Transport Report

Pitt Town Subdivision

20 July 2006

Prepared for

Johnson Property Group

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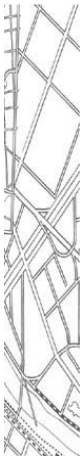

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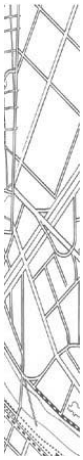
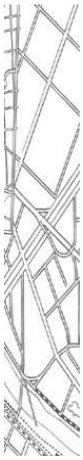


Contents



1. Introduction

1.1 Overview of the Pitt Town Subdivision Development Proposal

The Pitt Town Local Environmental Study (LES) prepared by Connell Wagner in 2003 identified Pitt Town as an area with urban development potential.

The LES considered various growth scenarios, namely:

- Low growth: 495 lots
- Medium growth: 710 – 730 lots
- High growth: 1,405 lots

The Pitt Town DCP (2004) and subsequent amendment to the Pitt Town LEP have been prepared on the basis of a development yield of 630 additional residential lots plus some community facilities.

The yield of 630 lots would be additional to the existing 60 lots within the Pitt Town LEP area.

The Pitt Town TMAP 2005 and subsequent investigations by the Roads and Traffic Authority (RTA) identified the transport implications of a development proposal consisting of 630 residential lots and developed a package of transport infrastructure improvements required to support the development.

Implementation of the package of transport infrastructure improvement works will significantly improve the capacity of the surrounding road network.

Given the improved capacity of the surrounding road network the potential to increase the development yield within Pitt Town has been identified.

It is proposed that the development yield with the Pitt Town LEP area be increased from 630 additional residential lots to 1,250 additional lots.

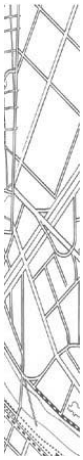
1.2 Purpose of this Study

Masson Wilson Twiney Pty Limited (MWT) has been commissioned by the Johnson Property Group to investigate the transport implications of an increased development yield within the Pitt Town LEP area from 630 residential lots to 1,250 residential lots.

For the purpose of these investigations, MWT have adopted the assumptions as presented in the Pitt Town TMAP 2005 prepared by Christopher Stapleton Consulting with regard to:

- traffic generation;
- trip containment;
- traffic distribution; and
- background (non development) traffic flows.

The primary purpose of these investigations is to determine if the package of road network improvements works as identified by the RTA is sufficient to accommodate the increased Pitt Town residential lot yield (+1,250 lots) or if additional works are required.



2. Background to Previous Transport Studies

Various transport investigations have been undertaken as part of the planning process for urban development in Pitt Town. A summary of the key documents is provided below.

2.1 Pitt Town Local Environmental Study (April 2003)

This study prepared by Connell Wagner Pty Ltd for Hawkesbury City Council considered, as part of broader environmental investigations, the transport implications of low, medium and high urban growth scenarios for Pitt Town.

The study identified the following key findings:

- Bathurst Street carrying capacity was a potential constraint to the amount of development. The high and potential medium growth scenarios would require the provision of a second site access road to Cattai Road in order to maintain satisfactory levels of service along Bathurst Street.

- For the high growth scenario it was assumed that Pitt Town Road between Wolseley Road at McGraths Hill and Windsor Road will need to be widened.

- Capacity improvements required at the Windsor Road / Pitt Town Road intersection. The level of capacity improvements required would depend upon the growth scenario adopted and the construction of the Windsor Flood Evacuation Route.

- Capacity improvements along Windsor Road between Pitt Town Road and Macquarie Street may be required to accommodate Pitt Town residential development and other planned developments in the area.

In summary, the LES concluded that, subject to the provision of appropriate road network improvements, traffic related issues would not constitute a constraint on any of the growth scenarios for Pitt Town.

2.2 Pitt Town LES – Preliminary Transportation Assessment (November 2003)

This study was prepared by Christopher Stapleton Consulting Pty Ltd for Hawkesbury City Council to examine the access and traffic issues associated with the development as described in the Pitt Town LES.

The study was prepared on the basis of a development yield of 690 lots.

The report highlighted the need to implement intersection improvements at:

- Bathurst Street / Chatham Street
- Cattai Road / Mitchell Road
- Pitt Town Road / Windsor Road
- Windsor Road / Mulgrave Road (if planned Windsor Road upgrade was not implemented)

The report concluded that "*Christopher Stapleton Consulting Pty Ltd does not believe that there are any significant accessibility or traffic issues which would prevent the development from occurring in its current form*".

2.3 Pitt Town TMAP 2005 (Draft March 2005)

This study prepared by Christopher Stapleton Consulting Pty for Hawkesbury City Council undertook further traffic and transport investigations as part of a TMAP process for a development yield of 630 additional residential lots.

In summary the TMAP recommended that Council and where appropriate the RTA, seek appropriate contributions to fund the recommended road improvements required to accommodate the additional traffic generated by the Pitt Town urban development, namely:

- Windsor Road / Pitt Town Road intersection improvements
- Cattai Road / Mitchell Road / Pitt Town Dural Road intersection improvements
- Construction of the Pitt Town Bypass or intersection improvements at Bathurst Road / Chatham Street intersection.
- New internal roads designed as per the DCP

2.4 RTA Correspondence to DIPNR (27 May 2005)

This correspondence was prepared by the RTA to:

- Identify the extent of road improvement works required to accommodate the additional Pitt Town development together with other traffic needs in the area;
- Estimate the cost of road improvement works; and
- Determine appropriate apportionment of costs to the Pitt Town development.

The RTA identified the following required road upgrades and costs (in 2005 dollars) associated with the Pitt Town development:

• Pitt Town Bypass	$ 12.1M
• Windsor Road Upgrade (between Pitt Town Road and Macquarie Street)	$ 18.0M
• Upgrade Cattai Road / Mitchell Road Intersection	$ 1.7M
• Upgrade Pitt Town Road Shoulders	$ 11.2M
• Upgrade 5 x Pitt Town Road Intersections	$ 1.7M
	$ 44.7M

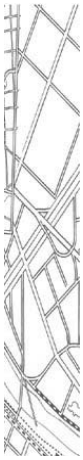
Of this total cost of works, the RTA estimated that the development should contribute a total of $19.6M to the above works. This is an apportionment of approximately 44% (or $31,100 per lot based on 630 additional lots).

The RTA indicated that contributions should be allocated to 'whole projects' on a priority basis with the Pitt Town Bypass considered the first priority project.

It is understood that the RTA subsequently revised the advice of their 27 May 2005, making the Upgrade Pitt Town Road Shoulders the first priority project, this is reflected in the recently exhibited Planning Agreement between the Minister For Planning and Johnson Property Group.

The RTA has thus established an arrangement under which development of the Pitt Town LEP area can occur subject to the provision of road network improvements.

The following sections of this report examine the potential for the identified works to serve the additional development in Pitt Town now proposed.



3. Development Proposal

3.1 Overview of Proposed Development

It is proposed to capitalize on spare traffic capacity arising from the road improvements necessitated by the already rezoned 630 lot capacity and other traffic needs to provide more residential lots in Pitt Town. This would allow the very high cost of providing the necessary road improvements to be spread over more development thus improving the affordability of the new housing that would result.

With an existing 60 lots within the Pitt Town LEP area, the proposal seeks to increase the total number of lots within the LEP area from the approved existing and additional (690 lots) to a total of 1,310 lots.

A proposed development yield of an additional 1,250 lots would represent a yield greater than the medium growth scenario but less than the high growth scenario considered by the LES (2003) prepared by Connell Wagner.

The increased lot yield would be obtained by primarily increasing lot densities within the Pitt Town LEP area.

The internal road network and road connections to the external road network would remain primarily unchanged from the approved LEP.

As previously proposed, existing road connections to Cattai Road / Pitt Town Road would be provided at:

- Bathurst Street;
- Buckingham Street;
- Bootles Lane; and
- Mitchell Road.

In addition to the above, a potential 'emergency vehicle only' access has been identified along Cattai Road between Mitchell Road and Canning Place. This

'emergency vehicle only' access would provide access to the north-eastern precinct within the Pitt Town LEP area.

3.2 Traffic Generation

In order to be consistent with the Pitt Town TMAP 2005 and Pitt Town LES the following assumptions have been used with regard to traffic generation for the proposed lot yield:

- High Generation Scenario = 9.0 trips / lot (dwelling) / day
  = 0.85 trips / lot (dwelling) / weekday peak hour

- Internal Trip Containment = 10% of trips contained within the site

As stated in the Pitt Town TMAP 2005, these assumptions are conservative and represent the worst case scenario with regard to traffic generation.

The traffic generation estimates for the proposed development are provided in Table 1.

Table 1 – Proposed Development Traffic Generation

	Approved LEP (+ 630 lots)		Proposed Development (+ 1250 lots)	
	Daily Traffic (vpd)	**Peak Hour (vph)**	**Daily Traffic (vpd)**	**Peak Hour (vph)**
Traffic Generation Rate	9.0 trips / lot	0.85 trips / lot	9.0 trips / lot	0.85 trips / lot
Total Traffic Generation	5,670	536	11,250	1,063
Less 10% internal trip containment	567	54	1,125	106
Total External Trips	**5,103**	**482**	**10,125**	**957**

A comparison of the estimated proposed development traffic generation with the traffic generation scenarios considered in the Pitt Town LES (2003) is presented in Table 2.

Table 2 – Comparison of Traffic Generation for Development Scenarios

Development Scenario	Lots	Daily Traffic Generation (vpd)	Peak Hour Traffic Generation (vph)
Low Growth (LES)	495	4455	420
Medium Growth (LES)	710-730	6,390-6,570	604-620
Proposed Development (+1250 lots)	1,250	11,250	1,063
High Growth (LES)	1405	12,645	1,194

Thus the traffic generation of the proposed 1,250 additional lots would be below the maximum which the LES determined could be satisfactorily accommodated (subject to appropriate road works).

3.3 External Traffic Distribution

The traffic distribution presented in the Pitt Town TMAP 2005 has been used in the analysis the proposed lot yield increase.

The distribution used is as follows:

- 60% of trips to and from the north via Pitt Town Road and Windsor Road;
- 25% of trips to and from the south via Pitt Town Road and Windsor Road;
- 5% of trips to and from the east via local roads (Pitt Town Dural Road / Schofield Road / Saunders Road; and
- 10% of trips to and from the west via Pitt Town Road and Windsor Road.

It is also assumed that the arrival / departure profile for external trips would be 40% arrival and 60% departure in the morning peak period and reverse for the afternoon peak period. This is consistent with the Pitt Town TMAP 2005.

3.4 Assignment of Additional External Traffic Generation

Based on the assumed traffic distribution estimated external traffic generation has been assigned to the external road network.

The assignment of additional external traffic to the external road network is summarised in Table 3.

Table 3 – Assignment of Proposed External Traffic Generation (+1,250 lots)

Road	Location	Additional Peak Hour Traffic Flow (veh / hr)
Cattai Road	Nth of Canning Place	24
Pitt Town Road	Between Bathurst St & Schofield Rd	933
Pitt Town Road	East of Windsor Rd	909
Windsor Road	Nth of Pitt Town Road	670
Windsor Road	Sth of Pitt Town Rd	239

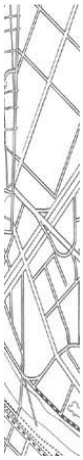
3.5 Identified External Road Network Improvement Works

As a minimum, the road network improvement works identified by the RTA correspondence will be required to facilitate the ultimate development of the Pitt Town LEP area.

These works are as follows:

- Pitt Town Bypass;
- Windsor Road Upgrade (between Pitt Town Road and Macquarie Street);
- Upgrade Cattai Road / Mitchell Road Intersection;
- Upgrade Pitt Town Road Shoulders; and
- Upgrade 5 x Pitt Town Road Intersections.

These works have been included in the traffic assessment of a yield scenario of an additional 1,250 residential lots.



4. Assessment of Traffic Impact

4.1 Existing Conditions

The existing traffic and transport conditions as reported in the Pitt Town TMAP 2005 have been adopted in this traffic assessment of the revised development yield.

As such the traffic assessment will be generally consistent with the findings of the Pitt Town TMAP 2005 and allow for a comparison of the traffic implications of the proposed development scenario (+1,250 lots) versus the 630 additional residential lot scenario.

4.2 Future Traffic Flows

4.2.1 Pitt Town Road and Cattai Road

As discussed in Section 3, traffic generated by the proposed development will predominately be distributed to Cattai Road (assuming the Pitt Town Bypass is constructed) and Pitt Town Road to access the regional road network.

The RTA provided traffic forecasts to Connell Wagner as part of the input to the modelling undertaken for the Pitt Town TMAP 2005 and subsequently as part of the apportionment calculations for road network improvement works.

The RTA base case (ie. no development) forecasts are shown in Table 4 and Table 5.

The base case forecasts are compared with the additional proposed development traffic flows for these roads.

Table 4 – Cattai Road: Estimated Traffic Flows with Proposed Development (Two Way)

	2002 [1.]	Forecast 2006 [1.] No Development	Development Traffic (+1,250 lots) [2.]	Total Traffic (2006)
AM Peak 1 Hour (2 Way)	225	253	933	1,186
AM Peak 1 Hour (1 Way)	191	215	560	775

Notes: 1. Sourced from RTA correspondence 27/5/05
2. Assumes 100% development traffic accesses Pitt Town Road via Cattai Rd and not Bathurst St

Table 5 – Pitt Town Road (north of Windsor Road) Estimated Future Traffic Flows with Proposed Development (Two Way)

	2016 Without Development	Development Traffic (+1,250 lots)	Total Traffic (2016)
AM Peak 1 Hour (1 Way)	664	545	1,209

Notes: 1. Sourced from Pitt Town TMAP 2005
2. North of Windsor Road intersection

The recently exhibited Planning Agreement between the Minister for Planning and Johnson Property Group identified the upgrading of road shoulders along Pitt Town Road as the first priority project.

The upgrading works include the provision of a 3.5 metre wide travel lane and a 2.0 metre wide sealed shoulder in each direction along Pitt Town Road. These works will significantly increase the effective mid block road capacity of Pitt Town Road.

Based on Austroad guidelines the uninterrupted traffic lane capacity for Pitt Town Road would be increased from approximately 1,180 to 1,550 vehicles one way (one lane) per hour. This includes the assumption that approximately 11% of total vehicles are heavy vehicles (Pitt Town TMAP 2005, Section 3.2.4)

These mid block road capacity improvements would also be applicable to Pitt Town Bypass when it is constructed.

The estimated future traffic flows (see Table 5) indicate that the Pitt Town Road upgrade and the Pitt Town Bypass / Cattai Road would have sufficient capacity to accommodate future traffic associated with the Pitt Town development. (One way flow of 1209 veh/hr verses one way capacity of 1550 veh/hr).

As such predicted future traffic flows along Pitt Town Road for 2016 with an additional 1,250 lots would be within the capacity provided by the planned improvement works as specified by the RTA.

Notwithstanding the above, it is noted that capacity constraints are typically associated with intersection operation. The package of road network improvement works identified by the RTA and included in the recent Planning Agreement between the recently exhibited Planning Agreement between the Minister for Planning and

Johnson Property Group also includes upgrade works at 5 separate intersections along Pitt Town Road.

It is considered that the Pitt Town Road upgrade works will increase capacity sufficiently to accommodate future traffic flows along Pitt Town Road generated by the proposed development in Pitt Town LEP area.

In support of this it is noted that with the increase in the number of lots in Pitt Town it is highly likely that an associated increase in support facilities and services would lead to greater containment of trips and thus the traffic forecasts provided in Table 4 and Table 5 are likely to be conservatively high.

4.2.2 Pitt Town Town Centre Roads

The Pitt Town LES and TMAP 2005 identify the capacity and amenity constraints of the existing Pitt Town town centre road network.

In particular, Bathurst Street, Chatham Street and Eldon Street were identified as sensitive streets with regard to additional traffic flow.

The Pitt Town TMAP 2005 indicated that the existing Pitt Town town centre road network, with minor upgrades at intersections to improve safety, could satisfactorily accommodate the additional traffic generation associated with an increased yield of 630 residential lots without the provision of the Pitt Town Bypass.

However, the construction of the Pitt Town Bypass will significantly reduce existing through traffic movements along these roads.

While it is acknowledged that some traffic generated by the proposed development (1,250 lots) will utilise these existing town centre roads, it is considered that there will be a negligible net change in traffic flows on these roads following construction of the Pitt Town Bypass.

The traffic analysis presented in this report indicates that the construction of the Pitt Town Bypass is an important project within the context of the proposed additional yield of 1,250 lots in the Pitt Town LEP area.

To minimise the potential impacts on the existing Pitt Town town centre it is recommended that the Pitt Town Bypass be constructed as the as the next priority project, following the Pitt Town Road shoulder upgrade and intersection works.

Furthermore, the Pitt Town TMAP 2005 and associated draft Section 94 Plan has identified local road and intersection works associated with the additional 630 lot yield scenario. These works are still considered valid as they address safety issues and would accommodate the proportion of proposed development (+1,250 lots)

traffic that would use the town centre rather than the Pitt Town Road Bypass to access Pitt Town / Cattai Road.

4.3 Intersection Analysis

4.3.1 Cattai Road /Mitchell Road / Pitt Town Dural Road

The operation of the Cattai Road / Mitchell Road / Pitt Town Dural Road was analysed using the aaSIDRA intersection modelling software. The results of the intersection analysis are compared with the predicted future intersection operation for the +630 residential lot scenario as presented in the Pitt Town TMAP 2005.

The base case (ie. 2016 with no Pitt Town development) traffic flows at each of the analysed intersection have been sourced from the Pitt Town TMAP 2005.

The intersection has been modelled with the intersection configuration proposed in the Pitt Town TMAP 2005.

The results of the analysis are presented in Table 6.

Table 6 - Cattai Rd / Mitchell Rd / Pitt Town Dural Rd Intersection Operation (2016)

	2016 with +630 lots		2016 with + 1250 lots	
	AM Peak	**PM Peak**	**AM Peak**	**PM Peak**
Level of Service	A	A	C	C
Degree of Saturation	0.08	0.07	0.55	0.58
Average Vehicle Delay (sec/veh) Worst Movement	10.9	10.9	18.7	20.1

The analysis presented in Table 6 indicates that the Cattai Road / Mitchell Road / Pitt Town Dural Road would operate satisfactorily with the proposed development yield scenario of +1250 residential lots.

4.3.2 Windsor Road / Pitt Town Road

This intersection was not included in the RTA's package of road network improvement works to accommodate the +630 lot yield scenario.

With the construction of the Windsor Flood Evacuation route as planned, the through traffic flows along Windsor Road at the Pitt Town Road intersection are predicted to decrease in the order of 40% (*Windsor Flood Evacuation Route EIS* prepared by Connell Wagner).

The future operation (2016) of the Windsor Road / Pitt Town Road intersection was modelled as part of the Windsor Flood Evacuation Route EIS. The results are summarised in Table 7.

Table 7 – Windsor Road / Pitt Town Road Intersection Operation (2016) With Flood Evacuation Route

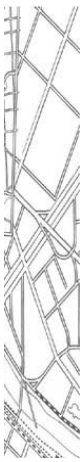
	2016 with Windsor Flood Evacuation Route	
	AM Peak	**PM Peak**
Level of Service	A	A
Degree of Saturation	0.49	0.33
Average Vehicle Delay (sec/veh)	12	10

Source: Windsor Flood Evacuation Route EIS (2002)

These results indicate that significant spare capacity would be available to accommodate the proposed residential lot yield scenario (+1250 lots) for the Pitt Town LEP area with the construction of the Windsor Flood Evacuation Route.

It is noted that the RTA has identified the upgrade of Windsor Road to 2 lanes in each direction between Pitt Town Road and Macquarie Road as one of the works required to accommodate the Pitt Town development and is seeking an apportioned contribution for these works.

On the basis of the works identified by the RTA to accommodate the +630 lot scenario, it can be concluded that should the Windsor Flood Evacuation Route not be constructed as planned or is delayed, development within the Pitt Town LEP area could reach an additional 630 residential lots before intersection improvement works need to be considered.

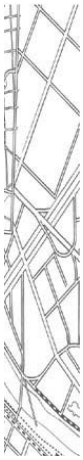


5. Public Transport Options

The Pitt Town TMAP 2005 identified the existing public transport, cycling and pedestrian conditions and future opportunities for the Pitt Town LEP area.

While it is noted that car modes (car as driver or passenger) will continue to be the predominant transport mode, the increased residential densities achieved through a lot yield increase from and additional 630 lots to an additional 1250 lots will generate additional total demand for public transport services and pedestrian / cycle facilities.

As such the financial feasibility of providing such services and facilities is increased by the proposed Pitt Town development. In this regard provision of additional development would be beneficial for public transport services in the area.



6. Road Infrastructure Improvement Works

6.1 Package of Required Road Improvement Works

The traffic analysis presented in this report has concluded that the package of regional road network improvement works identified by the RTA associated with the +630 lot yield scenario would satisfactorily accommodate a yield of +1,250 lots with the Pitt Town LEP area.

The required works are identified to be as follows:

1. Pitt Town Bypass
2. Windsor Road Upgrade (between Pitt Town Road and Macquarie Street)
3. Upgrade Cattai Road / Mitchell Road Intersection
4. Upgrade Pitt Town Road Shoulders
5. Upgrade 5 x Pitt Town Road Intersections

As part of the recently exhibited Planning Agreement between the Minister for Planning and Johnson Property Group for the development of 393 residential lots (as part of a +630 lot scenario), it was identified that works (4) and (5) were priority projects as contributions to road improvements were allocated wholly to these two projects.

Concept design plans for the Pitt Town Road intersection upgrades (5) are prepared and are provided in Appendix A.

6.2 Apportionment of Costs for Road Improvement Works with +1,250 Lots

6.2.1 RTA Apportionment Methodology

The RTA has utilised forecasted traffic flows along Cattai Road and Pitt Town Road with the +630 lot scenario to calculate the apportionment of costs for regional road network improvements attributable to development within the Pitt Town LEP area.

The forecasted traffic flows will increase along both Cattai Road and Pitt Town Road as a result of the +1,250 residential lot yield scenario.

Using the same methodology as the RTA for the +630 lot yield scenario, the apportionment of the identified improvement works to development within the Pitt Town LEP area has been calculated.

Traffic growth on both Cattai Road and Pitt Town Road associated with the Pitt Town development has been increased using the same trips / lot ratios used by the RTA.

As discussed in the following section, a number of queries about the methodology used by the RTA have been identified.

The results of the revised traffic forecasts for Pitt Town Road and Cattai Road using the RTA trip / lot ratios are shown in Table 8 and Table 9.

Table 8 – Cattai Road: Estimated Traffic Flows with +1,250 lots - RTA Method

	2002 [1.]	Forecast 2006 [1.]	Development Traffic (+1,250 lots) [2.]	Total Traffic (2006)	% Increase Due to Development
AM Peak 1 Hour (2 Way)	225	253	1052	1305	81 %
AM Peak 1 Hour (1 Way)	191	215	895	1110	81 %

Notes: 1. Sourced from RTA correspondence 27/5/05
2. Assumes 100% development traffic accesses Pitt Town Road via Cattai Rd and not Bathurst St

Table 9 – Pitt Town Road: Estimated Traffic Flows with +1,250 lots – RTA Method

	2016 Without Development	Development Traffic (+1,250 lots) 2.	Total Traffic (2016)	% Increase Due to Development
AM Peak 2 Hour (2 Way)	1,323	883	2,206	40 %
AM Peak 1 Hour (1 Way)	1,125	750	1,875	40 %

Notes: 1. Sourced from RTA correspondence 27/5/05
2. Assumes location south of Saunders Rd

The estimated cost of works defined by the RTA and the apportionment of costs attributable to the proposed development (+1250 lots) as calculated using the RTA methodology is summarised in Table 10.

Table 10 – Road Upgrade Costs & Apportionment – RTA Methodology

Road Improvement	Total Upgrade Cost	Relative Apportionment Cost		Cost Attributable to Development
	$M	81%	40%	$M
Pitt Town Bypass	8.6	6.9		6.9
Property Acquisition	3.5	2.8		2.8
Intersection - Mitchell / Cattai	1.7	1.4		1.4
Upgrade Pitt Town Rd Shoulders	8.6		3.4	3.4
Utility Adjustment	2.6		1.0	1.0
Pitt Town Rd Intersections (5)	1.7		0.7	0.7
Windsor Road Upgrade	18		7.2	7.2
Total Cost	44.7			
Total Contribution by Development (1250 lots)		11.1	12.4	23.5
Contribution / Dwelling				**$ 18,793**
Dwellings	1250			

Based on the results presented in Table 10 it is estimated that the proposed development of +1,250 lots within the Pitt Town LEP area would generate an additional $3.9M for road improvement works.

6.2.2 Issues with RTA Methodology

In preparing the revised cost apportionments for required road network improvement works, MWT have identified a number of queries regarding the methodology applied by the RTA.

This section of the report highlights these queries so as to assist in further discussions regarding cost apportionment.

i. Cattai Road - Trip Generation and Distribution

For Cattai Road, the RTA has applied a trip generation rate for the 1 hour two way of 0.85 trips / lot (assuming 630 lots). This rate was identified by the Pitt Town TMAP 2005 to be the total traffic generation per lot for the high traffic generation rate.

As such the RTA has made no allowance for trip containment which was identified in the Pitt Town TMAP 2005.

Furthermore, it assumes that all development traffic will access Cattai Road via Mitchell Road or Bootles Lane and thus not travelling through the Pitt Town town centre. If this is the case then it would negate the need for the development to contribute to local road works in the town centre as identified in the Section 94 Plan.

The AM 1 Hour 1 Way flows generated by the RTA are estimated to be 0.72 trips per lot in the peak direction. Assuming a total generation of 0.85 trips per lot and no trip containment, this represents an inbound / outbound split of 85% outbound and 15% inbound during the AM peak hour (and vice versa for the PM peak).

This is inconsistent with the Pitt Town TMAP 2005 which proposed a 60% outbound and 40% inbound split of total external traffic.

ii. Pitt Town Road - Trip Generation and Distribution

As for Cattai Road, it would appear that the RTA estimates for development generated traffic do not account for internal trips and have applied an inbound / outbound split significantly different to those used in the Pitt Town TMAP 2005.

MWT have estimated revised contributions for the Pitt Town development based on adjustments to development traffic flows resulting from the issues identified above.

The results of the estimated revised contributions are shown Table 11, Table 12 and Table 13.

Table 11 – Cattai Road: Estimated Traffic Flows with +1,250 lots – With TMAP Assumptions

	2002 [1.]	Forecast 2006 [1.]	Development Traffic (+1,250 lots) [2.]	Total Traffic (2006)	% Increase Due to Development
AM Peak 1 Hour (2 Way)	225	253	933	1186	79 %
AM Peak 1 Hour (1 Way)	191	215	560	775	72 %

Notes: 1. Sourced from RTA correspondence 27/5/05
2. Assumes 100% development traffic accesses Pitt Town Road via Cattai Rd and not Bathurst St

Table 12 – Pitt Town Road: Estimated Traffic Flows with +1,250 lots – With TMAP Assumptions

	2016 Without Development	Development Traffic (+1,250 lots) 2.	Total Traffic (2016)	% Increase Due to Development
AM Peak 1 Hour (1 Way)	1,125	545	1,670	33 %

Notes: 1. Sourced from RTA correspondence 27/5/05
2. Assumes location south of Saunders Rd

Table 13 – Road Upgrade Costs & Apportionment – With TMAP Assumptions

Road Improvement	Total Upgrade Cost	Relative Apportionment Cost		Cost Attributable to Development
	$M	72%	33%	$M
Pitt Town Bypass	8.6	6.2		6.2
Property Acquisition	3.5	2.5		2.5
Intersection - Mitchell / Cattai	1.7	1.2		1.2
Upgrade Pitt Town Rd Shoulders	8.6		2.8	2.8
Utility Adjustment	2.6		0.8	0.8
Pitt Town Rd Intersections (5)	1.7		0.6	0.6
Windsor Road Upgrade	18		5.9	5.9
Total Cost	44.7			
Total Contribution by Development (1250 lots)		10.0	10.1	20.1
Contribution / Dwelling				**$ 16,045**
Dwellings	1250			

iii. Pitt Town Road & Windsor Road Heavy Vehicle Flows

The Pitt Town TMAP 2005 identified the potential for significant increases in heavy vehicle flows along these roads. The TMAP stated:

> "*...it is important to note the heavy vehicle predictions of the RTA, which indicate the potential for significant heavy vehicle demands (in excess of 30% additional traffic) from existing operators under existing generation approvals.* " (Pitt Town TMAP 2005, Section 4.13.2)

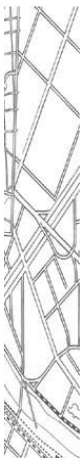
It appears that the RTA apportionment of costs has been estimated using actual vehicle flows. As such no account has been taken of existing and potential future increases of heavy vehicle flows.

Heavy vehicle flows have a significant impact on road pavement construction and maintenance and therefore costs. Furthermore, heavy vehicle flows require or take up greater road capacity given their slower vehicle speeds (particularly at intersections) and greater size.

As such a single heavy vehicle trip should be assigned a greater contribution than a single car trip. Thus it is considered that passenger car unit (PCU's) equivalents should be used in the calculations of cost apportionment.

This is particularly relevant if the proportion of heavy vehicles within the total traffic flow is significant as suggested by the Pitt Town TMAP 2005.

It is recommended that the RTA clarify the predicted proportion of heavy vehicles within the future traffic flows when undertaking contribution discussions associated with the +1,250 lot yield scenario.



7. Summary and Conclusions

The traffic analysis presented in this report indicates that the package of external road network improvement works identified by the RTA and the Pitt Town TMAP 2005 would increase the capacity of the road network surrounding the Pitt Town LEP area beyond that needed to serve the 630 additional lots proposed for Pitt Town.

The result is that the improvement works would also accommodate a lot yield scenario of an additional 1,250 lots.

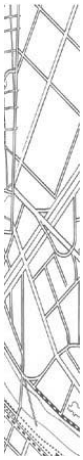
The RTA has indicated that preference should be given to completion of entire infrastructure projects rather than partial funding of a number of projects. This approach is reflected in the recently exhibited Planning Agreement between the Minister for Planning and Johnson Property Group. This approach is supported.

This agreement has established contributions to fund Pitt Town Road shoulder upgrades and intersection works (5) as identified in the RTA's package of works.

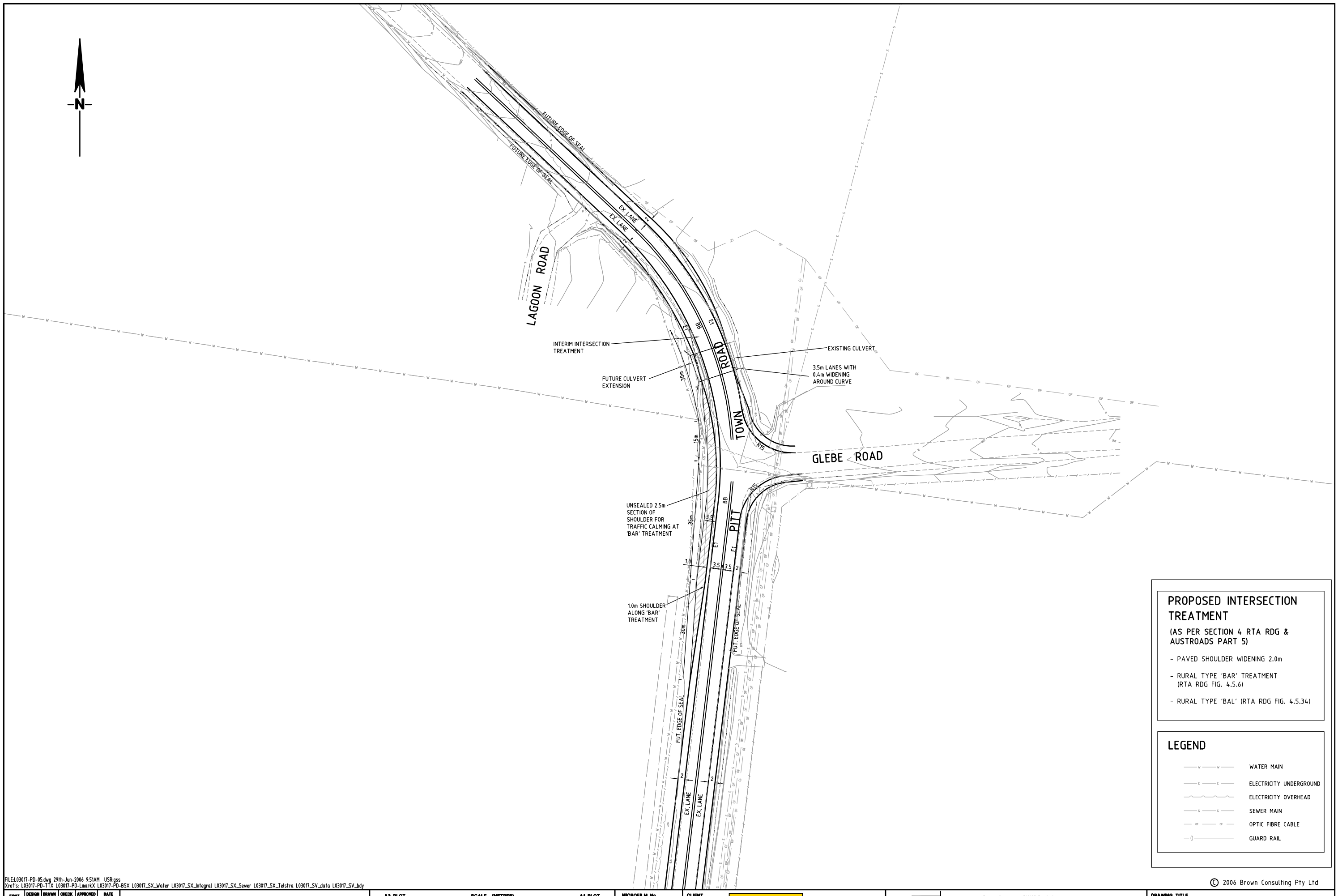
It is recommended that the next priority project be the construction of the Pitt Town Bypass which will provide significant amenity improvements to the Pitt Town town centre with the removal of existing and future through traffic flows and a proportion of traffic generated by the Pitt Town development.

The proposed increase in residential lot and thus population will increase demand for public transport services and pedestrian / cycle facilities. Increased demand will assist the viability of providing additional public transport services to Pitt Town.

The increased lot yield will increase the total contributions attributable to the development of Pitt Town, thus reducing the total amount of contributions required to be sourced from public funds or alternative private developments.



Appendix A - Pitt Town Road Intersection Upgrades – Concept Designs



PROPOSED INTERSECTION TREATMENT

(AS PER SECTION 4 RTA RDG & AUSTROADS PART 5)

- PAVED SHOULDER WIDENING 2.0m
- RURAL TYPE 'BAR' TREATMENT (RTA RDG FIG. 4.5.6)
- RURAL TYPE 'BAL' (RTA RDG FIG. 4.5.34)

LEGEND

- WATER MAIN
- ELECTRICITY UNDERGROUND
- ELECTRICITY OVERHEAD
- SEWER MAIN
- OPTIC FIBRE CABLE
- GUARD RAIL

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MICROFILM No.

PROJECT No. L03017

CLIENT Johnson Property Group

PROJECT **PITT TOWN ROAD INTERSECTION LAYOUT**

Brown Consulting (NSW) Pty Ltd Engineers & Managers
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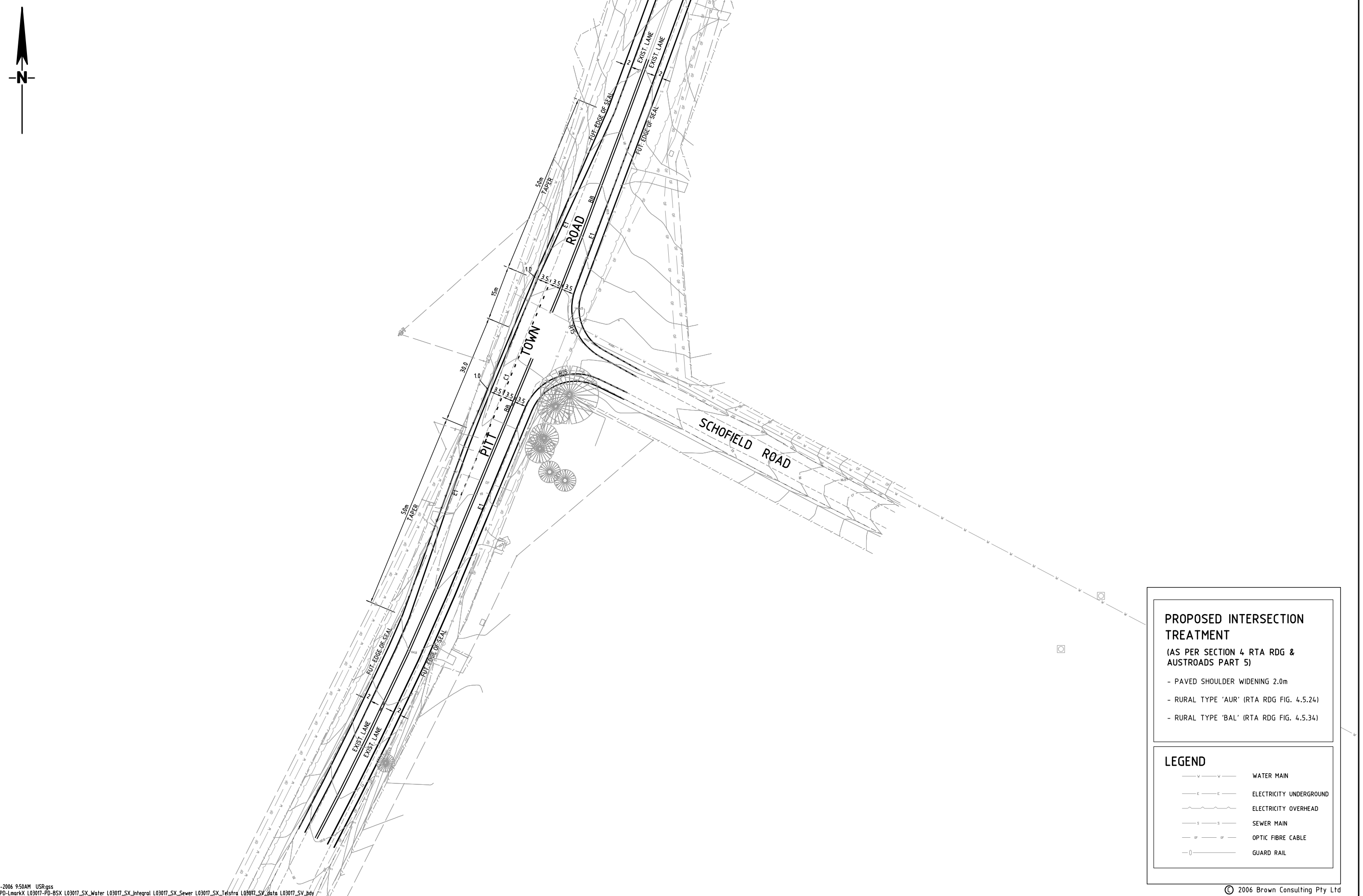
BROWN

DRAWING TITLE
LAYOUT PLAN - PITT TOWN ROAD INTERSECTION 5

DRAWING NUMBER L03017-PD-05 | 05 of 06 | Rev. 2



PROPOSED INTERSECTION TREATMENT

(AS PER SECTION 4 RTA RDG & AUSTROADS PART 5)

- PAVED SHOULDER WIDENING 2.0m
- RURAL TYPE 'AUR' (RTA RDG FIG. 4.5.24)
- RURAL TYPE 'BAL' (RTA RDG FIG. 4.5.34)

LEGEND

- WATER MAIN
- ELECTRICITY UNDERGROUND
- ELECTRICITY OVERHEAD
- SEWER MAIN
- OPTIC FIBRE CABLE
- GUARD RAIL

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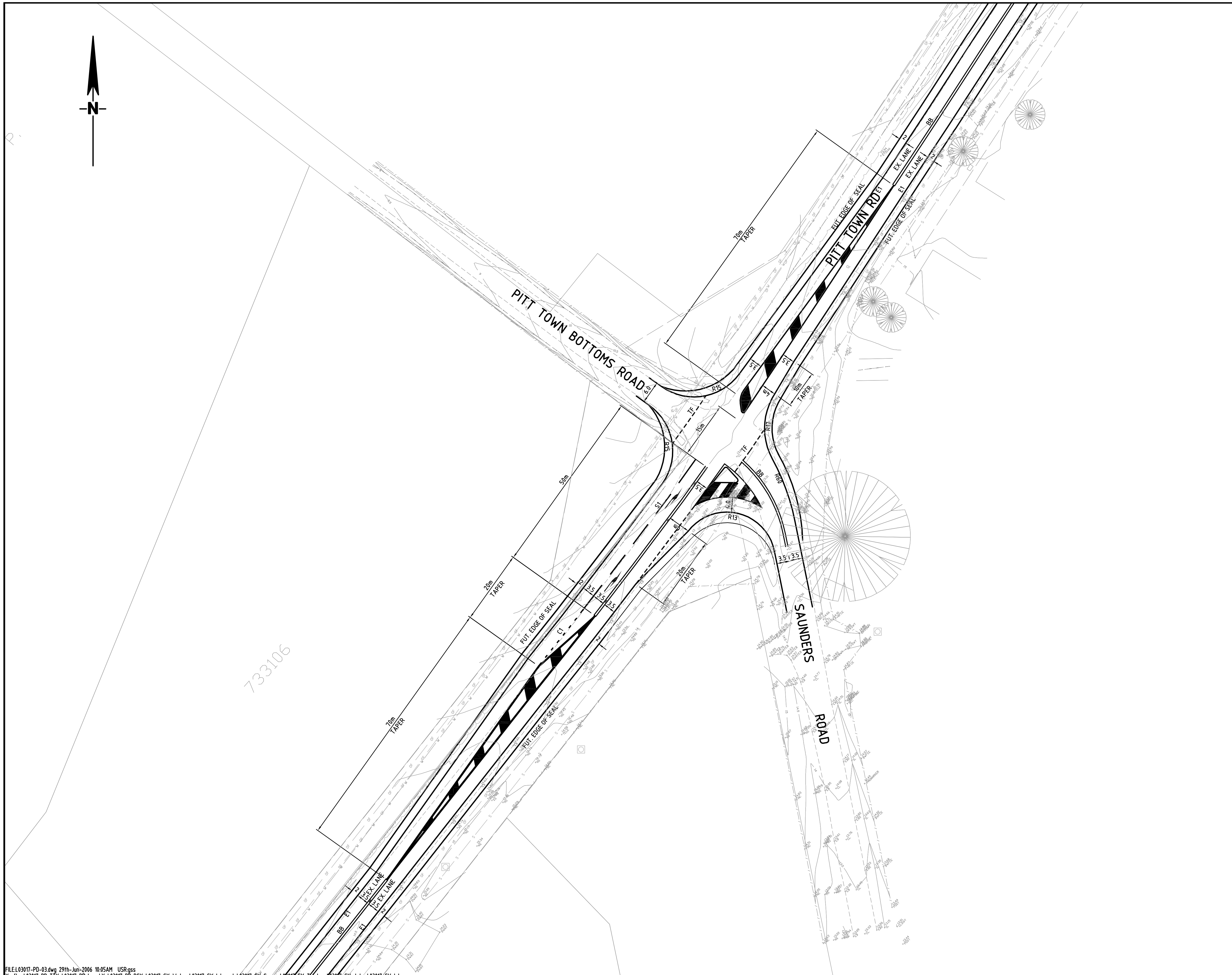

PROPOSED INTERSECTION TREATMENT

(AS PER SECTION 4 RTA RDG & AUSTROADS PART 5)

- PAVED SHOULDER WIDENING 2.0m
- RURAL TYPE 'CHR' TREATMENT (RTA RDG FIG. 4.5.6)
- RURAL TYPE 'BAL' (RTA RDG FIG. 4.5.34 & 4.5.35)
- RURAL TYPE 'CHL'

LEGEND

WATER MAIN
ELECTRICITY UNDERGROUND
ELECTRICITY OVERHEAD
SEWER MAIN
OPTIC FIBRE CABLE
GUARD RAIL

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MICROFILM No. ....

PROJECT No. L03017

CLIENT: Johnson Property Group — Creating living communities

PROJECT: **PITT TOWN ROAD INTERSECTION LAYOUT**

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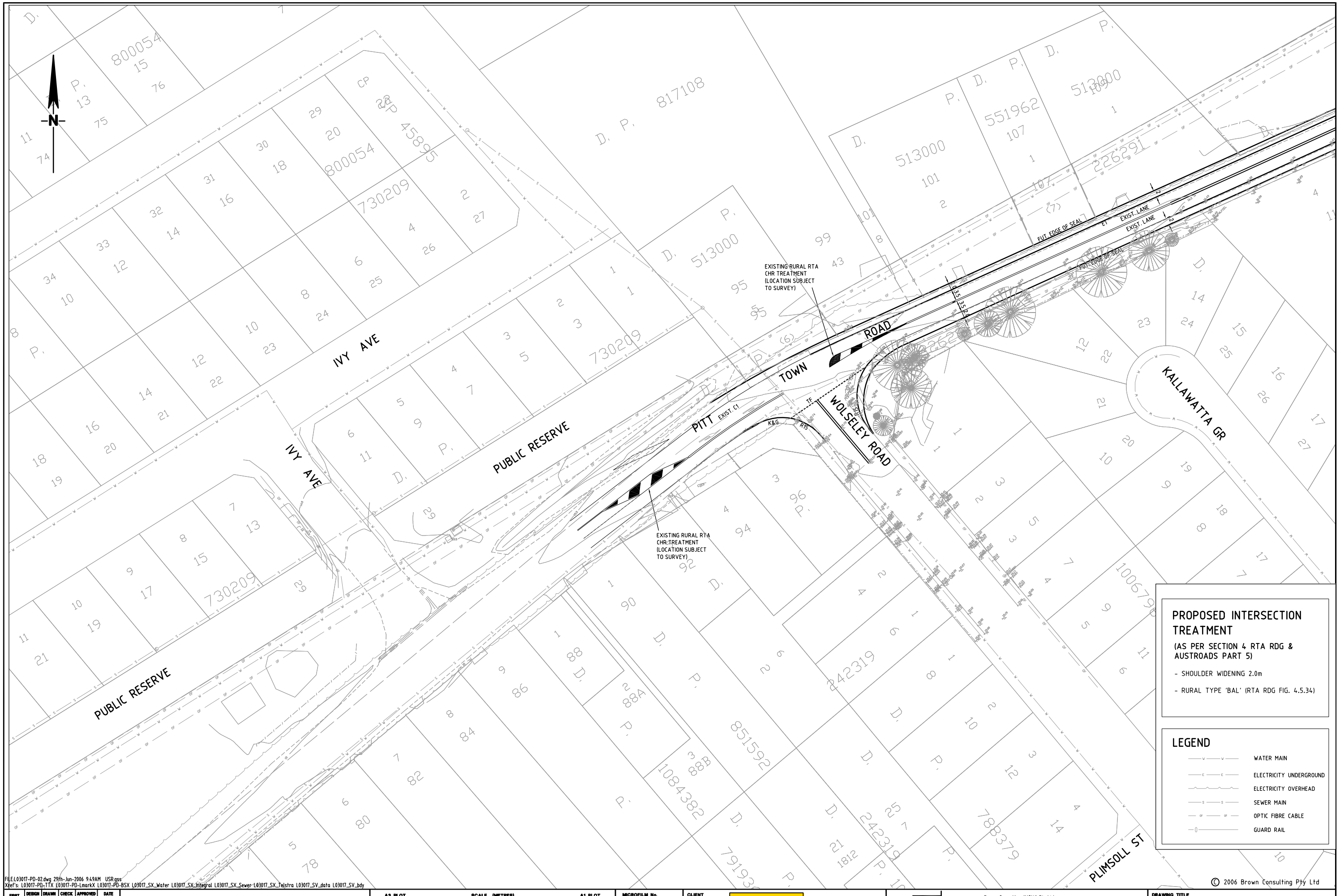

PROPOSED INTERSECTION TREATMENT

(AS PER SECTION 4 RTA RDG & AUSTROADS PART 5)

- SHOULDER WIDENING 2.0m
- RURAL TYPE 'BAL' (RTA RDG FIG. 4.5.34)

LEGEND

- WATER MAIN
- ELECTRICITY UNDERGROUND
- ELECTRICITY OVERHEAD
- SEWER MAIN
- OPTIC FIBRE CABLE
- GUARD RAIL

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MICROFILM No.

PROJECT No. L03017

CLIENT Johnson Property Group

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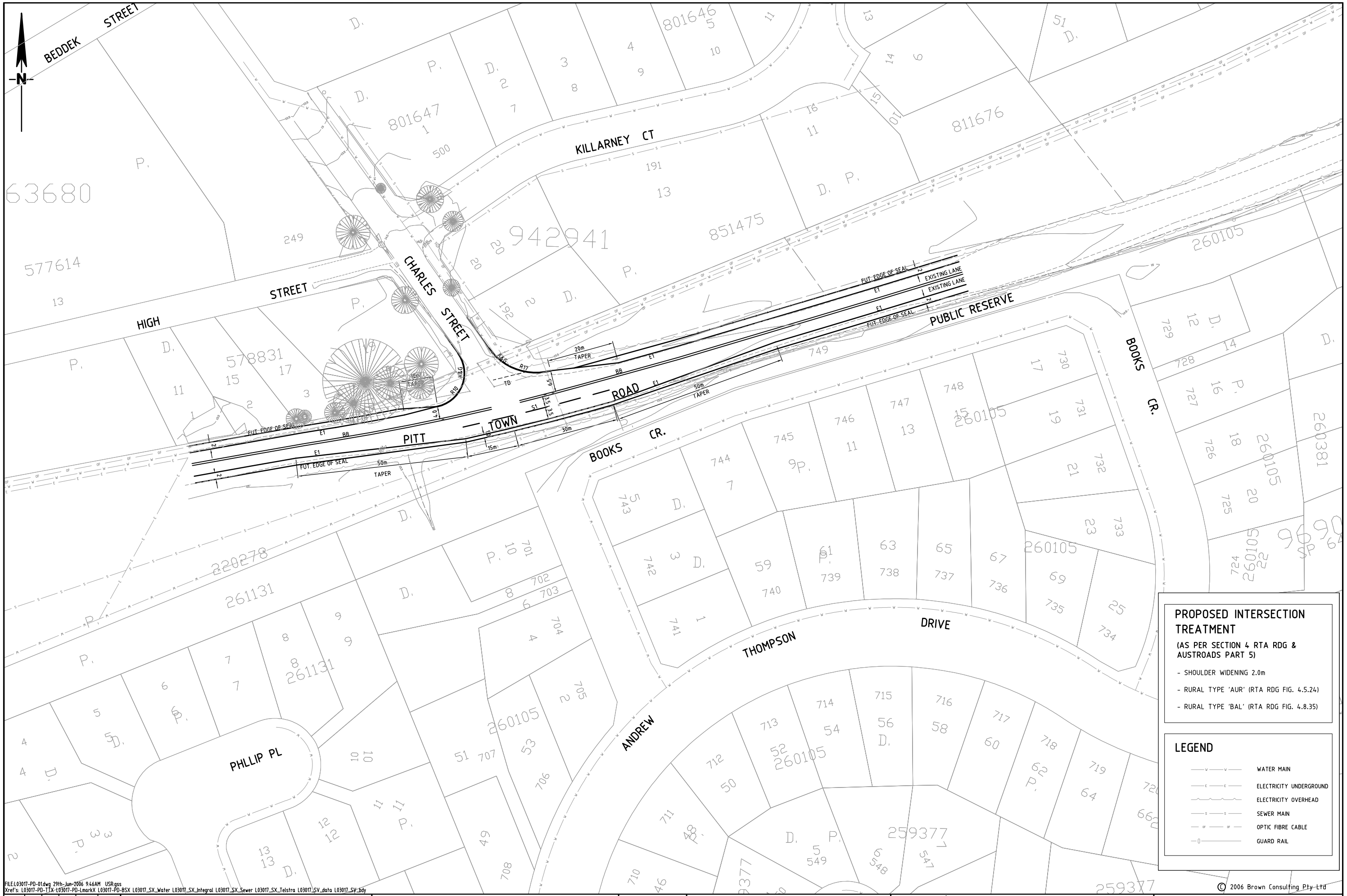

PROPOSED INTERSECTION TREATMENT

(AS PER SECTION 4 RTA RDG & AUSTROADS PART 5)

- SHOULDER WIDENING 2.0m
- RURAL TYPE 'AUR' (RTA RDG FIG. 4.5.24)
- RURAL TYPE 'BAL' (RTA RDG FIG. 4.8.35)

LEGEND

- WATER MAIN
- ELECTRICITY UNDERGROUND
- ELECTRICITY OVERHEAD
- SEWER MAIN
- OPTIC FIBRE CABLE
- GUARD RAIL

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MICROFILM No.

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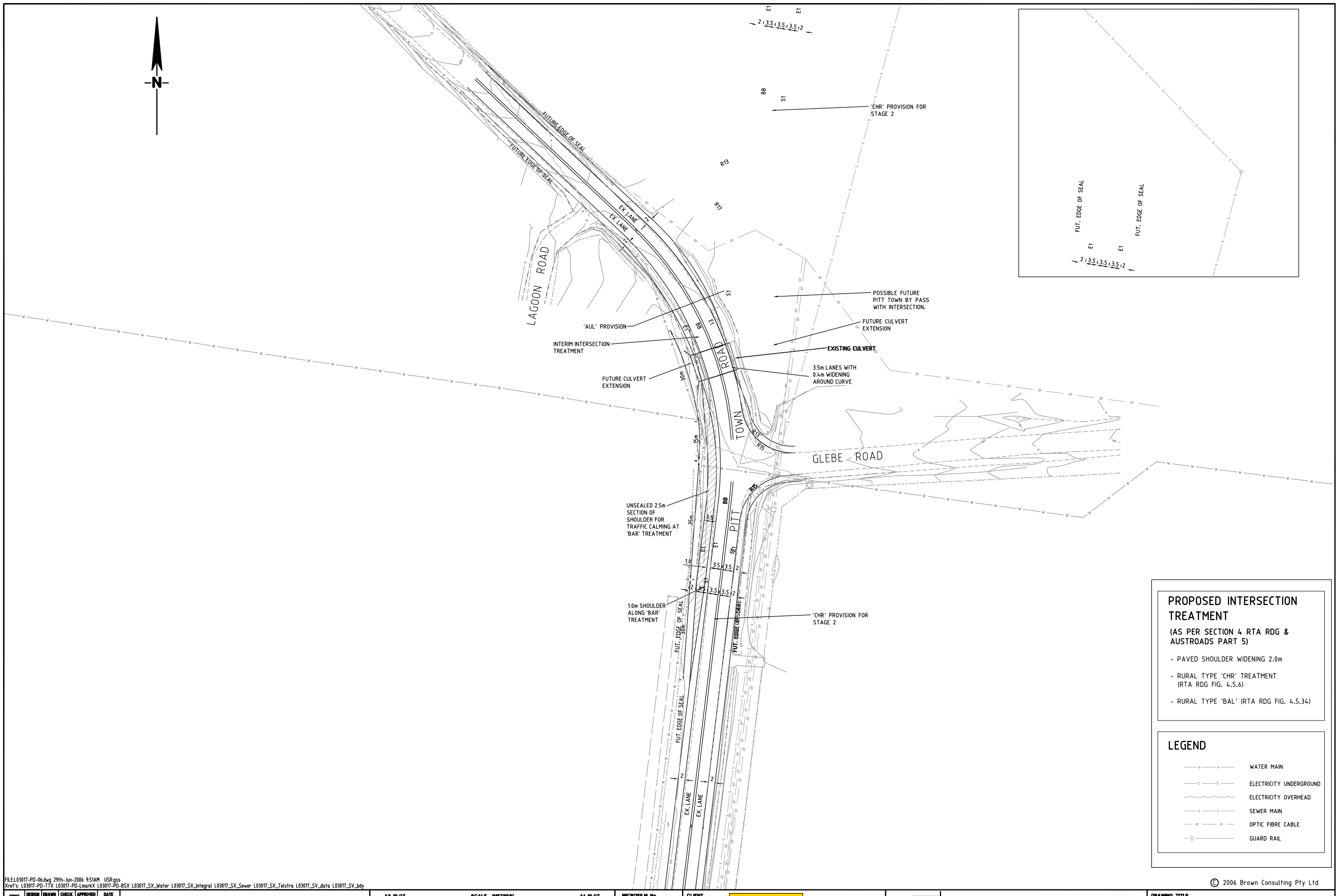

PROPOSED INTERSECTION TREATMENT

(AS PER SECTION 4 RTA RDG & AUSTROADS PART 5)

- PAVED SHOULDER WIDENING 2.0m
- RURAL TYPE 'CHR' TREATMENT (RTA RDG FIG. 4.5.6)
- RURAL TYPE 'BAL' (RTA RDG FIG. 4.5.34)

LEGEND

- WATER MAIN
- ELECTRICITY UNDERGROUND
- ELECTRICITY OVERHEAD
- SEWER MAIN
- OPTIC FIBRE CABLE
- GUARD RAIL

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CLIENT Johnson Property Group

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