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AQUATIC CENTRE REDEVELOPMENT
CNR HILL AND WARRENDINE STREETS
ORANGE NSW 2800

CONSIDERATION OF NOISE EMISSIONS ASSOCIATED WITH PROPOSED REDEVELOPMENT OF THE FACILITY

Prepared on behalf of:
Greenway Hirst Page Pty Ltd
November, 2010
Ref. 10944-2dkg

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1. INTRODUCTION

The Orange Indoor Aquatic Centre will be redeveloped. The major addition will be the addition of a building enclosed 25 metre swimming pool.

The facility upgrade will also include the relocation of the main entrance to the north east corner of the eastern façade of the new pool building.

The Council have requested further information in regard to noise associated with the following:

1. Measures incorporated into the design to control mechanical services noise control so to minimise the likelihood of the propagation of unreasonable noise to nearby residential locations and to the pool area itself.

2. Comments relating to traffic noise changes which may occur from the redevelopment.

3. Comments relating to occupant noise changes.

2. SITE ENVIRONS AND DEVELOPMENT LAYOUT

2.1 MECHANICAL PLANT

The new pool will be constructed in a new building to be located in the south east corner of the site.

The mechanical services equipment for the building ventilation equipment and pool filtering will be located in a mezzanine plant room at the southern end of the building and in a plant room below the raked seating plats also at the southern end of the pool building.

It has been determined that the façade of the new building including the plant rooms will be approximately 30 metres from the facades of the nearest residences located opposite the new building on the southern side of Warrendine Street.

2.2 TRAFFIC FLOW CHANGES

The writer has relied upon a traffic report prepared by Geolyse Consultants Ref 210180 REO 002TRAFFIC.DOCX.

The traffic report provides measurements of existing traffic flows in Hill Street, National Avenue and Warrendine Street. Pages 7 and 12 have been appended to this report describing the changes.

The redevelopment will include the creation of a parking area on site between the eastern facade of the new pool building and Hill Street. The car park will provide provisions for the extra occupants as well as replacing some of the on-street parking that occurs currently.

The change of traffic flows has been predicted to be less than 20% on any of the roads surrounding the pool.

Traffic noise level increases will equal 10 times log. new traffic volumes divided by existing traffic volumes.

Based on a 20% traffic flow increase, the noise levels will increase be less than 1 decibel. A 1 dB noise level increase would not be observed as a significant adverse change.

2.3 OCCUPANT CHANGES

The writer has relied on personable observations and experience, in particular the 35 years of acoustic consulting experience whereby the writer's firm has never been asked to review noise impacts associated with occupant noise from an indoor pool or investigate any excess noise emission issues from occupants using an indoor pool.

3. MECHANICAL PLANT NOISE LIMIT DESIGN OBJECTIVES

3.1 AT NEARBY RESIDENCES

Suitable noise limits will be those whereby the new noise sources will blend with the existing noise environment but do not dominate it.

The existing noise environment at the nearest residence will result predominantly from vehicle movements near to and more distant from the site.

The lower levels of the existing noise environment (known as the background noise) will be due to more distant vehicle movements.

It will be reasonable to set the design objective noise limits from the new plant to not exceed the lower levels of the ambient background noise by a value in the order of 5 dB(A)[(1)] during the day period (7.00 am to 6.00 pm) evening period (6.00 pm – 10.00 pm) and night period (10.00 – 7.00 am).

Based on a review of the aerial photos of the residential development surrounding the new building and past experiences of measuring noise in such environments, and the traffic flow data, it has been estimated that the ambient background noise (lower levels of the ambient noise) will be as follows:-

Day time	45 dB(A) L_{90} [(2)]
Evening	39 dB(A) L_{90}
Night time	34 dB(A) L_{90}

The Council has provided some measured ambient background noise data for two sites within Orange precinct. The results of these measurements are described below.

	Site 1	Site 2
Day time	47 dB(A) L_{90}	35dB(A) L_{90}
Evening	41 dB(A) L_{90}	35dB(A) L_{90}
Night time	34 dB(A) L_{90}	30dB(A) L_{90}

For the crucial evening and night time periods one site has equal or greater background noise values than predicted values and the other site several decibels lower.

The lower noise level site has daytime noise levels of 35dB(A)L_{90} qualifying the site as an especially quiet site and not consistent with sites with traffic flows as described in the traffic report.

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(1) **dB(A)** Decibels (dB) recorded on a sound level meter, which has had its frequency response modified electronically to an international standard, to quantify the average human loudness response to sounds of different character.

(2) **L_{90}** This noise level is indicative of the low noise level events. Often described, when applied to ambient noise adjacent to residential locations, as the background noise level. It is the noise level exceeded for 90% of the observation period, i.e. the noise level exceeded for 54 minutes for every 60 minutes of observation.

The Design Objective Noise limits adopted for the new plant will be as follows:-

Day time	48 dB(A) L_{eq} [3]
Evening	42 dB(A) L_{eq}
Night time	37 dB(A) L_{eq}

3.2 WITHIN THE POOL AREA

The noise within the pool area from the plant needs to be quiet enough for comfortable speech communication while acknowledging the size and noise output from the equipment necessary to move the volume of air necessary to ventilate the pool volume. It is proposed that a design objective of 55dB(A) L_{eq} with no point higher than 60dB(A) L_{eq} will achieve this objective.

4. MECHANICAL NOISE SOURCES

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The significant noise sources requiring noise control consideration will include the following:-

Source	Estimated Noise Levels
Pool Room Pumps	80 dB(A) in low level plant room south end of new building
Dehumidifiers (3 off)	Three fan units outputting up to 6500 litres/second Upper level plant room above pool plant room

Sound power level data provided by Manufacturer dB re 10-12 watts

	Octave Band Centre Frequency, Hz						
	63	125	250	500	1k	2k	4k
Exhaust (free field)	86	92	91	87	86	85	86
Supply (in duct)	96	97	94	88	87	86	86

5. PLANT ROOMS

5.1 POOL PLANT ROOM

The pool pump and filtering equipment will be the only significant plant needing to operate during the night period.

The ground floor pool plant room will be constructed with external walls of 140 mm hollow concrete blocks.

The common plant room wall with the pool area will be concrete. The raked seating plats forming the ceiling of the pool plant room will also be concrete.

The plant room will include air grilles above the person access door on the eastern facade.

A roller door or double panel solid timber core door will be provided in the eastern facade for equipment removal.

[3] **Leq** A special kind of average maximum noise level based on the energy of a noise that may vary in level over a period of time.

The room air inlet grille will need to include a 300 mm deep acoustic louvre to adequately control the night time noise emissions to allow compliance with the proposed design objective.

The acoustic performance for the acoustic louvre will need to be equal or greater than the following:-

	Insertion Loss, dB Octave Band Centre Frequency, Hz					
63	125	250	500	1k	2k	4k
3	7	9	11	14	13	15

5.2 DEHUMIDIFIER PLANT PLATFORM

The plant platform basic design will include metal deck roofing with conventional foil and fibrous thermal insulation.

The external walls will include 9 mm Versilux or other cement sheet fixed to outside of a steel or timber framed stud wall. The inside of the wall between the wall studs should include a 75 mm layer of 20kg/m^3 fibrous insulation. The fibrous insulation will be faced with perforated foil or perforated metal.

The plant platform will be separated by a wall, from the pool area.

The wall can be constructed at the location where the rectangular supply air ducts transition to round.

The wall can be constructed with 6 mm thick Versilux or cement sheet on each side of a 90 mm thick stud with 75 mm x 20 Kg/m^3 polyester or fibreglass fibrous insulation installed in the cavity.

The walls will need to be well sealed to the surrounding structure.

The plant platform floor will be constructed from 3mm thick checker plate aluminium and plywood.

It is recommended that the checker plate platform section of the floor that projects above the raking seating area have a suspended ceiling installed. The ceiling should be constructed from 6 mm Versilux or cement sheet.

The void between the checker plate and the ceiling should include 75 mm x 20Kg/m^3 fibrous insulation.

6. DUCTING NOISE CONTROL TREATMENTS

6.1 DEHUMIDIFIER – RETURN AIR DUCTS

Return air ducts to the inlets to the dehumidifiers are currently shown to have 50 mm thick internal acoustic lining. The acoustic lining should be increased to 100 mm internal acoustic lining. Any turn vanes installed inside the ducts should be made from perforated metal or the bends created as acoustic square backed bends.

6.2 DEHUMIDIFIER – SUPPLY AIR DUCTS

It is recommended that 100 mm internal acoustic lining be installed from the fan discharges for a distance of at least 3.5 metres. The acoustic lining should be faced with perforated sisalation or perforated metal 11%.

The acoustic lining should not include mylar facings. If a facing material is required it can be Baron Fibreglass AFT membrane. This membrane creates minimal downgrading of the acoustic lining performance while providing a moisture barrier.

6.3 EXHAUST AND CONDENSER AIR DISCHARGES

It is recommended that the entire length of the discharge duct to the underside of the metal deck roof be internally lined with 75 mm internal acoustic lining.

6.4 EXTERNAL FACADE AIR INLET GRILLES

It is assumed that the dehumidifier fans will not need to operate after 10.00 pm. The noise control requirements will need to be sufficient to achieve evening time noise limits at the nearest residences.

Based on the evening time noise limit criterion described above, the inlet grilles will need to be fitted with acoustic louvres.

The louvres will have to be 600 mm. deep.

The acoustic performance will need to be at least equal to the following:

	Insertion Loss, dB					
	Octave Band Centre Frequency, Hz					
63	125	250	500	1k	2k	4k
3	8	16	21	27	27	24

Based on the Manufacturer supplied noise data and standard noise propagation allowances the predicted resulting noise levels at the nearest residences will be 39dB(A)L_{eq} .

The supplied noise data does not indicate any character that would require any adverse weighting adjustments to the predicted noise level values before comparing with the design objective noise limits.

7. OVERVIEW

7.1 MECHANICAL PLANT

Several components of the mechanical plant to be installed as part of the pool redevelopment will operate during evenings and night time as well as day time.

The significant noise emitters have been found to require specific noise controls to prevent unreasonable noise to be propagated to the nearby residential locations. These residences will be located on the southern side of Warrendine Street. Noise from the equipment also needs to be controlled to reasonable noise levels within the pool area itself.

Design objective Noise Limits have been determined and recommendations provided to achieve them.

7.2 TRAFFIC NOISE

The existing traffic flows on the nearby road networks surrounding the pool complex are, in absolute volumes, relatively low and so will be the resulting traffic noise levels generated by them.

These relatively low traffic noise levels are reflected in the relatively low design objective noise limits for the mechanical plant.

The increase in traffic flows from the redevelopment will be less than 20% on any of the surrounding roads. A 20% increase in traffic volume will produce a less than 1 decibel increase in traffic noise, all other things being equal.

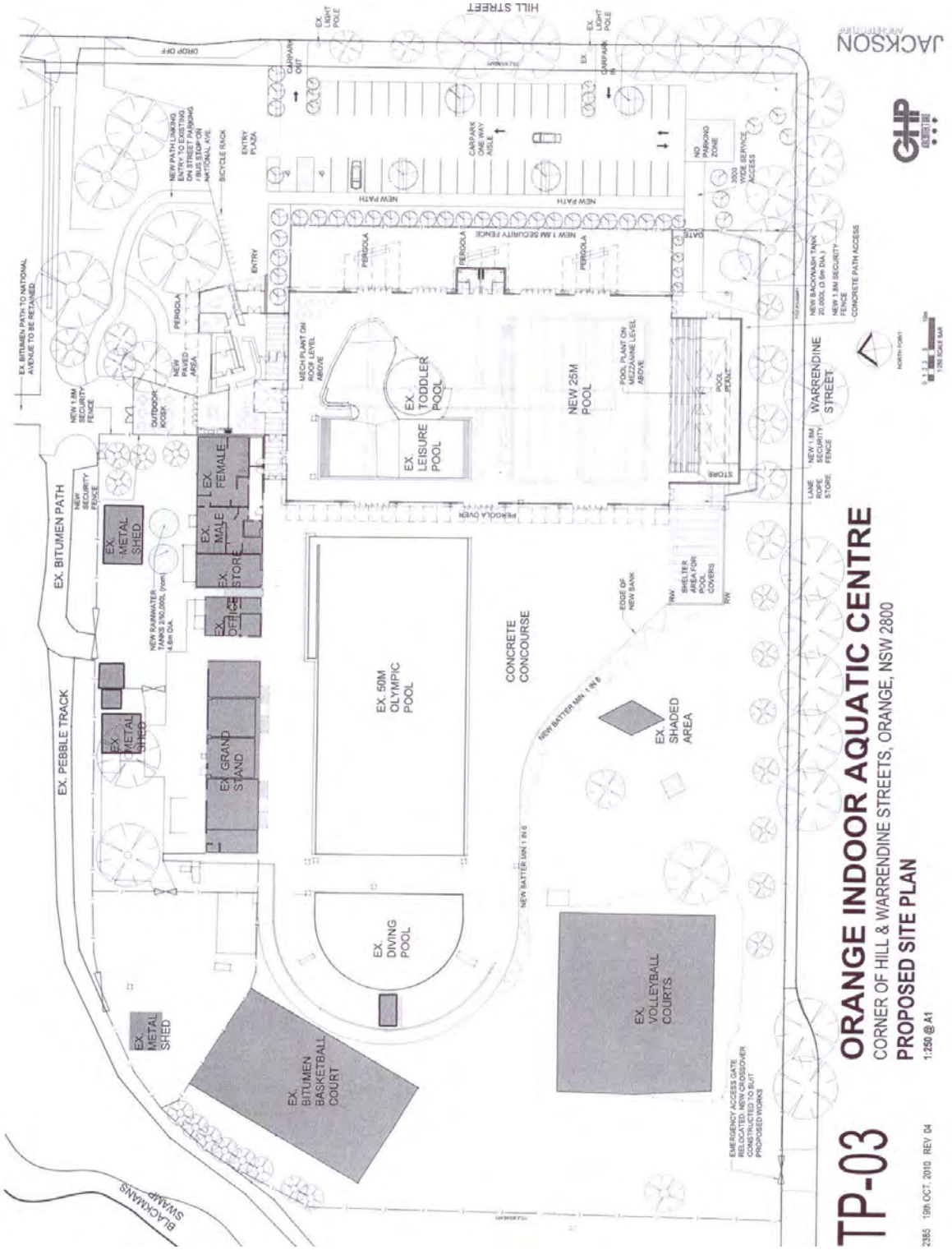
This increase in traffic noise will not be noticeable as an adverse change by nearby residents.

7.3 OCCUPANT NOISE

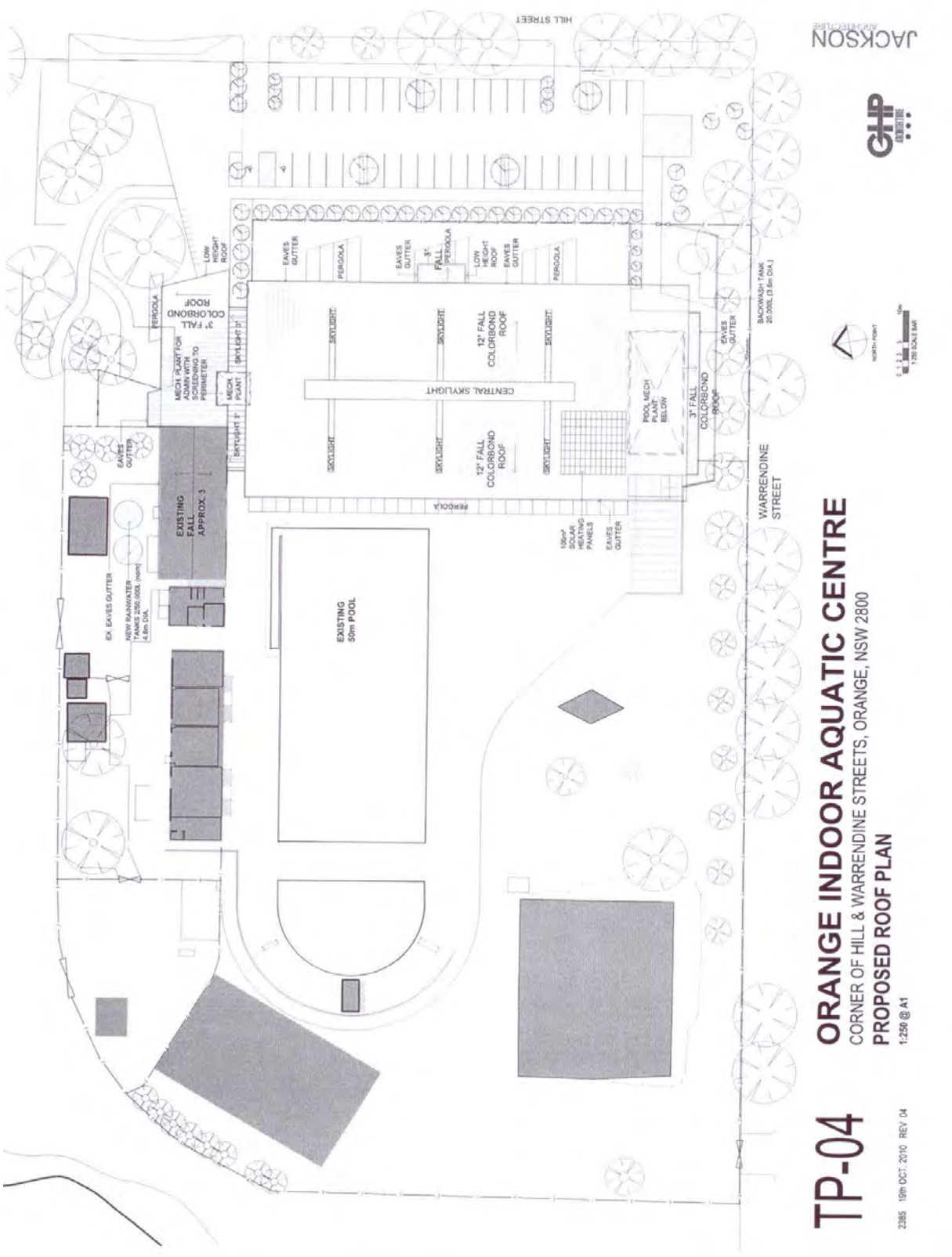
There is no evidence to suggest that the noise from occupiers of the venue have caused adverse change to the existing noise environment now or in the past. Based on the experience of the writer and knowledge of the proposed redevelopment, no adverse noise changes would be anticipated to be observed by the nearby residents.

DOUGLAS GROWCOTT
WATSON MOSS GROWCOTT
acoustics pty ltd

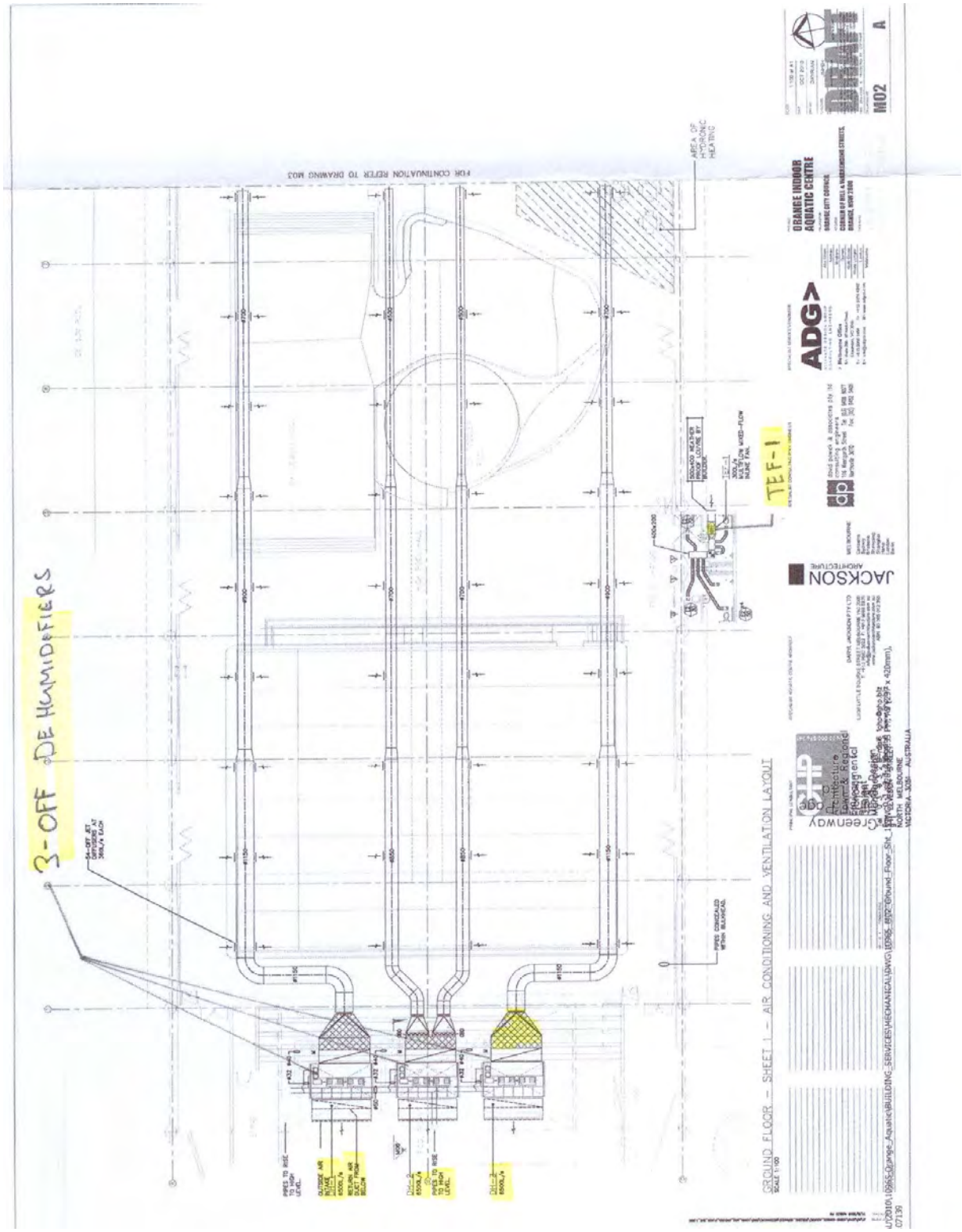
PROPOSED SITE LAYOUT

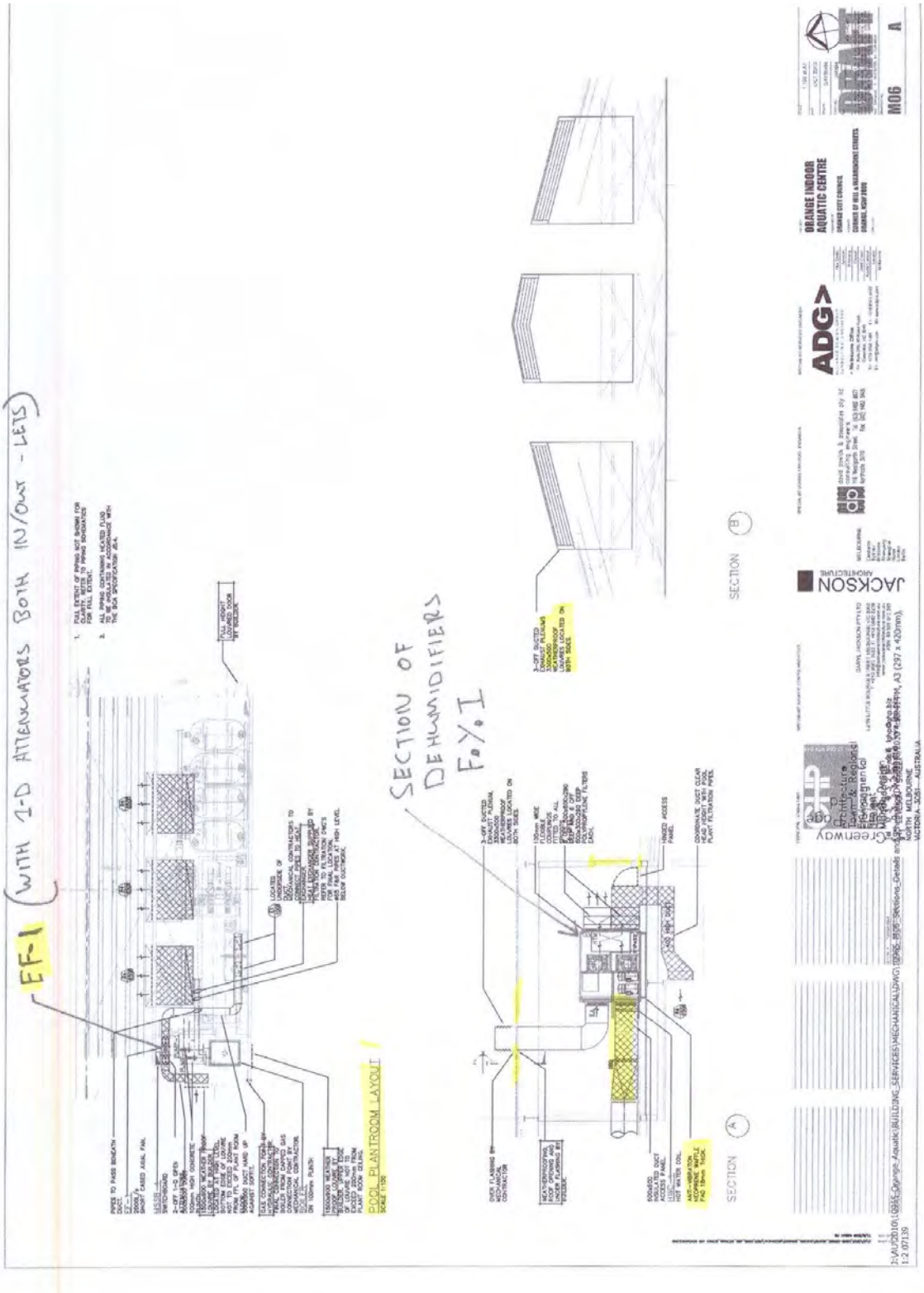


PROPOSED ROOF PLAN

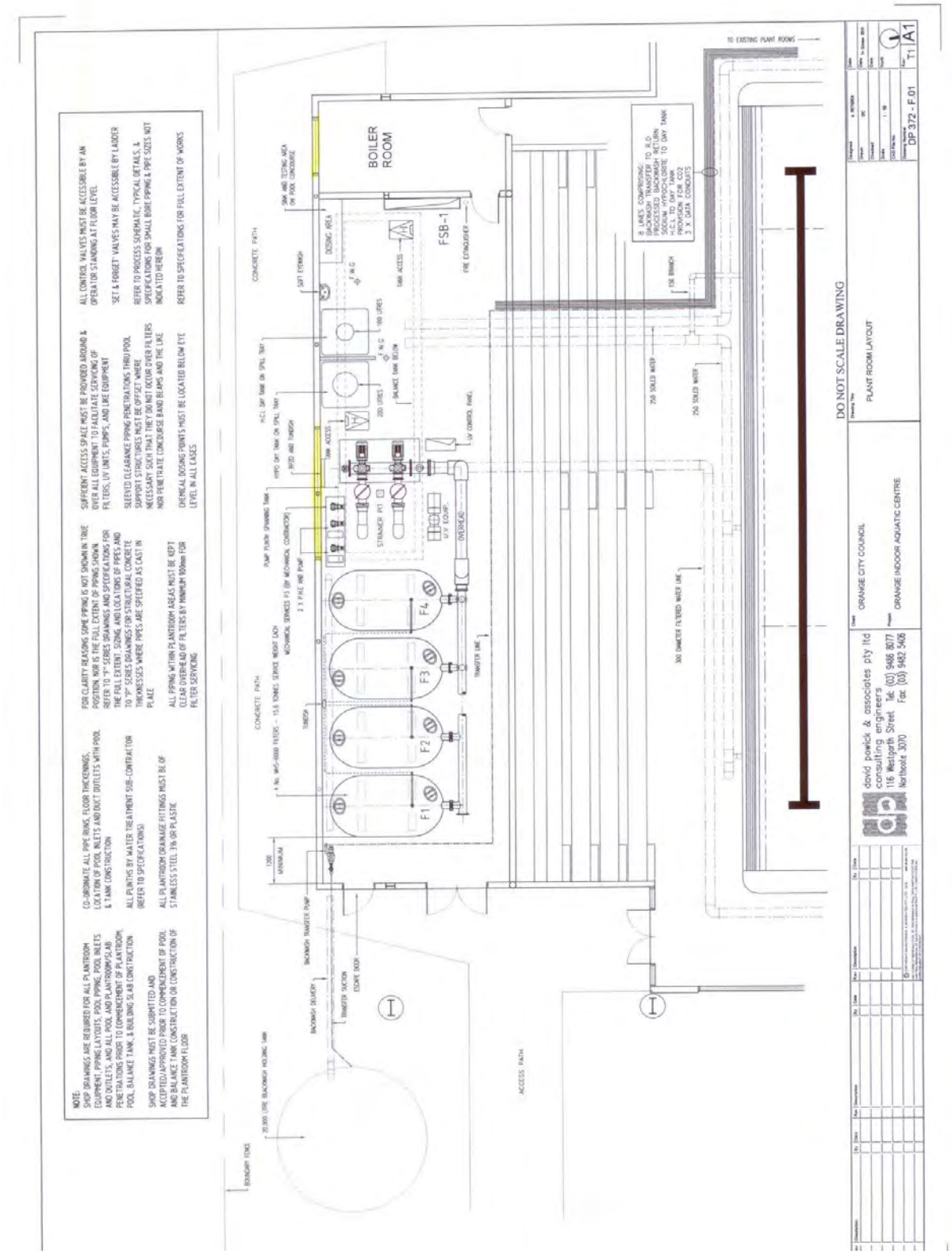


DEHUMIDIFIER INSTALLATION DETAILS




EF-1 (WITH 1-D ATTENUATORS BOTH IN/OUT - LETS)
SECTION OF DEHUMIDIFIERS F.Y.I
POOL PLANTROOM LAYOUT
SECTION (A)
SECTION (B)
ORANGE INDOOR AQUATIC CENTRE
ADG
JACKSON ARCHITECTURE
M06

POOL PLANT LAYOUT



DEHUMIDIFIER NOISE DATA

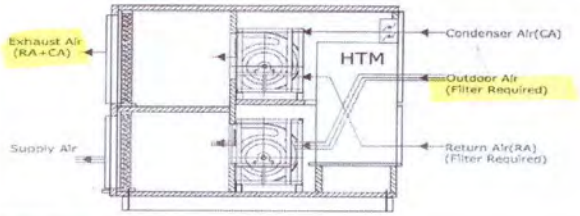
DE HUMIDIFIERS
3-OFF

PRODUCT RANGE: POOLPAC

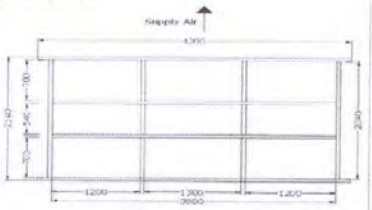
ACPP6500

TECHNICAL SPECIFICATIONS	UNIT	VALUE
Supply Air	L/s	6500
Return Air	L/s	6500
Outdoor Air	L/s	6500
Condenser Air	L/s	2300
Exhaust Air – (RA + CA)	L/s	8800
Compressor Qty		2
Refrigerant Charge (R22 / R407C)	kg/Comp	11.0
Total Compressor Capacity	kW	96
OUTDOOR AIR TO SUPPLY AIR		
Pressure Drop Heat Exchanger	Pa	243
Pressure Drop Evaporator Coil	Pa	140
External Static Pressure Up to	Pa	350
Total Pressure on Supply Fan	Pa	733
SUPPLY FAN		
Fan Speed (max)	rpm	1200
Motor Power	kW	11
Motor Poles		6
Motor Torque	Nm	82.3
RETURN AIR TO EXHAUST AIR		
Pressure Drop Heat Exchanger	Pa	243
Pressure Drop Condenser Coil	Pa	140
External Static Pressure Up to	Pa	350
Total Pressure on Exhaust Fan	Pa	733
EXHAUST FAN		
Fan Speed (max)	rpm	1200
Motor Power	kW	11
Motor Poles		6
Motor Torque	Nm	82.3
CONDENSER AIR		
Fan Qty		N/A
Air Flow	L/s	N/A
Fan Speed	rpm	N/A
COIL SIZE		
Condenser Coil	mm	3410 X 965
Evaporator Coil	mm	3410 X 790
Face Velocity Coil Evap	m/s	2.41
ELECTRICAL POWERING		415/3/50
Current (MCC) (Comp)	A	70
Current (RLA) (Comp)	A	45.6
Supply Fan FLA	A	21.2
Supply Fan LRA	A	137.8
Exhaust Fan FLA	A	21.2
Exhaust Fan LRA	A	137.8
Make Up Fan FLA	A	91.9/90.9/90.9
Nominal Running Current	A	89.0/88.0/88.0
Full Load Amps	A	113.4/112.4/112.4

PoolPac Schematic:



Base Dimensions:



Overall Dimensions
Height:2070 mm (Body 2060)
Width: 4200 mm (Body 3350)
Depth: 2350 mm (Body 2270)
Weight
2500kg
Spigot Size
Supply Air (3360 X 740)
Return Air (3900 X 620)
Exhaust Air (3360 X 920)
Outdoor Air (3900 X 1020)

General
6500L/s PoolPac with Dual Stage Heating and Cooling

Allow 2.0m clearance from doors to ensure adequate space for proper service and maintenance

Sound Power Levels dB

Exhaust – Free Field

63	Hz	85.8
125	Hz	91.5
250	Hz	91.3
500	Hz	86.8
1000	Hz	86.4
2000	Hz	85.4
4000	Hz	85.5
8000	Hz	80.4
Total	Hz	96.9

Supply - In Duct

63	Hz	96.2
125	Hz	97.2
250	Hz	93.7
500	Hz	87.6
1000	Hz	86.7
2000	Hz	85.5
4000	Hz	85.5
8000	Hz	80.4
Total	Hz	101.3

EXTRACT FROM TRAFFIC REPORT

Table 2.2 – Existing Daily Traffic and Calculation of Existing AADT

Traffic Count Description	Hill Street (vehicles/day)	National Avenue (vehicles/day)	Warrendine Street (vehicles per day)
Off Season Base Daily Traffic	2,111	231	1,074
Additional In Season Peak Daily Traffic	388	970	194
Additional In Season Average Daily Traffic	259	647	129
Additional Annual Average Daily Traffic	119	298	60
Total Annual Average Daily Traffic	**2,230**	**529**	**1,134**

2.5 EXISTING PEAK HOUR TRAFFIC

The traffic counts undertaken by Council provide information relating to the peak hour traffic volumes on Hill Street, National Avenue and Warrendine Street. Based on the traffic count data in **Appendix A**, the peak hour traffic volumes on the subject roads as follows.

2.5.1 HILL STREET

The recent traffic data (covering 21 September to 5 October 2010) gave an Average Weekday Peak Hour Traffic volume of 221 veh/hour (occurring in the afternoon between 5.00 to 6.00pm)

The older data (covering 11 January to 8 February 2005) gave an Average Weekday Peak Hour Traffic volume of 249 veh/hour (occurring in the afternoon between 5.00 to 6.00pm).

Indexed by an assumed annual growth rate of 2.5% this gives an Average Weekday Peak Hour Traffic volume of 281 veh/hour (occurring in the afternoon between 5.00 to 6.00pm)

2.5.2 NATIONAL AVENUE

The recent traffic data (covering 21 September to 5 October 2010) gave a calculated Average Weekday Peak Hour Traffic volume of 28 veh/hour (occurring in the afternoon between 3.00 to 4.00pm)

It was noted that from the Hill Street traffic counts that the peak hour traffic during the current pool season included an additional 60 vehicles per hour on the southern end of Hill Street during the peak summer period. It is assumed that all these additional vehicles coming from the south end of Hill Street enter National Avenue to access the pool complex and an additional 90 vehicles per hour enter National Street from the north end of Hill Street (assuming a 60/40 spilt of traffic to/from the north and south of Hill Street respectively). Hence the existing peak hour traffic on National Avenue can be calculated to be 178 vehicles per hour.

2.5.3 WARRENDINE STREET

The recent traffic data (covering 21 September to 5 October 2010) gave an Average Weekday Peak Hour Traffic volume of 132 vehicles per hour (occurring in the afternoon between 5.00 to 6.00pm)

(It should be noted that the traffic counts for the eastbound direction were erroneous and in the absence of reliable data it was assumed the traffic was split evenly in each direction.)

Table 3.1 – Comparison of Existing and Post Development AADT

Road	Existing AADT (vehicles/day)	Post Development AADT (vehicles/day)	Change (%)
Hill Street	2,230	2,510	13%
National Avenue	529	331	-37%
Warrendine Street	1,134	1,257	11%

The greatest percentage increase in AADT following the redevelopment of the Aquatic Centre occurs on Hill Street with an increase in traffic volume of approximately 13%. The percentage increase in annual average daily traffic volume on Warrendine Street is approximately 11%. The annual average daily traffic on National Avenue is expected to drop by 37% due to the entry to the Centre being relocated from National Avenue to Hill Street.

The expected peak hour traffic volume of an additional 30 vehicles per hour generated by the redevelopment of the Aquatic Centre will impact on the existing traffic volumes on Hill Street, National Avenue and Warrendine Street. Whilst the relocation of the pool entrance from National Avenue to Hill Street will reduce the peak hour traffic volume on National Avenue the peak hour traffic volumes on Hill Street and Warrendine Street will increase. A comparison of the estimated nominal peak hour traffic volumes on Hill Street, National Avenue and Warrendine Street with the total estimated traffic volumes on the subject roads following the redevelopment of the Aquatic Centre is indicated in **Table 3.2**.

Table 3.2 – Comparison of Existing and Post Development Peak Hour Traffic Volumes

Road	Existing Nominal Peak Hour Volume (vehicles/hr)	Post Development Peak Hour Volume (vehicles/hr)	Change (%)
Hill Street	281	329	17%
National Avenue	178	55	-69%
Warrendine Street	162	182	12%

The greatest percentage increase in peak hour traffic following the redevelopment of the Aquatic Centre occurs on Hill Street with an increase in traffic volume of approximately 17%. The percentage increase in peak hour traffic volume on Warrendine Street is approximately 12%. The peak hour traffic volume on National Avenue is expected to drop by 69% due to the entry to the Centre being relocated from National Avenue to Hill Street.

The percentage increase in the peak hour traffic volume on both Hill Street and Warrendine Street is considered slight. Reference to **Section 2.3** of this Report indicates that both Hill Street and Warrendine Street have a capacity of 1,200 vehicles per hour at a Level of Service B. At this capacity level, the post development traffic volumes of 329 and 182 vehicles per hour, for Hill Street and Warrendine Street respectively, is approximately 27% and 15% of the utilisation of the Level of Service B capacity of each road. Hence the additional peak hour traffic generated by the redevelopment of the Aquatic Centre is easily accommodated by the existing road network.

The impact of the additional traffic generated by redevelopment of the Aquatic Centre on the surrounding road network is limited and the classification of the surrounding roads would not change following the redevelopment of the Aquatic Centre. It should also be noted that the redevelopment of the Aquatic Centre would result in a significant decrease in the peak hour traffic volume on National Avenue.

22nd November 2010

John Boyd
Operations Manager
Orange City Council
ORANGE
New South Wales 2800

Dear John,

Thank you for the opportunity to provide my professional opinion on the potential impact of the proposed development of a car park in the vicinity of the new aquatic centre in Hill Street.

The trees in question are four established Pin Oak (*Quercus palustris*) trees on the north eastern aspect of Hill Street; and essentially I have been asked to determine whether the proximity of the proposed car park will impact on the health and well being of these trees. It is my understanding that the proposed car park will be 7 metres from the base of the identified trees.

In order to do this I have considered and determined where the Tree Protection Zone needs to be located in order to minimise any impact on the health of these trees.

A Tree Protection Zone is an important area around the trunk of a tree in which key feeder and stabilising roots can be found. This area must be protected to prevent instability and minimise the loss of health of the woody root system of the tree. The majority of roots are found within 1 metre of the surface, and most of these are within the top 600mm. Removing topsoil or filling within a tree protection zone can be detrimental to the health of the tree. Most feeder roots are within the first 600mm of soil and extend beyond the drip line of the tree.
The most effective tree protection zone can be determined simply by using the canopy of the tree as a guide This is known as the ‘drip line’. Any earthworks within the drip line of the tree is likely to impact on the root system of the tree. However, in many cases, a tree protection zone in line with the drip line is simply not viable; as every species of tree is different with regards to formation of the canopy and trunk width.

Another method of determining the tree protection zone is the commonly accepted Arboricultural formula called the Trunk Diameter Method.
The Trunk Diameter Method involves measuring the diameter of the tree at breast height (1.5 metres above the ground level). The tree protection zone (also known as Critical Root Zone) is simply ten times this diameter measurement.

Using the trunk diameter method, I have established that the tree protection zone should be 7 metres from the base of these trees and the drip line method also corresponds with this measurement. However, I have also taken a number of other factors into consideration whilst examining this situation.

These trees in this area are well established and I have taken the age (approximately 80 years old) and species of the trees into consideration - Pin Oak species are a very hardy species and extremely tolerant of harsh weather conditions.
The weather conditions experienced in our region over the last 5 - 7 years would commonly be referred to as severe drought and the impact on the trees of the Central

Tablelands district has been significant. Whilst there has been some biological impact on the Pin Oaks in Hill Street; they appear to have withstood these long term conditions very well.

There is currently a pedestrian footpath, and concrete that has been laid up to the base of the trees' trunks which can clearly be seen in the attached photos. It is my understanding that this concrete is to be removed as part of this development process and is to be replaced with an environmentally friendly paving alternative.

I believe that this would be extremely beneficial for these trees as this paving material is able to provide long term sustainability for tree preservation by allowing for aeration and adequate drainage which the existing concrete does not.

I would strongly recommend that in addition to using this paving product, and in order to encourage root growth and maintain future root growth, it is also wise to spread mulch (such as wood chips) to a depth of 10 cm around the base of the trunk within the tree protection zone. This assists in the retention of moisture, provides organic nutrients and reduces the potential of compaction.

The other issue that I have been asked to comment on is the proposed construction of an all-purpose building on the north eastern side of the aquatic centre, and the potential impact on an established Redwood (*Sequoiadendron giganteum*) tree in this vicinity.

The drip line of this tree is approximately 5 metres from the base of the tree and using the trunk diameter method, the tree protection zone would be 15 metres from the base of the tree; this measurement is not viable. It would be my recommendation that the proposed development be 6 metres from the base of the tree; and I am confident that due to the age (approximately 80 years of age) and species of this tree that this tree protection zone is adequate.

It is my understanding that the roots of the Redwood have had to be somewhat disturbed in order to lay some cabling to the building site. With this in mind, it is my professional opinion that any structure needs to be erected using alternative footing designs that allow construction within close proximity to trees. Footings construction methods, such as pier and beam construction, not only involve less soil and root disturbance, but also provide for future root growth without significant structural movements within buildings.

There is currently no existing pathway or paving in this vicinity and it is my understanding that the intention is to use permeable paving for an entrance path to the Aquatic Centre. Whilst I agree with the use of this type of paving material; I strongly believe that the placement of this pathway needs to be as far away from the tree's drip line as possible, with minimal disturbance and compaction to the soil surrounding the tree.

In summary my recommendations would be that:

- A tree protection Zone be established no less than 7 metres from the base of the Pin Oak trees; and no less than 6 metres from the Redwood tree. It is important that these tree protection zones are in place before any construction work commences and kept in place during all construction work undertaken on the site. In order to achieve this, it is critical that the tree protection zones are bound by solid fencing (such as a cyclone fence) of at least 1.5 metres in height and clearly signposted "Tree Protection Zone – Do Not Enter". In addition, this area must not be used to store rubbish or materials

associated with construction work and vehicles must be kept outside the area to avoid compaction. The tree protection zone should remain clear throughout the entire construction period.
- A permeable paving product is used in the immediate areas surrounding the tree bases to ensure adequate aeration and water drainage. This process needs to be completed with minimal disturbance to the immediate areas around the trees.
- Mulch is applied at a depth of 10 cm around the base of the trees within the tree protection zones.

Whilst I have considered the potential risk factors specifically related to this development, it is very important to note that trees are living and breathing organisms. The external influences on them are multifactorial and can include anything from long term weather conditions and existing roads through to microorganisms.

I have prepared this report in accordance to the mandate with which I was provided; if you have any further enquiries regarding this report, please do not hesitate to contact me on 0427 293 157.

Yours sincerely

Hayden Trott
Arborist / Horticulturalist
TREECRAFT NSW

ORANGE CITY COUNCIL

Development Application No **DA 323/2010(1)**

NA10/735 Container PR5086

NOTICE OF DETERMINATION OF A DEVELOPMENT APPLICATION

issued under the *Environmental Planning and Assessment Act 1979*
Section 81(1)

Development Application

Applicant Name:	Orange City Council
Applicant Address:	PO Box 35 ORANGE NSW 2800
Owner's Name:	Crown Land, Orange City Council as Trustees
Land to Be Developed:	Lot 7001 DP 1020319 - 21A Hill Street, Orange
Proposed Development:	Recreation Facility (indoor aquatic centre)

Building Code of Australia building classification: Class 9b

Determination

Made On:	13 December 2010
Determination:	**CONSENT GRANTED SUBJECT TO CONDITIONS DESCRIBED BELOW:**

Consent to Operate From:	14 December 2010
Consent to Lapse On:	14 December 2015

Terms of Approval

The reasons for the imposition of conditions are:

(1) To ensure a quality urban design for the development which complements the surrounding environment.
(2) To maintain neighbourhood amenity and character.
(3) To ensure compliance with relevant statutory requirements.
(4) To provide adequate public health and safety measures.
(5) Because the development will require the provision of, or increase the demand for, public amenities and services.
(6) To ensure the utility services are available to the site and adequate for the development.
(7) To prevent the proposed development having a detrimental effect on adjoining land uses.
(8) To minimise the impact of development on the environment.

Conditions

(1) The development is to be carried out generally in accordance with:

(a) Plan/s numbered 2385 comprising TP-00 Rev 2, TP-01 Rev 2, TP-02 Rev 5, TP-03 Rev 6, TP-04 Rev 5, TP-05 Rev 4, TP-06 Rev 5, TP-07 Rev 4, TP-08 Rev 5, TP-09 Rev 5 and TP-10 Rev 5 (10 sheets)

(b) statements of environmental effects or other similar associated documents that form part of the approval

as amended in accordance with any conditions of this consent.

Conditions (cont)

PRESCRIBED CONDITIONS

(2) All building work must be carried out in accordance with the provisions of the Building Code of Australia.

(3) A sign must be erected in a prominent position on any site on which building work, subdivision work or demolition work is being carried out:

a. showing the name, address and telephone number of the principal certifying authority for the work, and
b. showing the name of the principal contractor (if any) for any building work and a telephone number on which that person may be contacted outside working hours, and
c. stating that unauthorised entry to the site is prohibited.

Any such sign must be maintained while the building work, subdivision work or demolition work is being carried out.

PRIOR TO THE ISSUE OF A CONSTRUCTION CERTIFICATE

(4) Separate application must be made for a Construction Certificate (Subdivision) for civil works associated with the proposed car park. Engineering plans, showing details of all proposed civil and traffic management works, must be submitted to Orange City Council for approval prior to the issue of a Construction Certificate (Subdivision).

(5) Engineering plans, showing details of all proposed work and adhering to any conditions of development consent, must be submitted to, and approved by, Orange City Council or an Accredited Certifier prior to the issuing of a Construction Certificate.

(6) A water and soil erosion control plan must be submitted to Orange City Council or an Accredited Certifier for approval prior to the issuing of a Construction Certificate. The control plan must be in accordance with the Orange City Council Development and Subdivision Code and the Landcom, Managing Urban Stormwater; Soils and Construction Handbook.

(7) The development's stormwater design must include stormwater retention within the development, designed to limit peak outflows from the land to the pre-existing natural outflows up to the 100 year ARI frequency, with sufficient allowance in overflow spillway design capacity to safely pass flows of lower frequency (that is, a rarer event) without damage to downstream developments. Where appropriate, the spillway design capacity is to be determined in accordance with the requirements of the Dam Safety Committee.

The design of the detention storage is to be undertaken using the ILSAX rainfall-runoff hydrologic model or an approved equivalent capable of assessing runoff volumes and their temporal distribution as well as peak flow rates. The model is to be used to calculate the flow rates for the existing and post-development conditions. The developed flows are to be routed through the proposed storage within the model so that the outflows obtained are no greater than the flows obtained for the pre-existing natural flows. A report detailing the results of the analysis, which includes:

- catchment plan showing sub-catchments under existing and developed conditions;
- schematic diagram of the catchment model showing sub areas and linkages;
- tabulation detailing the elevation, storage volume and discharge relationships; and
- tabulation for the range of frequencies analysed, the inflows, outflows and peak storage levels for both existing and developed conditions;

together with copies of the data files for the model and engineering design plans of the required drainage system are to be submitted and approved by Orange City Council or an Accredited Certifier prior to the issue a Construction Certificate.

Conditions (cont)

Prior to the issue of a construction certificate (cont)

(8) All stormwater from the site must be collected and piped to Council's existing stormwater system. Orange City Council or an Accredited Certifier, prior to issuing a Construction Certificate, is to approve engineering plans for this drainage system.

(9) A Certificate of Compliance, from Orange City Council in accordance with the *Water Management Act 2000*, must be submitted to the Principal Certifying Authority prior to the issuing of a Construction Certificate.

The Certificate of Compliance will be issued subject to the payment of contributions for water, sewer and drainage works - at the level of contribution applicable at that time. The contributions are based on 3 ET's for water supply headworks and 1 ET for sewerage headworks.

(10) The maximum batter slope for all proposed works must be 1 in 6. The area between the south wall of the new 25m pool and the southern boundary fence may use a maximum batter slope of 1 in 4 if the area is fenced off from both internal users and pedestrian utilising the northern Warrendine Street footpath.

(11) The car park dimensions must be 2.6m x 5.4 m for car park bays with a 6.6 metre aisle width.

(12) A Construction Certificate application must be submitted to, and issued by, Council/Accredited Certifier prior to any excavation or building works being carried out on site.

(13) An approval under Section 68 of the Local Government Act must be sought from Orange City Council, as the Water and Sewer Authority, for water, sewer and stormwater connection. Details concerning the proposed backflow prevention between the nominated water tank supply and the potable system must be provided. No plumbing and drainage is to commence until approval is granted.

(14) A Fire Safety Schedule specifying the fire-safety measures (both current and/or proposed) to be implemented in the building must be submitted with the Construction Certificate application, in accordance with Part 9 Clause 168 of the *Environmental Planning and Assessment Regulation 2000*.

(15) A detailed plan and report indicating all fire safety measures for the existing site and/or building must be provided. This must be designed by a suitably qualified person. The specification must include all hydraulic calculations for any required hydrants, hose reels, fire water mains.

(16) Plans and specifications must be provided indicating all details in relation to the energy efficiency of the building in accordance with Section J (Energy Efficiency) of the Building Code of Australia.

(17) Detailed plans indicating the layout of all sanitary and access facilities for people with disabilities must be submitted. These designs must be in accordance with Part D3 of the Building Code of Australia, Australian Standard 1428.1:2001 - Design for Access and Mobility: General Requirements for Access - New Building Work.

(18) Detailed plans and specification must be provided specifying the proposed fit-out of the food preparation and storage areas in accordance with the requirements of Australian Standard 4674-2004 "Design and construction and fit-out of food premises" and Standard 3.2.3 "Food Premises and Equipment" of the Australian New Zealand Food Standards Code.

(19) A Waste Management Plan must be submitted to, and approved by Council/Accredited Certifier, prior to the issuing of a Construction Certificate.

(20) Prior to the issue of a Construction Certificate details shall be provided of the fire separation to be achieved between the existing store and existing two storey office.

(21) A detailed plan showing landscaping of the site shall be submitted to and approved by Councils Manager City Presentation prior to the issue of a Construction Certificate.

Conditions (cont)

Prior to the issue of a construction certificate (cont)

(22) Any construction work within the Tree Protection Zone of 21.4m (in accordance with AS4970-2009) of the Redwood (*Sequiadendron giganteum)* shall be undertaken using appropriate methodology such as pier and beam construction to reduce the impact on the root system. No part of the pergola structure (including roof or paving) shall be located within the drip line of the Redwood, as depicted in Drawing TP-03 Revision 6. These requirements must be reflected in the plans for the Construction Certificate.

PRIOR TO WORKS COMMENCING

(23) Soil erosion control measures shall be implemented on the site.

(24) A temporary on-site toilet must be provided and must remain throughout the project or until an alternative facility meeting Council's requirements is available on-site.

(25) Protective fencing shall be erected before any machinery or materials are brought onto the site and before the commencement of works, including demolition. Once erected, protective fencing must not be removed or altered without approval of Council's Manager City Presentation. The TPZ shall be secured to restrict access.

(26) A Tree Protection Zone (TPZ) shall be created within the Aquatic Centre site to protect the Pin Oaks (*Quercus pilustris*) located on Hill Street. The TPZ shall be a fenced exclusion zone (AS 4687 specifies applicable fencing requirements) setback from the outside circumference of the subject trees, a distance of 8 metres. The TPZ shall be delineated with protective fencing and shall be installed prior to site establishment and retained intact until completion of the subject works, including car park construction. The area between the existing chain-wire mesh eastern boundary fence and the TPZ delineation fence shall be mulched to a depth of 150mm to improve the soil moisture retention and reduce root zone compaction.

(27) A Tree Protection Zone (TPZ) shall be created within the Aquatic Centre site to protect the Redwood (*Sequiadendron giganteum)* located on Hill Street. The TPZ shall be a fenced exclusion zone (AS 4687 specifies applicable fencing requirements) setback from the outside circumference of the subject trees, a minimum distance of 6 metres. The TPZ shall be delineated with protective fencing and shall be installed prior to site establishment and retained intact until completion of the subject works. The area within the TPZ fence shall be mulched to a depth of 150mm to improve the soil moisture retention and reduce root zone compaction.

(28) A Construction Management Plan shall be prepared which outlines the stages of construction, and displayed in a visible location to provide users of the complex with sufficient notice of the upcoming construction works.

DURING CONSTRUCTION/SITEWORKS

(29) Any adjustments to existing utility services that are made necessary by this development proceeding must be at the full cost of the developer.

(30) The provisions and requirements of the Orange City Council Development and Subdivision Code must be applied to this application and all work constructed within the development is to be in accordance with that Code.

The developer must be entirely responsible for the provision of water, sewerage and drainage facilities capable of servicing the development from Council's existing infrastructure. The developer must be responsible for gaining access over adjoining land for services where necessary and easements are to be created about all water, sewer and drainage mains within and outside the lots they serve.

(31) A copy of the Soil and Water Management Plan must be kept on site at all times and made available to Council officers on request.

Conditions (cont)

During construction/siteworks (cont)

(32) All driveway and parking areas must be sealed with bitumen, hot mix or concrete and are to be designed for all expected loading conditions (provided however that the minimum pavement depth for gravel and flush seal roadways is 200mm) and be in accordance with the Orange City Council Development and Subdivision Code.

(33) Heavy-duty concrete kerb and gutter laybacks and footpath crossings must be constructed in the positions shown on the plan submitted with the Construction Certificate application. The works must be carried out to the requirements of the Orange City Council Development and Subdivision Code.

(34) Existing kerb and gutter laybacks in Hill Street that are not proposed to be used must be replaced with standard concrete kerb and gutter and the concrete footpath reinstated to the requirements in the Orange City Council Development and Subdivision Code.

(35) All construction/demolition work on the site must be carried out between the hours of 7.00 am and 6.00 pm Monday to Friday inclusive, 7.00 am to 5.00 pm Saturdays and 8.00 am to 5.00 pm on Sundays and Public Holidays. Written approval must be obtained from the General Manager of Orange City Council to vary these hours.

(36) The following inspections must be carried out by Council as the Water and Sewer Authority:

- internal sewer
- hot and cold water installation
- external sewer
- stormwater drainage
- final on water, sewer and stormwater drainage and Council services.

(37) All plumbing and drainage (water supply, sanitary plumbing and drainage, stormwater drainage and hot water supply) must comply with the *Local Government (Water, Sewerage and Drainage) Regulation 1998,* the *NSW Code of Practice - Plumbing & Drainage* and Australian Standard AS3500 - National Plumbing and Drainage Code. Such work must be installed by a licensed plumber and must be inspected and approved by Council prior to concealment.

(38) Tactile ground surface indicators must be provided for the orientation of people with vision impairment in accordance with the provisions of Australian Standard 1428 Part 4.

(39) Bollards must be installed outside exit doors so that such exit doors are not capable of being obstructed by vehicles, goods or other items.

(40) All materials on site or being delivered to the site must be contained within the site. The requirements of the *Protection of the Environment Operations Act 1997* are to be complied with when placing/stockpiling loose material or when disposing of waste products or during any other activities likely to pollute drains or watercourses.

(41) All excavated material must be removed from the site in an approved manner and disposed of lawfully to an authorised disposal area.

(42) Building demolition must be carried out in accordance with Australian Standard 2601:2001 - The Demolition of Structures, clause 65 of the *Local Government (Approvals) Regulation 1993* and the requirements of the NSW WorkCover Authority.

(43) Asbestos cement sheeting must be removed in accordance with the requirements of the WorkCover Authority.

(44) During construction the noise reduction recommendations outlined in the acoustic report prepared by Watson Moss Growcott P/L dated November 2010 shall be implemented.

Conditions (cont)

During construction/siteworks (cont)

(45) Activities restricted within the TPZ (AS4970 – 2009) of trees indicated on the submitted plans as being retained on the development site (within the aquatic centre complex) shall include but are not limited to:

- Machine excavation including trenching
- Excavation for silt fencing
- Cultivation
- Storage
- Chemical preparation including cement products
- Parking of vehicles and plant items
- Refuelling
- Dumping of waste
- Washing down and cleaning of equipment
- Placement of fill
- Soil level changes
- Temporary or permanent installation of utilities and signs

PRIOR TO THE ISSUE OF AN OCCUPATION CERTIFICATE

(46) A Certificate of Compliance, from a Qualified Engineer, stating that the stormwater retention basin complies with the approved engineering plans must be submitted to the Principal Certifying Authority prior to the issuing of an Occupation Certificate.

(47) Certification from Orange City Council must be submitted to the Principal Certifying Authority prior to the issue of an Occupation Certificate stating that all works relating to connection of the development Council assets, works on Public Land, stormwater, sewer and water reticulation mains and footpaths have been carried out in accordance with the Orange City Council Development and Subdivision Code and the foregoing conditions.

(48) No person must use or occupy the building or alteration that is the subject of this approval without the prior issuing of an Occupation Certificate.

(49) The owner of the building/s must cause the Council to be given a Final Fire Safety Certificate on completion of the building in relation to essential fire or other safety measures included in the schedule attached to this approval.

(50) Where Orange City Council is not the Principal Certifying Authority, a final inspection of water connection, sewer and stormwater drainage shall be undertaken by Orange City Council and a compliance certificate issued, prior to the issue of either an Interim or Final Occupation Certificate.

(51) Certification and evidence must be provided to prove that all wastes from the site were disposed of in accordance with the Council-approved waste management plan.

(52) Prior to the issue of an Occupation Certificate the applicant shall provide evidence that the noise control measures outlined in the report prepared by Watson Moss Growcott Acoustics P/L (ref. 10944-2dkg) dated November 2010 have been installed and the predicted noise levels measured at the nearest residences have been achieved.

(53) A total of 40 off-street car parking spaces (including 2 disabled parking spaces) shall be provided upon the site in accordance with the approved plans, the provisions of Development Control Plan 2004, and be constructed in accordance with the requirements of Council's Development and Subdivision Code prior to the issue of an Occupation Certificate.

Conditions (cont)

Prior to the issue of an occupation certificate (cont)

(54) The service access located to the south of the car park shall be extended eastwards to allow for appropriate manoeuvring of service vehicles.

(55) Landscaping shall be installed in accordance with the approved plans and shall be permanently maintained.

(56) The concrete footpath located on the Hill Street frontage of the proposed development shall have the concrete infill panels between each street tree removed to reduce the footpath width to 1.2 metres and replaced with mulch as detailed in the arborist's report. A qualified arborist shall oversee this element of the demolition works.

(57) All of the foregoing conditions must be at the full cost of the developer and to the requirements and standards of the Orange City Council Development and Subdivision Code, unless specifically stated otherwise. All work required by the foregoing conditions must be completed prior to the issuing of an Occupation Certificate, unless stated otherwise.

MATTERS FOR THE ONGOING PERFORMANCE AND OPERATION OF THE DEVELOPMENT

(58) Emitted noise shall not exceed 5dB(A) above background sound level measured at the nearest affected residences.

(59) Glare from internal lighting must not extend beyond the limits of the building authorised by this approval. Any ancillary light fittings fitted to the exterior of the building must be shielded or mounted in a position to minimise glare to adjoining properties. All lighting must comply with AS4292-1997 – Control of the Obtrusive Effects of Outdoor Lighting.

(60) The owner must provide to Council and to the NSW Fire Commissioner an Annual Fire Safety Statement in respect of the fire-safety measures, as required by Clause 177 of the *Environmental Planning and Assessment Regulation 2000*.

(61) Without the prior approval of Council, the hours of operation of the premises must not exceed 5:30am to 9pm Monday to Sunday inclusive.

ADVISORY NOTES

(62) It is recommended that an emergency access gate be provided within the enclosed area to the east of the indoor aquatic centre.

Other Approvals

(1) *Local Government Act 1993* approvals granted under section 68.

Nil

(2) General terms of other approvals integrated as part of this consent.

Nil

Conditions (cont)

Right of Appeal

If you are dissatisfied with this decision, section 97 of *Environmental Planning and Assessment Act 1979* gives you the right to appeal to the Land and Environment Court within 12 months after the date on which you receive this notice.

** Section 97 of the Environmental Planning and Assessment Act 1979 does not apply to the determination of a development application for State significant development or local designated development that has been the subject of a Commission of Inquiry.*

***Disability Discrimination Act 1992*:**	This application has been assessed in accordance with the *Environmental Planning and Assessment Act 1979*. No guarantee is given that the proposal complies with the *Disability Discrimination Act 1992*. The applicant/owner is responsible to ensure compliance with this and other anti-discrimination legislation. The *Disability Discrimination Act* covers disabilities not catered for in the minimum standards called up in the Building Code of Australia which references AS1428.1 - "Design for Access and Mobility". AS1428 Parts 2, 3 and 4 provides the most comprehensive technical guidance under the *Disability Discrimination Act* currently available in Australia.
Disclaimer - S88B Restrictions on the Use of Land:	The applicant should note that there could be covenants in favour of persons other than Council restricting what may be built or done upon the subject land. The applicant is advised to check the position before commencing any work.
Signed:	On behalf of the consent authority **ORANGE CITY COUNCIL** for a determination made by the Western Joint Regional Planning Panel
Signature:	
Name:	Allan Renike - Manager Development Assessments
Date:	14 December 2010