MDA CONSULTING ENGINEERS PTY LTD
ACN 010 926 093
ABN 16 997 612 233

Positon Paper for Conciliation Conference

Kings Forest Service Station
Tweed Coast Road, Kings Forest, NSW

External Lighting Impact Assessment

For Project 28 Pty Ltd

Prepared by
MDA Consulting Engineers
Level 4, 46 Cavill Ave
Surfers Paradise QLD 4217

Telephone: (07) 5592 0222
Facsimile: (07) 5592 0279
Email: info@mdaengineers.com.au

PROJECT NUMBER: 160377
DATE: Revised 13th October 2016
REVISION: Issue E

MDA CONSULTING ENGINEERS PTY LTD
ACN 010 926 093
ABN 16 997 612 233

DOCUMENT CONTROL RECORD

File Reference:	S:\Projects\2016\2016-0377\ Reports\160377 Light
Project Number:	160377
Original Date of Issue:	31st of August 2016
Author	Vaughan Oxenford
Signed	
Checked	
Signed	

Functionality Statement Details	
Title	Kings Forest Service Station External Lighting Impact Assessment
Client	Project 28 Pty Ltd
Client Contact	Mr Michael Geale
Description	Assess the impact the future external lighting to the proposed Service Station to be constructed at Tweed Coast Road, Kings Forest will not Negatively impact on the residential properties located on Old Bogangar Road.

Revision History

Issue No.	Date	Description	Distributed To	No. Of Copies
A	31/08/2016	Preliminary Issue	Project 28 Pty Ltd (LEDA)	1 (email)
B	02/09/2016	Draft	Project 28 Pty Ltd (LEDA)	1 (email)
C	02/09/2016	Final Issue	Project 28 Pty Ltd (LEDA)	1 (email)
D	05/10/16	Updated Issue	Project 28 Pty Ltd (LEDA)	1 (email)
E	13/10/16	Updated Issue	Project 28 Pty Ltd (LEDA)	1 (email)

Contents

1.0 INTRODUCTION

MDA Consulting Engineers have been engaged to complete a desk top assessment on the impact the external lighting proposed for the future service station at Tweed Coast Road, Kings Forest, and N.S.W will have on the neighbouring residential properties located on Old Bogangar Road.

As the external lighting system for the proposed future service station has not yet been designed, MDA Consulting Engineers will base the desktop review on the photometrics of light fixtures that are commonly available to the market place.

2.0 DESK TOP REVIEW OF EXTERNAL LIGHTING IMPACT

Whatever external lighting system/s that will be designed and installed for the proposed service station these systems must be designed to two (2) Australian Standards. These standards state the level of illumination required for the external area of project and also the amount of obtrusive lighting that crosses the property boundary and affects neighbouring properties. These standards are:-

- AS/NZS 1158.3.1:2005 Lighting for roads and public spaces Part 3.1: Pedestrian area (Category P) lighting—Performance and design requirements
- AS4282:1997 Control of the obtrusive effects of outdoor lighting.

In relation to the impact off external lighting the standard AS4282 Control of the obtrusive effects of outdoor lighting, the parameters set down will need to be met to avoid negative impact on the neighbouring residential properties.

On review of the architectural drawing provided MDA has identified Six (6) major areas where the external lighting may have the potential for a negative impact on the neighbouring residences**.** These three areas are:-

- External carpark lighting system
- Service Station Canopy lighting system
- Fast Food Drive thru areas.
- Signage located on the Façade of the Retail Building.
- Vehicle headlights parking in the western carpark on Tweed Coast Road.
- Pole signs

Additional factors of the assessment that will be considered are:-

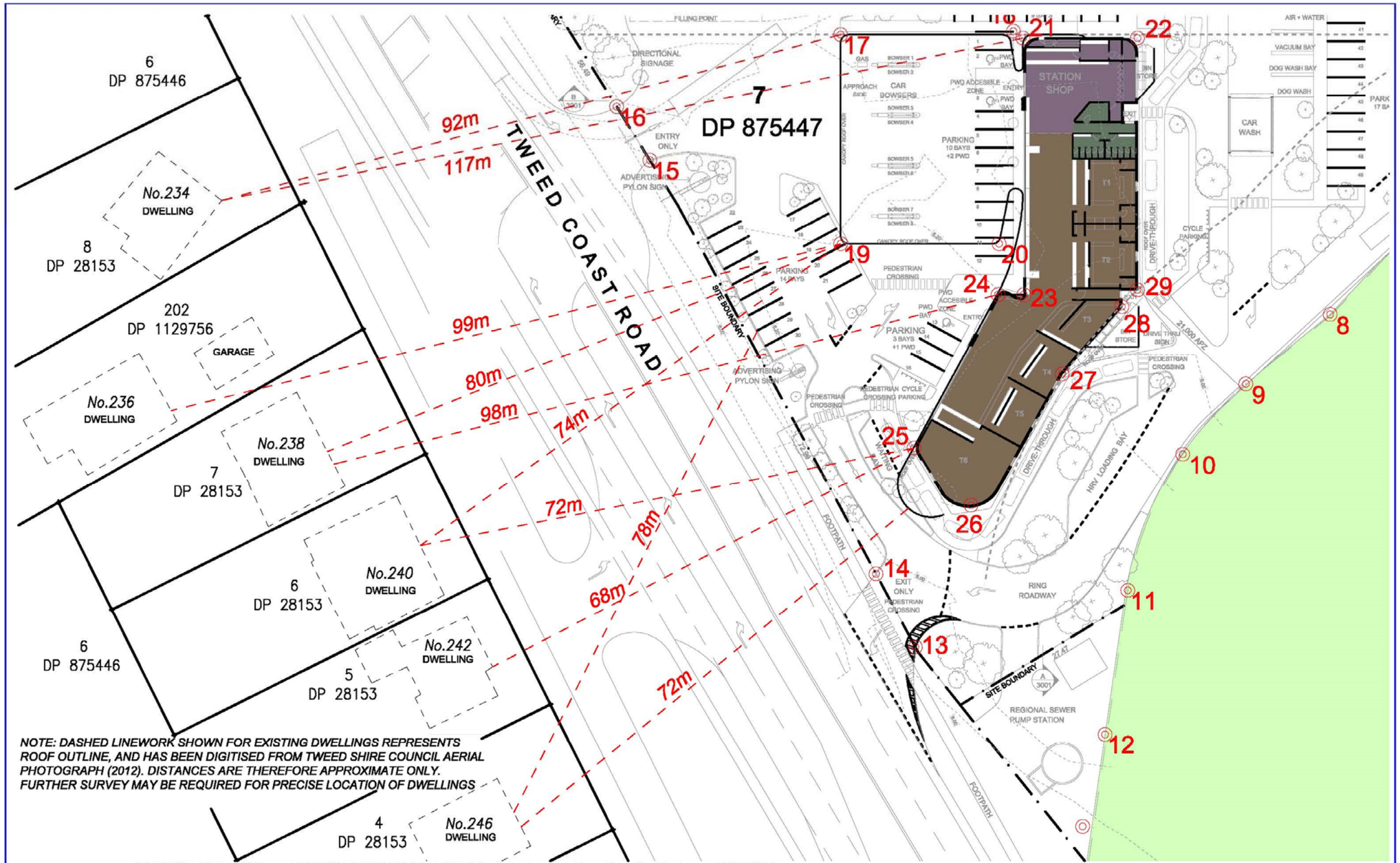
- Nuisance lighting that may be caused by the headlights of entering and exiting vehicles.
- Proposed Tweed Coast Road Lighting.

3.0 DESIGN PHILOSOPHY FOR EXTERNAL LIGHTING.

As has been stated in the above section it has been identified that there are four (4) areas which may have negative impact on the dwellings located on Old Bogangar Road. This section of the report will address the design philosophy that would need to be adhered to for to reduce the negative effects to these properties.

EXTERNAL CARPARK LIGHTING SYSTEM

The nearest car parking spaces are situated between 55 to 60 metres (see attached Land Survey Plan 21/09/16) from the property boundaries which may be effected in relation to the spill light from this lighting system. The design initiatives that would be implemented as part of the future design to the carpark lighting to reduce the risk of the spill lighting into the properties located on Old Bogangar Road are:-



NOTE: DASHED LINEWORK SHOWN FOR EXISTING DWELLINGS REPRESENTS ROOF OUTLINE, AND HAS BEEN DIGITISED FROM TWEED SHIRE COUNCIL AERIAL PHOTOGRAPH (2012). DISTANCES ARE THEREFORE APPROXIMATE ONLY. FURTHER SURVEY MAY BE REQUIRED FOR PRECISE LOCATION OF DWELLINGS

DRAWING USED: 1000 Issue M '*160831 KINGS FOREST- SITE PLAN.dwg*' received from Push Architecture on 31/08/2016

REVISION A 23/09/2016 - LOT DESCRIPTIONS AND STREET NUMBERS ADDED

www.dialbeforeyoudig.com.au

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BY RELEVANT AUTHORITIES BEFORE ANY WORK IS COMMENCED

DIAL 1100 BEFORE YOU DIG

LANDSURV PTY LTD
REGISTERED SURVEYORS & DEVELOPMENT CONSULTANTS
14 ENID STREET TWEED HEADS NSW 2485
Ph. (07) 55366467 Fax (07)55367489 email: macsurv@landsurv.com.au

TITLE
PLAN SHOWING DISTANCES FROM CLOSEST DWELLINGS
PROPOSED DEVELOPMENT - KINGS FOREST SERVICE CENTRE
TWEED COAST ROAD, CUDGEN NSW

LEVEL DATUM: AHD ORIGIN: PM75894 RL 4.603 (AHD)

CLIENT : LEDA	SCALE 1: 500 AT A3
DATE OF SURVEY:	
DATE: 21/09/2016	REVISION A
DRAWN: CBS	SHEET 1 OF 1
CHECKED: BG	JOB No 34860-2
CAD FILE No.: 34860-2_SIGHT1	

- High quality fixtures to be used with the following photometric parameters:-
    - Side and/or forward throw distribution that has been specifically design for the use of street lighting/carpark lighting.
    - Exceptional rear cut off.
- Mounting heights of pole fixtures not to exceed 6 metres
- Aiming of car park pole mounted luminaires i.e. ensure that rear cut off of the fixture is aimed towards the property boundary of the services station
- The Australian Standard AS4282 is adhere to for the level of obtrusive lighting reaching the property boundary.

The existing acoustic fence that is currently constructed at 1.9 metres, also needs to be considered as an element that would assist in any spill light from the carpark lighting system reaching the property boundary of the dwellings on Old Bogangar Road. It is proposed to increase the height of the acoustic fence to 2.5 metres. The only area where this spill light could have the potential to penetrate beyond the acoustic fence is the gap between the fence for the intersection of Old Bogangar Road and Tweed Coast Road. However given the distance from the car parking lighting system the spill light from this system would not impact on the residences.

With the design initiatives as stated, the acoustics existing fence and the distance the Old Bogangar Road residences are from the boundary of the proposed services station, the spill lighting from the carpark lighting system will not impact on these residences.

SERVICE STATION CANOPY LIGHTING SYSTEM

Given that the design lighting levels for the fuelling area beneath the canopy will be high due to the requirements of the fuel retailer. The design to achieve the high level of illumination would need to incorporate the maximum permissible levels of obtrusive lighting at each of the services station boundaries.

Given that the services station boundary closest to the Old Bogangar Road residence is the western boundary and that the closest point of the service station canopy is located 18 metres (see attached Land Survey Plan) from this boundary, the maximum permissible level of the obtrusive lighting can quite easily be met. Also this western boundary is located approximately 50 metres from Old Bogangar Road residence boundary therefore the spill lighting from the canopy lighting system would not reach these boundaries especially since the acoustic fence will block any spill lighting from the canopy lighting system.

Another positive design effect is the distances from the canopy to the residential dwellings (see attached Land Survey Plan). These distances reduces in the viewing angle from the dwellings and therefore assist in the reduction of glare that is viewed.

However further to these positive design initiatives, additional parameters specifically to the luminaire can be implemented as part of the future design to the canopy lighting to further reduce the risk of the spill lighting and glare into the Old Bogangar Road neighbouring properties.

- Recessed canopy luminaires should be installed.
- Position of lamp/LED should be positioned to create a baffle between the lens and reflector
- Glare control of the fixture should have a rating of UGR 25 or better
- Maximum beam width of 36^0 (medium) to be used
- The Australian Standard AS4282 is adhere to for the level of obtrusive lighting reaching the property boundary.

FAST FOOD DRIVE THRU AREAS

In reviewing the location of the drive through in relation to the property boundaries of the residences on Old Bogangar Road, the location of the existing acoustic fence would act as a barrier to block the majority of the car headlights that would be associated with driving thru this driveway (See attached Landscape Plan PUSH Dwg No. 5000, Issue C). Along with the lighting fixtures that would be used for the drive thru ordering area the lighting from these systems would not impact on the Old Bogangar Road residence.

However there would be some minimal impact to the residents on Lot 4 No 246 and Lot 5 242 due to the break in the existing fence for the Old Bogangar Road and Tweed Coast Road intersection. This minimal impact could be mitigated by providing dense hedge screening to a minimum height of 1.3 metres in the location shown in figure 1 (See attached Landscape Plan).

FAÇADE LIGHTING OF PORPOSED SERVICE STATION, FOOD AND DRINK BUILDING.

In reviewing the future façade signage lighting of the Proposed Service Station, Food and Drink building the following parameters where considered:-

- Orientation of the building in relation to the property boundaries of the residences located in Old Bogangar Road.
- The distance the facades are located from the property boundaries of the residences located in Old Bogangar Road.
- The viewing angle from the property boundaries of the residences located in Old Bogangar Road when the resident is standing parallel with their property boundary in relation to the proposed façade signage lighting for the proposed service station, food and drink building..

In considering these parameters the following comments in relation to the proposed façade signage lighting systems to the proposed service station, food and drink building can be made:-

- The orientation of the façade signage lighting in relation to the viewing angles of the residences in Old Bogangar Road as described means the lots 2/250, 1/252 and 1/254 and part of lot 4/246 would not be able to view the front façade illuminated signage. Therefore there would be no visual impact or light spill issue to these lots from the proposed façade illuminated signage.
- The distance lots 5/242, 6/240, 7/238 and 8/234 are located from the proposed façade, means that any light emitting from the proposed signage would not spill into these properties.
  The orientation of the façade signage lighting in relation to the viewing angles of the residences in Old Bogangar Road as described means that a section of lot 4/246 (refer figure 1) and all of lots 5/242, 6/240, 7/238 and 8/234 could view the proposed façade illuminated signage and this proposed façade illuminated may provide a visual impact to the residences

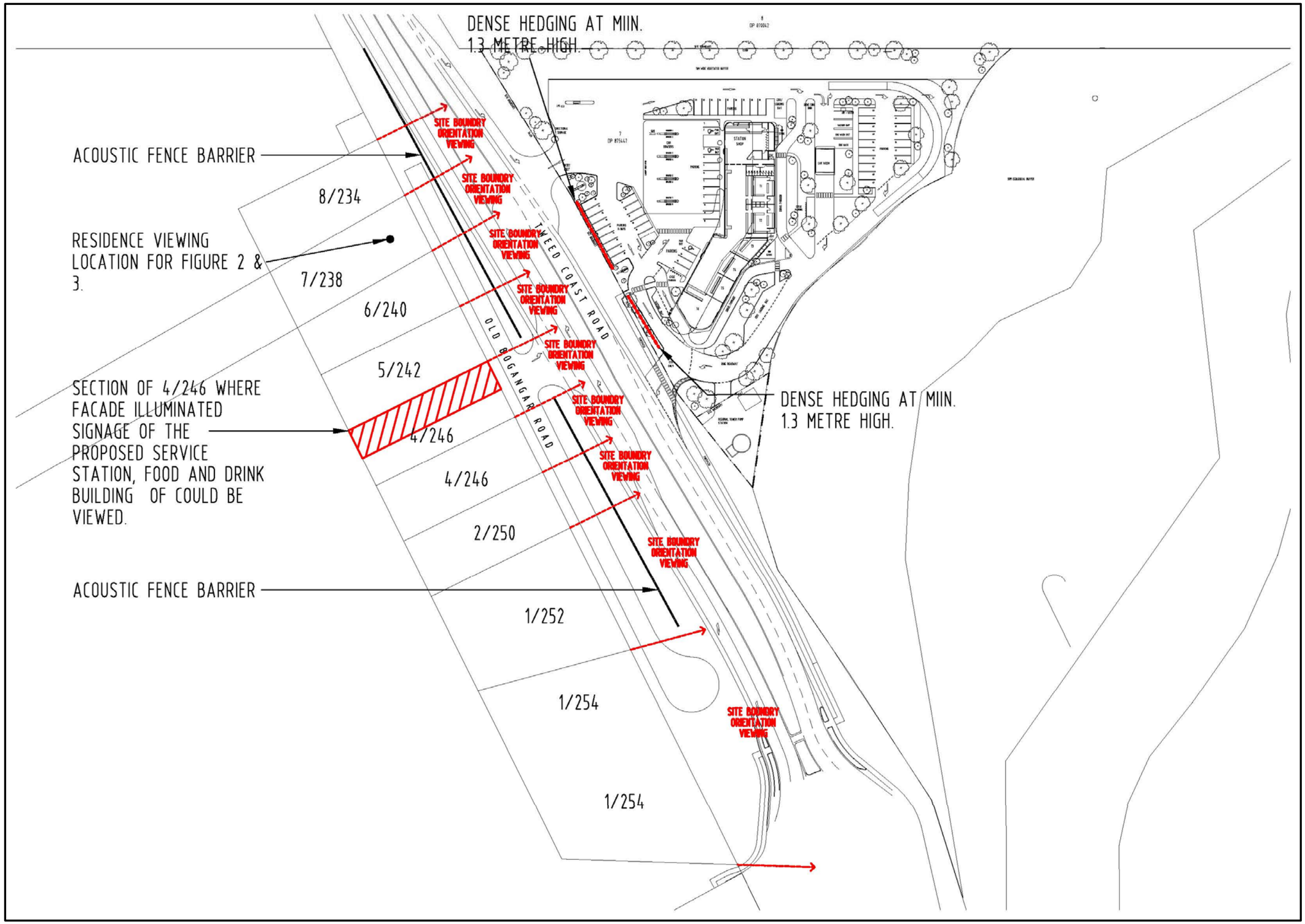


Figure 1 – Site Boundary Orientation

For lots 5/242, 6/240, 7/238 and 8/234 the spill light from the front façade illuminated signage will not reach these properties and therefore are not an impacted. These lots will however be able to view the signage which may cause a visual impact to the residents. This condition can be easily rectified by increasing the height of the acoustic fence to 2.9 metres north of the Old Bogangar Road intersection. Increasing the height of the fence to 2.5 metres, as proposed in figure 3 does not mitigate the visual effect of the façade signage from the viewing point of the front of the dwelling for Nº238. The minimum height extension requirement of 2.9 metres would mitigate this visual effect (refer to figure 2). For any person that is located nearer to the acoustic fence from the figure 2 design distance their viewing angle to the front façade is increased. Therefore the increased viewing angle height in relation to the fence height would block the front façade.

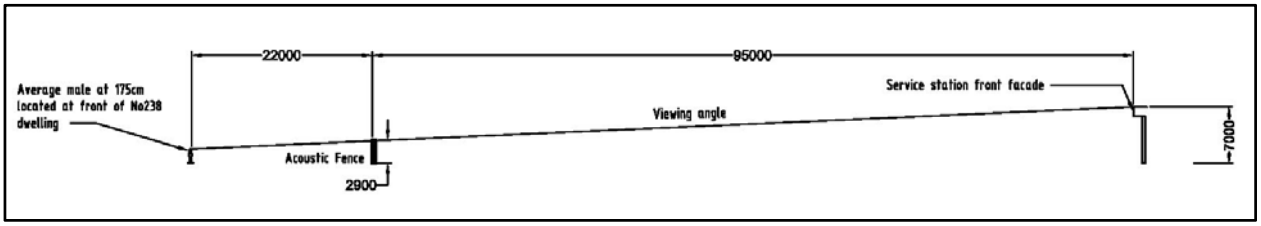


Figure 2 –Viewing Angle from Lot 7 (No. 238)

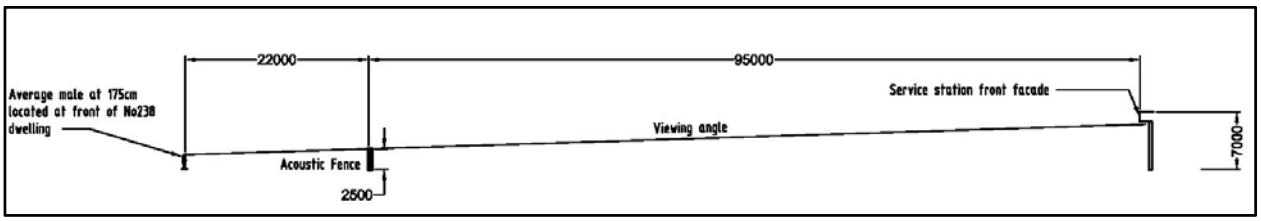


Figure 3 –Viewing Angle from Lot 7 (No. 238)

CAR HEADLIGHTS

As can be seen from figure 4 the service station is being designed so that entry into the service station will be on the northern end of the development. This means that for south bound traffic the headlights of the car will at no time in turning into the services station effect the properties in Old Bogangar Road. For the north bound traffic again entering into this services station via the turning lane being provided, the headlights of the cars at no time will effect these properties.

For the exiting cars there has been only one exiting point provide on the southern end of the site. Referring to figure 3 it can be seen that headlights of the exiting car could have affected lots 1/252 and 1/254, however since there is an existing acoustic fence, the fence shields these lots from headlights and removes the impact the headlights have on these lots.

For cars parking on the western boundary of service station their headlights of the cars could have affected lots 5/242, 6/240, 7/238 and 8/234 in Old Bogangar Road, however since there is an existing acoustic fence, the fence shields these lots from headlights and removes the impact of the headlights..

However there would be some minimal impact to the residents on lot 4/246 and 2/250 from the car headlights swinging in and out of the car parks due to the break in the existing fence for the Old Bogangar Road and Tweed Coast Road intersection. This minimal impact would be mitigated by providing dense hedge screening to a minimum height of 1.3 metres in the location shown in figure 1 (see attached Landscape Plan).

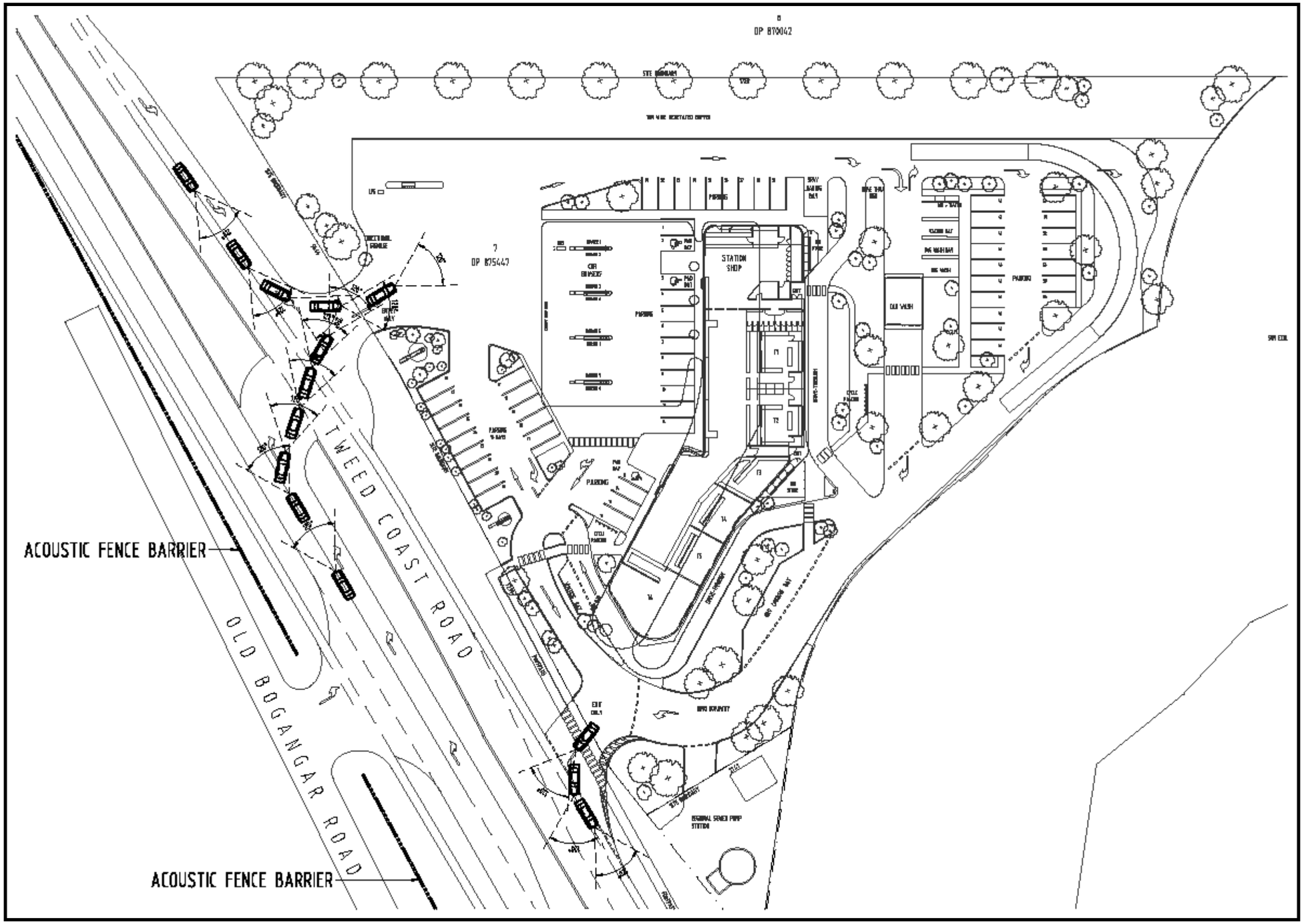


Figure 4 – Headlight Angle for Entering and Exiting Cars

Figure 5 – Push Proposed Landscape Plan.

ALL OTHER EXTERNAL AREAS

The lighting systems for all the rest of the external areas of the services station would be located due to their orientation and location within the site as not to affect the properties in Old Bogangar Road.

ROAD LIGHTING TO TWEED COAST ROAD

Separate to the proposed service station development the proposed Tweed Coast Road road lighting that will be occurring due to the Kings Forrest residential development needs to be considered.

Under the Australian Standard 1158.1.1:2005 Lighting for Roads and Public Spaces Part 1.1 Vehicular Traffic (Category V) lighting, the Tweed Coast Road would be deemed a distributor road. With this definition the design category Tweed Coast Road would require to be design to is Category P4. Whether or not the service station development would proceed this road lighting system has to be installed.

Figure 4 indicates the pole location and Isolux levels of this road lighting system to category P4. As currently there is no road lighting to either Old Bogangar Road or Tweed Coast Road for the area of figure the residences currently have no visual impact at night from a road lighting system.

With the future addition of a road lighting system to the Tweed Coast Road the visual impact that residents will have from this road lighting system to them will be significant. As this road lighting system will be the closest lighting system to the residences it is our opinion that this system will have a greater effect on the residences than the proposed service station.

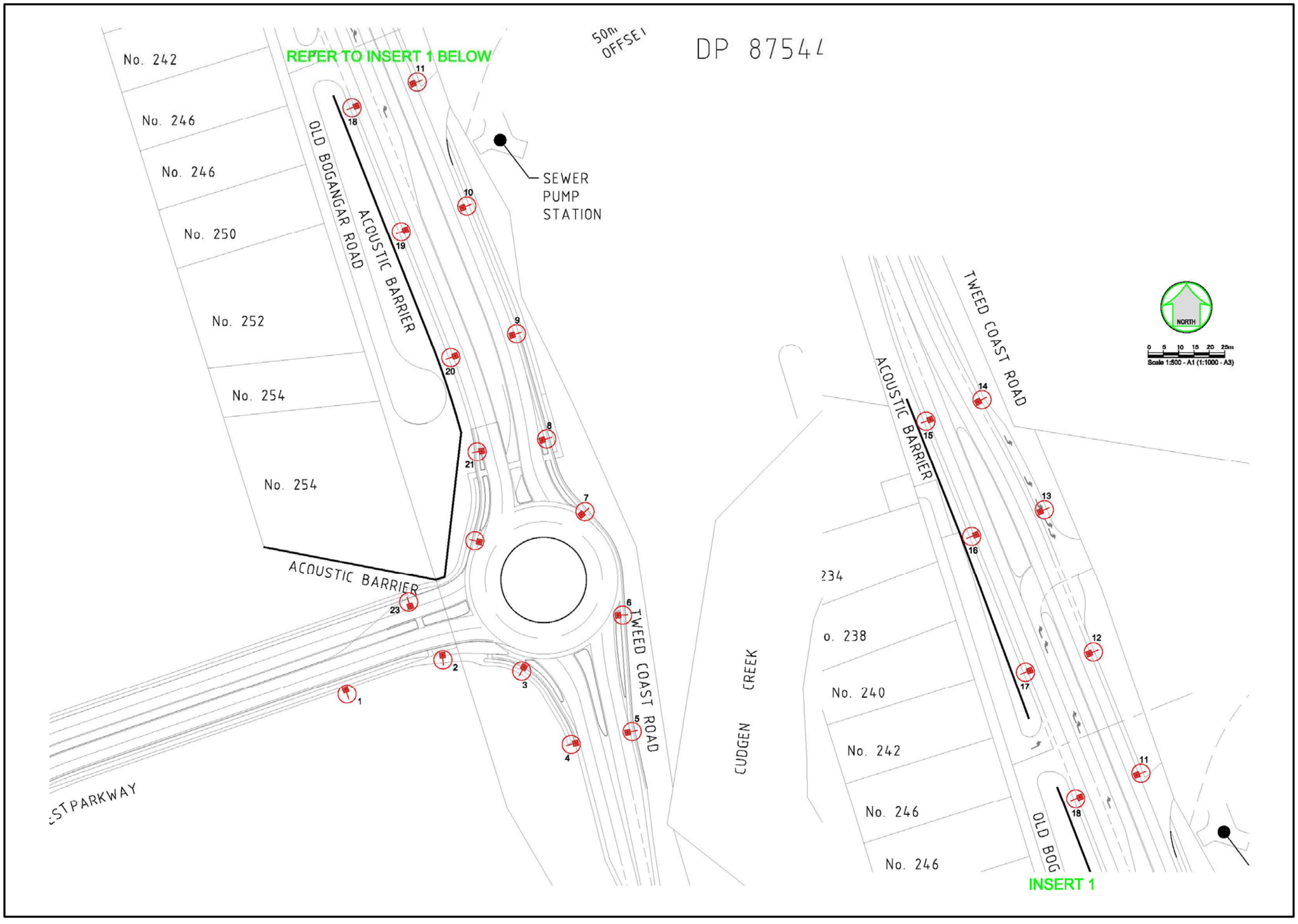


Figure 4 – Category P4 Lighting Design for Tweed Coast Road

4.0 SUMMARY

In summary with the below parameters being adhered to:-

- High quality fixtures to be used with the following photometric parameters:-
    - Side and/or forward throw distribution that has been specifically design for the use of street lighting/carpark lighting.
    - Exceptional rear cut off.
- Mounting heights of pole fixtures not to exceed 6 metres
- Aiming of car park pole mounted luminaires i.e. ensure that rear cut off of the fixture is aimed towards the property boundary of the services station
- The Australian Standard AS4282 is adhere to for the level of obtrusive lighting reaching the property boundary.
- Distance of the Canopy Lighting from the residential boundaries.
- Orientation of the service station shop/fast food tenancies building in relation to the property boundaries of the residences located in Old Bogangar Road.
- The distance the facades are located from the property boundaries of the residences located in Old Bogangar Road.
- The viewing angle from the property boundaries of the residences located in Old Bogangar Road to the façade of the building.
- The location of the acoustic fence.
- The entry and exit points.
- Increase the acoustic fence height to 2.9 metres north of the intersection of Old Bogangar Road and Tweed Coast Road to mitigate the visual impact of the service station façade illuminated signage.
- Dense hedging planted to mitigate car headlights spillage.
- The future installation of the category P4 road lighting system to Tweed Coast Road will provide a more visual impact to the residences in Old Bogangar Road than the Services Station Development lighting.

MDA Consulting Engineers are of the opinion that the future design of the external lighting systems to the Service Station on the Tweed Coast Road, Kings Forest should not have a negative impact on the properties located in Old Bogangar Road.

Yours faithfully

Vaughan Oxenford
TMIEAust, AIES
Senior Associate
Senior Electrical Engineer