Appendix N:

SPI PowerNet Pty Ltd

Transmission Revenue Reset (TRR) 2014/15 – 2016/17

WMTS Redevelopment Planning and Design Review

Public Version

SP AusNet
A member of Singapore Power Group

11 October 2013

AMS - Electricity Transmission Network

West Melbourne Terminal Station Redevelopment Planning and Design Review

PUBLIC VERSION

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ISSUE/AMENDMENT STATUS

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1 Executive Summary

SP AusNet with support from consultants Beca, Aurecon, SKM and GHD reviewed the West Melbourne Terminal Station (WMTS) redevelopment project following advice from the Linking Melbourne Authority (LMA) that a part of the WMTS site would be required for the new East West Link[1].

Three consultants were each asked to develop two options; one assessing the feasibility of redeveloping WMTS using land available on the existing site, and a second with no land constraints seeking innovative approaches. Six feasible options were developed ranging from redeveloping the terminal station on the existing site through to constructing a completely new terminal station on the south side of the Yarra.

Analysis of the options identified that the three consultants converged on a single on-site technical option for the redevelopment of WMTS with some minor variations in terms of equipment location (transformers, 66 kV and 22 kV), project staging and the sequencing of construction works. Other options involving the use of additional land were not economic because either the land adjacent to the existing site is insufficient to provide significant benefit or the cost of 220 kV line and 66 kV feeder redirections to other sites added significantly to the net cost of the project without any benefits.

The planning and design review converged on a single robust solution, which can be implemented on the existing site and outside the areas likely to be required by the East West Link by using compact gas insulated switchgear (GIS). A redevelopment of WMTS involving AIS with the same functionality is not possible in the available land and the consultants were not able to recommend a practical or economic AIS redevelopment option.

The option evaluation revealed strengths in each of the consultants' options. These aspects either improved constructability, reduced cost, or reduced the risk associated with an on-site rebuild. Instead of accepting one of the consultants' options, a combined option that incorporated several of the desirable aspects was further developed by planning detailed staging and producing a detailed cost estimate.

This optimised option, which is technically similar to the previous redevelopment proposal in that it employs GIS for all three voltage levels (220 kV, 66 kV and 22 kV), is estimated to cost $206.7 M ($165.4 M - including $23 M for distribution line relocations – in direct costs excluding management reserve, overheads and finance charges). A significant difference is that due to the additional space constraints the buildings and transformers are to be located in different areas and the project delivery time frame extends to 6 years with a completion date of end 2019.

The economical timing of the WMTS redevelopment has been reassessed based on AEMO's 2013 demand forecast, which is lower than the demand forecast used in the business case approved in 2012. The supply and safety risk at WMTS is expected to increase to levels where capital investment would be economical (annual project benefits exceed total annual cost) by 2019. The economic project completion time is 2019, using AEMO's 2013 terminal station demand forecast and the total estimated project cost of $206.7 M that includes distribution feeder relocation works.

Sensitivity studies have also been carried out to test the project economical timing for different discount rates, demand growth scenarios and asset failure rates. These sensitivity studies show that the outcome is sensitive to asset failure rate and the completion date of the BTS 220/66 kV augmentation project.

1 Linking Melbourne Authority letter titled: "The East West Link road project, 15 July 2013.

The optimised option delivers the project by the end of 2019 which is a 2 year deferral compared with the timing in SP AusNet's original Revenue Proposal submitted in February 2013.
It is concluded that:

- SP AusNet can meet its capital expenditure and safety obligations and provide the clearance requested by LMA by redeveloping the existing WMTS.
- The redevelopment of WMTS on the existing site and outside the areas proposed for the future East West Link is practical and cost efficient when compared with the redevelopment options proposed by the consultants and investigated in the planning study[2].
- The cost of the new redevelopment option is marginally more expensive compared with the GIS redevelopment option submitted to the AER in February 2013.
- The new redevelopment option will deliver the same functionality and benefits as the GIS redevelopment option approved by SP AusNet's Board in 2012.
- Air insulated switchgear (AIS) cannot be used for this redevelopment due to the additional space constraints imposed on this site.

2 West Melbourne Terminal Station, Terminal Station Redevelopment Planning Report, May 2012

2 Introduction

SP AusNet's Board approved a redevelopment of WMTS at an estimated total cost (including overheads and finance charges) of $192.8 million in May 2012[3]. The project scope included replacing the existing 220 kV air insulated switchgear (AIS), 66 kV AIS and GIS and 22 kV metalclad switchgear with indoor gas insulated switchgear (GIS) and three of the four existing 150 MVA 220/66 kV transformers with new transformers of the same rating as well as all secondary (protection, control and communication) systems.

The project cost was revised to $154 M (excluding distribution 66 kV and 22 kV line rearrangements) based on the contemporary project expenditure forecast and was included in SP AusNet's transmission revenue reset proposal[4]. In this report, the project approved in May 2012 is referred to as the "Approved WMTS Redevelopment Plan".

Prior to the SP AusNet Board approval, 11 options were investigated ranging from greenfield type redevelopment on a new site with either AIS or GIS to brownfield type redevelopment on the current site with AIS/GIS[5]. The AIS/GIS brownfield redevelopment option consisted of 220 kV AIS, 66 kV AIS and GIS, and 22 kV GIS as the existing site at WMTS is too small to accommodate AIS-only switchyards at all three voltage levels. The GIS brownfield redevelopment option employed GIS for all three voltage levels (220 kV, 66 kV and 22 kV).

In July 2013, the Linking Melbourne Authority (LMA) informed SP AusNet that a part of SP AusNet's WMTS property will likely be required for the construction of the East West Link road project[6]. (Refer Appendix A). LMA's proposal has a significant impact on all the options previously considered for the planned redevelopment of WMTS.

AEMO's 2012 and 2013 demand forecast for the 66 kV load supplied from WMTS is lower than the 2011 demand forecast. This planning and design review incorporates the 2013 demand forecast and reflects CitiPower transfers of load from WMTS to the enhanced Brunswick Terminal Station (BTS) by 2016. It also includes CitiPower's plan to transfer load (zone substations J and DA) from WMTS 22 kV to WMTS 66 kV by 2018 and 2019 respectively.

This planning and design review evaluates options to redevelop WMTS, identifies the most economical solution and establishes the economical time for the selected option to be completed.

3 West Melbourne Terminal Station Redevelopment Project Board paper, 15 May 2012
4 The redevelopment of WMTS will require 66 kV and 22 kV lines, which are owned by CitiPower and Jemena, to be re-arranged as the 66 kV and 22 kV connection points at WMTS will change after the terminal station redevelopment project. The cost for the distribution line changes is estimated at $23 M and has not been included in the project forecast of $154 M.
5 West Melbourne Terminal Station – Terminal Station Redevelopment Planning Report, May 2012 and WMTS XA14 Options Development Report prepared for SP AusNet by Beca, 11 October 2011.
6 Linking Melbourne Authority letter titled: "The East West Link road project, 15 July 2013.

3 Regulatory Obligations

SP AusNet is proposing a redevelopment of WMTS in order to meet the capital expenditure and safety obligations described below.

Clause 6A.6.7 of the National Electricity Rules (NER) requires SP AusNet to propose a total forecast capital expenditures, which it considers is required to:

- meet the expected demand for prescribed transmission services over that period;
- comply with all applicable regulatory obligations or requirements associated with the provision of prescribed transmission services;
- maintain the quality, reliability and security of supply of prescribed transmission services; and
- maintain the reliability, safety and security of the transmission system through the supply of prescribed transmission services.

The Electricity Safety Act (section 83B or Part 10) requires SP AusNet to *"design, construct, operate, maintain and decommission its supply network to minimise as far as is practicable the hazards and risks to the safety of any person arising from the supply network; having regard to the:*

a) severity of the hazard or risk in question; and

b) state of knowledge about the hazard or risk and any ways of removing or mitigating the hazard or risk; and

c) availability and suitability of ways to remove or mitigate the hazard or risk; and

d) cost of removing or mitigating the hazard or risk".

4 West Melbourne Terminal Station Redevelopment

4.1 WMTS Location

WMTS is the key terminal station supplying Melbourne's CBD and inner suburban areas and is connected in the western metropolitan 220 kV ring as shown in Figure 1 below.

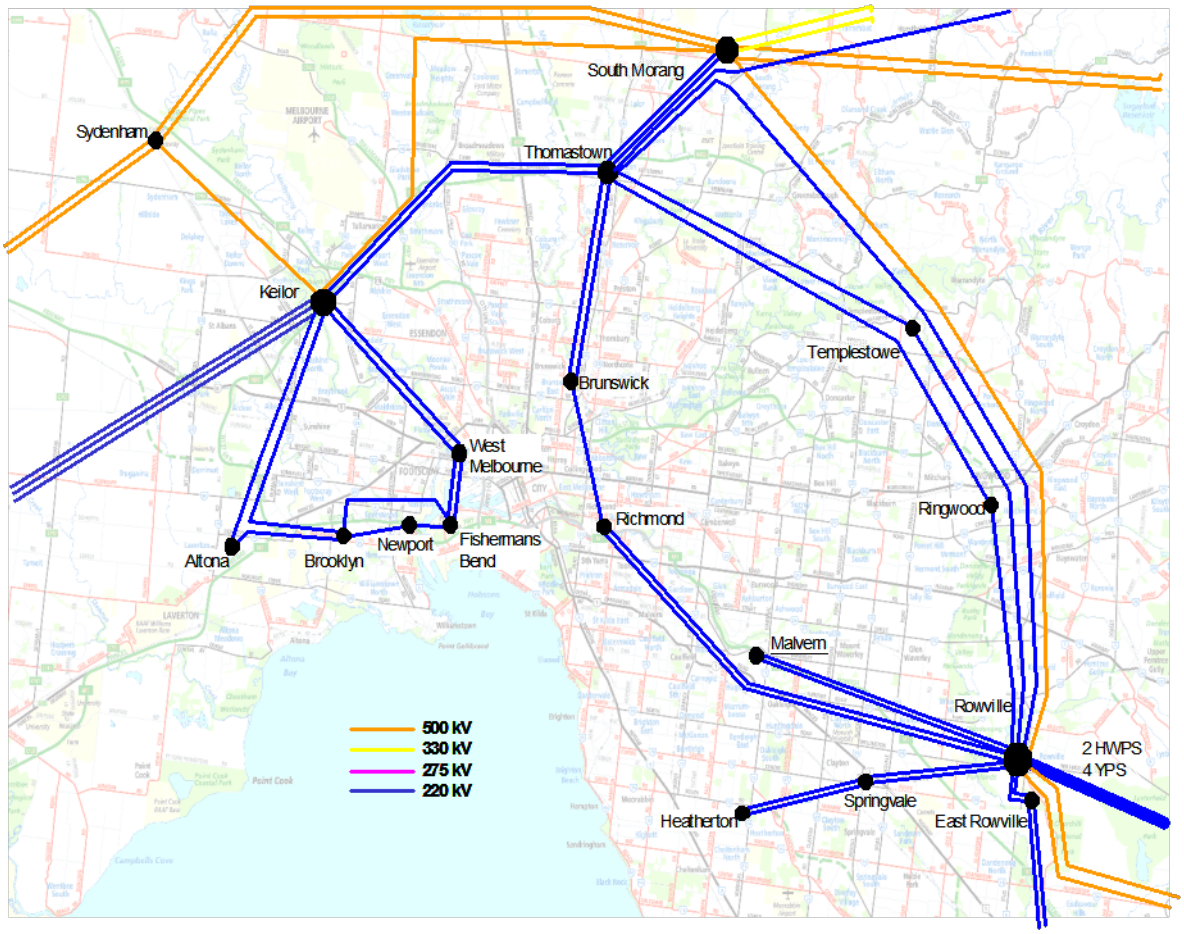


Figure 1: Metropolitan Transmission Network

4.2 Project Drivers

WMTS was established in the early 1960's. The majority of the electricity assets have provided more than 45 years' service, are in a deteriorated condition and are approaching the end of their technical lives. The key service constraints are:

- Health and safety risks presented by the 22 kV metalclad switchgear, which is not compliant with contemporary arc fault containment standards
- Health and safety risks and plant damage risks presented by an explosive failure of the 220 kV minimum oil circuit breakers, 66 kV bulk oil circuit breakers, 66 kV instrument transformers or ASEA 220/66 kV transformer bushings
- Supply risks presented by the failures of the 220/66 kV ASEA transformers, 220 kV minimum oil circuit breakers, 66 kV bulk oil circuit breakers or 22 kV metalclad switchgear.

4.3 Site Constraints and Redevelopment Challenges

The WMTS is established on a small landlocked site. It is located in a suburb which is undergoing urban renewal[7]. The 220 kV switching configuration is non-standard with most circuits connected with only one circuit breaker to a single bus. This is different to the standard breaker and half or double bus switching configurations normally used for transmission voltages of 220 kV or higher.

Combined, these factors create unique challenges[8] and costs to ensure that a brownfield redevelopment of WMTS complies with SP AusNet's standard techniques and procedures, which include maintaining safe working conditions throughout the project and minimising supply risks during the construction phase of the project.

Figure 2: Aerial view of WMTS

In the approved WMTS Redevelopment plan[9], the small parcel of vacant land in the south eastern corner of the WMTS site was planned to be used to locate two new transformers and the new 220 kV GIS building as shown in blue colour on the right in the following figure, Figure 3.

7 Arden-Macaulay Structure Plan, 2012, City of Melbourne
8 Beca Report: Appraisal of WMTS GIS and AIS Redevelopment Options; July 2013
9 West Melbourne Terminal Station Redevelopment Project Board paper, 15 May 2012

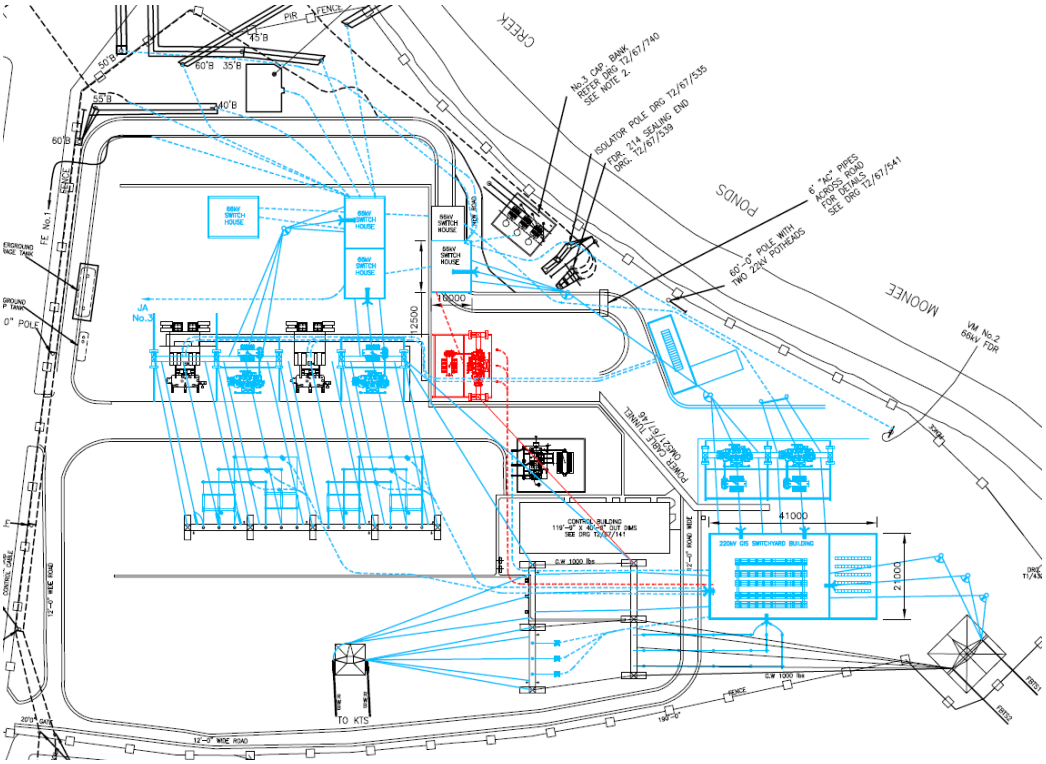


Figure 3: WMTS Site Layout for the Approved WMTS Redevelopment Plan

The LMA informed SP AusNet on 15 July 2013 that they may require this area as well as a strip of land on the eastern side of the WMTS site for the East West Link as illustrated in Figure 4. Restrictions will be placed on the type of electricity infrastructure that can be constructed in this area or the proposed roadway easement.

In addition; an underground railway tunnel forming part of the Melbourne Metro Rail Tunnel project, is also planned to cross under the southern end of the WMTS site. The location of the planned rail tunnel is illustrated by dotted red lines in Figure 4.

The Melbourne Metro Rail project involves the construction of a nine kilometre rail tunnel through inner Melbourne that will link the Sunbury and Pakenham/Cranbourne rail lines. The project will include five new underground stations to be located at Arden, Parkville, CBD North, CBD South and Domain. The rail tunnel will join the Dandenong corridor to the east of South Yarra Station and the Sunbury line west of South Kensington Station.

The planning approvals process for Melbourne Metro is underway and will be supported by a range of technical investigations that will assess the project's environmental, urban design, traffic and transport, economic, and social impacts. This process will take approximately two years to complete and if planning approval is received, will result in land being reserved for the future construction of the project when funding becomes available. The planning approvals process for Melbourne Metro will be conducted under the Major Transport Projects Facilitation Act 2009 (MTPF Act)[10].

10 Public Transport Victoria

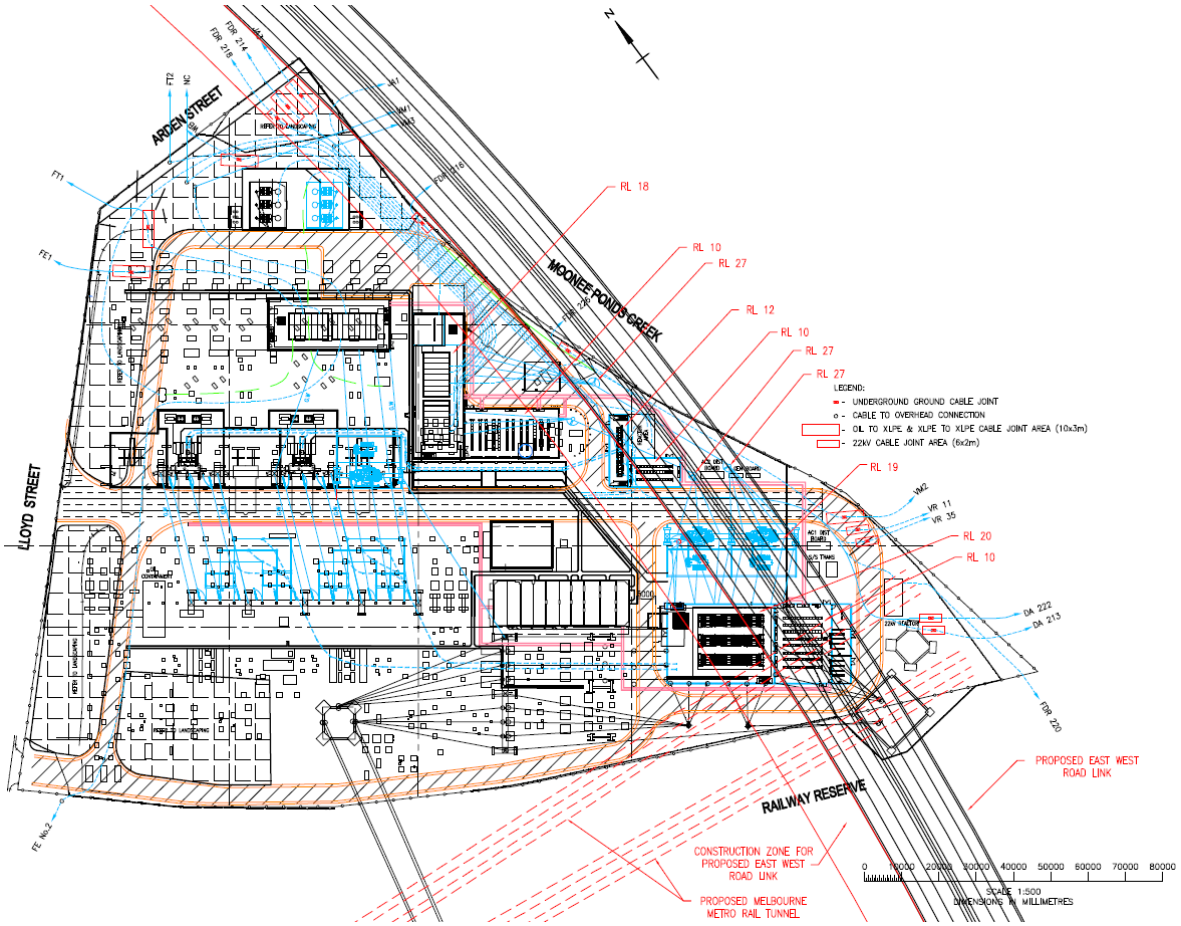


Figure 4: Restrictions Imposed by the July 2013 Proposed East West Link

Not one of the brownfield redevelopment options considered in the May 2012 WMTS redevelopment business case can be implemented following the restrictions imposed by the East West Link road project.

Alternative options to replace the deteriorated electricity assets have hence been developed from first principles and are described in the next section of this review.

5 WMTS Redevelopment Planning and Design Review

SP AusNet engaged three consultants Beca, Aurecon and Sinclair Knight Merz (SKM) to fundamentally reassess the redevelopment of WMTS with due consideration of the additional constraints introduced by the East West Link and the Melbourne Metro Rail Tunnel project[11]. SP AusNet's strategy to engage three consultants created an environment for innovation, whilst leveraging the best skills and expertise available in the market. The three consultants were tasked to independently develop options for the redevelopment of WMTS under the constraint of both the road and rail alignments.

Each of the consultants was requested to develop two options; one assessing the feasibility of redeveloping WMTS using land available on the existing site, and a second with no land constraints seeking innovative approaches.

The process that was followed to evaluate the redevelopment options is illustrated in Appendix E.

Following presentations by the consultants, each of the options was evaluated against key criteria. This evaluation revealed that each of the consultants had developed a feasible on-site rebuild option. Also, SKM developed technically feasible alternative options that utilised additional land, however these options carried more risk than the on-site rebuild options and due to being much more expensive, were considered commercially unfeasible.

The option evaluation revealed strengths in each of the consultants' options. These aspects either improved constructability, reduced cost, or reduced the risk associated with an on-site rebuild. Instead of selecting one of the consultants' options, it was decided to develop an option that incorporated several of the desirable aspects identified. This "combined" option was further developed by planning detailed staging and producing a detailed cost estimate.

5.1 Beca Redevelopment Option

Beca's approach was to consider all possible redevelopment options and then to eliminate the non-feasible options, based on constructability, supply risk, safety risk and cost. Beca recommended an all GIS redevelopment (220 kV, 66 kV and 22 kV) with the 220 kV GIS building located on the western boundary of the site, the transformers in a row in the existing location and for the 66 kV and 22 kV GIS buildings to be located as shown in Figure 5. Beca considered this to be the only feasible option[12].

11 The three consultant reports are included as an attachment to this report.
12 Beca West Melbourne Terminal Station Options Investigation, September 2013

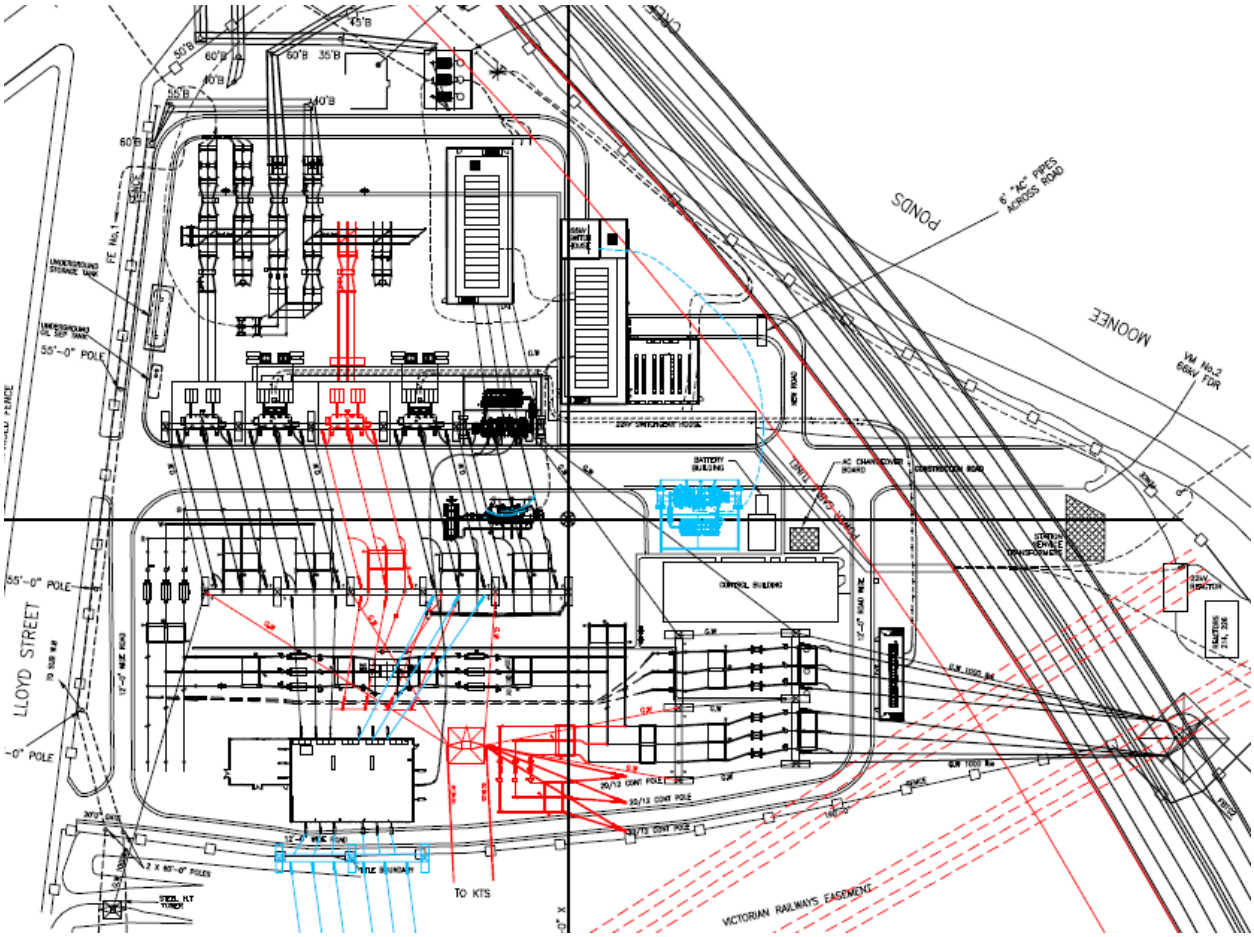


Figure 5: Beca September 2013 Redevelopment Option

Beca concluded that an acceptable rebuild solution is feasible on the existing site and that the original front end engineering design that was completed in August 2013 can largely be implemented except for some temporary line deviations and some additional cables (including jointing the 220 kV Fishermans Bend No.1 cable).

Beca considered that redevelopment with AIS/GIS is not possible with the additional site constraints introduced by the road and rail projects.

5.2 Aurecon Redevelopment Options

Aurecon presented two redevelopment options and has carried out thorough engineering research and due diligence of both options to prove with confidence that the solutions proposed are achievable at the concept stage[13]. Both options can be accommodated on the existing WMTS site without risk to the network and within all site and redevelopment constraints such as the East West Link, Melbourne Metropolitan rail project and requirement to maintain the security of supply from WMTS during construction.

Compact GIS is used for all voltages (220 kV, 66 kV and 22 kV) in both options. The location of the 220 kV GIS building is the same for the two options. Aurecon considered temporarily transferring load to Fishermans Bend Terminal Station (FBTS) and BTS in the second option as this provided the means to decommission some 66 kV assets and to create space to rebuild the 66 kV switchgear.

13 Aurecon, WMTS Rebuild – XA14 Report on Project Options Investigations, September 2013

Aurecon has carefully considered the design and construction of the 220 kV GIS building to ensure that it can be constructed on the existing WMTS site without affecting the electricity supply from WMTS.

The WMTS site layout after completion of the project is shown below for each of the two Aurecon options.

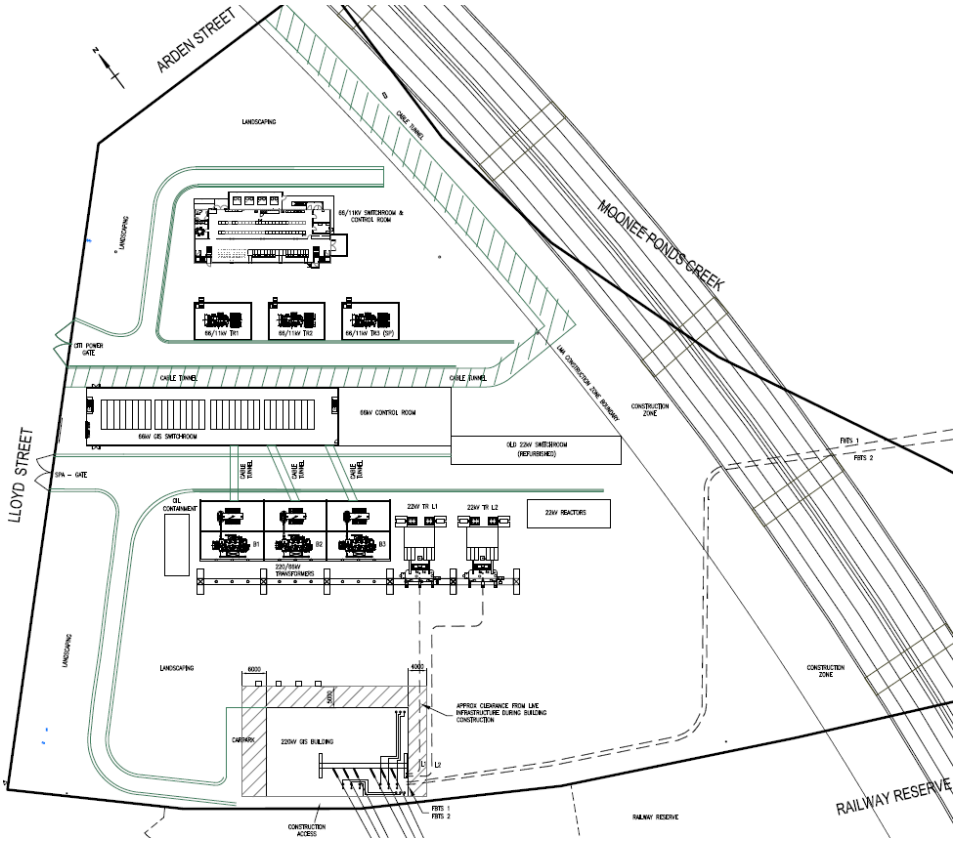


Figure 6: Aurecon September 2013 Redevelopment Option 1

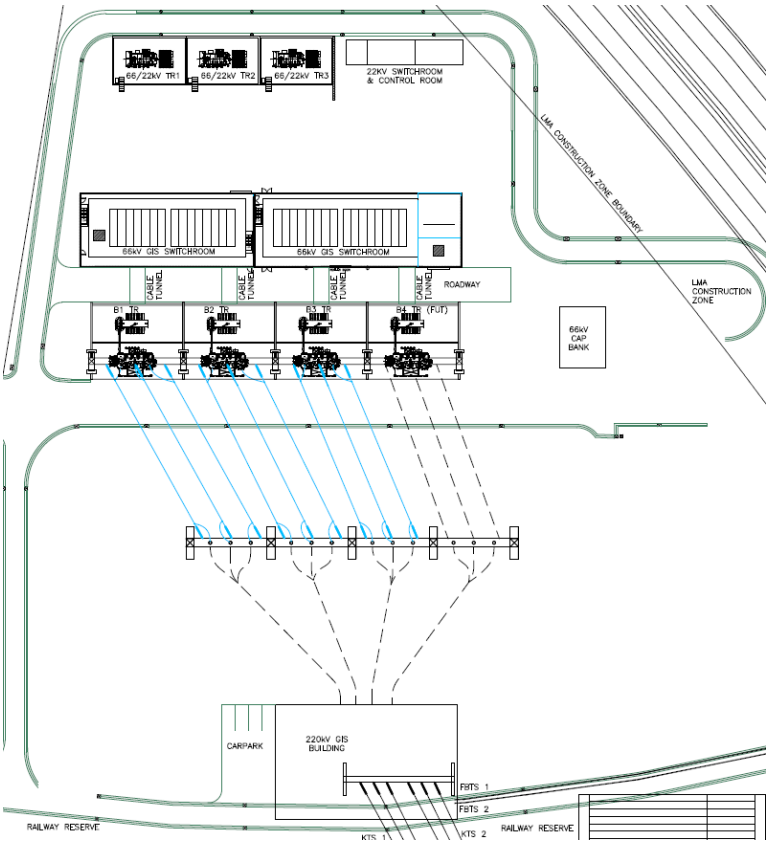


Figure 7: Aurecon September 2013 Redevelopment Option 2

5.3 SKM Redevelopment Options

SKM proposed two redevelopment options at WMTS as well as an alternative option to develop a new site near Lorimer Street, Fisherman's Bend after considering a number of locations for a new terminal station in a greenfield site[14]. The greenfield Lorimer Street site is shown in Figure 8 below.

14 West Melbourne (WMTS) Re-Build Options Investigation, SKM, September 2013

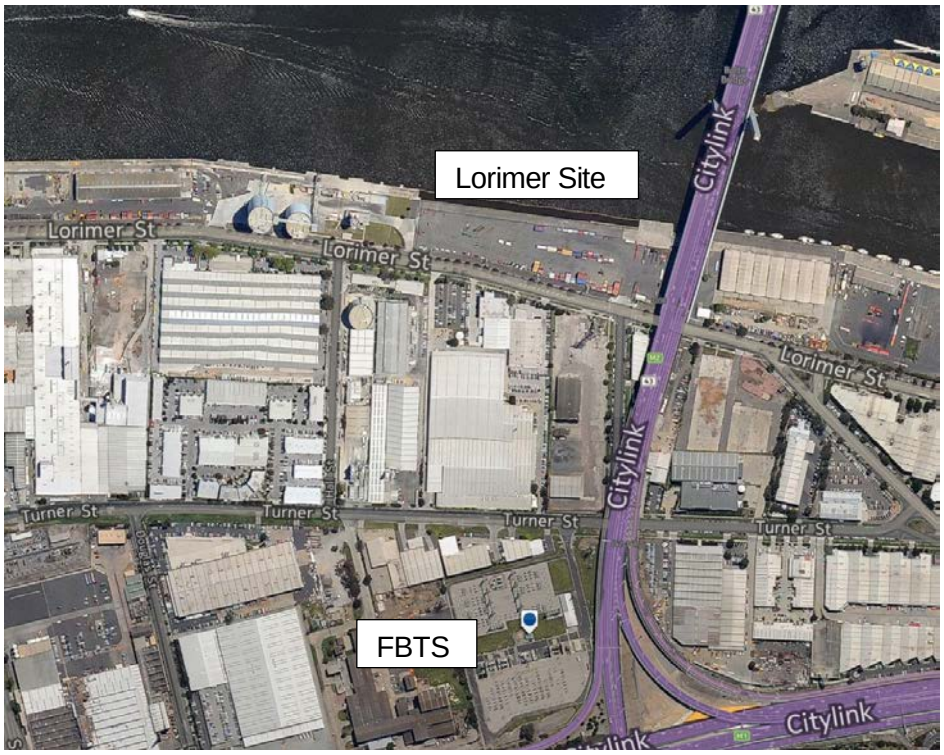


Figure 8: SKM September 2013 Greenfield Development Option at Lorimer Street

SKM proposed the development of a new terminal station at the Lorimer Street site as a strategic option to secure another site for a new supply point for Melbourne's CBD. This option would involve building a new terminal station on this site to match the existing WMTS transmission connection capacity and then retire all the assets at WMTS. It would, however, retain the WMTS site for development in future when demand exceeds supply. It includes the following infrastructure:

- 220 kV GIS
- Three 225 MVA 220/66 kV transformers
- 66 kV GIS
- Six 66 kV cross-river cables to connect into the CBD 66 kV network
- Two 66 kV cross river cables to connect into the FT and FTE loops
- Supply for the 22 kV load that are presently supplied from WMTS
- Possibly a new 220 kV underground cable from WMTS or a capacity upgrade of the Western Metropolitan 220 kV ring to support up to 500 MW at the proposed Lorimer Terminal Station as the capacity of the existing WMTS-FBTS 220 kV circuits are limited

Greenfield redevelopment is a technically feasible alternative to brownfield redevelopment, but typically costs significantly more. SP AusNet has previously estimated the cost of AIS and GIS greenfield redevelopment at between $350 M and $400 M for favourable sites that do not require significant 220 kV, 66 kV and 22 kV line/cable rearrangements, new lines or underground cables, or significant line/cable (particularly 220 kV) augmentation works[15].

The scope of work for these two previously considered greenfield redevelopment options is described in more detail in Appendix D.

15 West Melbourne Terminal Station – Terminal Station Redevelopment Planning Report, March 2012. Transmission line and underground cable cost can be significant for greenfield redevelopment, especially if the site is located some distance from the existing lines. Expensive underground cable may also be required to connect the existing lines (220 kV, 66 kV and 22 kV) to the new site. Earth and civil work is another cost consideration for green field redevelopment, which could be significant for unfavorable sites.

SKM's two brownfield redevelopment options on the existing WMTS site have similar final locations for the 220 kV GIS building, 66 kV GIS building and power transformers but use different approaches to create the space for the new replacement plant, structures and buildings.

SKM demonstrated that there are different ways to redevelop the infrastructure on the existing WMTS site without compromising personnel safety, supply security and the plans for future road and rail infrastructure, using compact GIS technology.

The final site layout plan for the two SKM redevelopment options are shown below in Figures 9 and 10.

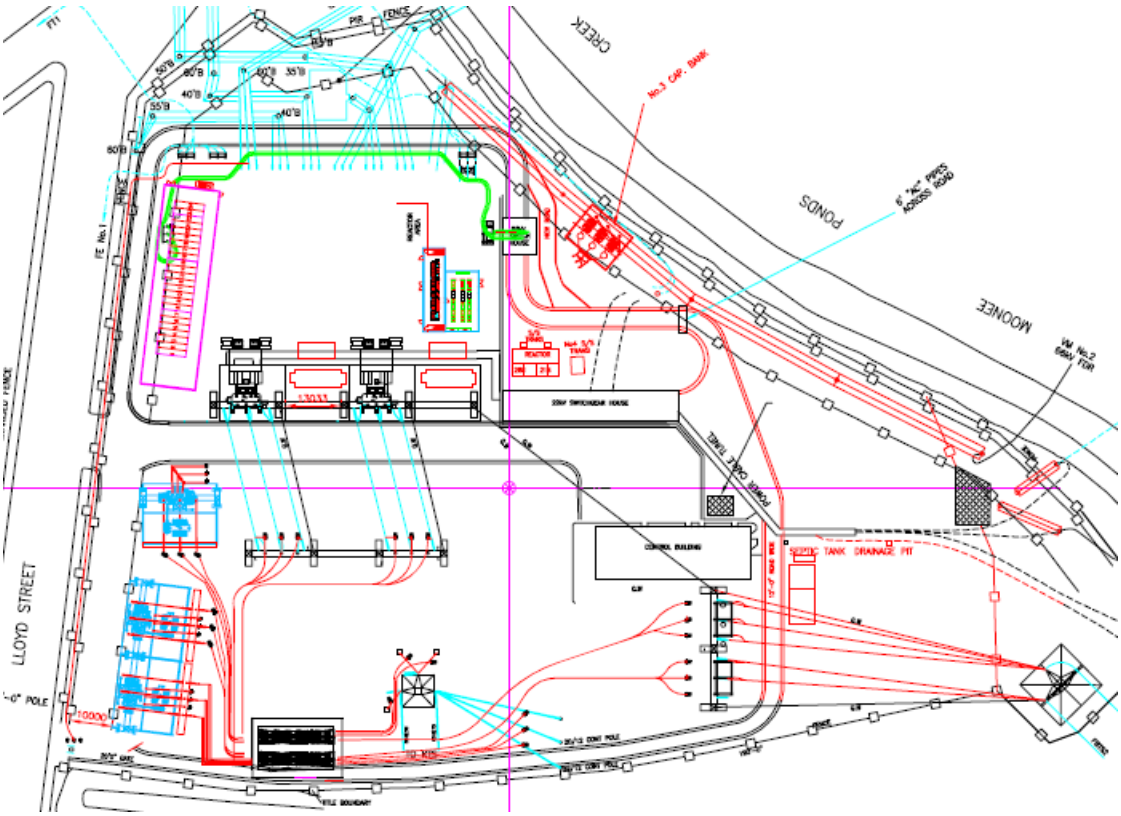


Figure 9: SKM September 2013 Redevelopment Option 1

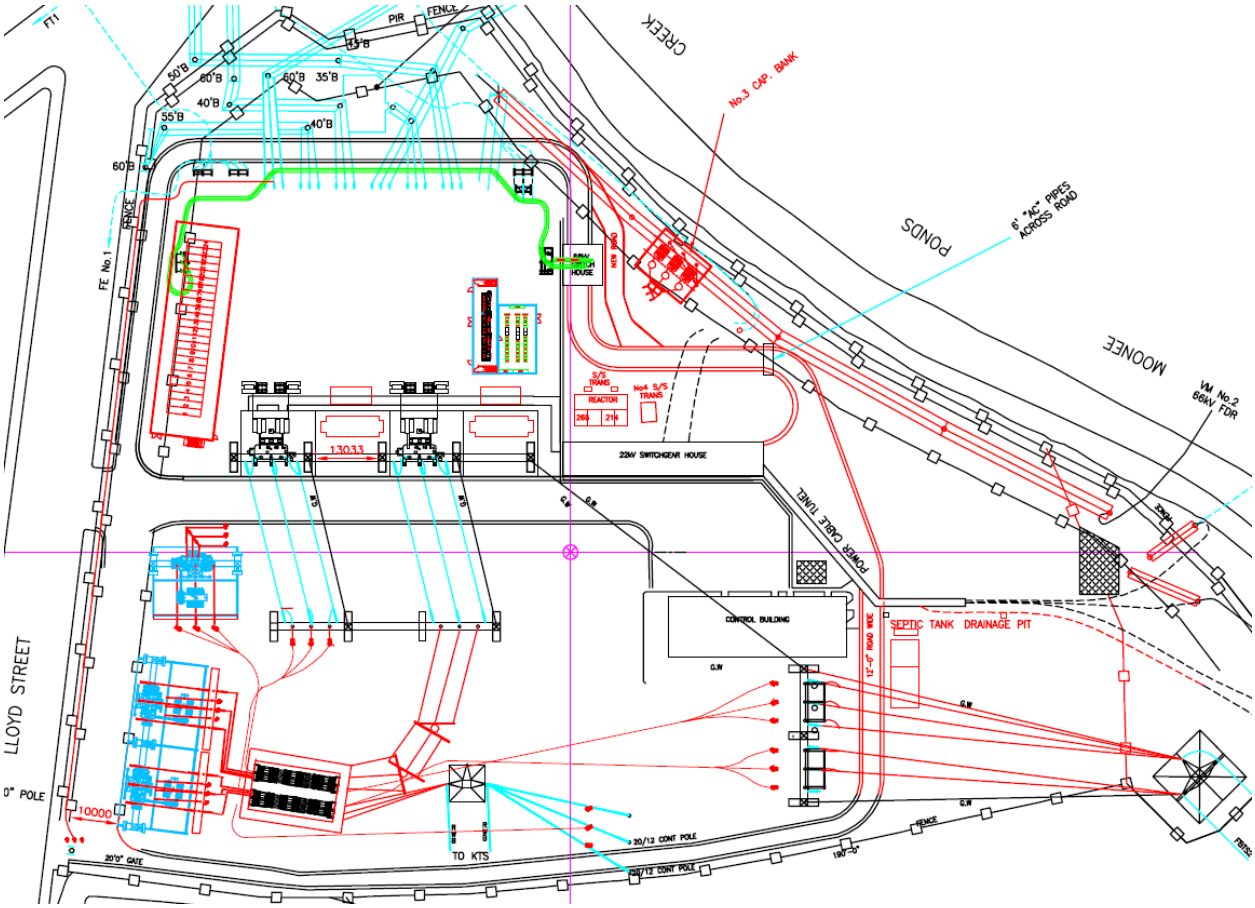


Figure 10: SKM September 2013 Redevelopment Option 2

5.4 WMTS Redevelopment Option Analysis

The redevelopment options have been evaluated based on the following criteria:

- Constructability
- Project delivery timeframe
- Supply risk during construction work
- Additional or sacrificial work

Assessment against the above criteria is summarised in Table 1 below.

Option	Constructability	Timeframe	Supply Risk	Additional Work	Conclusion
Beca	Proven. Complies with SP AusNet's terminal station redevelopment standards and practices to manage safety and supply risk. Can be constructed on the existing site outside the areas planned for the East West Link project	Can be completed in 5 or 6 years	Acceptable	Minimal	Opportunities for improvement and cost reduction have been identified. Option can be refined in the design review.

Option	Constructability	Timeframe	Supply Risk	Additional Work	Conclusion
Aurecon Option 1	Requires agreement from railway authorities to provide land for FBTS lines deviation. Depends upon retirement of 22 kV supply prior to construction of East West Link.	Likely to be longer than BECA due to need to get agreement from Railway authorities.	Higher due to deviation of both KTS lines and FBTS lines	Requires deviation of both KTS lines and FBTS lines at significant additional cost.	Significant cost for 220 kV line rearrangements. Final KTS 220 kV landing arrangement is a cost effective solution and can be considered in the design review.
Aurecon Option 2	Good as this option allows for temporary load transfers to BTS and FBTS to reduce the 66 kV load at WMTS prior to the redevelopment to enable decommissioning of 66 kV assets to create space for the redevelopment.	Longer than BECA due to additional planning approvals and works on CitiPower's network to enable the temporary 66 kV load transfers.	Lower 66 kV supply risk due to temporary transfer of 66 kV load from WMTS to BTS and FBTS. Higher 220 kV supply risk due to deviation of both KTS lines and FBTS lines.	This option requires development of 66 kV networks at FBTS and a new 220/66 kV transformer at FBTS and will cost more than the other options considered.	Significant cost for 66 kV works at FBTS and 66 kV subtransmission ties. The final KTS 220 kV landing arrangement is a cost effective solution and can be considered in the design review.
SKM 1	More complex construction as this option requires many temporary and permanent 220 kV underground cables.	Planning approval may take longer with more assets located near Lloyd Street.	Higher supply risk due to later replacement of 220/66 kV transformers	This option requires more temporary and permanent 220 kV cables at significantly higher cost compared with other options considered.	Elements of this option provide a cost effective solution and can be considered in the design review.
SKM 2	Uses temporary 220 kV switchgear to connect to transformer bus groups. The 66 kV GIS building orientation is not optimal Similar construction issues as SKM 1	Requires removal of assets prior to 66 kV rebuild, which extends the project delivery time frame and project cost.	Higher supply risk due to later replacement of 220/66 kV transformers	Requires more 220 kV cables and 66 kV connections. Also requires 1 additional transformer enclosure	It will cost more than the BECA option. Elements of this option provide a cost effective solution and can be considered in the design review.
SKM Lorimer Street	Development of a new GIS terminal station with new 66 kV cables and augmentation of Western Metropolitan 220 kV ring. Technical feasibility has not been proven.	The lead time to procure the site and to obtain planning approval will be significant and may not be possible.	Option will take much longer to complete and WMTS supply risk will be significantly higher due to deteriorated condition of transformers and switchgear.	Reinforcement of the 220 kV western metropolitan 220 kV ring at significant cost may be required in addition to the significant site works and 66 kV cross-river cables detailed in the SKM report.	Uneconomical option with significant technical and planning approval issues that would need to be resolved. Has the advantage of securing an additional site for the supply to the CBD.

Table 1: WMTS Redevelopment Options Analysis

The key conclusions from analysis of the options are:

- Each of the options developed by the consultants is technically feasible.
- The three consultants converged on a single on-site technical option for the redevelopment of WMTS with some minor variations in terms of equipment location (transformers, 66 kV and 22 kV), project staging and the sequencing of construction works.
- A redevelopment of WMTS involving AIS with the same functionality is not possible in the available land and the consultants were not able to recommend a practical or economic AIS redevelopment option.
- There is insufficient available land adjacent to the WMTS site to redevelop using lower cost (AIS) switchgear as the small strip of land on the south western side of the site is required by VicTrack for access to the existing railway lines and for the future Melbourne Metropolitan

Railway Tunnel project. The other sides of WMTS are bounded by the river, freeway, Lloyd Street and railway lines.

- The location of the potential rail tunnel has little impact on the redevelopment as the tunnel only passes under one corner of the site.

A process to refine and optimise the on-site redevelopment option was undertaken and is described in section 5.5 below.

5.5 WMTS Redevelopment Design Optimisation

SP AusNet, assisted by consultants GHD, assessed the redevelopment options prepared by the consultant's options and developed an option that incorporates the strongest elements to replace the deteriorating assets at WMTS in the most cost efficient and safe manner.

SP AusNet's evaluation of the Beca, Aurecon and SKM options and the elements of the consultant's designs that were adopted is summarised in the table below. The incremental direct cost shown in the table below compares the consultant's option with a more efficient alternative for that redevelopment element or component identified by SP AusNet and GHD.

BECA OPTION 1			
Project Component	WMTS Site Location	Redevelopment Component Feature	SP AusNet and GHD Design Team Recommendations
220 kV switchgear	GIS building on southern side of 220 kV yard between KTS tower and No. 1 Bus	Temporary diversion of the KTS 1 Line south of the site and temporary cable for the FBTS 1 line to create space for construction	The location of the 220 kV GIS building is similar for all brownfield redevelopment options proposed by the three consultants. The method proposed by Beca for the 220 kV line deviations to create space for the 220 kV GIS building is the most cost effective method. Adopted in SP AusNet solution
66 kV switchgear	Two GIS buildings, one located south of the existing No. 4 Bus and the second located where the No. 3 Bus is currently.	Two separate buildings to accommodate 66 kV GIS. Orientation of the buildings is not optimal to connect 66 kV feeders based on direction of the feeders leaving the site. It requires underground cables to transformers.	SP AusNet identified an opportunity to reduce the cost of the 66 kV cable connections by orientating the 66 kV GIS buildings such that it will minimise cable congestion for each 66 kV feeder. Incremental cost due to complexity of feeder exits and transformer cables is estimated at $3 M. Partly adopted in SP AusNet solution
22 kV switchgear	GIS building located east of FBTS lines entry gantry	Utilises section of land between line entry and proposed east west link	Slight increase in project cost due to temporary location of new transformer and additional complexity in cabling back to the existing transformers. Incremental cost estimated at $2M, Refined in SP AusNet solution
220/66 kV transformers	Transformers located either side of the existing transformer delivery road	Reuses two existing transformer positions	Transformers are replaced in situ, which presents a higher supply security risk. An alternative option with lower supply risk is possible at the same cost. Partly adopted in SP AusNet solution
220/22 kV transformers	Remain where they are	Minimum impact	Adopt in SP AusNet solution as the most cost effective option

BECA OPTION 1			
Project Component	WMTS Site Location	Redevelopment Component Feature	SP AusNet and GHD Design Team Recommendations
GENERAL COMMENT This option replaces transformers in situ, which depends upon transformer outages that decrease network security and may require the successful completion of the Brunswick Terminal Station upgrade to allow load to be shifted away from West Melbourne Terminal Station. The orientation of the 66 kV GIS buildings will result in increased cable connection cost. Significant elements of this option have been adopted in SP AusNet's option though minor changes have been made to reduce supply risk and cost with the incremental savings estimated at $5 M.			

AURECON OPTION 1			
Project Component	WMTS Site Location	Redevelopment Component Feature	Recommendation
220 kV switchgear	GIS building on southern side of 220 kV yard between KTS tower and No. 1 Bus	The FBTS and KTS line entries are removed to allow removal of the KTS tower to make enough space for the new 220 kV GIS building. The KTS lines are moved to a gantry on the 220 kV GIS building by the end of the project.	The location of the 220 kV GIS building is similar for all the consultant brownfield redevelopment options. The method for the 220 kV line deviations to create space for the 220 kV GIS building proposed by Aurecon will cost more than the Beca option and is not adopted. The final KTS 220 kV landing arrangement is a cost effective solution and is adopted in SP AusNet's option. Incremental cost is estimated at $20M to $30M. Partly adopted in SP AusNet solution
66 kV switchgear	Located along the existing transformer alignment	Located along the existing transformer alignment	The option requires demolition of the existing transformer foundations in order to build a basement for 66 kV cable access to the 66 kV GIS building. It also requires significant cable connections between the transformers and the 66 kV GIS. This component is not adopted due to the higher cost estimated at $1.8M. It also encroaches on land previously allocated for landscaping setback. Not adopted in SP AusNet solution
22 kV switchgear	Located in freeway easement south-east of existing 22 kV switchroom	This option assumes the 22 kV will be retired prior to construction commencing on the East West Link Freeway.	This is not adopted as the timing of the 22 kV supply and the construction of the East West link is uncertain at this stage. There is no cost advantage in adopting this option compared with the other options considered for the 22 kV switchgear. Not adopted in SP AusNet solution
220/66 kV transformers	Located on south western side of transformer delivery road	Reuse existing rack structures	One additional transformer enclosure needs to be constructed. Not adopted as it constrains the utilisation of the existing transformers during the rebuild and increases the supply risk and SP AusNet's recovery plans following a failure of an existing transformer. This option does not present any cost advantages compared with the other options considered for the 220/66 kV transformers. The incremental cost is estimated at $0.5M. Partly adopted in SP AusNet solution

WMTS Redevelopment Planning and Design Review

AURECON OPTION 1			
Project Component	WMTS Site Location	Redevelopment Component Feature	Recommendation
220/22 kV transformers	Located toward the southern end of the site under the proposed freeway alignment	Assumes the 22 kV will be retired prior to construction commencing on the East West Link Freeway	Two additional transformer enclosures need to be constructed and the transformers also need to be relocated at an estimated incremental cost of $1.5 M. The timing of the retirement of the 22 kV supply and the construction of the East West link is uncertain at this stage. Not adopted in SP AusNet solution
GENERAL COMMENT This option provides an ordered and elegant final design for the station. It however requires deviation of both KTS lines and FBTS lines at significant additional cost. This option is estimated to cost about $27 M to $37 M more than SP AusNet's option.			

AURECON OPTION 2			
Project Component	WMTS Site Location	Redevelopment Component Feature	Recommendation
220 kV switchgear	The 220 kV GIS building is located on the southern side of the 220 kV yard between the KTS tower and No. 1 Bus	The FBTS and KTS line entries are removed to allow removal of the KTS tower to make enough space for the new 220 kV GIS building. The KTS lines are moved to a gantry on the 220 kV GIS building by the end of the project.	The location of the 220 kV GIS building is similar for all the consultant brownfield redevelopment options. The method for the 220 kV line deviations to create space for the 220 kV GIS building proposed by Aurecon will cost more than the Beca option and is not adopted. The final KTS 220 kV landing arrangement is a cost effective solution and is adopted in SP AusNet's option. The FBTS lines diversion not required at this stage and will only be required when East West Link is constructed. This component is thus not adopted as it increases the project cost. Partly adopted in SP AusNet solution
66 kV switchgear	Installed between existing transformers and existing 66 kV switchyard	This option uses 66 kV subtransmission ties to BTS and FBTS to transfer 66 kV load from WMTS to BTS and FBTS prior to the redevelopment of WMTS. It required augmentation of the subtransmission network and FBTS. The new GIS buildings are being built in two steps as the AIS switchyard is demolished	No cost advantage with SP AusNet's location of 66 kV switch gear. Significant additional cost for the subtransmission network ties and feeder bays and a 220/66 kV transformer at FBTS estimated at $27 M. Not adopted in SP AusNet solution
22 kV switchgear	Installed in vicinity of existing No. 3 66 kV Bus	Well positioned to connect to existing 22 kV exits but conflicts with existing 66 kV exits	No cost advantage with the proposed location of 22 kV switch gear. Refined in SP AusNet solution
220/66 kV transformers	Installed along current transformer line	Efficient reuse of existing transformer enclosures with minimal modification	Adopted in final solution as the most cost effective solution. Adopted in SP AusNet solution

AURECON OPTION 2			
Project Component	WMTS Site Location	Redevelopment Component Feature	Recommendation
220/22 kV transformers	Replaced by 66/22 kV transformers located in existing 66 kV AIS yard	Provides significant space in old 66 kV switchyard	Provides an alternative option to supply 22 kV load connected at WMTS once the exiting 220/22 kV transformers needs to be retired. Replacement of the 220/22 kV transformers is not required at this stage and the higher cost ($9M) of this component support the decision not to adopt this component. Not adopted in SP AusNet solution
GENERAL COMMENT This option allows for 66 kV assets to be decommissioned prior to the redevelopment. The 66 kV ties used for the temporary load transfers can be used as emergency 66 kV ties after completion of the WMTS redevelopment. It requires additional planning approvals and works on CitiPower's network. It requires the load transfers to be completed prior to the transformer replacements at WMTS. The overall schedule to achieve this along with the uncertainty of when planning approvals could allow this option to proceed would expose the Melbourne CBD to unacceptable supply risk. The total incremental cost is estimated at $36M.			

SKM OPTION 1			
Project Component	WMTS Site Location	SKM Redevelopment Component Feature	Recommendation
220 kV switchgear	GIS building on southern side of 220 kV yard between KTS tower and No. 1 Bus	This option requires cable relocations and temporary 220 kV cable to divert the KTS 1 and FBTS 1 lines	This option requires temporary cables, which would increase the project cost compared with the other options considered in the planning and design review. The cost of the additional 220 kV cables for the KTS lines, two transformers, three temporary cables and additional movements of the KTS lines is estimated at $12.5M. Not adopted in SP AusNet solution
66 kV switchgear	Positioned in space vacated by B1 transformer and No. 1 66 kV bus.	Allows 66 kV GIS building to be built in only 2 steps Allows full existing 66 kV yard for cable exit routes	This option requires removal of a number of assets prior to the 66 kV rebuild, which extends the project delivery time frame and project cost. It requires cable connections between transformers and the 66 kV GIS. It does not allow for landscape setbacks. The estimated incremental cost is more than $1.5 M. Not adopted in SP AusNet solution
22 kV switchgear	Positioned between existing No. 3 66 kV Bus and B3 transformers	Utilises space vacated by existing outdoor switchyard	It is not compatible with SP AusNet's fire protection standards. It does not present any cost advantage and the location of the 22 kV building will result in inefficient future augmentation. Not adopted in SP AusNet solution
220/66 kV transformers	Positioned in the location of the existing No. 1 220 kV Bus	Allows development of two transformers once 220 kV GIS is complete	This option delays the ability to begin mitigating the risk of existing transformer failures. It requires one additional transformer enclosure estimated at $0.5M Not adopted in SP AusNet solution
220/22 kV transformers	Remain in the current location	Remain in the current location	Adopted as the most cost effective redevelopment option.
GENERAL COMMENT This option requires more temporary and permanent 220 kV cables at significantly higher cost compared with the other options considered. It locates assets closer to Lloyd Street, which is closer to neighbouring properties. The incremental cost is estimated at $14.5 M.			

SKM OPTION 2			
Redevelopment Component	WMTS Site Location	SKM Redevelopment Component Feature	Recommendation
220 kV switchgear	GIS building on southern side of 220 kV yard between KTS tower and No. 1 Bus	This option does not require as many 220 kV temporary cabling compared to SKM option 1 by using additional temporary overhead 220 kV connections, but requires additional temporary 220 kV switchgear to connect to the transformer bus groups.	The GIS solution is equivalent to SP AusNet's solution. The other parts of this option is not adopted due to the higher cost ($6M) for additional temporary AIS switchgear and additional engineering assessment required to determine if the proposed connections are physically possible within the constraints of the existing plant and connections. Partly adopted in SP AusNet solution
66 kV switchgear	Positioned in space vacated by the B1 transformer and No.1 66 kV bus.	Allows 66 kV GIS building to be built in only 2 steps. Allows full existing 66 kV yard for cable exit routes	This option requires removal of a number of assets prior to the 66 kV rebuild, which extends the project delivery time frame and project cost. It requires cable connections between transformers and the 66 kV GIS. It also does not allow for landscape setbacks. The estimated incremental cost is more than $1.5 M. Not adopted in SP AusNet solution
22 kV switchgear	Positioned between the existing No. 3 66 kV Bus and B3 transformers	Utilises space vacated by the existing outdoor switchyard	Not compatible with SP AusNet's fire protection standards. It does not present any cost advantage and the location of the 22 kV building will result in inefficient future augmentation. Not adopted in SP AusNet solution
220/66 kV transformers	Positioned in the location of the existing No. 1 220 kV Bus	Allows development of two transformers once 220 kV GIS is completed	This option delays the ability to begin mitigating the risk of existing transformer failures. It requires one additional transformer enclosure estimated at $0.5M Not adopted in SP AusNet solution
220/22 kV transformers	Remain in the current location	Remain in the current location	Adopted as the most cost effective option.
GENERAL COMMENT This option requires more 220 kV cables and the 66 kV connections are more difficult due to the 66 kV GIS building orientation. It will cost more than SP AusNet's option ($8M) and will require noise mitigation measures and visual amenity treatment to ensure a planning permit can be obtained as the assets are located close to the Lloyd Street site boundary.			

Table 2: WMTS Redevelopment - Optimisation of Design Proposals

5.6 SP AusNet Redevelopment Option

SP AusNet's redevelopment option has been developed from the components of the options presented by the consultants by refining and optimising each of the redevelopment components to minimise cost and supply risk during construction, whilst ensuring that a safe work environment is maintained throughout the project.

It can be constructed on the northern and north-western parts of the WMTS site and does not need new plant or infrastructure to be established in the areas planned to be used by the road and rail projects. It includes the following:

- 220 kV GIS installed in a dedicated building located at the south-western edge of the existing 220 kV AIS yard between the existing Keilor line tower and the no. 1 220 kV Bus
- three new 225 MVA 220/66 kV transformers located along the existing transformer access road

- New 66 kV GIS installed in dedicated buildings located between the existing 66 kV GIS building and 22 kV switchroom, with the other 66 kV GIS buildings progressively constructed across the vacated 66 kV AIS yard.
- 22 kV GIS installed in a dedicated building

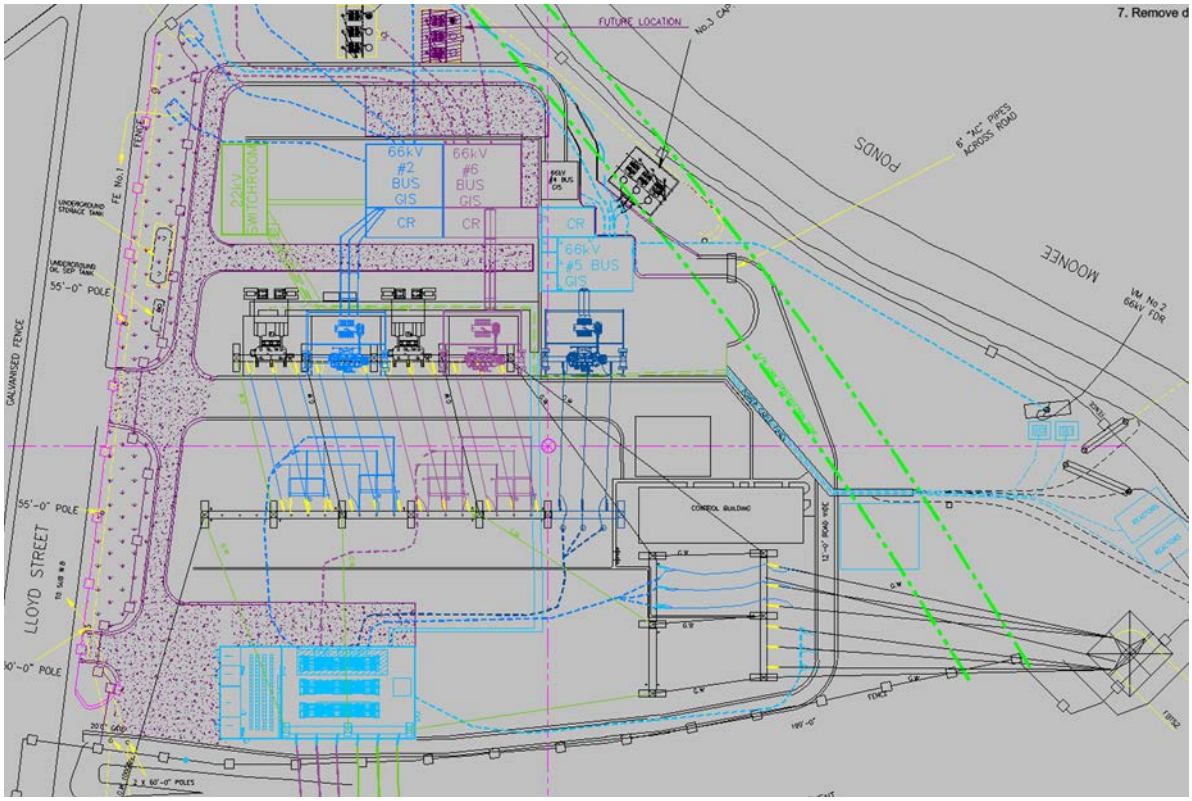


Figure 11: SP AusNet September 2013 Redevelopment Plan

The September 2013 preferred redevelopment option has some similarities with the GIS redevelopment proposed in SP AusNet's February 2013 revenue submission. It also uses compact GIS for all three voltages (220 kV, 66 kV and 22 kV), but places the GIS buildings and transformers in different locations to avoid those areas constrained by the road and rail projects.

The total estimated cost of this option is $206.7 M (total cost including overheads, finance charges and distribution line relocation cost of $23 M). The estimated direct cost is $165.4 M (including $23 M for distribution line relocations), which is about $16.9 M more than the total estimated cost ($125.5 M direct) of the WMTS GIS Redevelopment Option in SP AusNet's February 2013 Revenue Proposal.

The optimised option delivers the project by the end of 2019 which is a 2 year deferral compared with the timing in SP AusNet's original Revenue Proposal submitted in February 2013. A summary of the project plan is included in Appendix C.

It is the most economical solution ($206.7 M) that can be delivered by 2019, as detailed in the project timeline included in Appendix C, for the following reasons:

- It can be constructed within the existing WMTS site and does not require acquisition of additional land or a fundamental change to the four 220 kV line connections to Keilor and Fishermans Bend Terminal Stations.
- It does not permanently infringe on the East West Link easement or construction zone, with only one transformer to be temporarily located partly in the road construction area in the

early stages of the WMTS Redevelopment Project. Whilst the alignment of the underground railway tunnel is not well defined at this stage it will not result in material additional cost to avoid the indicative alignment.

- It introduces minimal supply risk during the construction phase of the project; consistent with SP AusNet's terminal station redevelopment practises that have been successfully applied at more than fifteen other terminal station redevelopment projects
- This option does not significantly deviate from the planning permit approved for the WMTS redevelopment consistent with clause 6A.6.7 part (2) of the NER. Approval of a revised planning permit will not result in project delays[16].

5.7 WMTS Redevelopment Design Optimisation Conclusion

Table 3 below summarises the direct cost of the options considered; demonstrating that the optimised option developed by SP AusNet with GHD's assistance is the most cost efficient option.

Option	Direct Cost
Greenfield redevelopment Like SKM Lorimer Street	More than $300 M
Aurecon 2	$178 M
Aurecon 1	$174 M
SKM 1	$157 M
SKM 2	$150 M
Beca	$147 M
SP AusNet	$142.4 M

Table 3: WMTS Redevelopment Cost Comparison[17]

The conclusions from this analysis are:

- The three on-site redevelopment options; Beca, SKM 2 and SP AusNet's optimised option, are very similar in cost.
- The SP AusNet optimised option is the least expensive as it has undergone a process of refinement and optimisation. The redevelopment option will cost between $5 M and $36 M less than the other brownfield redevelopment options considered in the planning and design review. It will also cost significantly less than any of the green field redevelopment options.
- Rebuilding the same facilities at a different site is possible but uneconomic because of the significantly higher cost for line relocations (220 kV, 66 kV and 22 kV), site establishment costs, and land procurement costs. All these components are required for a greenfield redevelopment option. This conclusion is consistent with the conclusion reached at the planning stage, which considered and set aside both AIS and GIS greenfield redevelopment options[18] as uneconomic.

16 Planning Permit, TP-2013-142, City of Melbourne, 4 June 2013
17 The cost excludes the cost of feeder relocation work estimated at $23M.
18 West Melbourne Terminal Station – Terminal Station Redevelopment Planning Report, May 2012.

6 GIS Cost Comparison

A significant part of the WMTS redevelopment project cost will be for GIS (220 kV, 66 kV and 22 kV). SP AusNet has tender prices for GIS and has gained valuable experience from the RTS Redevelopment and BTS augmentation projects, which are also using GIS similar to that proposed for WMTS.

SP AusNet has also prepared planning estimates for the redevelopment of Heatherton Terminal Station (HTS) and Springvale Terminal Station (SVTS) using GIS. A comparison of the cost estimates are shown in Table 4 below.

Terminal Station	Direct Cost (Real 2013-14)	No. of Transformer	No. of line connections	No. of Circuit Breakers
WMTS	P50 Direct: $142.4 M	• 3 x 225MVA 220/66kV transformers	• 2 x 220kV KTS lines • 2 x 220kV FBTS lines	• 12 x 220kV CBs • 22 x 66kV CBs • 17 x 22kV CBs
RTS	P50 Direct: $125.5M	• 3 x 225MVA 220/66kV transformers	• 2 x 220kV ROTS lines • 1 x 220kV BTS line	• 9 x 220kV CBs • 21 x 66kV CBs • 22 x 22kV CBs
HTS	P50 Direct: $131.5M	• 3 x 150MVA 220/66kV transformers	• 2 x 220kV SVTS lines	• 9 x 220kV CBs • 21 x 66kV CBs
SVTS	P50 Direct: $169.8M	• 4 x 150MVA 220/66kV transformers	• 2 x 220kV ROTS lines • 2 x 220kV HTS lines	• 12 x 220kV CBs • 29 x 66kV CBs

Note: The HTS and SVTS GIS estimates are indicative estimates used for planning purposes.

Table 4: GIS Cost Comparison

7 Baseline Risk

7.1 Introduction

The condition of the switchgear and transformers at WMTS presents safety and supply risks and were the key business drivers for SP AusNet's Board to approve the redevelopment of WMTS[19]. The WMTS baseline risk and the economical project time has been reassessed as part of the planning based on the latest demand forecast and CitiPower's latest plan to transfer load from WMTS 66 kV to Brunswick 66 kV and from WMTS 22 kV to WMTS 66 kV.

7.2 Obligation and Assumptions

The *Electricity Safety Act 1998* requires SP AusNet to design, construct, operate, maintain and decommission its supply network to minimize as far as practicable the hazards and risks to the safety of any person arising from the supply network[20].

In practice this means safety risk should be proactively managed until the cost to manage the safety risk becomes disproportionate to the benefits[21]. [C-I-C].

The following assumptions, consistent with those used in other SP AusNet planning reviews, were used to monetise the safety, plant collateral damage and environmental hazards presented by the plant at WMTS[22]:

- [C-I-C]

- Plant that contains large volumes of oil poses an environmental risk with an average consequence cost of $30 K
- Plant collateral damage, including consequent supply outages, is on average $1 M per event

The likelihood of the above hazards at WMTS are based on the major failure rates defined in the power transformer, circuit breaker and instrument transformer risk models and the assumption that only 1 in 20 major failures of a minimum oil or bulk oil circuit breaker and 1 in 5 major failures of an instrument transformer will present a safety, collateral plant damage or environmental hazard[23].

7.3 Monetised Safety, Plant Collateral Damage and Environmental Risk

The expected safety, plant collateral damage and environmental risk cost at WMTS is shown in Figure 12. It is expected that this risk will increase over time as the condition of the assets deteriorate and the consequences of failure also increase.

19 WMTS Redevelopment Business Case, April 2012 and WMTS Redevelopment Planning Report, May 2012
20 Section 98
21 Practical application of SFAIP in project specification SP AusNet 2012
22 Transmission Planning Assumptions
23 Transmission Planning Assumptions

The 22 kV metalclad switchgear presents the greatest safety hazard due to its condition and inability to comply with contemporary arc fault containment standards. The 220 kV minimum oil circuit breakers, 66 kV bulk oil circuit breakers, 66 kV instrument transformers and 220/66 kV transformers also present a safety risk and plant damage risk should they fail explosively.

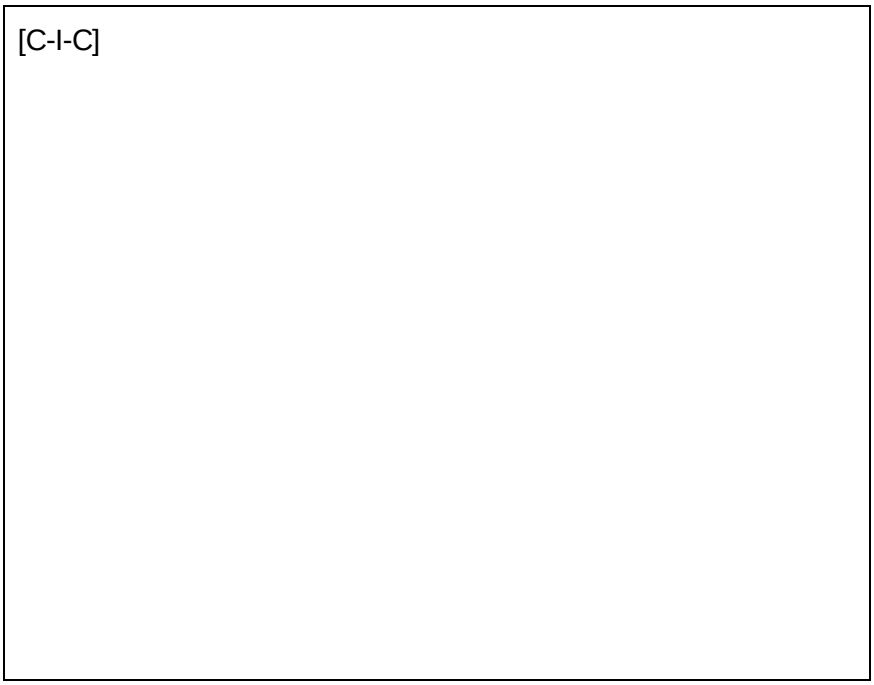


Figure 12: Monetised Safety, Environmental and Plant Collateral Damage Risk

7.4 Monetised Supply Risk

An outage of any one of the 220/66 kV transformers during the high demand period will result in an electricity supply interruption to many consumers, including Melbourne's CBD, when peak demand exceeds the N-1 transformer capacity at WMTS. Feeder or bus tie circuit breaker failure could also affect the reliability of the supply from WMTS.

The expected supply risk at WMTS has been calculated based on the condition of the assets, their expected failure rate and the Value of Customer Reliability (VCR) of $99,850/MWh and is presented in Figure 13 below.

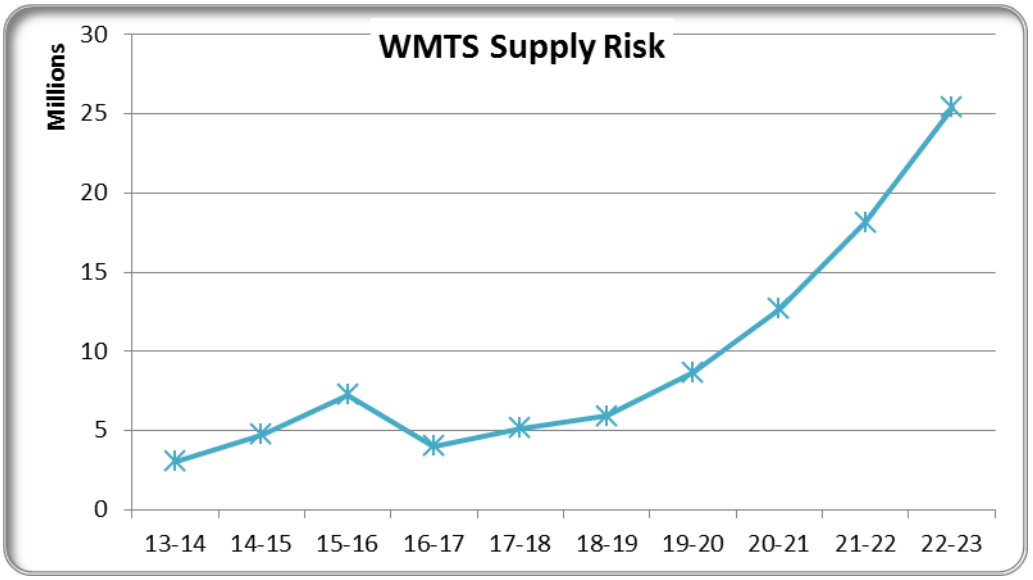


Figure 13: Monetised Supply Risk

The reduction in supply risk in 2016-17 is due to CitiPower's planned load transfers from WMTS to BTS, which will reduce the amount of load at risk at WMTS. CitiPower's planned load transfers from WMTS 22 kV to WMTS 66 kV will, however increase the supply risk at WMTS due to the deteriorated condition of three of the four existing 220/66 kV transformers.

7.1 Monetised Baseline Risk

The baseline risk for WMTS is illustrated in Figure 14. It summates the risk involved with safety, collateral damage and security of supply.

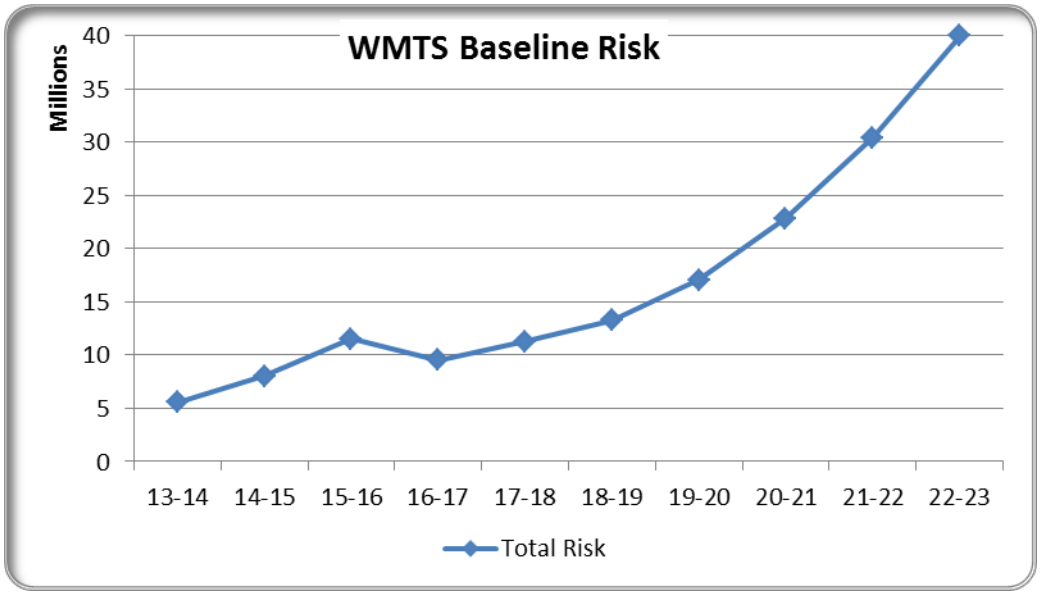


Figure 14: Monetised Baseline Risk

8 Economic Evaluation

The economical timing of the WMTS redevelopment has been reassessed based on AEMO's 2013 demand forecast, which is lower than the demand forecast used in the business case approved in 2012.[24] Sensitivity studies have also been done to test the project economical timing for different discount rates, demand growth scenarios and asset failure rates.

The updated economic evaluation shows that the annual project benefits exceed the annual cost in 2019 and that it would be prudent to complete the project before the high demand period in the summer of 2019/20. The planning review of the economic costs and benefits hence supports the business case and investment decision to proceed with the project to ensure a timely completion based on a project lead time of six years.

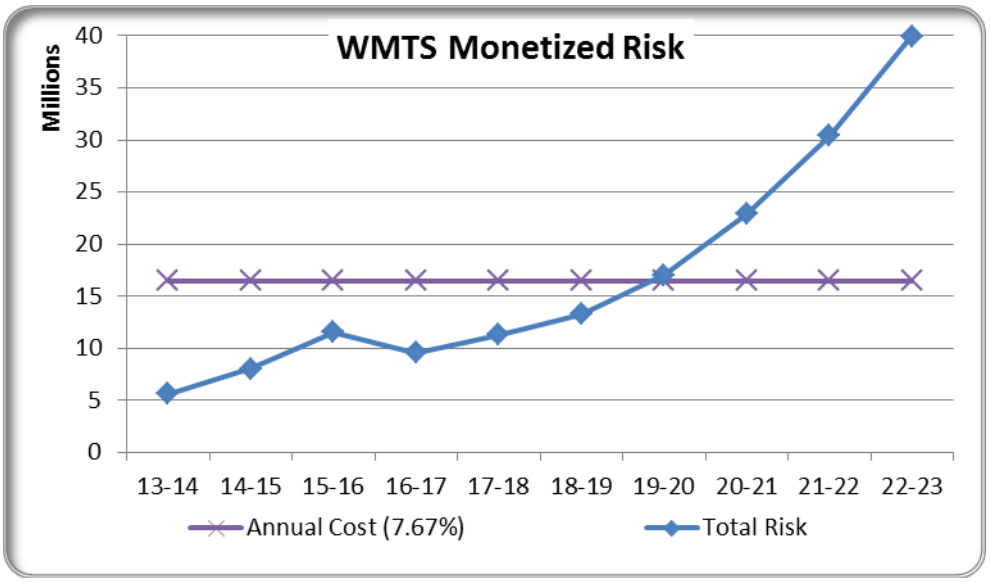


Figure 15: WMTS Redevelopment Economical Timing

8.1 Sensitivity Studies

The economical timing of the WMTS redevelopment has been tested for changes in the input assumptions such as discount cash flow rate, demand growth scenarios (high, medium and low) and asset failure rates (+50% and –50% of the base case). Later than expected completion of the BTS 220/66 kV augmentation project, which will result in delays to the planned load transfers from WMTS to BTS and increased supply risk at WMTS, has also been included in the sensitivity studies.

The sensitivity study results are shown below. They demonstrate that the outcome is sensitive to asset failure rate and the completion date of the BTS 220/66 kV augmentation project.

[24] The economic evaluation uses the combined cost of the WMTS redevelopment and the additional costs related to distribution feeder relocation at WMTS. This combined cost estimate is provided at Appendix B, along with the estimated cost of the project excluding additional costs.

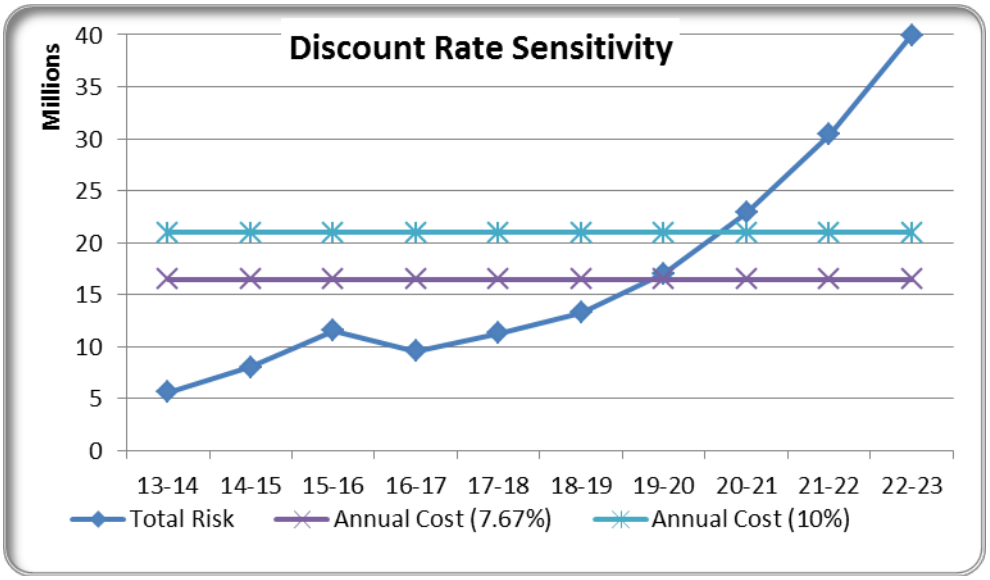


Figure 16: Discount Rate Sensitivity

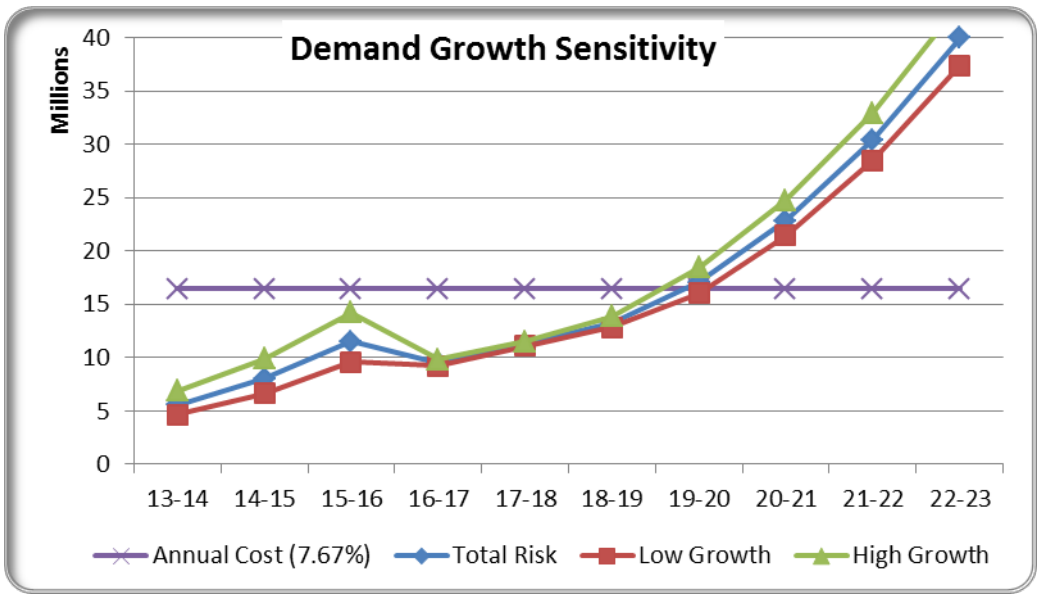


Figure 17: Demand Growth Sensitivity

Figure 17 shows that the timing of the project is not sensitive to changes in the rate of demand growth for AEMO's low, medium and high demand growth scenarios.

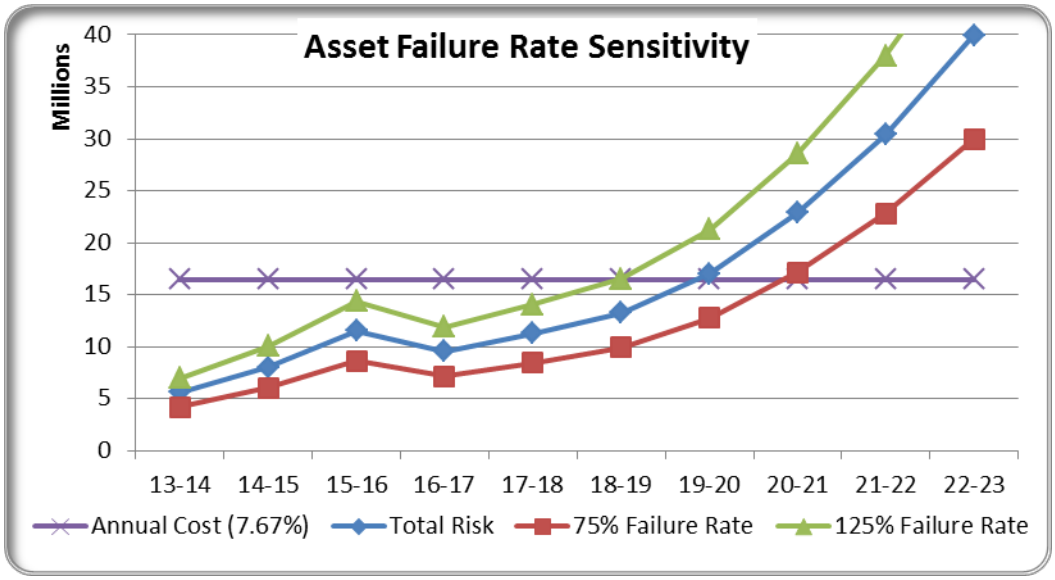


Figure 18: Asset Failure Rate Sensitivity

The NER require SP AusNet to propose the total forecast capital expenditure it considers is required to achieve the capital expenditure objectives.[25] The AER must approve the forecast if it is satisfied that the forecast reasonably reflects, amongst other things, the costs that a prudent operator in SP AusNet's circumstances would require to achieve the capital expenditure objectives. Whilst the project economical timing is sensitive to equipment failure rates, SP AusNet considers that, in the present circumstances, a prudent operator would complete the replacement of these assets before 2019/20.

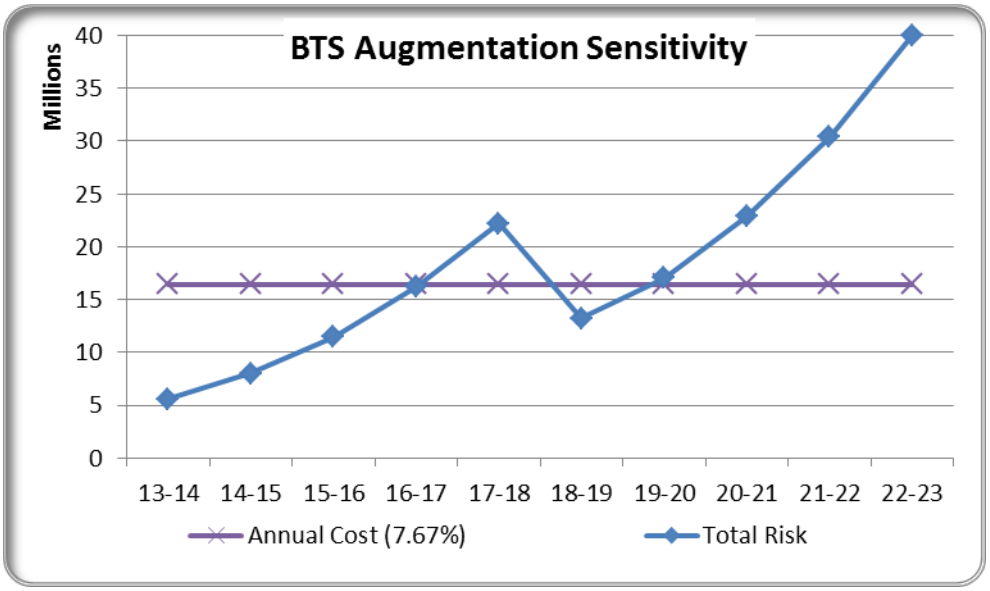


Figure 19: BTS Augmentation Sensitivity

A two year delay to the completion of the BTS project (from end 2015 to end 2017) will increase the risk at WMTS significantly as shown in Figure 19. This is due to planned load transfers from WMTS to BTS that will have to be deferred to after the summer of 2017/18, resulting in significantly higher supply risk at WMTS.

25 NER 6A.6.7(a).

9 Conclusion

SP AusNet assisted by consultants GHD, BECA, Aurecon and SKM has reviewed the redevelopment of WMTS following LMA's advice that the East West Link project will constrain the proposed redevelopment of the WMTS site.

Several innovative alternative redevelopment options have been assessed based on their feasibility, cost effectiveness, constructability and introduced supply risk. SP AusNet has drawn the following conclusions from the WMTS planning and design review:

- A new robust redevelopment option that complies with SP AusNet's terminal station redevelopment standards has been identified that can be implemented on the existing WMTS site and completed by 2019 before the supply and safety risk becomes excessive.
- The redevelopment of WMTS on the existing site and outside the areas proposed for the future East West Link and planned Melbourne Metropolitan Rail Tunnel is practical and cost efficient when compared with other feasible redevelopment options.
- The cost of the new redevelopment option is marginally more expensive compared with the Approved WMTS Redevelopment Plan submitted to the AER in SP AusNet's revenue proposal.
- The September 2013 Redevelopment Plan will deliver the same functionality and benefits as the WMTS Redevelopment Plan approved by SP AusNet's Board in 2012.
- Air insulated switchgear (AIS) cannot be used for this redevelopment due to the new space constraints imposed on this site.

10 APPENDIX A: Letter from the Linking Melbourne Authority

LINKING MELBOURNE AUTHORITY

15 July 2013

Mr K Karafotias
Manager, Program Delivery
SPI Powernet Pty Ltd (trading as SP AusNet)
Level 31, 2 Southbank Boulevard
SOUTHBANK VIC 3006

Dear Mr Karafotias

THE EAST WEST LINK ROAD PROJECT
297-307 ARDEN STREET, KENSINGTON

I am writing to provide you with an update regarding the East West Link road project and, in particular, the planned release of the detailed design which will be used during the planning approvals process over the next few months.

Linking Melbourne Authority is the government agency responsible for delivering the East West Link. Since late 2012 we have been conducting investigations that have informed the design. We are now able to release details of the proposed route and key features including on and off ramps, details of where the tunnel will surface at either end of the roadway, and how the design allows for existing and future public transport developments.

Importantly for you, this detailed design identifies that your property is likely to be required for construction of the East West Link. I have included a map of the proposed project corridor to illustrate this.

I would like to emphasise that this design is not yet finalised. It may be amended following consultation over the next few months with the community, relevant regulatory authorities and ultimately potential builders of the project. Despite this, it is important that you be aware of the potential impacts so that you understand your rights and have the opportunity to participate in the planning process.

I would also like to emphasise that this letter is not a formal notice of property acquisition; we will be in a position to advise if this is to occur in early to mid-2014, which is when we expect the planning process will be completed. Please be assured however, that should this be the case the *Land Acquisition and Compensation Act 1986* provides a fair compensation process. I have included a brochure that explains some of the elements of the Act.

I encourage you to make contact with David McQuilton at Linking Melbourne Authority on 0401 839 025 so that we can arrange to meet with you at your convenience to explain things in more detail, answer your questions and understand your particular situation.

I appreciate this letter may raise questions and concerns for you, but please be assured we will be doing all we can to provide you with information and regular updates as the project progresses. I have attached a fact sheet explaining the next steps for the project, including the necessary work that is required before construction can commence.

Finally, if you no longer have an interest in this property or know of others who should be made aware of the information in this letter, such as a managing agent, tenant or landlord, I would appreciate it if you would contact us so we may update our records.

Yours sincerely

Ken Mathers
Chief Executive Officer

If you require the assistance of an interpreter please phone (03) 9280 0753

State Government Victoria

Ref. ID 3038

Building 1, Level 1, Brandon Business Park, 540 Springvale Road, Glen Waverley, Victoria 3150
contact@lma.vic.gov.au T 03 8562 6800 F 03 8562 6899 www.linkingmelbourne.vic.gov.au

EAST WEST LINK
Indicative alignment - final location to be determined

Property Plan

ADDRESS: "NATIONAL ELECTRICITY SUBSTATION" 297-307 ARDEN STREET KENSINGTON

PLANNING ZONE: INDUSTRIAL ZONE 1

LOT/PLAN NO: 1/TP18018

TITLE: CT 7945/143

LINKING MELBOURNE AUTHORITY

SUBJECT PROPERTY LOCATION

Date Prepared: 15-07-2013. ID 3038
Linking Melbourne Authority. W www.linkingmelbourne.vic.gov.au T (03) 8562 6800 E contact@lma.vic.gov.au

East West Link

The Victorian Government is proceeding with plans to develop the first stage of the East West Link from the Eastern Freeway to CityLink, with consideration also being given to a further stage alongside CityLink to the Port of Melbourne area. Linking Melbourne Authority is the government agency planning and delivering the project on behalf of the Victorian Government.

One of our priorities is making sure that landowners in the project area are aware of the planning and consultation process underway as well as the potential for impacts. We encourage landowners to get in touch with us directly to discuss their views and concerns about the project. We are commonly asked about timeframes for the project and it's important to note that there are a number of steps before construction can start. The table below outlines these steps as well as some indicative timeframes:

July 2013	Release of a project design which identifies properties likely to be impacted by the road. This provides an indication to people, however it is not set in stone as engineering and planning work is continuing. It is also possible that the construction company engaged to build the project comes up with other ideas to minimise impacts.
July 2013	The construction and financing companies are invited to express interest in building the project. This is the very first step in the tendering process.
November 2013	The Comprehensive Impact Statement (or planning documentation) will be on display for public feedback, including details on the final recommended project design, benefits and potential impacts. Public submissions are invited and encouraged.
Early 2014	An Assessment Committee will consider community and other submissions as well as the planning documentation before making recommendations on the final project.
Early to mid 2014	Subject to planning approvals, we would formally commence acquisition by serving a Notice of Intention to Acquire to owners and occupiers. After this point, Linking Melbourne Authority would pay for all reasonable expenses directly arising from the acquisition including legal and valuation fees. Residents would be given as much notice as possible to vacate their properties once this acquisition process commences. Compensation negotiations will take into account the unaffected market value of the property (assuming the project did not exist) as well as reasonable additional allowances such all moving costs and replacement property expenses including stamp duty for a new property. For businesses, the compensation would also consider relocation costs and business losses directly arising from the acquisition. We would negotiate possession timeframes for businesses based on the circumstances of each business and project requirements.
Late 2014	Construction would commence.
2019	Anticipated project completion.

More information

For more information about the East West Link:
Visit: www.linkingmelbourne.vic.gov.au
Phone: (03) 8562 6800
Email: contact@lma.vic.gov.au

If you require the assistance of an interpreter please phone (03) 9280 0753

Connect with us

You can connect with LMA via our social media channels:

@LinkingMelb LinkingMelbourne /LinkingMelb Join the online conversation www.linkingmelbourne.vic.gov.au

www.linkingmelbourne.vic.gov.au

LINKING MELBOURNE AUTHORITY Victoria

Authorised by Linking Melbourne Authority, 540 Springvale Road, Glen Waverley 3150

11 APPENDIX B: WMTS Redevelopment Cost Estimate

[C-I-C]

[C-I-C]

12 APPENDIX C: WMTS Redevelopment Project Plan and Timeline

[C-I-C]

13 APPENDIX D: WMTS Greenfield Redevelopment Options

In 2012, SP AusNet considered two green field redevelopment options (GIS and AIS) for the redevelopment of WMTS on a new site. The high level scope of work for these two green field redevelopment options are shown below.

The study assumed that a suitable site can be procured near the existing WMTS site and the existing 220 kV transmission lines to present the best possible green field option at the lowest cost. The cost for the two greenfield redevelopment options was estimated at $380.6 M for GIS and $353.4 M for AIS.

None of the green field WMTS redevelopment options presented a more cost effective option compared with brownfield redevelopment, provided the supply security risk during the construction phase of the brownfield redevelopment project is not unacceptably high. The green field redevelopment options were estimated to cost about two times as much as the brownfield redevelopment options.

OPTION: Greenfield AIS

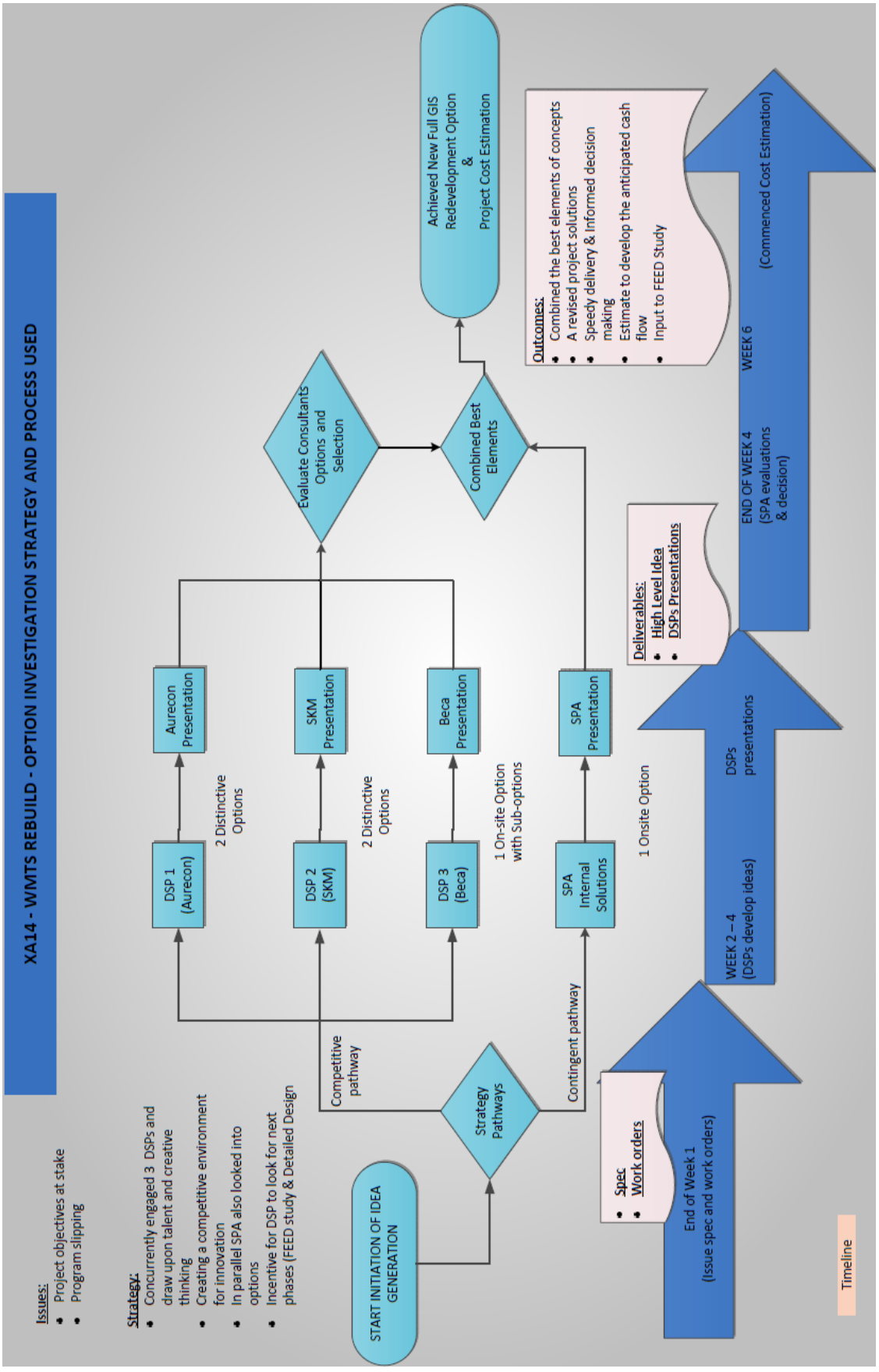
- Land Purchase: land size 185m x 201m
- 220kV Switchgear: Supply and installation of four bays of 220kV air insulated switchgear in a breaker and a half configuration. This will comprise twelve circuit breakers, twenty four motorised isolators & earth switches, voltage and current transformers in a two bus AIS arrangement and associated secondary and communication equipment. Equipment will be rated at a nominal 220kV, 4000A with a 50kA fault level.
- 66kV Switchgear: Supply and Install 27 x 66kV AIS panel in double bus arrangement
- 22kV Switchgear: Supply and Install 17 x 22kV AIS panel in double bus arrangement
- Transformers: Supply and Install 3 x 220/66kV 225MVA and 2 x 220/22kV 165MVA associated secondary and communication equipment.
- 66kV Cap Bank: Supply and Install 4 x 50MVAr and associated secondary and communication equipment
- Earth Grid and Lightning protection: Installation of new earth grid rated for 40kA and lightning masts
- 220kV Lines: Supply and Install new power for all 220kV Lines
- 66kV Feeder Exit: Supply and Install new power cable for all 66kV Feeders
- 22kV Feeder Exit: Supply and Install new power cable for all 22kV Feeders

OPTION: Greenfield GIS

- Land Purchase: land size 110m x 132m
- 220kV Switchgear: Supply and installation of four bays of 220kV gas insulated switchgear in a breaker and a half configuration. This will comprise twelve circuit breakers, twenty four motorised isolators & earth switches, voltage and current transformers in a two bus GIS arrangement and associated secondary and communication equipment. Equipment will be rated at a nominal 220kV, 4000A with a 50kA fault level. Eight sets of bus duct will be provided to enable connection to the 220kV GIS.
- 66kV Switchgear: Supply and Install 27 x 66kV GIS panel in double bus arrangement
- 22kV Switchgear: Supply and Install 17 x 22kV GIS panel in double bus arrangement

- Transformers: Supply and Install 3 x 220/66kV 225MVA and 2 x 220/22kV 165MVA and associated secondary and communication equipment.
- 66kV Cap Bank: Supply and Install 4 x 50MVAr and associated secondary and communication equipment
- Earth Grid and Lightning protection: Installation of new earth grid rated for 40kA and lightning masts
- 220kV Lines: Supply and Install new power for all 220kV Lines
- 66kV Feeder Exit: Supply and Install new power cable for all 66kV Feeders
- 22kV Feeder Exit: Supply and Install new power cable for all 22kV Feeders

14 APPENDIX E: Planning and Design Review Process Map



15 APPENDIX F: SP AusNet Redevelopment Option Layout drawings