The Queensland Floods Commission of Enquiry

Submitted by David A Dunworth
[redacted]

Dear Commissioners

My name is David Anthony Dunworth and I have been involved in Real Estate Investment and Development all my working life. I am a Licenced Real Estate Agent and have been a Registered Valuer for many years. I hold a Bachelor of Economics from UQ, a Graduate Diploma in Project Management from QUT and a Diploma of Real Estate Valuation from TAFE.

I have a deep knowledge of Property Development as I have undertaken projects in my own right and in syndicates for 30 years. For many years I was a Queensland judge and panel leader of the UDIA Awards for Excellence in Property Development.

Until recently my wife and I were residents in a level 1 apartment at Tennyson Reach. We were renting apartment 3101 after selling our house at Chelmer . My wife had level 1 apartment 3301 under contract, which was due to settle on 8/2/2011. Both of these apartments were inundated to a level of 6.05m on 12/1/2011.

After the apartments, storage areas and garages were flooded resulting in not only considerable financial loss from the destruction of personal items, furniture etc. but also great inconvenience I decided to investigate the planning procedures that were followed leading to the approval of the Tennyson Reach Apartments and the Brisbane International Tennis Centre.

I wondered how the first stage of a development only completed in mid-2009 and described as state of the art and including luxury waterfront apartments with premium finishes, riverside walk and bikeways, extensive landscaping, generous public space, offices, restaurant and an International Tennis Centre could be flooded. The apartments were also isolated as the public access road built some 2 years ago became impassable well before the height of the flood. Consequently when residents finally realised that they needed to remove heavy furniture they found it impossible as no trucks could access the flooded King Arthur Terrace.

I decided that I would investigate,

1) the flood history of the Tennyson Power Station
2) the Tennyson Reach Development Approval Process
3) the CMC 2004 investigation into the BCC not releasing vital flood information

Tennyson Power Station Flood History

2011 flood level was 9.05m, 1974 flood level was 10.8m and 1893 flood level has been estimated to be 2.85m above this level at 13.65m. Attached are photos from 1974 and also of the the 2011 flood line super imposed on the eastern elevation of Softstone apartments together with the 1974 flood line and an estimate of 1893 flood line. BOM sourced flood graph are also attached.

The Tennyson Reach Development Approval Process

Excerpts from the Tennyson Riverside Development Application dated November 2005 are attached [the full document can be forwarded by mail if required as it is bulky]. The document makes the case for approval of,

[redacted]

"An international Standard State Tennis Centre together with 385 residential apartments to be contained in six multi-unit dwellings. Three of the proposed residential buildings have been designed to a level that would enable a development permit for a material change of use to be issued."

Under town planning analysis

Sect 1.5.4 Proposed building height
The site is of sufficient size to accommodate buildings of 10 stories without causing adverse impact given that the site is located on the outside bend of the river, building height and scale do not restrict the views or vistas of the Brisbane River for any neighbouring properties or public places.

Sect 1.5.5 Proposed Riparian Setback
The City Plan Waterways Code requires that buildings, parking and servicing areas are setback 20 metres from the high water mark but significant relaxations are granted. Softstone [Building F] is setback between 6 & 19 metres, Lushington [Building E] is setback between 10 & 16 metres. An up to 70% relaxation was granted and approved.

Sect 1.8 Flooding and Stormwater Quality Management
The propose development is located on the banks and within a confined backwater area of the Brisbane River. BCC had estimated that the Wivenhoe Dam has reduced the 100 year ARI flood level at the site to 7.9m and estimated the 1974 flood level to be 10.8m AHD.

Sect 1.8.1 Brisbane flood Plain Storage
Analysis of the total works on both the subject site and the DPI land shows that loss of flood storage would be approximately 40000m² The document surmises that the proposed development will have no adverse impact upon flood afflux or peak flood flow rate due to loss of floodplain storage.

Sect 1.8.2 Brisbane River Flood Conveyance
4 of the proposed buildings [Buildings A B C & D] do not encroach forward of the alignment of the existing power station building to the river but Softstone [Building F] and Lushington [Building E] project forward into the fringe of the active flow path of the river. Both of these buildings flooded.

Sect 1.8.3 Flood Free Access
Flood free access will be provided for the proposed residential buildings, the State Tennis Centre, entry to the DPI and ARI and for alternative access to Ortive Street The access flooded well before the height of the flood.

Figure 6.1.1 attached illustrates that the natural overland flood flow path [as shown by the arrows] has been totally obstructed by the construction of Softstone and Lushington.

Figure 6.3.2 attached illustrates that Lushington is positioned approximately 40m into the obstructed high friction and low velocity fringe of the active flow path of the river.

Figure 6.3.3 attached illustrates that the construction of both Softstone and Lushington have impeded the active flood flow and forced the overland flowpath around the eastern extremity of Softstone Maybe this explains why Softstone flooded from the street entrance before the riverfront balcony.

Building envelope illustrations

The attached building envelopes approved heights ranging from 42.5m for Softstone and 45.5m for Lushington to 48.5m for Farringford so there does not appear to be any impediment, besides financial to the minimum floor being 9.4m rather than the prescribed minimum habitable floor level of 8.4m. At 9.4m no water intrusion would have occurred.

[redacted]

2004 CMC investigation into the non-release by the BCC of vital flood height information [This document can be downloaded from the web or posted if required]. Although the CMC exonerated the BCC it was apparent that some senior BCC officers were concerned enough about the adequacy of the proscribed Q100 level that they commissioned independent reports. One report by Sinclair Knight Merz, an internationally renowned engineering group, advised that they believed the post Wivenhoe Q100 could be up to 1.9m higher than the Q100 of 7.9m.

There was considerable coverage in the electronic and print media so in 2005 all parties involved in this approval would have been aware of the debate about the adequacy of the 7.9m Q100 level.

Questions

Why apartments, in what was promoted as a Luxury Riverfront Development, were approved to be built to the minimum habitable floor level of 8.4m when there does not appear to be any reason for not adding another meter to 9.4 metres? All parties were well aware of the unresolved debate as to the adequacy of the Q100 level of 7.9 metres.

Why was the minimum habitable floor level approved and accepted by the developer when the buildings were to be built within the active flood flow of the river, were allowed a 70% relaxation of the 20m riparian setback and directly impeded the pre-existing overland flood flow convergence?

Why was the access road not constructed at a flood free level when flood free access was a condition of the development approval?

Why do developers when they sell apartments off the plan provide potential purchasers with a perspective, floor plans, an elevation, landscape plans, a specification of finishes and fittings, a disclosure statement and a BCM statement but do not have to advise that sites such as Tennyson was flooded to 10.8m in 1974 and that the level 1 apartments are to be built to a habitable floor level of 8.4m?

Vehicle auctioneers have to disclose if a $2000 vehicle to be sold has been under water but this is not the case when buying houses or apartments.

With Yasi the first category 5 cyclone to cross the Queensland coast since Mahina in 1899 what is to say that we will not have a recurrence of the 1893 floods even though the flood level would be reduced somewhat by Somerset and Wivenhoe dams. The threat of this happening is real so purchasers must be made aware of flood levels when they purchase off the plan residential property.

Regards,

David Dunworth
M: [redacted]
E: [redacted]

[redacted]

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20 January 2011

Tennyson Reach Owners
[redacted]

Dear Tennyson Reach Owner,

FLOOD EMERGENCY AT TENNYSON REACH

Firstly can I say on behalf of all of us at Mirvac that our thoughts are with you in these most trying times. We have been working with the Tennyson Reach Body Corporate and Building Management over the past week to provide support to the community. Since Friday 14 January 2011 we have been co-ordinating clean up works for the Body Corporate, with the initial focus being to clean up water and debris and provide safe access to buildings and basements.

Important Facts

The ground floor level of Softstone and Lushington apartments is RL 8.4m, in accordance with the Brisbane City Council's town planning control to have the habitable floor level 500mm above the Q100 flood level of RL 7.9m. The ground floor level of Farringford apartments is RL 9.5m.

The flood event experienced at Tennyson Reach saw water reach RL 9.05m as confirmed by surveyors Bennett and Bennett. This saw flooding to both basement carpark levels, landscaped areas, and nine ground floor apartments at Softstone and Lushington.

We understand the Q100 level of RL 7.9m was established by Brisbane City Council following hydrological modeling that took consideration of the flood mitigation effect of Wivenhoe Dam. The 1974 flood peak at Tennyson was RL10.8m. As has been announced by the Queensland Government, a Commission of Inquiry has been established to investigate the 2011 flood event, including Wivenhoe Dam releases.

Mirvac will continue to liaise with our customers and the Tennyson Reach Body Corporate over the coming days. Should you have any queries, please contact [redacted] at [redacted]

Yours sincerely

[redacted]

Matthew Wallace
Chief Executive Officer
Development Queensland

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1.1 Introduction

In June 2005 Mirvac was announced by the Queensland State Government as the preferred developer of the proposed State Tennis Centre and associated residential development on the former Tennyson Power Station site.

Mirvac is required to develop and construct the State Tennis Centre in accordance with the State Government's detailed and prescriptive brief by December 2008.

The proposal will necessitate the demolition of the former Tennyson Powerhouse building which exists on the site together with remediation of the site. These works are defined as 'early works' under Mirvac's contractual obligations to the State and will be carried out by Mirvac as a contractor on behalf of the State.

1.2 The Tennyson Riverside Development Site

At the time of lodgement it is anticipated that a reserve for sport and recreational purposes will have been granted to the Department of Local Government, Planning, Sport and Recreation over the subject site.

The real property description of the reserve is:

Lot 1 on SP 164685

County Stanley

Parish Yeerongpilly

Title Reference: 49104467.

It is expected that the following easements will be registered on the reserve at the time of application:

Queensland Electricity Transmission Corporation Limited (Powerlink)

- Easement B on SP 184023 benefiting Lot 2 on SP164685 for electricity and access purposes

Energex Limited

- Easement A on SP184022 for electricity purposes
- Easement B on SP184023 for electricity purposes
- Easement C on SP184024 for electricity purposes

Lot 566 on SP 104107, which accommodates the Department of Primary Industries and Fisheries Animal Research Institute (DPI&F site), is included in the subject application only for the purposes of the following components of the development:

- The main access road to the proposed development from Fairfield Road;
- The pedestrian/cycleway which connects the proposed main access road to the foreshore area of the subject site;
- The pedestrian pathway connecting the main access road to the proposed overbridge to Yeerongpilly Railway Station at the Fairfield Road frontage of the site;
- Carparking associated with the State Tennis Centre; and
- Visitor carparking. (Under the agreement between the State and Mirvac, an easement for public purposes in favour of Council is required to be registered over this area.)

Other than an amended access arrangement to the Institute, no changes to the Institute's activities are proposed as part of this application.

The site has an area of 11.9042 hectares and a frontage to the Brisbane River of approximately 550 metres.

The site is bounded by the Brisbane River to the north, Softstone Street and the eastern end of King Arthur Drive to the west, the Corinda Yeerongpilly Rail corridor and Tennyson Memorial Avenue to the south and the DPI&F site and Fairfield Road to the east.

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An electricity substation exists on adjoining lot 2 SP 164658 which is located between the proposed tennis stadium and Tennyson Memorial Avenue. Access to this is provided from Softstone Street over lot 3. The site also contains significant underground electrical cables which run between the substation and the north eastern corner of the site and along the southern and western site boundaries.

1.3 The Proposal

The design philosophy behind the proposed development of the site is that of a tennis centre and residential community in a sub-tropical landscaped setting. The development of the site has been required to meet the specific requirements of the State's brief in addition to addressing the typical requirements of a development site. The Masterplan responds to the constraints of the site and utilises it's characteristics to provide a highly functional sporting facility, a multi-unit residential development with a high level of amenity, and a public riverside park facility for the benefit of the broader community. The design of the development aims to minimise impacts on the amenity of nearby residential neighbourhoods and mitigate the impacts of other surrounding non-residential uses on the development itself.

The overall development will be serviced by a tree lined access road which links Fairfield Road and Softstone Street with the principal access being from Fairfield Road. This road will be dedicated as a public road.

The development has been designed to provide vistas to the river from the centre court and from vantage points along the proposed access road. A linear park along the river frontage of the site will be dedicated as a public park. A combined pedestrian/cycle thoroughfare will be provided along the river frontage linking King Arthur Terrace and the main access road that joins Fairfield Road. This will also link up to the plaza area in front of the State Tennis Centre. It is intended that the riverside pathway will be used by recreational cyclists only, with speed cyclists using the generous road carriageway through the site.

1.3.1 The State Tennis Centre

The proposed development includes the establishment of an international standard tennis centre that will be capable of hosting major tennis events. It will be the only state tennis facility in Australia featuring all three grand slam surfaces.

The State Tennis Centre will have a centre court stadium, 16 hard courts, two grass courts and four clay courts. All courts are orientated on a north-south axis within 10 degrees due west of magnetic north.

The centre court will seat 7,000 spectators comprising 5,500 permanent seats and 1,500 temporary seats, and will be designed to convert to grass and clay surface as required. Two show courts to the west of centre court are designed to accommodate 300 spectators each.

Accessibility and security have been integral elements of the design of the State Tennis Centre. The Centre will be designed and constructed to be accessible to all people, including those with disabilities. The Centre will also be designed specifically to address the needs of wheel chair tennis players and to accommodate disabled spectators.

Tennis Queensland's headquarters will be based at the State Tennis Centre. Their facilities will be located in a glass pavilion within the centre court structure. The pavilion offers views to the river and creates an entry statement to the Centre.

The State Tennis Centre includes a Venue Management Facility that located to the west of the centre court. It will be a purpose built facility intended to serve the day to day operations of managing the tennis courts as a going concern by an independent operator. Located on the main access road, it the venue management facility will serve as a point of arrival for members of the public hiring and using the court facilities. A tennis pro-shop and café facilities will be located within the venue management facility.

16 courts are located to the west of the centre court stadium. All courts will be available for every-day use and will be managed by a commercial operator. It is anticipated that the everyday hire of courts together with coaching and local club competitions will comprise the typical use of the Tennis Centre for the majority of the time. Whilst it is envisaged that Tennis Queensland will be actively seeking to attract larger tournaments, such events will occur on an infrequent basis.

Tennis court lighting will be designed to national and international standards and in accordance with AS 2560.2.1 – 2003 and Tennis Australia Technical Instruction – Lighting for outdoor tennis. Light spill will be minimised as it represents wasted energy, affects the flight paths of insects and birds, and potentially impacts on the amenity of surrounding residences. Lighting will comply with Australian Standard 4282 as required by the City Plan Light Nuisance Code.

1.3.2 The Residential Development

The residential component of the development comprises 385 residential apartments in six buildings that are stepped ranging from 4 to 10 stories. The power house building has a height of RL45.52m to the top of the hoppers and all buildings within the development will be below this height.

The residential buildings have been positioned to take advantage of the northerly aspect and the riverside location. Breaks in the buildings provide vistas and linkages to the river. The design of the proposed residential buildings draws reference from the

existing power station building producing a tripartide building language comprising a base, middle and top with strong vertical elements passing though each element.

A residents' gymnasium and recreation facility is proposed within a building to be located adjacent to Softstone Street. This facility will be within common property of the residential community title scheme. It represents an ancillary residential building and will be for use of the residents only.

1.3.3 The Public Riverside Park

The proposed riverside park extends some 550 metres along the Brisbane River foreshore and will comprise an area of approximately 1.8 hectares. Existing riparian vegetation will be retained wherever possible. However, removal of some mangroves will be necessary to facilitate infrastructure and stabilisation work.

The Design Report in Volume 3 prepared by HPA Architects and EDAW Gillespies details the proposed design approach to the riverside park as well as the other landscape elements within the development.

Centrally located along the riverside park will be a large open area. This is aligned with the proposed park connection up to the plaza area and State Tennis Centre. This occurs between buildings C and D. Each of these two buildings is proposed to contain a café or commercial tenancy of 100m2 floor area at ground level to activate this space and enhance the function of this space as a riverside public gathering node.

All existing buildings within the proposed riverside park will be demolished with the exception of the eastern most pump house. Consideration will be given to future uses of the building.

Careful attention will be given to the delineation between areas of public and private ownership along the riverside area of the development. Of particular concern is the need to incorporate CPTED principles, including public surveillance and graffiti prevention in the building and landscape design.

1.3.4 Proposed Staging and Titling

The following tenure arrangements are proposed for the site.

The site will be contained within a reserve and it is understood that the site will be subdivided by DNRM under the *Land Act* to create freehold lots for the State Tennis Centre and the Residential development.

The main access road is proposed to be dedicated as public road reserve following construction and completion of the State Tennis Centre. Temporary closure arrangements for large tennis events will be the responsibility of the event organiser.

The residential development will be subdivided progressively by Mirvac as part of a community title scheme. The residents' gymnasium and recreation building located on the southern side of the proposed boulevard will form part of this community tilte scheme.

Public river park – this will be progressively dedicated to the crown in conjunction with the staged completion of the residential stages and adjacent pedestrian/cycle path and park embellishments.

1.4 Overview of the Application

In addition to the completed IDAS forms, the application material comprises seven volumes of information as follows:

Volume 1	**Project Overview**	
Volume 2	**Impact Assessment Report**:	Town Planning Analysis
		Construction Management
		Site Contamination Strategy
		Preliminary Ecologically Sustainable Development Report
		Noise Impact Assessment
		Community Consultation
		State Coastal Plan
Volume 3	**Design Report**:	Urban Design
		Landscape Design
		State Tennis Centre Concept
		Residential Built Form
Volume 4	**Transport and Traffic Report**	
Volume 5	**Engineering Services Report**	
Volume 6	**Flooding and Stormwater Quality Management**	
Volume 7	**Ecological Assessment**:	(includes Marine Plants Disturbance Report)

An **A3 set of Architectural Plans** including the Tennyson Riverside Masterplan also accompanies the application.

This application seeks approval of the Tennyson Riverside Development which comprises an international standard State Tennis Centre together with 385 residential units to be contained within six multi-unit dwellings. Development will occur in accordance with the Tennyson Riverside Development Masterplan. Approval of this Masterplan is sought by this application as part of a Preliminary Approval overriding the planning scheme.

Three of the proposed residential buildings have been designed to a level that would enable a Development Permit for a Material Change of Use to be issued. Similarly, the detailed design of the State Tennis Centre has progressed to a level appropriate for a Development Permit to be issued. The remainder of the residential development has not been subject to detailed design. Therefore, the application seeks approval of the Tennyson Riverside Development Code as part of the Preliminary Approval covering the site to provide design criteria against which any future application for a Development Permit would be assessed against. A Level of Assessment and Applicable Codes Table has also been prepared which nominates appropriate levels of assessment for future Development Permits for Material Change of Use and Reconfiguring a Lot applications.

Based on the above, this subject application seeks approval of the following components:

- Preliminary Approval – for a Material Change of Use overriding the planning scheme for development of the subject site generally in accordance with:
  - The Tennyson Riverside Development Master Plan (Drawing No.00-DA0001) and Building Envelope Plans (refer HPA Architectural Plans);
  - The Tennyson Riverside Development Level of Assessment and Applicable Codes Table provided in Appendix E to Volume 2; and
  - The Tennyson Riverside Development Supplementary Residential Provisions provided in Appendix F to Volume 2.
- Development Permit - for a Material Change of Use for a State Tennis Centre (Outdoor sport and Recreation) and associated facilities including administration offices, conference facilities, café and outdoor lighting.

- Development Permit for a Material Change of Use for Multi-unit dwellings (including residents'gymnasium and recreation building), Park and Centre Activities (café/restaurant shop or office use to a maximum gross floor area of 200m2).
- Development Permit for Operational Works for the Disturbance of Marine Plants. The inclusion of this application is triggered by section 3.2.2A of *IPA*.

The Tennyson Riverside Development Master Plan Drawing No.00-DA0001 shows the proposed layout for the overall site. It sets the principles and is the guiding document for future development of each component of the development. Approval of the Landscape Masterplan provided in Volume 3 is also proposed to support the Masterplan.

The Level of Assessment and Applicable Codes Table specifies the level of assessment and the applicable City Plan Codes that are to be used in assessing future development permits lodged for development in accordance with the Preliminary Approval. It is anticipated that this Table will be approved as part of the Preliminary Approval.

The Tennyson Riverside Development Supplementary Residential Provisions detail supplementary Performance Criteria and Acceptable Solutions to the Residential Design-High Density Code against which future applications for Development Permits are to be assessed. These provisions reflect the Masterplan, the design intent for the development and the characteristics of the site.

The application triggers referral coordination and triggers the following referral agencies:

- EPA (Coastal Management) Concurrence agency
- EPA (Contamination) Concurrence Agency
- DPI&F(Disturbance to Marine Plants) Concurrence Agency
- Queensland Transport Concurrence Agency
- The Chief Executive of the entity under the Electricity Act 1994 (Energex) Advice agency.

The majority of the uses included in the application are Impact Assessable – Generally Inappropriate. This means that the application will follow the Impact Assessment IDAS process and will be publicly notified for 30 business days.

1.5 Town Planning Analysis

1.5.1 State Planning Policies

An assessment against all applicable State Planning Policies is contained in Volume 2. This assessment demonstrates that the proposed Tennyson Riverside Development is generally consistent with these Policies.

1.5.2 City Plan Provisions

A detailed assessment against the relevant provisions of the Strategic Plan, The Stephens District Local Plan and the Impact Assessment Generally Inappropriate provisions of the Brisbane City Plan 2000 is provided in Volume 2 of this application.

Under the City Plan Lot 1 has an Area Classification of Community Use Area CU8 – Utility Installation and the area adjacent to the river that was formerly road reserve is within the Road Area. The level of assessment for any development in Road Area is the same as for the land immediately adjoining. The area of Lot 556 on SP104107 (DPI&F site) affected by this application also has an Area Classification of Community Use Area CU8- Utility Installation.

1.5.3 City Plan Codes and Policies

Given that uses proposed in the application are generally Impact Assessable – Generally Inappropriate in the Area Classifications affecting the site, the City Plan does not prescribe applicable Codes to be assessed in this application. Notwithstanding this, a range of primary and secondary codes considered relevant to the proposal have been considered and addressed.

A summary of the City Plan Codes addressed and a reference to where they are included in this application is provided below.

CODES AND POLICIES	REPORT REFERENCE
Residential Design–High Density Code	Volume 2 – Impact Assessment Report -Town Planning Assessment – Appendix G
Supplementary Residential Provisions	Volume 2 – Impact Assessment Report -Town Planning Assessment – Appendix F
Outdoor Sport and Recreation Code	Volume 2 – Impact Assessment Report -Town Planning Assessment – Appendix H
Biodiversity Code	Volume 7 – Ecological Assessment Report – Appendix D
Energy Efficiency Code	Volume 2 – Impact Assessment Report – Preliminary ESD Assessment Report – Appendix D
Filling and Excavation Code	Volume 5 – Engineering Services Report – Appendix E
Landscape Code	Volume 3 – Design Report
Light Nuisance Code	Volume 2 – Impact Assessment Report – Lighting Impact Assessment – Appendix J
Industrial Areas – Adjacent Development Code	Volume 2 – Impact Assessment Report -Town Planning Assessment – Appendix I
Non-discriminatory Access Code	Volume 2 – Impact Assessment Report – Town Planning Assessment - Appendix K and Volume 3 - Design Report
Park Code	Volume 3 – Design Report
Services, Works and Infrastructure Code	Volume 5 – Engineering Services Report – Appendix D
Stormwater Management Code	Volume 6 – Flooding and Stormwater Quality Management Report – Appendix B
Transport, Access, Parking and Servicing Code	Volume 4 – Transport and Traffic Report
Waterways Code	Volume 2 – Impact Assessment Report – (setback requirements) and

	Volume 7 – Ecological Assessment Report – Appendix D
Wetland Code	Volume 7 – Ecological Assessment Report – Appendix D
Consultation Planning Scheme Policy	Volume 2 – Impact Assessment Report – Appendix M
Crime Prevention Through Environmental Design Planning Scheme Policy	Volume 3 – Design Report
Noise Impact Assessment Planning Assessment Policy	Volume 2 – Impact Assessment Report – Appendix L
Natural Assets Local Law 2003	Volume 7 – Ecological Assessment Report

1.5.4 Proposed Building Height

As part of the masterplanning for the development, the appropriate height of development for this site was investigated. This was considered in the context of:

- The expectations of the brief given that Mirvac is required to deliver an international standard State Tennis Centre comprising a centre court stadium and 22 outdoor courts to the State;
- The nature and proximity of surrounding uses and potential amenity impacts;
- Vantage points to the site;
- Proximity to public transport facilitites;
- Height and scale of the existing power station building; and
- Ability to dedicate the river foreshore area of the site into public ownership.

Having regard to these factors, it was considered that the height of the existing building was a good reference point for future development given that this building has existed in the landscape since the 1950s.

In relation to potential overshadowing of neighbouring properties, the site is of sufficient size to accommodate buildings of ten stories without causing adverse impact.

Given that the site is located on the outside bend of the Brisbane River, building height and scale do not restrict the views or vistas of the Brisbane River for any neighbouring properties or public places.

Finally, the State Government's requirement to provide an international tennis centre on the site severely limits the available area for development and dictates a development of limited site cover and greater height.

It is also important to note that the site generally satisfies the stated Intent and Desired Environmental Outcomes for the High Density Residentail Area classification in that the site is close to City with very good access to public transport and facilities, is in a location with outstanding views to the Central City or Brisbane River, takes advantage of attractive views and aspects, has extensive quality private and public open space and has recreation areas and landscaping to soften the dominance of buildings and provide breathing spaces.

1.5.5 Proposed Riparian Setback

The City Plan Waterways Code requires that buildings, parking and servicing areas are setback 20m from the High Water Mark.

The Tennyson Riverside Development Masterplan has two of the six residential buildings located within this distance. The Masterplan has been developed in response to the State Government's brief to provide a Queensland State Tennis Centre and required infrastructure. The associated residential development is required to fund the provision of the facilities.

The six residential buildings along the waterfront are located in order to take advantage of river views, provide site lines and respond to site constraints. Individual building setbacks are as follows:

Building A- 30m-44m

Building B- 27.7m-32m

Building C- 35m-75m

Building D- 65m-80m

Building E- 10m-16m

Building F- 6m-19m.

The proposed buildings have been setback a variety of distances from the River as part of the Masterplan design. The majority of buildings are setback well outside of the 20m distance and the average setback distance from the buildings to the river is 37m.

Buildings E and F are located inside the 20m distance due to the constraints of the site in this area. An Energex easement containing high power electrical cables runs from the sub station along the eastern boundary of the site before turning east and into the ARI site. The buildings in this location directly abut against this easement boundary. The buildings cannot be located behind the easement as this is part of the ARI site.

Whilst components of the proposed development are witin 20 metres of the river due to prevailing site constraints, this application demonstrates that the objectives of the riparian setback can be achieved in terms of water quality, biodiversity values, visual amenity and public access.

The foreshore of this section of Brisbane River is largely colonised by mangroves with occasional native trees. This character will be retained following the completion of the development. The foreshore area of the site (1.8 hectares) will be dedicated into public ownership following rehabilitation works including the removal of existing weeds and the substantial amount of litter that has accumulated in this area.

Due to the location of the site on the outside bend of the River, river views from the surrounding properties will not be impacted upon. Similarly, views of the river from public vantage points will lot be restricted. Rather, the creation of the public park along the frontage of the site with access points back to the road will enhance public accessibility and views to the river.

1.6 Transport and Traffic

1.6.1 Access and Roadworks

A roundabout is proposed at the Softstone Street / King Arthur Terrace intersection to provide access from the west whilst a new signalised intersection is proposed on Fairfield Road (approximately 70m south of Ortive Street) to provide access from the east. An analysis of the performance of the intersections indicates that both will operate at an acceptable level of service and will provide safe and efficient access to the subject development. The access arrangements proposed to service the Tennyson Riverside Development can be effectively integrated with the external road network without creating any adverse impacts.

An internal road linking the site to Fairfield Road and Softstone Street will be treated with devices that will create a significant deterrent for non - local traffic to use the route as a "rat run" between King Arthur Terrace and Fairfield Road. It is intended that Ortive Street also be linked to the proposed internal road, allowing the intersection of Ortive Street and Fairfield Road to be terminated.

1.6.2 Car Parking

The proposed parking supply of 449 residential parking spaces (including 49 visitor spaces) for the 200 apartments for which a Development Permit is sought, and 163 spaces for the State Tennis Centre, satisfies Brisbane City Council's minimum parking requirement for both the uses proposed, even without including the on-street parking on the internal road system.

The car park design for both the residential development and the tennis centre comply with the minimum dimensions specified in the Traffic, Access, Parking and Servicing Policy.

1.6.3 Servicing

Refuse collection and furniture truck facilities provided in the development plan for the residential component are adequate to meet the access requirements for such vehicles. The servicing for the tennis centre will be distributed between the plaza area on the internal road adjacent to the State Tennis Centre and an area at the rear of the main stadium.

1.6.4 Transport Management Plan

An indicative Transport Management Plan has been prepared for a major event attracting a capacity crowd of 7000 at the State Tennis Centre. The indicative plan demonstrates that the existing transport infrastructure surrounding the site and the proposed internal road system, can accommodate the transport demands generated by such an event without compromising the amenity of local residents in terms of parking intrusion or traffic congestion in the surrounding area. The plan is focused on public transport as the prime mode of access for an event, with the Yeerongpilly Station the focus of the rail transport and a bus set down facility (capacity of 4 buses) on Softstone Street the focus of the bus transport. A pedestrian overpass on Fairfield Road is also proposed, linking Yeerongpilly Station to the internal pedestrian system to provide safe access from the station to the Tennyson Riverside Development.

The Transport and Traffic Report provided in Volume 4 of this application concludes that the proposed development will not create an adverse impact on the surrounding road network during both normal day to day operations, or during an event on the basis that a Transport Management Plan is implemented that focuses on public transport as the primary mode of transport to the event.

1.7 Noise Impacts

As part of the assessment of noise impacts, seven potential noise sources have been identified as requiring assessment in order to avoid noise problems. These are:

- Construction noise emissions onto nearby residences, including demolition of the existing building;
- Noise impacts from the stadium and tennis courts, including crowds, public address system, and tennis, onto both the existing neighbouring residences and the proposed residential site;
- Noise from mechanical plant installed as part of the tennis centre development onto both existing and proposed residences;
- Noise intrusion from nearby roads onto the proposed residential units;
- Noise from mechanical plant installed as part of the residential development onto the proposed residences and the existing residences; and
- Carpark noise emissions onto the proposed residences.

The Noise Impact Assessment Report provided as Appendix L to Volume 2 assesses each of these items and makes the following conclusions and recommendations:

- Construction hours should comply with the requirements of the Environmental Protection Act, and a construction noise management plan should be adopted for the site;
- Noise from the general daily activities of the proposed State Tennis Centre will generally comply with noise limits at the existing and proposed residences, however large scale events with a capacity crowd will exceed these limits;
- Building façade detailing for some noise affected dwellings within the development will need to address noise impacts from the proposed State Tennis Centre;
- It is recommended that the Council accept that exceedances of the noise limits will occur for one or two events per year, where a capacity crowd is expected;
- Mechanical plant installed as part of the proposed State Tennis Centre or the residential units should be designed to meet 41dB(A)$L_{Amax\ adj\ T}$ during the nighttime period and 45dB(A) $L_{Amax\ Adj\ T}$ during the daytime period at the nearest noise sensitive receptors;
- The PA System should be designed to meet a limit of 50dB(A) $L_{Amax\ Adj\ T}$ at the nearest noise sensitive receptors.
- Carparking associated with both the proposed State Tennis Centre and the residential component complies with the Council limits and no further treatments are required; and
- Residential Building A will be exposed to road traffic noise levels of up to 65dB(A) $L_{A10(18\ hour)}$. To control the traffic noise intrusion to acceptable levels, the building façade will be required to address these impacts. At this stage, specific unit designs have not yet been completed for this building, therefore based on a worst case scenario, a glazing requirement of Rw 25 has been determined.

1.8 Flooding and Stormwater Quality Management

The proposed development is located on the banks and within a confined floodplain backwater area of the Brisbane River. The development also encroaches into the Brisbane River Corridor. Accordingly, the provisions of the Stormwater Management Code of the Brisbane City Plan are applicable.

BCC have estimated that the Wivenhoe Dam has reduced the 100 year ARI river flood at the site to 7.9m AHD and estimated the 1974 peak flood level to be 10.8m AHD.

The site grades from the River High Astronomical Tide (HAT) level of 1.8mAHD to levels generally in the order of 12.0 mAHD.

Portions of the site, together with portions of the abutting Lot 566 on SP 104107, which accommodates the Department of Primary Industries and Fisheries ARI site, form an 'off stream' ineffective-flow-area or backwater (the site floodplain) to the Brisbane River of approximately 7.5 ha.

Existing floodplain storage on the site for 100 year ARI floods is approximately 111,400 m^3.

The primary hydrologic and hydraulic functions of the Brisbane River that are potentially impacted due to development are:

- Floodplain storage; and
- Flood conveyance.

1.8.1 Brisbane River Floodplain Storage

In order to accommodate the proposed development and, at the same time meet the design requirements in respect of flood immunity, a combination of site filling and cut will be required. Such earthworks alter the pattern of flooding on the site and floodplain storage available on the site.

Analysis of the net effect of cut and fill on the site shows that a loss of floodplain storage of approximately 40000 m^3 will result on the site.

Analysis of total works on both the subject site and on DPI&F land shows that loss of floodplain storage will be approximately 36,000 m^3.

Such storage volume represents a minimal percentage of total available floodplain storage in this reach of the Brisbane River. Further, the minimal loss of floodplain storage (approximately 36,000 m^3) represents only 0.0015% of the total volume of a 100 year ARI flood (approximately 2.4 x 10^9 m^3 as taken from BCC supplied data) at this point in the River.

Accordingly, due to:

- Minimal loss of floodplain storage; and
- The relative 'disconnectedness' of the site floodplain from the River,

it is expected that the proposed development will have no measurable adverse impact upon flood afflux or peak flood flow rate due to loss of floodplain storage.

1.8.2 Brisbane River Flood Conveyance

The southern limit of the existing active flow area of the Brisbane River is largely confined by existing power plant structures and associated flood free fill areas fronting the River. These structures result in the boundary of active flow area having an alignment similar to that of the existing power station building.

The proposed development includes river frontage residential buildings and public open space. Four of the proposed buildings (Buildings A,B,C and D) do not encroach forward of the alignment of the existing power station building to the river, and will result in a widening of available active flow path of the River in the upstream portions (Buildings C and D).

Buildings E and F project forward of the alighnment of the power station building and into the fringe of the active flow path of the River. Loss of available active flow path at this location is approximately 5% and is located in a region of low velocity and disturbed flow.

Such reduction in active flow area where velocities are lowest (due to increased friction and various obstructions discussed above) is not expected to result in afflux that will cause worsening of flooding to upstream properties.

Further detailed hydraulic modelling using Council's Brisbane River Mike 11 model is currently being completed in order to quantify any afflux due to the proposed development layout.

1.8.3 Flood free access

Flood free access will be provided for the proposed residential buildings, the State Tennis Centre, entry to the DPI Animal Research Institute and for the alternative access to Ortive Street.

1.8.4 Stormwater Quality

The water quality treatment measures proposed for the Tennyson Riverside Development aim to treat the site stormwater three month ARI discharge to meet the Council's Water Quality Objectives (WQOs) requirements. All water quality and quantity requirements will be addressed internally to the development as no downstream treatment is available prior to the receiving environment. The stormwater runoff will be treated before entering the trunk stormwater network which will discharge directly into the Brisbane River.

For this development a distributed treatment philosophy is proposed, with gross pollutant traps and bioretention filters in the form of basins, landscaped gardens and kerb gardens. These devices will be incorporated throughout the development site.

Presently the bioretention locations are indicative only. The final layout will depend upon issues to be resolved during the detailed design stage.

Bioretention devices are proposed primarily due to their high total nitrogen removal efficiency. Proprietary style gross pollutant traps are proposed where bioretention devices are impractical, as they are effective at removing suspended solids.

Stormwater quality modelling demonstrates that the currently proposed biofiltration and gross pollutant trap combinations will meet Council's WQOs. Pollutant load reductions are also in the order of, or better than desirable industry standards.

1.9 Engineering Services

1.9.1 Stormwater

It is proposed to discharge all stormwater for the subject site directly to the Brisbane River utilising the existing outlets located within the site. Runoff from STC, the Residential Precinct and the road network will be collected and treated prior to discharge.

It is proposed to divert the existing 1050mm diameter Council stormwater pipe traversing the subject site. A new 1200mm diameter stormwater pipe will be provided through the subject site to cater for the upstream external catchment located to the south of the site and the existing drainage from the existing Electrical Substation for the local 10 year ARI storm event. This will achieve a 'non-worsening effect' on the existing upstream catchment as required by Council.

Two piped connections will be provided to service the STC with treatment of runoff occurring prior to discharging into the council owned infrastructure. The western portion of the STC site will be collected and discharged to the north directly to the Brisbane River via the 1200mm diameter pipe from the external catchment. The eastern portion will be collected and discharged to the existing drainage infrastructure that traverses the ARI site. Piped drainage within the STC will be designed to cater for a 20 year ARI in accordance with the State Government design brief.

Overland flow drainage generated on the western catchment of the STC site during major storm events will be collected by the road network and discharged overland to the Brisbane River via a designated overland flow path located between buildings C & D. The eastern catchment will flow into the natural depression located on the ARI site. Overland flow drainage within the STC will be designed to cater for a 50 year ARI in accordance with the State Government design brief.

Runoff from the carpark areas of the residential component of the development will be collected and treated prior to connection to the Council owned infrastructure and subsequently be discharged to the Brisbane River.

The runoff captured from building roof areas is considered as clean and will not be included in the treatment train. This will be discharged via existing outlets to the Brisbane River and one new pipe outlet. It is intended to construct the new pipe outlet near the existing jetty which is to be removed so as to minimise any disturbance of the river bank.

Stormwater runoff from the road network will be collected and treated prior to discharge to the Brisbane River. The piped system will collect and convey runoff up to and including a Q10 storm event. Overland flow drainage will be conveyed along the road network and the designated overland flow paths to the Brisbane River. The access road linking the site to Fairfield Road will drain towards the central median area. The median will be used for treatment of runoff prior to collection and discharge to the Brisbane River.

The Softstone Street access will be conventional two way cross fall with drainage pits along both sides of the carriageway. This runoff will be piped through a GPT and then outlet to a landscaped treatment area located to the north of Building C. For storm events above a Q3 month event, runoff will bypass the low flow outlet and discharge directly to the Brisbane River.

No detention is proposed for the site. The proposed development will result in no detrimental drainage effect on adjoining properties.

1.9.2 Sewer Reticulation

It is proposed to provide a Council standard gravity reticulation main, pump station and rising main to service both the STC and the residential component of the site. Construction of this infrastructure will be necessary to service both components of the development.

The site will gravitate to a new pump station located adjacent to the STC which will then discharge via a new rising main underneath the railway line and Tennyson Memorial Avenue to an existing 225mm diameter gravity sewer and eventually to the Moolabin Creek Branch Sewer.

Augmentation of the existing gravity pipe network will be necessary to cater for the development. This will consist of approximately 280m of new 300mm diameter gravity main within Allawah Street and Moolabin Crescent. It is proposed to credit these augmentation works to the existing external sewer mains against the sewer headworks contributions for the development.

1.9.3 Water Reticulation

It is proposed to provide a new Council water main along the length of the new access road. This will link the existing water mains located in Fairfield Road and Softstone Street. Connections for the STC and residential components will be provided from this new main as required. It is anticipated that the size of this main will be a 150 or 200mm diameter pipe subject to further detailed design. It is anticipated that no augmentation of existing external mains will be necessary.

The detailed assessment of engineering services for the Tennyson Riverside Development carried out by Lambert and Rehbein is provided in Volume 5 of this application. The report concludes that services are available or can be provided to adequately cater for the requirements of the proposed development.

1.10 Ecological Values

The area of greatest ecological significance on the Tennyson Riverside Development site is the riparian vegetation community that aligns the Brisbane River. This encompasses both the lower bank that is dominated by mangroves and the upper bank that is vegetated by canopy species including several large Forest Red Gums. It is noted however that this area is infested with exotic species and will benefit from rehabilitation as part of the development. The tidal area of the lower bank will also benefit from the removal of the extensive amount of rubbish that has accumulated.

The riparian vegetation is significant for the following reasons:

- the habitat it provides to fauna (including food resources, cover, protection and nesting / denning sites);
- the potential role it has as a wildlife movement corridor;
- the role it plays in riverbank stabilisation; and
- the role it plays in buffering pollutants before they enter the river.

All other areas on site are of relatively low ecological significance. Most of the land area has been cleared and features mown grasses that are of minimal value to fauna. The section of planted native trees on the DPI ARI site, at the proposed entry point for the access road, is of some value as a refuge to locally present wildlife and for provision of food resources.

The vegetation on site that is designated for protection under the BCC Natural Asset Local Law has also been assessed. It is considered that the not all of these designations are appropriate to the site, most notably the Waterway and Wetland Vegetation designated in the central area of the DPI ARI site and a small section of the eastern boundary of the Power Station site. The Significant Native Vegetation designation is most relevant to the riparian vegetation aligning the river. It may apply to the trees on the DPI ARI site, however it is noted that these trees have been planted and comprise species not native to the locality.

Overall, to preserve the ecological values of the site, Mirvac propose to preserve and enhance the riparian vegetation aligning the river to the greatest extent possible. Any losses of vegetation will be compensated for by landscaping using local, native species. It is also proposed that appropriate measures will be put in place to ensure water quality of the Brisbane River is not degraded by the development during the demolition, construction and operational phases.

1.11 Site Remediation and Demolition

As the existing power station building and associated structures are not subject of any heritage listings, approval for demolition is not required to be sought as part this application. It is anticipated that demolition will occur prior to determination of this application.

The site is listed on the EPA's Environmental Management Register (EMR). Preliminary assessments of the site in the past have identified contaminated material on the site. GHD has been engaged by Mirvac to carry out the works necessary to have the site removed from the EMR or a Suitability Statement to proceed with the proposed development. The proposed strategy for achieving this is outlined in Appendix C to Volume 2 of this application. It is envisaged that remediation works will occur in association with demolition works on the site.

1.12 Construction Management

A construction environmental management plan will be prepared to ensure construction activities are managed in a manner that minimises impacts on the amenity of the surrounding area including control of dust, noise and haulage routes, and that ensures environmental impacts such as erosion and sediment control, water quality and impacts on riparian vegetation are also managed. A complaints management process will also be incorporated in to the document.

1.13 Community Consultation

Mirvac has prepared a Community Consultation Strategy to address consultation and communication process for the Tennyson Riverside Development. This strategy has been developed by Mirvac with input from the Department of Local Government, Planning, Sport & Recreation and sets out the way forward for consultation for the development of the site. The consultation process will be implemented by Mirvac and Promedia, Mirvac's consultation consultants.

An overview of the community consultation carried out to date and the proposed process from here on is outlined in a report provided as Appendix M to volume 2 of this application. This report addresses the principles of the City Plan Consultation Planning Scheme Policy.

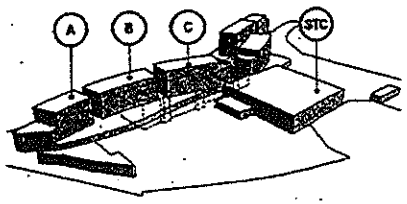
1.14 Conclusion

The proposed development represents the outcomes of a detailed and lengthy masterplanning process based on an analysis of the site's constraints and opportunitites and in response to the specific requirements of the State Government's brief.

In addition to proposing a high quality development outcome, Tennyson Riverside Development will offer the following community benefits:

- The delivery of an international standard State Tennis Centre and headquarters for Tennis Queensland. It is proposed that the tennis courts will be available for hire and use on an everyday basis.
- Dedication to the public of a 1.8 hectare riverside park providing public access to 550 metres of the Brisbane River foreshore. The existing semi-natural state of the river foreshore will be retained with the retention of most mangroves and trees except where requiring removal for infrastructure such as stormwater outlets and construction of the public boardwalk. Rehabilitation of the riparian zone by removal of existing weeds and the substantial amount of litter will also benefit the ecological values of this area.
- An important pedestrian/cycle linkage in the regional network between King Arthur Terrace and Ortive Street/Fairfield Road.
- A significant improvement to pedestrian access to Yeerongpilly Railway Station for residents and workers west of Fairfield Road with the construction of an overbridge, including a lift, across Fairfield Road. Access to this overbridge will be provided through the site by way of a 4 metre wide footpath within the proposed tree lined boulevard road linking King Arthur Terrace and Fairfield Road.

In conclusion, the Tennyson Riverside Development proposal is the result of a comprehensive masterplanning process and is proffered as a high quality development outcome for the site.



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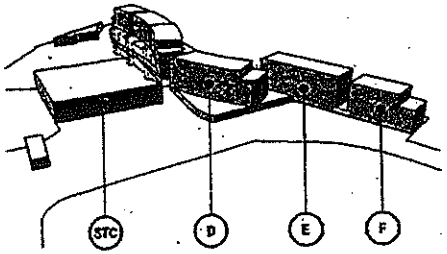

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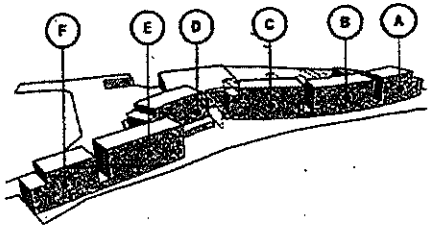

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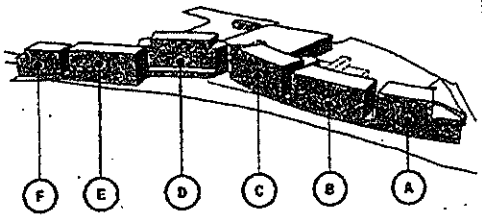

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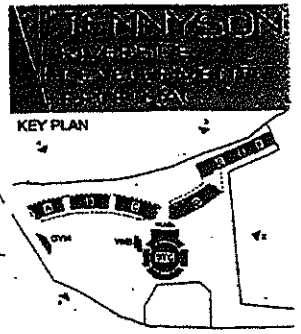

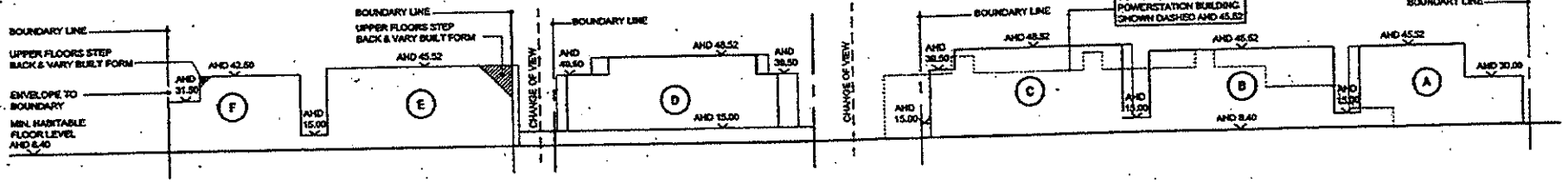

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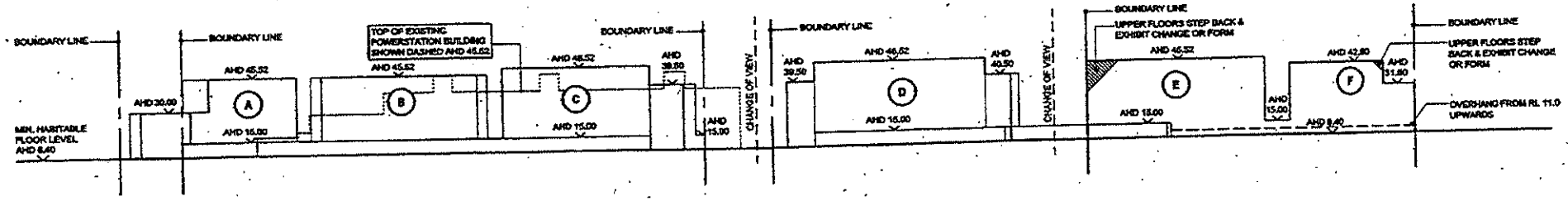

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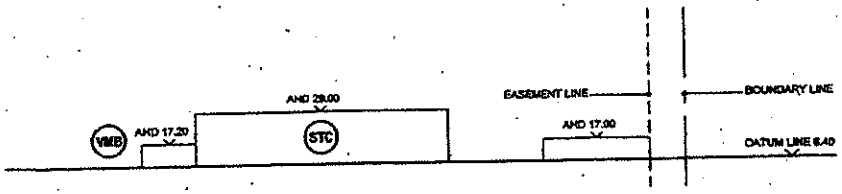

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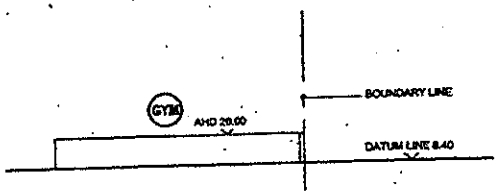

4 GYM ELEVATION

DUE TO CURVED PLAN ELEVATIONS ARE INDICATIVE ONLY

PLANS AND DOCUMENTS
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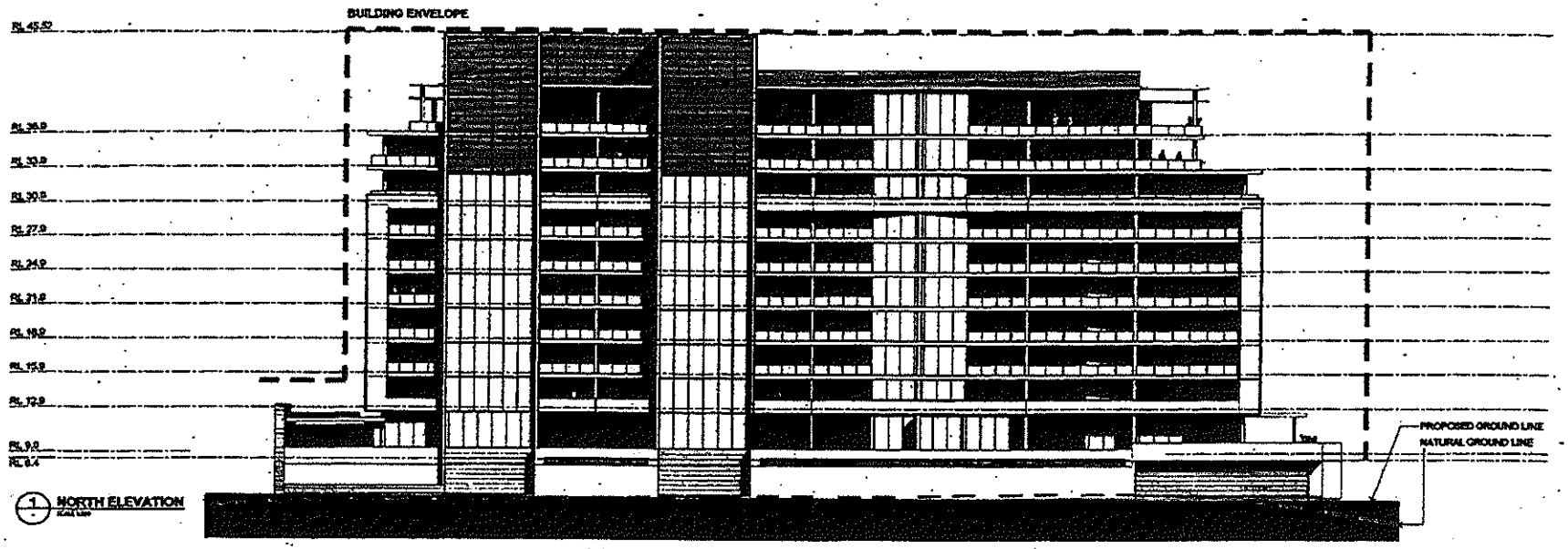

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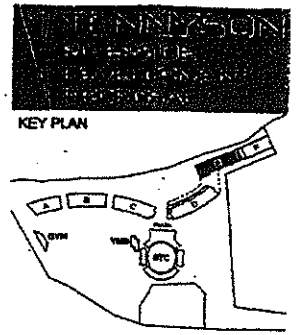

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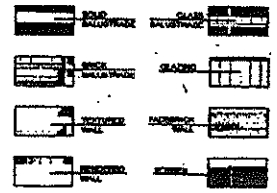

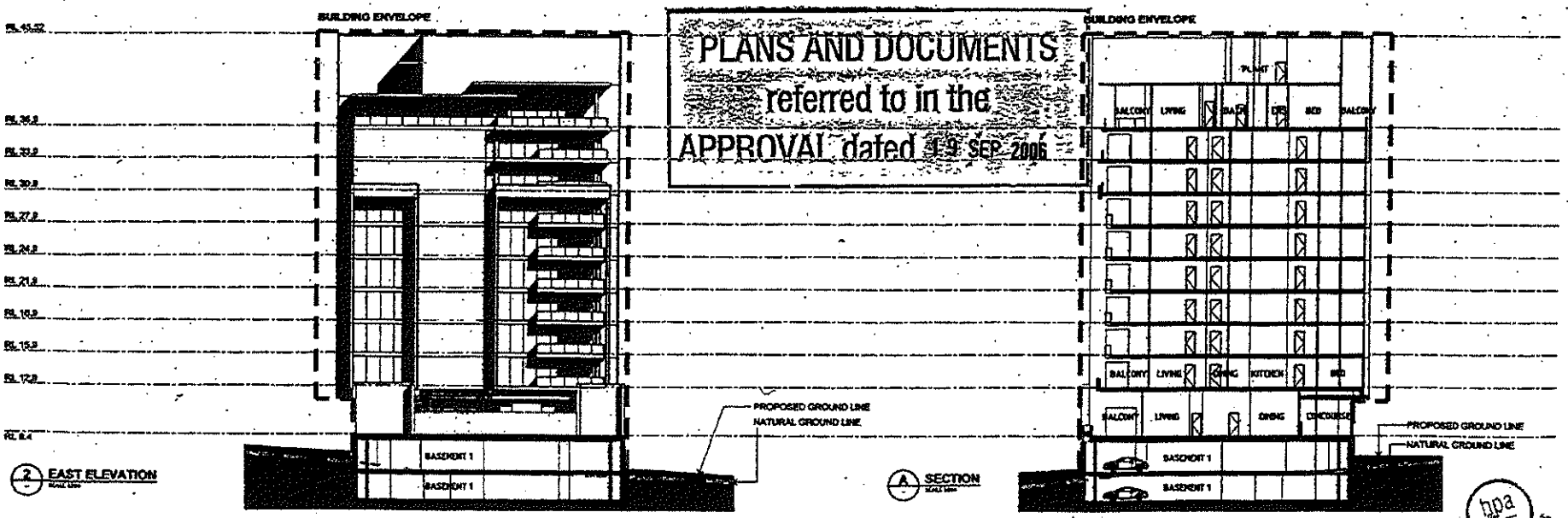

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2 EAST ELEVATION

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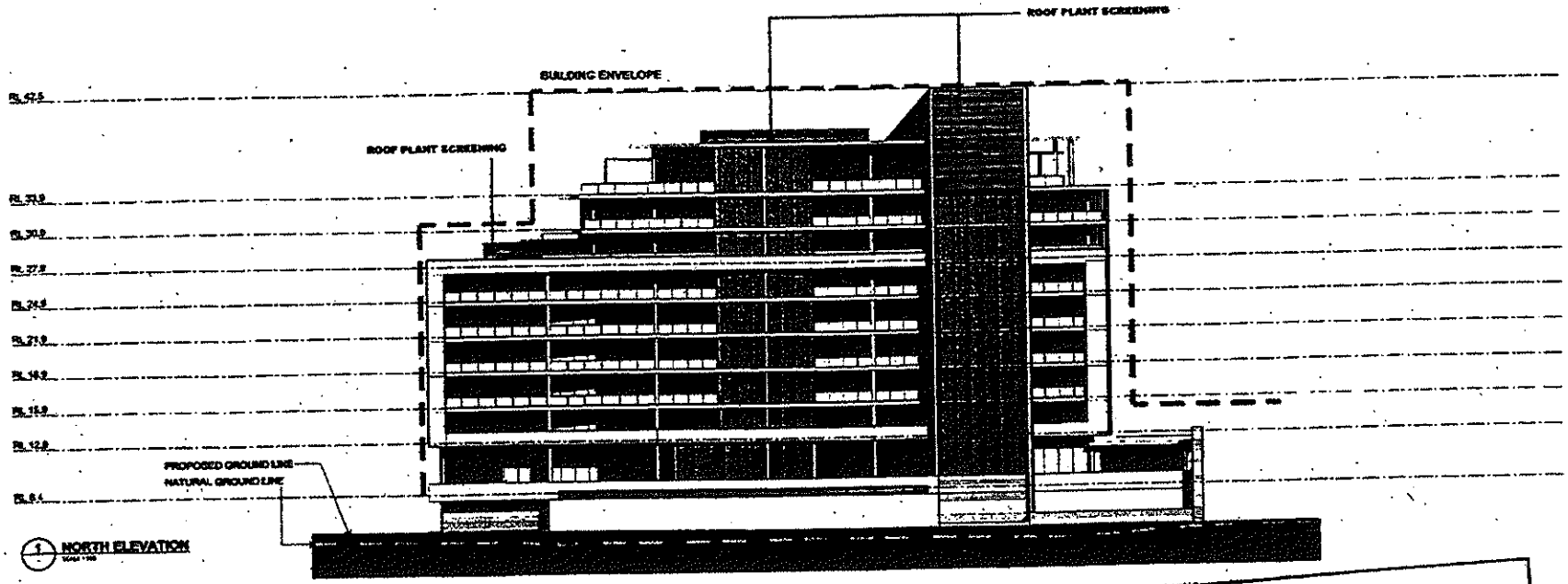

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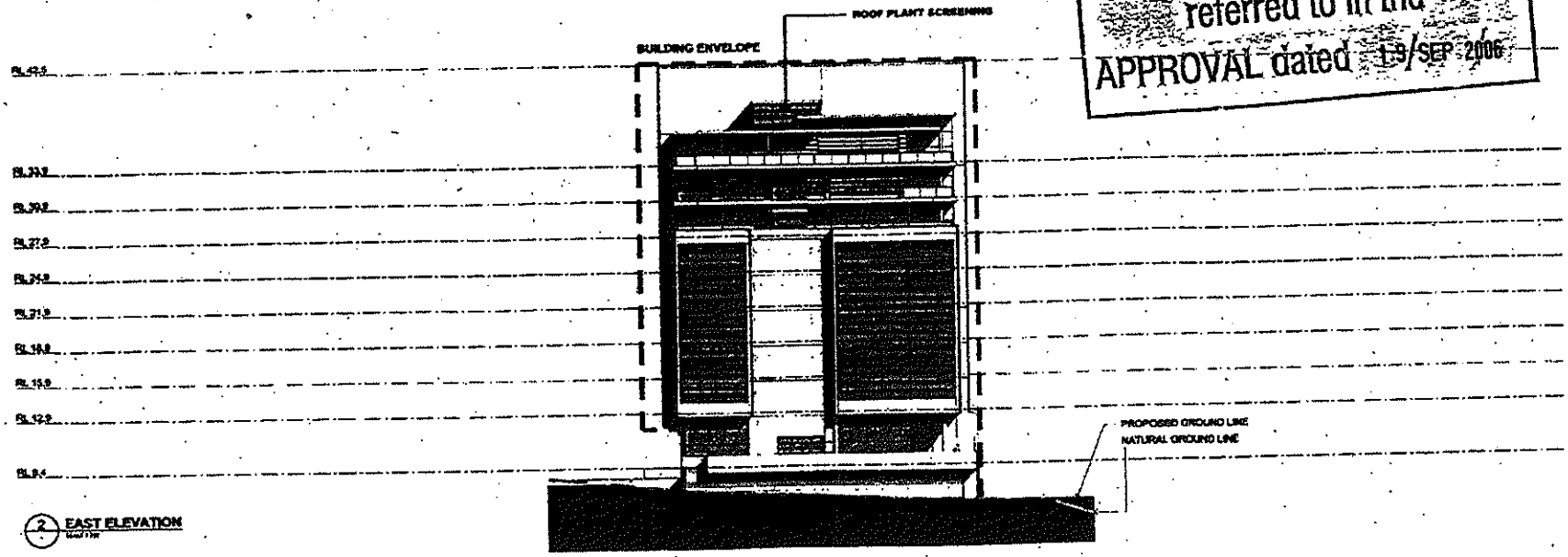

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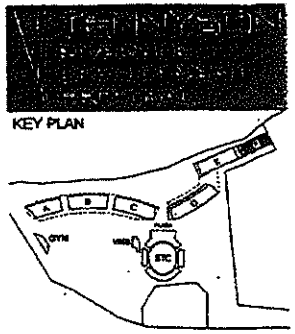

SUN CONTROL SCREENING

PRIVACY SCREENING

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BALCONY SCREEN ELEVATIONS
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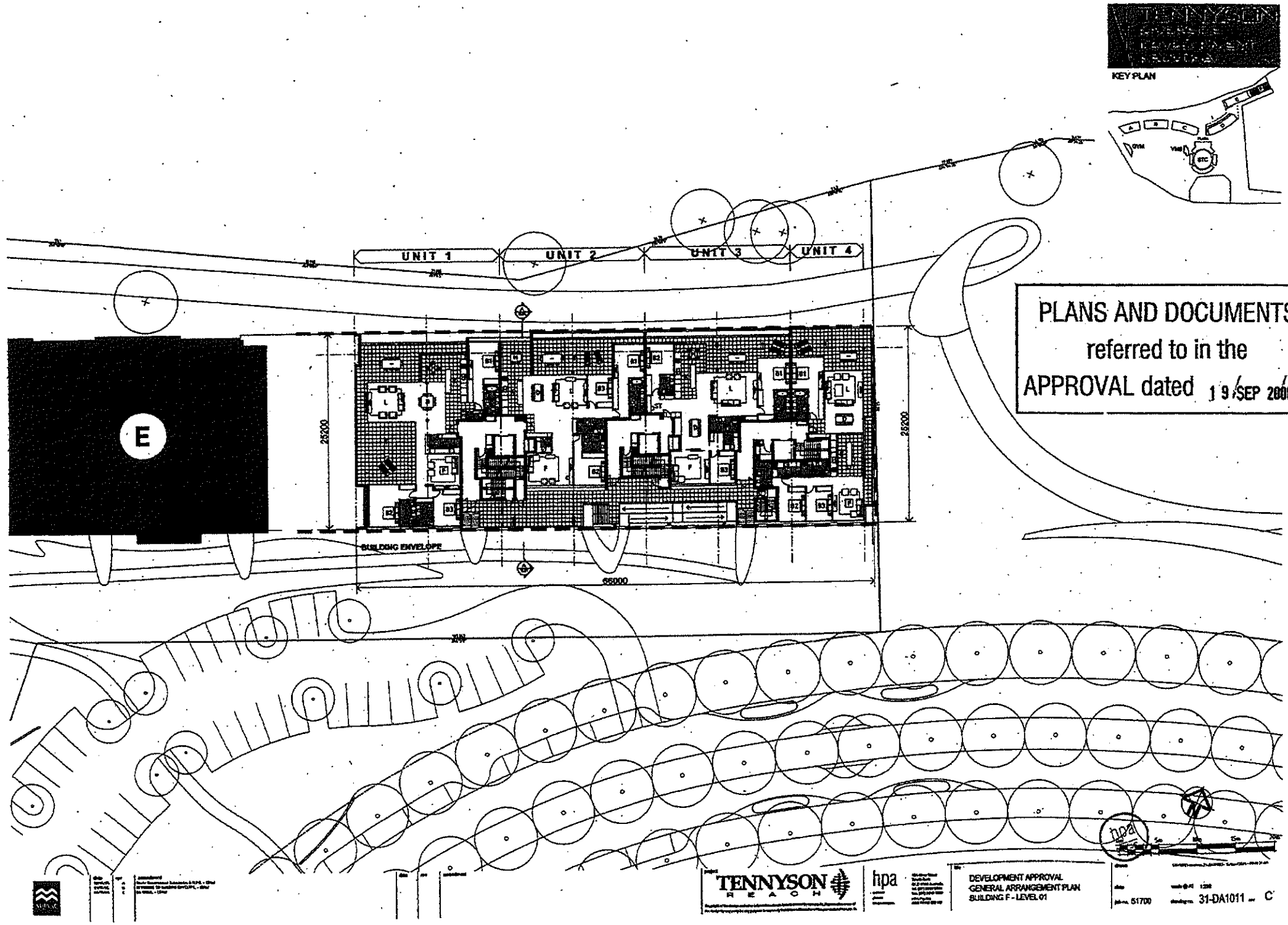
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UNIT 3
UNIT 4
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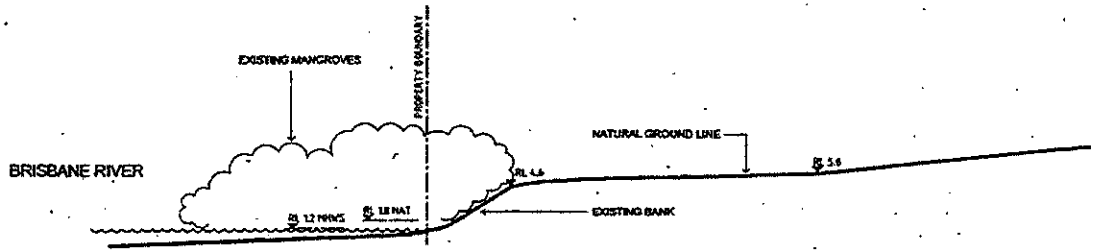

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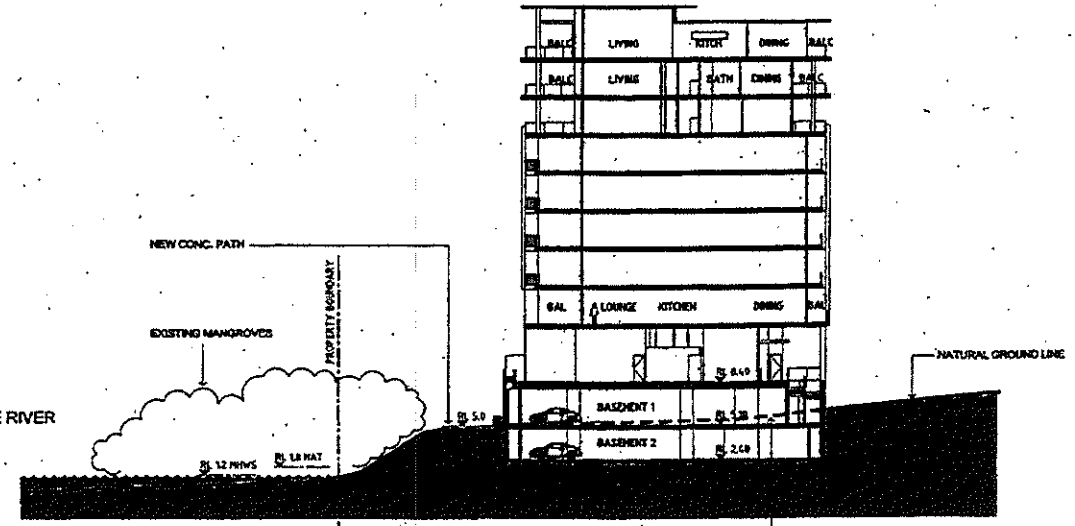

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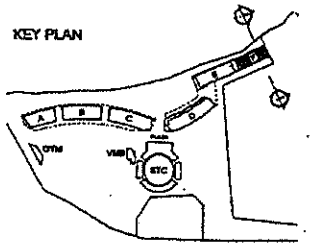

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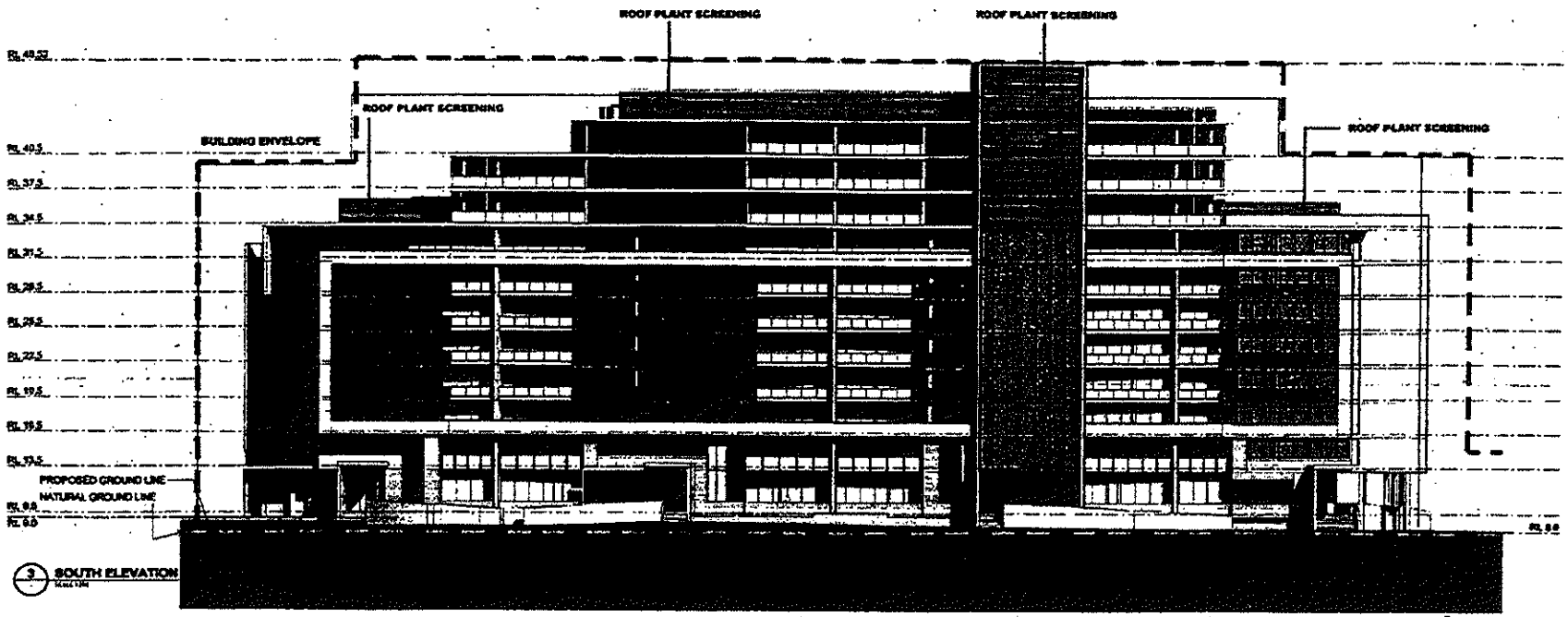

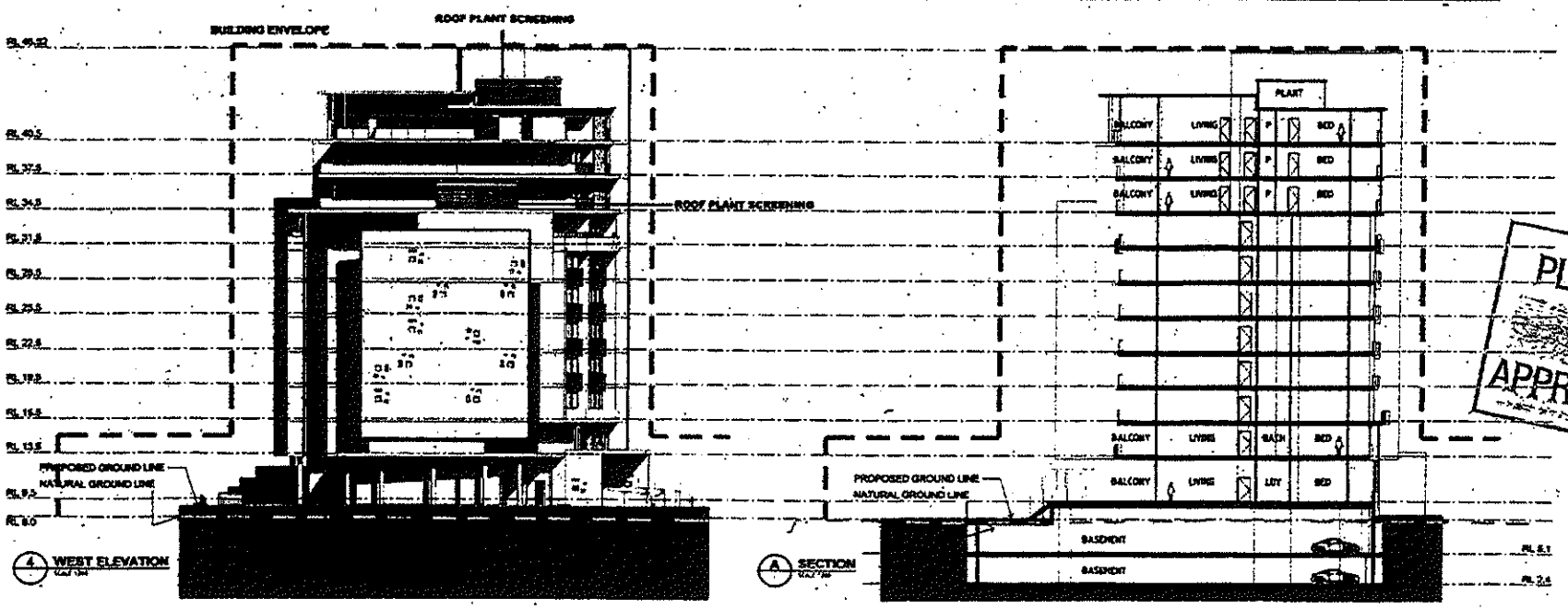

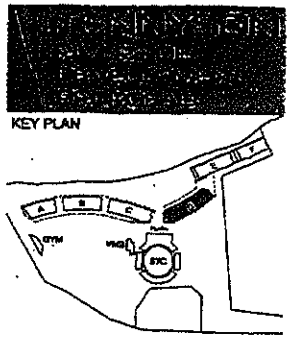

SUN CONTROL SCREENING

PRIVACY SCREENING

PLANS AND DOCUMENTS referred to in the APPROVAL dated 19 SEP 2006

TENNYSON REACH

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