363 Wellington Street Perth WA 6000
GPO Box L921 Perth WA 6842
T: 13 10 87 F: (08) 9326 4595
TTY: 1800 13 13 51 TIS: 13 14 50
www.westernpower.com.au
Electricity Networks Corporation ABN 18 540 492 861

Guildford Terminal to Southern Terminal 330 kV Transmission Reinforcement

Frequently Asked Questions: 6 and 29 October 2009 and 9 February 2010

The questions have been grouped into the following themes to allow for ease of accessing the information: Technical, Easements, Environment, Underground Cable and Social.

Technical

1. What is the required in service date?

Currently 2017 is the required in service date however this will be dependent on load growth, demand side management solutions and other bulk transmission projects being undertaken. Western Power however plans to have the selected option and all associated statutory approvals in place by the end of 2012.

2. Why is the line needed?

As the loading of the South West Interconnected System (SWIS) increases, it approaches a system limitation, especially at the main terminal stations Northern Terminal (Malaga) and Southern Terminal (Bibra Lake). The long 330 kV transmission lines that comprise Western Power's bulk transmission network are constrained by voltage limitations. The transfer of power from generation in the South West to the load centre (the Perth metropolitan area) requires substantial reactive support at the bulk load supply points. Increasing the loading of these 330 kV lines will significantly increase the reactive power required to maintain stable network operation.

3. Is this a done deal? Do you already have a preferred option in mind?

No, this is not a done deal.

Western Power registered the easement with provision for a second transmission line alongside the existing line. Given that the easement was registered over 30 years ago, Western Power will undertake all necessary investigations to identify whether this is still the most suitable option.

4. What are the criteria for evaluating the best options?

Western Power must seek approvals from a number of agencies prior to implementation of any option. These include the Environmental Protection Authority and the Department for Environment and Conservation. The proposal also needs to go to the Economic Regulatory Authority and be able to demonstrate the selected option delivers maximum benefit along the life of the asset, which includes social, economic and environmental consideration.

5. **Where does the proposed substation (Brookes Terminal) fit into this project?**

There is no current plan to establish a terminal at this location. The need for a terminal will depend on future consumption and demand patterns.

6. **What is the benefit of using tubular poles?**

Tubular poles have a smaller footprint (the base of the tower occupies less area) however they have similar maintenance requirements.

7. **What percentage of the line is made up of delta towers?**

Of a total of 166 structures, 68 are delta towers (41% delta structures)

8. **Can you get a different option for the two delta tower sections?**

Yes, there is no requirement for the two delta sections to consist of the same tower, pole or line (overhead or underground) type.

9. **How high are the delta and double circuit towers?**

The delta towers range from 22.0m - 34.2m in height.

The double circuit towers range from 42.2m - 57.0m in height.

10. **Now there is high density and land values, does Western Power take this into consideration when reviewing the options?**

Yes, social issues such as the impact on local residents are taken into consideration.

11. **What impact could self-generation of power have in the need for changes to these powerlines? Is the money better spent in this area?**

An increase in self-generation throughout the South West Interconnected System has the potential to delay the need for a these reinforcements works. The purpose of the Guildford Terminal to Southern Terminal 330 kV transmission line project is to cater for load (power demand) growth within the metropolitan area. If the rate of load growth were to decline due to more widespread self-generation, the requirement for a new line may be deferred.

12. **What is world's best practise in high voltage transmission lines?**

The best practice available is reducing the need for transmission lines through the use of demand side management (reduced consumption and local generation of electricity).

13. **Does Western Power have a capital expenditure budget and who pays for these works?**

Yes, Western Power has a capital expenditure budget which is funded by the State's Department of Treasury and Finance.

14. **Will Western Power consider utilising the line that runs north of Champion Lakes and goes over Victoria Falls?**

The line referred to here is the Kwinana – Northern Terminal / Muja – Northern Terminal double circuit 330 kV transmission line. This line and the Guildford Terminal to Southern Terminal 330 kV transmission line are only in close proximity to each other for a distance of 6 kilometres therefore constructing the proposed Guildford Terminal to Southern Terminal 330 kV transmission line alongside the double circuit line would significantly increase its length.

The easement registered over this line is 60 metres in width which is only sufficient to accommodate one set of double circuit structures. As buildings and structures have been built to the edge of this easement, it would not be feasible to increase the width of this easement.

15. Can the substation at the airport (Munday substation) be utilised instead?

The proposed Munday substation is a customer funded substation and will not influence the need to reinforce the 330 kV transmission network.

16. What are the technical considerations when planning a transmission line?

When planning for a transmission line, Western Power needs to consider likely future growth projections for loads, generators and transmission capacity. Considerations for this project have included (but are not limited to):

- Significant growth, expected in local industry;
- Demand for power, projected to grow due to industrial and mining developments;
- Increased power usage by existing customers and growth in local population; and
- Proposed generators, including wind farms wishing to access the market and meet new demand. The proposed transmission line will accommodate these connections.

The transmission line is also important in helping to provide network security. This means that if faults occur in one part of Western Power's overall network, power can then be drawn from other parts.

17. Can existing conductors be upgraded to attain the required supply?

Conductors will help with improved capacity however they do not address the reliability component of the required supply.

18. What is the serviceable life of the delta towers?

Towers are typically built for the 40-50 year life span.

19. What are the airport's regulations on height restrictions?

Airport regulations have the potential to restrict the heights of infrastructure located in proximity to flight paths. The height that this infrastructure is restricted to is dependent on distance from the flight path and the height of the terrain on which the infrastructure is to be installed on.

20. What is the timeframe for getting information from the civil aviation authority about height restrictions?

The information is now available and will need to be considered in conjunction with the aerial profile survey as height restrictions incorporate ground heights. We are currently going through the tender process for the aerial survey.

Easements

21. What is an easement?

An easement provides a right to use the land belonging to another in a particular manner and prevents the owner of that land from using his land in a particular manner.

22. Will there be compulsory acquisition of land? Will there be any remuneration/compensation?

If Western Power proceeds with the option of building a second transmission line adjacent to the existing Guildford Terminal to Southern Terminal transmission line, it is unlikely that it will require additional land. An easement was reserved for this purpose over 30 years ago when the existing transmission line was built. It therefore doesn't need to undertake compulsory acquisition of land as it already has the rights to use the land under the terms of the easement registered on the title.

If additional structures are required within the easement, titleholders would be compensated for the area of land occupied by the structure base, based on applicable valuation principles. The original land owners were financially compensated for the establishment of the easement corridor (approx 30 years ago).

23. When was the easement originally registered?

The timing of the registration of this easement varied depending on when compensation was agreed. The earliest easement registration that took place over this transmission line was in 1974.

24. Can the easement be changed?

Generally no, but in some circumstances changes can be made. This would be assessed on a case by case basis.

25. What are the easement conditions?

The easement conditions are contained within the easement document registered on the title for the land, however you can obtain a copy of Western Power's Standard easement conditions by contacting Western Power.

26. What are the restrictions on my property if I have an easement?

Restrictions are outlined in the relevant easement document registered on the Certificate of Title for the property.

27. How was easement compensation paid?

The easement compensation was assessed by an independent valuer. The valuer must fix the compensation by reference to applicable law and valuation principles.

28. Will compensation be paid to landowners who may get a new tower on their property?

Yes. Compensation will be paid for the area occupied by the footprint of the new tower.

29. How do I know if I have an easement on my property?

The easement is registered on the Certificate of Title for the property.

30. Why didn't I know about the easement and what will it do to property values?

As the easement is recorded on the certificate of title it is expected that the purchaser would become aware of it during their own enquiries. There is also a requirement for real estate agents to do a title search. The agent must find out or verify pertinent facts about the property transaction and promptly communicate them to the potential buyer. This only applies to facts that a prudent agent knows or should know from reasonable enquiry. There may be a course of action if land owners feel their agents did not disclose the term of the easement on their title. Purchasers should seek their own advice if they wish to pursue this matter.

31. Will any of the options affect land/development that is not within the easement?

While there is a need to assess what development may have occurred within the easement, the options under consideration are able to be implemented within the boundaries of the easement. i.e: it is unlikely for there to be any additional affect on land use outside of the easement.

32. Would the easement exist if the line was underground?

An easement would still be necessary for an underground transmission power line however the width of the easement required for cable would be less than that of an overhead line. There may be potential to reduce the width of the current easement if underground cable is used. The decision to reduce the existing easement width would need to be determined based on whether it is prudent to retain the entire easement for any future lines.

33. Is there a commitment by Western Power to reduce/release unused easements?

If an easement is deemed to be no longer necessary – for example, a section of a line has been relocated – it may be surrendered unless it is determined that the easement should be retained due to a future requirement.

Similarly, if the required line clearance (separation between the conductor and structures) can be maintained, it may be possible to reduce the width of that easement.

34. Does Western Power assess the cost benefit to the community if it releases unused easements?

It is unlikely that the cost benefit to the community of releasing unused easements or portions of easements will be factored into the economic criteria of Guildford Terminal to Southern Terminal 330 kV transmission line options analysis. The economic value to the community of the release of any easements would not provide justification for additional project expenditure.

35. If I sell my house do I have to tell potential buyers about the line?

The Real Estate Industry of Western Australia (REIWA) / Law Society Joint Form General Conditions includes warranties and representations for the sale by the seller regarding proposals by an authority that may be likely to materially affect the land. Therefore, if the REIWA joint form is used for the sale, it is likely that the owner will need to communicate the potential for a second transmission line within the easement however the owner of the property will need to seek independent legal advice.

36. When I bought my house the real estate agent didn't tell me about the line, can I sue?

This depends on the particular circumstances of the purchase. Landowners should seek their own advice.

37. Why did Western Power sell the land in the first place, when they had 100% ownership of the land?

Legislation for public works in the 1970s (when the line was constructed) did not allow for the electricity corporation to resume land for the purpose of an easement. An easement was registered on the properties of landowners along the line route that were willing for this to occur. Property owners that were unwilling to have an easement registered on their land were given the option of selling their properties to the electricity corporation. During the mid 1980s during a government review of all land-holdings, SECWA rationalised their land holdings with all land surplus to requirements sold. Easements were registered on SECWA owned properties along this line route after which these properties were sold.

Environment

38. What is the effect on Wildlife?

The existing route passes through a number of environmentally sensitive areas that support a range of flora species and vegetation communities in addition to providing habitat for threatened fauna species. Detailed biological surveys of proposed line route options will be undertaken over the next two–three years to further define the environmental values of the project area. This information, as well as management actions outlining how Western Power will reduce and mitigate impacts to environmentally significant areas, will be incorporated into reports for the Environmental Protection Authority, the Department of Environment, Heritage, Water and the Arts. Western Power will work closely with a range of environmental

stakeholders to ensure that any environmental impacts associated with this project are reduced to the smallest extent practicable.

39. What are the environmental impacts of a second line being constructed?

Information regarding specific environmental impacts of the line can only be provided once the line route is finalised. However vegetation clearing will be required and this has the potential to impact on biodiversity values, fauna habitat, rare flora and vegetation associations, areas of conservation estates, and riparian and wetland vegetation.

40. Will Western Power engage with environmental groups/consultants on the project?

Western Power engages an independent environmental consultancy to asses the environmental values on the proposed impact area and to develop recommendations as to how impacts to areas of environmental significance can be minimised.

Western Power will also work with additional environmental stakeholders to obtain environmental approval for the project and to ensure that we have adequate management measures in place to reduce the environmental impacts of the project to the smallest extent practicable.

41. Will birds fly into the line?

There is the potential for bird collisions with the transmission line. Western Power seek recommendations from its fauna consultant as to which sections of the line have a high risk of bird collision (e.g. near river and wetland area) and if it is considered necessary; bird diverters will be installed along the line.
For more information on bird diverters please go to
http://www.westernpower.com.au/mainContent/Sustainability/Environment/Bird_Diverters.html

42. What vegetation clearing is expected from this project?

Vegetation clearing will be required to allow for access along the line for construction and maintenance purposes. This will allow for tower construction and conductor stringing and to maintain safe electrical clearance between the line and vegetation. Estimations of the area of vegetation to be cleared can only be provided once the line route and tower type is finalised.

43. What is a spring survey?

A spring survey is a biological assessment that this undertaken to determine the environmental values of an area. The biological assessments that are primarily undertaken for WP projects include flora and vegetation, fauna and dieback surveys.

The term Spring Survey is used as biological assessments and are primarily undertaken in the spring months when the majority of plants flower, making them easier to identify and when most fauna species are highly active.

Biological assessments are undertaken to gather information that may be used in a number of ways;

- Line route or site selection and/or sustainability assessments;

- Determination of the significance of the environmental impact a project may have on an area. This information is included in statutory approval documents that are developed for submission to a variety of government agencies including the Environmental Protection Authority, the Department of Environment and Conservation and the Department of Environment, Heritage, Water and the Arts.
- Development of management actions that are incorporated into project specific environmental management plans.

44. What will it look like?

The most efficient and economic design for the transmission line is lattice steel structures. This is one option that Western Power is investigating. Structures vary in height depending on the restrictions from the airport and have span distances of 400 – 500 metres.

45. What will Western Power do about the visual impact?

Western Power recognises that the visual impact of its infrastructure can be a concern to local communities and other stakeholders.

Some section of the line may be visible to users of roads, from dwellings and from recreational areas.

Measures that can be taken to reduce the visual impacts include positioning transmission lines through gullies and along existing fence lines and adjusting structure heights and span distances.

A Visual Impact Assessment (VIA) will be undertaken for this project. The assessment will examine local character, natural areas, heritage areas and landscape value.

Information from the VIA will be incorporated into the environmental approval documentation and process. This may include recommendations on structure placement, structure heights and local screening methods.

Underground Cable

46. Will this project be part of the state undergrounding program?

No, the state undergrounding program relates to the undergrounding of distribution assets (33,000 volts of less). Transmission assets (66,000 volts and above) are not included within this program.

47. Is there any precedence for putting this type of transmission line underground?

There is one example of a section of 330kV cable within Kwinana however this is only 400 metres in length. Underground cable is not as effective in transmitting electricity as overhead line as heat cannot dissipate as freely. The reduced ability to dissipate heat restricts the amount of load that can pass through the line.

48. How much does undergrounding cost?

Typically the establishment of a transmission line as underground cable will cost 4-6 times that of the overhead line option.

49. How long is this solution expected to last? If the existing towers are getting close to their useful life of 40 years, is there a chance to replace/underground the entire line?

The 40 year design life of the structures refers to their maintenance requirements over this duration. Over the 40 year period, minimal maintenance work is expected to be required on the structures. After this 40 year period some maintenance works may be required depending on the state of the structures. The existing Guildford Terminal to Southern Terminal 330 kV transmission line towers are in good condition however it may be identified, after consideration of economic, social and environmental factors, that it is more prudent to replace the towers.

50. How frequently does underground cable have to be replaced?

It depends on the workmanship of the cable during manufacturing and also installation. The cable circuit includes not just the cable itself; it also has joints, terminations and other accessories (such as link boxes, temperature sensing cable and earthing cable).

Under normal service, it is quite rare that we will need to replace the cable or joint. Experience indicates that damage or disturbance arising from third parties site work in the vicinity of the cable is the major factor resulting in the need to replace or repair the cable. Termite attack on cable sheath (revealed in the periodic sheath test) is another factor that may result in the need to access the cable for repair.

51. What is the life expectancy of the cable?

There are two types of underground cable; oil filled which has historically been used for 66 kV cable and XLPE (cross linked polyethylene) which is used for 132 kV and 330 kV cable. We do not use oil filled cables anymore because they are not environmentally friendly due to the possibility of the oil leaking. For XLPE cables the life expectancy is about 40 years under normal operating conditions.

Normal operating conditions mean that the cable is not being overloaded with more current being pushed through it.

52. Why is underground cable so expensive?

Underground cable is more expensive than overhead line conductor due to the extra materials surrounding the copper cable core. The extra materials are the XLPE insulation, metallic sheath and protective layers. The stringent raw material purity requirement and manufacturing process of the cable i.e. the copper itself, also increases the total cost.

In addition, the installation cost which involves excavation, special backfilling and directional drilling contributes to the high cost of underground cable.

53. Is there ongoing maintenance for underground cable?

Western Power inspects and maintains all the transmission underground cable circuits on a regular basis (every 6 to 12 months).

For XLPE cable, the major maintenance will be the periodic sheath test to ensure the integrity of cable sheath. The test point will be via link box without exposing the cable itself. If the integrity of cable sheath is compromised, we will need to locate the fault point and access it for repair.

54. What is the impact on land use for underground power?

Typically, underground cable does not require as wide an easement as an overhead line. 330 kV underground cable is unlikely to be installed in trefoil (which means having 3 phases in a triangular formation to reduce the trench width) due to heat dissipation issues (an inability to dissipate heat affects the overall capacity of the transmission line). The separation required between the three phases of cable that form a circuit is dependent on the Amp rating required for that circuit. The total easement width required for one circuit of 330 kV underground cable in this instance has not been determined however it is expected to be between 11 and 13 metres.

During the installation of cable the land must be cleared and open trenches excavated. For some circuits, transition structures will need to be installed to connect the underground cable to the remaining overhead line circuit. Because of the size of these structures, it may impact on the land use.

55. Is the impact of electromagnetic fields better or worse for underground and overhead cable?

Normally, a higher magnetic field would be measured at ground level when comparing an underground cable and an overhead transmission line, due to the closeness of the underground cable to the ground's surface. The nominal depth for transmission cable circuits is about 1 metre below the ground surface.

Western Power designs transmission underground cable circuits to comply with the National Health and Medical Research Council of Australia's guidelines for continual exposure to electromagnetic fields.

Social

56. Who was invited to the outreach session on 6 October and who was invited to the session on 29 October?

The selection of participants for the meeting held on 6 October was based on an electronic title search of owners with an easement within the Shire of Kalamunda. 110 people were sent invitations by post. This session was based on a desire to answer questions that specifically related to people with easements.

The session held on 29 October included the titleholders from the 6 October session plus a further 140 residents who are not titleholders of an easement but who own land near the easement within the Shire of Kalamunda.

57. Why were landowners without an easement not invited to the first community outreach session?

The first community outreach session was part of a series of planned sessions that have included and will include people with and without easements on their titles. The selection of participants for this meeting was based on an electronic certificate of title

search for people with easements, and as such did not pick up residents 'near' the easement.

The decision to hold this session was based on a desire to answer questions that specifically related to landowners affected by the easement.

58. What happened to the SEC promise (1985) to use a route down Roe Hwy.

Western Power is not aware of any agreement to use Roe Highway for the purpose of a future transmission line between Guildford Terminal and Southern Terminal.

A Western Power overhead 330 kV transmission line was previously installed within a section of Roe Highway between Kenwick Link and Kwinana Freeway. This is the Southern Terminal to Kenwick Link transmission line.

The use of the controlled access highway road reserve for such a purpose has only previously been approved by Main Roads WA when it has been demonstrated that there is are no other feasible options available. The placement of the transmission line would also be dependent on how it can fit in with future Main Roads WA and Department of Planning and Infrastructure requirements.

Generally, Main Roads would not be willing to grant the use of the road reserve until such matters are thoroughly investigated and considered and only as a last resort.

59. What are the health effects of electromagnetic fields emitted by the transmission line?

Power frequency electromagnetic fields (EMFs) are a natural by product of electricity and are found where ever electricity is used. There are two components of EMF, the electric field, which is related to the voltage or pressure which forces electricity along the wires and the magnetic field, which is related to the current or the flow of electricity.

Over the past 35 years, more than a thousand studies have been conducted to examine the potential health affects from exposure to EMF. These studies have assessed both electric and magnetic fields, however the primary focus of the EMF health debate has focused on the magnetic field component. There are some studies that suggest that there is a link, some that do not, and others that raise more questions. On the balance of all the research, the scientific evidence does not indicate that exposure to power frequency EMF is a hazard to human health.

It is important to note that EMF levels dissipate rapidly to negligible levels as you move away from the source.

Powerlines are not the only source of EMF. Some examples of EMF levels are shown below.

- Transmission line, directly under the line – 10 to 200 milliGauss (mG)
- At the edge of the easement – 2 to 50 mG
- Electric blanket – 5 to 30 mG
- Personal computer – 2 to 20 mG

It should be noted that guidelines for human exposure to EMF in Australia are:

- 1,000 mG for continuous 24 hour per day exposure.

- 10,000 mG for a few hours per day (occupational purposes).

Western Power designs, constructs and operates all its powerlines and facilities in compliance with the guidelines recommended by the National Health & Medical Research Council of Australia (NH&MRC). This guideline is currently administered by the Australian Radiation Protection and Nuclear Safety Agency, an agency of the Commonwealth Department of Health charged with the responsibility for developing safety standards associated with electromagnetic radiation, and electric and magnetic fields.

Whilst the EMF health issue will remain dynamic and a concern to the community, Western Power will continue to closely monitor overseas research, and support such research here in Australia through its membership of the Energy Networks Association. It will also continue to take advice from the Australian Radiation Protection & Nuclear Safety Agency and other Australian health authorities on the issue.

60. Will you consider transposing the line to reduce the EMF levels?

Yes this will be considered during the design phase.

61. What role will the community have in the decision making?

This is start of the engagement process and the broader scoping of the project. As more information becomes available there is an intention to communicate with the community about the decision making process.

The community is able to access more information about the project through:

The Western Power website www.westernpower.com.au

Specific link to the Guildford to Southern Terminal page http://www.westernpower.com.au/mainContent/projects/currentProjects/guildford_southern_terminal_transmission_line.html

The Western Power blog site www.youhavethepower.com.au

62. Who can I voice my opinions to about the line?

Western Power is available to answer queries and follow up on concerns regarding this project, or any other. Landowners can contact our team on 13 10 87 or email communityenquiries@westernpower.com.au or write to Western Power, GPO Box L921, Perth WA, 6842.

Other options for landowners who may wish to voice their opinions about the project include:

- speaking with your local Member of Parliament;
- lodging a submission with the Economic Regulation Authority;
- providing comment during the public comment period set by the Environmental Protection Authority during environmental approvals process;
- attending future community outreach sessions.