BEFORE THE COMMISSIONERS APPOINTED BY THE QUEENSTOWN LAKES DISTRICT COUNCIL

IN THE MATTER	Of clause 6 of the First Schedule of the Resource Management Act 1991
AND	
IN THE MATTER	the Queenstown Lakes District Council Proposed District Plan (Stage 3)
BETWEEN	**AURORA ENERGY LIMITED**
	Original Submission 3153

STATEMENT OF EVIDENCE OF JOANNE DOWD

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BRIEF OF EVIDENCE OF JOANNE DOWD

Executive Summary

1. The focus of Aurora's submission in respect of Stream 16 is to enable the types of activities that are currently permitted under the PDP. There are two reasons for this:

   (a) Aurora is proposing to undertake a significant (approximately 400 million) investment in renewing aging infrastructure across the network. A significant number of poles will be replaced across the District, many of which are located within Wahi Tupuna areas and in proximity to waterbodies. The replacement of underground cables involves a much greater level of earthworks compared to the replacement of poles and will easily breach the maximum volume threshold for earthworks.

   (b) It is considered that the existing work Aurora has done to manage works in Archaeological Hazard Areas can be applied to managing works within Wāhi Tūpuna mapped areas. Aurora is continuing to develop its processes with Aukaha to ensure consultation is ongoing and that Kā Rūnaka's concerns are met.

2. The placement of underground cables and overhead lines are already excluded from the maximum earthworks volumes contained in Chapter 25 (Rule 25.3.2.8). It is not explicit in that rule whether "minor upgrading" activities such as the inspection, repair and upgrade of an existing underground cable is included within that rule. I consider that an amendment to Rule 25.3.2.8 by adding "minor upgrading" is an appropriate refinement of Aurora's relief on the variations to Chapter 25.

3. Aurora has a significant number of structures (poles and other small structures) in proximity to waterbodies. There is no ongoing impact on water quality once this infrastructure has been installed and there is no impediment to access to the waterbodies that might inhibit Mahika Kai. There may be sediment discharge as a result of the pole installation, where that pole is located directly within the waterbody, but this is a

temporary and minor effect which is otherwise managed by the rules in the Otago Regional Plan. I consider that the activities which Aurora can undertake as permitted or controlled activities in Rules 30.5.5.1 to 30.5.5.4 can appropriately be excluded. Activities which do not fall within those rules will require resource consent as a restricted discretionary activity though I consider that an additional matter of discretion is required to consider the functional needs of Aurora's infrastructure to give effect to the Strategic Directions contained in Chapters 3 and 6.

Introduction

4. My name is Joanne Dowd, I am the Resource Planning, Property and Environment Manager employed by Aurora Energy Limited (**Aurora**).

5. I set out my qualifications and experiences in my brief of evidence on Streams 17 and 18 filed 29 May 2020. However, for the benefit of the additional panel member who is not involved in those streams I repeat paragraphs [2]-[6] of that evidence below.

6. I hold a masters degree in Town and Country Planning from The Queens University of Belfast, obtained in 1993. I have been a full member of the UK Royal Town Planning Institute since 1997. I have been a member of the Resource Management Law Association since 2006. I sit on the Electricity Networks Association's (**ENA**) Resource and Environmental Planning Forum and I am an ENA representative on the Ministry for the Environment National Planning Template for Network Utilities Working Group. I am also a member of the Women's Infrastructure Network – WIN Otago/Southland. I am employed as Resource Planning, Property and Environment Manager at Aurora. Before that I was employed as the Network Policy Manager with Delta Utility Services Limited. I have been employed in my present position since July 2017 and I have 27 years international planning experience in both the private and public sector.

7. At Aurora, I am responsible for all Resource Management Act 1991 (**RMA**) processes associated with development of the network. Recent projects I have been involved with include the designation and

associated regional council consenting of the Riverbank Road and Camphill Substations in Wanaka; and the Carrisbrook substation in Dunedin. I have also been involved in the consenting of our 33kV asset upgrades at Fernhill and consenting for the installation of our upgraded SCADA communications network which links our various substations within the District. In recent years, I have focused on providing consultancy advice with respect to regional and district plans, utility developments, resource consents and environmental management and environmental effects assessments.

8. As I am an employee of Aurora, I am unable to comply with the Code of Conduct for expert witnesses contained in the Environment Court Practice Note. However, I have prepared this evidence with reference to it. I confirm that I have read the Code of Conduct for expert witnesses contained in the Environment Court Practice Note. I confirm that I have considered all the material facts that I am aware of that might alter or detract from the opinions I express. Unless I state otherwise, this evidence is within the scope of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

9. I have previously given evidence to hearings panel commissioners as part of the Stream 5 hearings on PDP Stage 1 in 2016. That evidence sought amendments to the notified chapters as part of PDP Stage 1, including to Chapters 3, 6 and 30.

10. I was also involved and attended mediations for Aurora in relation to the Proposed District Plan (**PDP**) Stage 1 appeals. I attended mediation on Topic 1 (Subtopic 4): A Resilient Economy, Topic 2 (Subtopic 11): Regionally Significant Infrastructure and Topic 17 (Chapter 30): Energy and Utilities. I reviewed and approved (on behalf of Aurora) the relief relevant to Aurora's appeal in relation to those subtopics and have knowledge of the matters that they relate to.

11. I repeat paragraphs [7] to [21] of my first brief of evidence on PDP Stage 3 which outlines a high-level overview of Aurora's network and its approach to its submission.

12. In preparing this evidence I have reviewed the following briefs of evidence filed on behalf of Kā Rūnaka:

    (a) Evidence of David Higgins;

    (b) Evidence of Michael Bathgate (planning);

    (c) Evidence of Maree Kleinlangvelsloo (planning);

    (d) Evidence of Dr Lynette Carter;

    (e) Evidence of Edward Ellison.

13. I have also reviewed the Section 42A Report of Sarah Helene Picard on behalf of Council on Chapter 39 Wāhi Tūpuna (**section 42A Report**) and the Section 42A Report of Craig Barr on behalf of Council regarding a strategic overview for all of PDP Stage 3.

Scope of Evidence

14. In this evidence I will address the following:

    (a) Outline of Aurora's network.

    (b) Proposed Upgrades to Aurora's network over the next 3 years.

    (c) Aurora's internal processes for managing works in Archaeological Hazard Areas

    (d) Relief sought

        (i) Chapter 25 Earthworks

        (ii) Chapter 39 "Buildings and Structures"

    (e) Conclusion

<u>Outline of Aurora's network</u>

15. In my brief of evidence on Streams 17 and 18 I provided a written explanation of Aurora's network, including the number of properties it provides electricity to and a breakdown of the types of infrastructure that is required to provide electricity like "electricity sub-transmission

infrastructure" (**ESTI**) and "significant electricity distribution infrastructure" (**SEDI**).

16. To assist the hearing panel in viewing the overlap between Aurora's network and the Wāhi Tūpuna overlay Aurora has created a link to its AuroraGIS software which adds the Wāhi Tūpuna overlay on top of Aurora's network. The purpose of this map is to easily view the extent of overlap between Aurora's network and the Wāhi Tūpuna mapped areas. A link to this web map can be found in the footnotes of this document.[1]

Proposed Upgrades to Network

17. Aurora owns a significant amount of assets in the District which it must install, maintain and upgrade to provide a resilient electricity supply to the District. Furthermore, Aurora is the only electricity distribution network in the District with grid-exit points that provide the connection between the national grid and electricity sub-transmission infrastructure.

18. On 12 June 2020 Aurora made an application to the Commerce Commission for a Customised price-quality path (**CPP**)[2]. The purpose of the CPP is to enable it to undertake $383.3 million investment in its network over three years on new assets, network maintenance and operations to deliver and support Aurora's electricity distribution service. This is a 20% increase above the latest three-year period. Of the total expenditure, Aurora plans to invest $227.7million in new assets, which is a 21% increase above the latest three-year period.

19. The reasons for the additional investment over the next 3 years are as follows:

[1] Link to ArcGIS mapping showing Wahi Tupuna Overlay with ESTI and SEDI https://data-qldc.opendata.arcgis.com/datasets/69f9d063bf574933aaf6e43e8165ca8a?fullScreen=true&geometry=168.672%2C-45.056%2C168.837%2C-45.010

[2] Electricity distribution businesses initially start on a Default Price Path (DPP), which relies on relatively low cost approaches for setting price or revenue limits and minimum standards for quality of service. If a business believes the default path does not meet its needs, particularly in terms of future investment requirements, it can apply for a CPP. A customised path is tailored to the company's specific plans and requires us to complete a detailed assessment of its proposal before making a decision on what its price path and quality standards should be.

(a) Address historical under-investment which has resulted in aging and degraded infrastructure.

(b) Maintain elevated levels of infrastructure renewals to manage health and safety.

(c) Growth and security investments to support regional growth and to provide the capacity for new customer connections. (I note here for completeness that a portion of growth investments have been deferred due to the expected impact of the Covid-19 pandemic).

20. Most of Aurora's three-year CPP spend will seek to renew aging infrastructure. A large proportion of the network was constructed during the 1950s-70s and, as many assets have an expected life of 50-60 years, a large proportion of the network has already or will soon become due for renewal. Information on poles in proximity to waterbodies at **Attachment 2** highlights some of the aging infrastructure which will need to be replaced.

21. As part of the CPP Application process Aurora undertook significant public consultation and sought submissions about its proposed works and what the publics priorities were for the type of work that should be undertaken. Out of all those who participated in this process, 53% of participants were from Wanaka, Central Otago, and Queenstown. Participants were supportive of an increase in investment over the next 3 years as well as a focus on avoiding asset degradation in future.

22. The Commerce Commission is yet to decide the CPP application. Regardless of the outcome of that process, Aurora will still need to carry out a significant amount of investment to its network. That work was outlined in Aurora's 2018 and 2019 Asset Management Plans (**AMP**) and the scope of works has been updated in the 2020-2030 plans to align with the CPP proposals.

23. Much of the work that is planned during the CPP period (2021-2024) and throughout the AMP period are those types of works that are generally permitted under the PDP, including:

(a) Overhead Line Support Structures/Poles: work to improve the health and safety, condition and reliability of poles throughout the district including replacing poor condition poles, reduce the wooden pole backlog to zero and to manage the risk of pole failure.

(b) Cables: replacing cables that are a risk to the health and safety of the public.

(c) Overhead conductors (lines): Replace poor condition overhead lines to reduce safety risks associated with line drop. Remedy low clearance spans to reduce third party contact risks.

24. Currently, Rules 30.5.5.1 to 30.5.5.4 enable these works to take place as permitted or controlled activities.

25. The work required to replace, or upgrade poles and cables often involves ground disturbance (earthworks) and therefore has the potential to affect Wāhi Tūpuna mapped areas. This appears to be what has given rise to the rules in Chapter 39 and variation to Chapter 25. In the case of overhead conductors, the installation of mid-span poles, or installing taller poles is often required to reduce line drop and low clearance spans. This work is undertaken to ensure that Aurora meets the mandatory requirements under the New Zealand Code of Practice for Electrical Safe Distances (**NZECP34**).

Wāhi Tūpuna Mapped Areas

26. PDP Stage 3 maps Wāhi Tūpuna areas which I understand from the evidence of Kā Rūnaka to be important cultural landscapes which cannot be broken down into individual sites (like Wāhi Tapu) and contain the basis for understanding Kai Tahu connection to place and values. In this way, I understand that a broader approach to the degradation of the landscape is required in addition to ensuring that individual activities do not degrade the natural landscape. In my view, it is appropriate to exclude activities which have less than minor effects on the landscape and which in the case of earthworks are temporary in nature and do not have an ongoing adverse effect on water quality.

Works within Archaeological Hazard Areas

27. There are approximately 3,500 archaeological sites recorded in the national database (ArchSite) and 480 heritage places listed in the HNZPT Rarangi Kōrero located in the Otago region and which are supplied electricity by Aurora. Undertaking works in proximity to known Wāhi Tapu or Archaeological Sites is therefore not a new phenomenon for Aurora. Any work that will affect archaeological sites requires an archaeological authority from Heritage New Zealand Pouhere Taonga (**HNZPT**) as set out in the Heritage New Zealand Pouhere Taonga Act 2014 and Aurora has developed processes and protocols for how works in these areas are: planned; managed and carried out.

28. The addition of the Wāhi Tūpuna mapped areas is different to undertaking works in the Wāhi Tapu or Archaeological Sites (collectively referred to as Archaeological Hazard Areas or **AHA**s) only in the sense that the mapped areas are on a much greater scale than defined Wāhi Tapu or Archaeological Sites and are much more focused on landscape generally, or in some instance, accessibility for the purpose of Mahika Kai. In my view, Aurora's existing processes for managing works in AHAs can be applied generally in relation to Wāhi Tūpuna areas with very little amendment. Additionally, Aurora's infrastructure does not inhibit access to waterbodies.

29. In 2015, Aurora obtained three global archaeological authorities from Heritage New Zealand relating to works undertaken by Aurora within the road reserve. These three authorities are due to expire in June/July 2020. With this in mind, Aurora commenced discussions with Heritage New Zealand in January 2019 to refine the existing processes.

30. Aurora engaged the University of Otago based Southern Pacific Archaeological Research ("SPAR") to undertake detailed research on the principles, standards, and processes for the management of archaeological sites that may be affected by maintenance and upgrade works, and to provide day-to-day operational guidance for managing those works. It is those works that are carried out on a day-to-day basis

(and which are otherwise permitted or controlled) that are the focus of this evidence.

31. In short, Aurora's existing and proposed enhanced processes for considering AHAs includes:

    (a) Obtaining global archaeological authorities from Heritage New Zealand at a "catchment" level to cover maintenance and upgrade activities across the network (specific to poles, cables, transformers, link pillars and switchgear).

    (b) Compliance with an Accidental Discovery Protocol (**ADP**) created in consultation with Heritage New Zealand which is engaged when earthworks are required for the works that are taking place.

    (c) An Archaeological Sites Management Plan for each catchment to guide operations with the potential to affect archaeological sites across the network.

    (d) Requirements for all approved contractors to be aware of ADP and any "archaeological hazard zones" which Aurora outlines in its GIS mapping software.

    (e) Annual briefings to Aurora staff and contractors carried out by an approved archaeologist about archaeological requirements and standards including activating the ADP.

    (f) Consultant archaeologists undertake desk-based studies where there is a risk of archaeological remains within a site or a known Wāhi Tapu site.

    (g) Archaeological monitoring in areas determined to be high risk to ensure that correct processes for working in archaeological hazard zones are followed.

32. A review of these processes was already underway prior to and following notification of PDP Stage 3 and further work is ongoing in consultation with Aukaha and Kā Rūnaka representatives.

33. Since notification of PDP Stage 3 Aurora has been working to add to its existing processes by undertaking the following:

    (a) Engaging with Aukaha seeking feedback on additional processes/considerations when undertaking works specifically in Wāhi Tūpuna overlays.

    (b) Adding the Wāhi Tūpuna overlay to Aurora's GIS mapping so that it is easily accessible to all approved contractors.

    (c) Reviewing its training programme with approved contractors regarding works within Wāhi Tūpuna mapped areas.

34. In my view, these processes, combined with consultation with iwi give effect to the provisions of Chapter 5 Tangata Whenua and the objectives and policies in Chapter 39.

Earthworks in Wāhi Tūpuna Mapped Areas

35. I support the intent of Chapter 39 Wāhi Tūpuna and the associated Wāhi Tūpuna overlay as it is a useful source of information to trigger when Aurora should be aware of the possibility of engaging Aurora's Accidental Discovery Protocol and when it should be engaging with local iwi.

36. The approach of mapping Wāhi Tūpuna areas is consistent with the approach in the Dunedin Second Generation Plan (**2GP**) where Wāhi Tūpuna mapped areas cover a significant extent of the District, including most of Dunedin's Otago Peninsula. The key difference between the 2GP and PDP Stage 3 however is that the 2GP does not impose additional constraints on permitted activities, such as operation, repair, minor upgrading and maintenance of existing network utilities which is akin to the definition of "minor upgrading" in the PDP. An example of works to replace aging infrastructure in a Wāhi Tūpuna area is shown at **Attachment 5**.

37. The variation to Chapter 25 seeks to impose an additional maximum threshold on earthworks within:

(a) Wāhi Tūpuna Mapped Areas (Rule 25.5.2).

(b) Roads - Wāhi Tūpuna areas where roads have been identified as a recognised threat to the values of the area (see Schedule 39.6) (Rule 25.5.7)

38. Aurora's submission was predicated on the earthworks that it undertakes being subject to maximum volume threshold limits in Chapter 25. That is indeed the impression given by Rule 30.3.3.3. In my view, if the above limits applied to all earthworks that Aurora undertook then it would be considerably constrained in terms of what it can do without resource consent given that many of the activities it could otherwise undertake in reliance of Chapter 30 are permitted.

39. In preparing this evidence I have reviewed the remaining rules of Chapter 25, including Rule 25.3.2.8 which provides that:

> *The provisions in this chapter to do not apply to the following activities in Chapter 30 Energy and Utilities:*
>
> *a. Earthworks, buildings, structures and National Grid sensitive activities undertaken within the National Grid Yard;*
>
> *b. Earthworks for the placement of underground electricity cables or lines.*
>
> *c. Earthworks for the construction, alteration, or addition to underground lines.*
>
> *[Emphasis added]*

40. The wording of Rule 25.3.2.8 is inconsistent with Aurora's general uses of the terms "cables" and "lines" which is why this had not been picked up at the time the submission was filed. In the context of electricity distribution infrastructure "cables" only relate to underground and "lines" only relate to overhead infrastructure. A "line" cannot be separated from its support structures and works on that line only require ground disturbance when a pole is being installed or replaced. To clarify the wording of this rule, without changing its substance or effect, I consider

that the word “overhead” can be added before the word “lines” at (b) and the word “to” in the first line can be removed.

41. The effect of Rule 25.3.2.8 is that earthworks pursuant to the placement of underground electricity cables *and* overhead lines are excluded from the maximum volume thresholds as notified in Rules 25.5.2 and 25.5.7.

42. In my view, it is unclear whether “minor upgrading” pursuant to Rule 30.5.5.1 is included within Rule 25.3.2.8. The definition of “minor upgrading” was subject to mediation in PDP Stage 1 and the consent order recording the agreed amendments was included in my first brief of evidence for Streams 17 and 18.

43. Activities that on their face appear to fall outside the scope of Rule 25.3.2.8 primarily relate to the inspection, repair and upgrade of existing underground cables as these activities do not involve the placement of a new cable. For cables that are direct buried, the only way to inspect a section of cable is to dig it up. This generally involves the same level of earthworks that would be required when the cable is placed in the ground, so the effects on the environment are the same. This type of activity will easily exceed the maximum volume threshold of $10m^3$. In my view, it is counter-intuitive to require earthworks consent for the inspection or upgrade of an existing underground cable but not require consent for the placement of a new cable. Once the earthworks are completed, the ground surface is restored to its original state.

44. To assist the commissioners in understanding the nature of adverse effects and the scale of earthworks involved I have included at **Attachment 1** photographs of cables being installed and upgraded.

45. In my view, Aurora’s relief on Chapter 25 can be refined through an amendment to Rule 25.3.2.8 as follows:

> The provisions in this chapter ~~to~~ do not apply to the following activities in Chapter 30 Energy and Utilities:
>
> a. Earthworks, buildings, structures and National Grid sensitive activities undertaken within the National Grid Yard;

b. Earthworks for the placement or minor upgrading of underground electricity cables or overhead lines.

c. Earthworks for the construction, alteration, or addition to underground lines.

[added text underlined, removed text ~~strikethrough~~]

46. The words "*or minor upgrading*" have been added to (b) to explicitly remove these activities from the maximum volume thresholds in Chapter 25. It is considered that the word "overhead" can be added and the word "to" removed as a Schedule 1 Clause 16 amendment as the change will have a minor effect and corrects an error.

47. The evidence of Michael Bathgate outlines refinements to Kā Rūnaka's position on earthworks as follows:[3]

(a) Remove 10m^3 maximum volume earthworks (Rule 25.5.2) from Wāhi Tūpuna in Urban Environment Zones.

(b) Amend Rule 25.5.11 to apply the 10m^3 maximum volume earthworks only in relation to Wāhi Tūpuna No. 5, 9, 12, 16, 20, 22 and 27.

48. While I support the amendments outlined above, in my view, these refinements do not address the issue of earthworks required for the purpose of "minor upgrading" and particularly for earthworks in relation to underground cables.

49. The evidence of Michael Bathgate also amends Rule 25.5.11 so that the maximum earthworks threshold applies where earthworks are being undertaken within 20 metres of a waterbody. I do not support this amendment on the basis that the works that Aurora undertakes in proximity to waterways have only minor and temporary effects on the landscape and may not have any adverse effects on water quality. This is expanded in my discussion of the rules in Chapter 39.

[3] Evidence of Michael Bathgate at Appendix 1 page 29.

Chapter 39 Rules

50. Rules 39.5.1 to 39.5.3 require that any building or structure, within a Wāhi Tūpuna overlay, where activities affecting water quality are a recognised threat within urban zones and all rural zones, shall be setback from waterbodies.

51. Aurora owns a minimum of 137 poles within the District which are located within 20 metres of a waterbody. I say a minimum because I have not been able to obtain the location of where a "waterbody" commences from the Council so the figures provided are an estimate based on data that I have been able to obtain. I suspect there are far more poles in proximity to waterbodies that will be affected by Rules 39.5.1 to 39.5.3. A breakdown of the pole numbers, height, date of installation and material of the pole is attached to this evidence as **Attachment 2**.

52. Of the 137 poles, 74 are located between 7 metres and 20 metres with the balance being located within 7 metres of the waterbody. Many of these poles were installed over 40+ years ago and are reaching the end of their lifecycle and need to be replaced.

53. Power poles are required to be located near a waterbody as they are required to cross the waterbody to provide a connection to remote areas.

54. An example of this is at Glenorchy where existing poles have been installed within the Rees River (Wāhi Tūpuna No. 15 Tāhuna) as shown at **Attachment 3**. This example shows two 10 metre hardwood poles (Poles 38028 and 38029) located directly within Rees River with other poles located within 20 metres of the bed of the waterbody.

<u>Definition of Structures</u>

55. Aurora's infrastructure broadly comes within the definition of a "structures" as defined by Chapter 2 of the PDP. The types of structures that are regularly installed by Aurora's contractors can range from very small structures such as link pillars to power poles which are typically 11 metres tall and would be caught by Rules 39.5.1 to 39.5.3. Photographs and descriptions of this infrastructure is included with this evidence at **Attachment 4**. These types of infrastructure will not be installed within

the waterbody but may be located within 20 metres of the waterbody. In my view the installation of these structures will not have an adverse effect on water quality.

56. Once installed, poles do not have any impact on water quality. If the pole is being installed directly within the waterbody (which is infrequent) then there may be some discharge of sediment to the waterbody as a result of earthworks. However, this sediment would be temporary and be controlled by the rules of the Otago Regional Plan. Included with this evidence at **Attachment 5** are examples of the dimensions of poles that have been installed in a Wāhi Tūpuna area on Dunedin's Otago Peninsula. While these poles have not been installed in proximity to a waterway, they provide useful guidance about the size of the pole and the scope of earthworks that would likely be required if a pole were to be installed in proximity to a waterway.

57. The evidence of Michael Bathgate provides an updated position on setbacks from waterbodies in urban areas and seeks to delete Rule 39.5.1. I support the addition of the Urban Wāhi Tūpuna areas and the deletion of Rule 39.5.1.

58. The evidence of Michael Bathgate also seeks to amend Rules 39.5.2 and 39.5.3 to remove "where activities affecting water quality are a recognised threat". I support this amendment. The term "Energy and Utilities" is a recognised threat in many of the Wāhi Tūpuna areas and even relatively small structures such as service fuse boxes, distribution pillars and 11 kV ring main units are caught by this term. It is not clear from the section 42A Report whether it was the intention of Rules 39.5.1 to 39.5.3 to encompass these structures.

59. I consider that it is appropriate to excluded the activities which Aurora can otherwise undertake as permitted or controlled activities pursuant to Rules 30.5.5.1 to 30.5.5.4 on the basis that the adverse effects on water quality are no more than minor and temporary in nature. Activities which are captured by the restricted discretionary rules should also consider the functional needs of Aurora's infrastructure. Having further

considered the matter of discretion sought for Rules 39.5.1 to 39.5.3 I consider that this can be refined to:

60. Discretion is restricted to:

> Functional needs of Electricity Subtransmission Infrastructure or Significant Electricity Distribution Infrastructure.

Conclusion

61. I consider the relief in Aurora's submission is an appropriate way of giving effect to the Strategic Directions set out in Chapters 3, 5 and 6 and that its existing internal processes, regarding works in AHAs will ensure that works are undertaken in a manner that is consistent with Chapter 5 and the objectives and policies of Chapter 39.

Dated this 19th day of June 2020

Joanne Dowd

Attachment 1


ADAMS
www.adamsnz.com


Hirepool
PORT-A-LOO
15 15 15


ELECTRIC CABLE

Attachment 2

Poles within 7 metres of a Waterbody

FID	STATUS	INSTALLATION	FACILITYID	CLASS	HEIGHT	MATERIAL
0	In Service	1/01/1972	7/09/2000	33kV	11	HW
1	In Service	1/01/1977	24/08/1940	66kV	11	HW
2	In Service	1/01/1977	25/08/1940	66kV	11	HW
3	In Service	1/01/1970	45328	33kV	10	HW
4	In Service	1/01/1993	48643	66kV	11	SW
5	In Service	1/01/1970	54930	HV	10	CONC
6	In Service	1/01/1974	41295	HV	10	HW
7	In Service	1/01/1970	41553	HV	10	HW
8	In Service	1/01/1973	40638	HV	10	CONC
9	In Service	1/01/1969	17705	HV	10	HW
10	In Service	16/03/2000	39140	HV	10	SW
11	In Service	1/01/1970	41122	HV	10	HW
12	In Service	1/01/1960	15076	HV	10	HW
13	In Service	1/01/1971	41551	HV	10	CONC
14	In Service	1/01/1970	41119	HV	10	HW
15	In Service	1/01/1970	54939	HV	10	CONC
16	In Service	1/01/1972	36775	33kV	11	HW
17	In Service	3/11/2003	49168	LV		HW
18	In Service	1/01/1990	16201	HV	10	HW
19	In Service	1/01/1999	39142	HV	10	HWIB
20	In Service	1/01/1960	33572	HV	12	HW
21	In Service	1/01/1970	41118	HV	10	HW
22	In Service	1/01/1975	33245	HV	10	HW
23	In Service	1/01/1970	41552	HV	10	HW
24	In Service	12/06/2007	46900	HV	10	HW
25	In Service	1/01/1971	38030	HV	10	HWIB
26	In Service	1/01/1971	38029	HV	10	HWIB
27	In Service	1/01/1993	16938	HV	10	CONC
28	In Service	1/01/1970	38507	HV	10	CONC
29	In Service	1/01/1992	16486	HV	10	SW
30	In Service	1/01/1970	45327	33kV	10	HW
31	In Service	21/11/2003	39718	HV	11	HW
32	In Service	10/08/2001	39907	HV	10	CONC
33	In Service	18/05/2010	50008	HV	12	HW
34	In Service	1/01/1970	16935	HV	10	HW
35	In Service	22/11/2001	49126	66kV	12	STEEL
36	In Service	22/11/2001	49125	66kV	12	STEEL
37	In Service	1/01/1970	16937	HV	10	HW
38	In Service	22/11/2001	49124	66kV	12	STEEL
39	In Service	1/01/1960	33571	HV	10	HW
40	In Service	1/01/1970	41130	HV	10	HW
41	In Service	1/01/1970	38553	HV	10	HWIB
42	In Service	1/01/1993	16939	HV	10	CONC
43	In Service	1/01/1967	17636	HV	10	HWIB
44	In Service	1/01/1990	41129	HV	11	SW
45	In Service	30/07/1993	15082	LV		HW
46	In Service	4/03/2010	62690	66kV	10	HW
47	In Service	4/03/2010	62616	66kV	14	HW
48	In Service	4/03/2010	41634	HV	10	CONC

Legend:
HW = Hardwood
SW = Softwood
CONC = Concrete
STEEL = Steel
HWIB = Hard Wood Iron Bark

49	In Service	4/03/2011		69766	66kV	15	HW
50	In Service	4/03/2011		69767	66kV	15	HW
51	In Service	10/01/2011		69806	66kV	18	HW
52	In Service	22/02/2011		40943	HV	10	CONC
53	In Service	1/01/1971		38028	HV	10	HWIB
54	In Service	25/11/2009		54680	HV	10	CONC
55	In Service	25/05/2017		86138	HV	12.5	CONC
56	In Service	23/11/2017		95275	HV	14	STEEL
57	In Service	23/11/2017		95303	HV	11	HW
58	In Service	29/11/2017	TBA3		HV	11	CONC
59	In Service	29/11/2018		95403	HV	11	STEEL
60	In Service	10/05/2019		98274	HV	14	HW
61	In Service	10/05/2019		98275	HV	14	HW

Poles within 20 metres of a Waterbody

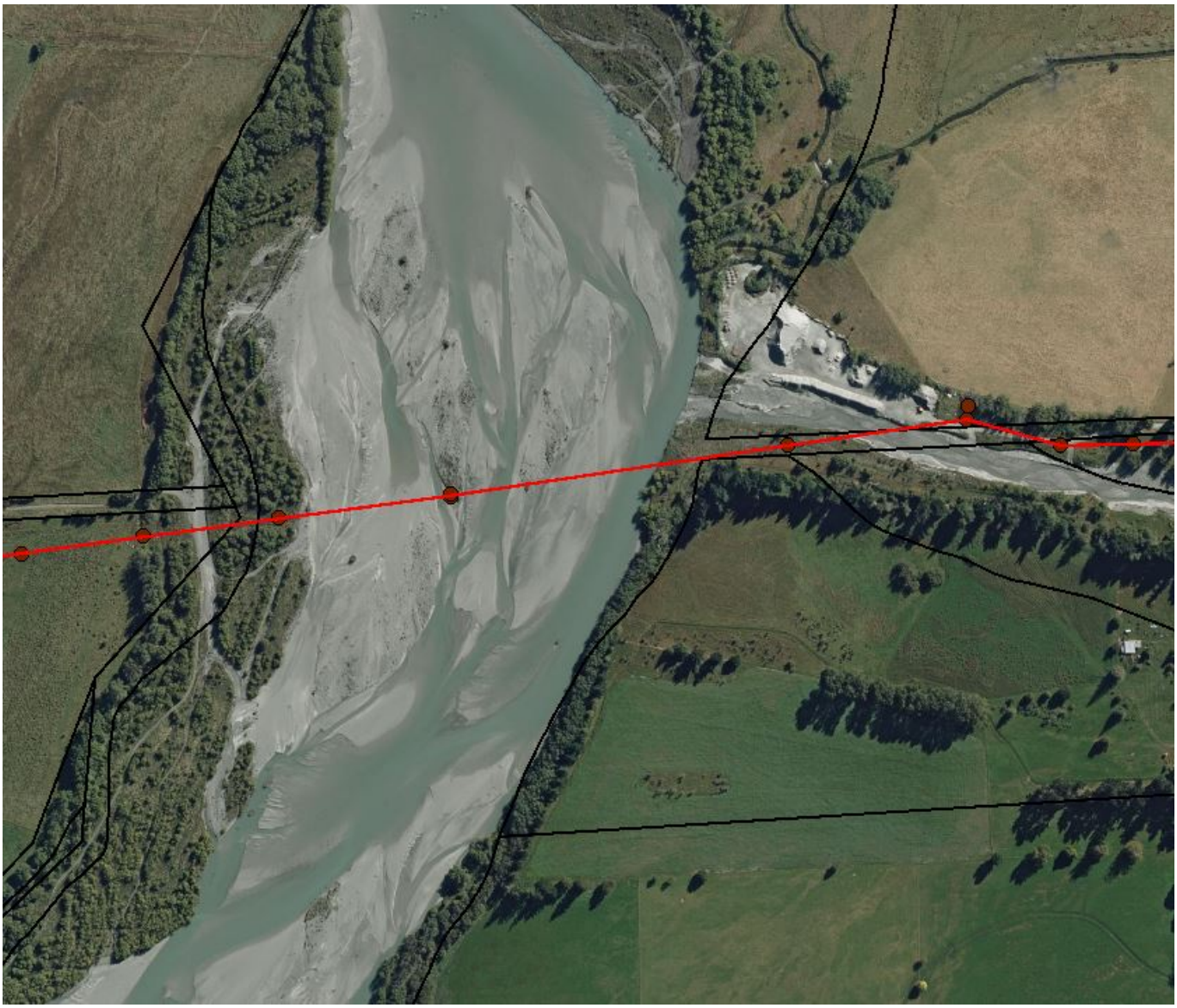
FID	STATUS	INSTALLATION	FACILITYID	CLASS	HEIGHT	MATERIAL
0	In Service	1/01/1970	31/10/1943	HV	10	HWIB
1	In Service	1/01/1960	6/12/1991	HV	10	HW
2	In Service	1/01/1970	20/05/2011	HV	10	HW
3	In Service	1/01/1979	3/04/2003	HV	10	HW
4	In Service	1/01/1972	20/09/2002	HV	10	CONC
5	In Service	1/01/1972	7/09/2000	33kV	11	HW
6	In Service	1/01/1977	24/08/1940	66kV	11	HW
7	In Service	1/01/1966	5/09/2012	HV	10	HW
8	In Service	1/01/1960	15/09/1993	HV	10	HWIB
9	In Service	1/01/1965	16/06/1958	HV	10	HW
10	In Service	1/01/1977	25/08/1940	66kV	11	HW
11	In Service	1/01/1960	34226	HV	10	HWIB
12	In Service	1/01/1966	41156	HV	10	HW
13	In Service	1/01/1970	45328	33kV	10	HW
14	In Service	1/01/1993	48643	66kV	11	SW
15	In Service	5/03/2008	39880	HV	11	HW
16	In Service	1/01/1990	16262	HV	10	HW
17	In Service	1/01/1985	34228	HV	10	SW
18	In Service	1/01/1960	15085	LV	9	HW
19	In Service	1/01/1970	54930	HV	10	CONC
20	In Service	1/01/1974	41295	HV	10	HW
21	In Service	1/01/1960	34917	HV	9	HWIB
22	In Service	1/01/1970	41553	HV	10	HW
23	In Service	1/01/1974	80037	HV	10	HWIB
24	In Service	1/01/1970	34225	HV	10	HWIB
25	In Service	1/01/1973	40638	HV	10	CONC
26	In Service	1/01/1972	36778	33kV	11	HW
27	In Service	1/01/1990	13427	HV	10	HW
28	In Service	1/01/1969	17705	HV	10	HW
29	In Service	1/01/1972	37520	HV	10	HW
30	In Service	16/03/2000	39140	HV	10	SW
31	In Service	1/01/1979	15396	STLT	9	SW
32	In Service	1/01/1970	41122	HV	10	HW
33	In Service	1/01/1976	37483	HV	10	HW
34	In Service	1/01/1960	15076	HV	10	HW
35	In Service	1/01/1973	40572	HV	10	HWIB
36	In Service	1/01/1970	41565	HV	10	HW
37	In Service	1/01/1971	41551	HV	10	CONC
38	In Service	1/01/1970	41119	HV	10	HW
39	In Service	1/01/1970	54939	HV	10	CONC
40	In Service	1/01/1972	36775	33kV	11	HW
41	In Service	1/01/1979	15521	STLT	9	SW
42	In Service	1/01/1972	40960	HV	10	HWIB
43	In Service	3/11/2003	49168	LV		HW
44	In Service	1/01/1990	16201	HV	10	HW
45	In Service	1/01/1999	39142	HV	10	HWIB
46	In Service	1/01/1979	15524	STLT	9	SW
47	In Service	1/01/1966	41154	HV	10	HW
48	In Service	1/01/1960	33572	HV	12	HW

Legend:
HW = Hardwood
SW = Softwood
CONC = Concrete
STEEL = Steel
HWIB = Hard Wood Iron Bark

49	In Service	1/01/1970	30988	HV	10	HW
50	In Service	1/01/1970	41118	HV	10	HW
51	In Service	1/01/1975	33245	HV	10	HW
52	In Service	1/01/1966	41155	HV	10	CONC
53	In Service	1/01/1970	41552	HV	10	HW
54	In Service	1/01/1966	41003	HV	10	HW
55	In Service	12/06/2007	46900	HV	10	HW
56	In Service	1/01/1990	16200	HV	10	HW
57	In Service	1/01/1971	38030	HV	10	HWIB
58	In Service	1/01/1971	41555	HV	10	HW
59	In Service	1/01/1971	38029	HV	10	HWIB
60	In Service	1/01/1960	15081	HV	10	HW
61	In Service	1/01/1993	16938	HV	10	CONC
62	In Service	1/01/1960	80063	HV	10	HW
63	In Service	1/01/1970	38507	HV	10	CONC
64	In Service	1/01/1979	37710	HV	10	HWIB
65	In Service	1/01/1992	16486	HV	10	SW
66	In Service	1/01/1970	45327	33kV	10	HW
67	In Service	21/11/2003	39718	HV	11	HW
68	In Service	10/08/2001	39907	HV	10	CONC
69	In Service	1/01/1966	41158	HV	10	HW
70	In Service	1/01/1973	16485	HV	10	HW
71	In Service	1/01/1970	16933	HV	10	HW
72	In Service	17/08/2007	22035	LV	10	CONC
73	In Service	1/01/1979	33170	STLT	9	SW
74	In Service	18/05/2010	50008	HV	12	HW
75	In Service	1/01/1970	16935	HV	10	HW
76	In Service	1/01/1960	15089	HV	10	HW
77	In Service	22/11/2001	49126	66kV	12	STEEL
78	In Service	22/11/2001	49125	66kV	12	STEEL
79	In Service	1/01/1970	16937	HV	10	HW
80	In Service	1/01/1970	34229	HV	10	HWIB
81	In Service	1/01/1970	16481	HV	10	HW
82	In Service	1/01/1975	33679	HV	10	CONC
83	In Service	1/01/1970	38506	HV	10	HWIB
84	In Service	1/01/1980	38395	HV	9	HW
85	In Service	1/01/1970	40682	HV	10	HW
86	In Service	1/01/1960	38327	HV	10	HW
87	In Service	22/11/2001	49124	66kV	12	STEEL
88	In Service	1/01/1960	33571	HV	10	HW
89	In Service	1/01/1974	40228	HV	10	HWIB
90	In Service	1/01/1997	38692	HV	11	SW
91	In Service	1/01/1970	41130	HV	10	HW
92	In Service	1/01/1970	38553	HV	10	HWIB
93	In Service	1/01/1966	41002	HV	10	HW
94	In Service	1/01/1993	16939	HV	10	CONC
95	In Service	1/01/1967	17636	HV	10	HWIB
96	In Service	1/01/1973	40571	HV	10	HWIB
97	In Service	1/01/1990	41129	HV	11	SW
98	In Service	1/01/1997	41494	HV	10	SW

99	In Service	1/01/1965		41911	33kV	10	HW
100	In Service	30/07/1993		15082	LV		HW
101	In Service	24/07/2009		51265	HV	10	CONC
102	In Service	21/07/2009		50083	LV	9	HW
103	In Service	1/12/2009		54907	HV	11	HW
104	In Service	1/12/2009		54906	HV	11	HW
105	In Service	1/01/1980		38396	HV	9	HW
106	In Service	4/03/2010		62690	66kV	10	HW
107	In Service	4/03/2010		62614	66kV	14	HW
108	In Service	4/03/2010		62615	66kV	14	HW
109	In Service	4/03/2010		62616	66kV	14	HW
110	In Service	4/03/2010		62617	66kV	14	HW
111	In Service	4/03/2010		41634	HV	10	CONC
112	In Service	4/03/2011		69766	66kV	15	HW
113	In Service	4/03/2011		69767	66kV	15	HW
114	In Service	10/01/2011		69806	66kV	18	HW
115	In Service	22/02/2011		40943	HV	10	CONC
116	In Service	22/02/2011		69819	HV	12	HW
117	In Service	26/10/2010		69890	66kV	14	HW
118	In Service	26/10/2010		69898	66kV	15	HW
119	In Service	1/01/1971		38028	HV	10	HWIB
120	In Service	25/11/2009		54680	HV	10	CONC
121	In Service	1/10/1991		49190	LV	10	SW
122	In Service	2/09/2015		85577	HV	11	CONC
123	In Service	25/05/2017		86138	HV	12.5	CONC
124	In Service	13/06/2017		79902	HV	11	UNKWN
125	In Service	31/08/2017		86146	HV	12.5	CONC
126	In Service	2/11/1992	Pole 19		LV		UNKWN
127	In Service	23/11/2017		95275	HV	14	STEEL
128	In Service	23/11/2017		95303	HV	11	HW
129	In Service	29/11/2017	TBA3		HV	11	CONC
130	In Service	20/12/2017		95224	HV	11	CONC
131	In Service	29/11/2018		95403	HV	11	STEEL
132	In Service	30/01/2018		95173	HV	11	CONC
133	In Service	10/05/2019		98274	HV	14	HW
134	In Service	10/05/2019		98275	HV	14	HW
135	In Service	18/10/2019		95046	LV	11	HW

Attachment 3



Map showing Rees River with Aurora Infrastructure Overlay

Legend:

- Solid Red Line: Overhead Line
- Dot: Pole
- Solid Black Line: Cadastral Boundary

Attachment 4

AURORA ELECTRICITY CABINET TYPES

Ground mounted cabinets are required in areas with underground electricity distribution.

Cabinets act as locations where the underground cables are brought to an accessible point above ground, to provide connection points to fuses, switches and transformers.

The types of cabinets that are used on the Aurora network include the following:

SERVICE FUSE BOX

A service fuse box is a small black or green pillar outside a residential property that holds the main low voltage fuses protecting that property.

One service fuse box usually holds fuses for the two nearest properties, but could in some circumstances hold more fuses, for example where infill subdivision has taken place.

A typical footprint for a service fuse box is 0.1m², with a height of up to 0.5m above ground level.

Figure 1: Typical Service Fuse Box

LOW VOLTAGE DISTRIBUTION PILLAR

A distribution pillar is a larger box that hold switches and fuses for controlling the low voltage cables running in the street.

Pillars allow the network operator to isolate short sections of cable in the event of a fault instead of isolating the entire circuit, minimising the number of customers affected by the outage.

The footprint of the pillar depends on the number of circuits it controls, but will typically range from 0.2m² to 0.4m², with a height of up to 1.1m above ground level.

Figure 2: Typical Distribution Pillar

11kV RING MAIN UNIT

An 11kV ring main unit fulfils the same operational function in the 11kV network as a distribution pillar does at low voltage.

The ring main unit will include fuses for protecting any transformers connected to it, and switches to control the 11kV cables in the street.

A typical footprint for an 11kV ring main unit is 0.85m², with a height of up to 1.4m above ground level.

Figure 3: Typical 11kV Ring Main Unit

DISTRIBUTION TRANSFORMER

Distribution transformers convert the 11kV supply to low voltage suitable for distributing to customers.

The low voltage network is usually capable of allowing a transformer to supply customers within a radius of approximately 300m.

Distribution transformers are available in a range of power capacities, measured in kiloVolt-Amps (kVA), with the appropriate capacity depending on the number and type of customers being supplied.

A common transformer size is 300kVA, which is suitable for supplying approximately 100 residential customers.

Larger transformers can supply greater numbers of customers, but the 300m radius limit remains relatively constant.

Figure 4: Typical 300kVA Distribution Transformer

The degree to which the physical size of a transformer can be reduced is limited by the requirement for it to contain oil.

The oil acts as both electrical insulation and as coolant, and there will be a minimum volume of oil that this necessary to do this.

Depending on its capacity, distribution transformer footprints range from 1.0m² from the smallest 15kVA units to 3.4m² for large 1000kVA units, with 2.2m² being a typical footprint for a 300kVA transformer. The transformer cabinet height is up to 1.5m above ground level.

In order to fulfil its function, each distribution transformer requires an 11kV ring main unit that incorporates the fuses that protect the transformer, and a low voltage distribution pillar to control the cable circuits leaving the transformer.

The low voltage distribution pillar is incorporated into one end of the transformer cabinet, but there is insufficient space in the cabinet to house an 11kV ring main unit, requiring it to be housed in a separate cabinet.

Figure 5: 300kVA Distribution Transformer with Adjacent Ring Main Unit

COMPACT SUBSTATION

A compact substation, also known as a berm substation, incorporates an 11kV switch, a distribution transformer and a low voltage distribution pillar into a single cabinet, in order to reduce the number of cabinets required.

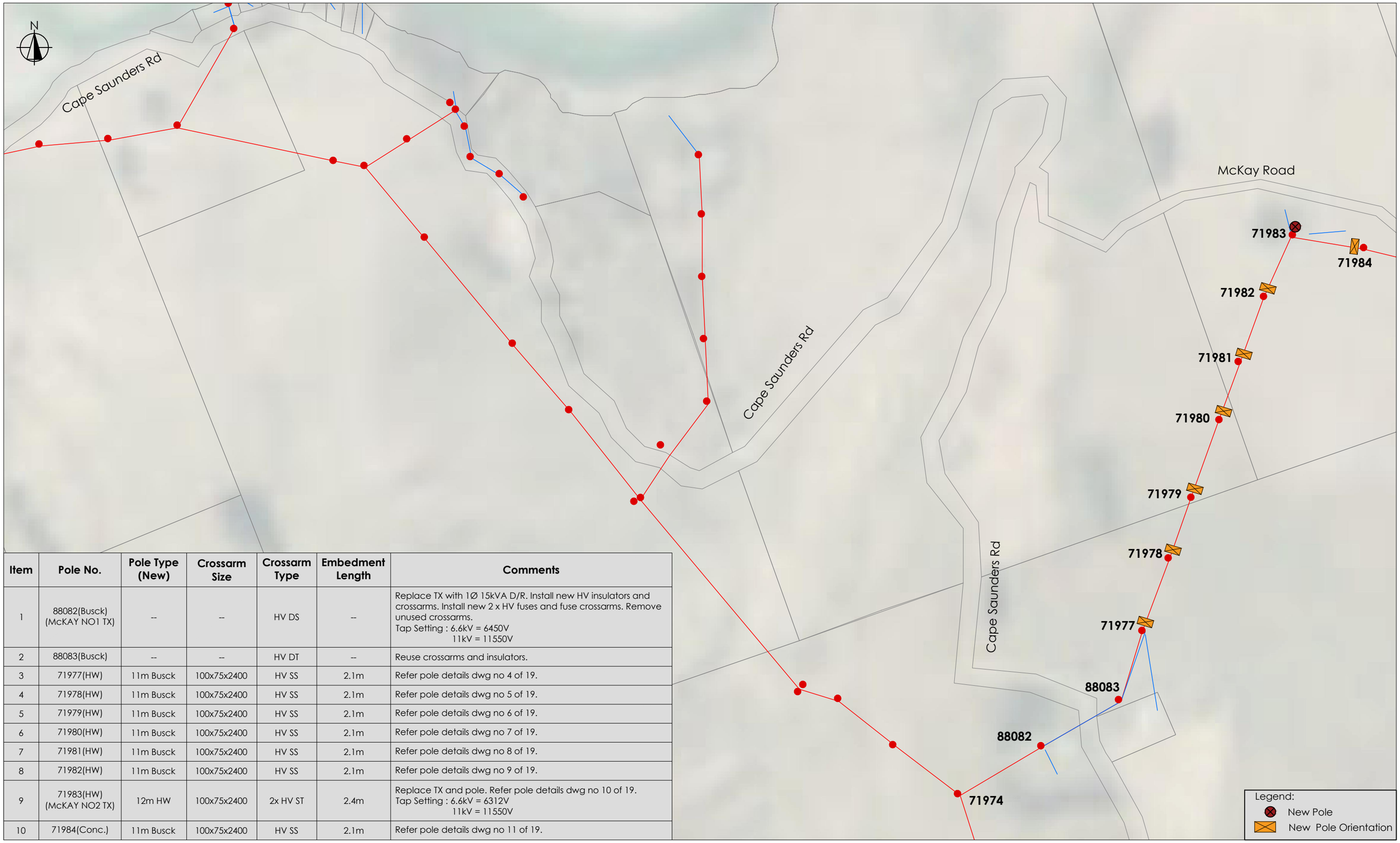
Compact substations are larger than standalone transformers, due to the additional space required to house a ring main unit inside the same cabinet as the transformer.

A typical compact substation has a footprint of between 3.0m² and 4.6m², with a height of up to 1.5m above ground level.

Figure 6: Typical Compact Substation incorporating Transformer and Ring Main Unit

Attachment 5

SITE LAYOUT PLAN



Item	Pole No.	Pole Type (New)	Crossarm Size	Crossarm Type	Embedment Length	Comments
1	88082(Busck) (McKAY NO1 TX)	--	--	HV DS	--	Replace TX with 1Ø 15kVA D/R. Install new HV insulators and crossarms. Install new 2 x HV fuses and fuse crossarms. Remove unused crossarms. Tap Setting : 6.6kV = 6450V 11kV = 11550V
2	88083(Busck)	--	--	HV DT	--	Reuse crossarms and insulators.
3	71977(HW)	11m Busck	100x75x2400	HV SS	2.1m	Refer pole details dwg no 4 of 19.
4	71978(HW)	11m Busck	100x75x2400	HV SS	2.1m	Refer pole details dwg no 5 of 19.
5	71979(HW)	11m Busck	100x75x2400	HV SS	2.1m	Refer pole details dwg no 6 of 19.
6	71980(HW)	11m Busck	100x75x2400	HV SS	2.1m	Refer pole details dwg no 7 of 19.
7	71981(HW)	11m Busck	100x75x2400	HV SS	2.1m	Refer pole details dwg no 8 of 19.
8	71982(HW)	11m Busck	100x75x2400	HV SS	2.1m	Refer pole details dwg no 9 of 19.
9	71983(HW) (McKAY NO2 TX)	12m HW	100x75x2400	2x HV ST	2.4m	Replace TX and pole. Refer pole details dwg no 10 of 19. Tap Setting : 6.6kV = 6312V 11kV = 11550V
10	71984(Conc.)	11m Busck	100x75x2400	HV SS	2.1m	Refer pole details dwg no 11 of 19.

Rev.	Description	Drn	Ckd	Date	References
A	Original Issue	Vena	AV	29/07/19	
B	Change Conductor To Flourine	Vena	AV	13/01/20	

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Drawn	Vena	29/07/19
Checked	AV	29/07/19
Approved	SJ	29/07/19

Job number	024529-1100
Section	8/9 and 10
CFR	10203
File Name	R24492AV
Scale	NTS
Sheet	2 of 19

Cape Saunders Rd, Cape Saunders
Conductor Replacement
Flourine AAAC Conductor
Feeder ID - PC3

Rev
B

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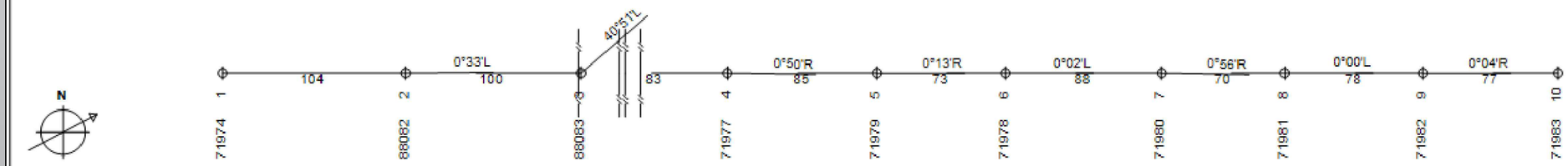
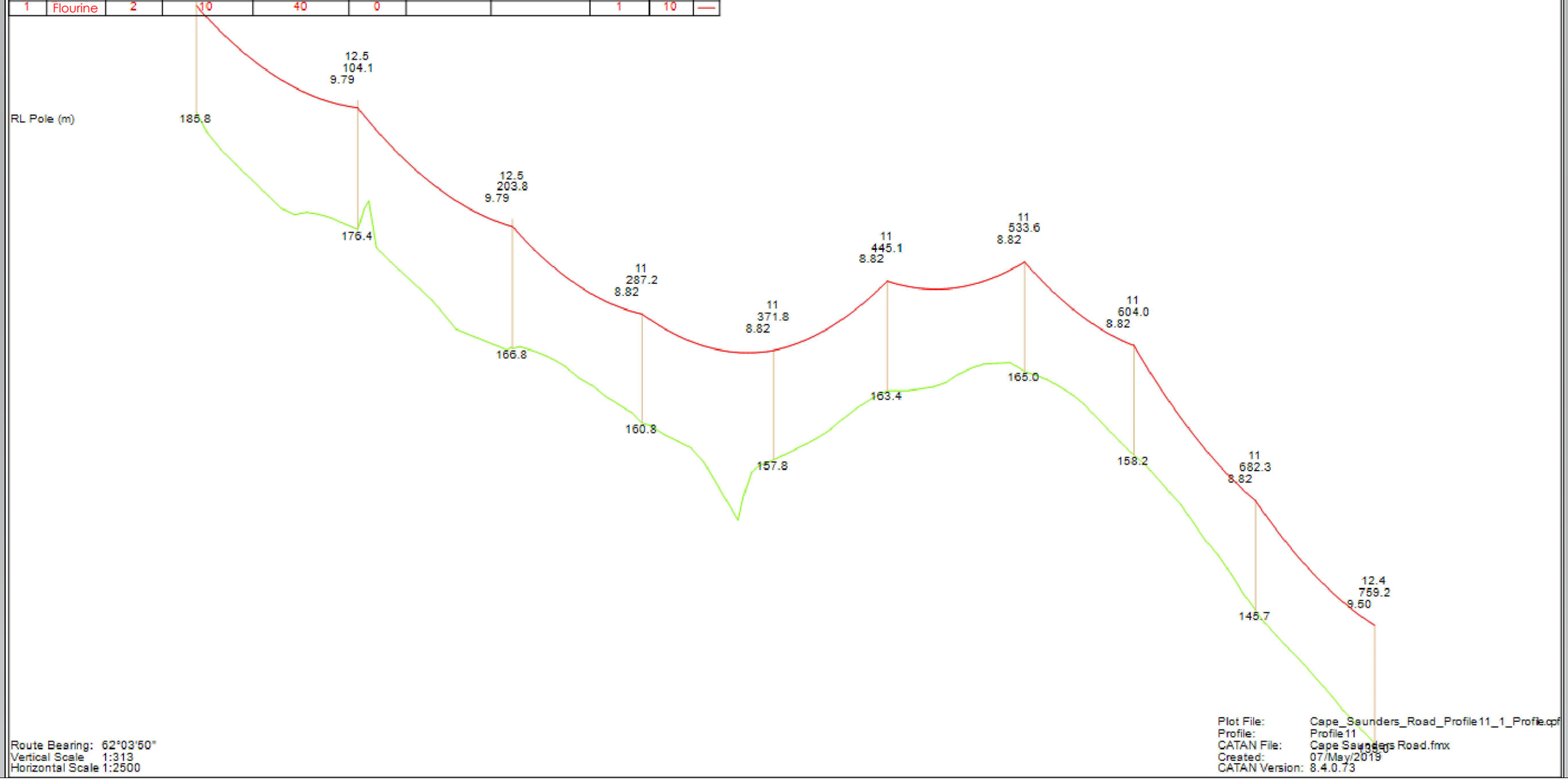


Part Number
Length (m)
Chainage (m)
POA (m)

						Plotted Circuits				
Circuit	Conductor	No. Wires	Tension (%CBL)	Temperature (°C)	Wind (Pa)	Radial Ice(mm)	Radial Snow(mm)	From Pole	To Pole	Line
1	Flourine	2	10	40	0			1	10	—



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Checked	AV	29/07/19	
Approved	SJ	29/07/19	

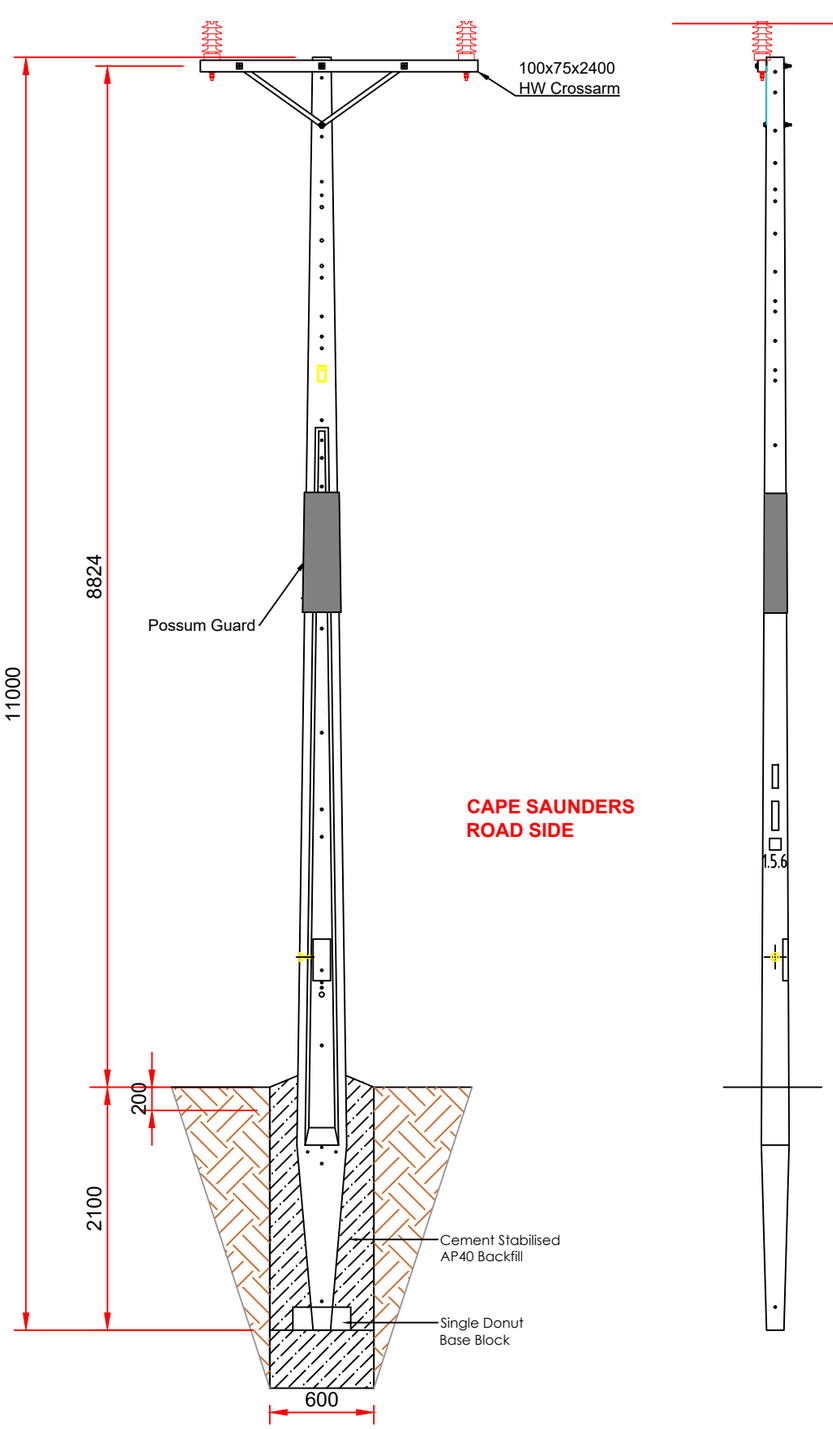
Job number	024529-1100
Section	8/9 and 10
CFR	10203
File Name	R24492AV
Scale	NTS
Sheet	3 of 19

Cape Saunders Rd, Cape Saunders
Conductor Replacement
CATAN Ground Profile 1
Flourine AAAC Conductor

Rev
B

Aurora ENERGY

POLE DETAILS



POLE PHOTO

Rev.	Description	Drn	Ckd	Date	References
A	Original Issue	Vena	AV	29/07/19	
B	Change Conductor To Flourine	Vena	AV	13/01/20	

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Drawn	Vena	29/07/19
Checked	AV	29/07/19
Approved	SJ	29/07/19

Job number	024529-1100
Section	8/9 and 10
CFR	10203
File Name	R24492AV
Scale	NTS
Sheet	4 of 19

Cape Saunders Rd, Cape Saunders
Conductor Replacement
PP-71977
Feeder ID - PC3

Rev
B

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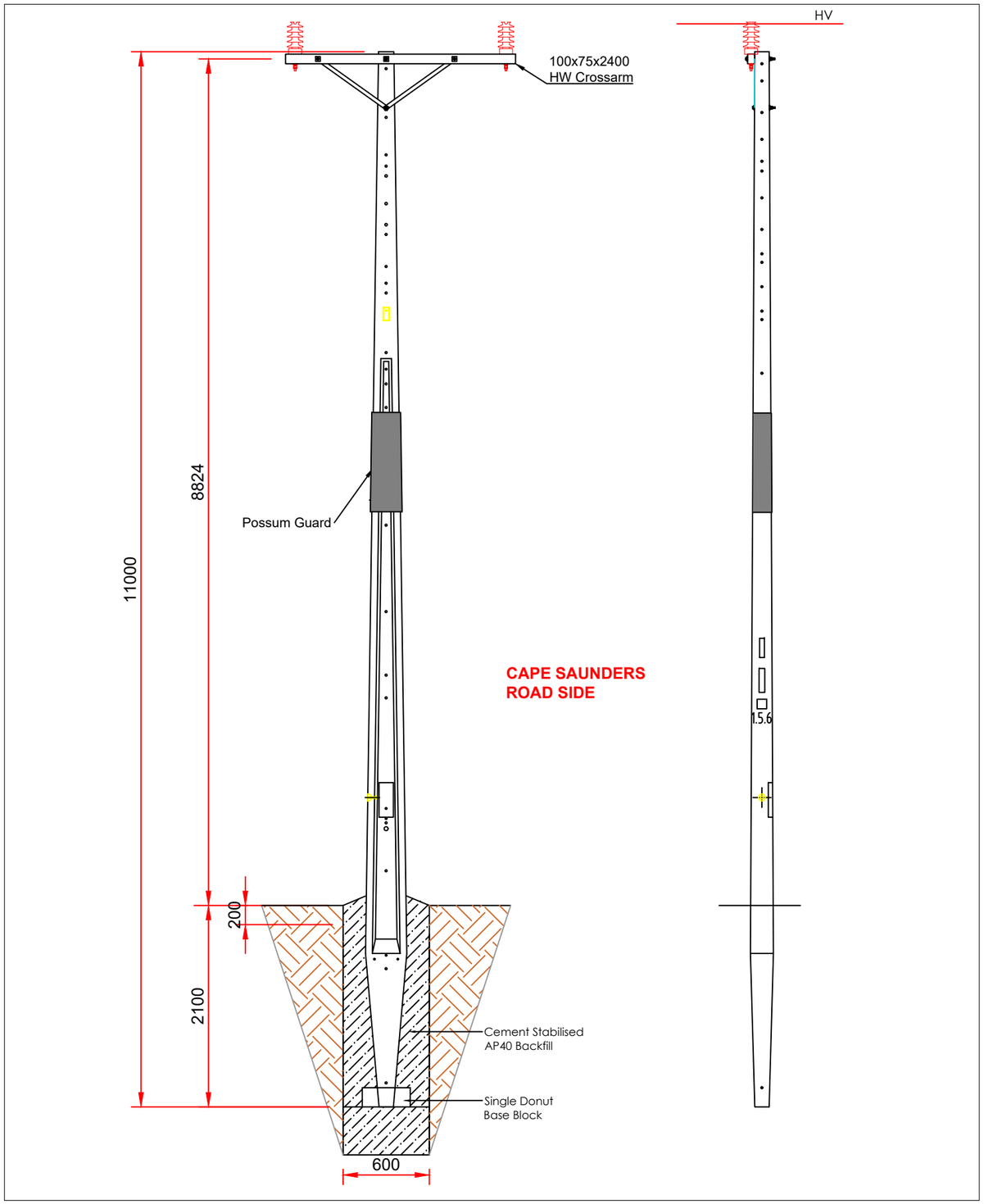
POLE DETAILS



POLE PHOTO

Rev.	Description	Drn	Ckd	Date	References
A	Original Issue	Vena	AV	29/07/19	
B	Change Conductor To Flourine	Vena	AV	13/01/20	

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Drawn	Vena	29/07/19
Checked	AV	29/07/19
Approved	SJ	29/07/19

Job number	024529-1100
Section	8/9 and 10
CFR	10203
File Name	R24492AV
Scale	NTS
Sheet	5 of 19

Cape Saunders Rd, Cape Saunders
Conductor Replacement
PP-71978
Feeder ID - PC3

Rev
B

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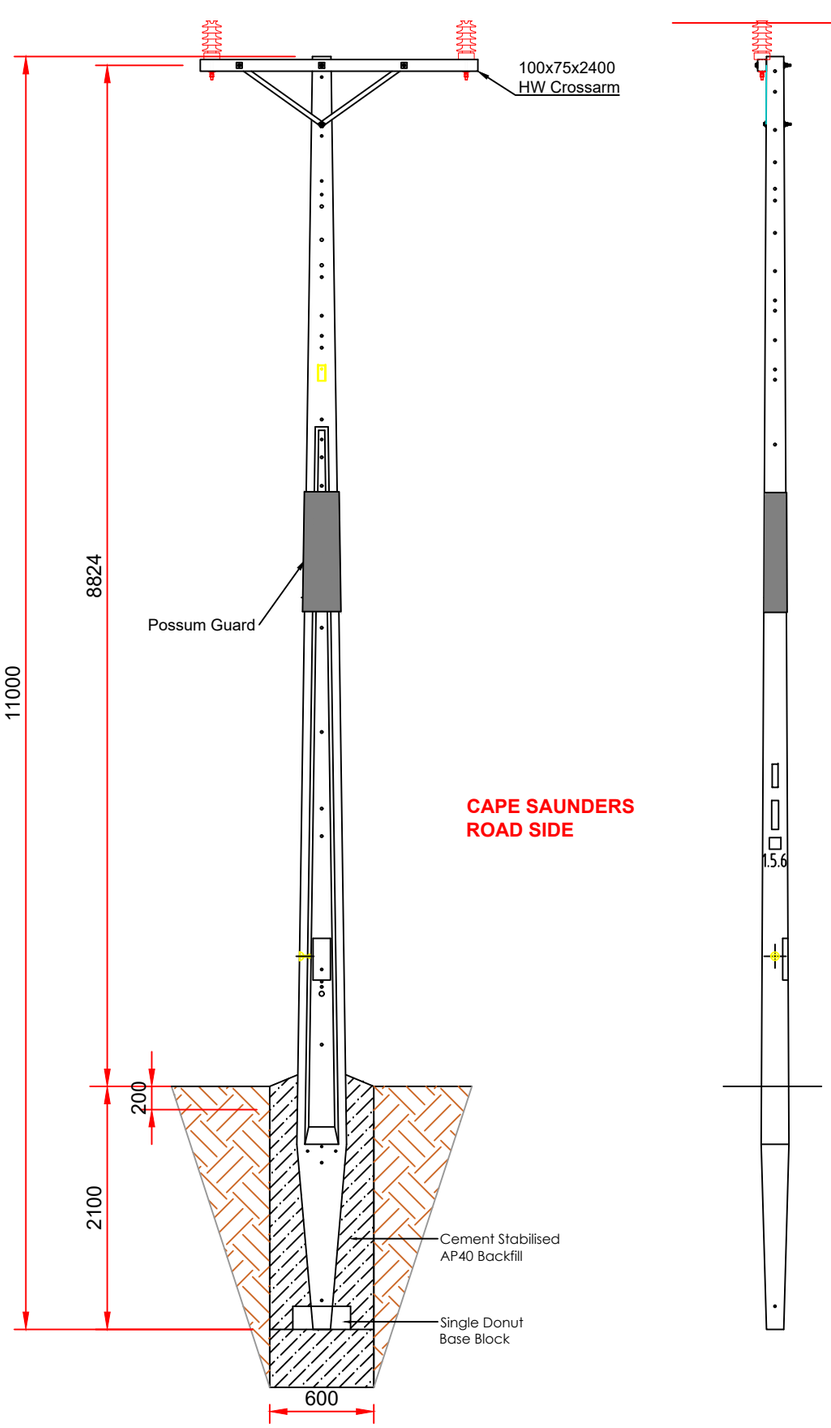
POLE DETAILS



POLE PHOTO

Rev.	Description	Drn	Ckd	Date	References
A	Original Issue	Vena	AV	29/07/19	
B	Change Conductor To Flourine	Vena	AV	13/01/20	

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Drawn	Vena	29/07/19	File Name	R24492AV
Checked	AV	29/07/19	Scale	NTS
Approved	SJ	29/07/19	Sheet	6 of 19

Job number	024529-1100
Section	8/9 and 10
CFR	10203

Cape Saunders Rd, Cape Saunders
Conductor Replacement
PP-71979
Feeder ID - PC3

Rev
B

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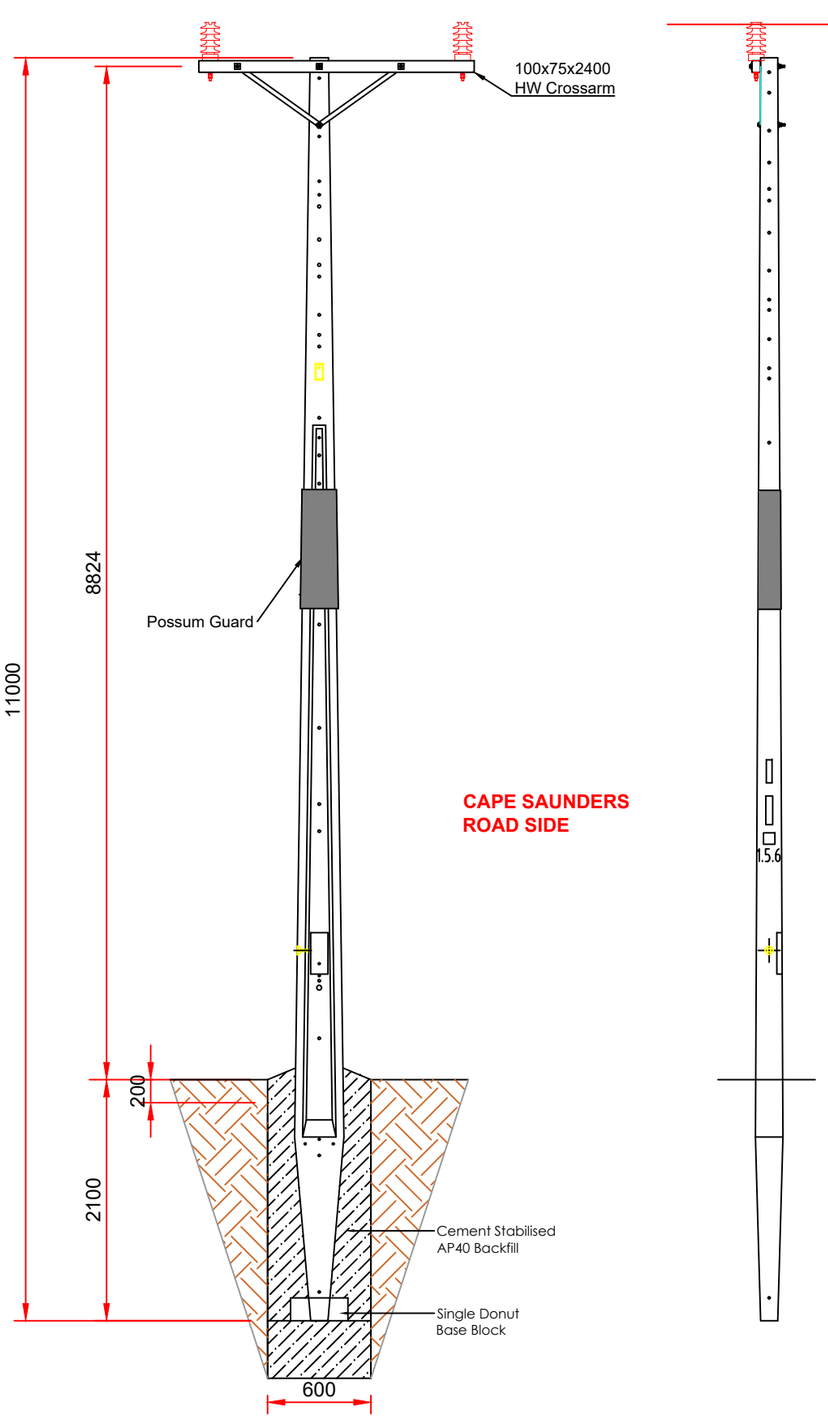
POLE DETAILS



POLE PHOTO

Rev.	Description	Drn	Ckd	Date	References
A	Original Issue	Vena	AV	29/07/19	
B	Change Conductor To Flourine	Vena	AV	13/01/20	

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Checked	AV	29/07/19
Approved	SJ	29/07/19

Job number	024529-1100
Section	8/9 and 10
CFR	10203
File Name	R24492AV
Scale	NTS
Sheet	7 of 19

Cape Saunders Rd, Cape Saunders
Conductor Replacement
PP-71980
Feeder ID - PC3

Rev
B

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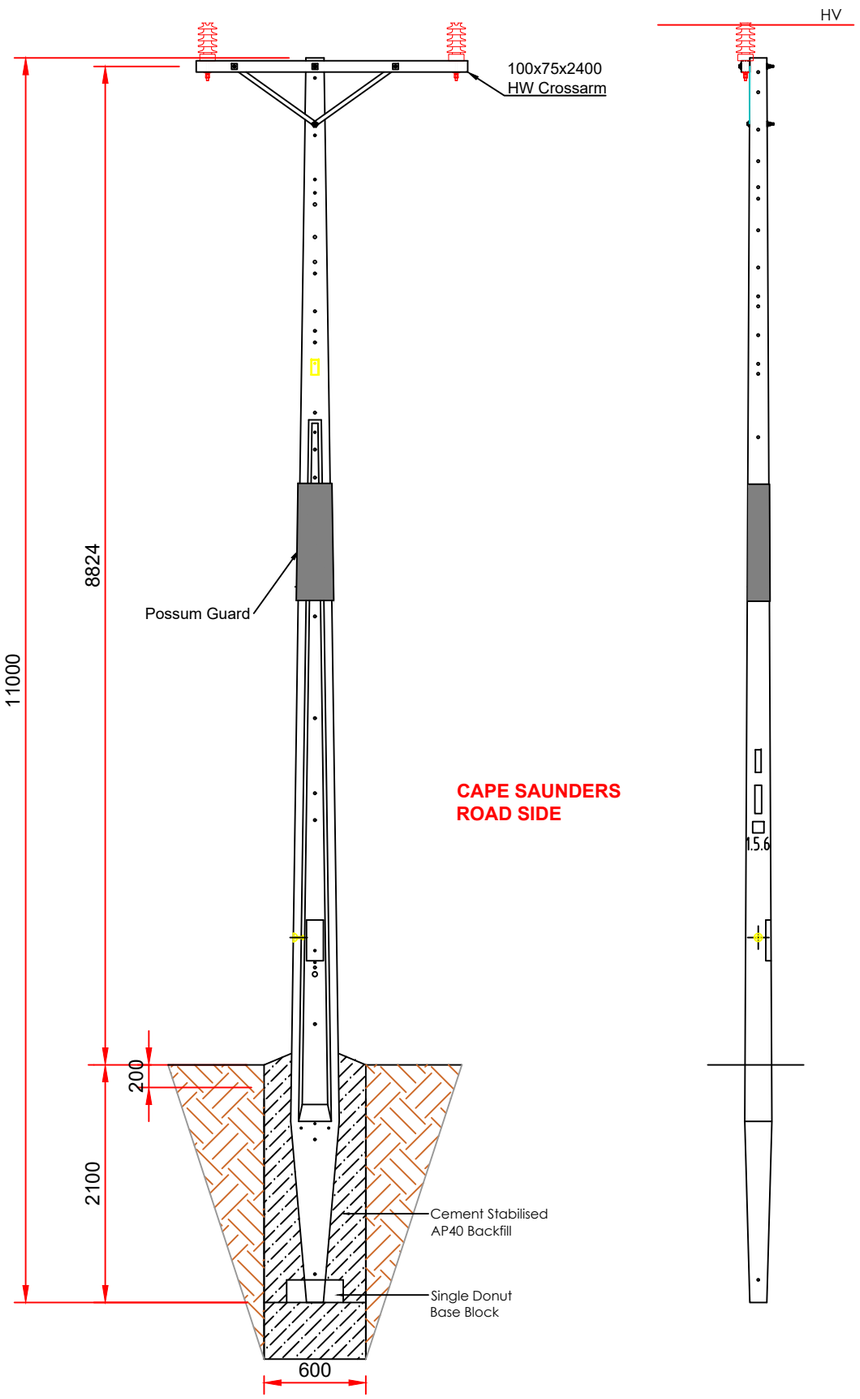
POLE DETAILS



POLE PHOTO

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B	Change Conductor To Flourine	Vena	AV	13/01/20	

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Drawn	Vena	29/07/19	File Name	R24492AV
Checked	AV	29/07/19	Scale	NTS
Approved	SJ	29/07/19	Sheet	8 of 19

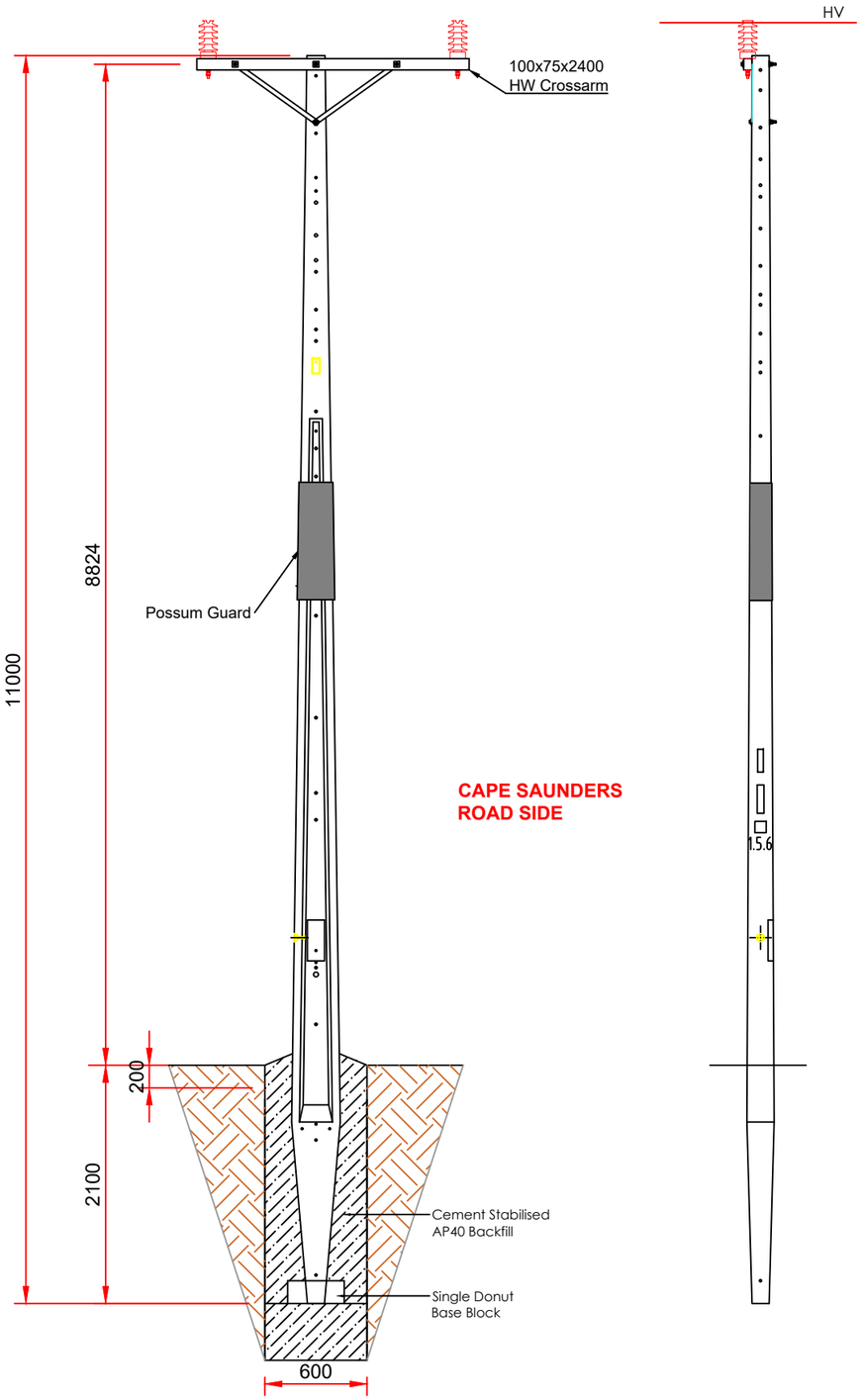
Job number	024529-1100
Section	8/9 and 10
CFR	10203

Cape Saunders Rd, Cape Saunders
Conductor Replacement
PP-71981
Feeder ID - PC3

Rev
B

Aurora ENERGY

POLE DETAILS



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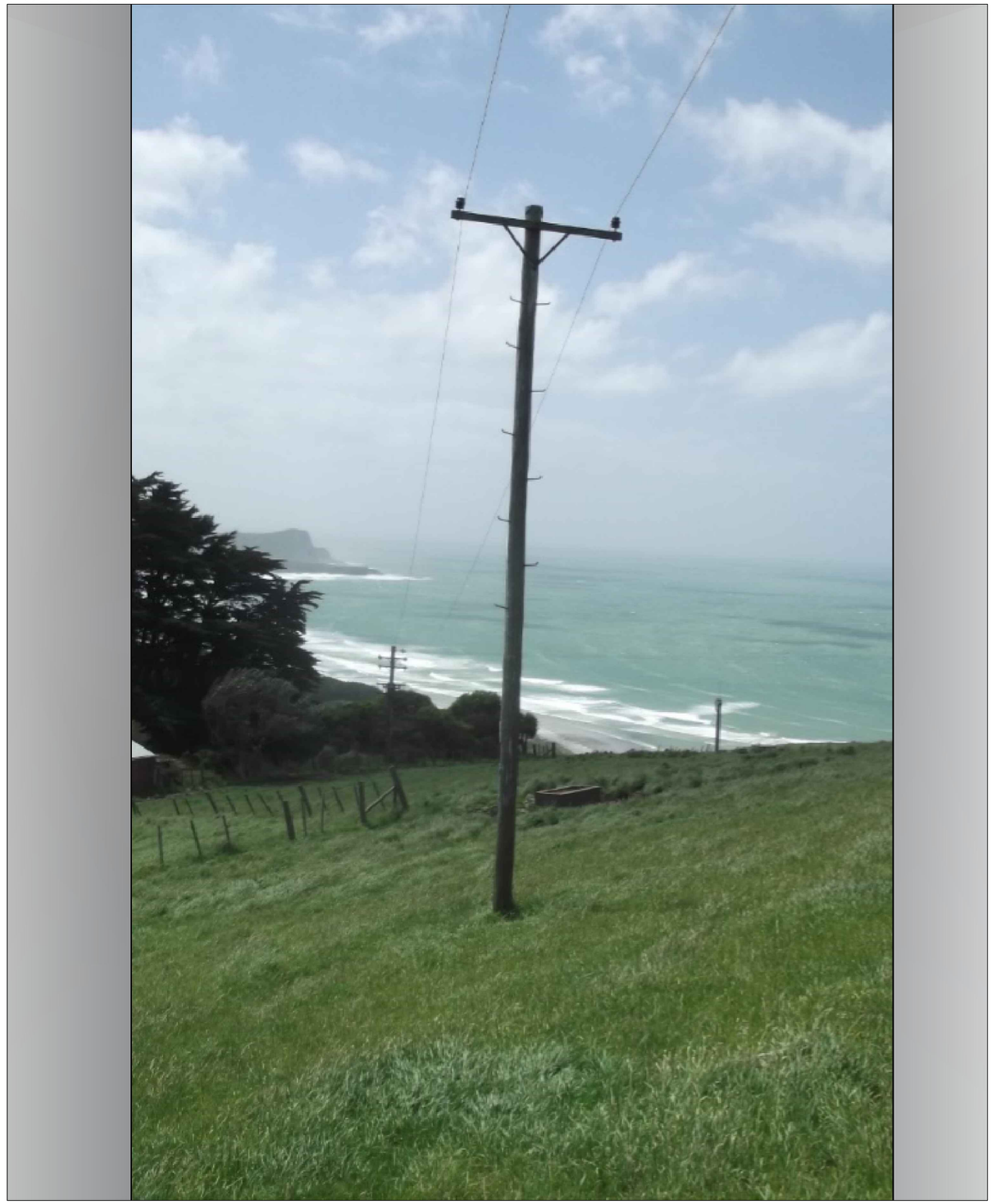

Rev.	Description	Drn	Ckd	Date	References
A	Original Issue	Vena	AV	29/07/19	
B	Change Conductor To Flourine	Vena	AV	13/01/20	

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Drawn	Vena	29/07/19
Checked	AV	29/07/19
Approved	SJ	29/07/19

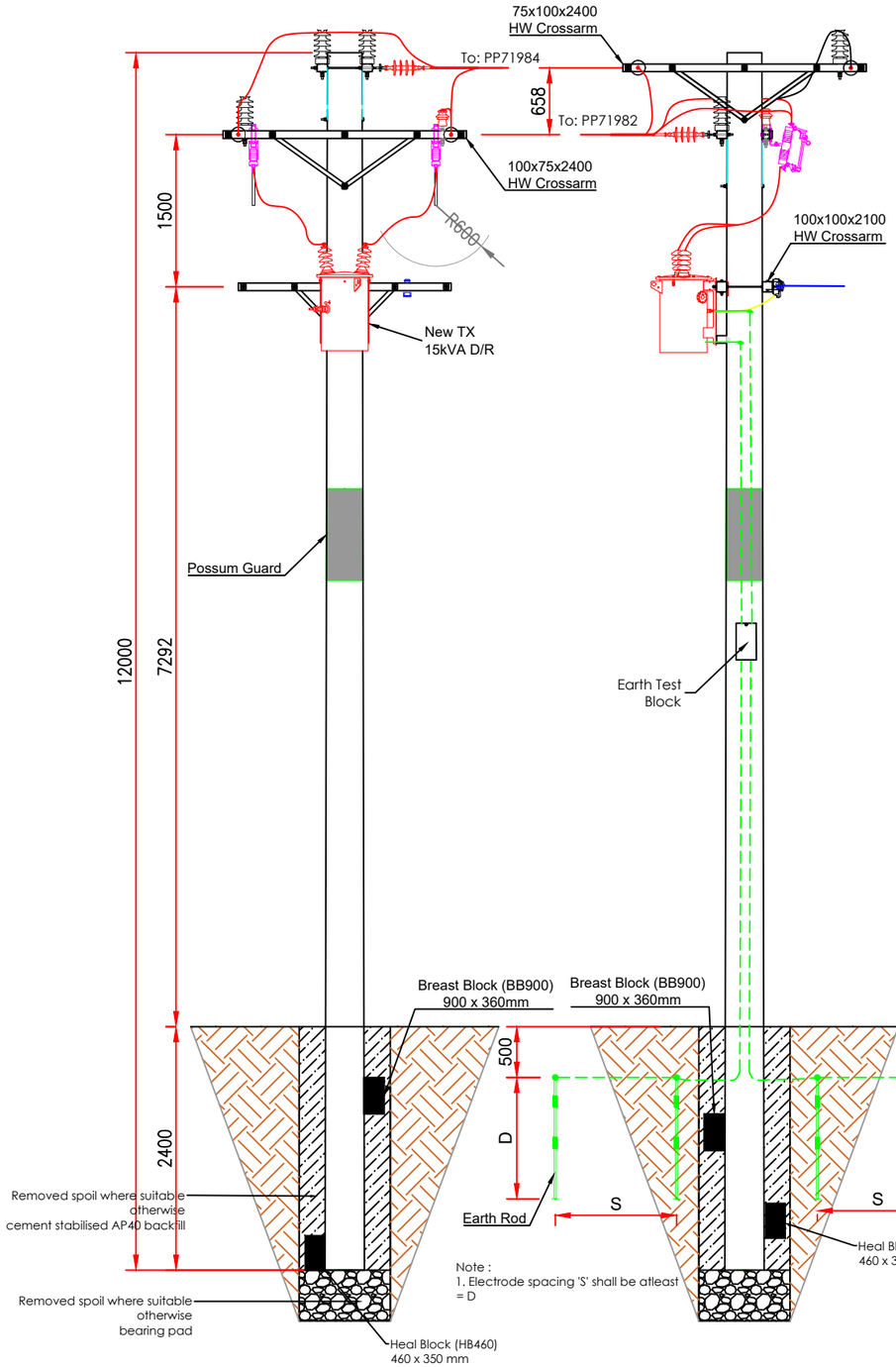
Job number	024529-1100
Section	8/9 and 10
CFR	10203
File Name	R24492AV
Scale	NTS
Sheet	9 of 19

Cape Saunders Rd, Cape Saunders
Conductor Replacement
PP-71982
Feeder ID - PC3

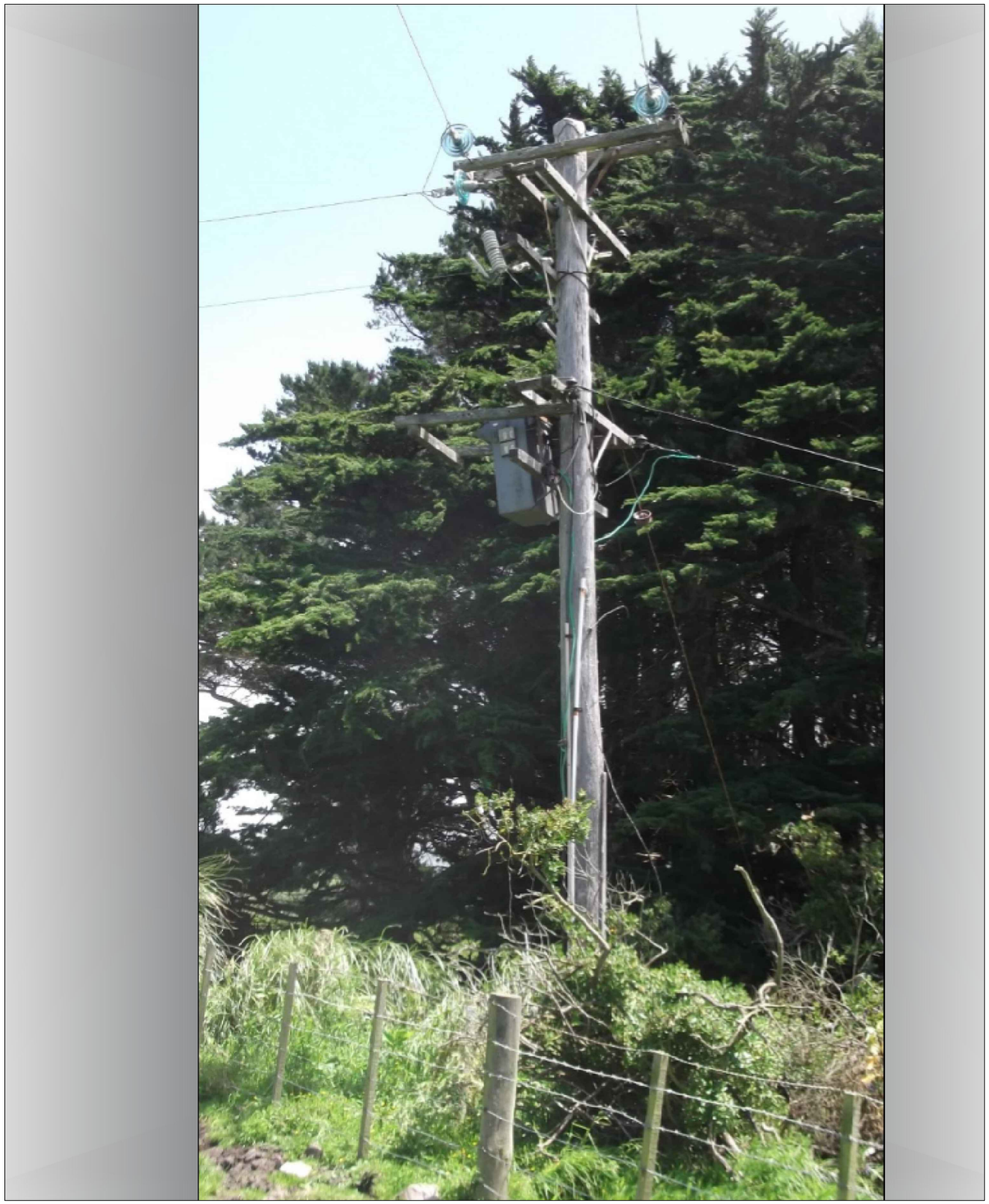
Rev
B

Aurora ENERGY

POLE DETAILS



POLE PHOTO



Rev.	Description	Drn	Ckd	Date	References
A	Original Issue	Vena	AV	29/07/19	
B	Change Conductor To Flourine	Vena	AV	13/01/20	

Dennis Andeza - Distribution Designer
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Drawn	Vena	29/07/19
Checked	AV	29/07/19
Approved	SJ	29/07/19

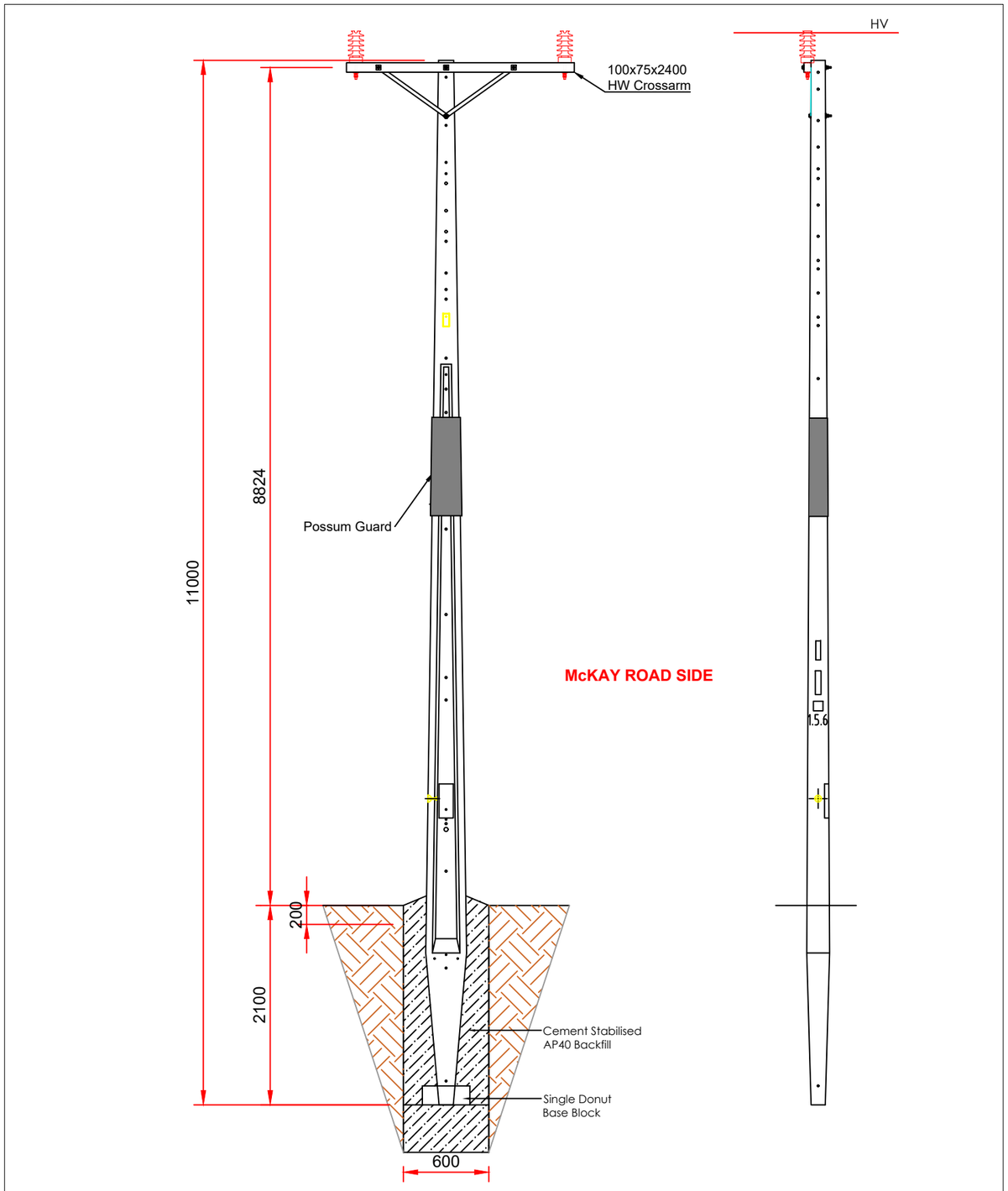
Job number	024529-1100
Section	8/9 and 10
CFR	10203
File Name	R24492AV
Scale	NTS
Sheet	10 of 19

Cape Saunders Rd, Cape Saunders
Conductor Replacement
PP-71983
Feeder ID - PC3

Rev
B

Aurora ENERGY

POLE DETAILS



POLE PHOTO

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File Name	R24492AV
Scale	NTS
Sheet	11 of 19

McKay Rd, Cape Saunders
Conductor Replacement
PP-71984
Feeder ID - PC3

Rev
B

Aurora ENERGY