



Athene Hillside Impala 1 & 2 132kV Bypass Refurbishment Project

The Athene Hillside Impala 1 & 2 132kV Bypass Lines are situated in the Richards Bay area, a marine and industrial environment (highly corrosive), resulting in the tower members, bolts and hardware being heavily corroded. Some of the members have corroded to the extent that some members have actually fallen off the tower. Corrosion of the tower members, bolts and hardware decreases its mechanical strength thus decreasing the mechanical integrity of tower as a whole which in turn increases the risk of hardware failure and tower failure. In order to eliminate the aforementioned risk it was decided that the Athene Hillside Impala 1 & 2 132kV Bypass Lines be refurbished.

- The scope of the refurbishment will include replacement of six towers (four 224 C towers and two 224 B towers), refurbishment of two beams (433D tower type) and the replacement of all insulators and hardware. The scope of work will also include the replacement of the 2 x 24 core ADSS on Line 1 with 2 x 48 core ADSS.

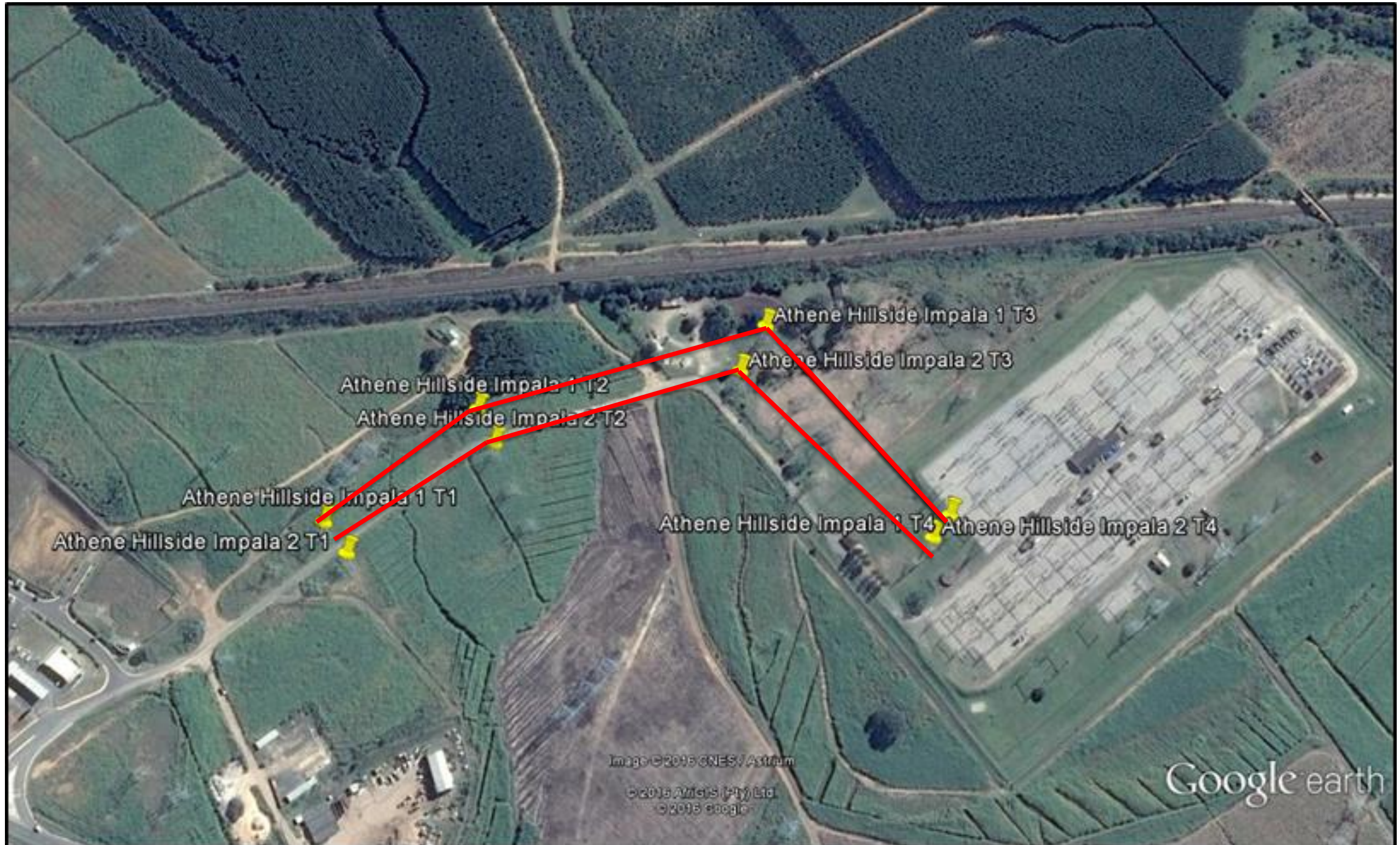
Tower Types: 433D without earth peaks (T1) , 224B without earth peaks (T2) , 224 C without earth peaks (T3) , 224C with earth peaks (T4)

Conductor: Quad Tern , 450mm Bundle Spacing

Insulators: Glass UI 90 210kN

Fibre: 2 x 24 Core Long Span ADSS on Line I only. Strung between phases at the top of the cross arms.

Hardware: Standard Strain Assemblies and Standard ADSS Strain Assemblies



Tower Types



433D



224B



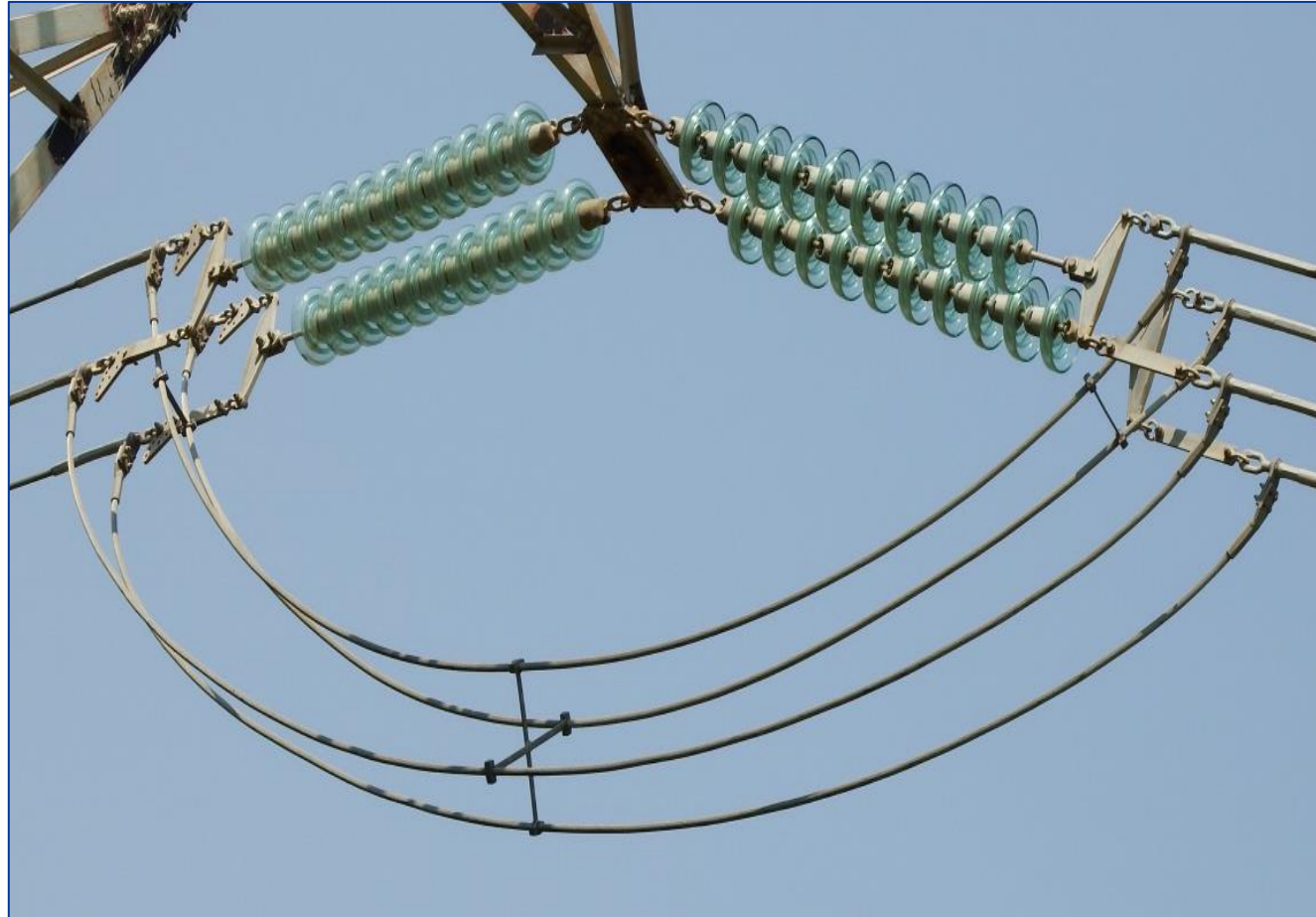
224B- no
earth peak



224C- with
earth peak



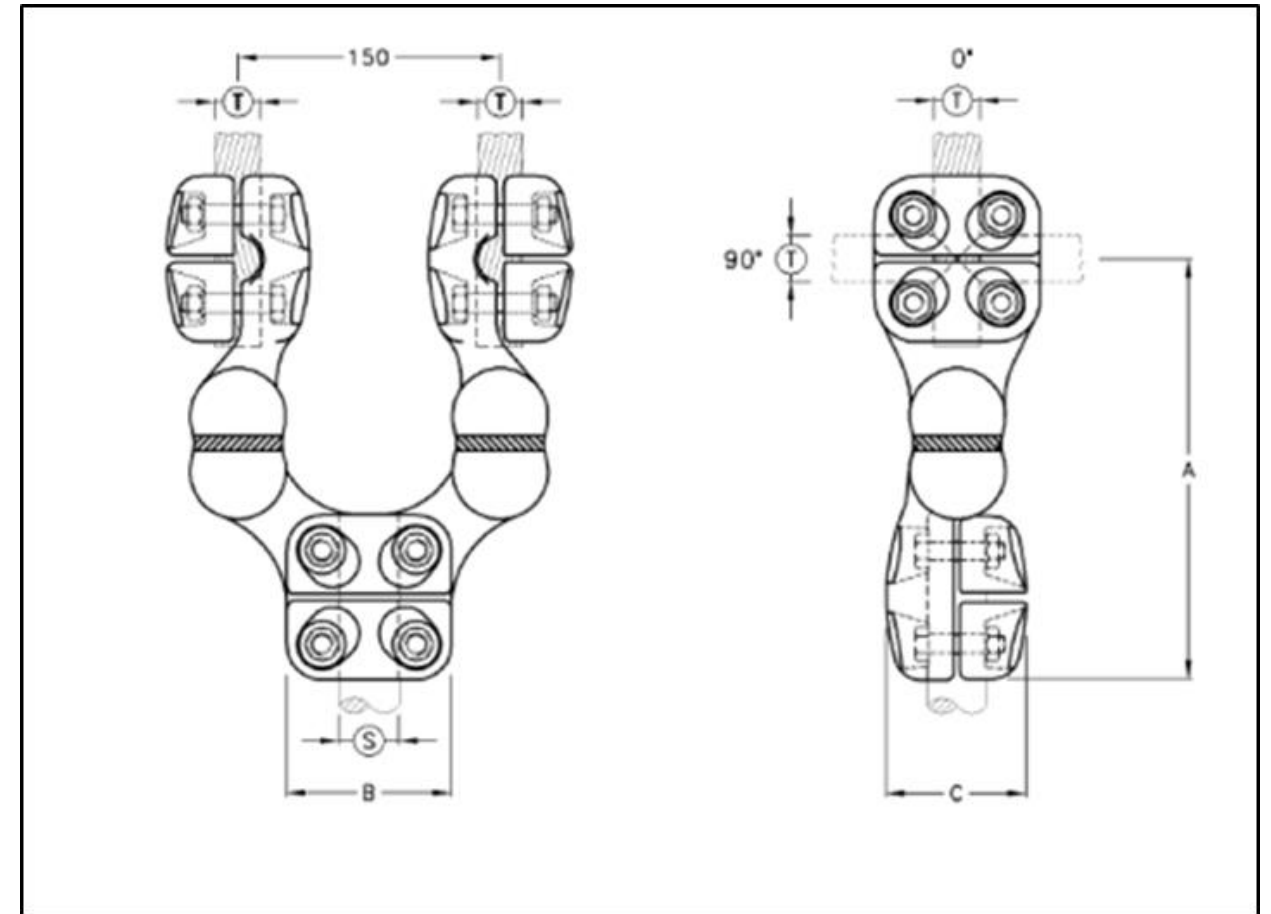
- Ball Oval Eye (300kN)
- Live Line Socket Tongue (300kN)
- Double Extension Link (300kN)
- Triangular Yoke Plate (300kN)
- Shackle(210kN)
- Twisted Shackle (210kN)
- Sag Adjuster (210kN)
- Shackle (210kN)
- Cranked Extension Link (300kN)



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Current Dropper Arrangement



New Dropper Arrangement-
McWade Modified Y-7/8

Item Number	Description	Quantity
1	2 Tern to 2 Tern Dropper Clamps – Clamps to connect Athene Hillside Lines to Bypass	24
2	Spacer Damper Quad Tern 450mm	60
3	Jumper Rigid Spacers – Twin	24
4	Jumper Rigid Spacers – Quad	12
5	Twin Bull Rigid Spacer	12
6	Bolts and Nuts for Jumper Flags	TBC

It must be noted that jumper flags will be refurbished.

In order to minimise the outage time for the fibre during the project, the following is recommended:

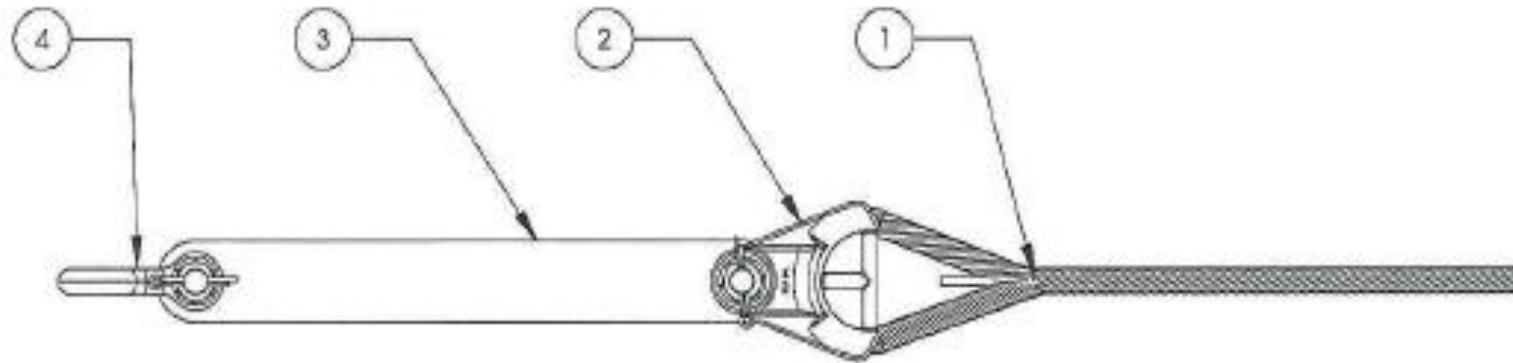
- Line 2 is to be refurbished first.
- Upon completion of Line 2 refurbishment. A trench of approximately 120m will need to be excavated from Athene Hillside 3 T6 to Athene Hillside Impala 2 T2.
- The 2 x 24 core ADSS fibre will be laid in the trench and the 2 x 24 core ADSS fibre will be spliced onto the 48 core fibre in the joint box on Athene Hillside Impala 2 T2.
- The 48 core fibre will then be strung at the top of the cross arms from Athene Hillside Impala 2 to Athene Hillside Impala 4.
- The 48 core fibre will then be strung to the Athene Hillside Impala 2 gantry. A temporary joint box will need to be installed on the Athene Hillside Impala 2 gantry. Telecomms need to develop the scope for routing the 48 core fibre to the control room.
- Once the refurbishment for Line 2 is completed, Line 1 is to be strung with 2x 48-core ADSS fibre.
- It must be noted that the current hardware configuration on Line 1 will suffice for the new 48-core fibre due to its light weight.

It should be noted that there is an agreement in place with the sugar cane owner, that the cane in this area is to be green harvested i.e. no burning of cane in this area.

The hardware assembly for the ADDS Fibre is as follows:

1. Fiberlign Dead End Assembly
2. Thimble Clevis 120kN
3. Extension Link 350mm, 120kN
4. Shackle 120kN

16 Assemblies will be required



- Joint Boxes required: 6
- Downlead clamps required: 100

Obstacles	Risks	Mitigations
<ol style="list-style-type: none"> 1. Substation Equipment below closing span. 2. Substation Road. 3. HV Yard Fence. 4. Cattle Farm. 5. Sugar Cane. 6. Roads. 7. Buildings. 	<ol style="list-style-type: none"> 1. Damage to substation equipment. 2. Blockage of substation road 3. Damage to HV Yard Fence. 4. Failure of hardware/ conductor/ tower while performing construction activities. 5. Access to towers and spans. 6. Outages. 7. Outages on fibre network. 8. Weather. 9. Contractor capabilities to perform work. 	<ol style="list-style-type: none"> 1. Construction of suitable structures to prevent conductor from touching ground. 2. Development of suitable safe work procedure to perform construction activities. 3. Planning of outages on both the lines and the fibre network to prevent delays. 4. Planning of work during periods when servitude is clear and no planting and harvesting is being done. 5. Use of competent prequalified contractors.

Item no	Basic description of steps to follow (not limited to these).
1	Development of Technical Documentation by Contractor – Method Statements, ITPS, etc.
2	Site establishment by contractor
3	Development and implementation of suitable structures for mitigation purposes – fences, road, houses, etc.
4	Supply, assemble new towers in sections
5	Drop phase and fibre connections from tower to ground (disconnection of droppers from Athene Hillside Lines also)
6	Remove old towers and replace with new
7	Reconnect phase and fibre connections with new insulators and hardware
8	Reconnect dropper to the Athene Hillside Lines
9	Redo foundation caps

Thank you

