

1 **3.1.4 Capital Projects by Category (5.4.1 d)**

2 The following tables summarize the total capital cost for the forecast period of the capital projects and
 3 Programs, sorted by category.

System Access	Year					5 Year Total
Project	2017	2018	2019	2020	2021	
City of London (Road Authority) Relocations	\$3,410,000	\$1,925,000	\$1,695,000	\$1,670,000	\$730,000	\$9,430,000
Developer Driven Distribution Circuit Expansions and Relocations	\$350,000	\$500,000	\$999,200	\$1,300,800	\$200,000	\$3,350,000
Residential Secondary Service Upgrades	\$355,000	\$363,000	\$370,000	\$377,000	\$384,000	\$1,849,000
New Single Family Residential Underground Distribution	\$1,380,000	\$1,410,000	\$1,440,000	\$1,470,000	\$1,494,000	\$7,194,000
New Multi-Housing Underground Distribution	\$900,000	\$920,000	\$940,000	\$955,000	\$974,000	\$4,689,000
New Commercial Distribution Services	\$1,950,000	\$1,960,000	\$2,030,000	\$2,070,000	\$2,111,000	\$10,121,000
Meter Sealing and Quality system	\$30,000	-	-	-	-	\$30,000
New Meters	\$638,000	\$657,140	\$676,854	\$697,159	\$718,074	\$3,387,227
Primary Meter Tank Replacement	\$354,000	\$364,620	\$375,558	\$368,825	\$398,430	\$1,861,433
AMI Communications Renewal	\$649,000	\$699,370	\$720,351	\$741,961	\$764,220	\$3,574,902
Cost Recoveries	(\$1,575,000)	(\$1,083,000)	(\$1,027,000)	(\$1,034,000)	(\$694,000)	(\$5,413,000)
Annual Total	\$8,441,000	\$7,716,130	\$8,219,963	\$8,616,745	\$7,079,724	\$40,073,562

Table 35: System Access - Capital Costs

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Appendix 2-6: Distribution System Plan

1 **3.1.4 Capital Projects by Category (5.4.1 d)**

2 The following tables summarize the total capital cost for the forecast period of the capital projects and
 3 Programs, sorted by category.

System Access	Year					5 Year Total
Project	2017	2018	2019	2020	2021	
City of London (Road Authority) Relocations	\$3,410,000	\$1,925,000	\$1,695,000	\$1,670,000	\$730,000	\$9,430,000
Developer Driven Distribution Circuit Expansions and Relocations	\$350,000	\$500,000	\$999,200	\$1,300,800	\$200,000	\$3,350,000
Residential Secondary Service Upgrades	\$355,000	\$363,000	\$370,000	\$377,000	\$384,000	\$1,849,000
New Single Family Residential Underground Distribution	\$1,380,000	\$1,410,000	\$1,440,000	\$1,470,000	\$1,494,000	\$7,194,000
New Multi-Housing Underground Distribution	\$900,000	\$920,000	\$940,000	\$955,000	\$974,000	\$4,689,000
New Commercial Distribution Services	\$1,950,000	\$1,960,000	\$2,030,000	\$2,070,000	\$2,111,000	\$10,121,000
Meter Sealing and Quality system	\$30,000	-	-	-	-	\$30,000
New Meters	\$638,000	\$657,140	\$676,854	\$697,159	\$718,074	\$3,387,227
Primary Meter Tank Replacement	\$354,000	\$364,620	\$375,558	\$368,825	\$398,430	\$1,861,433
AMI Communications Renewal	\$649,000	\$699,370	\$720,351	\$741,961	\$764,220	\$3,574,902
Cost Recoveries	(\$1,575,000)	(\$1,083,000)	(\$1,027,000)	(\$1,034,000)	(\$694,000)	(\$5,413,000)
Annual Total	\$8,441,000	\$7,716,130	\$8,219,963	\$8,616,745	\$7,079,724	\$40,073,562

Table 35: System Access - Capital Costs

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System Renewal Project	Year					5 Year Total
	2017	2018	2019	2020	2021	
Battery Bank Replacement Program	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$75,000
Substation RTU Standardization	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$150,000
Cable Silicone Injection	\$2,711,000	\$2,029,000	\$1,909,000	\$2,802,000	\$3,228,000	\$12,679,000
Subdivision Rehabilitation	\$75,000	\$328,000	\$1,334,000	-	\$780,000	\$2,517,000
Replacement/Removals of SEs	\$293,000	\$866,500	\$689,500	\$398,000	\$99,500	\$2,346,500
Fully Depreciated and Leaking Transformers	\$700,000	\$800,000	\$800,000	\$800,000	\$800,000	\$3,900,000
Secondary Pedestal Replacement	\$20,000	\$20,000	\$20,000	\$20,000	\$21,000	\$101,000
Vault Rebuilds	\$144,000	\$203,000	\$331,000	\$174,000	\$288,000	\$1,140,000
Zone B Underground Conversion	\$287,000	\$111,000	\$42,000	\$327,000	\$448,000	\$1,215,000
13.8 kV UG Conversions	\$269,000	\$866,000	\$1,340,000	\$2,169,000	-	\$4,644,000
27.6 kV Supply to Core	\$1,560,000	-	-	-	-	\$1,560,000
13.8 kV Conversion Main Feeders	\$815,000	\$690,000	-	\$550,000	-	\$2,055,000
Civil Structure Installation	\$1,000,000	\$1,500,000	\$1,200,000	\$200,000	\$1,200,000	\$5,100,000
New Main Feeder Ties	\$0	\$2,352,100	\$653,000	\$650,000	\$2,100,000	\$5,755,100
Network Vaults / Maintenance Holes / Transformer Replacements	\$1,020,000	\$1,030,000	\$950,000	\$1,050,000	\$1,050,000	\$5,100,000
Primary & Secondary Cables Replacements	\$380,000	\$380,000	\$380,000	\$380,000	\$380,000	\$1,900,000
Maintenance Hole Replacement due to Cable Rebuilds	\$200,000	\$150,000	\$200,000	\$200,000	\$150,000	\$900,000
Explosion-Limiting Maintenance Hole Covers	\$100,000	\$25,000	\$25,000	\$25,000	\$25,000	\$200,000
13.8 kV Network Conversion	\$370,000	-	-	-	-	\$370,000
Replace Deteriorating Poles	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$1,500,000
Replacement of Poles Susceptible to Fires	\$110,000	\$225,000	\$120,000	\$275,000	-	\$730,000
Rebuild Depreciated Areas	\$260,000	\$314,600	\$1,611,300	\$1,230,000	\$4,859,500	\$8,275,400
13.8 kV Overhead Conversions	\$315,000	\$243,000	\$445,000	\$32,000	-	\$1,035,000
Zone B Overhead Conversion	\$2,965,000	\$3,704,000	\$3,902,600	\$4,501,200	\$575,300	\$15,648,100
Quick Sleeve Replacements	\$30,000	\$70,000	\$35,000	\$35,000	\$35,000	\$205,000
Porcelain Insulator Replacement	\$500,000	\$600,000	\$600,000	\$200,000	\$150,000	\$2,050,000
Copper-Clad Steel Grounds	\$50,000	\$50,000	\$25,000	\$50,000	\$50,000	\$225,000
Transformer Returns	(\$200,000)	(\$200,000)	(\$200,000)	(\$200,000)	(\$200,000)	(\$1,000,000)
Annual Total	\$14,319,000	\$16,702,200	\$16,757,400	\$16,213,200	\$16,384,300	\$80,376,100

Table 36: System Renewal - Capital Costs

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System Service Project	Year					5 Year Total
	2017	2018	2019	2020	2021	
Relay Replacements	\$80,000	-	-	-	-	\$80,000
Backup Supply Installation	\$70,000	\$70,000	-	-	-	\$140,000
Fault Indicator Installations	\$20,000	\$20,000	\$20,000	\$20,000	\$21,000	\$101,000
Recloser Installations	\$195,000	\$195,000	\$195,000	\$195,000	\$195,000	\$975,000
Serial Modem Conversion Program	\$30,000	\$30,000	\$30,000	\$30,000	\$30,000	\$150,000
DART RTU Replacement Program	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$500,000
SCADA Cyber Security	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$250,000
Line Status Sensors, (Remote Current & Real time Fault Indication)	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$250,000
Automatic Fault Detection, Isolation and Restoration	\$50,000	\$50,000	\$50,000	\$50,000	\$50,000	\$250,000
Control Centre - Display Technologies	\$250,000	\$150,000	\$50,000	\$50,000	\$50,000	\$550,000
Annual Total	\$895,000	\$715,000	\$545,000	\$545,000	\$546,000	\$3,246,000

Table 37: System Service - Capital Costs

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2

General Plant	Year					Total 5 Years
	2017	2018	2019	2020	2021	
Information Technology (IT)						
IT: Regulatory and Sustainment ⁶⁷	\$850,000	\$1,350,000	\$950,000	\$1,450,000	\$950,000	\$5,550,000
IT: Enhancements ⁶⁸	\$2,025,000	\$1,550,000	\$1,400,000	\$1,100,000	\$850,000	\$6,925,000
IT: New Systems ⁶⁹	\$900,000	\$2,400,000	\$1,500,000	\$2,500,000	\$3,300,000	\$10,600,000
IT Infrastructure (HW/SW)	\$735,000	\$800,000	\$850,000	\$950,000	\$950,000	\$4,285,000
IT Sub-Total	\$4,510,000	\$6,100,000	\$4,700,000	\$6,000,000	\$6,050,000	\$27,360,000
Fleet and Facilities						
HVAC Upgrades	\$154,000	\$155,000	\$160,000	\$165,000	\$170,000	\$804,000
Misc. Buildings and Fixtures	\$308,000	\$386,000	\$315,000	\$321,000	\$258,000	\$1,588,000
Paving	\$325,000	\$325,000	\$325,000	\$325,000	\$150,000	\$1,450,000
Control Room Upgrades	\$125,000	\$125,000	-	-	-	\$250,000
Security Equipment	\$50,000	\$51,500	\$51,500	\$51,500	\$52,000	\$256,500
Furniture and Equipment	\$147,000	\$202,200	\$207,200	\$210,600	\$212,100	\$979,100
Fleet Replacements - Vehicles and Equipment	\$1,099,000	\$1,104,000	\$1,128,000	\$1,145,000	\$1,155,000	\$5,631,000
Operating Equipment	320,000	300,000	300,000	300,000	300,000	\$1,520,000
Fleet and Facilities Sub-Total	\$2,528,000	\$2,648,700	\$2,486,700	\$2,518,100	\$2,297,100	\$12,478,600
Capital Contribution to Transformer Station (Nelson)	\$1,882,000	\$1,835,000	\$250,000	-	\$1,450,000	\$5,417,000
Annual Total All	\$8,920,000	\$10,583,700	\$7,436,700	\$8,518,100	\$9,797,100	\$45,255,600

Table 38: General Plant – Capital Costs

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⁶⁷ For 2017, IT Regulatory and Sustainment projects include Oracle Update, HRIS Enhancements, Regulatory Changes, ODS Upgrade, Security System Upgrades and Infrastructure Upgrades (application enhancements)

⁶⁸ For 2017, IT Enhancement projects include Customer Engagement Solutions, Timesheet Field Automation, Asset Management System, Commercial & Industrial Apps Phase 2, SAP, Green Button and Analytics Systems Phase 2

⁶⁹ For 2017, IT New Systems projects include Automated Billing Payments (IVR/Online), Residential Customer Mobile App and JDE Upgrade

1 **3.1.5 Impact of Regional Planning (5.4.1 e)**

2 As noted in Section 1.2 Coordinated Planning with Third Parties, London Hydro is a participant in the
3 Group 2 Regional Plan, London Area Region. The “Needs Assessment Report” (included as Appendix C)
4 did not make any recommendations that would have an impact on London Hydro’s five-year Capital
5 Expenditure Plan.⁷⁰

6 **3.1.6 Impact of Customer Engagement (5.4.1 f)**

7 London Hydro regularly solicits information from its customers to identify preferences which are then
8 taken into account during the preparation of the Capital Plan. The main source of the most useful
9 information regarding customer preferences is the annual Customer Satisfaction Survey.⁷¹ For the past
10 several years, customers have indicated a strong preference for maintaining the existing level of
11 reliability and for keeping rates low. These preferences have been reflected in the DSP by ensuring
12 reliability is maintained through the proactive replacement of assets at risk of failing and causing an
13 outage and considering lower cost options for asset sustainment beyond like-for-like replacements.

14 Customer Engagement has also resulted in several non-distribution system initiatives such as the
15 Builders’ Portal and New Property Management Tool which were developed in response to customers’
16 requests for new or enhanced services⁷².

17 A complete listing of all Customer Engagement activities and the impact to the DSP and Capital
18 Expenditure Plan is provided in Section 3.2.4 Customer Engagement (5.4.2 d). Projects that specifically
19 address Customer Preference are noted in Section 3.1.8 (5.4.1 h).

20 **3.1.7 Five-Year Outlook (5.4.1 g)**

21 As noted in Section 3.1.2 Total Capital Expenditures (5.4.1 b), the majority of investments for the next
22 five years are focused on System Renewal to maintain the existing level of system reliability (customer
23 preference) by replacing assets at end of life and most at risk of failure. While total system load growth
24 is expected to be moderate, it is anticipated that load will increase in the downtown core, which will be
25 addressed by the addition of a new feeder tie and the conversion of the Nelson Transformer Station to
26 27.6 kV and related feeder voltage conversion projects.

27

⁷⁰ The redevelopment of Nelson TS is noted in Section 6.3 of the Needs Assessment Report and accounted for within this DSP.

⁷¹ Details on the Customer Engagement process and results are in Section 3.2.4 Customer Engagement 5.4.2 d)

⁷² Details on these and other IT projects addressing Customer Preferences can be found in Exhibit 4 (“Information Technology”) and Exhibit 2 (“Application Development”)