LGIP Stormwater Project Review

Prioritisation of Stormwater Projects

NW30153



Prepared for
Redland City Council

6 June 2022

Cardno

now

Stantec

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1 Introduction

Cardno now Stantec has been engaged by Redland City Council (RCC), to undertake a review of stormwater projects identified within the RCC Local Government Infrastructure Plan (LGIP). These projects are located throughout the RCC local government area (LGA), shown in Figure 1-1 below.

The aim of this project was to refine the list of stormwater projects to better align with the intended aims of LGIP projects.

The review is focused on LGIP projects that are delivered by Council rather than as developed contributed assets. As such no review of developer contributed LGIP projects has been performed.

1.1 Scope of Works

Broadly the review has involved:

- Review of current LGIP Stormwater list identified by RCC
- Consultation with stakeholders within RCC
- Addition and removal of projects from the list
- Update of civil costing of revised project list
- Reporting

Figure 1-1 Identified Projects



2 Methodology

After a high level review by Cardno of the projects to gain an understanding, a workshop was held to gather additional details. RCC provided Cardno with an initial LGIP Stormwater project list and this is documented in Table 2-1 below.

Table 2-1 RCC Stormwater Network Schedule of Works

Map reference	Trunk infrastructure	Establishment cost	Year of Fee Estimate	RCC Project	Contributed asset
SW-A-199	Wetland System	$2,243,426.00	2013	Yes	No
SW-A-258	Infiltration Bioretention B	$109,658.00		Yes	No
SW-A-266	Infiltration Bioretention B	$109,658.00		Yes	No
SW-A-267	Infiltration Bioretention B	$109,658.00		Yes	No
SW-A-268	Infiltration Bioretention B	$109,658.00		Yes	No
SW-A-269	Bioretention C	$89,640.00		Yes	No
SW-A-198	Wetland System	$1,442,477.00	2013	Yes	No
SW-A-294	Bioretention Basin - Native Dog Creek	$446,342.00	2010	Yes	No
SW-A-297	Bioretention Basin - Native Dog Creek	$271,688.00	2010	Yes	No
SW-A-302	Bioretention Basin - Native Dog Creek	$455,938.00	2010	Yes	No
SW-A-303	Bioretention Basin - Native Dog Creek	$455,938.00	2010	Yes	No
SW-A-304	Bioretention Basin - Thornlands	$455,938.00		Yes	No
SW-A-200	Bioretention Basin System	$375,392.00	2013	Yes	No
SW-A-249	Wetland	$784,585.00	2013	Yes	No
SW-A-250	Sediment Basin	$253,392.00	2013	Yes	No
SW-L-X	Cleveland Water Quantity -Island Street	$831,000.00	2013	Yes	No
SW-L-15	Cleveland Water Quantity -	$474,000.00	2013	Yes	No
Site 6 Option 2	Rachow - Overland Flow	$281,500.00	2021	Yes	No
	Sub-Total	**$9,299,888**			

2.2 Workshop Outcomes

An online workshop was facilitated by Cardno now Stantec and involved representatives from the stormwater assets team, environmental team and LGIP program coordinator.

General findings from the workshop are listed below:

- Maintenance of existing assets does not fit under LGIP, however modification/augmentation does;
- RCC's preferred approach to stormwater treatment within the region is end of line on the basis of access and maintenance;
- Water quality relating to waterway values and data is available and can be used to assist in prioritisation of projects;
- Some projects can be left on the LGIP list as place holders;

Tables Table 2-2 to Table 2-5 provide a high-level overview of project categorisation resulting from the workshop.

2.3 Projects Identified to Remain on LGIP

Projects identified to remain (Table 2-2), on the LGIP program are those projects which have been deemed acceptable at this stage, however these projects will be reviewed in detail as the LGIP program is implemented.

Table 2-2 LGIP Projects to Remain

ID	Name	Establishment Cost	RCC Project	Contributed Asset	Initial Workshop Finding
SW-A-249	Wetland	$784,585.00	Yes	No	Remain as placeholder
SW-A-250	Sediment Basin	$253,392.00	Yes	No	Remain as placeholder
SW-A-258	Infiltration Bioretention Basin	$109,658.00	Yes	No	Remain as placeholder
SW-A-266	Infiltration Bioretention Basin	$109,658.00	Yes	No	Remain as placeholder
SW-A-267	Infiltration Bioretention Basin	$109,658.00	Yes	No	Remain as placeholder
SW-A-268	Infiltration Bioretention Basin	$109,658.00	Yes	No	Remain as placeholder
	Sub-Total	**$1,476,609.00**			

2.4 Projects Identified for Review

Those projects identified in the workshop as needing to be reviewed are listed in Table 2-3.

with further details provided in Section 3.

Table 2-3 LGIP Project to Review

ID	Name	Establishment Cost	RCC Project	Contributed Asset	Initial Workshop Finding
SW-A-198	Wetland System	$1,489,591.00	Yes	No	Further review
SW-A-199	Wetland System	$2,243,426.00	Yes	No	Further review
SW-A-269	Bioretention C	$89,640.00	Yes	No	Further review
SW-A-297	Bioretention Basin - Native Dog Creek	$271,688.00	Yes	No	Further review
SW-A-304	Bioretention Basin - Thornlands	$455,938.00	Yes	No	Further review
	Sub-Total	**$4,550,283.00**			

2.5 Projects to be Added

As a result of the investigation performed by Cardno in 2021 for RCC, an additional project has been identified for inclusion in the LGIP program. This project will provide flood mitigation to surrounding properties along with a legal point of discharge for upstream developments.

Table 2-4 Projects for Addition

ID	Name	Establishment Cost (2021)	RCC Project	Contributed Asset	Initial Workshop Finding
Site 6 Option 2 (SW-A-XX)	Rachow - Overland Flow	$281,500	Yes	No	Add to LGIP
	Sub-Total	**$281,500.00**			

2.6 Projects Identified for Removal

During the workshop, the projects listed in Table 2-5 were identified for removal. Further detail outlining how this decision was made is discussed in Section 0.

Table 2-5 LGIP Projects for Removal

ID	Name	Establishment Cost	RCC Project	Contributed Asset	Initial Workshop Finding
SW-A-294	Bioretention Basin - Native Dog Creek	$446,342	Yes	No	Remove
SW-A-302	Bioretention Basin - Native Dog Creek	$455,938	Yes	No	Remove
SW-A-303	Bioretention Basin - Native Dog Creek	$455,938	Yes	No	Remove
SW-L-15	Cleveland Water Quantity -	$474,000	Yes	No	Remove
SW-L-X	Cleveland Water Quantity -Island Street	$831,000	Yes	No	Remove
	Sub-Total	**$2,663,218**			

3 Projects for Review

3.1 SW-A-198 Wetland System

Project SW-A-198 is located on Eprapah Creek, just upstream from the Victoria Point Shopping Centre (Figure 3-1). Stormwater at this location currently discharges via pipes to a vegetated gully which then flows into Eprapah Creek. Stormwater that discharges at this location is produced from an urbanised catchment with an associated expected low pollutant load.

Figure 3-1 SW-A-198



While implementing water quality treatment on existing developments is effective in reducing pollutant loads, it is not a requirement of the State Planning Policy, or current Council policies.

Introducing a water quality device at this location may be effective in improving water quality values in Eprapah Creek, however given the relatively small contributing catchment to this location and the low pollutant load from established urban catchment, other stormwater projects are recommended to take precedence over this specific project.

A wetland was recommended at this location in May 2013, with an estimated cost of $1,442,477.00.

Review Outcome: Remove

3.2 SW-A-199 Wetland System

Project SW-A-199 is located on Eprapah Creek, just upstream from the Victoria Point Shopping Centre and SW-A-198 (Figure 3-2**Error! Reference source not found.**). Stormwater at this location currently discharges via pipes to a wetland system with flows than discharging into Eprapah Creek. As per SW-A-198, stormwater that discharges at this location is produced from an urbanised catchment with limited potential in pollutant load increases.

Figure 3-2 SW-A-199



Based upon aerial imagery, the current system appears to be overwhelmed with nutrients, however the actual water quality parameters within the system are unknown. Construction details of the existing system are unknown, but it appears to not contain a high flow bypass. If this is indeed the case, currently this wetland system may contribute to nutrient loading during high flow events.

As maintenance is not part of LGIP funding, it is recommended that the current wetland system is redesigned into a more appropriate configuration with a by-pass structure. Other modifications may be necessary such as conversion of this space to a bio-retention system.

The estimated cost of this system in 2013 was $2,243,426.00

Review Outcome: Retain- further investigation required

3.3 SW-A-269 Bioretention C

SW-A-269 is located within the Weinman Creek priority development masterplan area. There are no existing water quality devices noted at the location shown in Figure 3-3, but there is an ECOSOL GPT nearby to the East as shown on Council mapping.

Figure 3-3 SW-A-269



It appears that the catchments used to originally size this device are fully developed, and for the most part do not discharge to this location.

As the proposed device is located within a priority development area with both medium and high-density residential development proposed, water quality targets for the development will be meet through the design of the development and a LGIP funded project could assist. Therefore, a water quality device is required. The final location and size of any proposed device will need to consider the PDA development plan to be confirmed during concept design.

The estimated cost of this device in 2013 was $89,640.00, this will change dependent on the final layout of Weinman Creek development masterplan.

Review Outcome: Retain – Final location TBC

3.4 SW-A-297 Bioretention Basin - Native Dog Creek

SW-A-297 is proposed to be located offline from Native Dog Creek. There are currently stormwater pipes that discharge at this location from urbanised upstream catchments.

Figure 3-4 SW-A-297



Implementing a water quality device at this location would be of little benefit given the upstream development has already occurred and is rural residential in nature. It is anticipated that the cost-benefit ratio may not support this project therefore this project is not recommended.

The estimated cost of this project in 2010 was $271,688.00.

Review Outcome: Retain as place holder. Value to increase to $1,6 million inline with total cost of four projects recommended by Engeny in 2013.

3.5 SW-A-304 Bioretention Basin – Thornlands

SW-A-304 is located in an existing park. Two stormwater networks pass through this location, with all upstream catchments fully developed.

Figure 3-5 SW-A-304



Given the existing infrastructure at this location and the layout any attempts to implement water quality devices at this location will require significant works to the existing infrastructure and may not even be feasible.

This project is not recommended.

The estimated cost of this project is $455,938.00 with the source of this estimate unknown.

Review Outcome: Remove

4 Projects for Removal

4.1 SW-A-294 Bioretention Basin - Native Dog Creek

Project SW-A-294 as identified below was recommended for removal during the workshop by Council. Factors contributing to this decision are that is located in an isolated spot surrounded by roads which make maintenance and access difficult.

The estimated price for this project was $446,342 in 2010.

Figure 4-1 SW-A-294



Review Outcome: Remove

4.2 SW-A-302 Bioretention Basin - Native Dog Creek

As per SW-A-294, project SW-A-294 as identified below was recommended for removal during the workshop by Council. Factors contributing to this decision are that is located in an isolated spot surrounded by roads which make maintenance and access difficult.

The estimated price for this project was $455,938 in 2010.

Figure 4-2 SW-A-302



Review Outcome: Remove

4.3 SW-A-303 Bioretention Basin - Native Dog Creek

As per SW-A-294 and SW-A-294, project SW-A-303 as identified below was recommended for removal during the workshop by Council. Factors contributing to this decision are that is located in an isolated spot surrounded by roads which make maintenance and access difficult.

The estimated price for this project was $455,938 in 2010.

Figure 4-3 SW-A-303



Review Outcome: Remove

4.4 SW-L-15 Cleveland Water Quantity – Channel Street

SW-L-15 was identified during the workshop for removal with the reasons being that it is problematic in design, this location is also not noted in regard to significant number of complaints registered. The estimated budget for this project was $474,000 in 2019.

Figure 4-4 SW-L-15



Review Outcome: Remove

4.5 SW-L-X Cleveland Water Quantity - Island Street

As per SW-L-X was identified during the workshop for removal with the reasons being that it is problematic in design, this location is also not noted in regard to significant number of complaints registered. The estimated budget for this project was $831,000 in 2019.

Figure 4-5 SW-L-X



Review Outcome: Remove

5 Updated Costing for Projects

Using the originally established pricing of infrastructure from 2016 as a baseline, the cost of projects has been updated to current estimates for the year 2022. This has been achieved through the application of indexation and PPI to reflect the change in cost of construction over time. It should be noted that projects SW-A 262, 258 and 297 are placeholder projects that represent multiple projects in their respective catchment location with the estimated cost in 2016 representing a single asset and the cost in 2022 representing multiple assets. The below cost estimates will be subject to confirmation upon detailed design of the works required and the actual devices implemented.

Mapping for all assets is contained in the appendices.

Table 5-1 Updated Cost Estimate

ID	Name	Location	Estimated Cost (2016)	Year of Initial Fee Estimate	RCC Project	Contributed asset	Estimated Cost (2022)
SW-A-262	Bioretention	Weinam Creek	$439,965	2013	Yes	No	$1,493,168
SW-A-199	Wetland System	Upper Eprapah Creek Wetland	$2,243,426	2013	Yes	No	$2,741,451
SW-A-258	Bioretention	Weinam Creek	$109,658	2013	Yes	No	$526,808
SW-A-269	Bioretention C	Weinam Creek	$89,640	2013	Yes	No	$109,539
SW-A-297	Bioretention Basin - Native Dog Creek	Native Dog Creek	$1,183,564	2010	Yes	No	$1,606,120
SW-A-249	Wetland	Lower Tingalpa Creek	$784,585	2013	Yes	No	$958,758
SW-A-250	Sediment Basin	Lower Tingalpa Creek	$253,392	2013	Yes	No	$309,643
Site 6 Option 2	Rachow - Overland Flow	Thornlands	$281,500	2021			$343,991
						Sub Total	**$8,089,479**
SW-L-17	South East Thornlands Drainage System 1 (pipes, pits & headwall)	SE Thornlands Precinct	$1,216,650.0		No	Yes	$1,486,738
SW-A-275	Wetland C (including inlet pond)	Upper Eprapah Creek	$2,400,000.0		No	Yes	$2,932,784
SW-P-16	South East Thornlands Scour	SE Thornlands Precinct	$32,000.00		No	Yes	$39,104

	Protection Works						
						Sub Total	**$4,575,347**
						Total	**$12,664,826**

6 Removed Projects

Table 6-1, below identifies those projects that have been recommended for removal from the LGIP program.

Table 6-1 Projects identified for removal

ID	Name	Establishment Cost	RCC Project	Developer Contributed Asset
SW-A-294	Bioretention Basin - Native Dog Creek	$446,342	Yes	No
SW-A-302	Bioretention Basin - Native Dog Creek	$455,938	Yes	No
SW-A-303	Bioretention Basin - Native Dog Creek	$455,938	Yes	No
SW-L-15	Cleveland Water Quantity -	$474,000	Yes	No
SW-L-X	Cleveland Water Quantity -Island Street	$831,000	Yes	No
SW-A-198	Wetland System – Eprapah Creek	$1,442,447	Yes	No
SW-A-304	Bioretention Basin - Thornlands	$455,938	Yes	No
SW-A-305	Bioretention Basin C – Kinross Road Precinct	$210,243	No	Yes
SW-P-8	Kinross GPT D – Kinross Road Precinct	$71,172	No	Yes
SW-A-279	Bioretention Basin D – Kinross Road Precinct	$814,032	No	Yes
SW-A-287	Detention Basin - Kinross Road Precinct	$691,578	No	Yes
SW-P-26	Kinross GPT J – Kinross Road Precinct	$51,376	No	Yes
SW-A-306	Bioretention Basin J – Kinross Road Precinct	$772,090	No	Yes
SW-A-201	Bioretention Basin System – Eprapah Creek	$306,549.00	No	Yes
SW-A-202	Bioretention Basin System – Eprapah Creek	$693,582.00	No	Yes

7 Conclusion

Cardno has conducted a review of identified projects within the RCC LGIP program. This review was conducted alongside RCC staff with input from both parties. Resulting from this review, a number of LGIP projects have been recommended for removal due to being unnecessary, unviable, and located in sub-optimal locations. Costing for those projects that remain in the program has been updated to the year 2022.

APPENDIX A

PROJECT LOCATIONS

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LGIP Review

Project Locations

SW-A-250
SW-A-249
SW-L-X
SW-L-15
SW-A-304
SW-A-XX
SW-A-199
SW-A-198
SW-A-269
SW-A-268
SW-A-267
SW-A-258
SW-A-266
SW-A-302
SW-A-297
SW-A-303
SW-A-294

Legend

- Projects to Progress
- Projects For Review
- Projects to Add
- Projects For Removal

Metromap 20220406

Figure 0

1:70,000 Scale at A3

0 1.5 3 km

N

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Map Produced by Flooding and Coastal (2304)
Date: 2022-4-7| Project: LGIP Review
Coordinate System: GDA94 / MGA zone 56
Map: LGIP_Review.qgz

APPENDIX

B

DETAILED PROJECT LOCATION

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LGIP Review

Project Locations

Legend

- Projects to Progress
- QLD_Road_Centreline

Metromap 20220406

Figure 1

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations

Legend

- Projects to Progress
- Watercourse_lines
- QLD_Road_Centreline

Metromap 20220406

Figure 2

1:500 Scale at A3

0 10 20 m

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LGIP Review

Project Locations

Legend

- Projects to Progress
- Watercourse_lines
- QLD_Road_Centreline

Metromap 20220406

Figure 3

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations

Legend

- Projects to Progress
- Watercourse_lines
- QLD_Road_Centreline

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Figure 4

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations



Legend

- Projects to Progress
- Watercourse_lines
- QLD_Road_Centreline

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Figure 5

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations

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- Projects to Progress
- Watercourse_lines
- QLD_Road_Centreline

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Figure 6

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations

Legend

- Projects For Review
- QLD_Road_Centreline

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Figure 7

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations

Legend

- Projects For Review
- Watercourse_lines
- QLD_Road_Centreline

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Figure 8

1:500 Scale at A3

0 10 20 m

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Project Locations

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- Projects For Review
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Figure 9

1:500 Scale at A3

0 10 20 m

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LGIP Review

Project Locations



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- Projects For Review
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Figure 10

1:500 Scale at A3

0 10 20 m

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Map: LGIP_Review.qgz



LGIP Review

Project Locations

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- Projects For Review
- QLD_Road_Centreline

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Figure 11

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations

Legend

Projects to Add

Metromap 20220406

Figure 12

1:500 Scale at A3

0 10 20 m

N

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Map: LGIP_Review.qgz



LGIP Review

Project Locations

Legend

- Projects For Removal
- QLD_Road_Centreline

Metromap 20220406

Figure 13

1:500 Scale at A3

0 10 20 m

N

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Map: LGIP_Review.qgz



LGIP Review

Project Locations

Legend

- Projects For Removal
- QLD_Road_Centreline

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Figure 14

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations

Legend

- Projects For Removal
- QLD_Road_Centreline

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Figure 15

1:500 Scale at A3

0 10 20 m

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LGIP Review

Project Locations



Legend

- Projects For Removal
- Watercourse_lines
- QLD_Road_Centreline

Metromap 20220406

Figure 16

1:500 Scale at A3

0 10 20 m

N

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LGIP Review

Project Locations

Legend

- Projects For Removal
- Watercourse_lines
- QLD_Road_Centreline

Metromap 20220406

Figure 17

1:500 Scale at A3

0 10 20 m

N

Cardno

Map Produced by Flooding and Coastal (2304)
Date: 2022-4-8| Project: LGIP Review
Coordinate System: GDA94 / MGA zone 56
Map: LGIP_Review.qgz

APPENDIX

C

COSTING TABLE PROJECTS

Cardno

now

Stantec

LGIP Review

Council Contributed Assets

Legend

- Council_Contributed_Assets
- QLD_Road_Centreline

Metromap 20220406

SW-A-249
SW-A-250
SW-A-Rachow
SW-A-199
SW-A-269
SW-A-258
SW-A-297
SW-A-262

GELDART ROAD
CYCLEPATH
CLEVELAND NORTH STRADBROKE FERRY
SUMMIT STREET
PIONEER ROAD
DUNCAN ROAD
KLOSKE ROAD
EPRAPAH ROAD
REDLAND BAY NORTH STRADBROKE FERRY
FORD ROAD
AVALON ROAD
TRACK
DOUBLE JUMP ROAD
GILES ROAD
GILES ROAD
PATH
BOGGY LOOP
TRACK
GERMAN CHURCH ROAD
REDLAND BAY ISLANDS FERRY
PATH
PRIVATE ROAD
TRACK
TRACK
TRACK
PROPOSED ROAD
PATH
TRACK
PROPOSED ROAD
PROPOSED ROAD
PATH

FIGURE 2

1:65,000 Scale at A3

0 1,500 3,000 m

N

Cardno

Map Produced by Flooding and Coastal (2304)
Date: 2022-5-18| Project: LGIP Review
Coordinate System: GDA94 / MGA zone 56
Map: LGIP_Review.qgz

LGIP Review

Developer Contributed Assets

Legend

- Developer Contributed Assets
- QLD_Road_Centreline

Metromap 20220406

SW-L-17
SW-P-16
SW-A-275
SW-A-272

DINWOODIE ROAD
BOUNDARY ROAD
KIAMA CIRCUIT
SEAFORTH AVENUE
FINLANDIA VILLAGE REST HOME ACCESS
KALBARRIE TERRACE
LUNGREN DRIVE
AJINBY CLOSE
THORNTON DRIVE
CASASOLA PLACE
EDINA STREET
BEVERIDGE ROAD
CLEVELAND REDLAND BAY ROAD
ABEYA STREET
MANGO PLACE
LUKE STREET
KODAK CLOSE
COLBURN AVENUE
HIGH STREET
PRIVATE ROAD

FIGURE 3

1:5,000 Scale at A3

0 100 200 m

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Coordinate System: GDA94 / MGA zone 56
Map: LGIP_Review.qgz

LGIP Review

Deleted Developer Contributed Assets

Legend

- Deleted Developer Contributed Assets
- QLD_Road_Centreline
- Cadastre

Metromap 20220406

FIGURE 4

1:25,000 Scale at A3

0 500 1,000 m

Cardno

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Coordinate System: GDA94 / MGA zone 56
Map: LGIP_Review.qgz