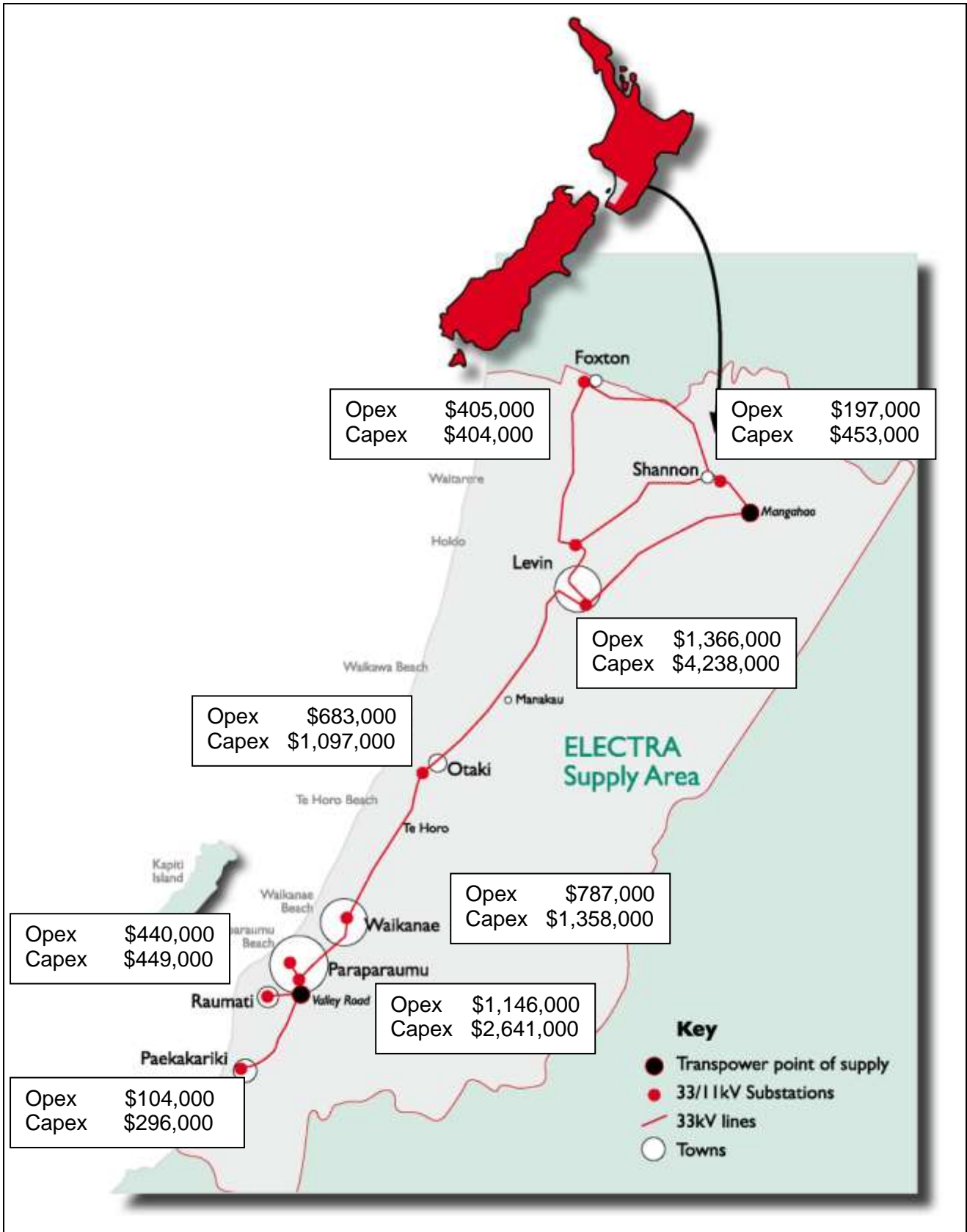


## **ASSET MANAGEMENT PLAN OVERVIEW 2016-26**

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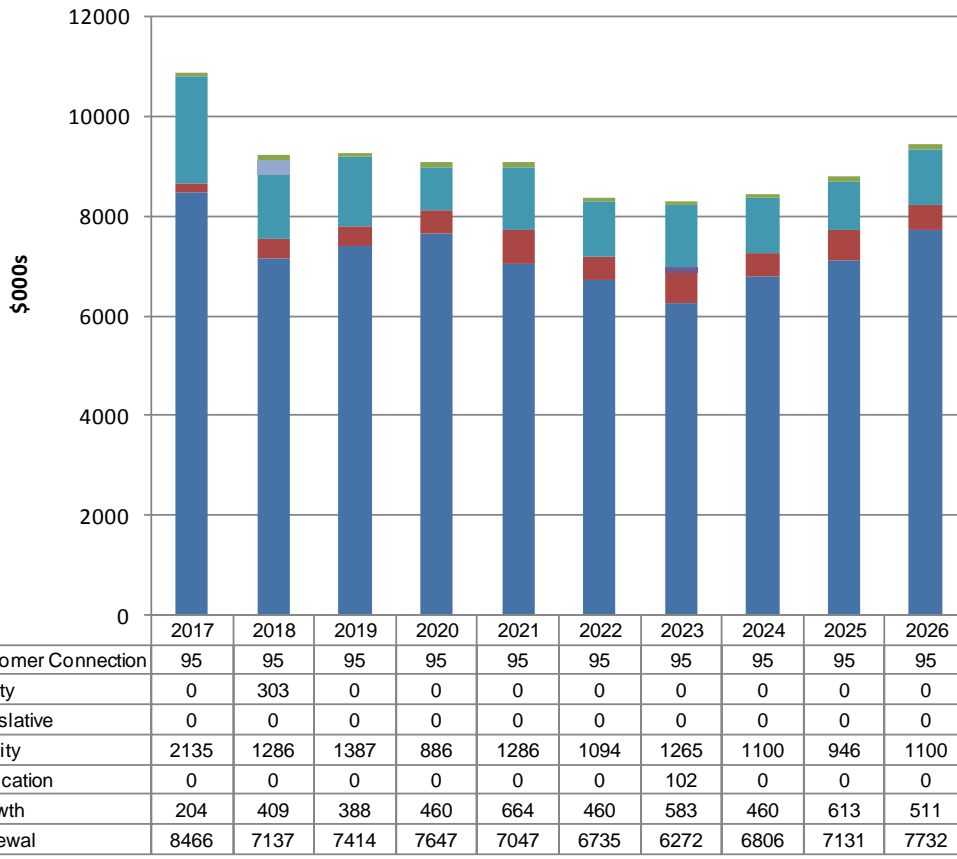
**Expenditure by location 2016/17**

<p><b>EXECUTIVE SUMMARY</b></p>	<ul style="list-style-type: none"> <li>• This document reflects the key issues and overall direction of Electra’s detailed 2016-2026 Asset Management Plan (AMP).</li> <li>• The 2016 AMP continues to emphasise a sustained asset replacement programme in the medium to long term. This is consistent with the path of our previous plan.</li> <li>• While the focus is on renewal and replacement, we also expect the programme to result in a concurrent improvement in underlying reliability for our customers by installing devices that can provide and act on the increasing amount of data that is currently available. The increased availability and application of data and technology will also enhance our ability to respond to changing customer expectations.</li> <li>• There continues to be less accent on growth, partly because we have little indication of any turn around in this area, but also simply because there are increasing numbers of ageing assets that need replacing in a timely fashion to prevent the network from aging further overall and to maintain system reliability.</li> <li>• It highlights opportunities with Transpower along with each main area of the network being: <ul style="list-style-type: none"> <li>• 33kV subtransmission</li> <li>• Zone Substations</li> <li>• 11kV distribution</li> <li>• Distribution transformers</li> <li>• 400V distribution</li> <li>• Consumer connections</li> </ul> </li> <li>• Capital costs will average \$9.14m per year over the next 10 years with \$10.94m allocated for 2016/17. These figures are substantially the same as in previous year’s AMP’s after allowing for changes in accounting treatment.</li> <li>• Operational costs will average \$4.45m per year over the same period. Aside from changes in accounting treatment, this figure is slightly more in real terms than the last plan. This is to allow for the additional costs associated with maintaining the soon to be purchased Transpower 110kV lines.</li> <li>• A summary of key projects for the next 12 months is included.</li> </ul>
<p><b>FOCUS ON RENEWAL, REPLACEMENT AND RELIABILITY</b></p>	<ul style="list-style-type: none"> <li>• With continued flat electricity demand in the local economy and the need to replace assets that are at the end of their economic life, the focus of this AMP continues to be on asset replacement, renewal and reliability.</li> <li>• This investment is intended to stabilise aging of the network, with specific assets to be replaced being identified by inspection/testing and ranking of condition.</li> <li>• Electra will continue to install “smart capable” equipment as part of the renewal and replacement programme that operate and communicate the information needed for faster restoration of supply to customers in the event of a fault. Electra is currently identifying commercially available</li> </ul>

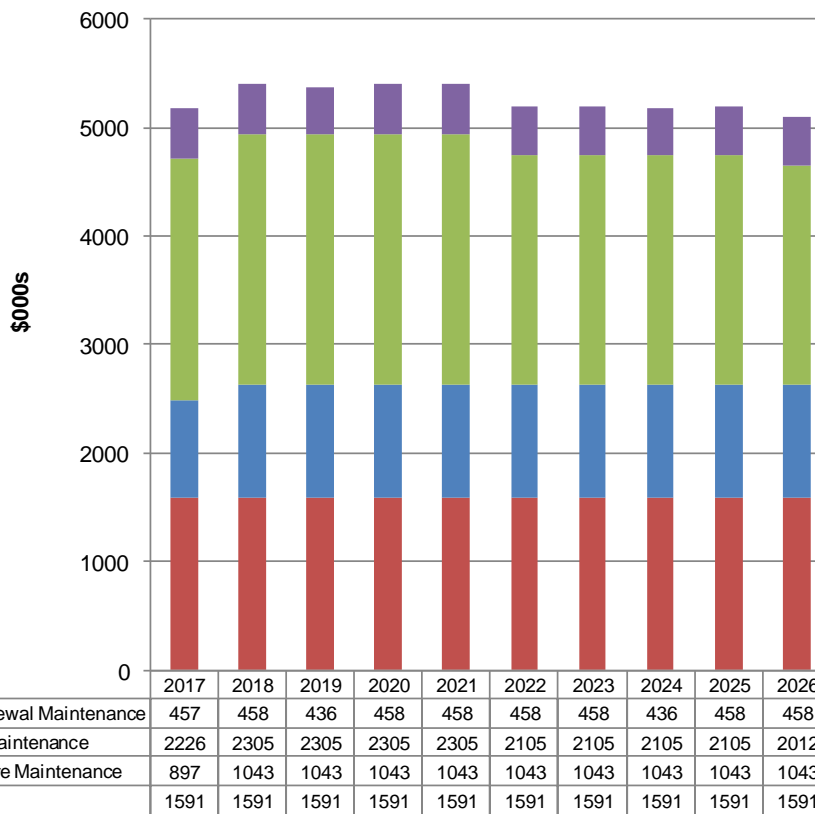
	<p>systems that will enable the automatic operation of these units.</p> <ul style="list-style-type: none"> <li>• The percentage of projected capital expenditure over the next 10 years for growth is expected to remain at 6%. The additional investment associated with the purchase of the Transpower 110kV lines will result in an increase in reliability expenditure from 13% to 17%. Renewal and replacement work is expected to account for 76% of capital expenditure over the planning period.</li> <li>• If load growth returns to the levels experienced prior to 2008, Electra has the flexibility to modify its Capex approach where needed. Any load growth exceeding the 1.5% per annum already allowed for in the AMP would require additional capital expenditure to a maximum of approximately \$1.1 million per percentage point of additional growth.</li> </ul>
<p><b>TRANSPOWER SUPPLY</b></p>	<ul style="list-style-type: none"> <li>• Transpower has now connected Paraparaumu to its core 220kV network. The new 220kV/33kV transformers have increased firm capacity from 68 to 120MVA and will ensure that Electra has sufficient capacity in that area well beyond the planning period.</li> <li>• A decision on to purchase and operate the Transpower 110kV lines between Mangahao and Levin at 33kV was made in 2015. It is a more efficient way of complementing the existing 33kV lines and will simplify the eventual rebuilding of the existing double circuit 33kV line between Mangahao and Levin East.</li> <li>• The Transpower lines from Bunnythorpe to the Mangahao GXP are rated at 60MVA, with the existing transformers at 30MVA supplying a peak load of 35MVA last year. This does not include any offset at peak from generation at Mangahao. The transformers are near the end of their economic life and are scheduled to be replaced in 2020 with 60MVA units (the expected standard Transpower size).</li> </ul>
<p><b>33KV SUB TRANSMISSION NETWORK</b></p>	<ul style="list-style-type: none"> <li>• The completion of the 33kV cable from Levin East substation will allow full doubling of the circuits between Mangahao GXP and that substation. Currently the double circuit only runs as far as Waihou Road outside Levin and the cable will allow greater operational flexibility by effectively giving us another 33kV circuit from Mangahao. The point of connection for this cable will be finalised once ownership of the existing 110kV Transpower lines is passed to Electra.</li> <li>• Planning for the eventual replacement of the original (ca1942) lines supplying Levin from Mangahao is expected to start in 2017 with reconstruction currently scheduled to commence in 2020</li> </ul>
<p><b>ZONE SUBSTATIONS</b></p>	<ul style="list-style-type: none"> <li>• Replacement of the old substation at Paraparaumu East has been progressing faster than expected and the project is now back on its original schedule with completion expected in 2016</li> <li>• The remainder of the work for zone substations in the planning period involves renewal and replacement of older equipment. This includes phasing out of the last oil filled circuit breakers, along with replacement of electro-mechanical and 1st generation electronic relays with modern equivalents at several of our older substations.</li> <li>• Completion of the Paraparaumu East substation rebuild and cabling along with the Shannon circuit separation completes the major individual projects planned for the next few years.</li> </ul>

	<ul style="list-style-type: none"> <li>• The possibility of new zone substations north of Otaki and at Waikanae West will be largely dependent on growth, which based on current projections remains outside the planning period.</li> <li>• At this stage it is planned to avoid investment in additional zone substations (particularly Waikanae West/Beach) by reinforcement of the 11kV distribution network in the short term and expansion of capacity at the existing Waikanae substation through the addition of a third transformer in the medium term.</li> </ul>
<b>11KV DISTRIBUTION NETWORK</b>	<ul style="list-style-type: none"> <li>• The primary emphasis over the next 10 years will be on consistently meeting reliability targets (SAIDI, SAIFI and CAIDI) and improving operational flexibility. It is anticipated the planned investment will also result in incremental improvement in these measures.</li> <li>• Increased sectionalisation will reduce the number of consumers affected by a single fault. This, coupled with the automation of alternative supply routes, will allow quicker restoration and fault isolation to minimise the duration of outages. The recently completed loop automation scheme north of Shannon demonstrates this. It will be subject to ongoing evaluation with the expectation that similar arrangements will be installed on other parts of the network where there are benefits.</li> <li>• There are still some several locations where concentrations of consumers do not have an alternative supply. These are primarily in beach front settlements such as Waitarere Beach, Waikawa Beach and Te Horo Beach. Waitarere Beach is the largest of these settlements and planning for an alternative supply to this area is underway with construction expected to commence in 2019.</li> <li>• For the remainder of the period we expect to see a slight increase in replacement and renewal of assets. As noted this will be due to age and condition rather than a need for increased capacity as had been the case with the high growth of previous periods. However the opportunity will be taken to install larger capacity cables and wires as part of the renewal work to provide greater operational flexibility and network resilience.</li> <li>• The expectation is to replace 8-15km of line, 150-200 poles, 800-1000 cross arms and 2-4km of cable in any given year to provide a stable expenditure programme of around \$3.9m per year for these assets.</li> <li>• The removal of the remaining 34 hardwood poles from the network is expected to be completed in 2016 in addition to the routine level of replacement.</li> <li>• Expenditure on vegetation control is anticipated to continue at around \$1.4m per year using two tree crews.</li> </ul>
<b>DISTRIBUTION TRANSFORMERS</b>	<ul style="list-style-type: none"> <li>• Work on this asset class is derived from the results of our regular inspection cycles. The previously increasing rate of defects identified has stabilised under our current management system.</li> <li>• The expectation is to replace 15-20 ground mounted and 20-30 pole mounted units each year to provide a stable expenditure programme of around \$1.4m per year.</li> <li>• An active programme targeting the replacement of large two pole deck transformers each year with ground sited transformers is expected to be</li> </ul>

	<p>completed within the period. This reduces future maintenance requirements and improves safety overall.</p> <ul style="list-style-type: none"> <li>• A similar programme for transformers located within buildings owned by consumers is also underway with the same expected outcomes.</li> <li>• The completion of these two programmes in around 2022 will reduce the expected expenditure on this asset class from \$2.1m per annum to \$1.6m per annum.</li> </ul>
<b>400V DISTRIBUTION NETWORK</b>	<ul style="list-style-type: none"> <li>• Work on this asset class is also derived from the results of our regular inspection cycles.</li> <li>• We expect to see an increase in replacement and renewal of aged assets as they are now less likely to be replaced before their end of life for growth reasons.</li> <li>• The expectation is to replace 6-12km of line, 100-150 poles, 400-600 cross arms and 5-10km of cable each year to provide a stable expenditure programme of around \$2.8m per year.</li> <li>• In 2016/17 we will be carrying out this work mainly in, Levin, Otaki, and Paraparaumu.</li> </ul>
<b>CUSTOMER CONNECTIONS (PILLAR BOXES)</b>	<ul style="list-style-type: none"> <li>• We expect to see increasing replacement rates as the earliest pillar boxes are now approaching 50 years of service and may shortly present public safety issues. We have already changed a number of older metal pillar boxes that were potentially unsafe.</li> <li>• The expected replacement rate will be 150-200 annually at a cost of around \$0.6m per year.</li> </ul>
<b>EXPECTED COSTS</b>	<ul style="list-style-type: none"> <li>• Capital and operational expenditure forecasts for the next 10 year planning period are shown in the following tables.</li> <li>• Average capital expenditure is \$9.14 million per year, with \$10.94 million budgeted for this year.</li> <li>• Operational expenditure is expected to average \$4.45 million over the next 10 years with \$4.37 million budgeted for this year.</li> <li>• Growth expenditure is expected to average \$0.48million per annum based on an average load growth of less than 1.5% per annum, including new consumers.</li> <li>• If growth were to increase above 1.5% then around \$1.1 million would be needed for each 1% of growth. This figure has been derived by modelling the network with 50% increased load and customer numbers and apportioning the cost requirement for the extra assets needed in this scenario.</li> </ul>



### CAPITAL EXPENDITURE



### OPERATIONAL EXPENDITURE



## KEY CAPITAL PROJECTS FOR 2016/17

### Paraparaumu Zone Substation Switchyard Rebuild

Estimated cost, \$2,900,000 (\$890,000 in 2016/17)

Primary Benefit – Asset Renewal

This substation was built in 1970 and has had many additions and alterations since then. The outdoor structure is vulnerable to damage from external events. It also has a number of oil filled circuit breakers and aged protection systems. The final stage part of this project is expected to be completed this year.



### Levin, Mangahao - Tararua Rd, 33kV Line Duplication

Estimated Cost \$663,000

Primary Benefit – Quality

Connection from Levin Substation to existing line from Mangahao GXP to enable full duplication of the existing lines. This will eliminate a common mode failure point and allow increased operational flexibility and load transfer capability.



### Levin, SH1 south, 11kV Line Replacement.

Estimated Cost \$284,000

Primary Benefit – Asset Renewal

Secondary Benefit - Reliability

Replacement of an aged small Copper line 2.5km long with larger Aluminium conductor. The opportunity will be taken to link the lines in Buller Rd and Kimberley Rd with those on SH1 minimise customer outages and give more operational flexibility in future.



### Te Horo, Hautere Cross Rd, 11kV Reconductor

Estimated cost, \$245,000

Primary Benefit – Asset Renewal

Secondary Benefit – Power Quality

Replacement of an aged small Copper line 4km long with larger Aluminium conductor. This line has been subject to several faults over the last few years and has structures that need replacing as well. The new conductor will also improve voltage support into Te Horo and Otaki Gorge.





### **Paraparaumu, Cedar Dr, 11kV Cable Replacement**

Estimated Cost, \$204,000

Primary Benefit – Growth

Secondary Benefit – Power Quality

Replacement of the original cable into this area which is now insufficient for the load under certain network configurations. This work will also improve operational flexibility and load transfer capability.



### **Levin, Gladstone Rd, 11kV Reconductor**

Estimated Cost \$183,000

Primary Benefit – Asset Renewal

Secondary Benefit – Power Quality

Replacement of a 2.5km long aged small Steel Cored Aluminium line with larger Aluminium conductor to increase transfer capability in South of Levin and Ohau.



### **Levin, Roslyn Rd, 11kV Reconductor**

Estimated Cost, \$170,000

Primary Benefit – Asset Renewal

Secondary Benefit – Power Quality

Replacement of an aged small Copper line 4.5km long with larger Aluminium conductor. The opportunity will be taken to link the lines in Roslyn Rd with those on SH1 minimise customer outages and give more operational flexibility in future.

