

ANNEXURE 8

Traffic Impact Assessment

prepared by

ARC Traffic & Transport



Shoalhaven Starches, Bomaderry

MP 06_0028 Modification

Traffic Impact Assessment

May 2017

prepared for

Manildra Shoalhaven Starches

prepared by

ARC Traffic + Transport

Introduction

Manildra Shoalhaven Starches Pty Ltd (Manildra) proposes a Modification to the approved MP 06_0028 - Shoalhaven Starches Expansion Project (SSEP) - which would allow for modifications to a number of boilers located within the Shoalhaven Starches Site, Bolong Road Bomaderry (the SS Site). Specifically, it would provide for the conversion of Boiler 4 from gas fired to coal fired operations; the conversion of Boiler 2 from woodchip fired to coal fired operations; and the provision of new bag house at Boiler 6.

ARC Traffic + Transport (ARC) has been commissioned to examine the access, traffic and parking issues associated with the Modification. These issues specifically relate to the potential (albeit minor) additional coal and ash truck trip generation associated with the Modification; and to the short construction period during which the infrastructure required to provide the conversion from to coal operations is constructed.

In determining the scope of this assessment, the Department of Planning & Environment (DP&E) has provided no specific assessment requirements, other than a requirement to provide a traffic assessment as part of the Modification application. Shoalhaven City Council (Council) has provided assessment recommendations in an email dated 17th February 2017: -

Council's Traffic Unit recommends the Traffic Impact Assessment (TIA) also include (however some of these – highlighted in red – may be able to be conditioned):

- *an assessment of all traffic, bicycle and pedestrian movements along Bolong Road;*
- *an assessment of all vehicle movements to and from the boiler access, including movements between the boiler access and other access points;*
- *details of traffic management and movements during construction;*
- *detailed plans showing the intersection location and layout in relation to both sides of Bolong Road, and in relation to the other site access points;*
- *vehicle turning paths via swept path analysis; and*
- *plans showing any proposed changes required to the driveway, including signs and lines.*

The issues raised by Council are examined in further detail in the assessment below.

Importantly, this assessment references a number of past reports prepared by ARC in regard to the operations of the broader Starches Sites; specifically, ARC has referenced the following past reports: -

- Shoalhaven Starches Access & Parking Assessment April 2017 (APA 2017)
- Shoalhaven Starches, Bomaderry Environmental Farm Traffic Assessment August 2016 (Farm TA)
- Shoalhaven Starches Packing Plant Construction Traffic Management Plan 2016 (PP CTMP)
- Shoalhaven Starches Flour Mill Modification Traffic Impact Assessment 2015 (Flour Mill TIA)
- Shoalhaven Starches Ethanol Upgrade & Packaging Plant TIA 2008 (Ethanol Upgrade TIA)

The recent APA 2017 – which has recently been provided to the DP&E as (essentially) an addendum to the recent Modification 12 (Beverage Grade Ethanol Plant) and Modification 10 (Flour Mill B) applications - is a key reference in this assessment. The APA 2017 was prepared in response to specific issues raised by the DP&E, Council and the Roads & Maritime Service (RMS) not only in regard to Modification 12 (Beverage Grade Ethanol Plant) and Modification 10 (Flour Mill B), but moreover in regard to a number of outstanding issues relating to earlier Modifications and consent conditions.

While a formal endorsement/approval (by the DP&E) of the conclusions and recommendations detailed in the APA 2017 has not been provided at this time, our discussions with the DP&E and with Council suggest (without prejudice) that the recommendations provided in the APA 2017 – and specifically those recommendations relating to access to/from Bolong Road from the numerous Starches Sites – are generally supportable.

ARC has been instructed by Manildra to prepare this Modification assessment on the basis of the APA 2017 recommendations being ultimately approved by the DP&E; ARC acknowledges that should the DP&E require revisions (to those recommendations) then revisions would in turn likely be required to this Modification assessment.

From the outset, ARC would acknowledge the input of DP&E, Council and RMS officers in regard to scoping this assessment, and in regard to the identification of local issues.

1 Background

1.1 Manildra Shoalhaven Starches

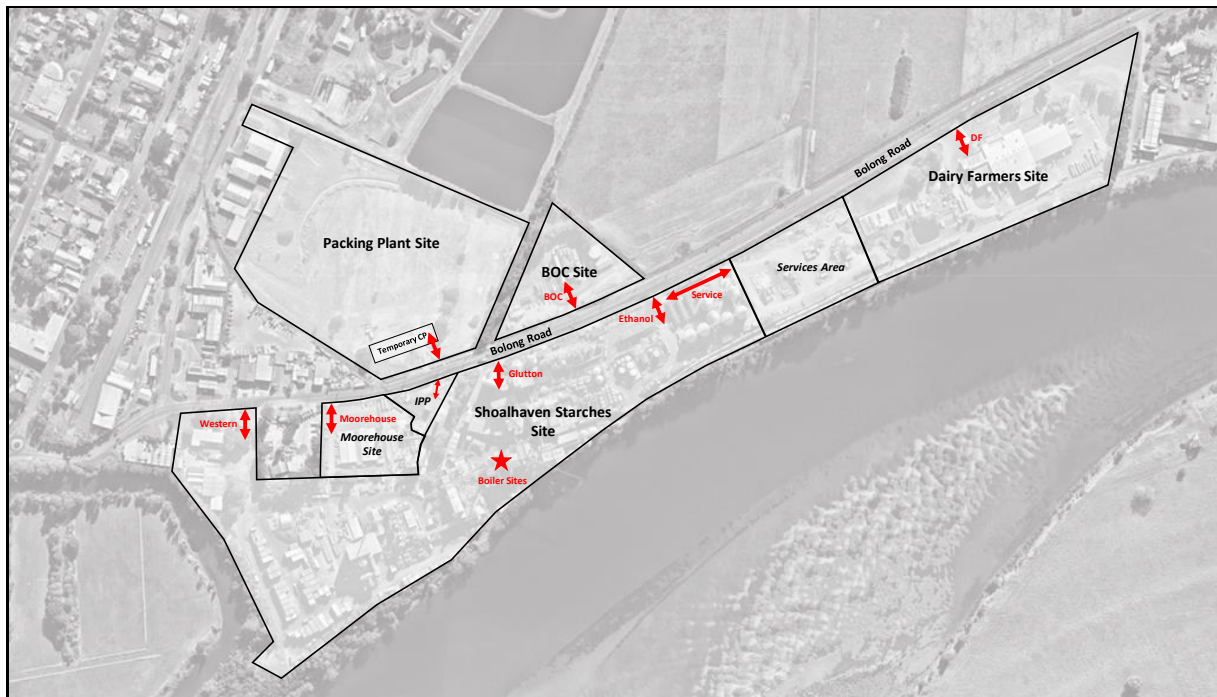
Manildra Shoalhaven Starches operates a number of distinct 'sites' north and south of Bolong Road, Bomaderry.

The primary SS Site and immediately adjacent Dairy Farmers Site (Dairy Site) are located south of Bolong Road. The Moorehouse Site sits within the SS Site east of the railway spur; the Interim Packing Plant (IPP) sits within the SS Site west of railway spur; and the Services Area occupies the eastern portion of the SS Site. The boilers which are the focus of this Modification lie in the southern-central part of the SS Site.

The approved Packing Plant Site (PP Site) is located on the northern side of Bolong Road opposite the primary SS Site, and currently accommodates a Temporary Car Park accessed from Bolong Road per Modification 6 (Moorehouse Demolition) and Modification 7 (Starch Dryer 5) Approvals. The BOC Site is located on the northern side of Bolong Road east of Abernathy's Creek.

These key Starches Sites, as well as their access points to Bolong Road, are shown in **Figure 1.1**.

Figure 1.1 Shoalhaven Starches Sites, Bolong Road Bomaderry



Source: Nearmap

1.2 Previous Site Approvals

1.2.1 Shoalhaven Starches Expansion Project Approval MP06-0228

The SSEP Approval was granted by the Minister for Planning on the 28th January 2009, and encapsulated previous approvals into one overall approval. The SSEP is a 'transitional Part 3A Project' for the purposes of Schedule 6A of the Environmental Planning & Assessment Act.

The SSEP provides for an increase in ethanol production at Shoalhaven Starches in a staged manner from 126 million litres per year to 300 million litres per year. To accomplish the increase in ethanol production, the SSEP required a series of plant upgrades and increases in throughput of raw materials, principally flour and grain. The SSEP included the following alterations and additions: -

- The provision of an additional product dryer;
- Additional equipment and storage vessels for the ethanol plant including additional fermenters, additional cooling towers and molecular sieves;
- Upgrades to the Stillage Recovery Plant, including additional DDG Dryers, Decaners, chemical storage, evaporators and the installation of a DDG Pellet Plant; and
- The establishment of a new Packing Plant, container loading area and rail spur line on the northern side of Bolong road.

As outlined, the SSEP Approval also consolidates all previous approvals (up to that time) into a single Project Approval.

Following the SSEP Approval, Manildra acquired the Dairy Site, and commenced investigations into relocating the Packing Plant from the approved PP Site north of Bolong Road to the Dairy Site; as an interim measure during these investigations, approval was provided in 2012 for the Interim Packing Plant operations at their current location.

In 2015, Manildra submitted modification proposals to the DP&E in regard to the demolition of an industrial building on the Moorehouse Site (Modification 6) and for the construction of the No.5 Starch Dryer on the Moorehouse Site (Modification 7); and for minor design amendments to the Packing Plant (Modification 9). These Modifications have all been approved by the DP&E.

More recently (2016) Manildra submitted the following additional Modification proposals, all of which are currently before the DP&E: -

- 06_0228 Modification 10 for a new Flour Mill (B);
- 06_0228 Modification 11 for a reduction in the number of DDG dryers on the SS Site and associated works; and
- 06_0228 Modification 12 for modifications to the existing Ethanol Distillation Plant to provide Beverage Grade Alcohol.

As discussed in the **Introduction**, the recent [APA 2017](#) provided a number of recommendations to address issues raised by the DP&E, Council and the RMS in regard to areas of non-compliance (from earlier Modification Approval conditions) and in regard to the current Modifications before the DP&E. Key recommendations, which have been adopted by Manildra but as discussed remain to be formally approved by the DP&E, include: -

- The extension of the Bolong Road median and barrier fence across Ethanol Driveway, thereby requiring vehicle movements from the west to utilise the Dairy Driveway turn facility in an identical manner to movements to the Glutton Driveway (for which the Dairy Driveway turn facility was designed). This would also eliminate observed U-Turn concerns at the intersection of Bolong Road & Ethanol Driveway.
- The provision of additional car parking to be accessed via the Dairy Driveway, generally consistent with the Modification 3 (DF Car Park) approval.
- The provision of all access to the Services Area via Dairy Driveway, allowing for the closure (to all but emergency vehicles) of the existing Service Driveway which provides an internal link between Ethanol Driveway and the Services Area.
- Further to the above, the upgrade of the Bolong Road & Dairy Driveway intersection to provide full compliance with the approved Modification 3 (DF Car Park) design plans, noting that the reinstatement of car parking accessed via the Dairy Driveway would require the provision of a left turn auxiliary lane, Bolong Road to Dairy Driveway, as proposed in the approved Modification 3 (DF Car Park) design plans.
- The continued use of the Temporary Car Park located on the PP Site through to the end of construction of the Modification (Flour Mill B) infrastructure, estimated at mid-2018.
- Upgrades of existing staff car parks across the Starches Sites to provide compliance with Australian Standards.

Again (and without prejudice) it is expected that these recommendations will be supported by the DP&E, as they (in the opinion of ARC) appropriately respond to the outstanding issues raised by the DP&E, Council and the RMS.

With regard to key access, traffic and parking issues, this generally summarises all Shoalhaven Starches Modification proposals/approvals relating to the Starches Sites to May 2017.

1.3 Boilers Access

All access to the boiler sites (all of which lie within the primary SS Site) is via the intersection of Bolong Road & Western Driveway (which provides for all movements to/from the east and west) and then via existing internal roads. Further to the Modification, all coal trucks would arrive and depart this intersection from the west, while all ash trucks will essentially loop between this intersection and the Environmental Farm via Hanigans Lane. These future coal and ash movements would be identical to existing coal and ash movements to/from the boiler sites.

During the construction period, up to 20 construction staff will be employed for a period of approximately 12 weeks in the final quarter of 2017. The Modification provides for these construction staff to utilise the Temporary Car Park via the Bolong Road & Temporary Car Park Driveway intersection (again providing for all movements to/from the east and west).

While the Western Driveway and Temporary Car Park Driveway intersections to Bolong Road are the primary focus of this assessment, ARC has extended our assessment to include the Bolong Road intersections with Railway Street and with Moorehouse Driveway. Outside of this section of Bolong Road, both the operational and construction trip generation associated with the Modification would generate only a handful of additional trips (as through trips) in Bolong Road, and in our opinion have no significant impact on the future road network operations.

1.4 Base Traffic Flows

1.4.1 Bolong Road Through Flows

The [APA 2017](#) provides a detailed assessment of future traffic flows to Bolong Road further to the redistribution of trips arising from the detailed access recommendations, and further to the (short term) potential for the simultaneous construction of the Modification 10 (Flour Mill B) and Modification 12 (Beverage Grade Ethanol Plant) infrastructure. The resulting through flows in Bolong Road have been referenced to provide base through flows in Bolong Road for this assessment.

These through flows represent '120th Highest Hour' recreational peak flows, and have been developed by ARC in consultation with Council over time and through numerous survey projects across the Starches Sites. Importantly, the through flows used in this assessment (and in the [APA 2017](#)) do not include any reduction in future through movements (in Bolong Road) further to the Princes Highway Upgrade; it is the opinion of Council that the current proportional distribution of north-south sub-regional trips between the Princes Highway and the 'Sandtrack'/Bolong Road will not change further to the Upgrades (currently well advanced). We note that it is the RMS position (recently confirmed as part of the [APA 2017](#) assessment) that there will be a very significant redistribution of trips, such that the 2019 AADT in Bolong Road will represent less than 60% of the 2013 AADT. Even with background growth continuing after 2019, the 2029 AADT is estimated to represent only 70% of the 2013 AADT; and the 2039 AADT still only some 87% of 2013 AADT.

Regardless, and as per previous assessments, ARC has used the higher (Council forecast) through flows to provide an (absolute) worst case assessment.

1.4.2 Temporary Car Park Trips

Surveys conducted by ARC for previous Modification assessments indicate the following general trip generation and distribution characteristics across the Starches Sites: -

- The highest (peak hour) trip generation per parking space of any (existing) Starches Site car park is that of the Moorehouse Car Park, generating a rate of 0.43 trips per parking space in the AM peak hour, and 0.41 trips per parking space in the PM peak hour. Again, this reflects the staggered nature of shift arrival and departure times, i.e. staff do not all arrive or departure in a single peak hour, and moreover few staff trips are generated within the (broader) road network (commuter) peak hours.

- In the AM peak hour, approximately 75% of trips are arrival trips, and 25% departure trips. In the PM peak hour, approximately 20% of trips are arrival trips and 80% departure trips.
- In both peak periods, approximately 75% of trips arrive and depart to the west, and approximately 25% of trips arrive from and depart to the east.

For the assessment of the Bolong Road & Temporary Car Park Driveway intersection, ARC has: -

- Determined a peak Temporary Car Park demand (at the time of the proposed Modification 10 construction) for 60 parking spaces, noting that the higher (existing) demand identified in the [APA 2017](#) would be reduced further to the construction of the DF Car Park and upgrade of the BOC Car Park, which would accommodate construction staff for the Modification 12 (Beverage Grade Ethanol Plant) construction.
- Assigned Temporary Car Park trips to the intersection based on the peak surveyed trip generation per parking space and then distributed those trips with reference to the future distribution detailed above.

1.4.3 Western Driveway Trips

The trip generation of the Western Driveway was most recently detailed in the [PP CTMP](#); this trip generation – which has changed little over many years – has been used for the assessment.

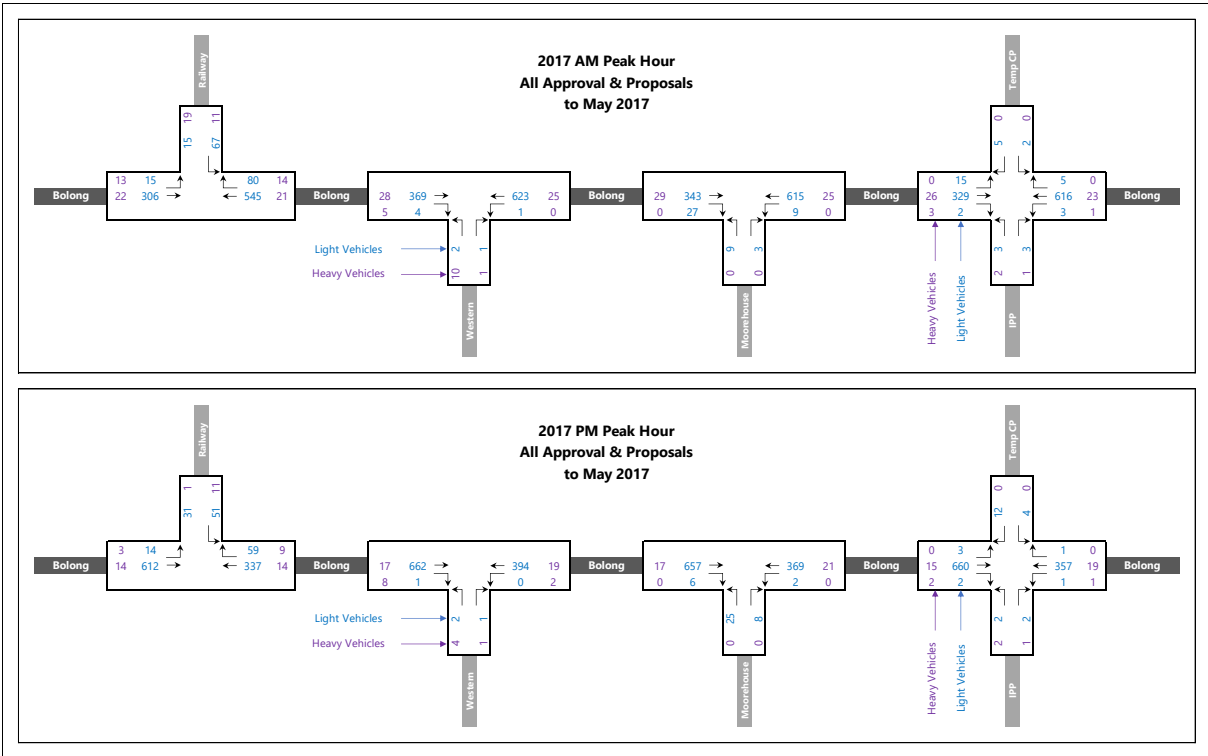
1.4.4 Railway Street Flows

Finally – and acknowledging the potential impacts of increasing trip generation to the Temporary Car Park - ARC has also referenced traffic flows to/from Railway Street, most recently reported in the [PP CTMP](#). Given the recent Modification 9 (Packing Plant) approval, the potential exists to provide access to the Temporary Car Park via Railway Street (either supplementing or replacing the existing Temporary Car Park Driveway to Bolong Road) should the Modification result in any significant impacts at the intersection of Bolong Road & Temporary Car Park Driveway & IPP Driveway.

1.4.5 Forecast Flows

With reference to sections above, **Figure 1.4.5** below provides a summary of the 2017 forecast traffic flows, which as discussed include the potential trip generation of two major construction projects (as well as all standard operational trip generation).

Figure 1.4.5 2017 'Base' Traffic Flows



1.5 Intersection Performance

1.5.1 SIDRA

The operations of the key intersections have been assessed using the SIDRA intersection model (Version 7.0). SIDRA reports key intersection performance indicators as detailed below.

1.5.1.1 Level of Service

Level of Service (LoS) is a basic performance indicator assigned to an intersection based on average delay. For signalised and roundabout intersections, LoS is based on the average delay to all vehicles, while at priority controlled intersections LoS is based on the worst approach delay. The RMS LoS parameters are detailed in **Table 1.5.1.1**.

Table 1.5.1.1 RMS Level of Service Parameters

Level of Service (RMS)	Control delay per vehicle in seconds (d) (including geometric delay)		
	Signals and Roundabouts	Rating	Stop and Give Way Signs
A	$d < 14.5$	Good	$d < 14.5$
B	$14.5 < d < 28.5$	Good with acceptable delay	$14.5 < d < 28.5$
C	$28.5 < d < 42.5$	Satisfactory	$28.5 < d < 42.5$
D	$42.5 < d < 56.5$	Near capacity	$42.5 < d < 56.5$
E	$56.5 < d < 70.5$	At capacity	$56.5 < d < 70.5$
F	$70.5 < d$	Over capacity	$70.5 < d$

Source: SIDRA

1.5.1.2 Degree of Saturation

Degree of Saturation (DoS) is defined as the ratio of demand (arrival) flow to capacity. DoS above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). The capacity of the movement with the highest DoS is reported.

1.5.1.3 Delay

Delay represents the difference between interrupted and uninterrupted travel times through and intersection, and is measured in seconds per vehicle in this assessment. Delays include queued vehicles accelerating and decelerating from/to the intersection stop, as well as general delays to all vehicles travelling through the intersection. With reference to the LoS criteria above, the average intersection delay for signals and roundabouts represents an average of delays to all vehicles on all approaches, while for priority intersections the average delay for the worst approach is used.

1.5.2 2017 Base Intersection Operations

The existing operations of the key intersections are reported in **Table 1.5.2**.

Table 1.5.2 2017 Base Intersection Operations

2017 Base Intersection Operations	Level of Service		Average Delay (s)		Worst Approach Delay (s)		Degree of Saturation	
	AM	PM	AM	PM	AM	PM	AM	PM
Bolong Road & Railway Street	B	A	2.7	2.2	15.3	12.5	0.338	0.354
Bolong Road & Western Driveway	A	A	0.5	0.3	11.1	10.1	0.359	0.326
Bolong Road & Moorehouse Driveway	A	A	0.6	0.2	4.5	3.5	0.359	0.375
Bolong Road & IPP & TCP Driveway	B	B	0.5	0.5	15.7	17.3	0.360	0.371

With reference to **Table 1.5.2**, all of the key intersections which might be impacted by the Modification currently operate at good Levels of Service, with very moderate average delays and significant spare capacity.

2 The Modification Proposal

2.1 The Proposal

As stated in the Introduction, the Modification would provide for modifications to a number of boilers located within the (the SS Site). Specifically, it would provide for the conversion of Boiler 4 from gas fired to coal fired operations; the conversion of Boiler 2 from woodchip fired to coal fired operations; and the provision of new bag house at Boiler 6.

Full details of each of the components of the Modification are provided within the broader Environment Assessment that this assessment accompanies.

2.2 Access

2.2.1 Boiler Construction & Operational Access

As previously discussed, all truck access to the boilers (both during construction and once operational) would be via the existing Western Driveway and existing internal roads. Coal trucks would all arrive from and depart to the west, while ash trucks would loop between the Western Driveway and the Farm access point off Hanigans Lane.

With regard to Council's comments relating to turning paths, it is noted that the construction and operational trucks required further to the Modification are essentially identical to the trucks currently accessing this part of the SS Site via the Western Driveway, and would therefore be provided with the same access widths and turn paths as provided for existing trucks. The Modification would not require any trucks larger than those current accessing the SS Site.

2.2.2 Construction Staff Access

As previously discussed, it is proposed that all construction staff parking be provided in the Temporary Car Park off Bolong Road, as this provides the nearest (construction staff) parking location to the construction area. Once operational, the Modification would not result in an increase in operational staff numbers.

2.3 Operational Trip Generation & Distribution

2.3.1 Operational Trip Generation & Distribution

It is estimated that the modified boiler operations will require the supply of an average of some 1,050 tonnes of coal per week.

Based on existing (coal) truck capacities of an average 38 tonnes, it is estimated that the Modification would generate an additional 28 coal trucks per week, or 54 coal truck trips per week; and in turn an estimated additional 6 coal trucks per day or 12 coal truck trips per day.

At most, this is estimated to result in an additional 2 truck trips in any weekday AM or PM peak hours (i.e. potentially a single coal truck arriving, unloading and then departing in a peak hour). This estimate is based on the recent Farm TA analysis of coal truck movements using weighbridge data from the Western Driveway. This analysis indicated that of the 785 coal delivery trucks reported in the weighbridge data 1st March 2016 to 30th June 2016: -

- A total of only 53 coal trucks were generated in the broader weekday AM and PM peak periods (i.e. between 7:00am and 9:00am, and between 4:00pm and 6:00pm) during the data period, or some 7% of all coal truck arrivals.
- A maximum of 2 coal trucks were generated to a single (day) AM peak hour (11th June 2016).
- A maximum of 3 coal trucks were generated to a single (day) PM peak hour (24th March 2016).

As stated, these coal truck trips would all be generated to/from the west of the Site, where routes to/from Princes Highway are available either directly via Bolong Road, or via Railway Street, Cambewarra Road and Meroo Road (for vehicles not subject to Restricted Access Vehicle restrictions).

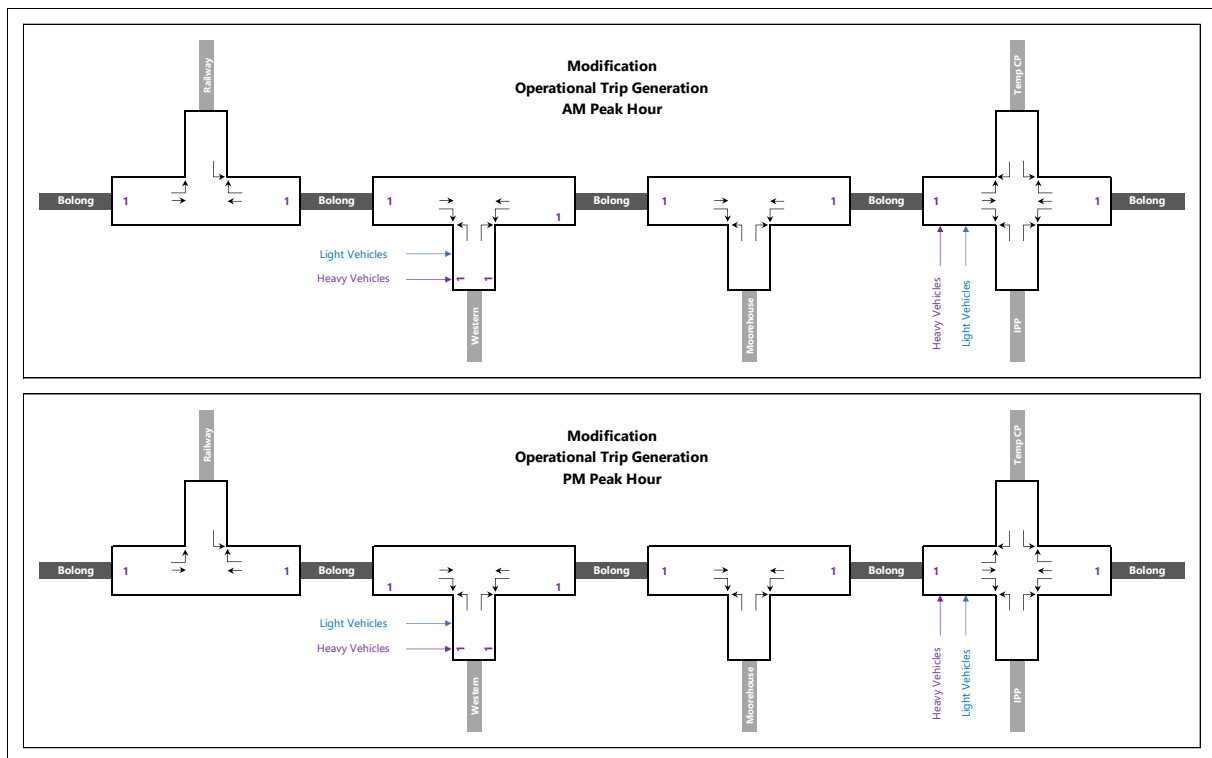
It is further estimated that the modified boiler operations will require the removal of an average of some 157 tonnes of ash per week. Based on existing ash truck capacities of 17 tonnes (as also examined in the Farm TA) it is estimated that the Modification would generate an additional 10 ash trucks per week, or 20 ash truck trips per week; and in turn an estimated additional 2 coal trucks per day or 4 coal truck trips per day. At most, this is estimated to result in a single additional ash truck trip in any weekday AM or PM peak hour.

Finally, the conversion of Boiler 2 from woodchip to coal fired operations will result in removal of all woodchip truck trip generation. At present, Boiler 2 woodchip operations require some 320 tonnes of woodchip per week. Based on existing woodchip truck capacities of 22.5 tonnes, it is estimated that the Modification would generate 14 fewer woodchip trucks per week, or 28 fewer woodchip truck trips per week; and in turn approximately 3 fewer woodchip trucks per day, or 6 fewer woodchip truck trips per day.

Based on the recent Farm TA assessment of woodchip truck deliveries, woodchip trucks currently have an almost identical arrival profile to coal trucks as detailed above, with the majority of movements between 7:00pm and 7:00am; as such, it is estimated that the removal of woodchip trucks would result in the removal of a single woodchip truck trip in any weekday AM or PM peak hour.

2.3.2 Operational Trip Assignment

With reference to **Section 2.3.1** above, the assignment of additional Modification operational trips to the key local intersections is shown in **Figure 2.3.2** below.

Figure 2.3.2 Modification Additional Operational Trips

2.4 Construction Trip Generation & Distribution

2.4.1 Construction Schedule & Requirements

Based on discussions between Manildra and the principle contractor for the Modification works, the construction phase is estimated to occur over some 12 weeks, and require: -

- Up to 20 construction staff on-site daily
- Up to 5 construction material carrying trucks per day

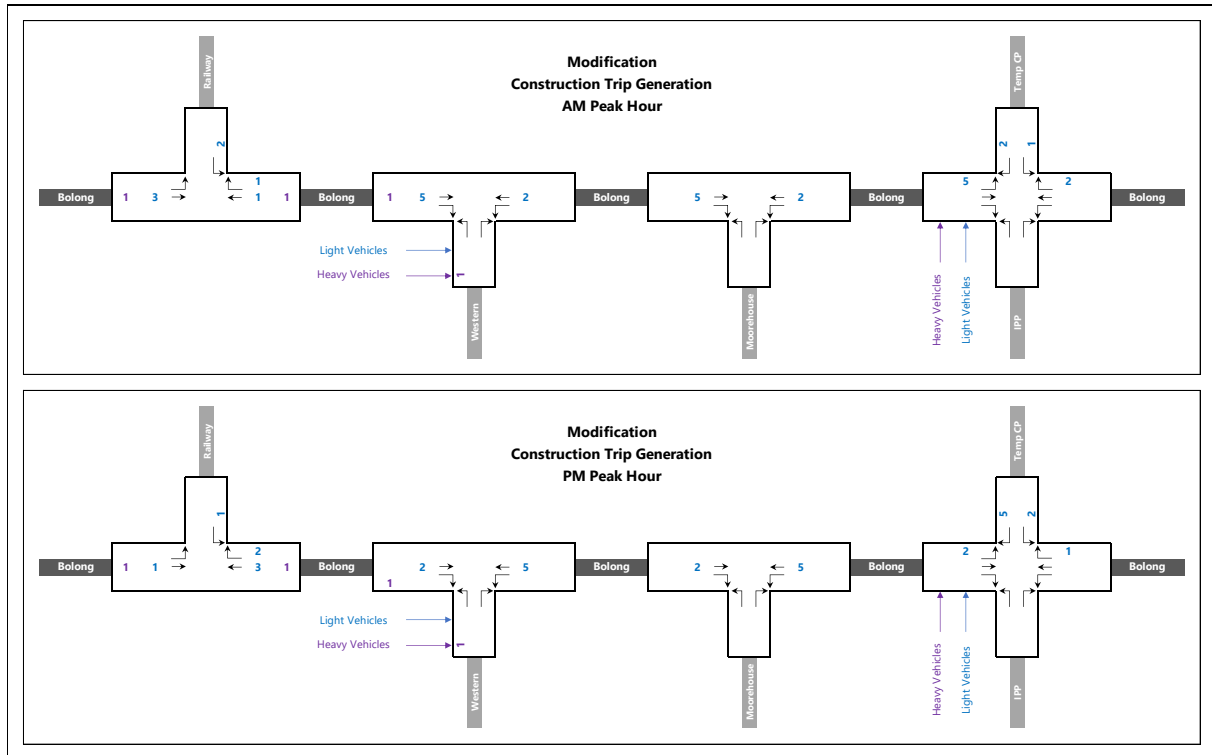
2.4.2 Construction Traffic Generation

The primary construction contractor has indicated to Manildra that they intend to employ local sub-contractors for the majority of the construction works, many of whom have worked on the SS Site during previous construction projects. The recent [APA 2017](#) provides clear evidence that construction staff – even when locally based – generate fewer trips through car sharing and the like, but to provide a worst-case assessment all construction staff are designated as drivers, with the same trip generation (and distribution) profile as that outlined in **Section 1.4.2**. As such, it is estimated that the construction staff could generate up to 9 vehicle trips in a peak hour.

2.4.3 Construction Trip Assignment

With reference to sections above, the assignment of additional Modification construction trips to the key local intersections is shown in **Figure 2.4.3** below.

Figure 2.4.3 Modification Additional Construction Trips



2.5 Traffic Impacts

2.5.1 Operation Traffic Impacts

It is in our opinion immediately apparent that the Modification operational trip generation will have little if any impact on the local road network simply as a factor of the very minimal trip generation of those operations. Even if traffic flows in Bolong Road increased annually from the existing peak levels (again noting that the RMS forecasts flows to be significantly reduced) the additional of 1 – 2 vehicle trips in a peak hour would have no impact on levels of service at any of the key intersections, nor in the broader road network.

2.5.2 Construction Traffic Impacts

Similarly, it is in our opinion immediately apparent that the construction phase will have little if any significant impact on the local road network simply as a factor of the minimal generation and short duration of the construction phase.

Notwithstanding, ARC has completed revised SIDRA analysis of this construction period, with the results provided below in **Table 2.5.2**.

Table 2.5.2 Modification Construction Period Intersection Operations

2017 Base Intersection Operations + Modification Construction Trips	Level of Service		Average Delay (s)		Worst Approach Delay (s)		Degree of Saturation	
	AM	PM	AM	PM	AM	PM	AM	PM
Bolong Road & Railway Street	B	A	2.7	2.3	15.4	12.6	0.340	0.356
Bolong Road & Western Driveway	A	A	0.5	0.4	11.2	9.6	0.360	0.329
Bolong Road & Moorehouse Driveway	A	A	0.6	0.2	4.6	3.5	0.360	0.376
Bolong Road & IPP & TCP Driveway	B	B	0.6	0.6	15.9	18.1	0.362	0.372

With reference to **Table 2.5.2**, it is clear that all intersections will continue to operate at a high Level of Service through the peak Modification construction period (again noting that the base flows include other peak construction projects across the Starches Sites).

Perhaps the only issue for resolve relates to the additional (construction staff) use of the intersection of Bolong Road & IPP & Temporary Car Park. At present, the Modification 7 (Starch Dryer 5) Approval provides for all movements at this intersection, and as previously discussed the [APA 2017](#) recommends the retention of the Temporary Car Park through mid-2018 to accommodate construction staff working on the Modification 10 (Flour Mill B) construction, as this parking would be provided in direct proximity to the Flour Mill B construction site.

Council has raised issues with ARC in regard to the operation of the Temporary Car Park Driveway, and specifically its provision of all turning movements, its proximity to the Bolong Road median and barrier fence (to the immediate east) and alignment directly opposite the IPP Driveway. However, based on the current Modification 7 (Starch Dryer 5) Approval, and moreover our on-site observations and a review of the short construction period traffic flows and intersection operations, it is the opinion of ARC that the use of the Temporary Car Park by the Modification construction staff during the 12 week construction schedule would not compromise the existing (approved) access conditions.

Further to the above, the [APA 2017](#) does provide additional recommendations in regard to the Temporary Car Park, including the upgrade of the driveway at Bolong Road (to provide a formal concrete driveway as provided at the Moorehouse Car Park) and for the marking of all parking spaces in accordance with Australian Standard 2890.1. Manildra has committed to these works further to an approval of the [APA 2017](#) recommendations.

In summary, ARC has concluded that the trip generation of the construction phase of the Modification would have no impact on the local traffic environment.

2.6 Parking

As discussed in sections above, it is proposed that all construction staff parking be provided in the Temporary Car Park. It is important to note that during the Modification construction phase (estimated within the final quarter of 2017) two other construction projects are expected to be underway (further to course to appropriate approvals), being the Modification 10 (Flour Mill B) and Modification 12 (Beverage Grade Ethanol Plant) construction projects.

Importantly, the Modification 12 (Beverage Grade Ethanol Plant) construction staff will be provided with parking in the DF Car Park adjacent to the Modification 12 (Beverage Grade Ethanol Plant) works site, reducing the demand within the Temporary Car Park (100 spaces) to Modification 10 (Flour Mill B) construction staff and a minor number of (Starches) operational staff redistributed from the Moorehouse Car Park during the Flour Mill B construction. As such, it is estimated that up to 60 of the 100 spaces within the Temporary Car Park would be used under peak construction conditions, leaving 40 spaces – or double the demand – for the Modification construction staff.

Once operational, the Modification would not require additional operational staff, and as such there would be no increase in operational staff parking demands.

2.7 Construction Management

Notwithstanding the findings above, it remains that the case that the Modification construction phase will need to be governed by an appropriate set of management procedures.

In relation to access, traffic and parking requirements during the construction phase, ARC recommends the following initiatives, which essentially mirror the Construction Traffic Management Plan (CTMP) prepared by ARC for the construction requirements of past SS Site projects, including most recently the Packing Plant: -

- All parking for construction staff and construction trucks must be contained within an appropriately secure on-site environment so as not to impact or be impacted by existing SS Site operations; or on the off-site traffic environment. As discussed above, it is proposed that all construction staff parking be provided for in the approved Temporary Car Park, which is readily accessible to the SS Site, noting the existing pedestrian paths on both sides of Bolong Road and the pedestrian refuge crossing in Bolong Road directly adjacent to the Temporary Car Park.
- While it is not anticipated that Restricted Access Vehicles (RAVs) will be required as part of the construction task, it is nonetheless the case that any such vehicles would be required to utilise the existing approved RAV route between the Western Driveway and the Princes Highway via Bolong Road.

- Construction work hours are generally between 6:00am/7:00am and 5:00pm/6:00pm Monday to Friday, with an earlier finish time on Saturdays and no work on Sundays. Construction hours are most often established to minimise amenity impacts on neighbouring residential areas, and will require finalisation further to consultation with the DP&E and Council.

As stated by Council in the correspondence of 17th February 2017, the provision of further details in regard to the management of construction traffic can be conditioned as part of a Modification Approval.

2.8 Additional Issues

As stated in the Introduction, the Council correspondence of 17th February 2017 recommends the assessment of a number of issues relating to the Modification; these issues are summarised below.

2.8.1 Bicycle & Pedestrian Movements (Council Dot Point 1)

Based on our numerous site visits, it is the case that there is only very minimal pedestrian demand adjacent to the Starches Sites other than that generated by Starches staff. As discussed previously, pedestrian paths along Bolong Road link all sites and pedestrian refuge crossings of Bolong Road are provided adjacent to the Temporary Car Park and adjacent to the BOC Site in line with past approvals. The [APA 2017](#) has further recommended the provision of a new pedestrian path linking the BOC Site through to the existing formal path and pedestrian refuge crossing adjacent to the Temporary Car Park Driveway; and a new pedestrian path linking the DF Car Park with the existing formal path adjacent to the Ethanol Driveway.

With regard to cyclists, while our observations have shown little mid-week demand in Bolong Road, Council has suggested that there is a reasonable weekend demand. In the section of Bolong Road between Railway Street and the Temporary Car Park Driveway, it is our understanding that the line-marked kerbside 'lane' (both eastbound and westbound) provides for cyclists, and additional (on-road) cycle infrastructure is proposed by Council in Bolong Road east of the Dairy Site. As part of the [APA 2017](#) recommendations, upgrade works will also be finalised at the Bolong Road & Dairy Driveway intersection to appropriately provide cycle access (through the intersection) in line with Modification 3 (DF Car Park) approved plans, and it is also anticipated that the recommended extension of the Bolong Road median and barrier fence across Ethanol Driveway will provide scope to extend this cyclable kerbside lane along the eastern frontage of the BOC Site.

As such, while it is important to state that the Modification in and of itself would have no impact on existing cycle infrastructure (or indeed on existing cycle movements), significant improvements to that cycle infrastructure will be provided as a result of the implementation of the [APA 2017](#) recommendations.

2.8.2 Truck Access (Council Dot Point 2 and Dot Point 5)

As detailed in **Section 1.3** and **Section 2.2**, construction and operational trucks will use the same access paths between Bolong Road and the boiler sites as trucks currently accessing the boiler sites, and there is no proposal to utilise trucks of greater dimensions (or by association greater turning paths) than existing trucks. As such, it is inherently the case that appropriate access aisle widths and turning paths are available.

2.8.3 Construction Traffic Management (Council Dot Point 3)

As discussed in **Section 2.6**, it is expected that a Modification Approval will condition the provision of a Construction Traffic Management Plan if further (construction management) details are required by Council; ARC notes that the minimum trip generation and timeframe of the Modification construction works are unlikely to raise any significant CTMP issues.

2.8.4 Intersection and Driveway Plans (Council Dot Point 4 and Dot Point 6)

The Modification proposes the use of the approved Western Driveway (which was recently upgraded further to Council approvals, and indeed was approved to accommodate significant additional car park trip generation); and the approved Temporary Car Park Driveway. As such, it is not clear what '*the intersection location and layout*' refers to, and (per Dot Point 6) no changes are proposed to the internal driveways other than the formalising of the Temporary Car Park Driveway (per the [APA 2017](#) recommendation).

Notwithstanding, it is important to again state that the [APA 2017](#) recommendation to finalise the upgrade of the Bolong Road & Dairy Driveway intersection, and revise the Bolong Road & Ethanol Driveway intersection, have been adopted by Manildra and will be completed further to DP&E approval.

3 Conclusions

Following a detailed and independent assessment of the access, traffic and parking characteristics of the proposed Modification, ARC has concluded that the Modification – and specifically the potential impacts of construction and operational traffic – would have no significant impacts on the local traffic environment. In summary: -

- The Modification will not result in production increases above those provided for in the SSEP Approval, nor as a result increases in SS Site vehicle or rail trips above those provided for in the SSEP Approval.
- During the construction phase, construction vehicle trips would be generated over only a short 12 week period and access would be exclusively via existing access points and internal roads which appropriately provide for the largest construction vehicles. The operation of local intersections during the construction periods would not be detrimentally impacted by the additional construction traffic, and construction staff parking can be provided for within the existing capacity of the Temporary Car Park.

The provision of additional detail in regard to the management of construction traffic can be conditioned as part of a Modification Approval.

- During the operational phase, operational vehicle trips would again exclusively use existing access points and internal roads which appropriately provide access for the largest operational vehicles. The operation of local intersections during the operational phase would be essentially unchanged, with operations estimated to generate a maximum of only 1 – 2 additional truck trips in a peak hour. The Modification would not result in increases in operational staff, and as such there would be no increase in operations staff parking demand.
- The access and parking network upon which this assessment is based is in turn based on the recommendations of the [APA 2017](#), which in the opinion of ARC appropriately responds to all outstanding issues as raised previously by the DP&E, Council and the RMS. These recommendations specifically include the finalisation of upgrades of key Bolong Road intersections and the appropriate provision, design and marking of car parking areas across the Starches Sites.

It is acknowledged that should the DP&E require further revisions to the recommendations of the [APA 2017](#), revisions may be required to this Modification assessment.