WAVERLEY PARK MULGRAVE

Planning Expert Witness Statement
VCAT Reference No. P768/2014

August 2014

urbis

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Director	Michael Barlow
Job Code	Waverley Park Mulgrave
Report Number	VCAT-1

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1 INTRODUCTION

1. My name is Michael Bruce Barlow and I am a Director of Urbis Pty Ltd that conducts its business at Level 12, 120 Collins Street Melbourne. My qualifications and experience are set out in Appendix A of this report and summarised below.

2. I am a qualified town planner with a Diploma of Applied Science – Town Planning from RMIT (1981). I have over 35 years of experience including 29 years as a consultant planner advising on the development of cities. I have a particular knowledge and expertise with respect to the development of large-scale residential developments and the strategic assessment of major urban projects.

3. Mirvac Victoria Pty Ltd (Mirvac) purchased the Waverley Park site in December 2001 following its closure as a football stadium serving the AFL. A master plan and specific planning controls to guide the future redevelopment of the site were introduced in August 2002 as part of Amendment C20 to the Monash Planning Scheme.

4. A planning permit (STA/2001/000714) for the development of the site was also issued by the Minister for Planning on 14th August 2002. The permit allowed for the creation of up to 1500 lots and the construction of up to1250 dwellings. It is noted that Condition 50 of the permit requires:

   The existing powerline easement through the land must be removed and the high voltage electricity transmission lines must be placed underground in a location and via a route which is to the satisfaction of S.P.I. PowerNet Pty Ltd or the relevant electricity authority.

5. Development of the site commenced in 2003 with the demolition of most of the existing grandstand and the construction of the first dwellings in the north-west corner of the site adjacent to Wellington Road. The 'roll-out' of the new estate proceeded towards the south over the following years. I understand that during this time extensive discussions were held with the power transmission company to achieve a solution for the undergrounding of the transmission lines.

6. I further understand that following these extensive discussions Mirvac concluded that there were a number of significant barriers to providing an underground transmission link through the Waverley Park estate. In July 2009 and June 2011 applications were made to amend condition 50 to enable the retention of the above ground transmission lines. The June 2011 application was amended in August 2013 with the provision of further information regarding additional works in the proposed open space and the community benefits package.

7. The Minister for Planning issued a Refusal to Grant and Amendment to a Permit on 28th April 2014 on the following grounds:

   a. *There was an implicit obligation by way of Condition 50 of Planning Permit STA2001/000714 to underground the powerlines.*

   b. *The proposal is contrary to the expectations of the Waverley Park community regarding visual amenity.*

   c. *The proposal does not provide sufficient community facilities or improvements to Lake Park in accordance with the recommendations of the Panel Report (Monash Planning Scheme Amendment C20), dated August 2002.*

   d. *The cost increase of undergrounding the powerline is not an overriding planning consideration.*

8. I was initially engaged in this matter by letter dated 10th September, 2013 from Norton Rose Fulbright acting on behalf of Mirvac where I was asked to:

   1. *Review the letter and enclosed documents.*

   2. *Confer with the instructing solicitors and counsel where necessary; and*

3. *Prepare and expert report considering town planning matters, and in particular, to conduct an independent net community benefit analysis of the Amendment Application.*

9. On 16th May 2014 Norton Rose Fulbright provided additional instructions as follows:

    1. *In considering the net community benefit analysis, your report should have regard to the visual impact and the open space outcomes of the alternative comparators, being:*

        a. *The undergrounding of the Powerlines with the required transition enclosures; and*

        b. *Retaining the Powerlines aboveground, with the slight realignment of the easement and movement of the towers.*

    2. *Ensure that your report complies with the requirements of the Tribunal's Practice Note PNVCAT2 regarding the preparation of expert evidence; and*

    3. *Appear at the final hearing of the Application for Review to present your expert opinion on a date to be confirmed.*

10. On 20th June 2014 Norton Rose Fulbright further requested that in preparing my expert evidence I should:

    1. *Review the Statement of Grounds received in the matter; and*

    2. *Respond to the issues raised in the statements of grounds as relevant to your area of expertise.*

11. I note that on 14th July 2014 Mirvac applied to the Tribunal to substitute amended plans for the Above Ground Option to replace the traditional lattice transmission towers with monopoles as follows:

    - The central lattice tower will be replaced by a tapered monopole rising to 45 m in height. This monopole will have three main cross arms and a smaller cross arm at the top of the tower.
    - The western lattice tower will be replaced by a pair of slimline tapered monopoles rising to 48 m in height, with three 'triangular' arms on one side of the pole only aligned towards the south.
    - The eastern lattice tower will be replaced and relocated approximately 15 metres to the east (subject to separate permit).

12. I confirm that I have had no prior involvement with any aspect of this project until being requested by Norton Rose Fulbright to review the matter and advise of my opinion in September 2013.

13. In undertaking my assessment I have inspected the site of the transmission line easement, the surrounding Waverley Park estate and neighbouring areas and had regard to the following documents:

    - The planning policy provisions of the Monash Planning Scheme and the detailed planning controls pertaining to the Waverley Park site.
    - The report of the Planning Panel regarding Amendment C20 to the Monash Planning Scheme dated August 2002.
    - The Waverley Park Concept Plan and the Planning Permit STA/2001/000714.
    - The Planning Report accompanying the Application to Amend Planning Permit STA/2001/000714 prepared by Collie Pty Ltd, dated 8 June 2011.

- The Landscape and Recreation Master Plan Report prepared by MDG Landscape Architects dated 3 June 2011.
- The Revised Town Planning Report accompanying the Application to Amend Planning Permit STA/2001/000714 prepared by Collie Pty Ltd, dated 12 August 2013.
- The proposed Community Benefits Package that includes the proposed enhancements of the Lake Park and associated open space for the Above Ground Option.
- The officer report to the Council of the City of Monash considering the amendment request dated 27 August 2013.
- The grounds of the Refusal to Grant and Amendment to a Permit issued on 28th April 2014.
- Mirvac's grounds in the Application for Review
- The amended documents for the Above Ground Option circulated on 14th July, 2014.
- The Statements of Grounds by other parties in response to the appeal by Mirvac.

14. In preparing this report I have examined the background history, as disclosed in these reports, of the design concepts for the Waverley Park development and the proposal to underground the existing transmission lines that traverse the southern part of the site. This is helpful in understanding the changes that have occurred since the idea for undergrounding the transmission lines was proposed as part of the original development concept.

15. My assessment of the proposed amendment to Condition 50 of the Planning Permit addresses the following matters:

    - A general review of the broader context of the Waverley Park site and the existing development of Waverley Park to identify and define the principal features and issues that will influence the assessment of the two options.
    - The current planning policy settings and detailed controls as they pertain to the consideration of the proposed above ground and Below Ground Options.
    - The role and provision of open space within the Waverley Park development and the broader area.
    - An assessment of each option having regard to:
        - The elements of each option.
        - The proposed arrangement of the adjoining residential development, roadways and open space in response to each option.
        - The visual appearance and potential impacts of the transmission elements on the amenity and the preferred character of the overall estate.
        - The definition of the community potentially affected by each option.
    - An overall assessment of the net community benefit of each option having regard to the above assessment and the relevant requirements of the Monash Planning Scheme.

16. I note that for the purposes of preparing this report I have assumed that the EMF and EPR effects of the two options are similar and have not taken this matter into further consideration of the net community benefit of each option.

FINDINGS

17. In summary it is my opinion that:

    i. The Above Ground Option provides for a significantly enlarged area of open space and will provide a number of benefits (over and above the Below Ground Option) including:

        - A significant increase in the number of recreational and community facilities given the supply of additional 'level' land.

        - More semi-active play and 'kick-around' space for the Waverley Park estate.

        - Increased proximity to open space for residents located north and south of the park alignment, particularly at the eastern part of the estate.

        - An increased number of larger canopy trees in key locations that enhances the garden city character of the estate and surrounding area.

    ii. The Above Ground and Below Ground Options, whilst having different characteristics, are not significantly different in terms of their relative visual impacts on the Waverley Park and broader community. I note that:

        - The Below Ground Option removes the central tower and associated wires improving views from and within the central portion of the Waverley Park estate and the open space. Yet the transition enclosures introduce large 'industrial type' structures into the Waverley Park estate with higher visual impacts than the proposed above ground monopoles due to the concentration of transmission elements.

        - The Jacksons Road transition enclosure will be a prominent and discordant element on them Jacksons Road edge of the Waverley Park estate. This view will remain in place for the long term as there is no opportunity to provide significant landscaping to attenuate or buffer views to the enclosure.

        - In each option locations close to the transmission elements will enable the viewer to obtain clear views to those elements.

    iii. The existing and proposed landscaping will over time attenuate or buffer many other views to the transmission elements of both options. The taller monopoles (for the Above Ground Option) and lattice towers (for the Below Ground Option) will be visible above the landscaping from more distant views but will not be a prominent or dominant element within these views.

    iv. The provision of an above ground transmission line with monopole pylons and the concurrent provision of a significantly greater area of open space and associated recreational facilities provide a superior net community benefit than does the proposed undergrounding of the transmission wires for the reasons outlined above.

    v. The transition enclosures (in particular the Jacksons Road enclosure) for the Below Ground Option require a significant amount of land that would otherwise be provided for usable open space and will also create a significant visual impact on the broader locality.

18. I note that Mirvac has proposed a broader offer to the community as part of its Community Benefits Package including the upgrading of existing open space areas and individual payments to residents. I consider that these proposals will provide additional benefits to the community. However, given the outcomes of my assessment I have not found it necessary to rely on these additional benefits in reaching the conclusion I have.

2 THE SITE CONTEXT

2.1 THE WAVERLEY PARK ESTATE AND ITS CONTEXT

19. The Waverley Park site occupies approximately 80 hectares of land and is located on the west side of Jacksons Road between the Monash Freeway to the south and Wellington Road to the north. The site, formerly a major AFL football stadium, has been progressively developed for residential housing and associated facilities since early 2003. When completed it is anticipated the estate will accommodate approximately 1300 dwellings depending on the final form of development in the southern portion of the site.

20. The site when used as a football stadium was principally occupied by car parking areas that were generally arranged in a series of concentric 'bands' following the stadium form itself. This car parking arrangement was 'interrupted' by a large water storage dam located in the south of the site and a group of industrial buildings on the corner of Jacksons and Wellington Roads (outside of the site). An above ground 220kV transmission line running from the Rowville terminal station to the Springvale terminal station and then onto Heatherton station also traversed the southern car park area.

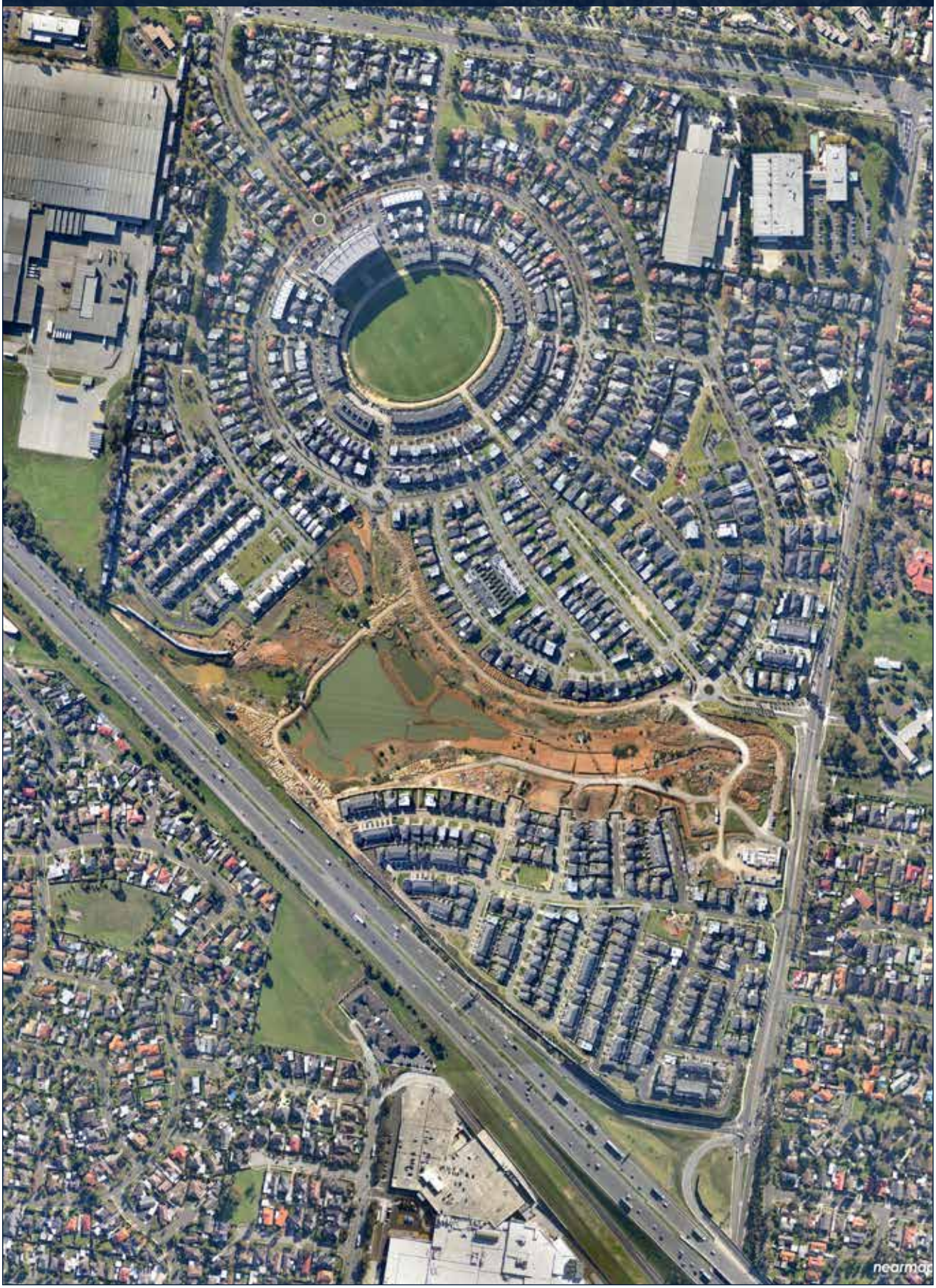
21. The areas surrounding the Waverley Park site were already well established with most of the development occurring in the 1980s. Land immediately to the west is occupied by a large warehouse/logistics operation associated with the Woolworths retail stores. To the north of Wellington Road are detached housing and the Cumberland Retirement Village. These dwellings are generally oriented away from Wellington Road and instead take their access from local or internal streets.

22. The land on the east side of Jacksons Road opposite the site is principally developed for detached housing, a theological college and a seminary (two separate uses) are located in a central position on Jacksons Road. These dwellings face on to Jacksons Road and obtain views across the Waverley Park site. Further to the east of this residential area is a large open space, Gladeswood Reserve, which serves the local community and primary school. This open space links through to a major walking track linking to the Dandenong Valley Parklands to the north.

23. Land to the south of the Monash Freeway is developed with the Waverley Gardens shopping centre and detached housing.

24. The site and immediate surrounds are shown in the aerial photo provided in *Figure 1 – Aerial photo of Waverley Park estate and surrounds.*

Figure 1 – Aerial Photo of Waverly Park Estate and surrounds



2.2 THE PLANNING CONTEXT

25. The following State and Local planning policies are relevant to the assessment:

- **Clause 10 – Operation of the State Planning Policy Framework** as it particularly relates to integrated decision making. Clause 10.4 provides that:

  Society has various needs and expectations such as land for settlement, protection of the environment, economic well-being, various social needs, proper management of resources and infrastructure. Planning aims to meet these by addressing aspects of economic, environmental and social well-being affected by land use and development.

  Planning authorities and responsible authorities should endeavour to integrate the range of policies relevant to the issues to be determined and balance conflicting objectives in favour of net community benefit and sustainable development for the benefit of present and future generations.

- **Clause 11 – Settlement** as it particularly relates to the management of open space.

- **Clause 15 – Built Environment and Heritage** as it particularly relates to the achievement of quality urban design outcomes.

- **Clause 21.03 – Vision For Monash** as it particularly relates to the definition of the Garden City Character for the City of Monash.

- **Clause 21.04 – Residential Development** as it particularly seeks to achieve the vision for a the Garden City Character within the City of Monash through a series of specific residential character types including the Waverley Park site.

- **Clause 21.10 - Open Space** that identifies the key issues to be achieved through the establishment and enhancement of the open space network in the City.

- **Clause 21.11 - Physical Infrastructure** where it provides an overview of the importance of infrastructure stating:

  Physical infrastructure by its appearance, function and location should positively contribute to the visual amenity and well being of the City, while providing a reliable, efficient and safe range of services.

  It is noted that the policy does not provide any additional guidance with respect to electricity transmission infrastructure.

- **Clause 22.01 – Residential Development and Character Policy** provides a detailed explanation of the importance of the Garden City Character as a core value for the community and Council and its use a significant and importance consideration in all land use and development decisions in most residential areas. The policy is supported by detailed descriptions of residential 'character types'. The Waverley Park site has its own character type (Type F) drawn from the Waverley Park Concept Plan (August 2002).

These policies are further discussed in my assessment of the two transmission line options and the matter of net community benefit.

26. Recently the principal zone affecting the Waverley Park site has changed from Residential 1 to General Residential (Schedule 2). The purposes of the General Residential Zone are:

    To implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.

    To encourage development that respects the neighbourhood character of the area.

    To implement neighbourhood character policy and adopted neighbourhood character guidelines.

    To provide a diversity of housing types and moderate housing growth in locations offering good access to services and transport.

    To allow educational, recreational, religious, community and a limited range of other non- residential uses to serve local community needs in appropriate locations.

27. The oval, the former grandstand building and additional land either side of that building are included within a Comprehensive Development Zone (Schedule 1). The purposes of this zone are principally to facilitate a range of uses including Office, Retail, Dwelling (in apartment buildings) and Minor sports and recreation facility.

28. The majority of the site, excluding the land covered by the Comprehensive Development Zone, is within a Neighbourhood Character Overlay (NCO) control that establishes a preferred neighbourhood character and a series of development controls designed to ensure new development respects the neighbourhood character. The NCO contains a statement of neighbourhood character that establishes the preferred development outcomes for the Waverley Park site. This statement is consistent with the Waverley Park Concept Plan August 2002.

29. The Statement of Neighbourhood Character for Waverley Park as set out in the Schedule to the NCO includes the following points:

    The preferred neighbourhood character of Waverley Park is for a concentrated and intensive built form of individual dwellings, terraces and townhouses, and multi-storey apartment buildings, within a framework of local streets, prominent precinct parks and a broader open space and pedestrian circulation system.

    The preferred neighbourhood character is the result of integrated site, built form and lot planning, design and development for the whole of Waverley Park by its single developer. The design and preferred neighbourhood character are intended to be implemented through full construction by the developer.

    The preferred neighbourhood character of Waverley Park incorporates:

    - *…*
    - *The retention and promotion of significant views and vistas within the site.*
    - *A generally concentric (based on the oval) main road pattern reminiscent of the previous radial street layout.*
    - *Precincts based on structured open spaces and clearly delineated circulation paths that provide permeability, passive surveillance of public areas and greater safety.*
    - *Retention of the oval.*
    - *…*
    - *Provision of a lake as a main water feature and sited generally in the area of the existing lake.*

30. The NCO control requires that a planning permit is required for most development and provides for a number of specific modifications to Clause 54 and 55 standards. The control does not make any specific references to the future treatment of the transmission line.

3 THE OPTIONS FOR THE TRANSMISSION EASEMENT

3.1 INTRODUCTION

31. The 220kV transmission easement across the southern half of the Waverley Park site was put in place before the establishment of the football stadium and car parking. The areas of Mulgrave and adjoining suburbs were developed around the existing transmission network during the 1970s and 1980s.

32. With the redevelopment of the site for residential purposes the opportunity to remove the two transmission towers and overhead wires on the site was explored in detail with the transmission company SP Ausnet. It is understood that following the extensive discussions and detailed design Mirvac concluded that there were a number of significant barriers to providing an underground transmission link through the Waverley Park estate.

33. The option of providing an alternative Above Ground Option was then explored and an application lodged to modify Condition 50 of the Planning permit was lodged for consideration. The following sections describe each option.

34. I am advised that the proposed design of the open spaces for each option is described and discussed in the evidence of Mr Barry Murphy. Mr Murphy's designs have been used in a series of photomontage views of the proposed options to assess their respective appearance and visual impacts. My analysis of these views is contained in Section 4 of my report.

3.2 THE EXISTING TRANSMISSION ALIGNMENT

35. The transmission easement across the Waverley Park site forms part of one of four easements that run from the Rowville terminal station through the eastern region of metropolitan Melbourne. The easement connects with another terminal station in Centre Road, Springvale and then terminates at the Heatherton terminal station in Warrigal Road (*see Figure 2 – Route of Rowville to Heatherton Transmission Easement*).

36. The Rowville-Springvale-Heatherton transmission easement features typical lattice towers supporting a 220 kV double circuit and has a length of 15 kilometres that traverses the full variety of uses within the urban area including:

    - Parkland – an example is the Gladeswood Reserve that hosts the transmission easement before it approaches Waverley Park from the east across the seminary and Jacksons Road. It is noted that the transmission lines travel over tennis courts – this is a common circumstance in many of the metropolitan transmission easements.

    - Residential properties – on occasion the easement is set aside as a specific reserve of approximately 40 metres width with other uses adjoining the reserve. On other occasions a reserve was not created with the subdivision of the property for residential development. Instead lots with larger 'back yards' were created to accommodate the transmission lines. The backyards are used for a variety of activities from private open space to garages and stores.

    - Industrial precincts – the principal buildings serving the various industrial uses are clear of the transmission lines with the easement being used for parking, hard standing and external storage.

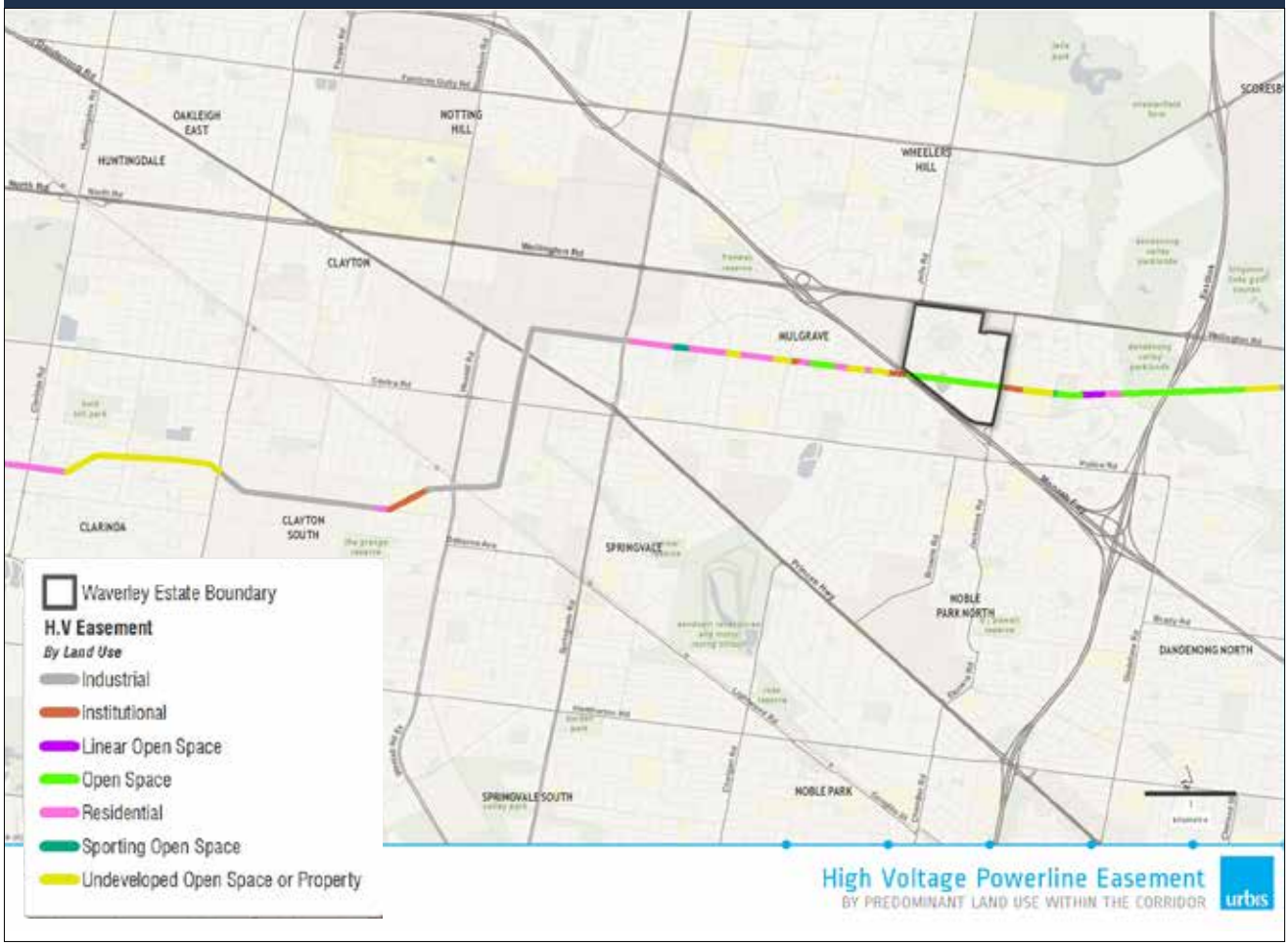
A series of aerial photos in Appendix B illustrates some of these 'easement typologies'.

37. The transmission easement on the site originally traversed the 'outer' car parking areas and the dam serving as water storage for the football ground. The easement runs for a distance of approximately 760 metres, which represents approximately 5% of the length of the total easement.

38. The existing arrangement for the transmission lines across the site comprise two lattice towers of approximately 34 and 39 metres in height on the site itself with a further tower being located just to the east of Jacksons Road frontage opposite the site. Another tower is located on the western side of the Monash Freeway approximately 120 metres from the Waverley Park site.

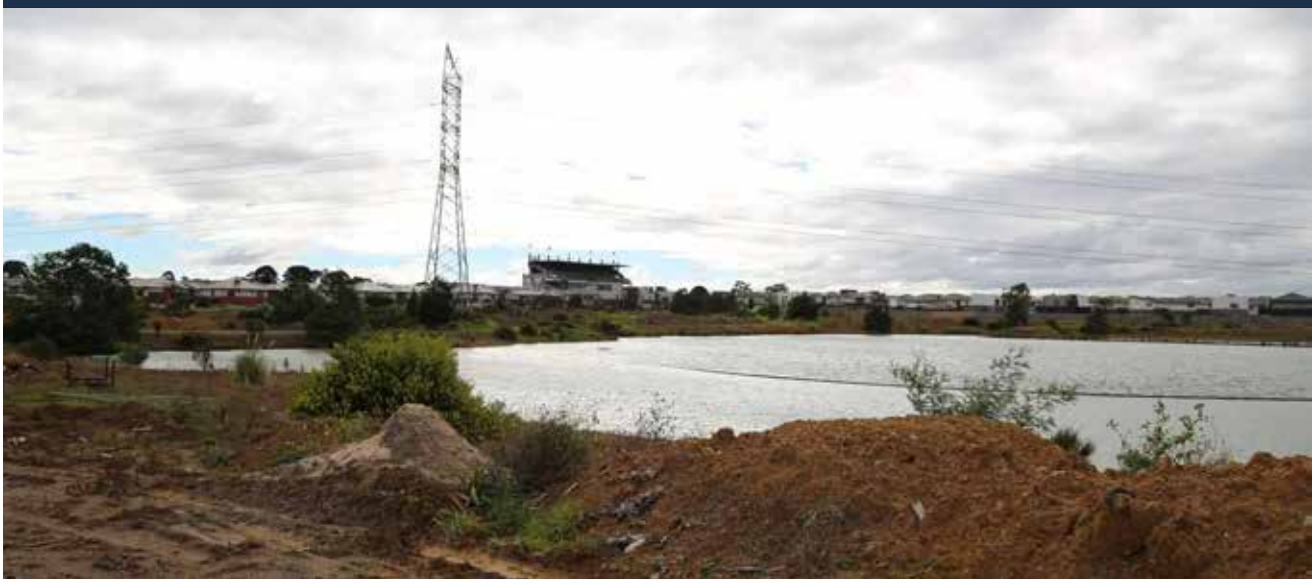
39. The existing pathway of the transmission easement across the Waverley Park site is currently vacant excepting the transmission infrastructure and the existing water storage dam (see *Figure 3 - Existing Transmission Easement, Waverley Park*).

Figure 2 – High Voltage Powerline Easement



View of existing central tower from southern end of Queensberry Circuit

View of existing western tower looking north to grandstand



View of existing eastern tower looking north along Jacksons Road

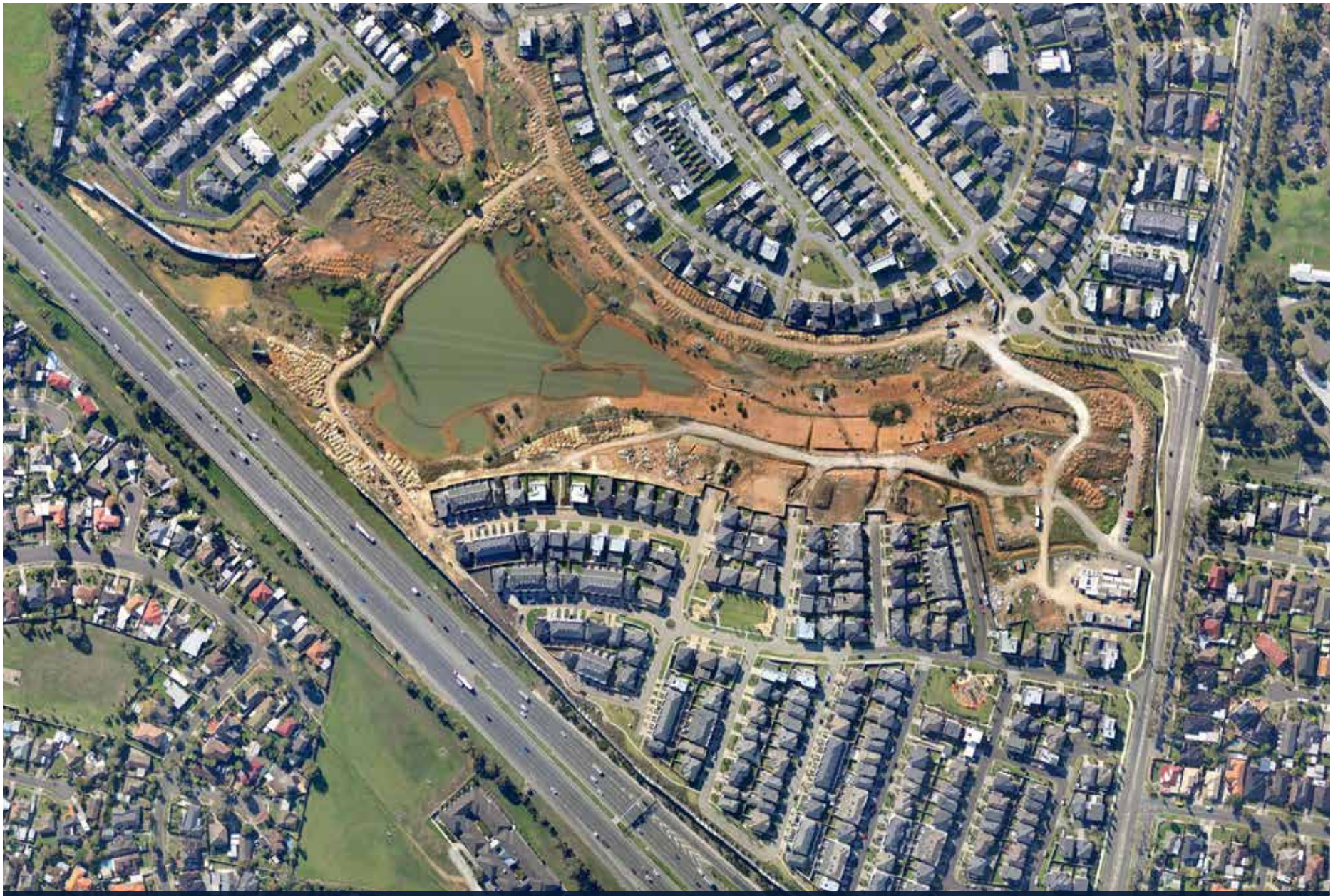


Figure 3 – Existing Transmission Easement, Waverly Park

40. The existing towers and associated over-head wires are visible from a number of points within the Waverley Park site. It is noteworthy that as the estate has developed certain views towards the easement or towers are obscured by new buildings or planting. Other views are highlighted by virtue of the arrangement of the street and open space networks. This matter is discussed in more detail in Section 4 of the report.

3.3 THE BELOW GROUND OPTION

41. When one has regard to the early plans for the new residential estate it is apparent that the concept of undergrounding the transmission line in 2002 was only that – a concept. The plans for the redevelopment of the site (see Appendix C for a copy of the plans) did not make any allocation of land for transition stations and it was assumed that the underground transmission link could follow a relatively lengthy and circuitous route to cross the site from Jacksons Road to the Monash Freeway.

42. Whilst the overall plan is diagrammatic it appears that there was a view that the link from the above ground towers to the underground route would involve only a small area. The plans also showed a future expectation that the undergrounding would release additional land for residential development.

43. Subsequent detailed investigations have revealed that the transitioning of high voltage transmission lines is complex and requires a significant area of land and infrastructure. This in turn required modifications to the original design concept. A copy of the plans for the Below Ground Option is attached at Appendix D.

44. The detailed plans for the Below Ground Option propose:

    - The removal of the existing central lattice tower and overhead wires in the central part of the easement.
    - The creation of two transition enclosures: One on the eastern side of the site abutting the Jacksons Road frontage and the other at a point near the south-west corner of the site. Each transition enclosure will contain six monopoles (three pairs of poles) ranging in height from 17 to 30 metres that take the above ground wires to the underground route. A 3 metre high wall will enclose each of the transition enclosure.
    - The western transition enclosure will occupy an area of 8,700 m^2 and will located at the western end of the Lake Park area adjoining the Monash Freeway. The transition enclosure will also contain a 48 metre high lattice tower that will connect with the above ground route continuing on over the Monash Freeway to the west.
    - The Jacksons Road transition enclosure will occupy an area of 4,600 m^2 and will be located at the eastern edge of the site adjoining the road reserve. The transition enclosure will be linked by overhead wires to a lattice tower located on the east side of Jacksons Road. It is understood that the current lattice tower will be replaced with a new tower capable of accommodating the loads associated with the proposed transition. The new tower will be approximately 45 metres in height and will be located 15 metres to the east of the current tower location.
    - It is proposed that a number of houses would be placed immediately south of the transition enclosure. To the north would be a laneway providing access to five dwellings. It is proposed that all of these dwellings will be two storeys in height.
    - The underground easement runs east from the Jacksons Road transition station generally following a landscape/park and roadway corridor before joining the western transition station.

45. The total amount of parkland to be provided as a result of the adoption of the Below Ground Option is 47,100 m^2. This parkland comprises a series of different areas including a large lake and smaller water bodies as part of the overall site drainage management system. The lake is shaped to be adequately setback from the underground easement.

3.4 THE ABOVE GROUND OPTION

46. The Above Ground Option proposes to introduce new monopoles to carry the transmission wires across the Waverley Park site generally following the current transmission easement. A copy of the plans for the Above Ground Option is attached at Appendix E.

47. The detailed plans for the Above Ground Option propose:

- The relocation and replacement of the 'central' tower located near to Sabina Park Drive/Beaconsfield Road running north-south across the open space area. The tower will be moved approximately 35 metres to the south-west to enable the completion of Gertrude Street, a semi-circular roadway that is a key element of the Waverley Park estate design.
- The current ' central' lattice tower will be replaced with a tapered monopole with an overall height of 45 metres. The monopole will feature 3 main cross-arms and a smaller cross arm at the top of the pole. The monopole will have a base of 1.8 metres tapering to a width of 0.76 metres at the top. The cross arms will have length of 9.8 metres.
- The 'western' tower located closer to the Monash Freeway will be replaced with a pair of tapered monopoles rising to 48 meters in height, with three 'triangular' arms on one side of the pole only aligned towards the south. These poles will have a base of 1.5 metres tapering to a width of 0.6 metres at the top. The location of the new monopoles will be approximately 50 metres to the west of the existing lattice tower location.
- It is proposed that the monopoles will be constructed of galvanised steel that will be allowed to naturally weather resulting in a light grey colour.
- The eastern lattice tower to the east of Jacksons Road will be replaced and relocated approximately 15 metres to the east. The tower will be increased in height to approximately 39 metres.

48. The total amount of parkland to be provided as a result of the adoption of the Above Ground Option is 67,665 m^2. This parkland comprises three areas of open space (divided by two roads linking the southern part of the estate to the north) providing an open landscaped corridor from Jacksons Road to the Monash Freeway boundary at the west of the site. The western most park area contains the lake that is to be enhanced with a boardwalk and a range of supporting park infrastructure.

49. A table providing a quantitative comparison of the existing conditions and the two options is set out below.

Option	Description of Tower/Pole	Tower/Pole Height	Number of Towers/Poles	Width of Tower/Pole Base	Arm Span	Distance of easement with overhead wires	Enclosure Area	Enclosure Structures
Existing Above Ground	Lattice Tower	39 metres	2	9 metres	9.4 metres	750 metres	None	None
Below Ground Option	Lattice Tower	48 metres	1	9.4 metres	9.4 metres	Approx. 150 metres	8,700 m^2	3 metre high screen fence
	Monopoles	30 metres	4	1.1 metres	8 metres		4,600 m^2	
		22.1 metres	4		8 metres			
		17 metres	4		8 metres			
New Above Ground Option	Monopole	45 metres	1	1.8 metres	9.8 metres	750 metres	None	None
	Twin Monopole	48 metres	2	1.5 metres	2.5 metres			

4 NET COMMUNITY BENEFIT ASSESSMENT

4.1 BACKGROUND

50. Having regard to the site context, relevant planning policies and controls and the attributes of the Above and Below Ground Options it is considered that the following matters need to be assessed as part of undertaking a net community benefit assessment being:

    1. An analysis of where the elements of each option can be viewed having regard to the layout and design of the Waverley Park estate and the surrounding road and open space networks.

    2. The characteristics of each option that contribute to their visual appearance and their general visual impacts.

    3. An understanding of the prominence of the elements of each option relative to distance and types of viewpoints.

    4. The potential visual impact of each option on the character of the Waverley Park estate and the broader area having regard to the identified character for the estate and the Monash municipality.

    5. An analysis of the proposed open space to be provided as a consequence of implementing each of the two options having regard to:

        i. The overall amount of open space provided.

        ii. The range of activities and uses capable of being accommodated in the open space.

        iii. The opportunity provided by the open space to accommodate landscaping to ameliorate or buffer views to the transmission elements in each option.

        iv. The overall usability of the open space.

51. The following sections of the report provide my analysis of each of the options having regard to these matters and provides a summary net community benefit assessment.

4.2 VIEWPOINTS AND VIEWSHED ANALYSIS

4.2.1 VIEWPOINTS

52. The assessment of viewpoints focuses on publicly accessible locations, as these locations are able to be accessed by the entire community and generally demonstrate more open views than views from inside residences or from within private open space areas where views can be limited by the screening effects of vegetation, fences, walls and furnishing.

53. The scale of the Waverley Park estate together with the integration of the local topography and adopted street and open space network provides for a variety of locations and types of views towards the transmission easement. The easement itself traverses the site generally along an east-west alignment whereas the Waverley Park estate has adopted two general forms of street and open space layout being a curvilinear form for the majority of streets and links north of the easement and a rectilinear form for the newer development south of the easement.

54. This arrangement means that there are few north-south streets north of the easement providing direct views to the easement. The two exceptions are the eastern most leg of Gertrude Street and Sabina Park Drive/Beaconsfield Road linking the northern part of the estate with the south across the easement/open space area. The arrangement of the streets provides for a greater number of streets aligned at 45 degrees to the easement with views along those streets generally terminating at the western and eastern ends of the easement. Other streets run parallel with or 'turn away' from the easement.

55. This arrangement of the streets and open space links creates a number of different view types that can be defined as follows:

AXIAL OR DIRECT VIEWS

- Axial views are views along roadways or lineal open space areas aligned directly towards individual transmission line elements with minimal intervening screening. Road side or open space street tree vegetation generally provides greater screening than built form.
- The viewpoints are typically located at a perpendicular or oblique angle to the easement alignment but have a direct line of sight to a large proportion of a single element or grouped elements of either option.
- Given the orientation and the potentially exposed proportion of the component visible, these views are considered to be the most significant in assessing visual impact. Typical axial viewpoints extend from 50 to 200 metres.
- An example of this type of view is the view south along Queensbury Crescent or the view north and south along Sabina Park Drive/Beaconsfield Road.

Typical Axial View

PERPENDICULAR OR APPROACHING VIEWS

- Perpendicular views are views that are possible along the streets or open space towards the alignment but not directly towards key elements of transmission infrastructure. Parts of the elements may be viewed above the tops of intervening built form in the middleground or background.
- The potential for prominent views of the elements is moderate given intervening buildings and vegetation. Visual prominence reduces with an increase in distance from the element.
- Typical perpendicular viewpoints can extend from 50 to 300 metres.

Typical Perpendicular

OBLIQUE OR MOMENTARY VIEWS

- Oblique views are views along curved roadways where views towards components are generally screened by roadside built form or vegetation but are possible for a section of the road where the direction of movement is momentarily aligned towards a component.
- The potential for prominent views of the elements is moderate given intervening buildings and vegetation. Visual prominence reduces with an increase in distance from the element.
- Typical oblique viewpoints extend from 50 to 100 metres.

Typical Oblique View

OFFSET PARALLEL OR INCIDENTAL VIEWS

- Offset parallel views are those from locations offset from, but parallel to the alignment and separated from it by existing built form and vegetation.
- Generally viewing will be in the direction of travel along the street and an object located close to perpendicular to the direction of travel (70 to 90 degrees) will not be readily apparent unless the viewer turns their head towards the element.
- Mostly a small percentage of the transmission elements will be visible above built form. Perpendicular or axial views will possible along intersecting roads and open space areas.
- Typical offset viewpoints extend for approximately 20 metres.

Typical Offset Parallel View

PARK VIEWS

- When the new open space is created it will also provide new opportunities for views towards the transmission elements. The more open nature of the space and the planting restrictions imposed by both options means that from certain viewpoints the elements will be highly visible.
- Views from within the park will principally be **Axial or Perpendicular Views** with the key difference to the viewpoints described above being the relative proximity of the transmission elements to various viewpoints. Some of these viewpoints will extend for the length of the park being up to a distance of approximately 600 metres for the Above Ground Option.
- As is discussed later it is also possible with both options to ameliorate the visual impact through a combination of planting at locations intersecting with key viewpoints and the use of built form (new dwellings) adjacent to the transmission elements.

EXTERNAL VIEWS

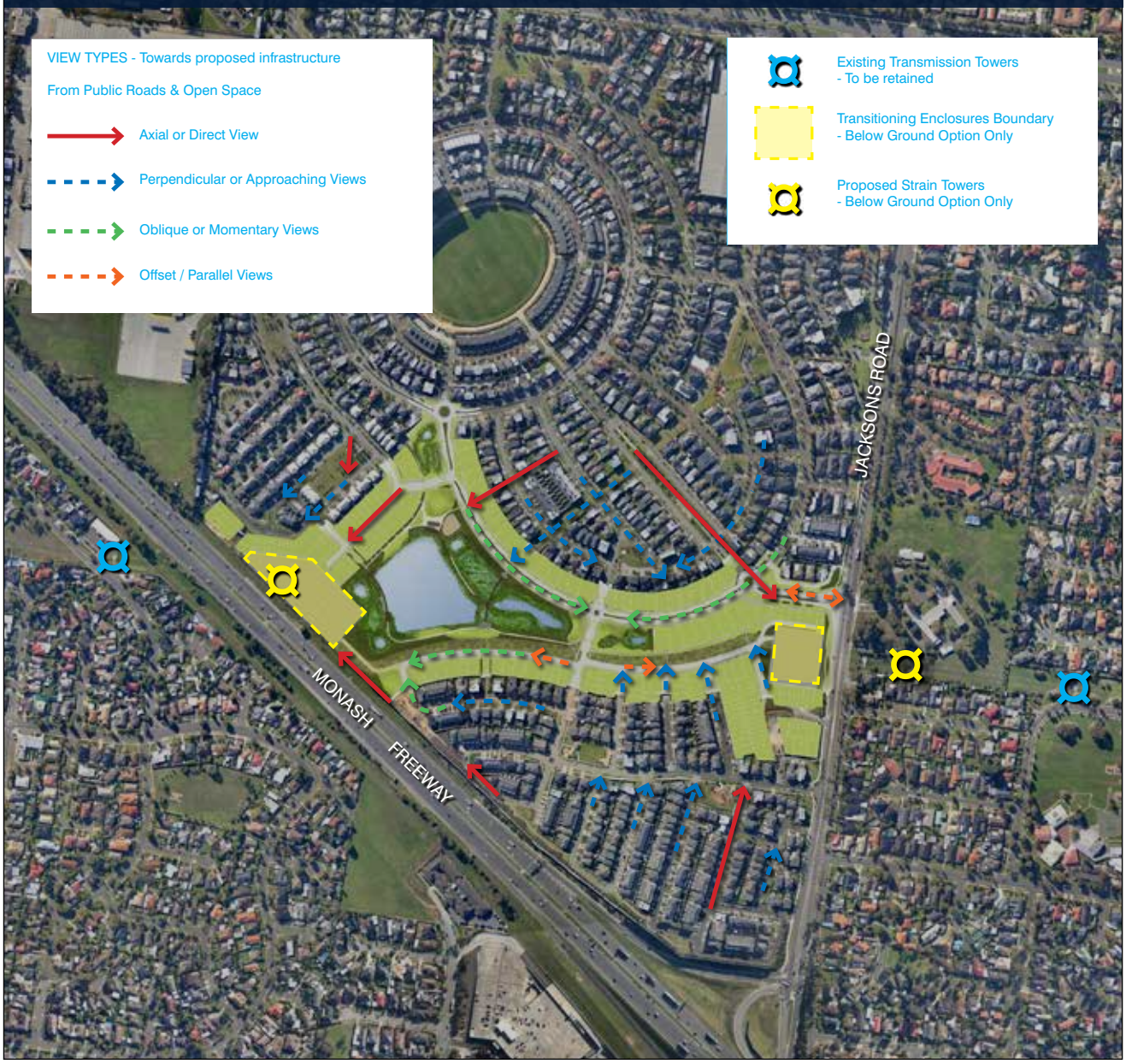
- Some of the transmission elements will be visible from locations outside the Waverley Park estate including:
  - Jacksons Road – views from Jacksons Roads will include **Axial Views** for a distance of approximately 150 metres approaching the easement from the north and south. As a viewer draws along side the easement the views will become **Offset Parallel Views**.
  - Residential area south of the Monash Freeway – the residential area closest to the freeway already obtains views of the transmission line and the associated towers. There are a couple of small courts that provide **Axial Views** to the western end of the easement whilst **Offset Parallel Views** are available from nearby streets.

– The Monash Freeway – views of the existing transmission line and the associated towers are available from the Monash Freeway. The views are relatively brief given the speed of travel and can be characterised as **Perpendicular Views**.

56. Using these view types an analysis of the views for each option was undertaken. This view analysis is shown in Figures 4 and 5. The analysis was then used to assess which particular viewpoints should be further modelled to define the key viewpoints for the preparation of photomontages showing the respective visual impact of the two options. I have reviewed the photomontages prepared by Mr Peter Haack and Mr Ashley Poon.

Figure 4 – Views towards Proposed Infrastructure - Above Ground Option

Figure 5 – Views towards Proposed Infrastructure - Below Ground Option



57. The photomontages have been prepared to show:

- A photo of the existing view (except for views from within the proposed park as the current levels within the park area are significantly different to the proposed finished levels of the park design).
- A photomontage of the Above Ground Option with existing landscaping only.
- A photomontage of the Above Ground Option with existing and proposed landscaping in 10 years, typical of species.
- A photomontage of the Below Ground Option with existing landscaping only.
- A photomontage of the Below Ground Option with existing and proposed landscaping at 10 years, typical of species..

58. The photomontages have informed my assessment of the visual impacts of the two options.

4.2.2 VIEWSHED ANALYSIS

59. The prominence of an element diminishes with distance from the element. From my various site inspections of the Waverley Park estate and the current transmission towers and wires it is apparent that in most views from locations 300 metres or greater the towers are not a prominent element. Whilst the tower structure is visible (in part or full) it generally sits at a similar 'height' as other elements in the view such as the two storey dwellings, other street furniture and existing street planting.

Views of existing 'central' tower from the north

View of existing 'western' tower from the north

View of existing 'eastern' tower from Queensberry Circuit

60. A viewshed analysis has been undertaken to assist in defining those areas within Waverley Park and beyond where the elements for each option would be most visible – particularly those areas within 300 metres of the transmission elements for each option.

61. The analysis is based on a three dimensional (3D) model which includes the pylons, transitioning enclosures, HV lines, built form within Waverley Park, including yet to be built residences, and the existing and proposed noise walls along the north and south sides Monash Freeway. Houses for undeveloped lots have been modelled based on the typical Mirvac housing product for each lot size.

62. It is noted that the 3D model does not extend beyond the Waverley Park site and hence viewsheds have not been calculated for areas external to the site. The existing conditions photos show that there are a number of locations where views of the existing transmission infrastructure on the site is visible. The diagrams therefore understate the viewshed area.

63. The viewshed analysis has been undertaken for each option as follows:

BELOW GROUND OPTION

- Plan 1 - identifies the locations and maximum area where 25% and 50% or more of either of the two 30 metre monopoles in the Eastern Transition enclosure may be visible.
- Plan 2 - identifies the locations and maximum area where 25% and 50% or more of either of the two 30 metre monopoles in the Western Transition enclosure may be visible.
- Plan 3 - identifies the locations and maximum area where 25% and 50% or more of the eastern lattice transmission tower may be visible.
- Plan 4 - identifies the locations and maximum area where 25% and 50% or more of the western lattice transmission tower may be visible.
- Plan 5 – combines plans 1 - 4 to identify all locations and maximum area where 25% and 50% or more of one of the monopoles or towers may be visible.

ABOVE GROUND OPTION

- Plan 6 - identifies the locations and maximum area where 25% and 50% or more of the central monopole may be visible.
- Plan 7 - identifies the locations and maximum area where 25% and 50% or more of the eastern lattice tower may be visible.
- Plan 8 - identifies the locations and maximum area where 25% and 50% or more of the western twin monopoles may be visible.
- Plan 9 – combines plans 6 - 8 to identify all locations and maximum area where 25% and 50% or more of one of the monopoles or towers may be visible.

64. The viewshed analyses are attached in Appendix G (Pla*ns of Viewshed Analysis for Below Ground Option*) and H (*Plans of Viewshed Analysis for Above Ground Option*) and are further discussed in my assessment of the two options.

65. The 25% and 50% view criteria were adopted to provide an understanding of how much of the transmission element would be seen in the viewshed analyses.

66. It is noted that the analysis is conservative, with a greater extent of viewshed identified than would actually exist, as it does not take into account the effects of screening of views by existing or proposed vegetation. The viewshed analysis for each option highlights the respective park areas as being locations where the selected transmission elements are highly visible given the lack of vegetation in the model. The introduction of landscaping into the open space and surrounding streets will reduce the number of locations and area where a viewer may see each of the elements as set out in paragraph 61. This is apparent having regard to the various photomontage views.

4.3 CHARACTERISTICS AND VISUAL IMPACTS

4.3.1 THE BELOW GROUND OPTION

67. The Below Ground Option will enable the removal of the current 'central' lattice tower and associated wires through the establishment of two transition enclosures at the eastern and western ends of the transmission easement as it traverses the Waverley Park estate. The two enclosures are large infrastructure elements by virtue of their significant 'footprints' of approximately 4,600 m^2 and 8,700 m^2 and the collection of monopoles and associated surge protectors.

68. The western enclosure will also accommodate a 48 metre lattice strain tower to take the wires over the Monash Freeway. The new 39 metre strain tower serving the eastern enclosure will move 15 metres to the east of the current tower location located near Jacksons Road.

69. The critical outcome of the creation of the transition enclosure is the concentration of a number of poles and wires within the enclosure structure itself. The enclosures and the associated transmission elements will create two significant and discordant places within Waverley Park. Moreover, these enclosures will be highly visible from a number of viewpoints, this is particularly apparent in the following views:

    - View VP07 – View looking south-east along Queensberry Crescent to Jacksons Road.
    - View VP08 – View from the intersection of Jacksons Road and Gate Seven Drive looking south-west.
    - View VP09 – View from the east side of Jacksons Road looking west to the enclosure.
    - View VP10 – View looking north along Jacksons Road to the enclosure.
    - View VP16B – View from northern edge of lake to western enclosure.

70. It will be possible to provide new landscaping to intervene or buffer certain views. For example the view from the north side of the lake (View VP16B) will be ameliorated as planting on the west side of the lake matures over the next 10 years - albeit it is difficult to fully screen the monopoles.

71. Other viewpoints, however, will remain open to permanent view as the opportunity to provide significant landscaping is either constrained by the requirements of the transmission operator or the lack of sufficient land. This is particularly the case for the closer western and eastern (see Views VP08 and VP09) sides of the Jacksons Road enclosure.

72. In assessing the potential visual impact of the proposed enclosures and associated infrastructure I have formed the following opinions:

- The areas away from the enclosures will be free of views to a centrally located transmission tower and overhead wires. The areas around Sabina Park Drive and Beaconsfield Road will no longer have a tower structure in their views to the north and south.
- It is noteworthy that the viewshed analysis indicates that, notwithstanding the removal of the central tower, the areas where you will see 50% or more of a transmission tower or monopole will only reduce by 11% given the continued existence of the towers at each end of the Waverley Park easement.
- The transition enclosures (featuring combined location of a number of monopoles, surge arrestors and associated wiring) create large infrastructure compounds that are of industrial character and 'at odds' with the current and emerging residential character of the Waverley Park and the established character on the east side of Jacksons Road.
- The transition enclosures contain a concentration of transmission infrastructure elements that provides a more intense visual impact than the single lattice towers or proposed monopoles.
- The eastern and western sides of the transition enclosures are particularly constrained from providing comprehensive landscape or built form buffers by virtue of their location and the need to accommodate the overhead and underground wiring. This creates a number of highly exposed elevations that will be prominent in views from the proposed open space and residential streets.
- The transition enclosures are located in key views and vistas, particularly the Jacksons Road enclosure, due the location of the enclosures at the 'ends' of the transmission easement. The Jacksons Road enclosure terminates the vista running from the Grandstand along Queensberry Circuit to the corner of Jacksons Road and Gate Seven Drive. This is clearly demonstrated in Plan 1 of the viewshed analysis.
- The western enclosure terminates views looking north-west along a new road serving the southern precinct of Waverley Park and views looking south-west along Peterleigh Road. The introduction of new housing and mature landscaping will generally screen the multiple poles rising into view.
- The western lattice tower will be visible from most streets located within the western portion of the Waverley Park estate. The streets in the south-west corner of the estate will gain views to both the new lattice strain tower and the monopoles in the transition station. This is shown in Views VP03 (from corner of St James Park Drive and Lords Avenue looking south) and VP15 (from the eastern end of Lords Avenue looking south-west down Peterleigh Road).
- There will also be views to the transition enclosure and associated infrastructure from points around the lake and associated park areas. This is shown is View VP16B looking west from the north side of the lake. The western transition station introduces additional transmission elements and a more intense visual impact for views from the residential areas south of the Monash Freeway – see View VP14.
- The eastern transition enclosure brings a new 'industrial element' to Jacksons Road that will be highly visible (and incapable of effective screening by planting) at a key entry to the Waverly Park estate. The estate has sought to create a very strong Garden City character through the use of extensive parks, open space links and comprehensive street planting. A good example of this character is found at the entry to the estate via Padey Drive off Jacksons Road (the next entry north of Gate Seven Drive). The proposed enclosure is inconsistent and out of character with this design approach.

4.3.2 THE ABOVE GROUND OPTION

73. The modified Above Ground Option is to relocate and replace the central (Tower 11A) and western (Tower 12A) lattice towers with a monopole with cross arms and two slimline monopoles with triangular arms on one side of the monopole, respectively.

74. The Above Ground Option will retain the overhead wires with a minimum clearance of 14.5 metres above ground. The actual width occupied by the transmission monopoles and wires will vary between 9.8 metres for the single monopole to 13 metres for the twin monopoles. The monopoles have been introduced to provide more slender structures, than the current lattice towers.

75. The original design intent for the lattice towers was to provide an 'open structure' whereby the viewer would see more of the backgound than with other alternatives. This approach has some merit for longer distance views but when the lattice structure is viewed from closer points it is often seen as an 'industrial structure' that dominates the view. The lattice tower structure also 'occupies' an extensive footprint in the order of 90-100m^2, which exacerbates the dominant nature of the structure in near distance views.

76. It is considered that the lattice towers are likely to have a greater negative visual presence than the actual wires. This is due to their more obvious or noticeable physical form as opposed to the more visually discrete wires, which often blend within the back dropping sky, particularly during cloudy conditions. The photos of existing conditions across the site demonstrate that in many views the wires are a minor element in the view.

77. The monopoles will be capable of being viewed from many of the same locations as the existing lattice towers but will present a significantly narrower and 'cleaner' silhouette. This is demonstrated in a number of views including:

    - View VP06 – looking south along Beaconsfield Drive to the open space and transmission easement.
    - View VP05 – looking south-west along Punt Lane across the open space to the western tower location.
    - View VP12 – looking north along Sabina Park Drive
    - View VP20 – looking south from the intersection of Stadium Circuit and Marylebone Drive to the open space and the transmission easement.

78. In assessing the potential visual impact I have formed the following opinion:

    - The proposed use of a single monopole as the support structure, instead of a traditional lattice tower, for the central pylon location will significantly improve on the current views to the transmission easement. The monopole, whist being a tall element, is far more slender in profile and will be less prominent in many views particularly 'side on' views from the surrounding residential areas and streets.
    - The top half of the central monopole and the associated wires will be visible within the north-south streets running perpendicular to the park and the north side of a number of curvilinear streets to the north of the easement. More distant views will be available to two streets to the south-west of the oval, areas within the oval and north south streets that are approximately 500 metres north of the monopole.
    - Some viewpoints will directly align with the monopole, (see View VP06), and others will be obtained as the viewer approaches the open space and others will be oblique or momentary views. Many of these closer views of the monopole will be attenuated by street planting and landscaping at the edge of the open space.
    - The central monopole will be a prominent element in a number of views but by virtue of its slender profile will not be a dominant element. In most views the monopole will be read as 'secondary' element sitting behind or within views of housing, street furniture and trees.
    - Similarly the twin monopoles will present a far more slender profile than the current lattice tower. As the

western ‘tower’ in both of the options is required to be 48 metres tall the twin monopoles will be visible from a larger area than the current lattice tower. It is considered that this additional height is of no real impact as the ‘new’ locations where the taller poles can be seen are distant from the poles. The relocation of the monopoles further to the west than the current lattice tower will also slightly change the location of the areas where the poles can be seen from as compared to the current lattice tower.

- The western twin monopoles will be visible to views from the north and south in a similar manner to the proposed western lattice tower serving the Below Ground Option – see View VP15 (from the eastern end of Lords Avenue looking south-west down Peterleigh Road).
- Users of the open space will obtain views to the single central monopole and twin monopoles from viewpoints in the centre of the open space, around the lake and at entries to the open space. Views of the entire monopole will generally be only available within the easement ‘corridor’ due to the proposed landscaping treatment within and along the edges of the open space.
- The open space enables the appropriate planting response of smaller trees within the transmission easement bordered by taller trees at the edge of the easement. It is understood that the landscape concept for the enlarged park will comprise a series of ‘open rooms’ defined by planting. Visual compartmentalisation of the linear landscape under the power lines through planting will break up views from within the open space. This effect will occur with any planting above head height and is not dependent on tall canopy tree planting as is demonstrated in Views VP17, VP19 and VP21.
- The Above Ground Option will provide for views of the wires from a number of vantage points – particularly those within the open space. Again, landscaping in the street network and within the open space will restrict and attenuate views to the wires.

4.3.3 SUMMARY

79. Each option introduces elements that will be visible to many residents within the Waverley Park estate. It is particularly apparent that different options and transmission elements are viewed by different groups of residents from the street near their home.

80. The ‘summary’ viewshed analysis plans that identify the locations where either 50% or 25% of a transmission element is visible with Waverley Park for each option. These analyses demonstrate that notwithstanding the proposed removal of the central ‘tower’ as part of the Below Ground Option many residents within Waverley Park and nearby residential areas will continue to experience views of transmission elements.

81. The key factors arising from my analysis of the visual impacts of the two options can be summarised as follows:

    - The central monopole in the Above Ground Option will be most visible to households located within the centre of the estate by virtue of its height and central location. Households elsewhere in the estate will obtain more distant views or no view at all.
    - The proposed central monopole will generally present as a slender element with the cross arms only being fully apparent in views looking east – west within the open space. In many instances views to the monopole will also feature intervening landscaping and buildings - see Views VP01 and VP03.
    - Both options require the continued reliance on ‘towers’ at the eastern and western ends of the Waverley Park easement to connect to the existing above ground transmission towers further to the east and west.

The eastern tower for both the Above Ground and Below Ground Options will be located east of Jacksons Road and set further away from the road (a distance of approximately 30 metres). The tower will be visible from within Waverley Park but its principal visual impact will be small given the distance of views involved and the existing vegetation to the north of the tower in Jacksons Road.

- By contrast the western towers, being the twin monopoles for the Above Ground Option and the lattice tower for the Below Ground Option will be more visible to residents within Waverley Park. As is demonstrated in the photomontages (in particular Views VP03, VP05, VP15 and VP20) the lattice tower and monopoles of the transition station are generally more prominent than the twin monopoles given the higher 'visual intensity' of elements within the view. It is noted that the landscaping within some streets will attenuate views from the north-west over the next 10 years for both options.
- The removal of the central 'tower' will provide 'open views' across the park from vantage points generally to the immediate north and south of the open space area.
- There will be eastern and western views to the transmission elements for both options within the open space areas.
- The proposed transition enclosures with their various monopoles and associated towers will be most visible to households in the streets providing axial or approaching views. These households are generally located towards the western and eastern parts of the Waverley Park estate – that is away from the centre.
- In effect the critical difference between the two options is that the central area bounded by the new road adjoining park, Stadium Drive, and Queensberry Circuit will have reduced visibility of transmission towers in the Below Ground Option. Whereas an increased area of the western and eastern parts of the estate (generally within 300 metres of the transition stations) will have visibility of a number of transmission elements.
- The locations of the transition enclosures also 'externalise' the visual impact of the concentration of monopoles to people outside the estate. The Jacksons Road enclosure will present as a significant industrial element in a residential neighbourhood and will be inconsistent with the desired Garden City character for the estate and surrounding area. The transmission elements of the western enclosure will be visible from residential areas south of Monash Freeway.

82. In summary I considered that although the removal of the central tower and associated wires will provide a sense of visual spaciousness and vistas clear of transmission elements when viewed from the central area of the estate and the immediate areas of the park itself, other parts of the estate will retain views to multiple transmission elements notwithstanding this removal of the central tower, the solution of removing the central tower and its associated wires imposes a significant visual dis-benefit on residents living near to the proposed transition enclosures and the broader community.

4.4 OPEN SPACE ANALYSIS

83. The open space area that will host either of the transmission options was identified as the 'Lake Park' in original design concepts for the Waverley Park estate with an associated linear park linking to the east. It is apparent from a review of the earlier concept plans for the estate that the Lake Park was expected to serve a number of roles including:

    - Being a major part of the drainage management of the site, in effect carrying on the role of the original dam serving the football stadium. An early plan (Drawing 82-85-/DS, prepared by Parry Fraser and Jones) showing the drainage strategy for the site (see Appendix I) shows much of the Lake Park being required for:

        - A permanent water body – the Lake.

        - Peripheral Wetlands adjoining the lake and the main east west roadway.

        - Dry retention basins that could also be used as parkland.

    - An area of open space.

84. In addition to these uses potentially part of the land adjacent to the route for the main east west roadway may have been required to provide part or all of the underground transmission easement. The opportunity for larger areas of open space for recreational purposes appears to have been limited to two 'Neighbourhood Parks' running south off the linear open space that was to be principally devoted to wetlands. It is noteworthy that at this stage of planning no allocation of land had been made for the transition stations.

85. The Panel assessing the original design concept as part of the Amendment C20 review commented that (at page 45 of the report):

    Lake Park will be one of the key landscape features of Waverley Park. It is part of the first tier in the hierarchy of open space. The lake will serve to retain one of the significant heritage features of the site and will be an important component in the drainage strategy for the site. It is intended that the Lake Park will be visible from the Monash Freeway and there will be vistas to it from various perspectives within the development. Importantly, it will provide an attractive outlook for dwellings surrounding it. Some higher density terrace dwellings are proposed in the vicinity to take advantage of this outlook.

    The Panel considers that not enough is being made of this feature in the overall planning for Waverley Park. The lake has the potential to be a major asset to the development and to the City of Monash. Some of the local submittors who lament the demise of Waverley Park in its current form referred to the loss of the lake and the loss of its use and enjoyment by the community. The Panel considers that the lake should remain a focus for the wider community to enjoy and not just be regarded as an attractive feature for a relatively few dwellings to look out upon.

    Within the estate, walking and cycling for exercise and pleasure are likely to be activities engaged in by residents, which will be promoted by the permeability of the pedestrian and open space networks. However, people appreciate a destination for their outings. They like to gather, meet with friends in attractive locations or indulge in some refreshment at the end of their walk or cycle. The proliferation of cafes is testament to these tendencies. Particularly when sited in attractive locations, a café or coffee shop can form the nucleus of community focus and provide a facility that many people living within Waverley Park are likely to want. ***The Panel considers this sort of facility should be incorporated in the planning of Lake Park. (Panel emphasis)***

86. The Panel further commented (at page 48) that consideration also be given to consolidating some of the proposed local precinct parks to provide a 'robust' response to the long term maintenance of the open spaces in the estate.

87. Whilst I do not consider that the park is an appropriate location for a café or coffee shop (given questions of commercial viability and sustainability) it is apparent that the Lake Park has the opportunity to provide a 'first tier' open space to complement the range of activities centred on the oval. Further the open space has the opportunity to accommodate a range of activities that cannot be provided in the neighbourhood and local precinct spaces.

88. The open space arrangements centred on the lake and associated areas that was designed for the Below Ground Option provided an open space area that provided for the drainage of the estate with a large lake and associated wetlands, accommodated the underground cable route and provided for a number of discrete recreation spaces.

89. I understand that with the development of the Above Ground Option the opportunity arose to provide for an expanded open space area through the ability to use land that would otherwise be used for the transition stations and a decrease in the number of dwellings to be built. In all an additional 2 hectares of open space is proposed to be provided with the Above Ground Option.

90. The open space schemes proposed for each of the two transmission options provide varied responses based on the requirements of each transmission option and the amount of land available. In both options the open space will be landscaped to the high standards found elsewhere on the Waverley Park estate. The details of the two options are described in the report prepared by Mr Murphy, Landscape Architect and are not repeated in this report.

91. For the purposes of understanding the impact of the open space proposals in terms of establishing a relative net community benefit for each it is considered that the following factors are determinative:

    - The amount of open space provided and the role of that open space, e.g. water body, landscaping, flat space capable of accommodating a range of activities etc.
    - The range of activities and uses capable of being accommodated in the open space.
    - The opportunity provided by the open space to accommodate landscaping to ameliorate or buffer views to the transmission elements in each option.
    - Whether the transmission infrastructure in either option significantly detracts from the 'sense of spaciousness'.
    - The overall usability of the open space.

92. The two options are assessed below.

4.4.1 BELOW GROUND OPTION

93. The Below Ground Option proposes to provide a large area of open space with the following features and attributes:

    - Total area – 4.7 hectares.
    - The lake, other water bodies and associated wetlands – 1.95 hectares.
    - Area required for the underground cabling easement – 4,870 m^2.
    - Level land outside cabling easement – 5,700 m^2.
    - Various recreational facilities including BBQs, a picnic area, a shelter, a boardwalk adjoining the lake and a playground.

94. The proposed open space will provide a significant addition to the open space provided within the estate and establish the Lake Park that has formed part of the overall master plan from the inception of the project. It is considered that the park will provide a very pleasant environment linking with the already established open space network within the estate.

95. This open space provides for views unimpeded by a centrally located transmission tower for views looking from the south or north perpendicular to the open space. As noted above there will be many locations where the transition enclosures or the associated transmission towers will be in view – with some views being dominated by the concentration of elements.

96. The area of land available for open space and the design and usability of the park is influenced by:

    - The provision of the two enclosures (which occupy approximately 1.32 hectares) and the path of the underground cabling.
    - The need to maintain a large water body for drainage and heritage purposes. It is understood that the open space will also be used for bio-retention and wetlands purposes. These uses occupy a significant proportion of the open space area (41.5%).
    - A further 10% of the open space is utilised by the area required for the underground cabling easement that whilst available to view and occasional use is not available for active or semi-active use.

97. Other parts of the open space near the enclosures will be principally used for landscaping to create a pleasant amenity and screen views towards the enclosures (particularly the western enclosure).

98. The configuration of the open space relative to the location of the two enclosures enables certain views to be well screened by new planting. This includes the westernmost 'corner' of the open space adjacent to the eastern edge of the Monash Freeway enclosure. This planting will ameliorate views from the north and east across the lake to the enclosure. The limited size of planting above the underground cabling means that certain views are not able to be significantly obscured or ameliorated by landscaping.

99. These requirements leave little additional land available for other uses, particularly 'semi-active spaces' where it possible to a kick a ball or participate in informal sporting activities. The only such area is found at the north-west corner of the park adjacent to the lake.

100. In summary, the open space to be provided with below ground solution features an extensive area of land which provides for open spacious views (without any transmission infrastructure) looking north and south across the open space. A significant amount of the land set aside for the open space is consumed by the water bodies and wetlands associated with the drainage system for the estate providing only a small land area for semi-active recreation or other facilities.

4.4.2 ABOVE GROUND OPTION

101. The Above Ground Option proposes to provide a larger area of open space with the following features and attributes:

    - Total area – 6.7 hectares.
    - The lake, other water bodies and associated wetlands – 2.04 hectares.
    - Area under the overhead wires – 7,766 m^2
    - Level land outside cabling easement – 22,100 m^2.
    - Various recreational facilities,

102. The scale of the additional open space proposed to be provided with the Above Ground Option is significant. By way of comparison new community developments in Melbourne's greenfields are provided with open space (both active and passive) at a rate of approximately 1.7 – 2 hectares per 1,000 people. The proposed increase in open space will be provided with no expected increase in the final population for the estate.

103. The enlarged area of open space enables a greater variety of activities and functions to be accommodated within the Waverley Park estate than planned with the Below Ground Option. These facilities will include a 'sports court' serving a number of activities, a teenage hangout area, extended walking trails and larger areas set aside for landscaping.

104. I note that Mirvac do not propose to locate the additional playing areas within the 40 metre wide easement notwithstanding the opportunity to do so. The SP Ausnet guidelines for controlling development and use within the transmission easements allow for the easement and the areas under the overhead lines to be used for a variety of purposes including:

    a. Tennis courts provided that earthed metal net posts are used.

    b. Ground level sporting activities, such as football, cricket, golf, basketball and netball, subject to special requirements regarding the design of fences, goals and lights.

    c. Playground equipment, subject to a 1 metre maximum height.

105. Indeed, there are many examples of recreation areas and active playing areas being located within transmission easements or directly under HV powerlines. Some examples within the City of Monash are shown in Appendix J.

106. The greater area provided with the open space provides for a number of other important outcomes being:

- The creation of a highly attractive landscaped park at the entry to the estate from Jacksons Road – the Entry Park. The area will feature a small water body with a boardwalk and a large area of tree planting aligned with the Queensberry Circuit axis leading to the oval and grandstand. This feature will complement the existing landscaped entry from Jacksons Road at Padey Drive further to the north. Most importantly it will provide a positive visual response to the broader area and clearly achieve a Garden City character.

- The use of the area crossed by the transmission wires and the broader easement for a number of other purposes not available for pedestrian access or use including water bodies, wetlands and drainage and associated landscaping. It is noted that the proportion of the open space required for these purposes comprises 30% of the open space despite a slightly larger area (2.04 hectares) being required for this purpose in the Above Ground Option.

- The provision of the additional facilities and associated open space is directly on point with the commentary of the C20 Panel that sought to encourage the consolidation of some smaller open spaces with the lake park area. These activities will also enliven the use of the open space as identified by the Panel – albeit in a different manner. These facilities are also appropriately directed to the growing community of Waverley Park which has a demographic profile with a high number of younger families (38% of households are families with children under the age of 15 as compared to 28% of households in metropolitan Melbourne – 2011 Census).

- The larger area of open space contributes to the sense of spaciousness, notably at three key points within the estate being:

    - The entry from Jacksons Road

    - The ‘centre park’ between Beaconsfield Drive and a new street further to the east

    - The western end of the park near Peterleigh Road.

107. I note that the actual ‘footprint’ of the Above Ground Option is approximately 10-13 metres wide for the main part of the distance across the Waverley Park estate – that is the width of the cross arms and track of the power lines themselves. It is considered that from a park user point of view the legal easement of 40 metres is not a restriction on access or usability.

108. The remainder of the easement is there to control development and restrict the planting of taller trees. It is considered that the landscape concept for the a larger open space demonstrates how the areas within the easement can be effectively utilised and landscaped to provide for a pleasant visual aspect for views to and within the park areas.

109. I acknowledge that a number of residents have expressed concern that the Above Ground Option will detract from the enjoyment of the park and open space and intrude into the sense of spaciousness. Given the height of the monopoles it is not possible to obscure views of these structures or the overhead wires from all viewpoints. Yet, as the various photomontage views demonstrate the combination of taller planting outside the transmission easement and the lower planting within the easement significantly attenuates or visually buffers views.

110. The use of monopole structures as opposed to the traditional lattice towers also minimises the impact of the structure in the park both visually and in terms of area occupied and influenced. Further as mentioned above the physical width of the transmission line is far smaller, being approximately 10-13 metres wide, than the statutory easement.

111. The net result of the enlarged open space with the use of monopoles to carry the transmission wires is to create a significantly more usable open space that provides for a greater range of recreational options for the community whilst also accommodating the necessary drainage system. The monopoles and overhead wires will be visible to park users but will be 'read' within a highly landscaped environment (as opposed to the traditional cleared easement found elsewhere along the easement route).

4.4.3 SUMMARY

112. In summary the critical factors arising from the above analysis are:

113. Both open space options achieve the outcomes sought for the Waverley Park character being:

- *A generally concentric (based on the oval) main road pattern reminiscent of the previous radial street layout.*
- *Precincts based on structured open spaces and clearly delineated circulation paths that provide permeability, passive surveillance of public areas and greater safety.*
- *Retention of the oval.*
- *Provision of a lake as a main water feature and sited generally in the area of the existing lake.*

114. I consider that the Below Ground Option falls short of the aspiration of *the retention and promotion of significant views and vistas within the site* given the proposed development of a transition enclosure at the terminus of the view along Queensberry Circuit to Jacksons Road entry.

115. The open space area needs to meet a number of requirements including the retention of the lake, provision of additional wetlands/drainage detention for WSUD purposes, recreational spaces and landscaping. Both options achieve this but the Below Ground Option requires a greater proportion of the open space (41.5%) to accommodate these functions as compared to the Above Ground Option (30%).

116. The size of the open space and availability of level ground determines what additional facilities and landscaping can be provided. Simply put, the larger space provided in the Above Ground Option is significantly better placed to achieve that outcome as the additional space is capable of providing a broader range of recreational facilities than the open space provided with the Below Ground Option.

117. The transmission easement is not of itself a constraint on the use of the land for recreational purposes. The easement does prevent most development of the land and places limits on the height of vegetation but not on other activities – there are many examples where passive and active open space is place directly under transmission lines.

118. There will be views to and of the monopoles and overhead wires within the park. Many of these views will be attenuated or buffered by the proposed landscaping. The central monopole and twin monopoles present as a slender structures and occupy a significantly lesser footprint and visual profile than the traditional lattice towers serving the current transmission easement.

119. The proposed larger open space in the Above Ground Option provides for a far more spacious and equitable allocation of park land and recreational facilities across a broader extent of the estate than the below ground open space opportunity. The additional open space brings a greater proportion of the community within ready walking distance of the park, particularly at the eastern part of the estate. By contrast the Below Ground Option requires much of this land to be devoted to the transition enclosure.

120. The larger open space in the Above Ground Option also enables the provision of extensive areas of additional landscaping with canopy trees that directly achieves the aspirations of the City of Monash to maintain a garden city character.

121. In conclusion the open space area and design of the above ground park option is a significantly superior outcome when compared with the Below Ground Option. The monopoles and wires of the above ground transmission infrastructure occupy a small proportion of the open space area with that land being available for use and enjoyment.

122. The additional size of the open space has enabled the provision of new recreation and community facilities beyond the broader 40 metre easement notwithstanding that all of the propsed sporting facilities are permitted to locate within the easement, as many sporting facilities have already done.

5 SUMMARY OF NET COMMUNITY BENEFITS & CONCLUSION

5.1 NET COMMUNITY BENEFIT ASSESSMENT

123. The net outcome of these two options is:

1. The Above Ground Option provides for a significantly enlarged area of open space and will provide a number of benefits (over and above the Below Ground Option) including:
    - A significant increase in the number of recreational and community facilities given the supply of additional 'level' land.
    - More semi-active play and 'kick-around' space for the Waverley Park estate.
    - Increased proximity to open space for residents located north and south of the park alignment, particularly at the eastern part of the estate.
    - An increased number of larger canopy trees in key locations that enhances the garden city character of the estate and surrounding area.
2. But for the transition enclosures the Above Ground and Below Ground Options are not significantly different in terms of their relative visual impacts on the Waverley Park and broader community. I note that:
    - The Below Ground Option removes the central tower and associated wires improving views from and within the central portion of the Waverley Park estate and the open space. Yet the transition enclosures introduce large 'industrial type' structures into the Waverley Park estate with higher visual impacts than the proposed above ground monopoles due to the concentration of transmission elements.
    - The Jacksons Road transition enclosure will be a prominent and discordant element on the Jacksons Road edge of the Waverley Park estate. This view will remain in place for the long term as there is little opportunity to provide significant landscaping to attenuate or buffer views to the enclosure.
3. In each option, locations close to the transmission elements will enable the viewer to obtain clear views to those elements.
4. The existing and proposed landscaping will over time attenuate or buffer many other views to the transmission elements of both options. The taller monopoles (for the Above Ground Option) and lattice towers (for the Below Ground Option) will be visible above the landscaping from more distant views but will not be a prominent or dominant element within these views.

5.2 CONCLUSION

124. In conclusion I consider that the provision of an above ground transmission line with monopole pylons and the concurrent provision of a significantly greater area of open space and associated recreational facilities provide a superior net community benefit than does the proposed undergrounding of the transmission wires. By contrast the transition enclosures (in particular the Jacksons Road enclosure) for the Below Ground Option require a significant amount of land that would otherwise be provided for usable open space and will also create a significant visual impact on the broader locality.

125. I note that Mirvac has proposed a broader offer to the community as part of its Community Benefits Package including the upgrading of existing open space areas and individual payments to residents. I consider that these proposals will provide additional benefits to the community. However, given the outcomes of my assessment I have not found it necessary to rely on these additional benefits in reaching the conclusion I have.

APPENDICES

APPENDIX A

VCAT PRACTICE NOTE 2

VCAT PRACTICE NOTE 2: EXPERIENCE & PROFESSIONAL EXPERTISE

1. Name and Professional Address of Expert

Michael Bruce Barlow
Director
Urbis Pty Ltd
Level 12, 120 Collins Street, Melbourne

2. Qualifications and Experience

I am a Director of Urbis Pty Ltd. I am a qualified town planner and have practised as a town planner for 35 years (including 29 as a consultant planner) and hold a Diploma of Applied Science (Town Planning) from Royal Melbourne Institute of Technology for which I qualified in 1981.

My experience includes:

- 2011 to present – Director of Planning, Urbis Pty Ltd
- 2002 to 2010 – Managing Director, Urbis Pty Ltd
- 1990 – 2001 – Director of Urbis Pty Ltd (and its predecessors including A.T. Cocks Consulting)
- 1985 – 1990 – Senior Planner, A.T. Cocks Consulting
- 1982 – 1985 – Planning Officer and Appeals Officer, City of Melbourne
- 1981 – Planning Officer, Shire of Eltham
- 1977 – 1980 – Planning Officer, City of Doncaster and Templestowe

I advise on the development of cities, their principal activities and land uses and have extensive experience in strategic and development planning. I have been engaged on a wide range of projects throughout Australia, China and the Middle East. I have particular project experience involving major urban development projects across a range of localities and activities including:

- The analysis of drivers of change in cities and their impacts and influence on industry, employment and economic development, retail and activity centres, residential development strategies and policy, metropolitan growth and urban management.
- The preparation of Master plans for institutional and educational establishments, airports and new urban development.
- A wide range of international urban development projects including the planning of the new port city serving Shanghai and major city and new town strategies for a number of cities within the Yangtze River corridor, China.
- Leadership of the development of a comprehensive Framework Plan for the Emirate of Dubai. This project created a Vision to guide the economic development of the Emirate, an Urban Framework Plan and an Urban Management System for the government of Dubai.
- Advice on new and specialist land uses and development concepts including the ongoing development of major Australian airports, the introduction and impacts of new retail concepts and standalone megaplex cinemas and the introduction of the casino into central Melbourne.
- Major retail developments comprising central city centres, super-regional centres and mixed use developments.
- Major commercial and residential developments in the Melbourne central city area including the CBD, Docklands and Southbank and throughout metropolitan Melbourne.

I provide expert evidence at various forums including the Supreme Court of Victoria, Federal Court of Australia, Land and Environment Court (NSW), the Victorian Civil and Administrative Tribunal and independent planning panels regarding the planning implications and impacts of development.

3. Area of expertise includes:

- Major retail, commercial, mixed use and activity centre developments and policy.
- Strategic city planning including international city development.
- City governance and policy.
- Residential and mixed use developments; medium density through to high-rise apartments.
- Entertainment facilities, including gaming, hotels and restaurants.
- General advice on urban planning issues.

4. Expertise to prepare this report:

I have extensive experience in preparation and presentation of planning expert witness statements and have provided planning advice on a wide number of strategic developments as set out above.

5. Instructions received in relation to this matter:

See Section 1 of my report.

6. Questions outside expertise, inaccuracies and additional matters

To my knowledge, there are none contained in my report.

7. Facts, matters and assumptions

See body of the report.

8. Reference documents

See Section 1 of my report.

9. Other persons relied upon

Mr Peter Haack, Director of Design at Urbis who assisted in the preparation of the photomontages.

Mr Ashley Poon, Modelling and CAD Expert, who prepared the model of the transmission line options and the various photomontages of the two options.

Mr Alistair Towers, Manager GIS at Urbis who prepared the viewshed analyses for the above ground and Below Ground Options.

Mr Barry Murphy, Landscape Architect for the Waverley Park project.

10. Summary of opinion

See Section 1 of my report.

11. Provisional opinions

None.

12. Date of site inspection:

Inspection of site and surrounds and broader Mulgrave area

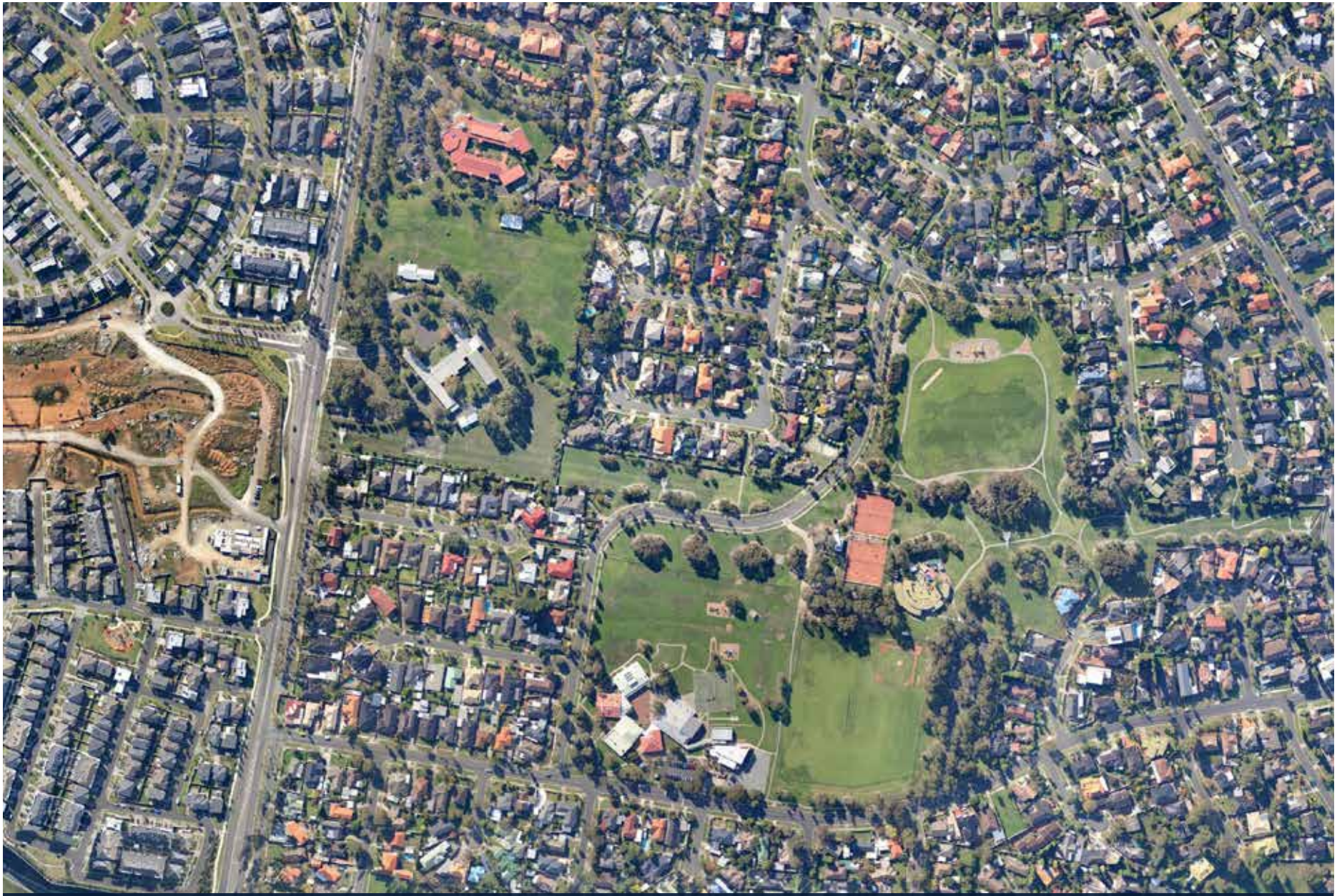
- 18th December 2013

- 9th March 2014

- 27th May 2014

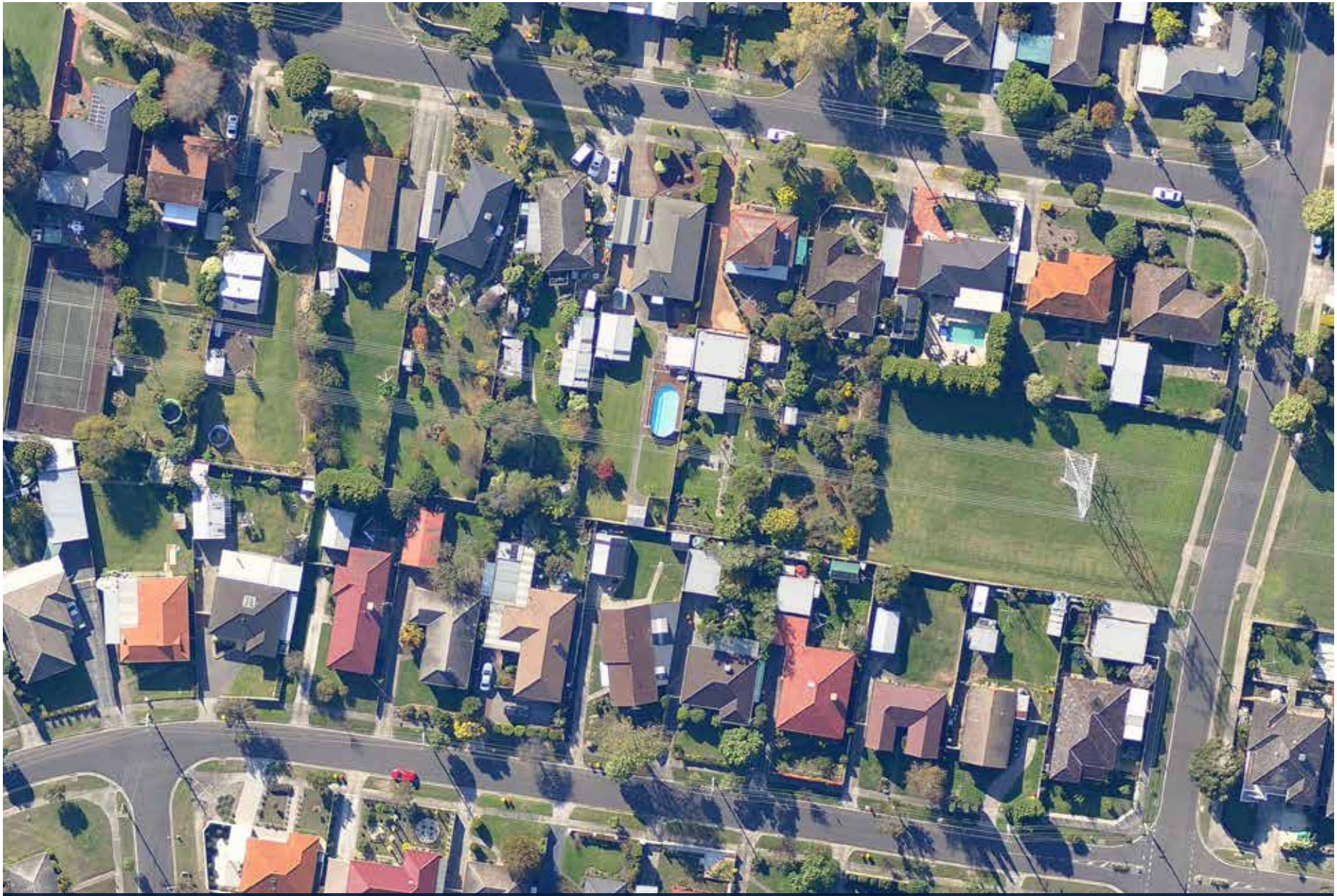
APPENDIX B

AERIAL VIEWS OF TRANSMISSION EASEMENTS TYPOLOGIES



Transmission lines in Gladeswood Reserve adjoining Waverly Park

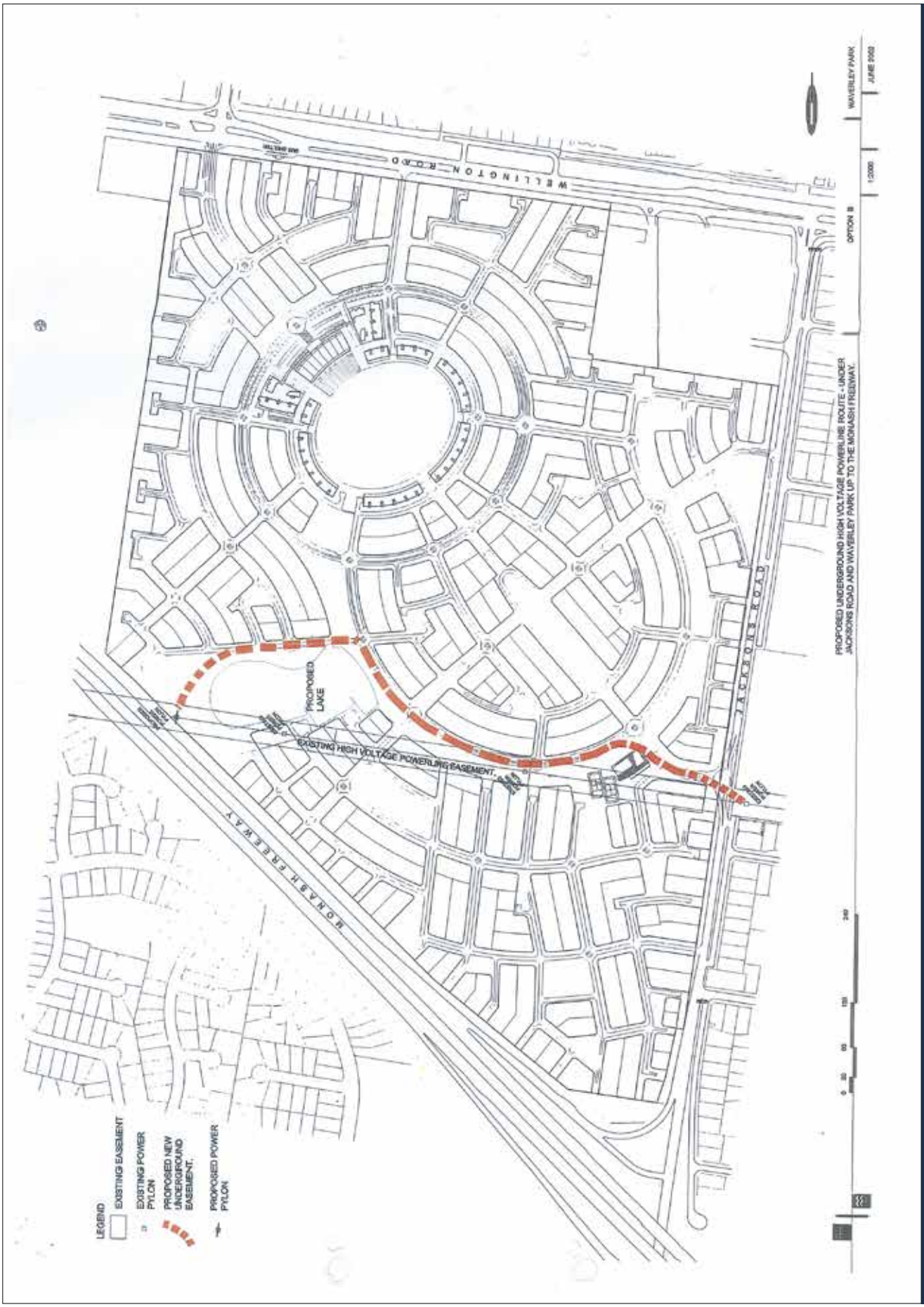
Transmission lines over rear yards, open space and car park Mackie Road and Redfern Crescent, Mulgrave



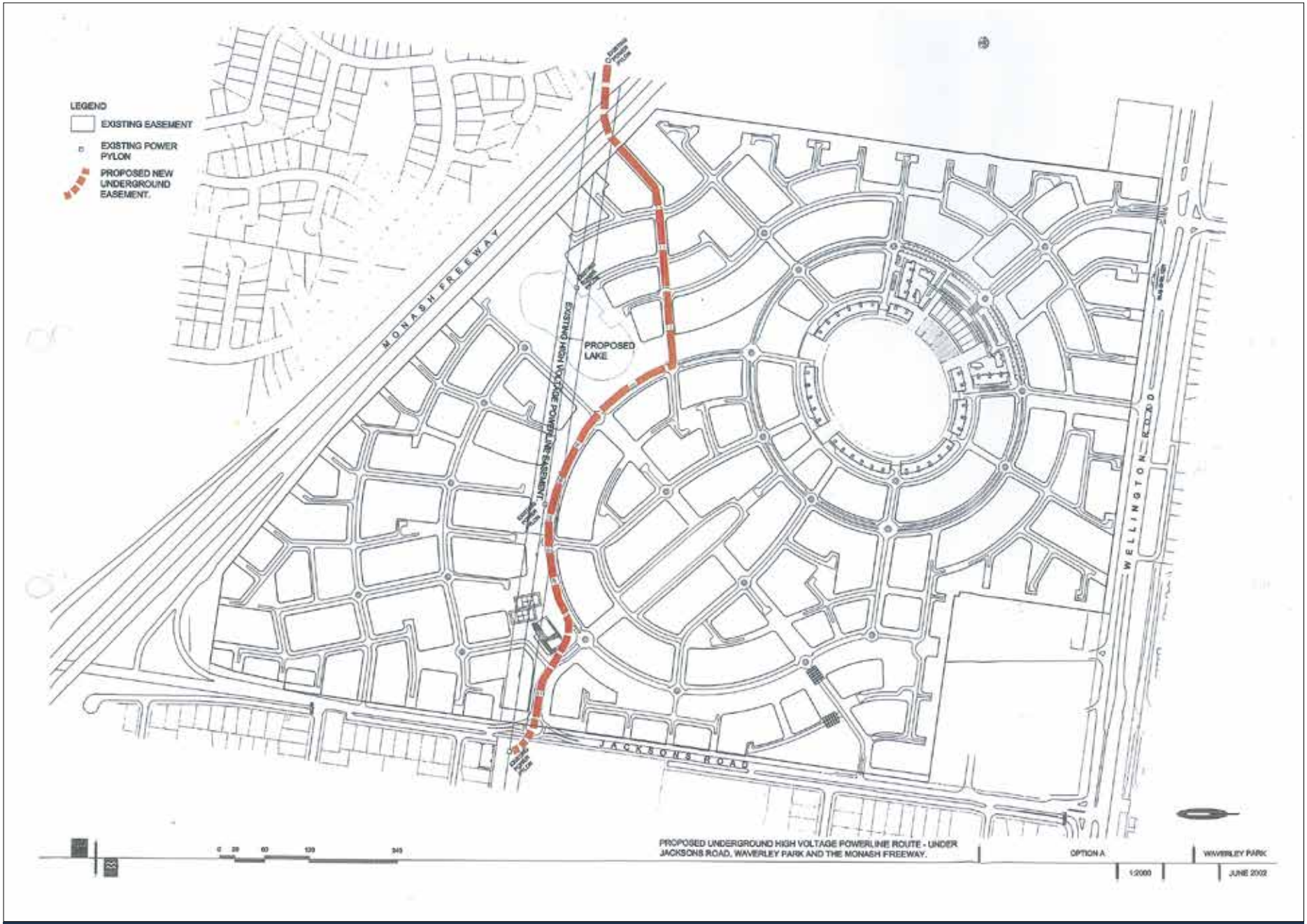
Transmission lines over rear yards at Whitehaven Crescent, Mulgrave

APPENDIX C

PLANS OF PROPOSED UNDERGROUND HV POWERLINE ROUTES – JUNE 2002



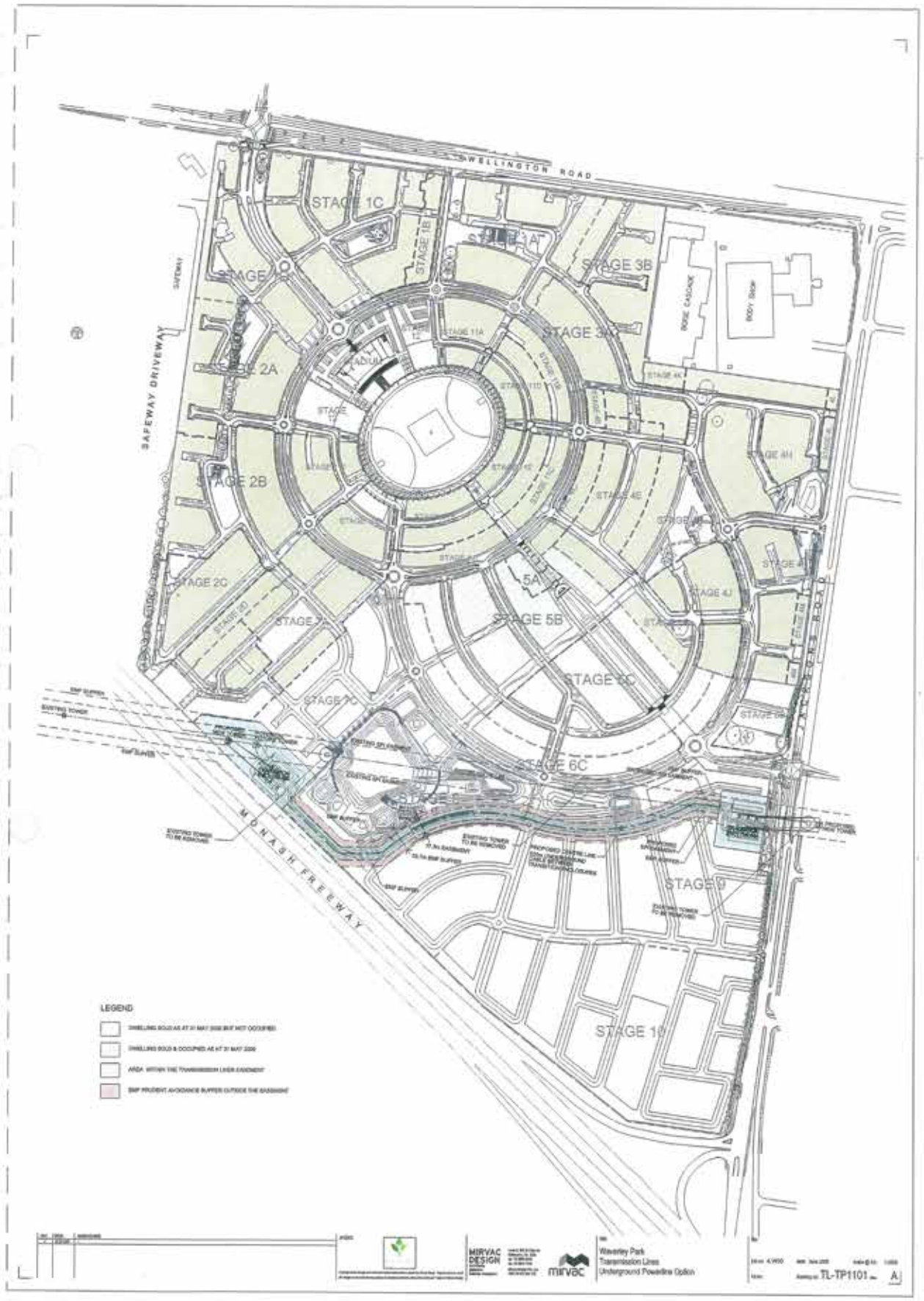
Proposed route for undergrounding of Waverly Park transmission line with tunnel under Jacksons Road



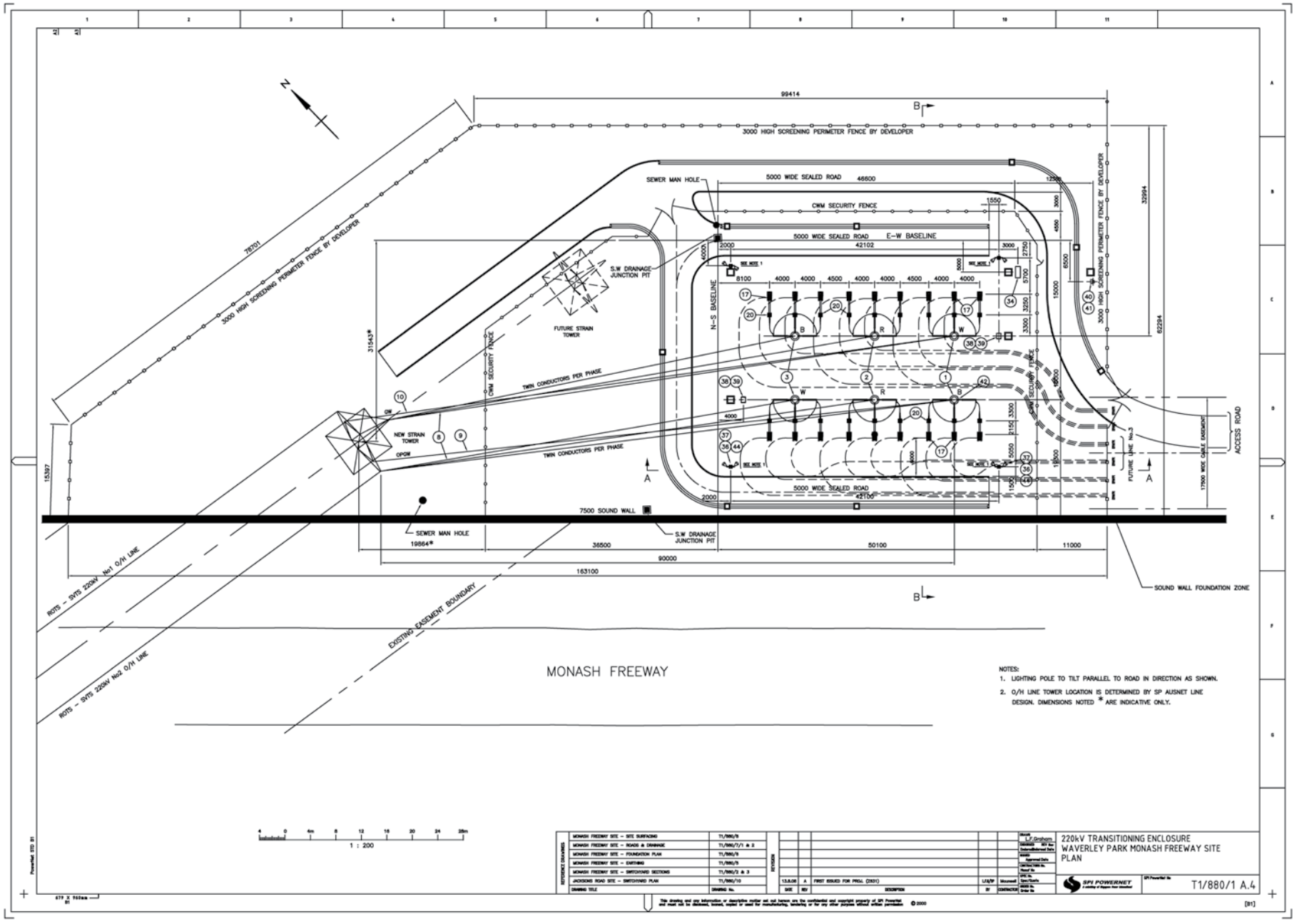
Proposed route for undergrounding of Waverly Park transmission line with tunnels under Monash Freeway and Jacksons Road

APPENDIX D

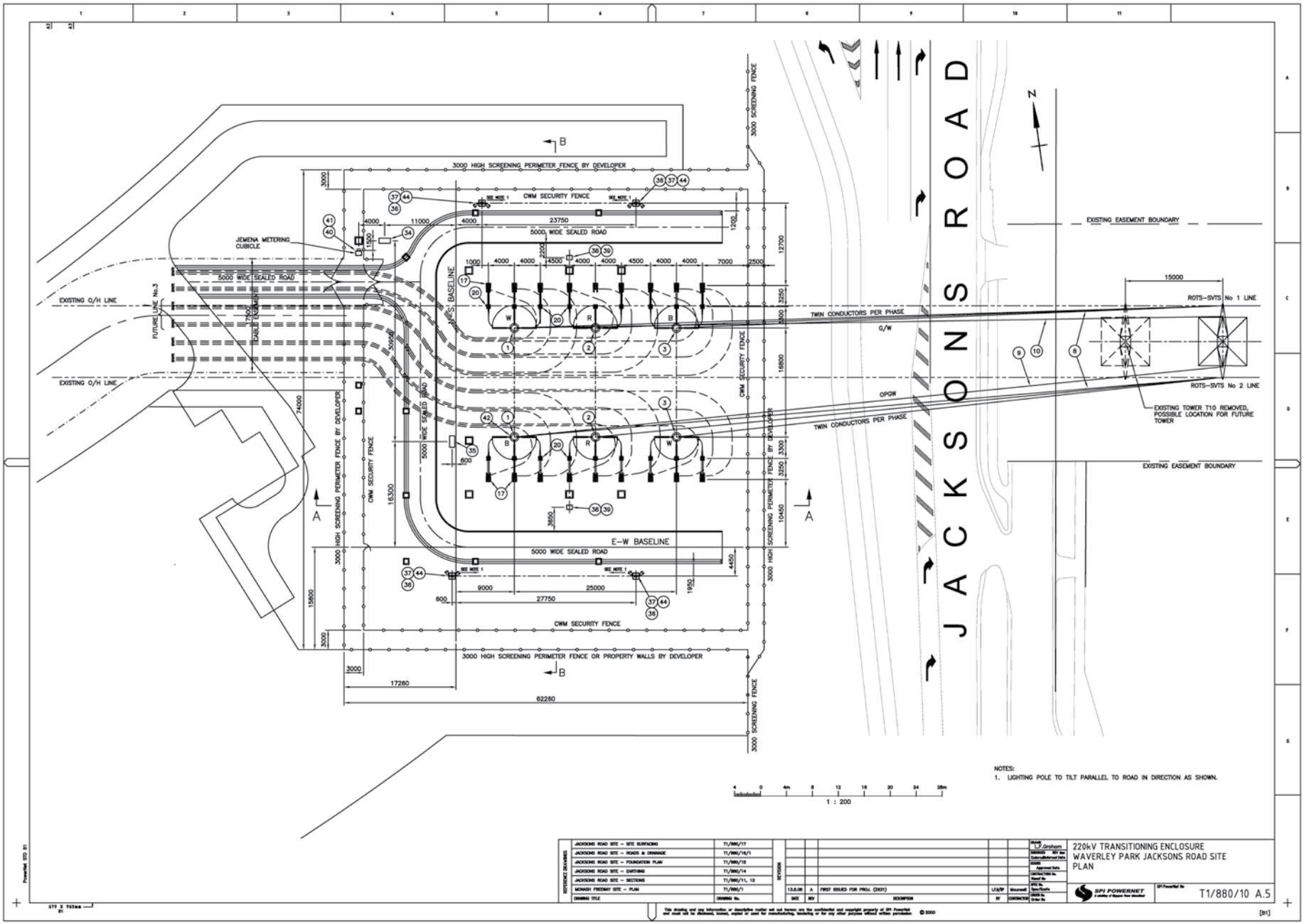
DETAILED PLANS FOR THE BELOW GROUND OPTION



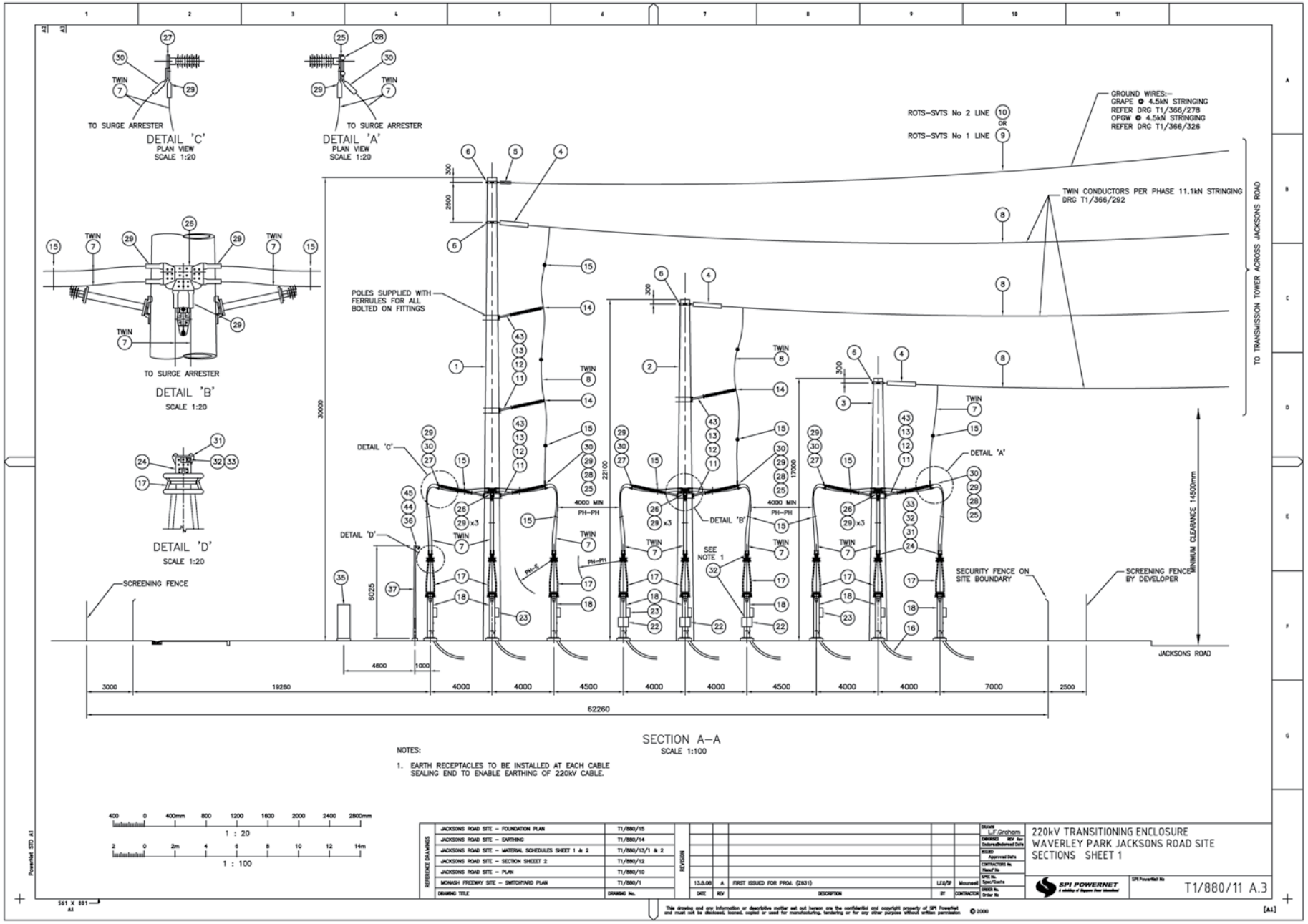
Plan of Below Ground Option



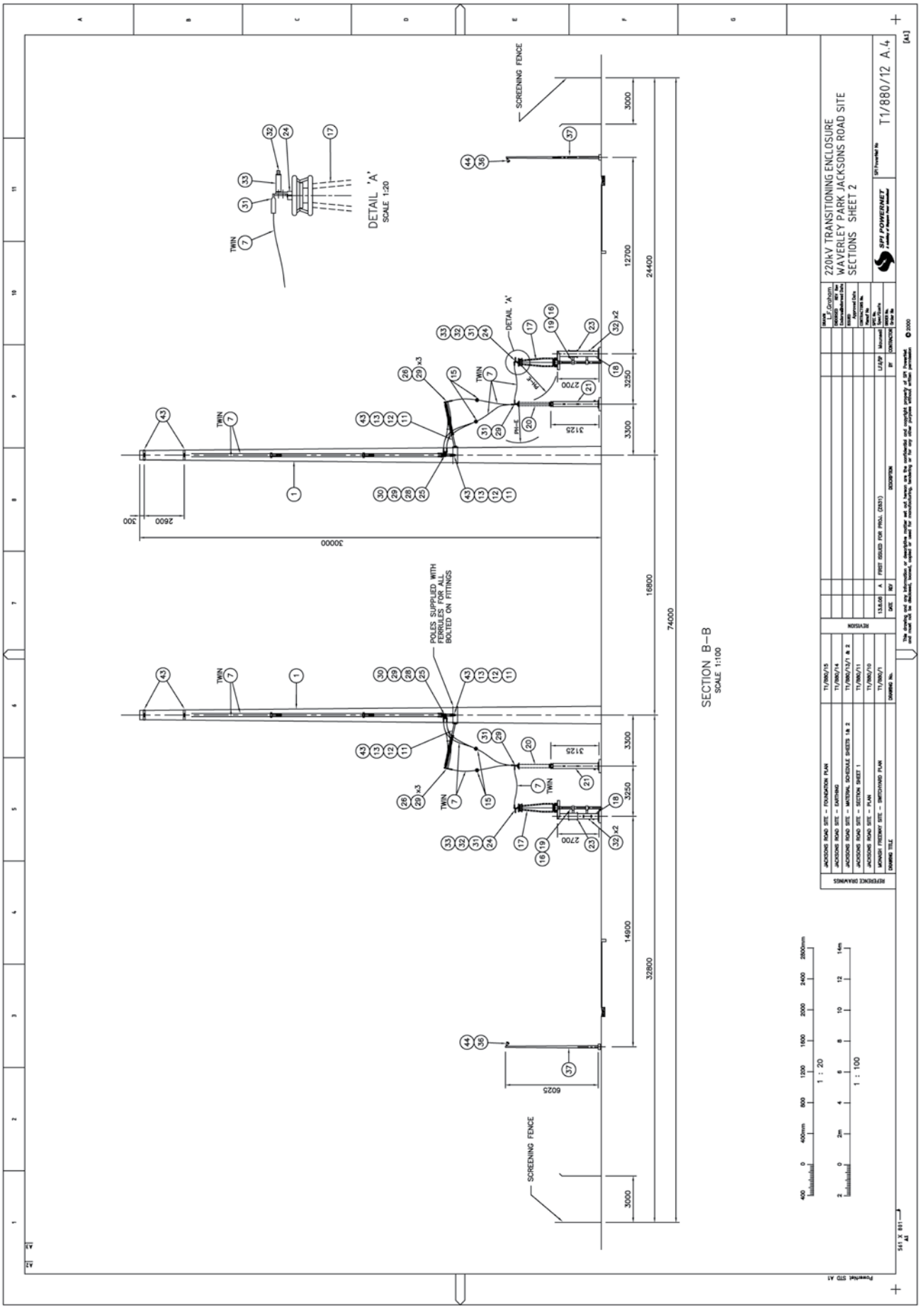
Layout of Western Transition Enclosure



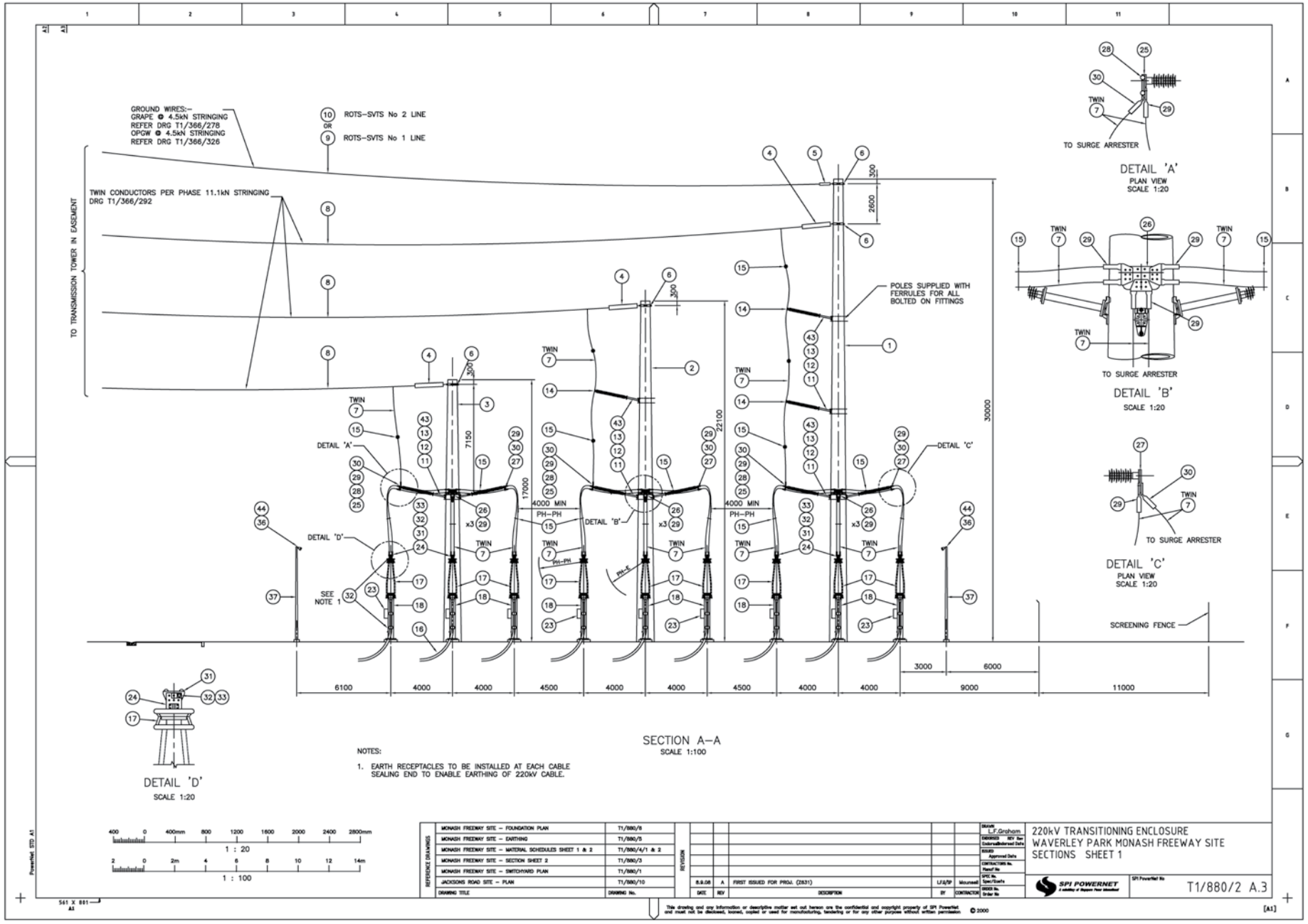
Layout of Eastern (Jacksons Road) Transition Enclosure



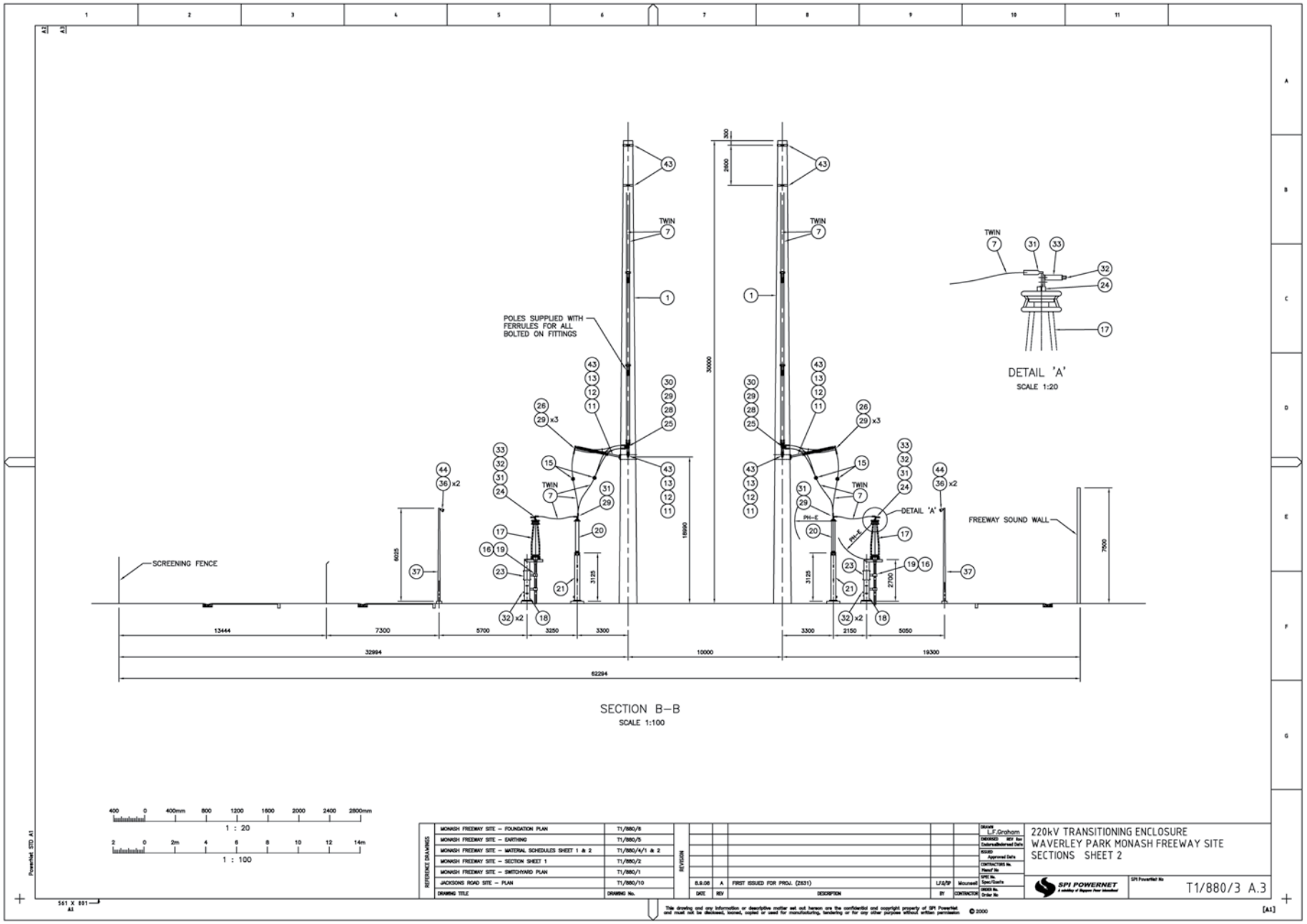
East-West Cross Section Jacksons Road Transition Enclosure



North-South Cross Section Jacksons Road Transition Enclosure



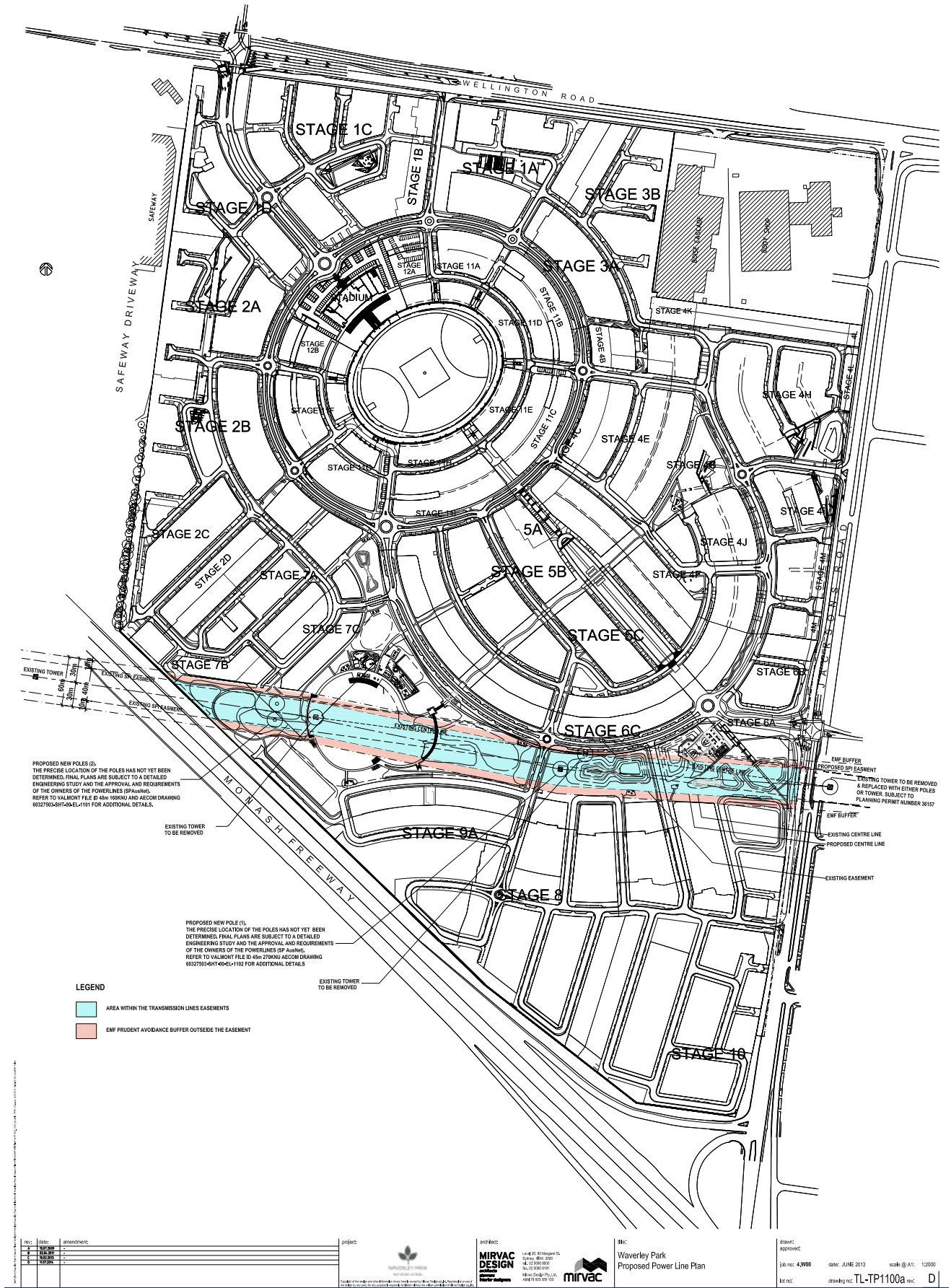
East-West Cross Section Western Transition Enclosure



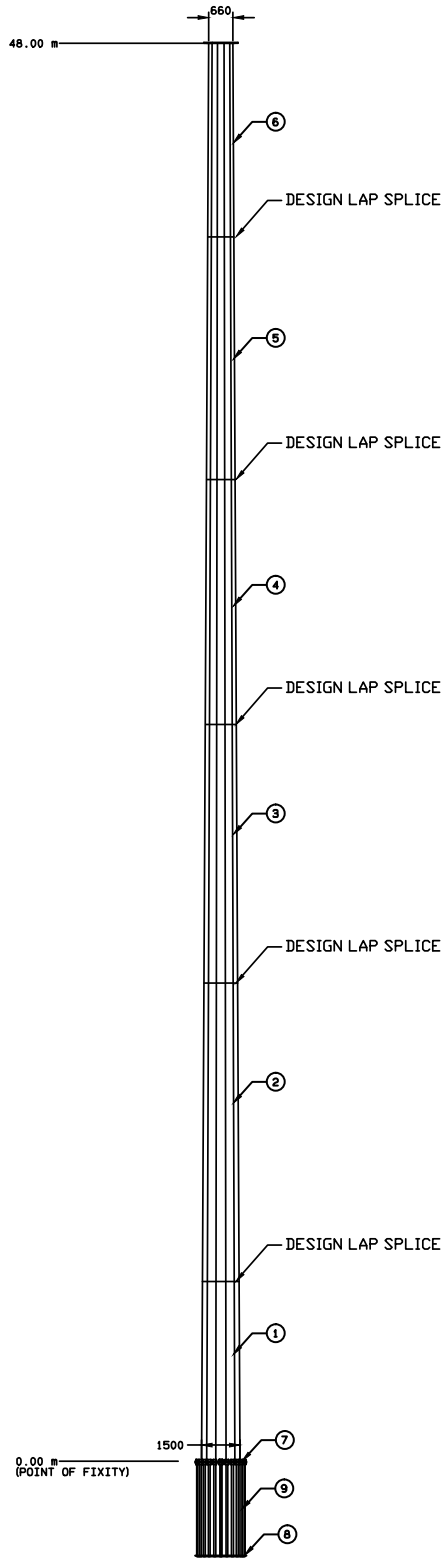
North-South Cross Section Western Transition Enclosure

APPENDIX E

DETAILED PLANS FOR THE ABOVE GROUND OPTION



Plan of the Above Ground Option



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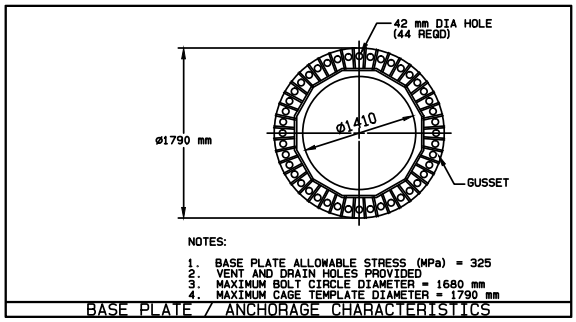
1	1	SECTION A	17824
2	1	SECTION B	
3	1	SECTION C	
4	1	SECTION D	
5	1	SECTION E	
6	1	SECTION F	
7	1	BASE PLATE	
8	1	BOTTOM CAGE PLATE	
9	44	36mm 40CR MATERIAL ANCHOR BOLT, LENGTH = 2.0m	
	1	TOP CAGE PLATE	
	1	POLE CAP	
	44	GUSSETS	
		GALVANIZING	



NOTES:

1. BASE PLATE ALLOWABLE STRESS (MPa) = 325
2. VENT AND DRAIN HOLES PROVIDED
3. MAXIMUM BOLT CIRCLE DIAMETER = 1680 mm
4. MAXIMUM CAGE TEMPLATE DIAMETER = 1790 mm

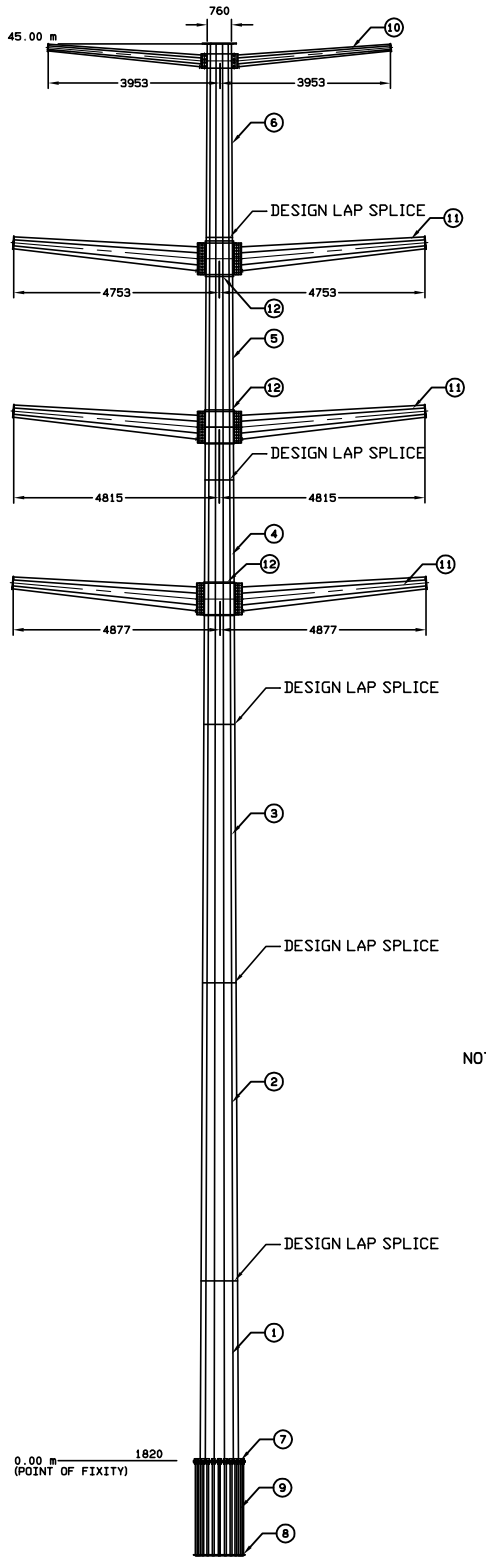
BASE PLATE / ANCHORAGE CHARACTERISTICS

NOTE:

These plans and elevations are indicative only and are based on assumptions and preliminary reviews as at 10 July 2014. In particular, dimensions are approximate only and the precise location, height and width of the poles has not yet been determined. Final plans and elevations are subject to the approval and requirements of the owners of the powerlines (SP AusNet) and to a detailed engineering study

valmont
Valmont Industries (China) Ltd.
维蒙特工业(中国)有限公司
100 RONGCHANG ROAD
SONGJIANG INDUSTRY DEVELOPMENT ZONE
SHANGHAI, 201611, P.R. CHINA
TEL: (021) 57609200
FAX: (021) 57609222

			QUOTATION #	FILE ID	PROJECT	ENGR	DRAWN
			E14190A	48M 160KNU		SXP	HSL
A	VERSION 1	8/7/2014	DESCRIPTION				
REVISION	DESCRIPTION	DATE	48M,160KNU BPM, 220kV MIRVAC WAVERLEY PARK DEVELOPMENT				



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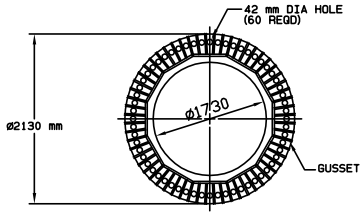
2	1	SECTION B	
3	1	SECTION C	
4	1	SECTION D	
5	1	SECTION E	
6	1	SECTION F	
7	1	BASE PLATE	
8	1	BOTTOM CAGE PLATE	
9	60	36mm 40CR MATERIAL ANCHOR BOLT, LENGTH = 2.0m	
10	2	J3.57M-4N	
11	6	J4.29M-7N	
12	3	SADDLE	
	2	VANG	
	6	VANG	
	16	BOLT M24x85x55 1N1W1SW	
	120	BOLT M24x100x50 1N1W1SW	
	1	TOP CAGE PLATE(TH=10mm,Q235B)	
	1	POLE CAP	
	60	GUSSETS	
		GALVANIZING	



NOTES:

1. BASE PLATE ALLOWABLE STRESS (MPa) = 335
2. VENT AND DRAIN HOLES PROVIDED
3. MAXIMUM BOLT CIRCLE DIAMETER = 2020 mm
4. MAXIMUM CAGE TEMPLATE DIAMETER = 2130 mm

BASE PLATE / ANCHORAGE CHARACTERISTICS

NOTE:

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			QUOTATION #	FILE ID	PROJECT	ENGR	DRAWN
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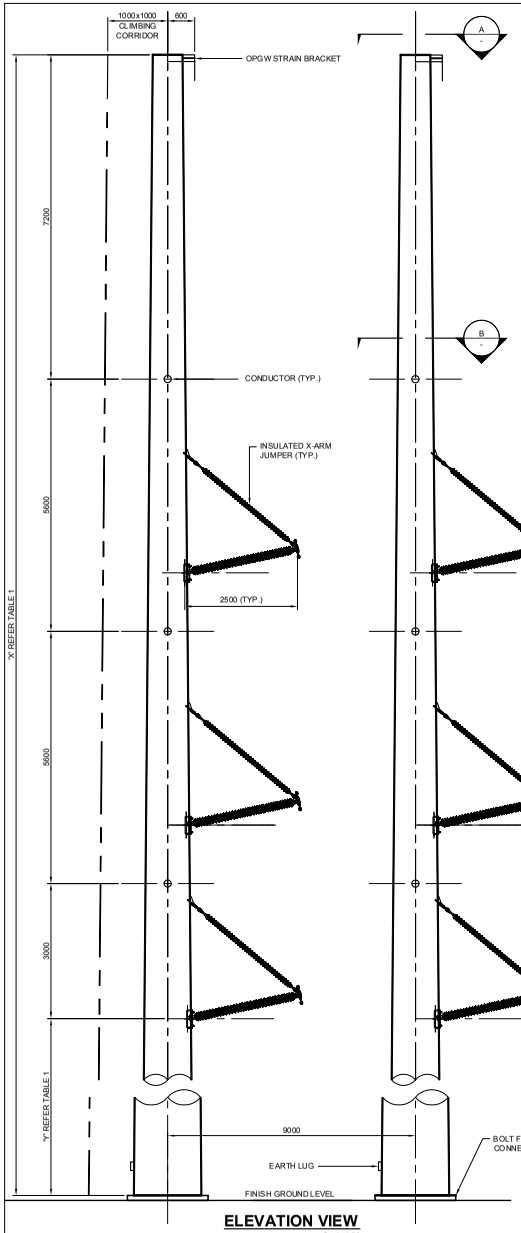
A	VERSION 1	8/7/2014	DESCRIPTION				
REVISION	DESCRIPTION	DATE	45M,270KNU BPM, 220kV MIRVAC WAVERLEY PARK DEVELOPMENT				



ELEVATION VIEW
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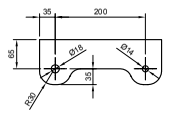
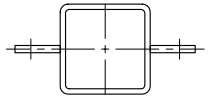


1 DETAIL
Scale 1:5



A VIEW
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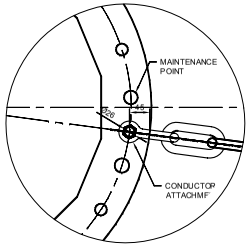
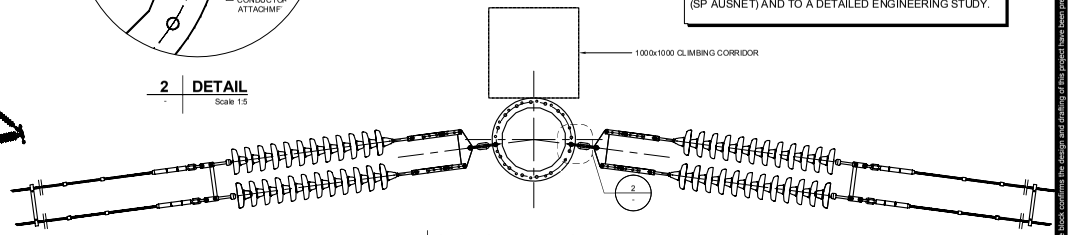


2 DETAIL
Scale 1:5



B SECTION TYP. (ROTATED 90°)
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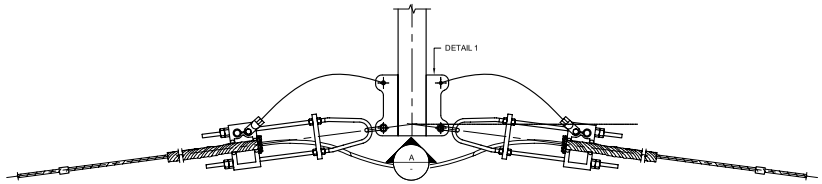

A SECTION (ROTATED 90°)
Scale 1:10
0 250 500 mm

NOTES:

1. DIMENSIONS IN MILLIMETRES AND SUBJECT TO DETAILED DESIGN.
2. PHASE CONDUCTOR LINE HARDWARE FITTINGS AND EARTHWIRE LINE HARDWARE FITTINGS TO AS1154.
3. FALL RESTRAINT ATTACHMENT POINTS TO BE PROVIDED STARTING 5 METRES ABOVE GROUND LEVEL. FALL RESTRAINT TO BE LOCATED BETWEEN CLIMBING STEP BOLTS.
4. PERSONNEL ACCESS TO BE PROVIDED USING EITHER - a) STEP BOLTS @ APPROX. 350mm VERTICAL CENTRES or b)PERSONNEL ACCESS LADDER OVER THE LENGTH OF THE STRUCTURE STARTING 5 METRES ABOVE GROUND LEVEL.
5. POLE DIAMETER AT GROUND LEVEL AND TOP TO BE SUBMITTED BY MANUFACTURER FOR APPROVAL.
6. HOLD DOWN BOLTS TO BE HOT DIP GALVANIZED TO AS/NZS 4680.
7. POLE AND ALL COMPONENTS TO BE HOT DIP GALVANIZED TO AS/NZS 4680 (DULL FINISH).
8. PLAN VIEW AND DETAILS ARE DRAWN ON THE ASSUMPTION THAT THE POLE HAS 12 SIDES. SUBJECT TO DETAILED DESIGN.
9. THE ATTACHMENT DETAILS ARE FOR GUIDANCE TO THE DETAIL DESIGNER WHO MAY DECIDE FOR MANUFACTURING AND STRENGTH REASONS TO PROPOSE ALTERNATIVES.
10. ALL POLE SECTION CONNECTIONS TO BE SLIP JOINTS.
11. POLE TO BE DESIGNED FOR MINIMUM SERVICE TEMPERATURE OF -5 DEGREES C.
12. FOR POLES WHICH ARE SUPPLIED IN MULTIPLE SECTIONS AND UTILISE SLIP JOINTS, JACKING FORCES AND MINIMUM/MAXIMUM OVERLAP SHALL BE SPECIFIED. JACKING CLEATS SHALL BE PROVIDED ON EACH SECTION.
13. DESIGN OF STEEL POLES AND CROSS ARMS TO BE CARRIED OUT IN ACCORDANCE WITH ANY OF THE FOLLOWING REFERENCE STANDARDS: AS/NZS 4065, AS4100, AS/NZS 4600 ,AS/NZS 4676 AND ASCE 48-05, USING APPROPRIATE STRENGTH REDUCTION FACTORS FOR EACH PARTICULAR STANDARD DOCUMENT.
14. ALL STRAIN INSULATOR ATTACHMENT POINTS TO BE RATED TO BREAKING STRENGTH OF STRAIN INSULATOR ASSEMBLY.
15. ALL OPGW STRAIN ATTACHMENT POINTS TO BE RATED TO BREAKING STRENGTH OF STRAIN OPGW ASSEMBLY.
16. FOR POLE DETAIL REFER TO VALMONT CONCEPT DRAWING E14190A 48m 160kNU.

TABLE 1

POLE No.	DIM 'X'	DIM 'Y'
12A	48000	26600

NOTES:

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AECOM

PROJECT
WAVERLEY PARK DEVELOPMENT

CONSULTANT
AECOM Australia Pty Ltd
A.B.N 20 093 846 925
www.aecom.com

SAFETY IN DESIGN INFORMATION
ARE THERE ANY ADDITIONAL HAZARDS / RISKS NOT NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING?
☒ NO
☐ YES

REGISTRATION

CHECK PRINT	BACKDRAFT REQUIRED ☐	READY TO ISSUE ☐
	INITIAL	DATE
SELF CHECK		
DRAFTING		
DESIGN ENGINEER		
LEAD DESIGN		
VERIFIER		
BACKDRAFTED/CORRECTED		
CONFIRMED		

FOR INFORMATION ONLY

PROJECT MANAGEMENT INITIALS

BM	SB	SB
DESIGNER	CHECKED	APPROVED

ISSUE/REVISION

VR	DATE	DESCRIPTION
A	11.07.14	FOR INFORMATION ONLY

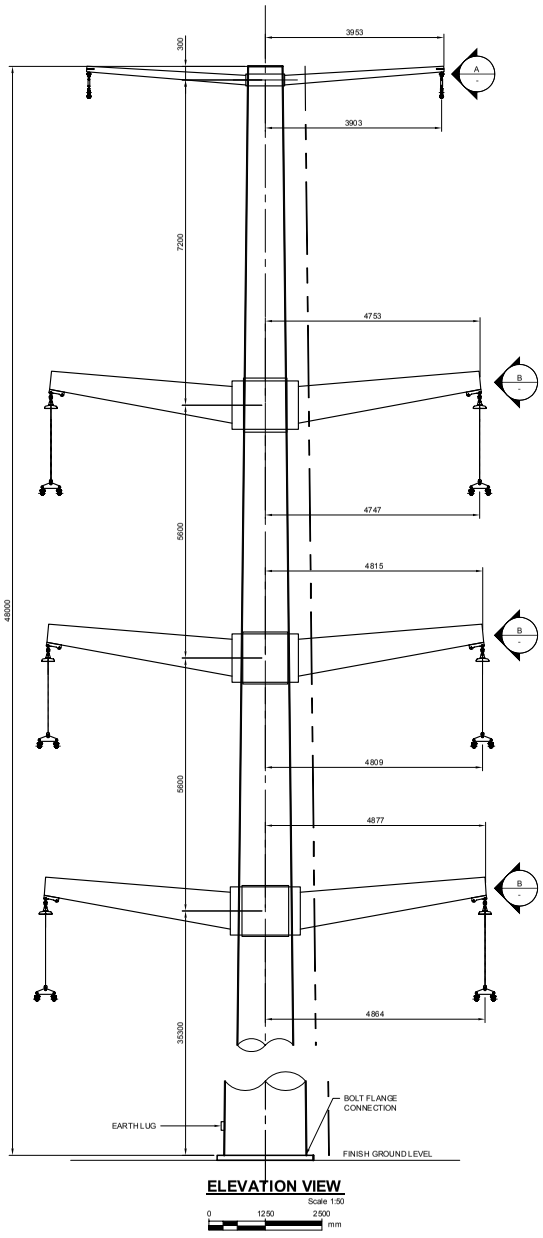
KEY PLAN

PROJECT NUMBER
60327503

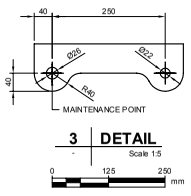
SHEET TITLE
WAVERLEY PARK DEVELOPMENT
220kV TRANSMISSION LINE
STRAIN TWIN POLE-DOUBLE CIRCUIT

SHEET NUMBER
60327503-SHT-00-EL-1101

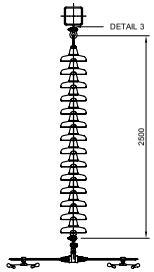
ISO A1 594mm x 841mm



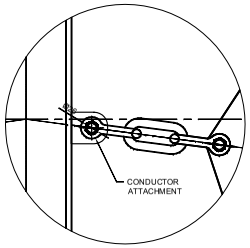
ELEVATION VIEW
Scale 1:50
0 1250 2500 mm



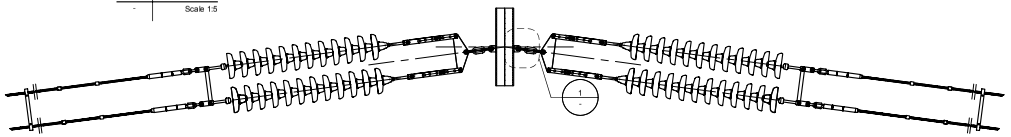
3 DETAIL
Scale 1:5
0 125 250 mm



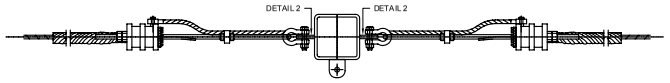
B VIEW
Scale 1:25
0 625 1250 mm



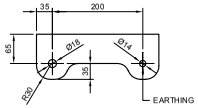
1 DETAIL
Scale 1:5



CONDUCTOR STRAIN INSULATOR ARRANGEMENT
Scale 1:25
0 625 1250 mm



A OPGW STRAIN ARRANGEMENT
Scale 1:10
0 250 500 mm



2 DETAIL
Scale 1:5
0 125 250 mm

NOTES:

1. DIMENSIONS IN MILLIMETRES AND SUBJECT TO DETAILED DESIGN.
2. PHASE CONDUCTOR LINE HARDWARE FITTINGS AND EARTHWIRE LINE HARDWARE FITTINGS TO AS1154.
3. FALL RESTRAINT ATTACHMENT POINTS TO BE PROVIDED STARTING 5 METRES ABOVE GROUND LEVEL. FALL RESTRAINT TO BE LOCATED BETWEEN CLIMBING STEP BOLTS.
4. PERSONNEL ACCESS TO BE PROVIDED USING EITHER - a) STEP BOLTS @ APPROX. 350mm VERTICAL CENTRES or b)PERSONNEL ACCESS LADDER OVER THE LENGTH OF THE STRUCTURE STARTING 5 METRES ABOVE GROUND LEVEL.
5. POLE DIAMETER AT GROUND LEVEL AND TOP TO BE SUBMITTED BY MANUFACTURER FOR APPROVAL.
6. HOLD DOWN BOLTS TO BE HOT DIP GALVANIZED TO AS/NZS 4680.
7. POLE AND ALL COMPONENTS TO BE HOT DIP GALVANIZED TO AS/NZS 4680 (DULL FINISH).
8. PLAN VIEW AND DETAILS ARE DRAWN ON THE ASSUMPTION THAT THE POLE HAS 12 SIDES. SUBJECT TO DETAILED DESIGN.
9. THE ATTACHMENT DETAILS ARE FOR GUIDANCE TO THE DETAIL DESIGNER WHO MAY DECIDE FOR MANUFACTURING AND STRENGTH REASONS TO PROPOSE ALTERNATIVES.
10. ALL POLE SECTION CONNECTIONS TO BE SLIP JOINTS.
11. POLE TO BE DESIGNED FOR MINIMUM SERVICE TEMPERATURE OF -5 DEGREES C.
12. FOR POLES WHICH ARE SUPPLIED IN MULTIPLE SECTIONS AND UTILISE SLIP JOINTS, JACKING FORCES AND MINIMUM/MAXIMUM OVERLAP SHALL BE SPECIFIED. JACKING CLEATS SHALL BE PROVIDED ON EACH SECTION.
13. DESIGN OF STEEL POLES AND CROSS ARMS TO BE CARRIED OUT IN ACCORDANCE WITH ANY OF THE FOLLOWING REFERENCE STANDARDS: AS/NZS 4065, AS4100, AS/NZS 4600 ,AS/NZS 4676 AND ASCE 48-05, USING APPROPRIATE STRENGTH REDUCTION FACTORS FOR EACH PARTICULAR STANDARD DOCUMENT.
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16. FOR POLE DETAIL REFER TO VALMONT CONCEPT DRAWING E14190A 48m 270kNU.

NOTES:

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AECOM

PROJECT
WAVERLEY PARK DEVELOPMENT

CONSULTANT
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SAFETY IN DESIGN INFORMATION
ARE THERE ANY ADDITIONAL HAZARDS / RISKS NOT NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING?
☒ NO
☐ YES

REGISTRATION

FOR INFORMATION ONLY

PROJECT MANAGEMENT INITIALS

BM	SB	SB
DESIGNER	CHECKED	APPROVED

ISSUE/REVISION

I/R	DATE	DESCRIPTION
A	11.07.14	FOR INFORMATION ONLY

KEY PLAN

PROJECT NUMBER
60327503

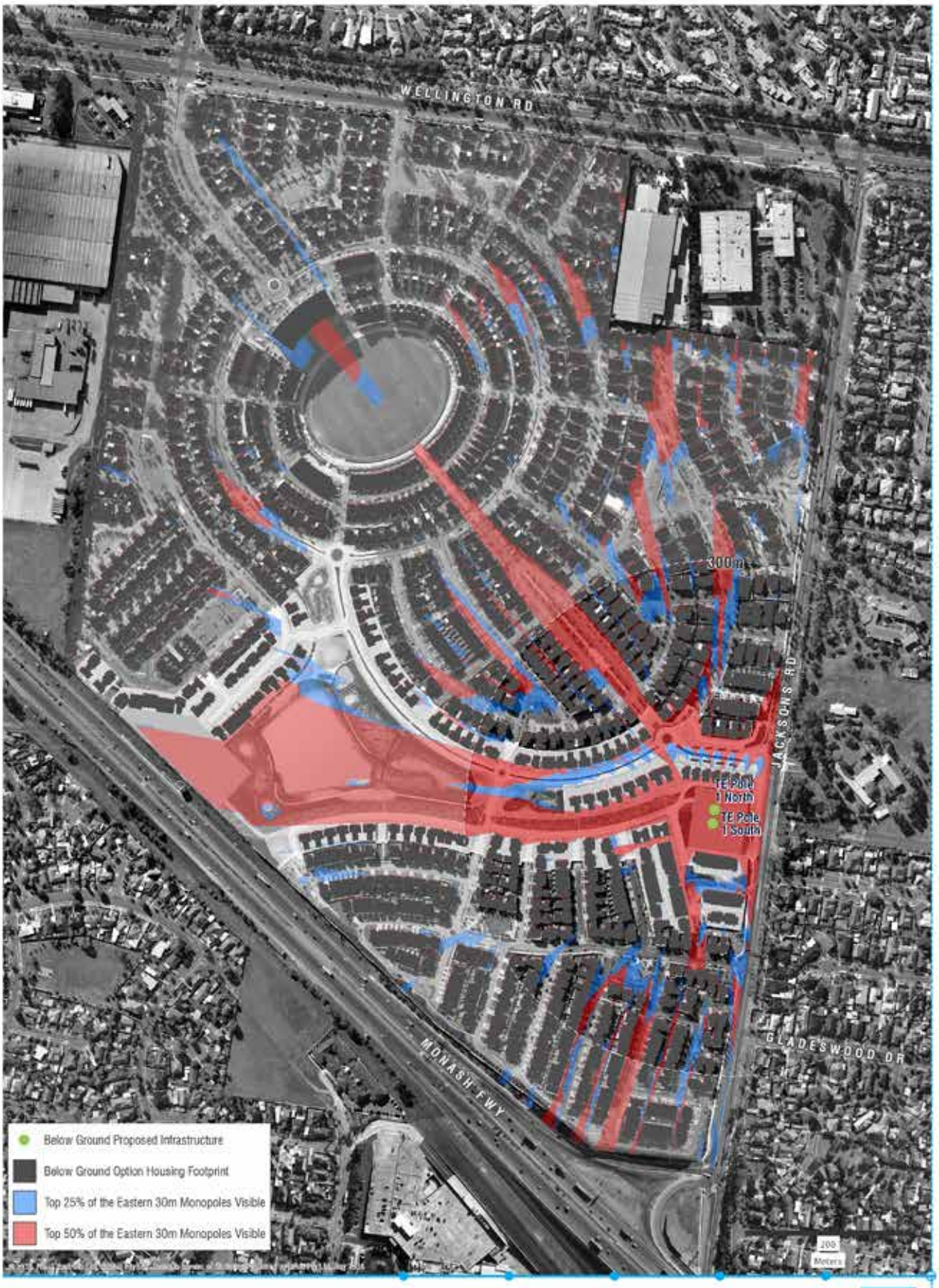
SHEET TITLE
WAVERLEY PARK DEVELOPMENT
220kV TRANSMISSION LINE
MONO POLE-DOUBLE CIRCUIT

SHEET NUMBER
60327503-SHT-00-EL-1102

Filename: P:\60327503\17_COLLINSVILLE\5. CAD\02-SHEETS\DO NOT PRINT _60327503-SHT-00-EL-1102.DWG

APPENDIX F

PLANS OF VIEWSHED ANALYSIS FOR BELOW GROUND OPTION



Plan 1 - Waverley Park - Below Ground Option

Where 50% & 25% of the 30m Monopoles (Eastern Enclosure) are Visible From, Assuming a 1.5m Observer Height

urbis

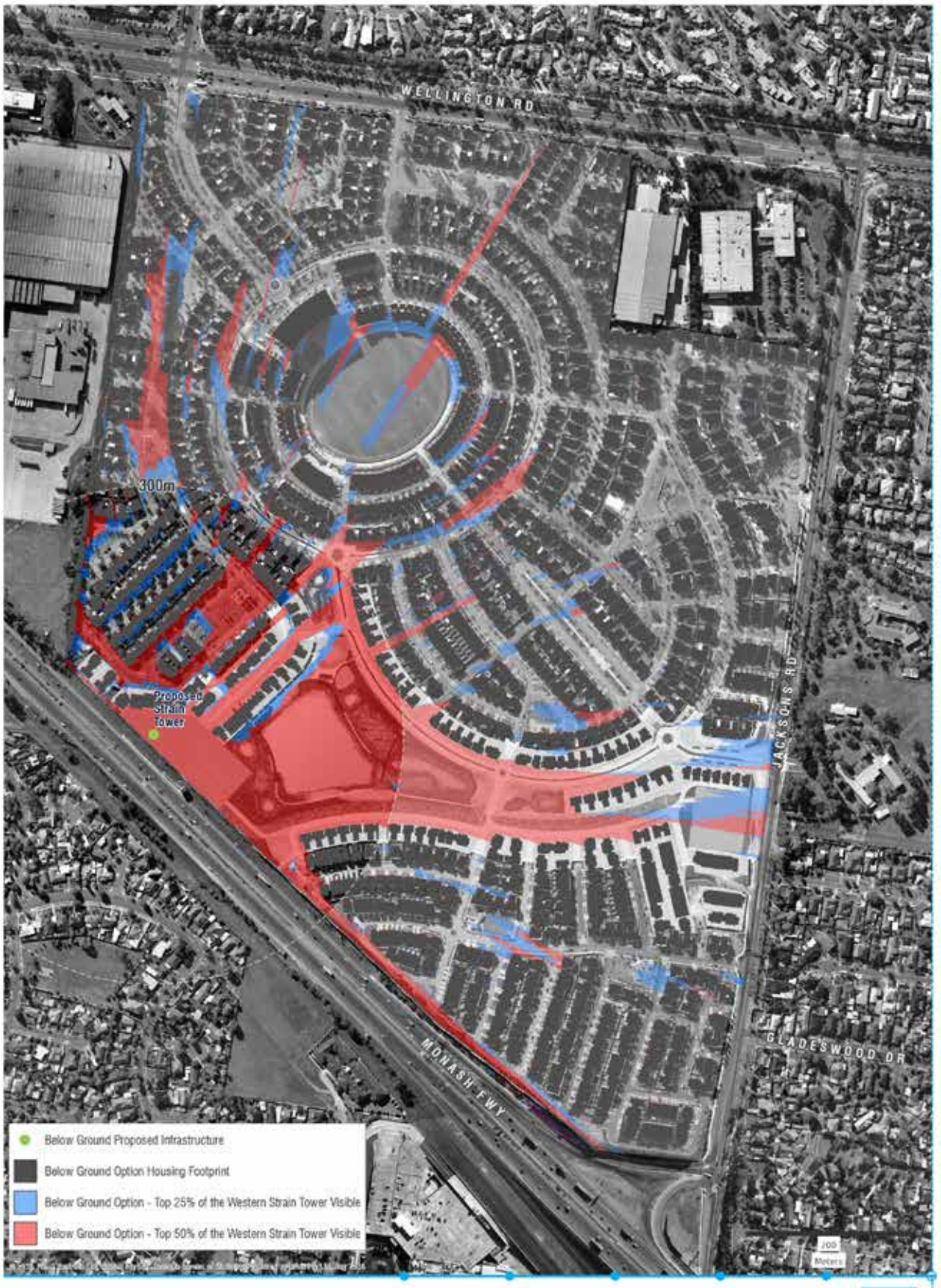
Plan 2 - Waverley Park - Below Ground Option

Where 50% & 25% of the 30m Monopoles (Western Enclosure) are Visible From, Assuming a 1.5m Observer Height

urbis

Plan 3 - Waverley Park - Below Ground Option

Where 50% & 25% of the Eastern Strain Tower is Visible From, Assuming a 1.5m Observer Height



Plan 4 - Waverley Park - Below Ground Option

Where 50% & 25% of the Western Strain Tower is Visible From, Assuming a 1.5m Observer Height

urbis

Plan 5 - Waverley Park - Below Ground Option

Where 50% & 25% of Any of the the Below Ground Infrastructure is Visible From, Assuming a 1.5m Observer Height

urbis

Waverley Park - Below Ground Option

Definition of Public Open Space and Streets

urbis

APPENDIX G

PLANS OF VIEWSHED ANALYSIS FOR ABOVE GROUND OPTION

Plan 6 - Waverley Park - Above Ground Option

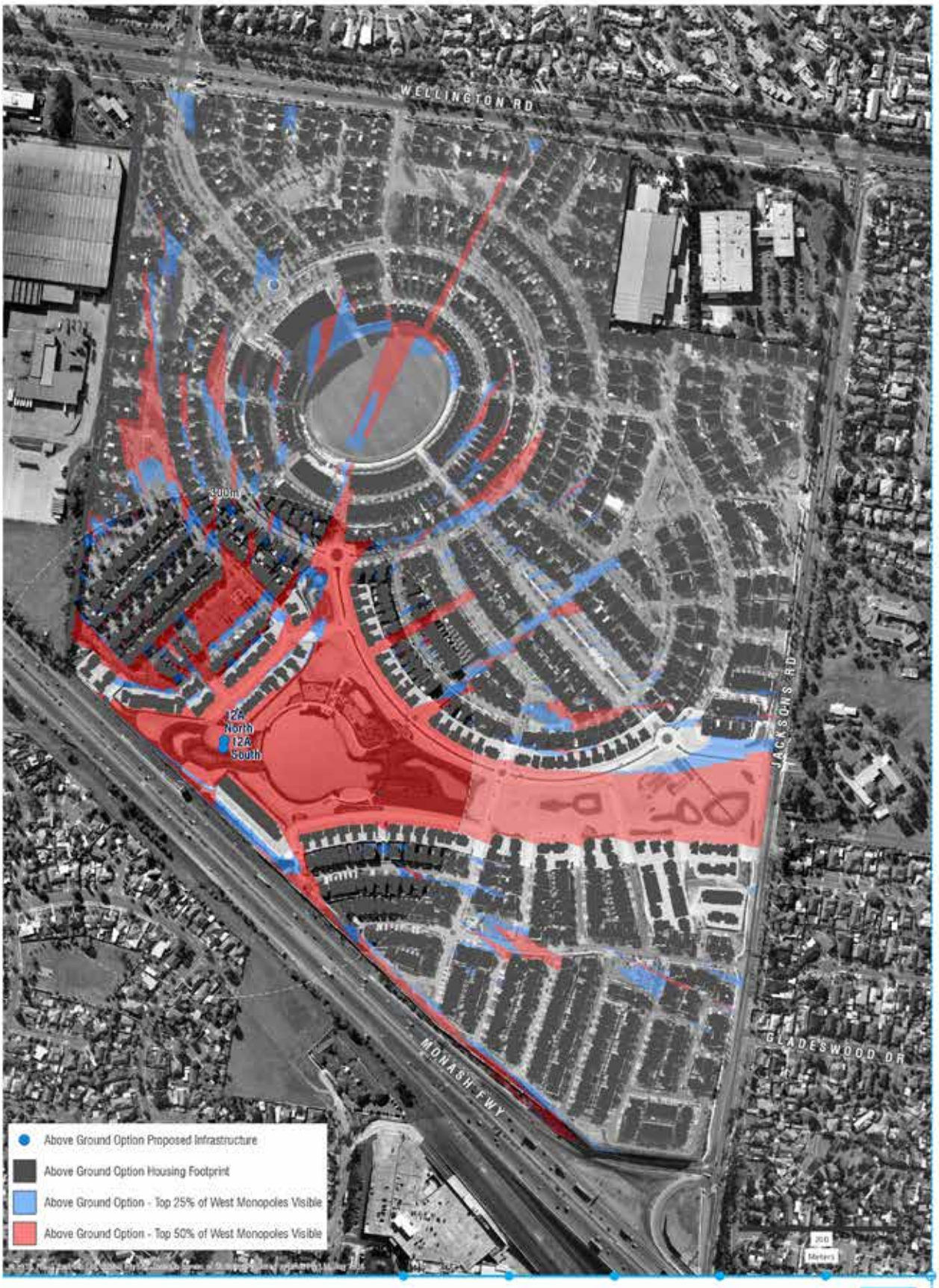
Where 50% & 25% of the Central Monopole are Visible From, assuming a 1.5m observer height

urbis

Plan 7 - Waverley Park - Above Ground Option

Where 50% & 25% of the Eastern Lattice Tower is Visible From, assuming a 1.5m observer height

urbis



Plan 8 - Waverley Park - Above Ground Option

Where 50% & 25% of the Western Monopoles are Visible From, assuming a 1.5m observer height

urbis

Plan 9 - Waverley Park - Above Ground Option

Where 50% & 25% of Any of the Above Ground Infrastructure is Visible From, assuming a 1.5m observer height

urbis


Waverley Estate Boundary
Above Ground Option Housing Footprint
Public Space (Above Ground Option)
200
Meters
Waverley Park - Above Ground Option
Definition of Public Open Space and Streets
urbis

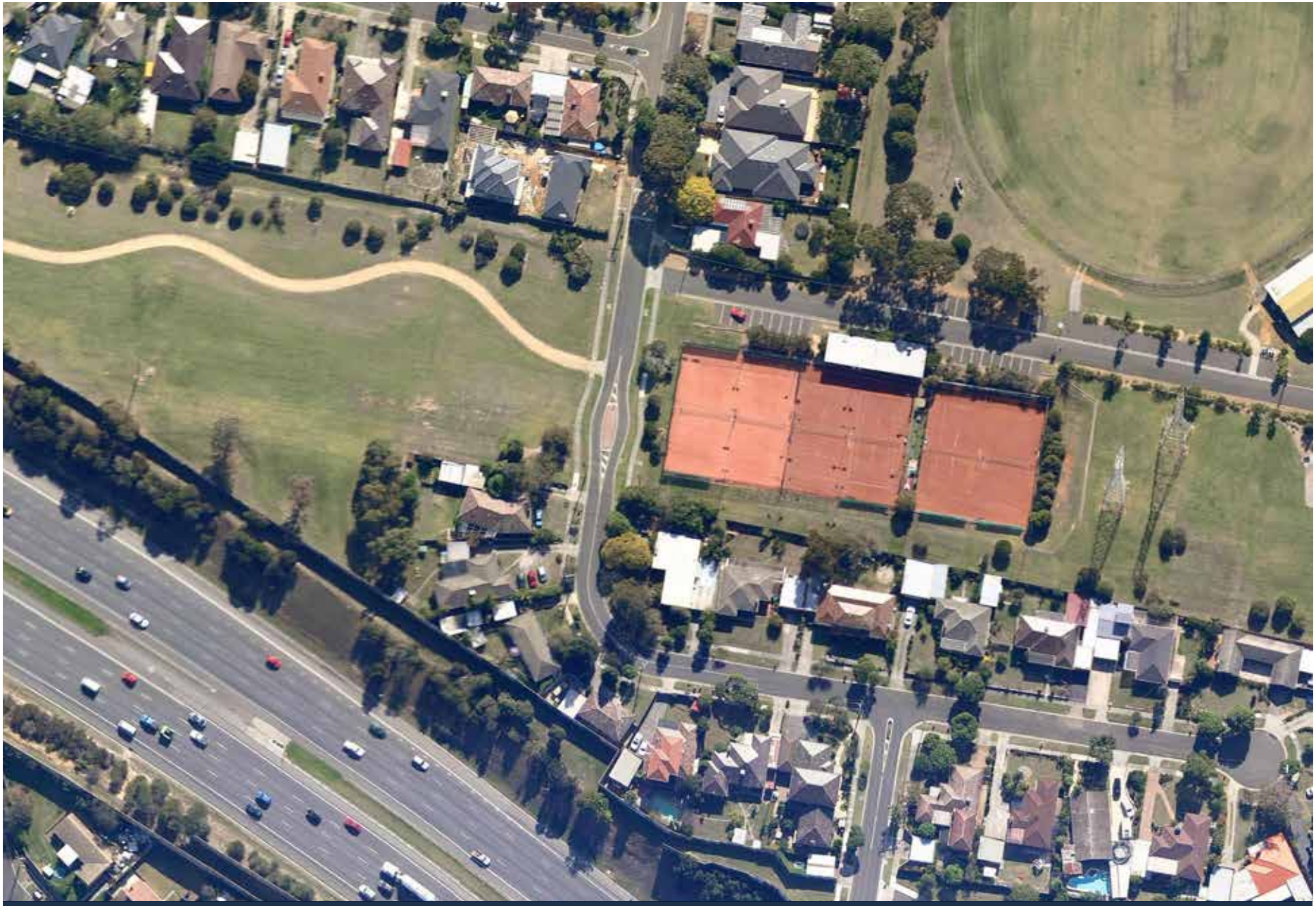
APPENDIX H

DRAINAGE STRATEGY PLAN
DRAWING 82-85-/DS

Waverly Park Drainage Strategy Plan

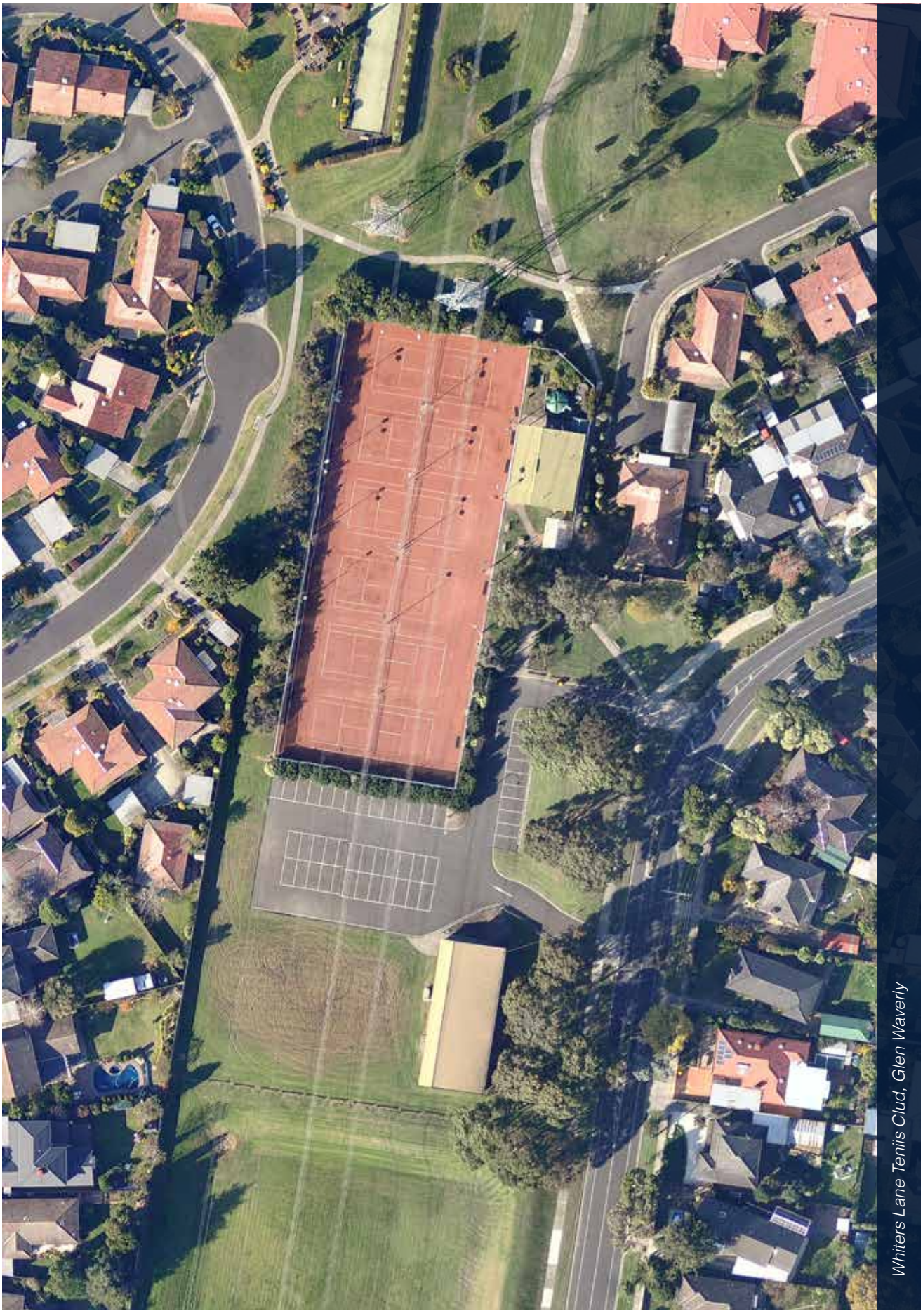
APPENDIX I

PHOTOS OF SPORTING FACILITIES AND POWERLINES IN THE CITY OF MONASH



Mayfield Reserve Tennis Courts, Mayfield Drive, Mt Waverly

Wheelers Hill Tennis Courts, Sunnybrook Drive, Wheelers Hill



Whiters Lane Tenlis Clud, Glen Waverly

Sydney

Tower 2, Level 23, Darling Park
201 Sussex Street
Sydney, NSW 2000
Tel: +612 8233 9900
Fax: +612 8233 9966

Brisbane

Level 7, 123 Albert Street
Brisbane, QLD 4000
Tel: +617 3007 3800
Fax: +617 3007 3811

Melbourne

Level 12, 120 Collins Street
Melbourne, VIC 3000
Tel: +613 8663 4888
Fax: +613 8663 4999

Perth

Level 1, 55 St Georges Terrace
Perth, WA 6000
Tel: +618 9346 0500
Fax: +618 9221 1779

urbis

Australia · Asia · Middle East
www.urbis.com.au
info@urbis.com.au