015, 3rd edn., 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM
- IPWEA, 2008, 'NAMS.PLUS Asset Management', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/namsplus.
- IPWEA, 2015, 2nd edn., 'Australian Infrastructure Financial Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/AIFMM.
- IPWEA, 2020 'International Infrastructure Financial Management Manual', Institute of Public Works Engineering Australasia, Sydney
- IPWEA, 2018, Practice Note 12.1, 'Climate Change Impacts on the Useful Life of Assets', Institute of Public Works Engineering Australasia, Sydney
- IPWEA, 2012, Practice Note 6 Long-Term Financial Planning, Institute of Public Works Engineering Australasia, Sydney, https://www.ipwea.org/publications/ipweabookshop/practicenotes/pn6
- IPWEA, 2014, Practice Note 8 – Levels of Service & Community Engagement, Institute of Public Works Engineering Australasia, Sydney, https://www.ipwea.org/publications/ipweabookshop/practicenotes/pn8
- ISO, 2014, ISO 55000:2014, Overview, principles and terminology
- ISO, 2018, ISO 31000:2018, Risk management – Guidelines
- Adelaide Plains Council Strategic Plan 2020 - 2024
- Adelaide Plains Council Annual Plan and Budget
- Adelaide Plains Council Roads Priority Matrix
- Adelaide Plains Council Asset Valuation & Methodology Report
- Adelaide Plains Council Layout Drawings – D0 to D21

8.0 APPENDICES

Appendix A Acquisition Forecast (New)

FOOTPATHS

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Footpath Capital New											
Joseph Street - Chivell Street to Elizabeth Street (101m)	22,350	0	0	0	0	0	0	0	0	0	22,350
Butler Street - Irish Street to End of Seal	88,500	0	0	0	0	0	0	0	0	0	88,500
Elizabeth Street (Mallala) - Joseph St to Mary St	41,200	0	0	0	0	0	0	0	0	0	41,200
Mary Street - Chivell St to Elizabeth St	24,000	0	0	0	0	0	0	0	0	0	24,000
Second Street (Dublin) - Sixth St to Seventh St	28,200	0	0	0	0	0	0	0	0	0	28,200
Donaldson Street - Elizabeth St to Wilson Rd	58,000	0	0	0	0	0	0	0	0	0	58,000
Elizabeth Street - William St to Donaldson Rd	30,600	0	0	0	0	0	0	0	0	0	30,600
Cameron Terrace - Dublin Rd to Feltwell Rd	0	37,000	0	0	0	0	0	0	0	0	37,000

Railway Avenue - Balaklave Rd to Lindsay St	0	17,000	0	0	0	0	0	0	0	0	17,000
South Terrace (Dublin) - Old Port Wakefield Rd to Seventh St	0	40,000	0	0	0	0	0	0	0	0	40,000
Carmel St - Balaklave Rd to End of Seal	0	25,000	0	0	0	0	0	0	0	0	25,000
Calagora St - Lisieux Street to Carmel St	0	32,000	0	0	0	0	0	0	0	0	32,000
Jenkin Crt - Butler Rd to End	0	0	25,000	0	0	0	0	0	0	0	25,000
Irish Street - Butler Stret to Redbanks Rd	0	0	23,000	0	0	0	0	0	0	0	23,000
Calala Crt - Old Port Wakefield Rd to End	0	0	47,000	0	0	0	0	0	0	0	47,000
Seventh Street - Third Street to Second Street (156m)	0	0	0	0	13,000	0	0	0	0	0	13,000
Seventh Street - Fourth Street to Third Street (142m)	0	0	0	0	0	12,000	0	0	0	0	12,000
Seventh Street - Fifth Street to Fourth Street (145m)	0	0	0	0	0	12,000	0	0	0	0	12,000
Third Street (Dublin) - Sixth Street to Seventh Street (151m)	0	0	0	0	0	13,000	0	0	0	0	13,000
Future Program Allocation	0	0	0	90,000	90,000	90,000	90,000	90,000	90,000	90,000	630,000
TOTAL FOOTPATH NEW	292,850	151,000	95,000	90,000	103,000	127,000	90,000	90,000	90,000	90,000	1,218,850

KERBING, CHANNEL & WATERTABLES

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Kerbing Capital New											
South Terrace (Dublin) - Old Port Wakefield Road to Sixth Street (468m)	0	165,000	0	0	0	0	0	0	0	0	165,000
South Terrace (Dublin) - Sixth Street to Seventh Street (332m)	0	120,000	0	0	0	0	0	0	0	0	120,000
TOTAL KERBING NEW	0	285,000	0	0	0	0	0	0	0	0	285,000

SEALED ROADS PROGRAM

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Intersection Upgrade - Hill Street (Dublin Road and Balaklava Road)	100,000	0	0	0	0	0	0	0	0	0	100,000
Intersection Upgrade - Dawkins Road and Williams Road	0	100,000	0	0	0	0	0	0	0	0	100,000
Hickinbotham Subdivision Infrastructure - Cycle/Walking Path	0	125,000	0	0	0	0	0	0	0	0	125,000
Redbanks Road - Mallala - Two Wells Road to Irish Street	0	165,000	0	0	0	0	0	0	0	0	165,000
Germantown Road - Gawler Road to Temby Road	110,000	0	0	0	0	0	0	0	0	0	110,000
Balaklava Rd - Mallala - Lisieux St, Town Centre - Shoulder Hotmix	0	0	0	65,000	0	0	0	0	0	0	65,000
List of New Roads for Construction and Sealing - From updated Road Matrix	0	0	0	0	0	0	0	0	0	0	0
TOTAL SEAL NEW	210,000	390,000	0	65,000	0	0	0	0	0	0	665,000

UNSEALED ROADS PROGRAM

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
	0	0	0	0	0	0	0	0	0	0	0
TOTAL UNSEALED NEW	0	0	0	0	0	0	0	0	0	0	0

CAR PARKS & TRAFFIC CONROL

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Two Wells Mainstreet - Pedestrian Refuges/Crossing	0	195,000	0	0	0	0	0	0	0	0	195,000
Two Wells Mainstreet - Eastern End Car Parking and WSUD	0	300,000	0	0	0	0	0	0	0	0	300,000
Ruskin Road, Thompson Beach Car Parking	0	0	0	60,000	0	0	0	0	0	0	60,000
Coastal Carpark Formalise, Adelaide International Bird Sanctuary (AIBS)	0	0	0	0	45,000	0	0	0	0	0	45,000
TOTAL CAR PARKS & TRAFFIC CONTROL NEW	0	495,000	0	60,000	45,000	0	0	0	0	0	600,000

Appendix B Operation Forecast

CAR PARKS & TRAFFIC CONROL

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Car Parks & Traffic Control Operating											
Two Wells, Mainstreet - Underground Powerlines (Seek PLEC Funding, 66% of Total Cost Contribution)	0	900,000	0	0	0	0	0	0	0	0	**900,000**
	0	**900,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**900,000**
TOTAL CAR PARKS & TRAFFIC CONTROL OPERATING	**0**	**900,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**900,000**

BRIDGES

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Bridges Operating											
Level 2 Assessments	**0**	**0**	**0**	**0**	**0**	**0**	**50,000**	**0**	**0**	**0**	**50,000**
TOTAL BRIDGES OPERATING	**0**	**0**	**0**	**0**	**0**	**0**	**50,000**	**0**	**0**	**0**	**50,000**

Appendix C Maintenance Forecast

All Transport Asset Categories, Excluding Bridges – Bridges See Below and Operations Section

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Total Maintenance - Transport											
Maintenance - Unsealed & Sealed Rds, Footpaths, Kerb & Channel, Spoon Drains, Car Parks, Traffic Control	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**10,500,000**
TOTAL MAINTENANCE	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**1,050,000**	**10,500,000**

BRIDGES

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Bridges Maintenance											
Repairs/Maintenance Assessment Report Includes Salt Creek Culvert	0	170,000	0	0	0	0	0	0	0	0	**170,000**
TOTAL BRIDGES MAINTENANCE	**0**	**170,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**170,000**

Appendix D Renewal Forecast Summary

FOOTPATHS

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Pram Ramp Renewal, Meet DDA Compliant Requirements	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000
TOTAL FOOTPATH RENEWAL	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	100,000

KERBING, CHANNEL & WATERTABLES

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Southern Side - Kerb and Watertable - Redbanks Road (005) from Mallala - Two Wells Road to Irish Street	0	115,000	0	0	0	0	0	0	0	0	115,000
Northern Side - Kerb and Watertable - Balaklava Road (010) from Lisieux Street to Carmel Street	0	75,000	0	0	0	0	0	0	0	0	75,000
Northern Side - Kerb and Watertable - Balaklava Road (015) from Carmel Street to Aerodrome Road	0	100,000	0	0	0	0	0	0	0	0	100,000
Kerb and Watertable - Windmill Road (005) from Gawler Road to End	0	0	65,000	0	0	0	0	0	0	0	65,000
TOTAL KERBING, CHANNEL & DRAINS RENEWAL	0	290,000	65,000	0	0	0	0	0	0	0	355,000

SEALED ROADS PROGRAM

FINANCIAL YEAR:	2021/2022 $	2022/2023 $	2023/2024 $	2024/2025 $	2025/2026 $	2026/2027 $	2027/2028 $	2028/2029 $	2029/2030 $	2030/2031 $	Total
Dawkins Road (Judd Road to Boundary Road) and Hayman Road (Williams to Boundary)	650,000	0	0	0	0	0	0	0	0	0	650,000
Future program	0	610,000	610,000	610,000	610,000	610,000	610,000	610,000	610,000	610,000	5,490,000

TOTAL SEALED ROADS RENEWAL	**650,000**	**610,000**	**610,000**	**610,000**	**610,000**	**610,000**	**610,000**	**610,000**	**610,000**	**610,000**	**6,140,000**

UNSEALED ROADS PROGRAM

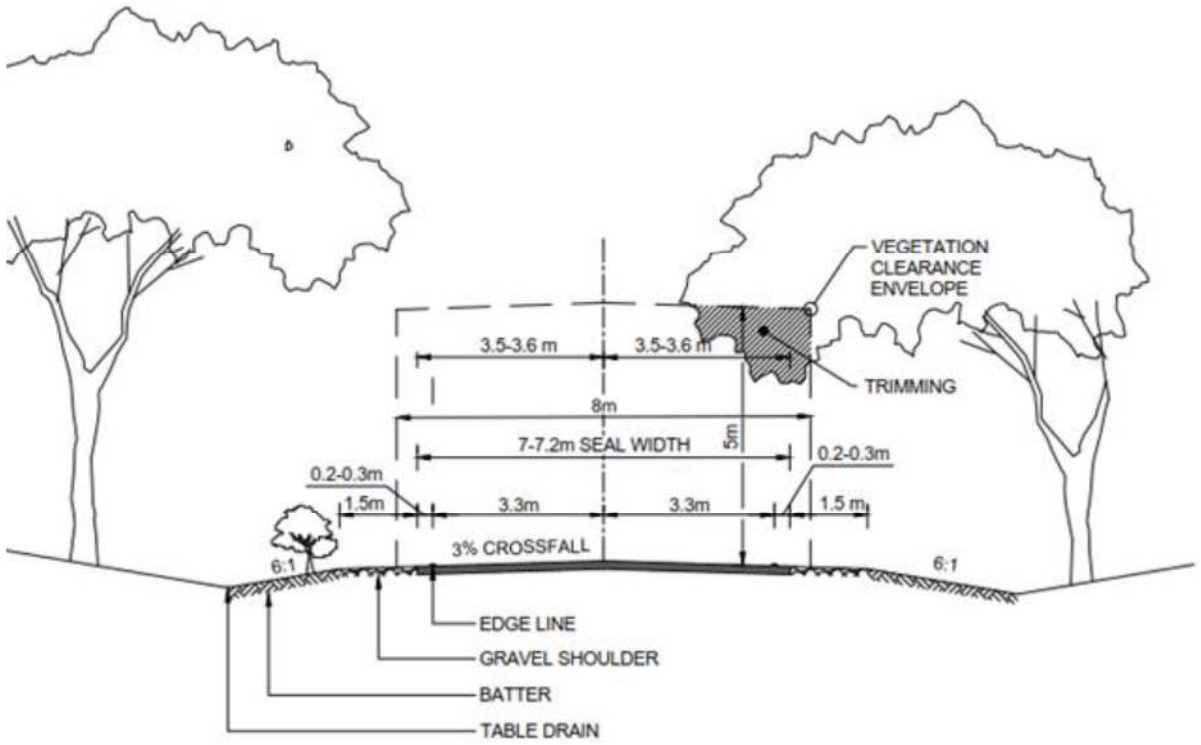
FINANCIAL YEAR:	**2021/2022 $**	**2022/2023 $**	**2023/2024 $**	**2024/2025 $**	**2025/2026 $**	**2026/2027 $**	**2027/2028 $**	**2028/2029 $**	**2029/2030 $**	**2030/2031 $**	**Total**
Reheeting 2021-2022	**1,195,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1,195,000**
Future Resheeting Program	**0**	**975,000**	**975,000**	**1,000,000**	**1,000,000**	**1,100,000**	**1,100,000**	**1,200,000**	**1,200,000**	**1,300,000**	**9,850,000**
TOTAL UNSEALED ROADS RENEWAL	**1,195,000**	**975,000**	**975,000**	**1,000,000**	**1,000,000**	**1,100,000**	**1,100,000**	**1,200,000**	**1,200,000**	**1,300,000**	**11,045,000**

CAR PARKS & TRAFFIC CONTROL

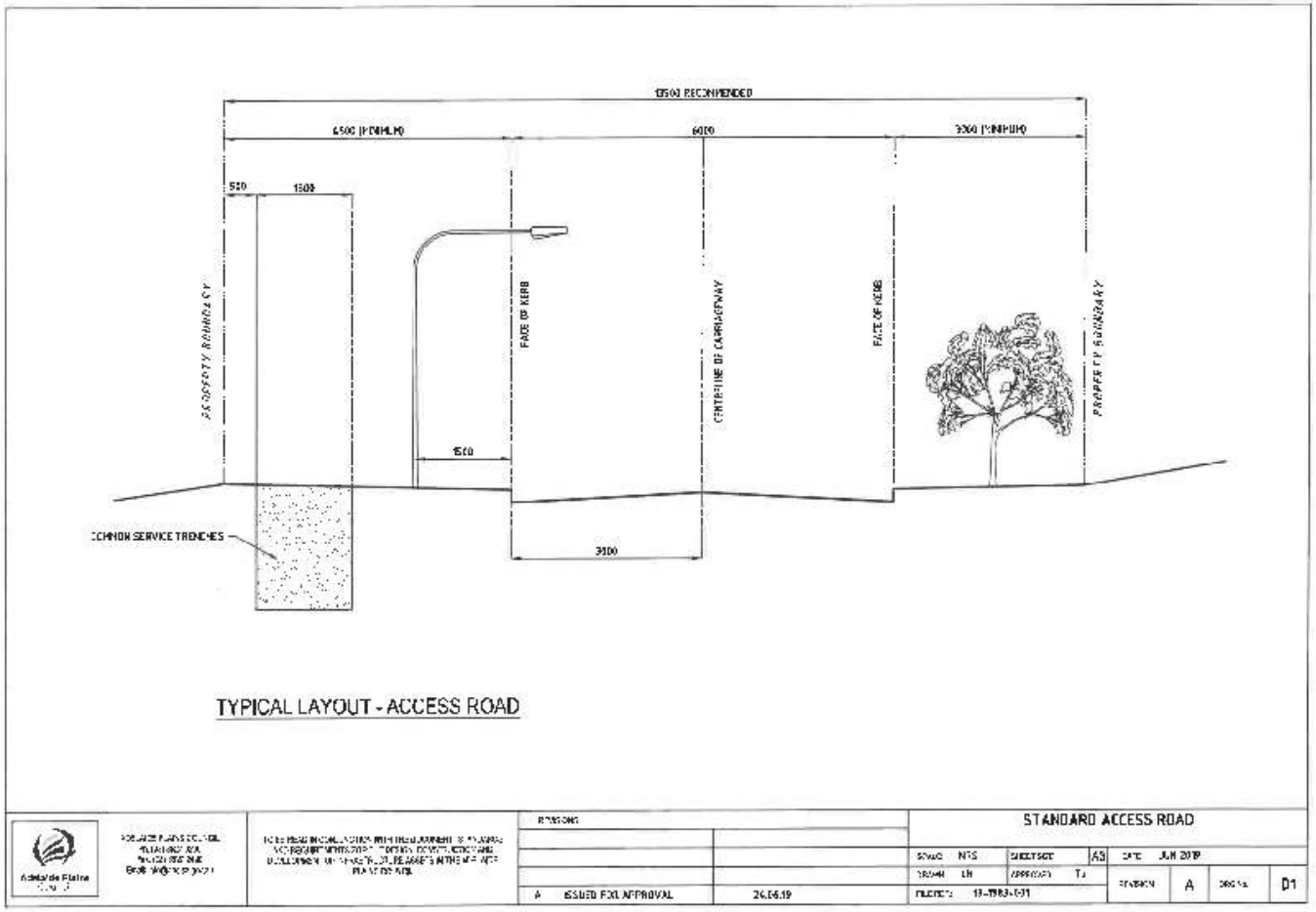
FINANCIAL YEAR:	**2021/2022 $**	**2022/2023 $**	**2023/2024 $**	**2024/2025 $**	**2025/2026 $**	**2026/2027 $**	**2027/2028 $**	**2028/2029 $**	**2029/2030 $**	**2030/2031 $**	**Total**
Longview Road	**0**	**30,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**30,000**
TOTAL CAR PARKS & TRAFFIC CONTROL	**0**	**30,000**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**30,000**

Appendix E DRG D0 to D21

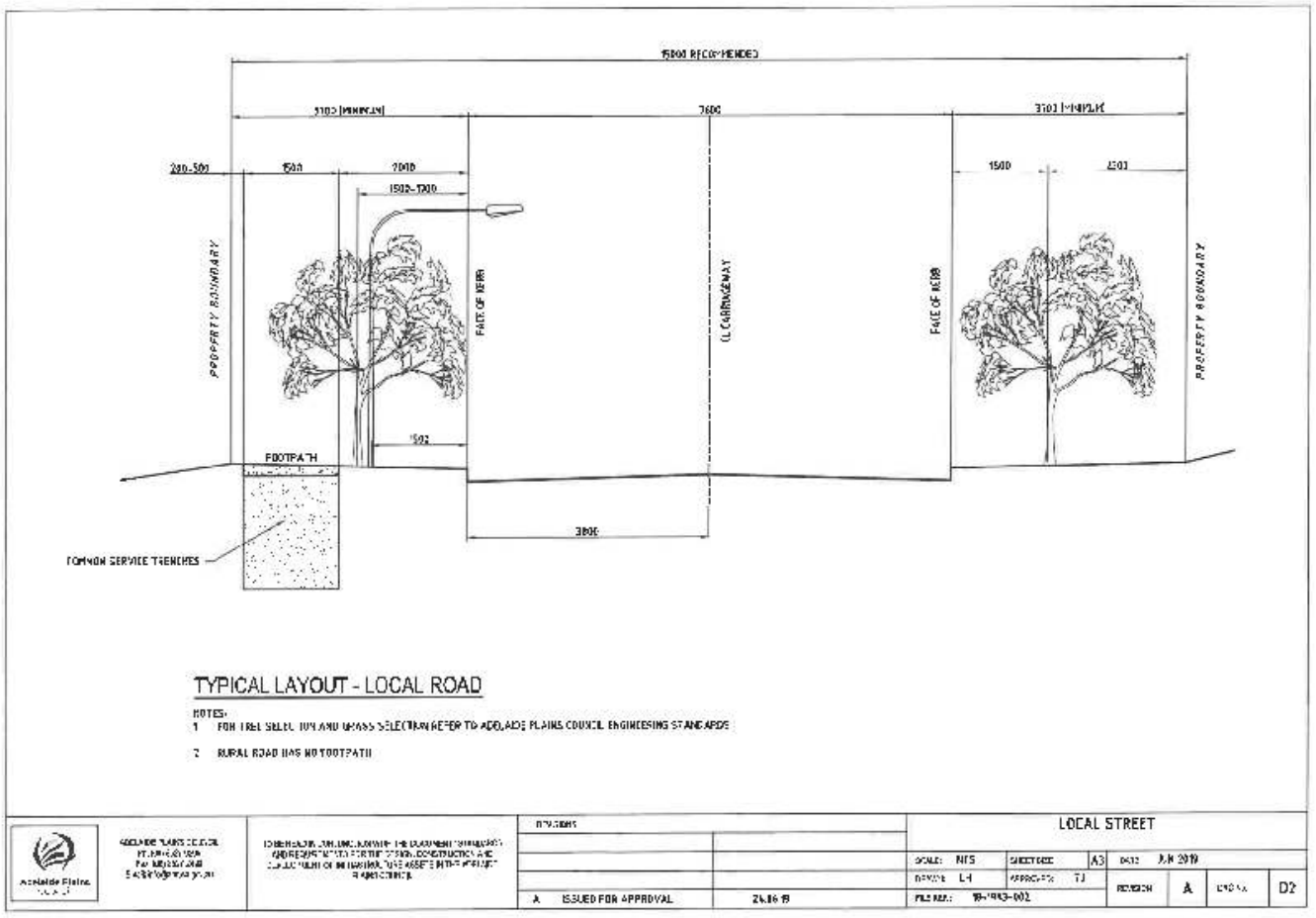
D0 – Typical Rural Road Construction, Bitumen Sealing



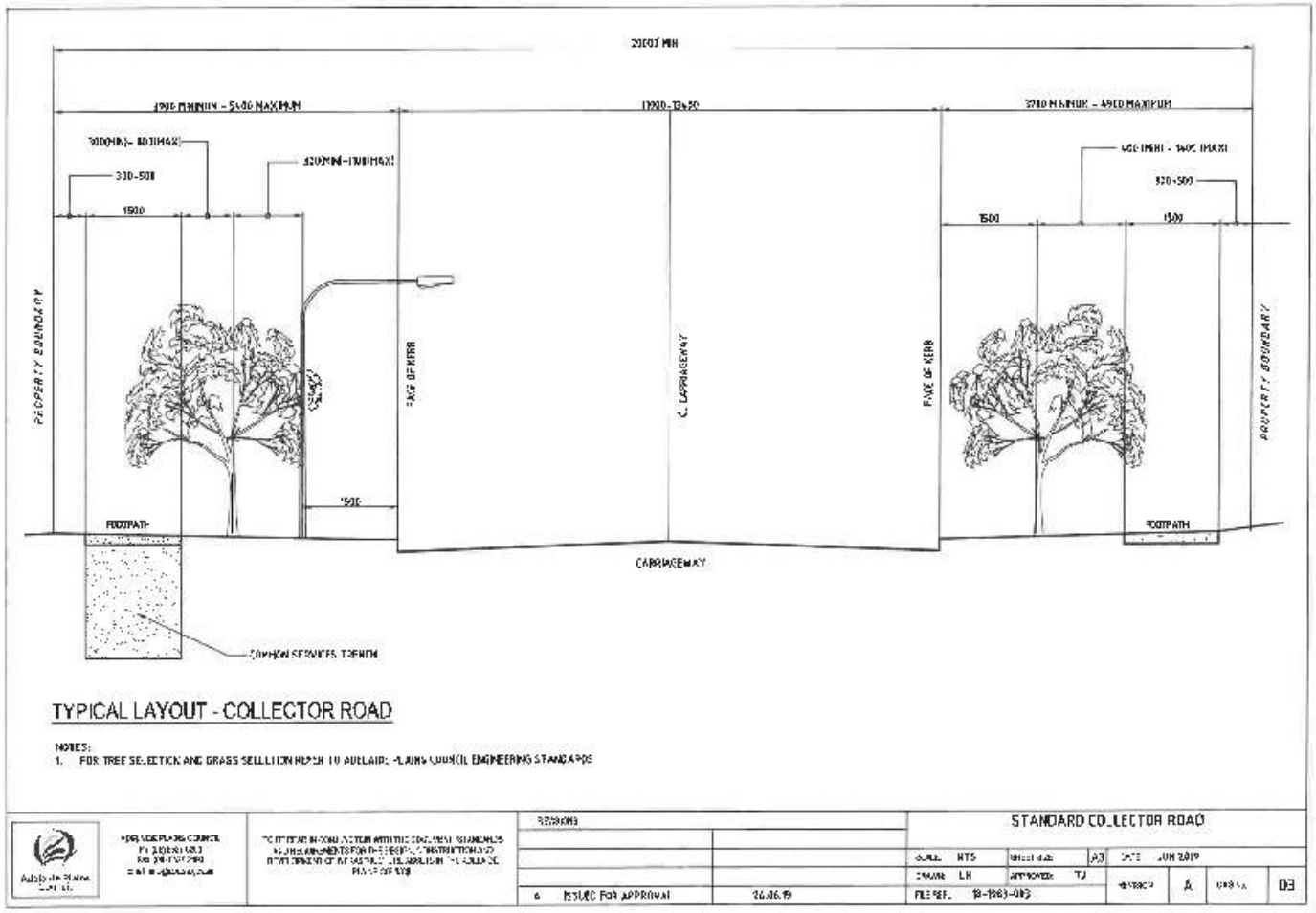
D1 – Residential Access Sealed Road, Carriageway Width 6m



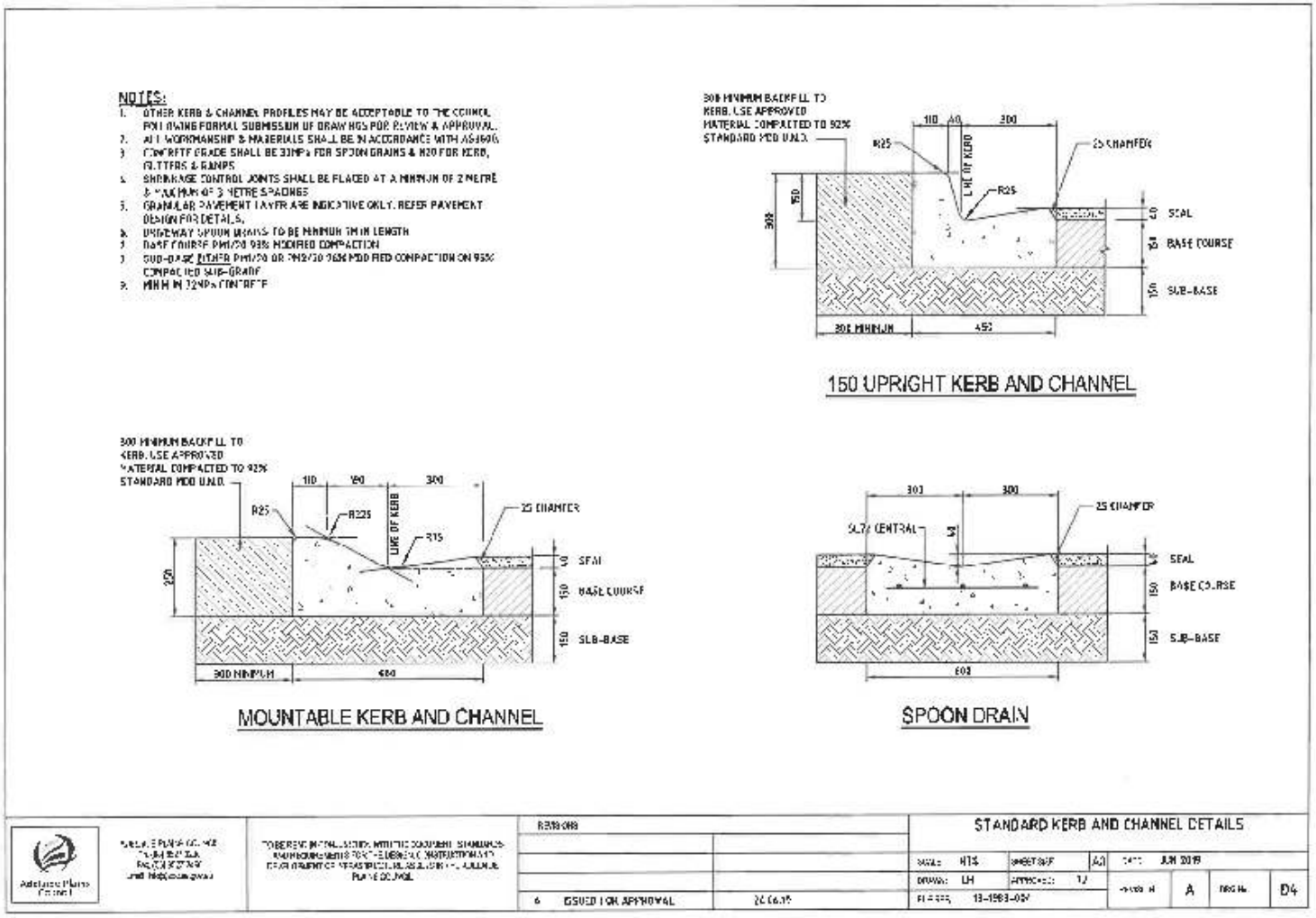
D2 – Residential Local Sealed Road, Carriageway Width 7.6m



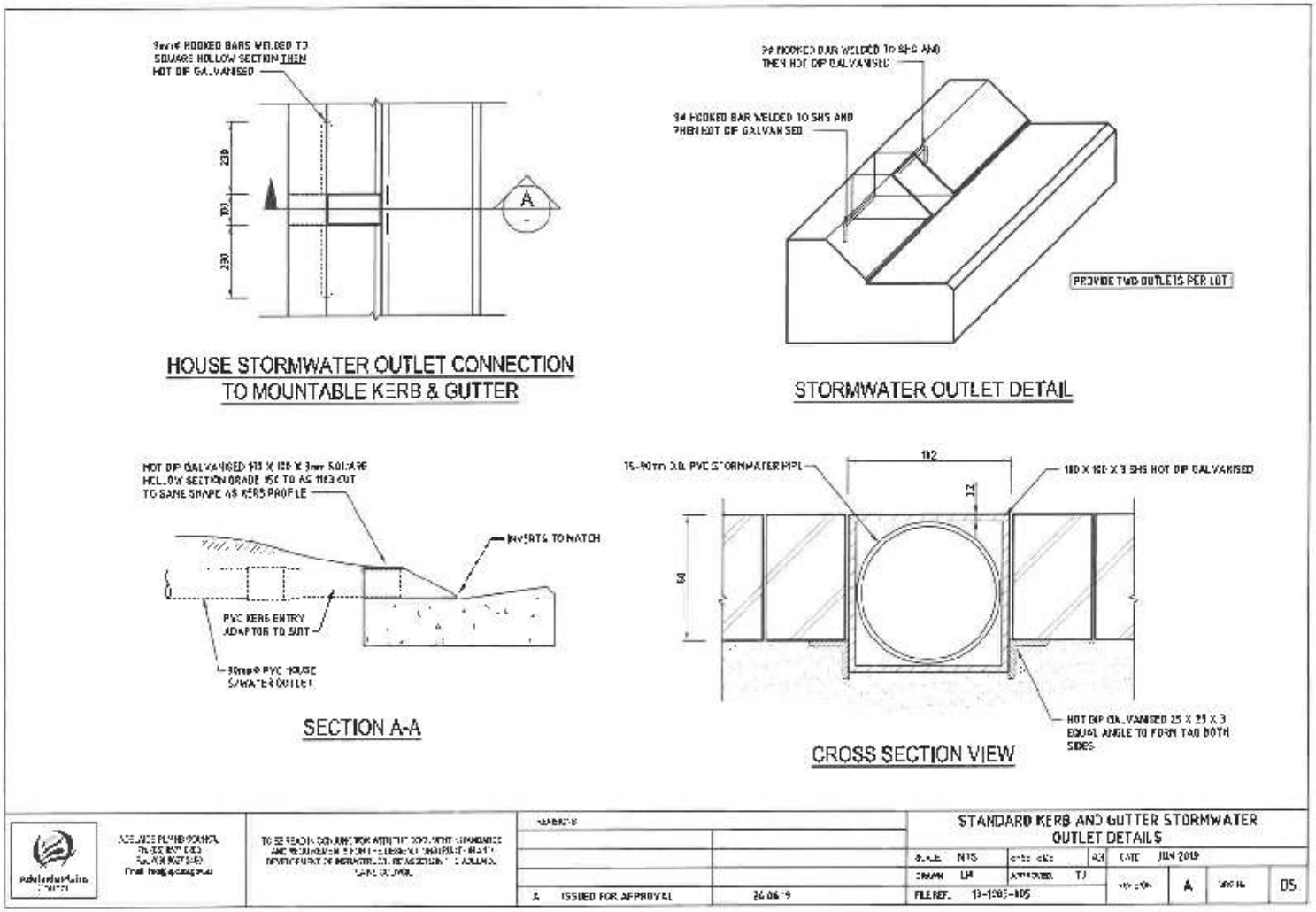
D3 – Residential Collector Sealed Road, Carriageway Width 11.0 - 13.4m



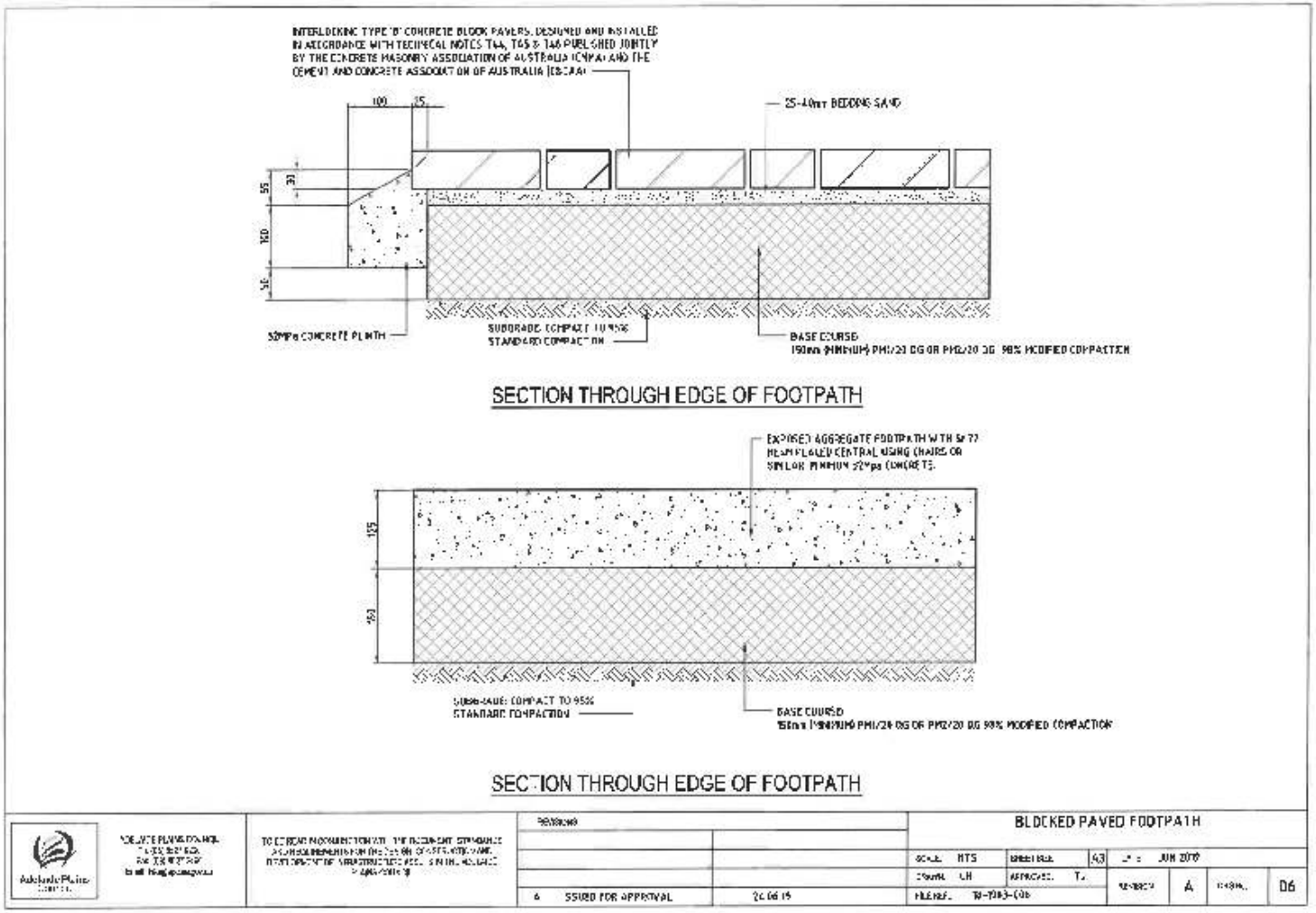
D4 – Mountable Kerb & Channel, 150mm Upright Kerb & Channel, Spoon Drain Details



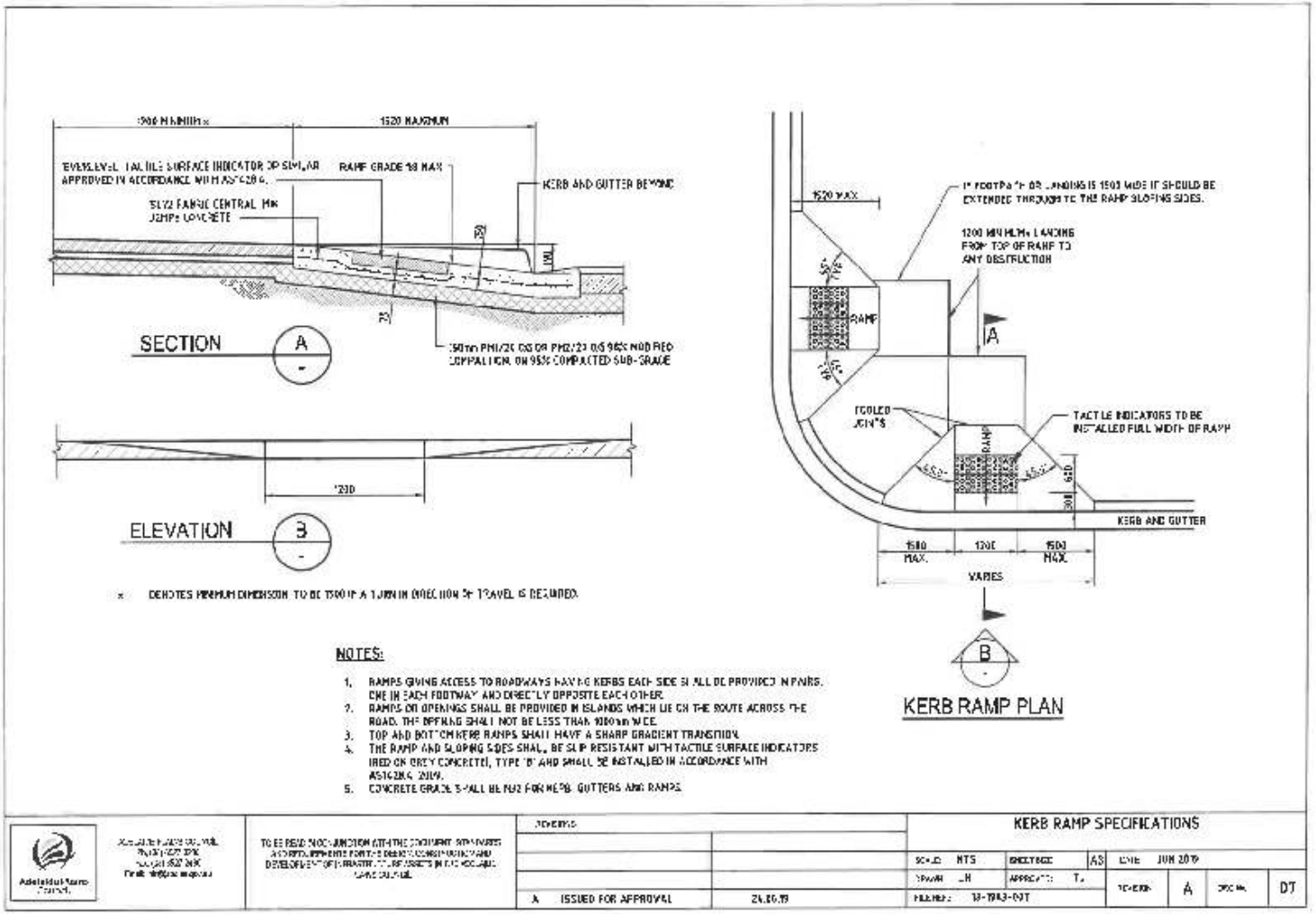
D5 – Kerb & Channel Stormwater Outlet Details



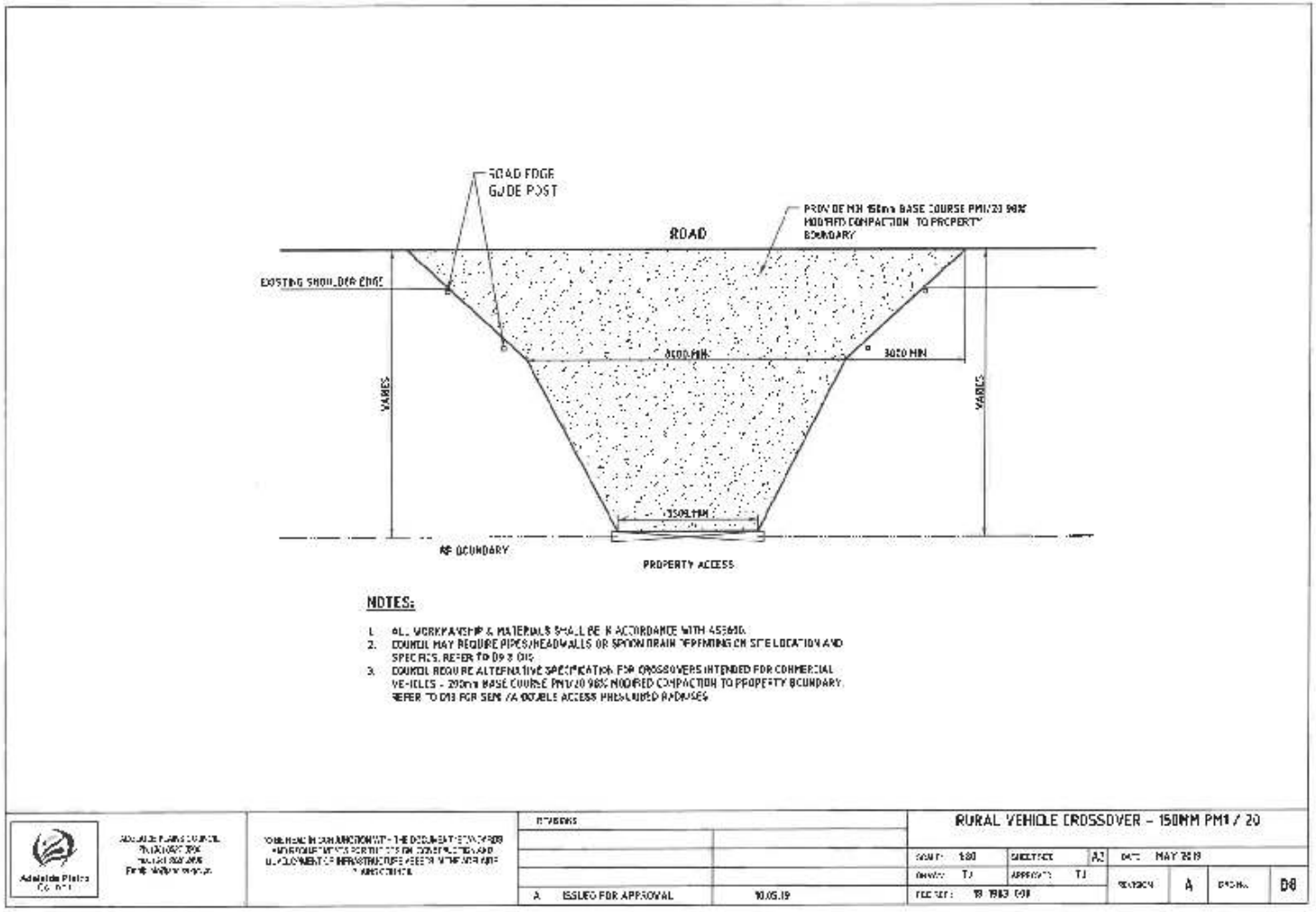
D6 – Blocked Paved Footpath



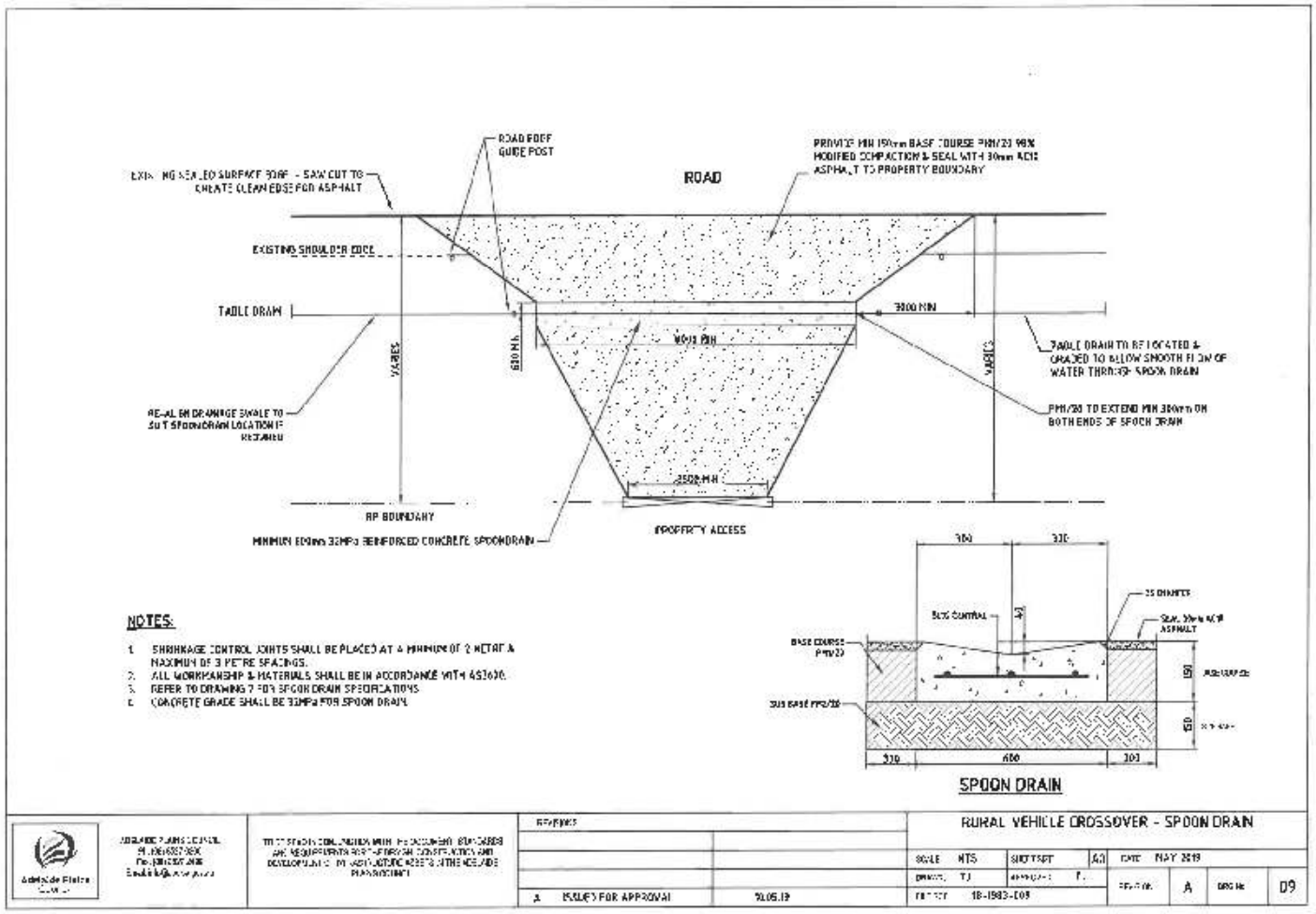
D7 – Kerb Ramp Specifications



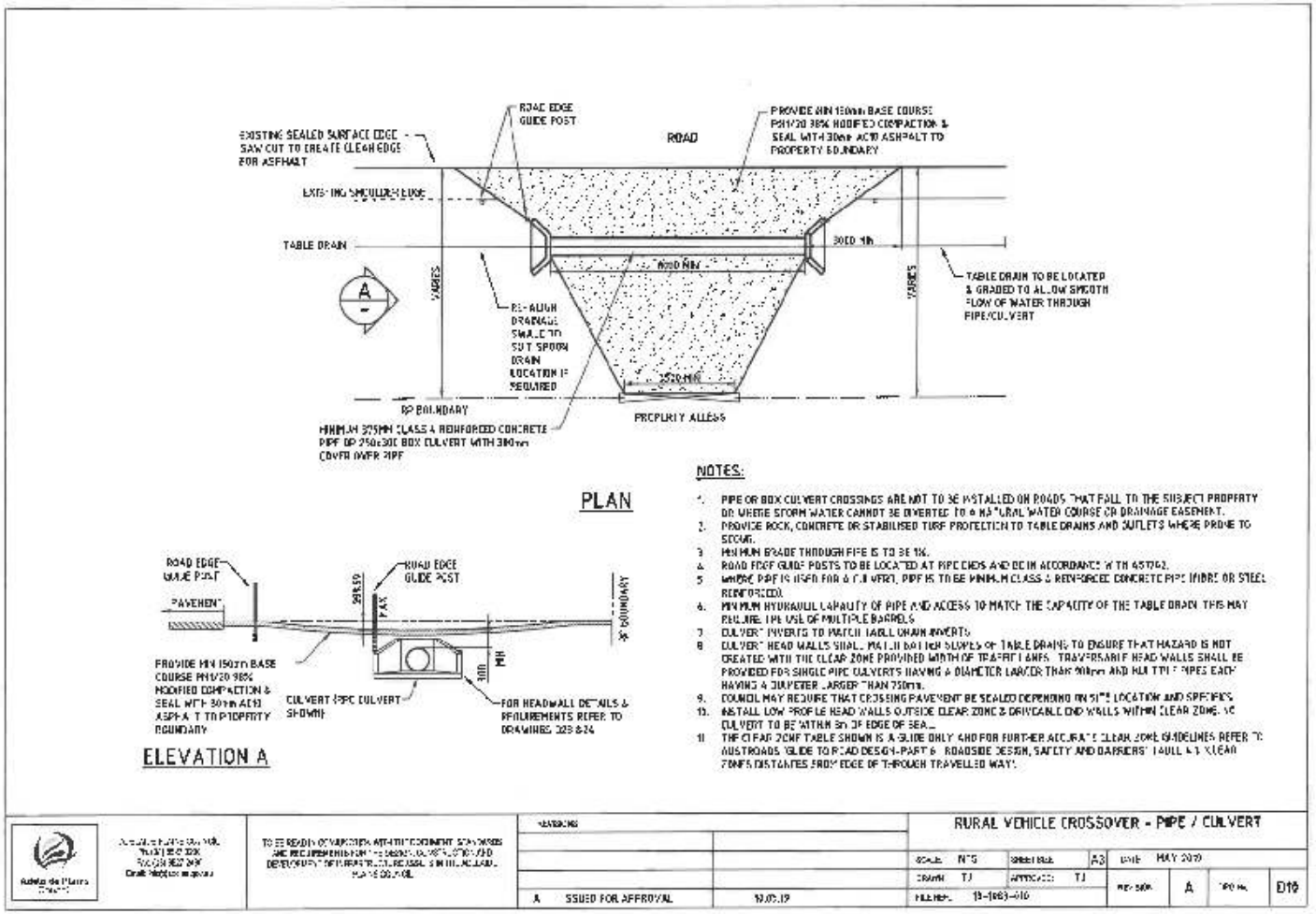
D8 – Rural Vehicle Crossover – 150mm PM1/20QG



D9 – Rural Vehicle Crossover – Spoon Drain



D10 – Rural Vehicle Crossover – Pipe / Culvert

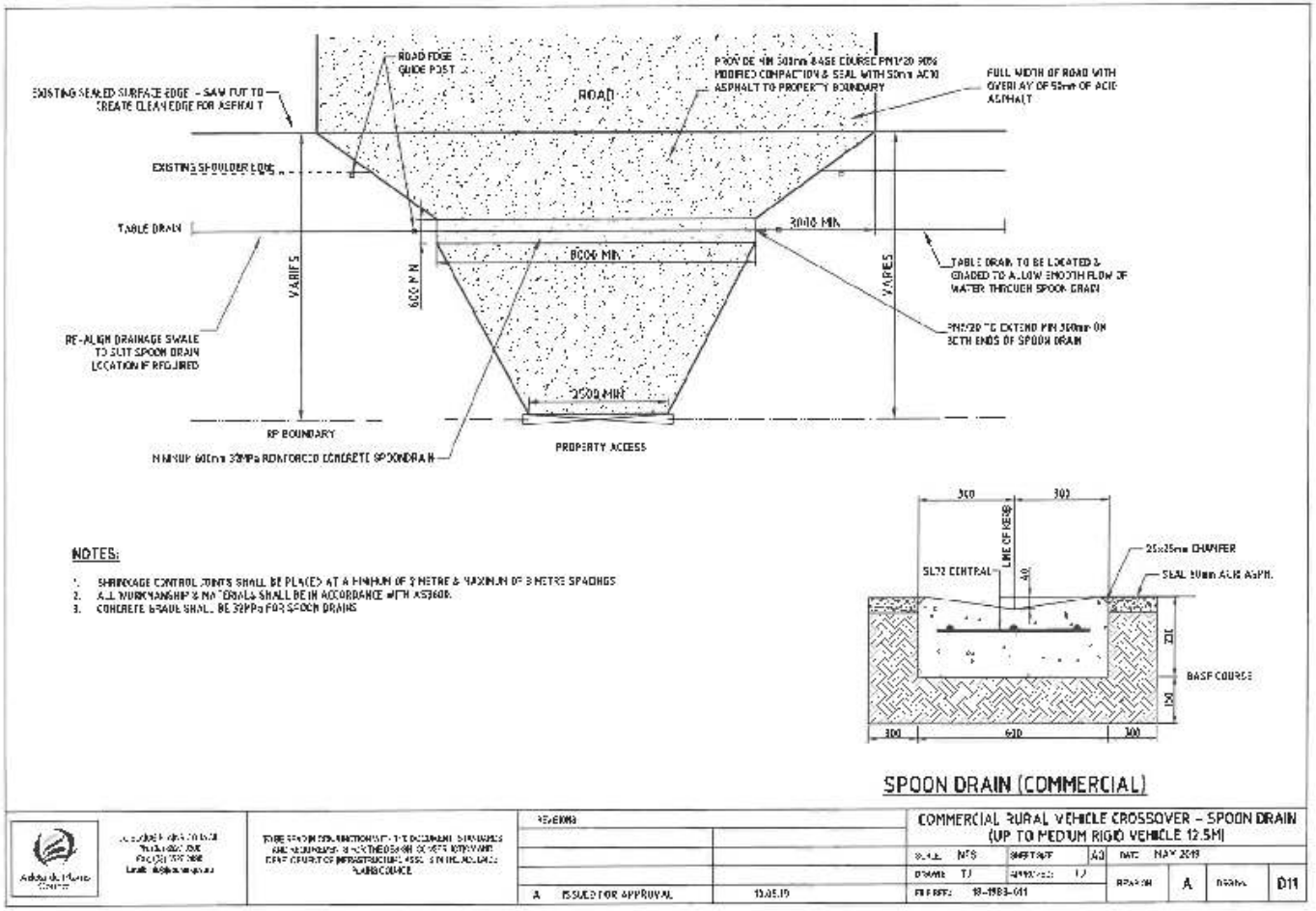


NOTES:

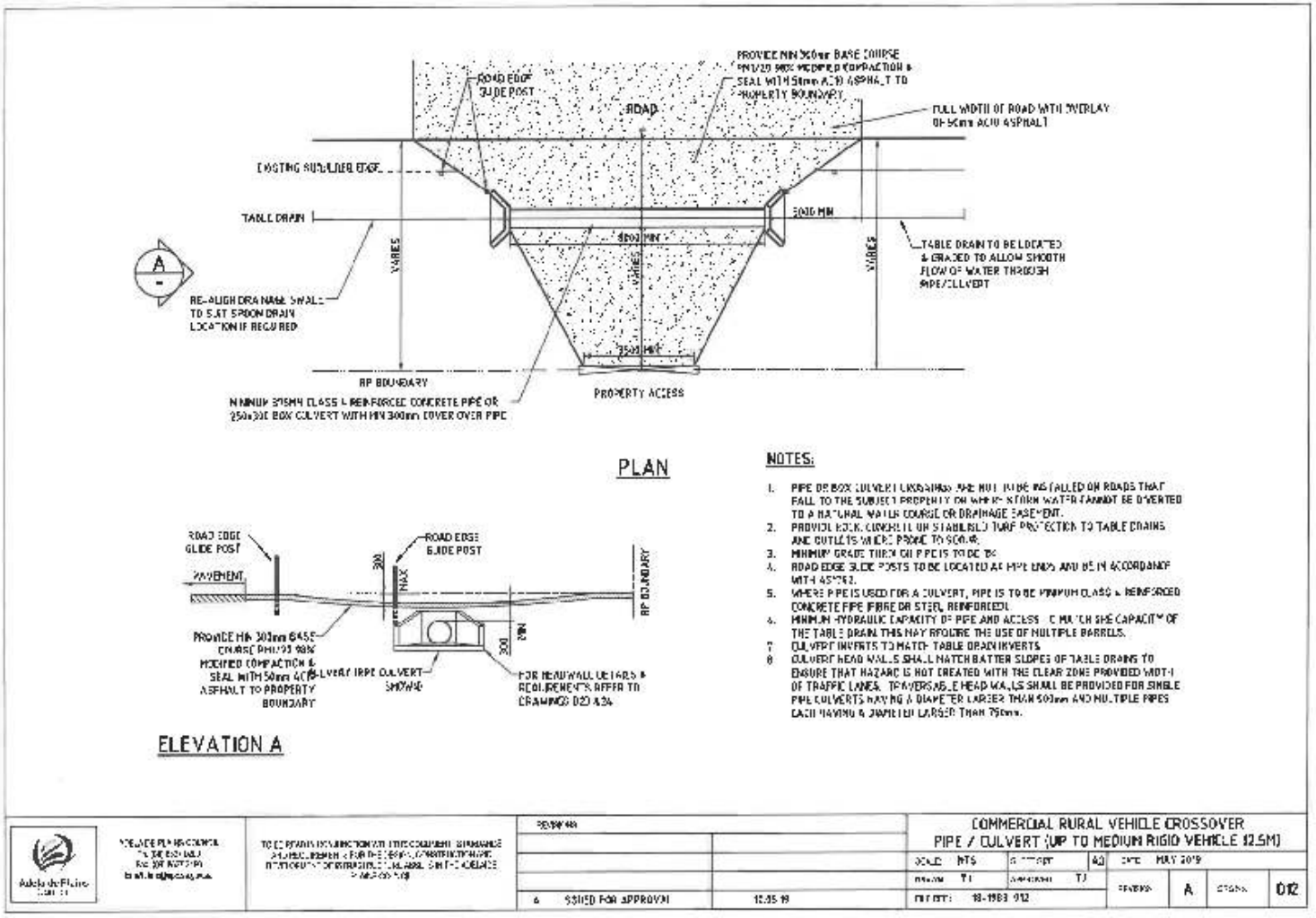
1. PIPE OR BOX CULVERT CROSSINGS ARE NOT TO BE INSTALLED ON ROADS THAT FALL TO THE SUBJECT PROPERTY OR WHERE STORM WATER CANNOT BE DIVERTED TO A NATURAL WATER COURSE OR DRAINAGE EASEMENT.
2. PROVIDE ROCK, CONCRETE OR STABILISED TURF PROTECTION TO TABLE DRAINS AND OUTLETS WHERE PRONE TO SCOUR.
3. MINIMUM GRADE THROUGH PIPE IS TO BE 1%.
4. ROAD EDGE GUIDE POSTS TO BE LOCATED AT PIPE ENDS AND BE IN ACCORDANCE WITH AS1742.
5. WHERE PIPE IS USED FOR A CULVERT, PIPE IS TO BE MINIMUM CLASS 4 REINFORCED CONCRETE PIPE (FIBRE OR STEEL REINFORCED).
6. MINIMUM HYDRAULIC CAPACITY OF PIPE AND ACCESS TO MATCH THE CAPACITY OF THE TABLE DRAIN. THIS MAY REQUIRE THE USE OF MULTIPLE BARRELS.
7. CULVERT INVERTS TO MATCH TABLE DRAIN INVERTS.
8. CULVERT HEAD WALLS SHALL MATCH BATTER SLOPES OF TABLE DRAINS TO ENSURE THAT HAZARD IS NOT CREATED WITH THE CLEAR ZONE PROVIDED WIDTH OF TRAFFIC LANES. TRAVERSABLE HEAD WALLS SHALL BE PROVIDED FOR SINGLE PIPE CULVERTS HAVING A DIAMETER LARGER THAN 900mm AND MULTIPLE PIPES EACH HAVING A DIAMETER LARGER THAN 750mm.
9. COUNCIL MAY REQUIRE THAT CROSSING PAVEMENT BE SEALED DEPENDING ON SITE LOCATION AND SPECIFICS.
10. INSTALL LOW PROFILE HEAD WALLS OUTSIDE CLEAR ZONE & DRIVEABLE END WALLS WITHIN CLEAR ZONE. IF CULVERT TO BE WITHIN 5m OF EDGE OF SEAL.
11. THE CLEAR ZONE TABLE SHOWN IS A GUIDE ONLY AND FOR FURTHER ACCURATE CLEAR ZONE GUIDELINES REFER TO AUSTROADS 'GUIDE TO ROAD DESIGN-PART 6 : ROADSIDE DESIGN, SAFETY AND BARRIERS' TABLE 4.1 'CLEAR ZONES DISTANCES FROM EDGE OF THROUGH TRAVELLED WAY'.

Ashley de Plater [illegible]	[illegible]	REVISIONS	RURAL VEHICLE CROSSOVER - PIPE / CULVERT
	TO BE READ IN CONJUNCTION WITH THE CURRENT STANDARDS AND REQUIREMENTS FOR THE DESIGN, CONSTRUCTION AND DEVELOPMENT OF INFRASTRUCTURE ASSETS IN THE ADELAIDE PLAINS COUNCIL	A ISSUED FOR APPROVAL 10.05.19	SCALE: NTS SHEET SIZE: A3 DATE: MAY 2019 DRAWN: TJ APPROVED: TJ FILE REF: 19-1983-010 REV: 001 A SHEET No. D10

D11 – Commercial Rural Vehicle Crossover – Spoon Drain (Up To Medium Rigid Vehicle 12.5M)



D12 – Commercial Rural Vehicle Crossover – Pipe / Culvert (Up To Medium Rigid Vehicle 12.5M)

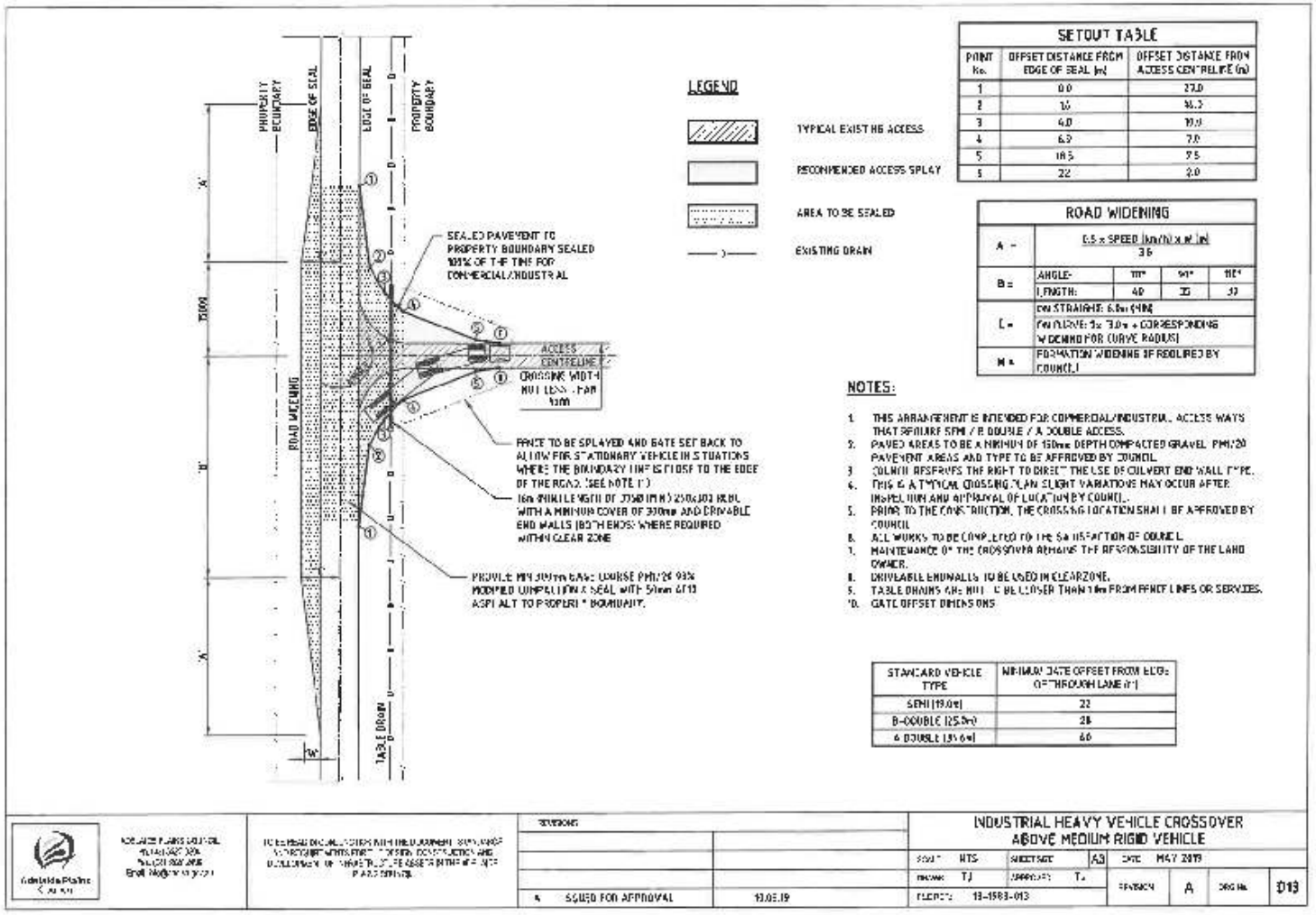


NOTES:

1. PIPE OR BOX CULVERT UNDERNEATH SHE NOT TO BE INSTALLED ON ROADS THAT FALL TO THE SUBJECT PROPERTY OR WHERE STORM WATER CANNOT BE DIVERTED TO A NATURAL WATER COURSE OR DRAINAGE EASEMENT.
2. PROVIDE ROCK LINING OR STABILISED TURF PROTECTION TO TABLE DRAINS AND OUTLETS WHERE PRONE TO SCOUR.
3. MINIMUM GRADE THROUGH PIPE IS TO BE 1%
4. ROAD EDGE GUIDE POSTS TO BE LOCATED AT PIPE ENDS AND BE IN ACCORDANCE WITH AS1742.
5. WHERE PIPE IS USED FOR A CULVERT, PIPE IS TO BE MINIMUM CLASS 4 REINFORCED CONCRETE PIPE (FIBRE OR STEEL REINFORCED).
6. MINIMUM HYDRAULIC CAPACITY OF PIPE AND ACCESS TO MATCH THE CAPACITY OF THE TABLE DRAIN. THIS MAY REQUIRE THE USE OF MULTIPLE BARRELS.
7. CULVERT INVERTS TO MATCH TABLE DRAIN INVERTS.
8. CULVERT HEAD WALLS SHALL MATCH BATTER SLOPES OF TABLE DRAINS TO ENSURE THAT HAZARD IS NOT CREATED WITH THE CLEAR ZONE PROVIDED WITHIN OF TRAFFIC LANES. TRAVERSABLE HEAD WALLS SHALL BE PROVIDED FOR SINGLE PIPE CULVERTS HAVING A DIAMETER LARGER THAN 600mm AND MULTIPLE PIPES EACH HAVING A DIAMETER LARGER THAN 750mm.

Adelaide Plains Council	[illegible]	[illegible]	REVISION		COMMERCIAL RURAL VEHICLE CROSSOVER PIPE / CULVERT (UP TO MEDIUM RIGID VEHICLE 12.5M)			
					SCALE: NTS	SIZE: A3	DATE: MAY 2019	
					DRAWN: TJ	CHECKED: TJ	DRAWING: A	STORM: 012
			6	ISSUED FOR APPROVAL 10.05.19	PROJECT: 18-1983 012			

D13 – Industrial Heavy Vehicle Crossover Above Medium Rigid Vehicle



SETOUT TABLE		
POINT No.	OFFSET DISTANCE FROM EDGE OF SEAL (m)	OFFSET DISTANCE FROM ACCESS CENTRELINE (m)
1	0.0	23.0
2	1.0	16.2
3	4.0	10.0
4	6.2	7.0
5	10.5	3.5
6	22	2.0

ROAD WIDENING				
A =	0.5 x SPEED (km/h) x W (m) / 36			
B =	ANGLE:	111°	90°	157°
	LENGTH:	40	20	10
C =	ON STRAIGHT: 0.8m (MIN)			
	ON CURVE: 1x 3.0m + CORRESPONDING WIDENING FOR CURVE RADIUS			
W =	FORMATION WIDENING IF REQUIRED BY COUNCIL			

NOTES:

1. THIS ARRANGEMENT IS INTENDED FOR COMMERCIAL/INDUSTRIAL ACCESS WAYS THAT REQUIRE SEMI / B DOUBLE / A DOUBLE ACCESS.
2. PAVED AREAS TO BE A MINIMUM OF 150mm DEPTH COMPACTED GRAVEL PM1/20 PAVEMENT AREAS AND TYPE TO BE APPROVED BY COUNCIL.
3. COUNCIL RESERVES THE RIGHT TO DIRECT THE USE OF CULVERT END WALL TYPE.
4. THIS IS A TYPICAL CROSSING PLAN SLIGHT VARIATIONS MAY OCCUR AFTER INSPECTION AND APPROVAL OF LOCATION BY COUNCIL.
5. PRIOR TO THE CONSTRUCTION, THE CROSSING LOCATION SHALL BE APPROVED BY COUNCIL.
6. ALL WORKS TO BE COMPLETED TO THE SATISFACTION OF COUNCIL.
7. MAINTENANCE OF THE CROSSOVER REMAINS THE RESPONSIBILITY OF THE LAND OWNER.
8. DRIVEABLE ENDWALLS TO BE USED IN CLEARZONE.
9. TABLE DRAINS ARE NOT TO BE CLOSER THAN 1m FROM FENCE LINES OR SERVICES.
10. GATE OFFSET DIMENSIONS

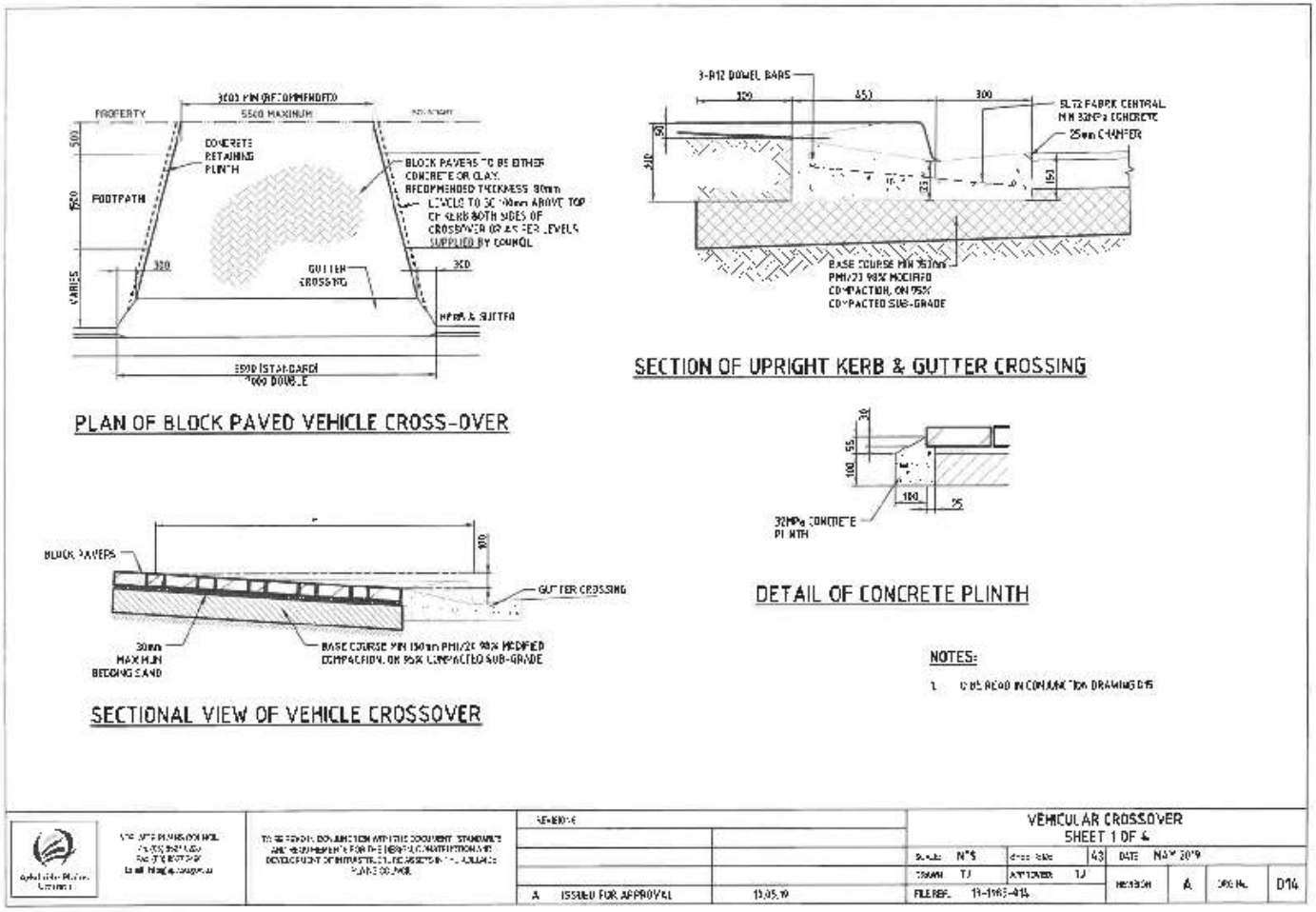
STANDARD VEHICLE TYPE	MINIMUM GATE OFFSET FROM EDGE OF THROUGH LANE (m)
SEMI (19.0m)	22
B-DOUBLE (25.0m)	28
A DOUBLE (35.6m)	66

REVISIONS		
A	ISSUED FOR APPROVAL	10.05.19

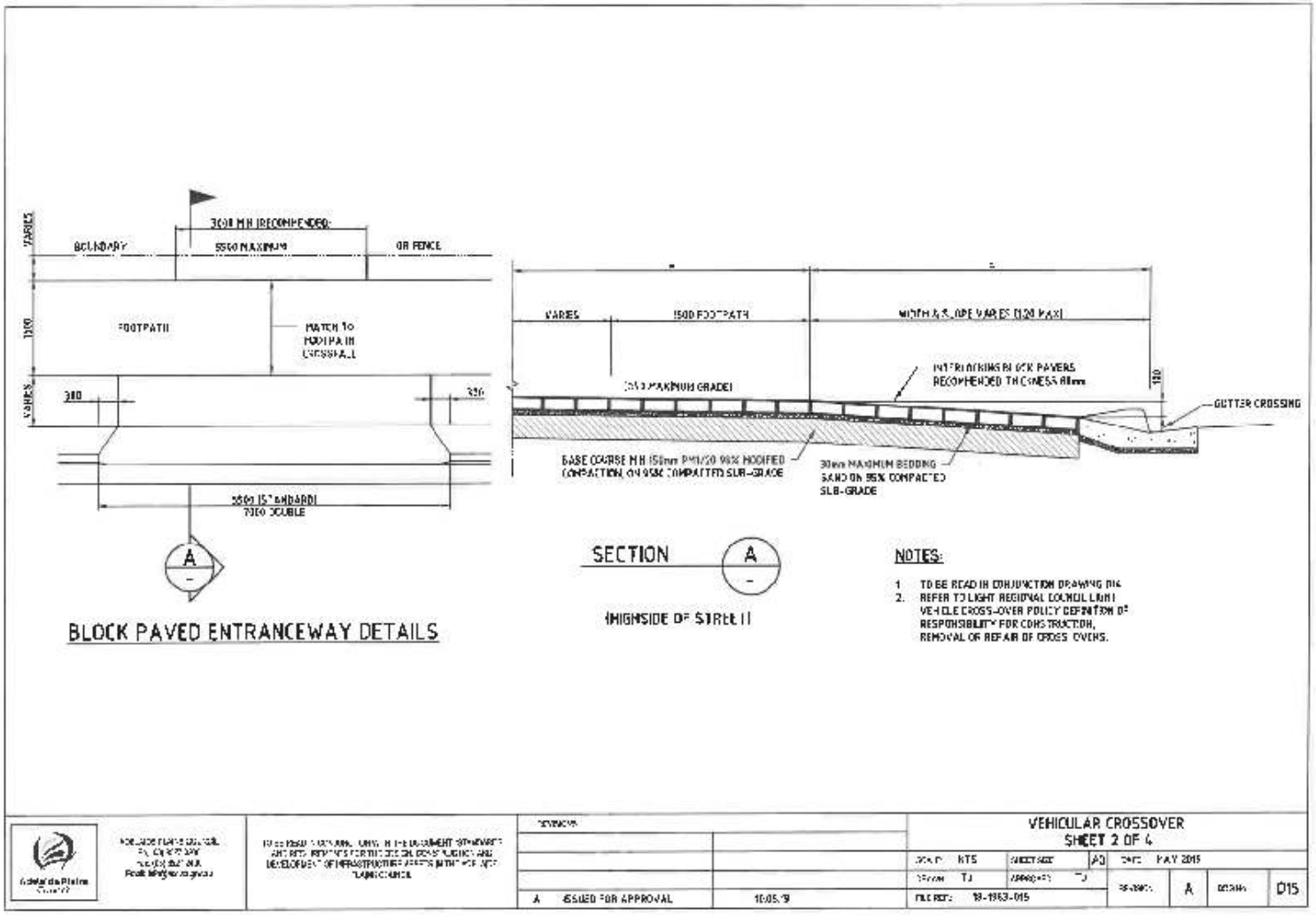
INDUSTRIAL HEAVY VEHICLE CROSSOVER ABOVE MEDIUM RIGID VEHICLE

SCALE: NTS | SHEET SIZE: A3 | DATE: MAY 2019
DRAWN: TJ | APPROVED: T.J
FILE No.: 19-1583-013
REVISION: A | DRG No.: D13

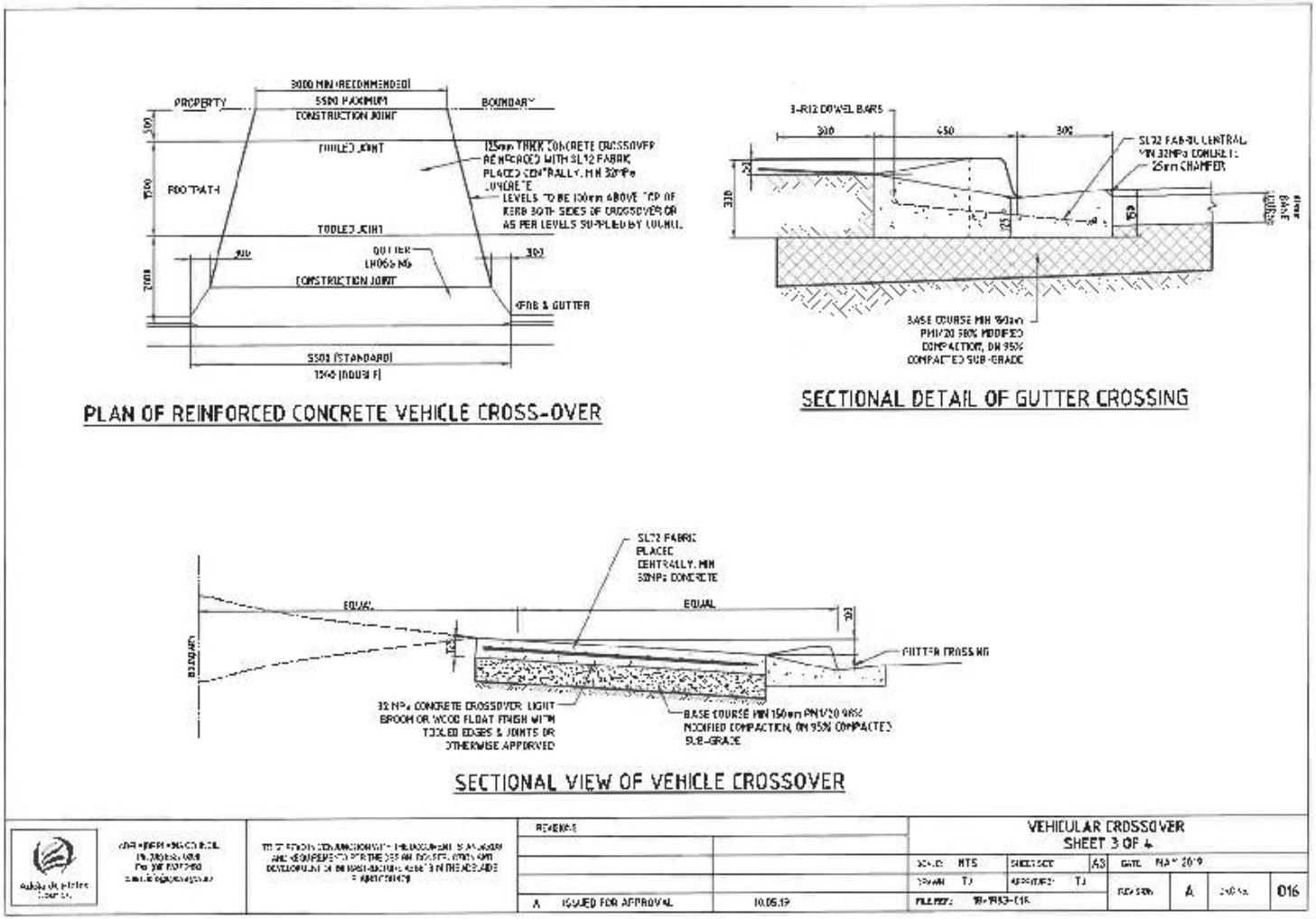
D14 – Vehicular Crossover, Sheet 1 of 4



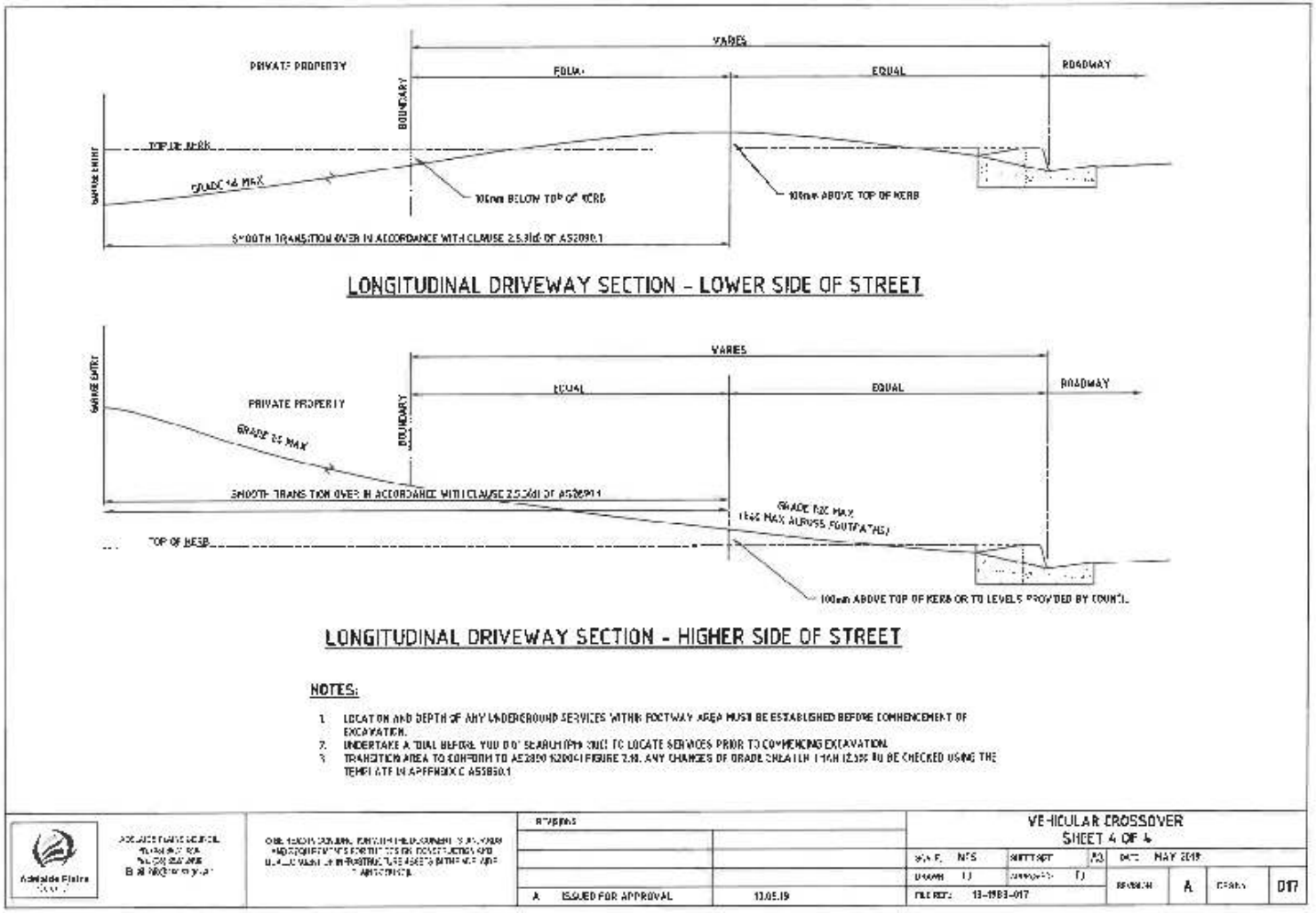
D15 – Vehicular Crossover, Sheet 2 of 4



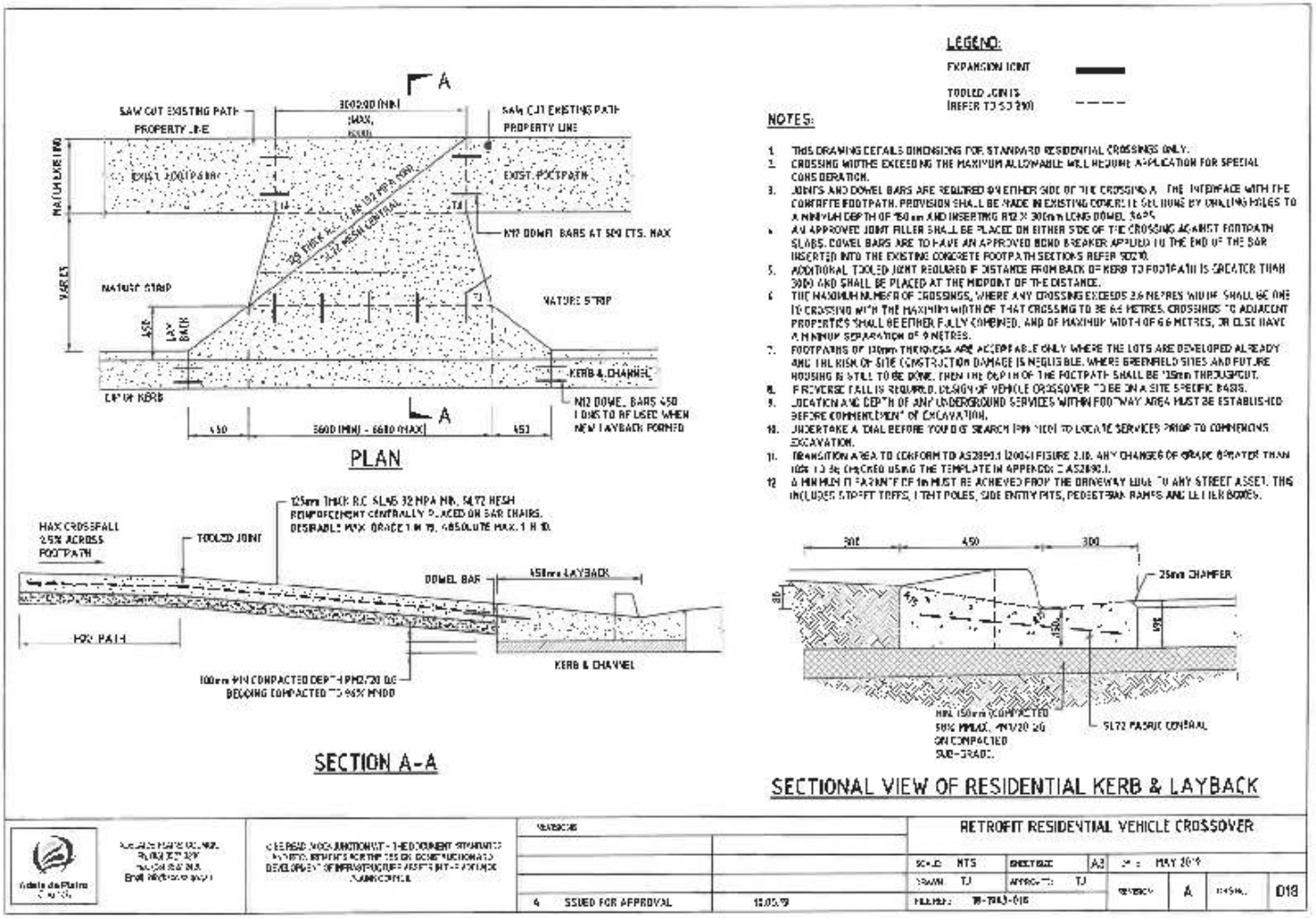
D16 – Vehicular Crossover, Sheet 3 of 4



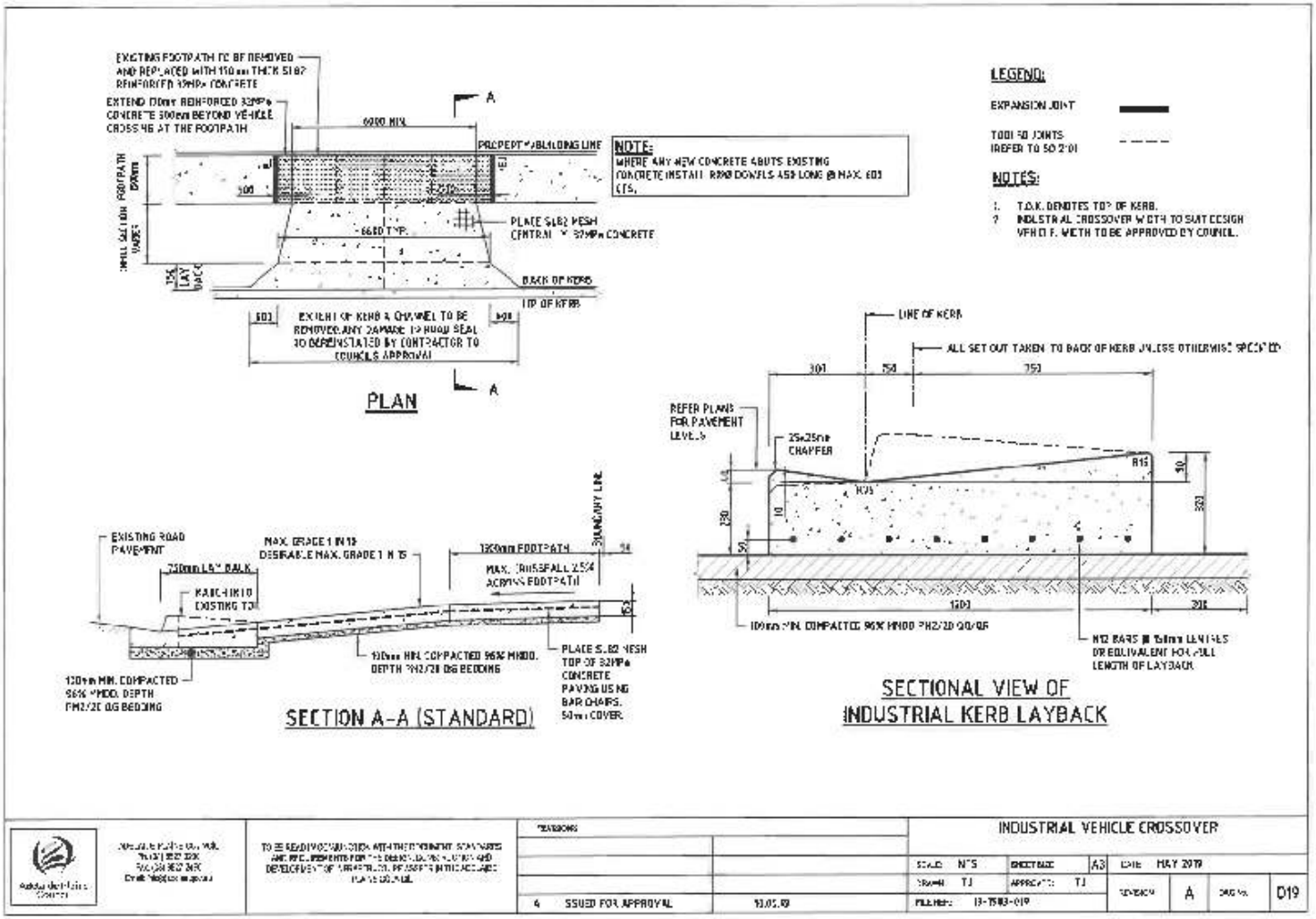
D17 – Vehicular Crossover, Sheet 4 of 4



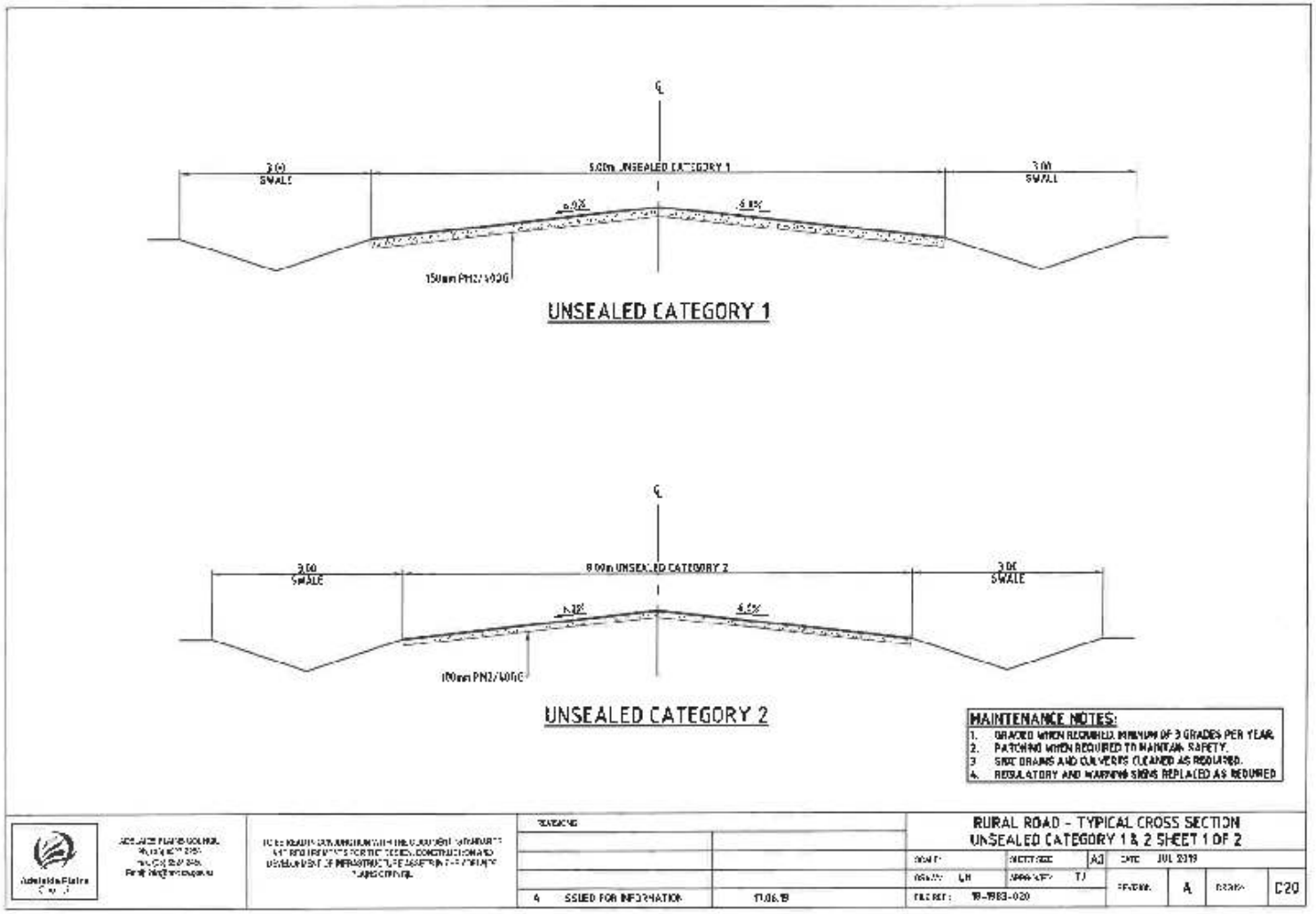
D18 – Retrofit Residential Vehicle Crossover



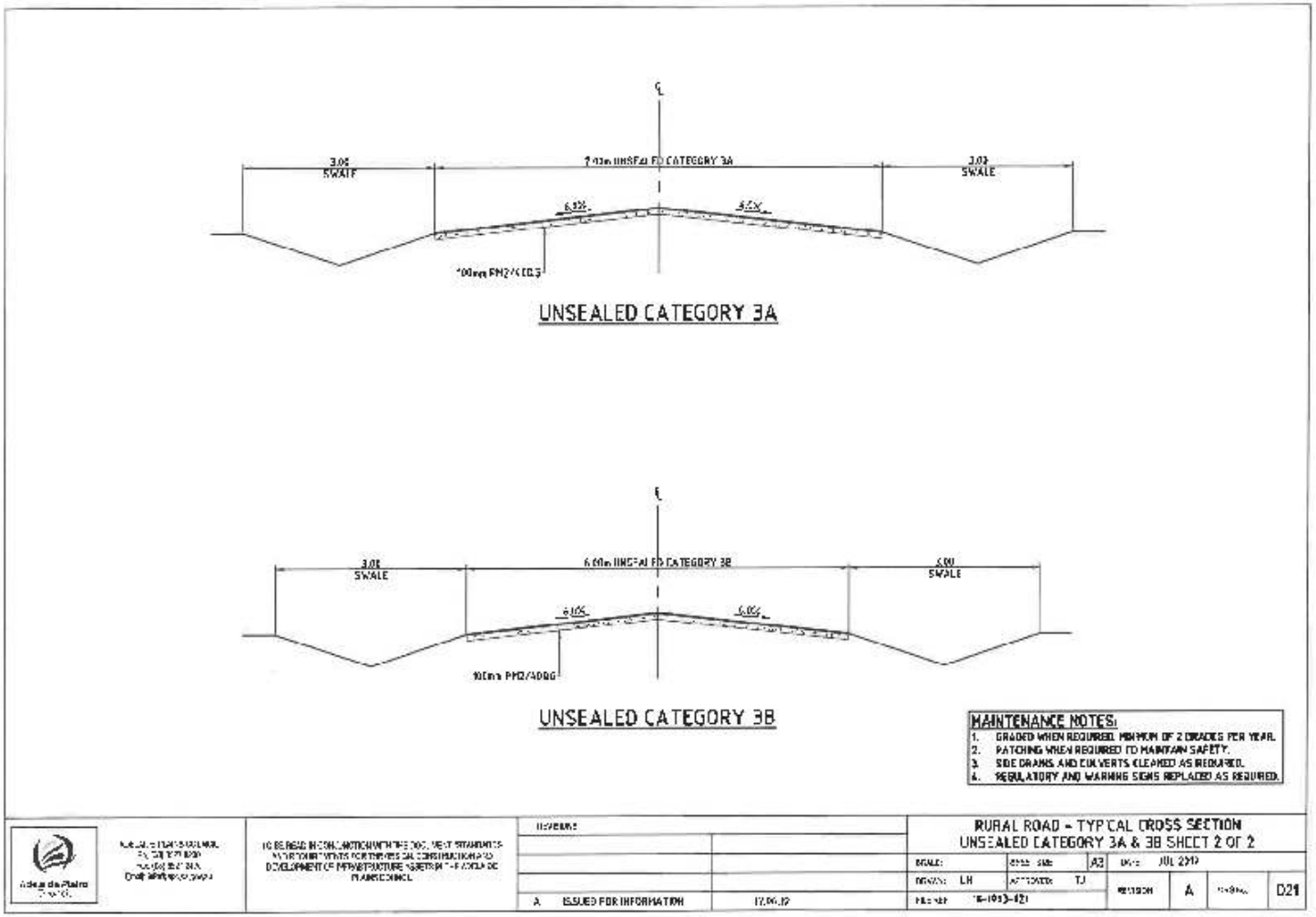
D19 – Industrial Vehicle Crossover



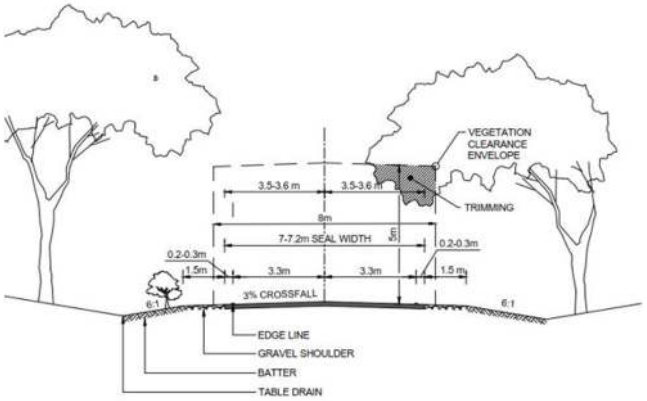
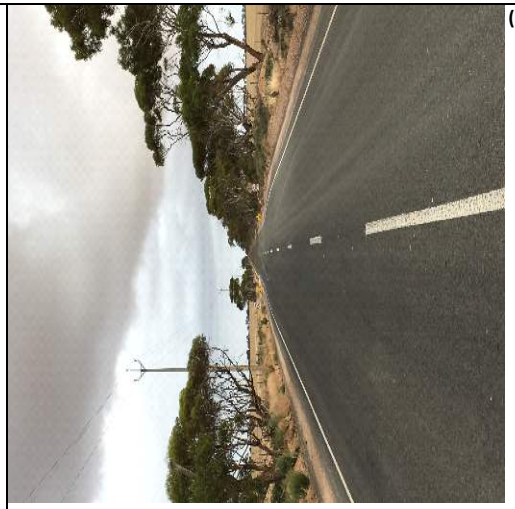
D20 – Rural Road, Unsealed Category 1 & 2

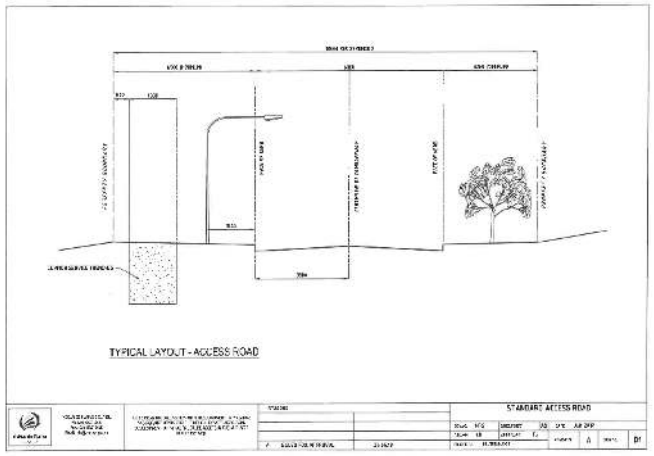
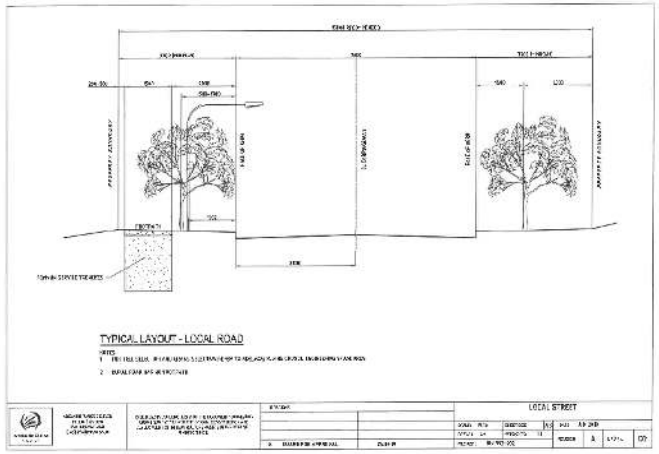


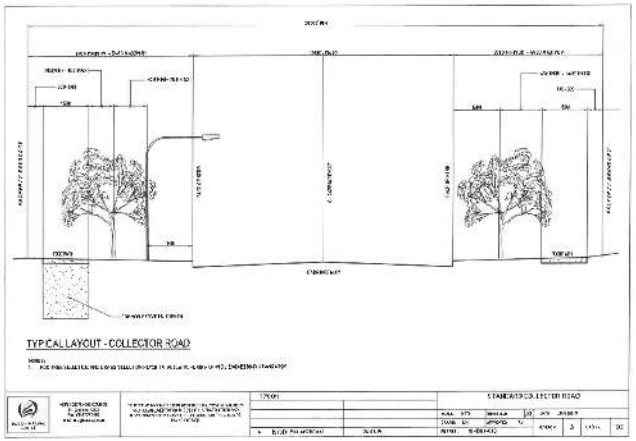
D21 – Rural Road, Unsealed Category 3A & 3B

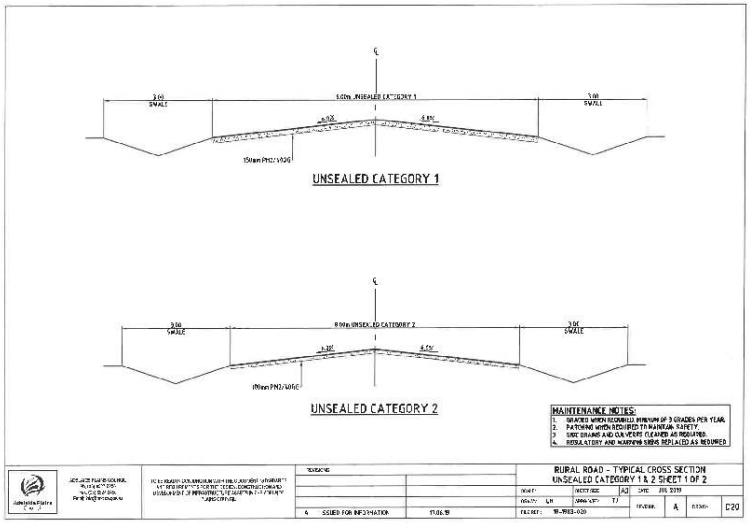


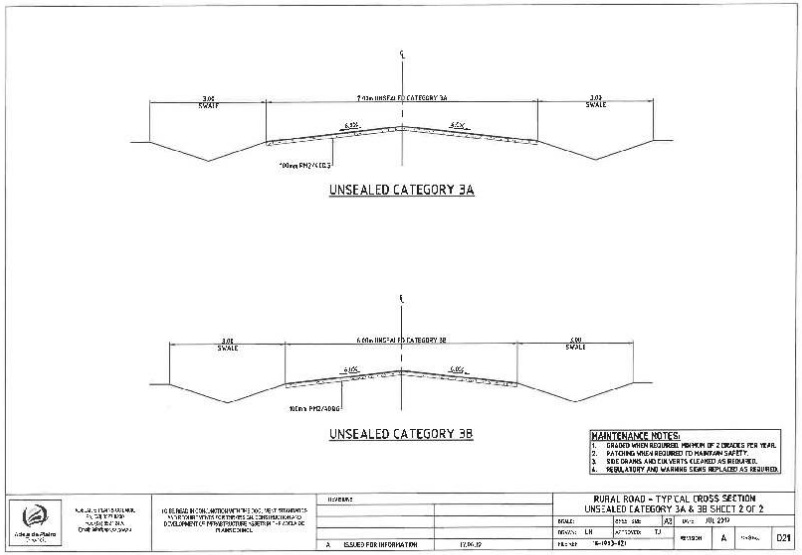
Appendix F Descriptions - Sealed Road Designs & Unsealed Road Categories

D0		 **(Bitumen Seal 7.2m min)**

D1 **6m wide**		
D2 **7.6m wide**		

D3 **11.0 - 13.4m wide**		
D20 **Cat 1 9m wide** **Cat 2**		**Typical Category 1 Road** **Rural Sheeted Road – Good Condition** 

8m wide		**Typical Category 2 Road** **Rural Sheeted Road** 

D21 **Cat 3-A 7m wide** **Cat 3-B 6m wide** **Cat 3-C 6m wide**		**Typical Category 3-A Road** **Rural Sheeted Road Showing Signs of Wear and Developing of Patches** 

Cat 4-A **various widths**	No Design Required	**Natural Formed Road** 