PROJECTS $500K AND OVER FOR 2014

SUSTAINING PORTFOLIO – UNDERGROUND SYSTEM

Table 1: Underground Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
23060	Rouge Park Underground Rebuild SCXGF3 (Civil) Phase #2	6.8
22984	85M7 Underground Direct Buried Rebuild Hidden Trail & Surrounding Area Phase #2	3.1
22987	85M7 Underground Direct Buried Rebuild Hidden Trail & Surrounding Area Phase #1	3.0
14133	85M7 Underground Rebuild on Festival & Carnival	2.1
23362	Underground Rebuild SS68-F10 Francine Zircon McNicoll (Civil)	2.1
12642	Underground Trunk & Lateral Cable Rehab Beecroft	1.8
14163	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A11E, A12E, A31E & A33E	1.7
23004	85M7 Black Hawkway Underground Rebuild	1.7
23403	Livonia Underground Rebuild SCNT47M8 (Civil)	1.6
23195	Rouge Park Underground Rebuild SCXGF3 (Electrical) Phase #2	1.5
22887	Underground Rebuild Milner Industrial H9M23 Trunk Neilson (Civil)	1.5
23297	Underground Rebuild H9M30 Kingston Mason (Civil)	1.4
14172	Replace/Upgrade Cable from PILC to 500KCMIL TRXLPE on A-33-E	1.4
14171	Replace/Upgrade Cable from PILC to 500KCMIL TRXLPE on A-31-E	1.4
22888	Underground Rebuild Milner Industrial H9M23 Trunk Neilson (Electrical)	1.3
23046	Underground Rebuild 502M32 Eastwood SD (Civil)	1.3
14155	Lateral Cable Replacement – Chesswood & Champagne	1.2
14166	Replace/Upgrade Feeder A11E from PILC to 500KCMIL TRXLPE Cable	1.2
14167	Replace/Upgrade Feeder A12E from PILC to 500KCMIL TRXLPE Cable	1.2
23355	Underground Rebuild SS68-F10 McNicoll Michael (Civil)	1.1
14154	Lateral Cable Replacement – Dufferin, Finch, Toro	1.1
23363	Underground Rebuild SS68-F10 Francine Zircon McNicoll (Electrical)	1.0

Estimate Number	Project Title	Estimated Cost ($Millions)
23041	Underground Rebuild E51M24 Masonette SD (Civil)	1.0
22658	Upgrade Underground Trunk E51M21 and H9M27 SC Town Centre (Civil)	1.0
14096	Coreydale / Brockington Underground Residential Rebuild	1.0
23077	Underground Rebuild Agincourt Ind Park H9M23_M32 (Civil)	1.0
22880	Underground Rebuild H9M32 Milner B Crt Progress (Civil)	0.9
22920	Canterbury Crescent Underground Voltage Conversion	0.9
23404	Livonia Underground Rebuild SCNT47M8 (Electrical)	0.9
23262	Underground Rebuild 502M29 Bonis King Henrys (Civil)	0.8
22740	Lateral Cable Rehab - Oakdale S/O Jody	0.8
16004	Replace/Upgrade Feeder A53CS from PILC to 500KCMIL TRXLPE Cable	0.7
14078	Underground Lateral Cable Rehab Dufferin / Finch / Wilmington	0.7
23199	Underground Replacement 53M25 Trunk York Mills Road	0.7
22568	Underground Rebuild Prudential Drive SCNAE5-1M26 (Electrical)	0.7
14148	Underground Lateral Cable Rehab - Milvan	0.7
23441	Manse Road 209-245 Underground Rebuild (Civil)	0.7
22992	Underground Direct Buried Rebuild Ingles Gate & Shenstone Road	0.6
14157	Replace/Upgrade Feeder A47GD from PILC to 500KCMIL TRXLPE Cable	0.6
14156	Replace/Upgrade Feeder A41GD from PILC to 500KCMIL TRXLPE Cable	0.6
22881	Underground Rebuild H9M32 Milner B Crt Progress (Electrical)	0.6
23367	SS68-F10 Transformer Replacement	0.6
23187	Underground Replacement 53M25 Trunk Underhill Redwillow	0.6
23300	Underground Rebuild H9M30 Kingston Mason (Electrical)	0.5
22159	Ling Road Underground Rebuild SCNAH9M29 (Electrical)	0.5
23356	Underground Rebuild SS68-F10 McNicoll Michael (Electrical)	0.5
23006	85M7 Torresdale Avenue Underground DB Rebuild	0.5
Total Cost		**58.4**

1

Portfolio:	Underground
Project Title:	Rouge Park Underground Rebuild SCXGF3 (Civil) Phase #2
Project Number:	23060
Project Year:	2014
Estimate Cost:	$6,818,550

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the aged, direct buried cable that has exceeded its useful lifespan and subject to contamination and failure with cables in concrete-encased ducts for improved reliability.

Scope:

The scope of work for this project is to install 5,860m of concrete-encased ducts for primary and secondary installation in the Rouge Park subdivision, and install ducts for new padmount switch pads. It would also involve reusing existing transformer values and installing tap boxes to supply secondary services, as required. Lastly, direct buried ducts from the street line to the meter base would be installed for all customers presently fed by the transformers connected to the cables under replacement.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	RIDGEWOOD
STATION(S)	EAST AVENUE TUDOR GLEN MS
FEEDER(S)	SCXGF3

JUSTIFICATION

Project Background

This Rouge Park subdivision was constructed with direct buried XLPE cable in 1986. Direct buried XLPE cables are subject to contamination and electrical treeing and thus premature failure. They are also difficult to fault locate and require lengthy time for power restoration. These direct buried cables will be replaced with new TRXLPE cable in concrete encased ducts. Some circuits in this subdivision loop radially back to one PMH switch, and the rebuild will loop all circuits to two padmount switches for improved reliability and fault recovery.

Preparation work under another project will have converted a portion of feeder XG-F3 to 27.6kV by extending feeder 47-M17 along Lawrence Avenue and then north along Rouge Hills Drive to Starspray Boulevard to facilitate direct buried cable and transformer replacements in the Rouge Park subdivision. This neighbourhood has experienced outages in the last few years, with one major outage causing 124,121 CMO for 2007 customers in 2009.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			72
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,608	2,192	15
Feeder CMO ***(Cumulative)***	466,281	142,660	2,385

Benefits

- Replaces old and failing direct buried cables ranging from 25 to 47 years of age
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	85M7 Underground Direct Buried Rebuild Hidden Trail & Surrounding Area Phase #2
Project Number:	22984
Project Year:	2014
Estimate Cost:	$3,100,220

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild and replace the underground distribution on feeder NY85M7 and the surrounding area(s) to improve service reliability.

Scope:

The scope of work for this project is to enable the replacement of approximately 1200m of 1/0 primary cable, 6500m of secondary cable, 1000m of main ducts and 6500m of service ducts in the following areas: Hidden Trail, Millersgrove Drive and south of Fisherville Road. As such, the civil infrastructure to be constructed will balance loading in the area. This project would also involve the replacement of about 10 submersible transformers and 30 tap boxes that had generally been installed in the 1980's.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WESTMINSTER-BRANSON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M7

JUSTIFICATION

Project Background

The distribution system, mainly direct buried cables, experienced a number of failures in recent years. To improve the reliability of supply to the area distribution and operational flexibility,

THESL will replace the primary cables installed in concrete-encased ducts to the latest standard. The primary distribution system passes though the streets – Hidden Trail, Millersgrove Drive and south of the Fisherville Road.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			179
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,871	1,228	3,414
Feeder CMO ***(Cumulative)***	74,881	84,907	46,360

Benefits

- Replaces over 30 years old direct buried cables that are at risk of failing reducing the frequency of cable faults
- Provides improvements in feeder reliability through the rebuilding and optimal reconfiguration of lines for operational and reactive work
- Improves customer satisfaction as a result of greater service reliability by reducing long restoration times
- Reduces emergency and reactive capital and maintenance costs due to lateral sectionalisation through the switching of transformers

IMPACT OF DEFERRAL

Deferral of this project will increase the risk of future outages due to the continued deterioration of direct buried #1 solid XLPE cable. Furthermore, delays in this project will result in higher reactive investment costs, leading to longer outages and customer dissatisfaction. In addition, the re-configuration of the loop will improve flexibility in power restoration operations by having the feed and the termination connections of the loop connecting at different sections of the

feeder. Thus, deferral of this work would prevent THESL from optimizing its system design for greater operational flexibility during restoration operations during an outage incident.

Portfolio:	Underground
Project Title:	85M7 Underground Direct Buried Rebuild Hidden Trail & Surrounding Area Phase #1
Project Number:	22987
Project Year:	2014
Estimate Cost:	$2,985,073

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild and replace the underground distribution on feeder NY85M7 and the surrounding area(s) to improve service reliability.

Scope:

The scope of work for this project is to enable the replacement of approximately 2600m of 1/0 primary cable, 6100m of secondary cable, 1350m of main ducts and 6100m of service ducts in the following areas: Hidden Trail, Millersgrove Drive and south of Fisherville Road. As such, the project would also involve the construction of civil infrastructure to ensure sufficient load balancing in the area, and would include the replacement of about 13 submersible transformers and 30 tap boxes that had generally been installed in the 1980's. Lastly, about 138 residential, secondary services south of Millersgrove Drive will be placed in ducts.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WESTMINSTER-BRANSON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M7

JUSTIFICATION

Project Background

The distribution system, mainly direct buried cables, experienced a number of failures in recent years. To improve the reliability of supply to the area distribution and operational flexibility, THESL will replace the primary cables installed in concrete-encased ducts to the latest standard. The primary distribution system passes though the streets – Hidden Trail, Millersgrove Drive and south of the Fisherville Road.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			179
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,871	1,228	3,414
Feeder CMO ***(Cumulative)***	74,881	84,907	46,360

Benefits

- Replaces over 30 years old direct buried cables that are at risk of failing reducing the frequency of cable faults
- Provides improvements in feeder reliability through the rebuilding and optimal reconfiguration of lines for operational and reactive work
- Improves customer satisfaction as a result of greater service reliability by reducing long restoration times
- Reduces emergency and reactive capital and maintenance costs due to lateral sectionalisation through the switching of transformers

IMPACT OF DEFERRAL

Deferral of this project will increase the risk of future outages due to the continued deterioration of direct buried #1 solid XLPE cable. Furthermore, delays in this project will result in higher

reactive investment costs, leading to longer outages and customer dissatisfaction. In addition, the re-configuration of the loop will improve flexibility in power restoration operations by having the feed and the termination connections of the loop connecting at different sections of the feeder. Thus, deferral of this work would prevent THESL from optimizing its system design for greater operational flexibility during restoration operations during an outage incident.

Portfolio:	Underground
Project Title:	85M7 Underground Rebuild on Festival & Carnival
Project Number:	14133
Project Year:	2014
Estimate Cost:	$2,102,179

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild and replace the underground distribution on feeder NY85M7 and the surrounding area(s) to improve service reliability.

Scope:

The scope of work for this project is to rebuild the civil infrastructure and replace the non-standard, direct buried loop distribution installed in the 1980s, starting with a pole on Festival Drive and Carnival Court and terminating on a pole at Hidden Trail. This project would also entail the reconfiguration of supply points by replacing the cable risers on Steeles Avenue to improve restoration capabilities in the event of an outage. Lastly, the secondary services for approximately 200 residential homes in the area of Festival Drive and Carnival Court would be placed in ducts. Accordingly, the work would then require the replacement of approximately 1,000m of primary cable, 11 submersible transformers, installation of 1,000m of duct, 4000m of secondary cable service duct and 26 tap boxes.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WESTMINSTER-BRANSON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M7

JUSTIFICATION

Project Background

As part of feeder reliability improvements, THESL plans to replace the direct buried distribution in order to improve operational flexibility. These direct buried cables are subject to contamination, and thus premature failure. They are also difficult to fault locate and takes lengthy time for power restoration.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			179
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,871	1,228	3,414
Feeder CMO ***(Cumulative)***	74,881	84,907	46,360

Benefits

- Replaces over 30 years old direct buried cables that are at risk of failing reducing the frequency of cable faults
- Provides improvements in feeder reliability through the rebuilding and optimal reconfiguration of lines for operational and reactive work
- Improves customer satisfaction as a result of greater service reliability by reducing long restoration times
- Reduces emergency and reactive capital and maintenance costs due to lateral sectionalisation through the switching of transformers

IMPACT OF DEFERRAL

Deferral of this project will increase the risk of future outages due to the continued deterioration of direct buried #1 solid XLPE cable. Furthermore, delays in this project will result in higher reactive investment costs, leading to longer outages and customer dissatisfaction. In addition, the re-configuration of the loop will improve flexibility in power restoration operations by having the feed and the termination connections of the loop connecting at different sections of the feeder. Thus, deferral of this work would prevent THESL from optimizing its system design for greater operational flexibility during restoration operations during an outage incident.

Portfolio:	Underground
Project Title:	Underground Rebuild SS68-F10 Francine Zircon McNicoll (Civil)
Project Number:	23362
Project Year:	2014
Estimate Cost:	$2,099,074

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed over the period of 1964 to 1986 off feeder SS68-F10 with cable in concrete-encased ducts, and rebuid the cable chambers as required. The distribution feeds mostly residential units. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to enable the replacement of 1/0 AL cables and a small section of 1000kcmil from an overhead cable riser and secondary bus wires in the area of Francine Drive, Zircon Court, portions of Michael Drive and McNicoll Avenue. As such, the project will require the installation of 2,700m of concrete-encased ducts, two cable chambers and five tap boxes

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	FRANCINE & ZIRCON
STATION(S)	LESLIE MS
FEEDER(S)	SS68-F10

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder SS68-F10 has been reinstalled in concrete-encased ducts. However, there are some sections that are still direct buried. As such, this project

has been planned to install the necessary civil infrastructure for rebuilding the distribution with cables in concrete-encased ducts, and would include the replacement of single-phase transformers connected to the cables and rebuild of the secondary distribution, as per the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			101
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,574	156	8,003
Feeder CMO ***(Cumulative)***	136,102	4,356	137,674

Benefits

- Replaces old and failing direct buried cables ranging from 25 to 47 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Trunk & Lateral Cable Rehab Beecroft
Project Number:	12642
Project Year:	2014
Estimate Cost:	$1,845,465

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all primary XLPE underground service laterals along feeder NY80M9 with 1/0 AL TRXLPE primary cable, as well as replace aluminum wires from portions of underground trunk feeders NY80M23, NY80M24 and NY80M27 to copper, where multiple feeders share the same conduit.

Scope:

The scope of work for this project is to replace portions of the three, 1000kcmil aluminum cables on trunk circuits, NY80M9, NY80M23, NY80M24 and NY80M27 housed in the same duct bank along Beecroft Road, starting from Park Home Avenue and ending at Sheppard Avenue West. These cables will be replaced with three, 1000kcmil TRXLPE copper cables and would involve approximately 250m of underground civil infrastructure and 3000m of underground feeder cable. Moreover, THESL also plans to address 21 overhead and underground services in the targeted project area that would include two SCADA switches and three submersible transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	PARK HOME & BEECROFT
STATION(S)	FAIRCHILD TS
FEEDER(S)	NY80M9

JUSTIFICATION

Project Background

THESL has an ongoing WPF program. Its intention is to improve system reliability and asset performance by applying immediate adjustments to the planned program, with the intent of removing these problem feeders from the WPF list.

NY80M9 is currently identified as a FESI-7 feeder as of May 2011, and had experienced 4 outages since January 2011. In addition, a vast majority of the faults were specifically caused by adverse weather and non-standard CSP transformers. Non-standard fuses, animal guards, and transformers were also replaced within the last year. To further improve on the FESI status of NY80M9 requires reducing the probability of failure in the underground cable and its associated equipment. Lastly, the feeder was found to have the early vintage XLPE cable that has been identified as being poor performing, and THESL is proactively replacing this type of cable to reduce the outage duration times, frequency and system losses, in the event of an outage event.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			159
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,721	3,666	141
Feeder CMO ***(Cumulative)***	77,562	99,733	25,358

Benefits

- Significantly improves feeder reliability through the replacement of direct buried XLPE primary cable
- Improves customer satisfaction as a result of greater service reliability
- Provides greater flexibility for power distribution, mechanical protection and durability of the underground cable through the use of concrete encased ducts

- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems on the feeder(s) in question, and would subsequently lead to customer dissatisfaction and higher reactive maintenance costs. Specifically, there have been two outages along this portion of the feeder within the last two years, with one of the faults pertaining to defective equipment. As such, deferral of this project would increase the probability of continued failures to the aluminum XLPE cable.

Portfolio:	Underground
Project Title:	Cable Chamber Rebuilds for PILC Replacement/Upgrade of A11E, A12E, A31E & A33E
Project Number:	14163
Project Year:	2014
Estimate Cost:	$1,700,903

PROJECT DESCRIPTION

Objective:

The purpose of this project is to inspect and rebuild cable chambers containing feeder A11E, A12E, A31E and A33E. This work is necessary to replace the PILC cable on the trunks of these feeders to the standard 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to inspect 52 cable chambers and rebuild those in need of refurbishment, and will enable the subsequent replacement and upgrade of existing PILC cable that will run through them.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A11E, A12E, A31E, A33E

JUSTIFICATION

Project Background

This project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Moreover, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily

available TRXLPE cable.

Benefits

- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, THESL construction workers would continue to face health issues and environmental risk due primarily to the potential exposure of PCBs and lead. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL would not only face procurement concerns, but also have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Underground
Project Title:	85M7 Black Hawkway Underground Rebuild
Project Number:	23004
Project Year:	2014
Estimate Cost:	$1,692,582

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild and replace the underground distribution on feeder NY85M7 and the surrounding area(s) to improve service reliability.

Scope:

The scope of work for this project is to rebuild and redesign the Black Hawkway non-standard, direct buried infrastructure installed in the 1980's by replacing overhead laterals on Steeles Avenue West, and would be extended eastward. Accordingly, all non-standard CSP transformers identified will be replaced as per THESL current standards. This project would also entail the construction of civil infrastructure to replace the direct buried loop distribution in the area of Black Hawkway, Duck Hawkway, Kite Hawkway and Sea Hawkway and will be terminated along Steeles Avenue West, thereby eliminating the needs for the existing primary feed from Fisherville Road. Finally, the secondary services for approximately 132 residential homes in the development will be placed in ducts. Accordingly, work for this project will require the installation of 3,900m of concrete-encased ducts, 20 tap boxes, replacement of 900m of primary cable, 3,000m of secondary cables and three transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WESTMINSTER-BRANSON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M7

JUSTIFICATION

Project Background

As part of feeder reliability improvements, THESL plans to replace the direct buried distribution in order to improve operational flexibility. These direct buried cables are subject to contamination, and thus premature failure. They are also difficult to fault locate and takes lengthy time for power restoration.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			179
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,871	1,228	3,414
Feeder CMO ***(Cumulative)***	74,881	84,907	46,360

Benefits

- Replaces over 30 years old direct buried cables that are at risk of failing reducing the frequency of cable faults
- Provides improvements in feeder reliability through the rebuilding and optimal reconfiguration of lines for operational and reactive work
- Improves customer satisfaction as a result of greater service reliability by reducing long restoration times
- Reduces emergency and reactive capital and maintenance costs due to lateral sectionalisation through the switching of transformers

IMPACT OF DEFERRAL

Deferral of this project will increase the risk of future outages due to the continued deterioration of direct buried #1 solid XLPE cable. Furthermore, delays in this project will result in higher reactive investment costs, leading to longer outages and customer dissatisfaction. In addition, the re-configuration of the loop will improve flexibility in power restoration operations by having the feed and the termination connections of the loop connecting at different sections of the feeder. Thus, deferral of this work would prevent THESL from optimizing its system design for greater operational flexibility during restoration operations during an outage incident.

Portfolio:	Underground
Project Title:	Livonia Underground Rebuild SCNT47M8 (Civil)
Project Number:	23403
Project Year:	2014
Estimate Cost:	$1,559,792

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables off feeder SS68-F10 with cable in concrete-encased ducts, and rebuild the cable chambers as required. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to install 1,400m of concrete-encased ducts on Neilson Road and Livonia Place to support the planned installation of electrical equipment in the area, as well as build the civil infrastructure for two new padmount switches in the area. This project would also include undergrounding three 1000 and 1/0 cables from overhead lines on Ellesmere Avenue, install concrete-encased ducts for two submersible transformers on Livonia Place, and run two loops between the two padmount switches. Lastly, THESL plans to reuse all existing transformers and civil infrastructure where possible.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	LIVONIA
STATION(S)	SHEPPARD TS
FEEDER(S)	SCNT47M8

JUSTIFICATION

Project Background

This subdivision was constructed with direct buried XLPE cable in 1976. Direct buried XLPE cable is subject to contamination and electrical treeing, and thus fail prematurely. Direct buried cables are also difficult to fault locate and require an extenstuve amount of time for power restoration. As such, the intent of this project is to replace these direct buried cables with new 500kcmil TRXLPE cable in concrete-encased ducts. The circuits in this neighbourhood loop will be connected radially back to one PMH switch, as well as two new padmount switches for improved reliability and fault recovery capability.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			59
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,447	9,555	0
Feeder CMO ***(Cumulative)***	150,971	528,445	0

Benefits

- Replaces old, failing direct buried XLPE cables approximately 35 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Rouge Park Underground Rebuild SCXGF3 (Electrical) Phase #2
Project Number:	23195
Project Year:	2014
Estimate Cost:	$1,501,481

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the aged, direct buried cable that has exceeded their useful lifespan and subject to contamination and failure with cables in concrete-encased ducts for improved reliability.

Scope:

The scope of work for this project is to install SF6 padmount type switches on new pads in Starspray Boulevard and Ridgewood Road that would loop the 1/0 Al primary TRXLPE cable feed into new concrete-encased ducts from in the Rouge Park subvision. This project would also involve the replacement of 50 submersible transformers in the three loops to switchable 100kVA, 27.6kV submersible transformer units. Lastly, secondary bus cable would be installed from the transformer locations to new tap boxes to the customers' meter base, in concrete-encased ducts from the tap box, as per the latest THESL standard. As such, the project would entail the replacement of 50 submersible transformers, 5,000m of primary cable and 13,000m of secondary cables, along with the installation of padmount switches.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	RIDGEWOOD
STATION(S)	EAST AVENUE TUDOR GLEN
FEEDER(S)	SCXGF3

JUSTIFICATION

Project Background

This Rouge Park subdivision was constructed with direct buried XLPE cable in 1986. Direct buried XLPE cables are subject to contamination and electrical treeing and thus premature failure. They are also difficult to fault locate and require lengthy time for power restoration. These direct buried cables will be replaced with new TRXLPE cable in concrete encased ducts. Some circuits in this subdivision loop radially back to one PMH switch, and the rebuild will loop all circuits to two padmount switches for improved reliability and fault recovery.

Preparation work under another project will have converted a portion of feeder XG-F3 to 27.6kV by extending feeder 47-M17 along Lawrence Avenue and then north along Rouge Hills Drive to Starspray Boulevard to facilitate direct buried cable and transformer replacements in the Rouge Park subdivision. This neighbourhood has experienced outages in the last few years, with one major outage causing 124,121 CMO for 2007 customers in 2009.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			72
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,608	2,192	15
Feeder CMO ***(Cumulative)***	466,281	142,660	2,385

Benefits

- Replaces old and failing direct buried cables ranging from 25 to 47 years of age
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers in the area. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Rebuild Milner Industrial H9M23 Trunk Neilson (Civil)
Project Number:	22887
Project Year:	2014
Estimate Cost:	$1,462,882

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables off feeder SCNAH9M32 with cable in concrete-encased ducts. The project would also rebuild the cable chambers as required. The distribution feeds a number of small industries and commercial units. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to install 3,640m of concrete-encased ducts for the new three-phase 1000kcmil Al and 1/0 cables in the following areas: Milner Avenue from Neilson Road to a newly installed SF6 padmount switch on the west side of Novopharm Court, and from overhead risers at Sheppard-Lapsley along Lapsley-Burrows Hall, Dailing Gate to the same SF6 padmount switch. As part of this project, THESL will also look to use as many of the existing concrete-encased ducts and the distribution will be updated to current THESL standards, where necessary.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MILNER & NEILSON
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M32, SCNAH9M23

JUSTIFICATION

Project Background

The three-phase distribution in the area of the Milner Business Court and Progress Avenue was built between 1973 and 1980, and contains primarily direct buried cables. Due to many recent failures in the the distribution sytsem, THESL plans to replace the old, deteriorated wall mounted primary switches (with SF6 type indoor switchgear or mini-rupters) found in customer vaults in the project area, as well as all SF6 or sealed type pad switches. Accordingly, to improve the overall reliability of the system and update the distribution to current THESL standards, THESL will rebuild the subdivisions centered around Finch Avenue with cables in concrete-encased ducts. On a related note, the existing three-phase loop has connected load that requires greater fusing the the current 140k, maximum allowable size for protection coordination. As such , the loop will need to be split into two segments and 140A fuses will be required from the feeder trunk to the riser/dips. A moratorium is currently in place for the aforementioned project area that will end in December 2015.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			204
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,429	1,968	2,013
Feeder CMO ***(Cumulative)***	233,721	26,657	9,111

Benefits

- Replaces old, failing direct buried XLPE cables ranging from 31 to 38 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement

and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Rebuild H9M30 Kingston Mason (Civil)
Project Number:	23297
Project Year:	2014
Estimate Cost:	$1,424,177

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed over the period of 1975 to 1977 of feeder SCNAH9M30 with cable in concrete-encased ducts, and rebuid the cable chambers as required. The distribution feeds a number of townhomes and residential units. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to enable the replacement of 1/0 Al cables and secondary bus wires in the area of Mason Road, portions of Greendown Drive and the TH complex at Kingston Road. This project would also involve the installation of direct buried ducts from the street line to the meter base for all affected customers, as well as primary and secondary tap boxes and handwells to the current THESL standard. Accordingly, this project would require the installation of 1,900m of concrete-encased ducts and 2,400m of direct buried PVC conduit.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	KINGSTON & MASON
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M30

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder SCNAH9M30 has been reinstalled in concrete-encased ducts. However, there are some sections that are still direct buried. As such, this project has been planned to install the necessary civil infrastructure for rebuilding the primary and secondary distribution with cables in concrete-encased ducts, and would include the replacement of single-phase transformers connected to the cables and rebuild of the secondary distribution, as per the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			34
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,139	8,147	6,796
Feeder CMO ***(Cumulative)***	229,249	490,481	566,474

Benefits

- Replaces old and failing direct buried cables ranging from 34 to 36 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Replace/Upgrade Cable from PILC to 500 TRXLPE on A-33-E
Project Number:	14172
Project Year:	2014
Estimate Cost:	$1,410,630

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace PILC cable on the trunk of feeder A33E with the standard 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to enable the replacement and upgrade the existing 3,617m of existing PILC cable, of various sizes, to 500kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A33E

JUSTIFICATION

Project Background

This project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Moreover, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, THESL construction workers would continue to face health issues and environmental risk due primarily to the potential exposure of PCBs and lead. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL would not only face procurement concerns, but also have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Underground
Project Title:	Replace/Upgrade Cable from PILC to 500 TRXLPE on A-31-E
Project Number:	14171
Project Year:	2014
Estimate Cost:	$1,410,630

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace PILC cable on the trunk of feeder A31E with the standard 500kcmil TRXLPE cable and rebuild cable chambers as required.

Scope:

The scope of work for this project is to enable the replacement and upgrade the existing 3,617m of existing PILC cable, of various sizes, to 500kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A31E

JUSTIFICATION

Project Background

This project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Moreover, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, THESL construction workers would continue to face health issues and environmental risk due primarily to the potential exposure of PCBs and lead. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL would not only face procurement concerns, but also have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Underground
Project Title:	Underground Rebuild Milner Industrial H9M23 Trunk Neilson (Electrical)
Project Number:	22888
Project Year:	2014
Estimate Cost:	$1,298,259

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables of feeder SCNAH9M32 with cable in concrete-encased ducts. The distribution feeds a number of small industries and commercial units. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to install three-phase 1000kcmil AL cables from a SCADAMATE riser switch on a new pole at Sheppard Avenue to a new PMH switch to be installed at Milner Avenue, on the west side of Novopharm Court. The project would also include the replacement of three padmount switches with SF6 type PMH switches that would terminate the two ends of the three, 1000kcmil AL cable to the SCADAMATE riser. Furthermore, the cables would loop in connected padmount and submersible transformers that include 100k and 140k fusing for protection, as well as replace existing three-phase padmount transformers with dual fed transformers configurations and install a mini-rupter arrangement for three vault transformers. As such, the project would require the replacement of approximately 18,500m of existing direct buried cable with new cable installed in concrete-encased ducts, six padmount switches and two overhead switches.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MILNER & NEILSON
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M32, SCNAH9M23

JUSTIFICATION

Project Background

The three-phase distribution in the area of the Milner Business Court and Progress Avenue was built between 1973 and 1980, and contains primarily direct buried cables. Due to many recent failures in the the distribution sytsem, THESL plans to replace the old, deteriorated wall mounted primary switches (with SF6 type indoor switchgear or mini-rupters) found in customer vaults in the project area, as well as all SF6 or sealed type pad switches. Accordingly, to improve the overall reliability of the system and update the distribution to current THESL standards, THESL will rebuild the subdivisions around the middle of Finch Avenue with cables in concrete-encased ducts. On a related note, the existing three-phase loop has connected load that requires greater fusing the the current 140k, maximum allowable size for protection coordination. As such , the loop will need to be split into two segments and 140A fuses will be required from the feeder trunk to the riser/dips. A moratorium is currently in place for the aforementioned project area that will end in December 2015.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			204
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1429	1968	2013
Feeder CMO ***(Cumulative)***	233721	26657	9111

Benefits

- Replaces old and failing direct buried cables approximately 27 years of age to prevent future negative impact to commercial and industrial customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Modernizes the system by removing the non-compliant, single-phase PMH switches and existing padmount and submersible transformers
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers in the area. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Rebuild 502M32 Eastwood SD (Civil)
Project Number:	23046
Project Year:	2014
Estimate Cost:	$1,261,167

PROJECT DESCRIPTION

Objective:

The objective of this project is to replace the old and failing primary cables in the area of Brownspring Rd, Hallbank Terr, Charterhouse Rd, Lawnmere Cres, Tidworth Sq, Hayward Cres, Keyworth Trail and a section of Pilfield Rd (area known as Eastwood subdivision) supplied by feeder NAE502M32.

Scope:

The scope of work for this project is to design and install civil infrastructure for the single-phase 1/0 AL cables along Brownspring Road, Hallbank Terrace, Charterhouse Road, Lawnmere Crescent, Tidworth Square, Hayward Crescent, Keyworth Trail and a section of Pilfield Road, referred to as the "Eastwood subdivision". As such, the cables would be terminated to riser fused switches on Sheppard Avenue and McCowan Road. Accordingly, this project requires the installation of 3,750m of concrete-encased ducts.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SHEPPARD & BRIMLEY
STATION(S)	CAVANAUGH TS
FEEDER(S)	SCNA502M32

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder SCNA502M32 was built in 1990 with direct buried cables. Accordingly, the distribution equipment in this area has experienced a number of cable, elbow and transformer failures in the recent past. As such, this project has been planned to install the necessary civil infrastructure for rebuilding the distribution with cables in concrete-encased ducts and secondary distribution, as per the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			473
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,000	2,219	90
Feeder CMO ***(Cumulative)***	12,000	49,403	14,580

Benefits

- Replaces old and failing direct buried cables approximately 21 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Lateral Cable Replacement – Chesswood & Champagne
Project Number:	14155
Project Year:	2014
Estimate Cost:	$1,238,280

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all primary XLPE underground service laterals along feeder NY85M4 with 1/0 AL TRXLPE primary cable from an overhead feeder to a connected transformer room or vault, in order to improve the reliability of the distribution in the area.

Scope:

The scope of work for this project is to replace all 3-1/0 ALXLPE primary service riser cables with 1/0 AL TRXLPE cable, along with any locations where direct buried cable has been installed between the primary drop pole and the transformer. Moreover, the project would also involve the planned replacement of nine submersible vault transformers and 14 padmount transformers along Champagne Drive, Chesswood Drive and Vanley Crescent and requires the removal of approximately 1,300m of three-phase cable.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	CHESSWOOD
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M4

JUSTIFICATION

Project Background

THESL has an ongoing WPF program. Its intention is to improve system reliability and asset performance by applying immediate adjustments to the planned program, with the intent of removing these problem feeders from the WPF list.

This project covers the streets of Champagne Drive, Chesswood Drive and Vanley Crescent fed by feeder NY85M4, and is deemed to be poor performing as it is a FESI-5 feeder. In terms of the THESL Worst Performing Feeder List, the feeder is ranked 63rd. The majority of asset on this feeder are old and in poor condition, causing a high impact on feeder reliability. Moreover, in the past 10 years, the feeder has experienced 15 underground cable and 10 underground transformer faults.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			90
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,261	524	26
Feeder CMO ***(Cumulative)***	28,208	7,744	5,043

Alternatives

An alternative approach would be to perform spot replacements. However, due to poor plant condition and the high concentration of failures in the identified areas, THESL considers it more efficient to rebuild this area to current standards.

Benefits

- Significantly improves feeder reliability through the replacement of direct buried XLPE primary cable

- Improves customer satisfaction as a result of greater service reliability
- Provides greater flexibility for power distribution, mechanical protection and durability of the underground cable through the use of concrete encased ducts
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems on the feeder(s) in question, and would subsequently lead to customer dissatisfaction and higher reactive maintenance costs.

Portfolio:	Underground
Project Title:	Replace/Upgrade Feeder A11E from PILC to 500KCMIL TRXLPE Cable
Project Number:	14166
Project Year:	2014
Estimate Cost:	$1,170,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace PILC cable on the trunk of feeder A11E with the standard 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to enable the replacement and upgrade the existing 3,050m of existing PILC cable, of various sizes, to 500kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A11E

JUSTIFICATION

Project Background

This project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Moreover, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily

available TRXLPE cable.

Benefits

- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, THESL construction workers would continue to face health issues and environmental risk due primarily to the potential exposure of PCBs and lead. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL would not only face procurement concerns, but also have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Underground
Project Title:	Replace/Upgrade Feeder A12E from PILC to 500KCMIL TRXLPE Cable
Project Number:	14167
Project Year:	2014
Estimate Cost:	$1,170,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace PILC cable on the trunk of feeder A12E with the standard 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to enable the replacement and upgrade the existing 3,050m of existing PILC cable, of various sizes, to 500kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CARLAW
STATION(S)	CARLAW TS
FEEDER(S)	A12E

JUSTIFICATION

Project Background

This project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Moreover, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily

available TRXLPE cable.

Benefits

- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, THESL construction workers would continue to face health issues and environmental risk due primarily to the potential exposure of PCBs and lead. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL would not only face procurement concerns, but also have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Underground
Project Title:	Underground Rebuild SS68-F10 McNicoll Michael (Civil)
Project Number:	23355
Project Year:	2014
Estimate Cost:	$1,076,558

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed over the period of 1969 to 1986 off feeder NYSS68-F10 with cable in concrete-encased ducts, and rebuild the cable chambers as required. The distribution feeds a number of residential units. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to design and install the civil infrastructure for the single-phase 1/0 Al cables and secondary bus wires along McNicoll Avenue (east of Leslie Street), Patina Drive, Myers Lane, portions of Michael Drive and Osmund Court. The project would also involve the installation of direct buried ducts from the street line to the meter base for all affected customers, as well as primary and secondary tap boxes and handwells to the current THESL standard as needed. Accordingly, this project will require the installation of approximately 1,800m of concrete-encased ducts.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	MCNICOLL & LESLIE
STATION(S)	LESLIE MS
FEEDER(S)	NYSS68-F10

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder NYSS68-F10 has been reinstalled in concrete-encased ducts. However, there are some sections that are still direct buried. As such, this project has been planned to install the necessary civil infrastructure for rebuilding the primary and secondary distribution with cables in concrete-encased ducts to the latest THESL construction standard. Currently, there is no moratorium on these roads and as THESL plans to replace the entire Leslie MS station switchgear in a new location close to the existing project area, the decision has been made to no convert this rebuild project.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			101
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1574	156	8003
Feeder CMO ***(Cumulative)***	136102	4356	137674

Benefits

- Replaces old and failing direct buried cables ranging from 25 to 42 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Lateral Cable Replacement – Dufferin, Finch, Toro
Project Number:	14154
Project Year:	2014
Estimate Cost:	$1,074,443

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all primary XLPE underground service laterals along feeder NY85M4 with 1/0 AL TRXLPE primary cable from an overhead feeder to a connected transformer room or vault, in order to improve the reliability of the distribution in the area.

Scope:

The scope of work for this project is to replace all 3-1/0 ALXLPE primary service riser cables with 1/0 AL TRXLPE cable, along with any locations where direct buried cable has been installed between the primary drop pole and the transformer. Moreover, the project would also involve the planned replacement of seven submersible vault transformers and 13 padmount transformers along Dufferin Street, Tangiers Road and Alexdon Road and requires the removal of approximately 1,100m of three-phase cable.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DUFFERIN
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M4

JUSTIFICATION

Project Background

THESL has an ongoing WPF program. Its intention is to improve system reliability and asset performance by applying immediate adjustments to the planned program, with the intent of removing these problem feeders from the WPF list.

This project covers the streets of Dufferin Street, Tangiers Road and Alexdon Road fed by feeder NY85M4, and is deemed to be poor performing as it is a FESI-5 feeder. In terms of the THESL Worst Performing Feeder List, the feeder is ranked 63rd. The majority of asset on this feeder are old and in poor condition, causing a high impact on feeder reliability. Moreover, in the past 10 years, the feeder has experienced 15 underground cable and 10 underground transformer faults.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			90
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,261	524	26
Feeder CMO ***(Cumulative)***	28,208	7,744	5,043

Alternatives

An alternative approach would be to perform spot replacements. However, due to poor plant condition and the high concentration of failures in the identified areas, THESL considers it more efficient to rebuild this area to current standards.

Benefits

- Significantly improves feeder reliability through the replacement of direct buried XLPE primary cable

- Improves customer satisfaction as a result of greater service reliability
- Provides greater flexibility for power distribution, mechanical protection and durability of the underground cable through the use of concrete encased ducts
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems on the feeder(s) in question, and would subsequently lead to customer dissatisfaction and higher reactive maintenance costs.

Portfolio:	Underground
Project Title:	Underground Rebuild SS68-F10 Francine Zircon McNicoll (Electrical)
Project Number:	23363
Project Year:	2014
Estimate Cost:	$1,030,106

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed over the period of 1964 to 1986 off feeder SS68-F10 with cable in concrete-encased ducts. The distribution feeds mostly residential units. This part of the project will address the electrical work only.

Scope:

The scope of work for this project is to enable the replacement of single-phase 1/0 AL cables and a small section of 1000kcmil from an overhead dip and secondary bus wires in the area of Francine Drive, Zircon Court, portions of Michael Drive and McNicoll Avenue. As such, this project will require the replacement of 8,500m of primary cable, 19 transformers, one padmount switch and 4,600m of secondary conductor.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	FRANCINE
STATION(S)	LESLIE MS
FEEDER(S)	NYSS68-F10

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder SS68-F10 has been reinstalled in concrete-encased ducts. However, there are some sections that are still direct buried. As such, this project has been planned to install the necessary civil infrastructure for rebuilding the distribution with cables in concrete-encased ducts, and would include the replacement of single-phase transformers connected to the cables and rebuild of the secondary distribution, as per the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			101
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,574	156	8,003
Feeder CMO ***(Cumulative)***	136,102	4,356	137,674

Benefits

- Replaces old and failing direct buried cables ranging from 25 to 47 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Modernizes the system by removing the non-compliant, single-phase PMH switches and existing padmount and submersible transformers
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers in the area. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Rebuild E51M24 Masonette SD (Civil)
Project Number:	23041
Project Year:	2014
Estimate Cost:	$1,025,812

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, 27.6kV direct buried cables off feeder SCNAE5-1M24 installed in the area of Terryhill Crescent, Snowhill Crescent, Cleethorpes Boulevard and portions of Pitfield Road (area known as the Masonette subdivision). This part of the project will address the civil work only.

Scope:

The scope of work for this project is to design and install the civil infrastructure for the single-phase 1/0 AL cables and secondary bus wires along Terryhill Crescent, Snowhill Crescent, Cleethorpes Boulevard and portions of Pitfield Road, with the ends terminating to riser fused switches on Brimley Road. The project would also involve the installation of direct buried ducts from the street line to the meter base for all affected customers, as well as primary and secondary tap boxes and handwells to the current THESL standard as needed. Accordingly, the work for this project would require the installation of 2,750m of concrete-encased ducts.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	SHEPPARD & BRIMLEY
STATION(S)	SCARBOROUGH TS
FEEDER(S)	SCNAE51M24

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder SCNAE51M24 was built in 1974 with direct buried cables. Accordingly, the distribution equipment in this area has experienced a number of cable, elbow and transformer failures in the recent past. As such, this project has been planned to install the necessary civil infrastructure for rebuilding the distribution with cables in concrete-encased ducts and secondary distribution, as per the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			189
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,290	0	171
Feeder CMO ***(Cumulative)***	152,656	0	11,115

Benefits

- Replaces old and failing direct buried cables approximately 37 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Upgrade Underground Trunk E51M21 and H9M27 SC Town Centre (Civil)
Project Number:	22658
Project Year:	2014
Estimate Cost:	$1,022,538

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, 750kcmil direct buried primary cables off feeders SCNAE51M21 and SCNAH9M27 installed in the area around the Scarborough Town Centre, bounded by sections of Ellesmere Road, Borough Approach West, Brian Harrison Way, Triton Road and the Town Centre Court. This project will address the civil work only.

Scope:

The scope of work for this project is to design and install the civil infrastructure for the three-phase, 1000 TRXLPE AL cables inside and around the Scarborough Town Centre for feeders SCNAE51M21 and SCNAH9M27 in sections of Ellesmere Road, Borough Approach West, Brian Harrison Way, Triton Road and Town Centre Court. The project would subsequently target deteriorating sections on the trunks of the two feeders by removing the existing 750kcmil cable with the standard 1000kcmil TRXLPE cables in concrete-encased ducts. Lastly, where possible, THESL will look to reuse sections of the existing concrete-encased ducts and consider construction of additional cable chambers as required. As such, the work for this project will require the installation of approximately 1,400m of concrete-encased ducts.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MCCOWAN & ELLESMERE
STATION(S)	SCARBOROUGH TS, ELLESMERE TS
FEEDER(S)	SCNAE51M21, SCNAH9M27

JUSTIFICATION

Project Background

There are some sections of the undersized cables on the aforemtioned feeders that have been built with direct buried cables, with distribution in the area dating to the early 1970's. As such, this project has been planned to install the necessary civil infrastructure for rebuilding the primary and secondary distribution with cables in concrete-encased ducts to the latest THESL construction standard. This would ensure that full capacity is available to the feeder mains and improve the ovreall reilability of the targeted feeders. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			433
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	0	206	125
Feeder CMO ***(Cumulative)***	0	19,962	7,500

Benefits

- Mitigates the risk of failure associated with deteriorating plant by rebuilding the underground route in and around Scarborough Town Centre that is approximately 30 years of age
- Enables sufficient capacity and would improve reliability by replacing portions of undersized, direct buried cable to current THESL standard

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Coreydale / Brockington Underground Residential Rebuild
Project Number:	14096
Project Year:	2014
Estimate Cost:	$975,235

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing, underground direct buried primary system on feeder 85M6 with TRXLPE cable in the areas of Coreydale Court and Brockington Crescent.

Scope:

The scope of work for this project is to replace the existing underground direct buried cable with TRXLPE cable. This project would also involve constructing concrete-encased primary ducts around the entire loop, secondary bus ducts and tap boxes as required, to service the 40 residential homes within the project area. As such, the work required for this project would entail the installation of approximately 1,100m of concrete-encased ducts, 700m of primary cable and 420m of secondary cables.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	BROCKINGTON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M6

JUSTIFICATION

Project Background

THESL has an ongoing WPF program. Its intention is to improve system reliability and asset performance by applying immediate adjustments to the planned program, with the intent of removing these problem feeders from the WPF list.

This project covers the streets of Milvan Drive, Penn Drive, Toryork Drive and Weston Road fed by feeder NY55M9, and is deemed to be poor performing as it is a FESI-9 feeder. In terms of the THESL Worst Performing Feeder List, the feeder is ranked 25th. As such, this project has been initiated to improve the reliability of the distribution in this area. Lastly, the feeder was found to have the early vintage XLPE cable that has been identified as being poor performing, and THESL is proactively replacing this type of cable to reduce the outage duration times, frequency and system losses, in the event of an outage event.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			25
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	118	576	1,831
Feeder CMO ***(Cumulative)***	13,021	2,304	46,929

Alternatives

An alternative approach would be to perform spot replacements. However, due to poor plant condition and the high concentration of failures in the identified areas, THESL considers it more efficient to rebuild this area to current standards.

Benefits

- Significantly improves feeder reliability through the replacement of direct buried XLPE primary cable
- Improves customer satisfaction as a result of greater service reliability
- Provides greater flexibility for power distribution, mechanical protection and durability of the underground cable through the use of concrete encased ducts
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability
- Improves grid operating conditions and would enable THESL to avoid potential second contingency scenarios

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems on the feeder(s) in question, and would subsequently lead to customer dissatisfaction and higher reactive maintenance costs.

Portfolio:	Underground
Project Title:	Underground Rebuild Agincourt Ind Park H9M23_M32 (Civil)
Project Number:	23077
Project Year:	2014
Estimate Cost:	$963,205

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed over the period of 1975 to 1978 off feeders SCNAH9M23 and SCNAH9M32 with cable in concrete-encased ducts, and rebuid the cable chambers as required. The distribution feeds a number of small industries and commercial units. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to install approximately 1,610m of concrete-encased ducts for the new three-phase 1/0 AL cable along Nugget Avenue from overhead line feeds, starting at Markham Road and ending at Shorting Road. Along the way, the cable will connect and supply all three-phase customers. THESL also anticipates that an existing padmount switch will need to be replaced, as well as a customer-owned 3000kVA, 600/347V transformer, pending approval, with a dual fed transformer. Lastly, THESL will also look to reuse as many of the existing concrete-encased ducts from the road line to the customer vaults, where possible.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	NUGGET
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M23, SCNAH9M32

JUSTIFICATION

Project Background

The three-phase distribtuion on Nugget Avenue between Shorting Road and Markham Road was built between 1975 and 1978, with direct buried cables. Accordingly, the distribution equipment in this area has experienced a number of cable, elbow and transformer failures in the recent past. As such, this project has been planned to install the necessary civil infrastructure for rebuilding the distribution with cables in concrete-encased ducts and secondary distribution, as per the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			204
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,429	1,968	2,013
Feeder CMO ***(Cumulative)***	233,721	26,657	9,111

Benefits

- Replaces old and failing direct buried cables ranging from 33 to 36 years of age to prevent future negative impact to commercial and industrial customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Rebuild H9M32 Milner B Crt Progress (Civil)
Project Number:	22880
Project Year:	2014
Estimate Cost:	$907,414

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables of feeder SCNAH9M32 with cable in concrete-encased ducts. The project would also rebuild the cable chambers as required. The distribution feeds a number of small industries and commercial units. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to install approximately 1,020m of concrete-encased ducts for the new three-phase 1000kcmil AL and 1/0 cables in the following areas: Milner Avenue from Neilson Road to a newly installed SF6 padmount switch on the west side of Novopharm Court, and from overhead risers at Sheppard-Lapsley along Lapsley-Burrows Hall, Dailing Gate to the same SF6 padmount switch. As part of this project, THESL will also look to use as many of the existing concrete-encased ducts running from the road line to the customer vault, and the distribution will be updated to current THESL standards where necessary. Lastly, THESL will get rid of the single-phase pad switch and loop in the connected single-phase transformers through a newly planned single-phase supply.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MARKHAM & MILNER
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M32

JUSTIFICATION

Project Background

The three-phase distribution in the area of the Milner Business Court and Progress Avenue was built primarily in 1984, and contains mostly direct buried cables. Due to many recent failures in the the distribution sytsem, THESL plans to replace the old, deteriorated wall mounted primary switches (with SF6 type indoor switchgear or mini-rupters) found in customer vaults in the project area, as well as all SF6 or sealed type pad switches. Accordingly, to improve the overall reliability of the system and update the distribution to current THESL standards, THESL will rebuild the subdivisions around the middle of Finch Avenue with cables in concrete-encased ducts. On a related note, the existing three-phase loop has connected load that requires greater fusing the the current 140k, maximum allowable size for protection coordination. As such , the loop will need to be split into two segments and 140A fuses will be required from the feeder trunk to the riser/dips. Currently, there is no moratorium in place for the affected streets in question.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			296
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,771	235	263
Feeder CMO ***(Cumulative)***	188,289	705	1,025

Benefits

- Replaces old, failing direct buried XLPE cables approximately 27 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Canterbury Crescent Underground Voltage Conversion
Project Number:	22920
Project Year:	2014
Estimate Cost:	$853,223

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the civil infrastructure on Canterbury Crescent and convert the existing primary distribution from 4kV to 27.6kV.

Scope:

The scope of work for this project is to install five underground transformers, in order to feed customers at Canterbury Crescent. This project also includes cabling work to upgrade the primary distribution system from 4kV to 27.6kV using concrete-encased conduits. Moreover, the scope will also include three overhead transformers and the installation of seven new poles to address the overhead sections identified within the project area.

DISTRICT	ETOBICOKE
NEIGHBOURHOOD	CANTERBURY
STATION(S)	MANBY TS
FEEDER(S)	ET38M7

JUSTIFICATION

Project Background

The feeders supplied by Ashley MS are at or are approaching end-of-life conditions. The poles and many cross-arms are visibly deteriorating and the overhead equipment and pole framings are frequently non-standard (i.e. CSP transformers). Similarly, the underground equipment consists

of aged and deteriorating direct buried cable, T-splices and non-standard switching kiosks. Direct buried cable was installed in the outer area of the city in 1970's and 1980's. The majority of these are XLPE cables directly buried in ground. As a result of the method of installation, they are constantly exposed to contamination from the soil, causing premature degradation to the insulation strength and corrosion to the neutral conductors leading to premature cable failure.

Due to the increasing frequency of outages in this area, THESL plans to rebuild and convert the feeders to the standard 27.6kV primary voltage via feeder 38M7 supplied by Manby TS. The voltage conversion is deemed to be beneficial, as the feeder needs a complete rebuild and the 27.6kV feeders are readily available.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			388
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	11,680	5,656	80
Feeder CMO ***(Cumulative)***	148,324	291,564	30,360

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Reduces system losses when 4kV is upgraded to 27.6kV
- Modernizes the system by removing obsolete, aged 4kV breaker and switchgear equipment from the Ashley MS station

IMPACT OF DEFERRAL

If this project was to be deferred, THESL would endure higher maintenance costs associated with existing, obsolete non-standard 4kV equipment when compared to standard 27.6kV equipment. Moreover, there is also a higher risk of failure due to the number of assets past useful life. A failure could also cause the station breaker connected to the feeder to lockout, which would result in power loss to all customers supplied by that feeder. Additionally, fault locating under these circumstances would be highly disruptive and lengthy in duration, as THESL personnel would then be required to break up roads and/or sidewalks to identify the source of the fault.

Portfolio:	Underground
Project Title:	Livonia Underground Rebuild SCNT47M8 (Electrical)
Project Number:	23404
Project Year:	2014
Estimate Cost:	$852,278

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables off feeder SCNT47M8 with cable in concrete-encased ducts. This part of the project will address the electrical work only.

Scope:

The scope of work for this project is to install two new padmount, SF6 type switches on Livonia Place at Neilson Road, with a loop feeding the single-phase 1/0 bare circuit from Purpledusk Trail between the new switches. This project would also include a loop feed for a 1-1/0 AL TRXLPE primary cable through Livonia Place and the replacement of 21 submersible transformers with switchable, 100kVA primary submersible transformers and refurbishment of two transformer vaults. In addition, THESL plans to install multiple three-phase riser and switches. Lastly, approximately 3,500m of 3-#1 direct buried cables would be replaced in the project area with cables in concrete-encased ducts to feed connected padmount and submersible transformers, and THESL will look to reuse all existing concrete-encased ducts where possible.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	LIVONIA
STATION(S)	SHEPPARD TS
FEEDER(S)	SCNT47M8

JUSTIFICATION

Project Background

This subdivision was constructed with direct buried XLPE cable in 1976. Direct buried XLPE cable is subject to contamination and electrical treeing, and thus fail prematurely. Direct buried cables are also difficult to fault locate and require an extenstive amount of time for power restoration. As such, the intent of this project is to replace these direct buried cables with new 500kcmil TRXLPE cable in concrete-encased ducts. The circuits in this neighbourhood loop will be connected radially back to one PMH switch, as well as two new padmount switches for improved reliability and fault recovery capability.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			59
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,447	9,555	0
Feeder CMO ***(Cumulative)***	150,971	528,445	0

Benefits

- Replaces old, failing direct buried XLPE cables approximately 35 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers in the area. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Rebuild 502M29 Bonis King Henrys (Civil)
Project Number:	23262
Project Year:	2014
Estimate Cost:	$818,544

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed over the period of 1971 to 1980 off feeder SCNA502M29 with cable in concrete-encased ducts, and rebuild the cable chambers as required. The distribution feeds a number of townhomes residential units. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to design and install approximately 1,310m of concrete-encased ducts for the single-phase 1/0 AL cables and secondary bus wires along Bonis Avenue and King Henrys Boulevard. The project would also involve the installation of direct buried ducts from the street line to the meter base for all affected customers, as well as primary and secondary tap boxes and handwells to the current THESL standard as needed.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	BIRCHMOUNT & BONIS
STATION(S)	CAVANAUGH TS
FEEDER(S)	SCNA502M29

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder SCNA502M29 was built during the span of 1971 to 1980 with direct buried cables. Accordingly, the distribution equipment in this area has experienced a number of cable, elbow and transformer failures in the recent past. As such, this project has been planned to install the necessary civil infrastructure for rebuilding the distribution with cables in concrete-encased ducts and secondary distribution, as per the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			37
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,031	1,246	6,171
Feeder CMO ***(Cumulative)***	146,971	472,235	129,977

Benefits

- Replaces old and failing direct buried cables ranging from 31 to 40 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Lateral Cable Rehab - Oakdale S/O Jody
Project Number:	22740
Project Year:	2014
Estimate Cost:	$765,997

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all primary XLPE underground service laterals on feeder NY55M26 along Oakdale Road, Jody Avenue and Sheppard Avenue West with 1/0 AL TRXLPE primary cable from an overhead feeder to a connected transformer room or vault, in order to improve the reliability of the distribution in the area.

Scope:

The scope of work for this project is to install 3-1/0 AL XLPE primary service riser cables with 1/0 AL TRXLPE cable, along with any locations where direct buried cable and construction of concrete-encased ducts between the primary drop pole and the transformer. Furthermore, the feeder will also be reconfigured to abandon XLPE cable and better distribute loading in the area. Accordingly, this project would require the installation of approximately 710m of concrete-encased ducts, 2,700m of primary cable and the replacement of two overhead switches and two transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	OAKDALE
STATION(S)	FINCH II TS
FEEDER(S)	NY55M26

JUSTIFICATION

Project Background

THESL has an ongoing WPF program. Its intention is to improve system reliability and asset performance by applying immediate adjustments to the planned program, with the intent of removing these problem feeders from the WPF list.

This project covers the streets of Oakdale Road, Jody Avenue and Sheppard Avenue West fed by feeder NY55M26, and is deemed to be poor performing as it is a FESI-13 feeder. In terms of the THESL Worst Performing Feeder List, the feeder is ranked 128th. The majority of asset on this feeder are old and in poor condition, causing a high impact on feeder reliability. Lastly, the feeder was found to have the early vintage XLPE cable that has been identified as being poor performing, and THESL is proactively replacing this type of cable to reduce the outage duration times, frequency and system losses, in the event of an outage event.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			128
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			13
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	150	693	1,334
Feeder CMO ***(Cumulative)***	18,085	45,076	61,657

Alternatives

An alternative approach would be to perform spot replacements. However, due to poor plant condition and the high concentration of failures in the identified areas, THESL considers it more efficient to rebuild this area to current standards.

Benefits

- Significantly improves feeder reliability through the replacement of direct buried XLPE primary cable
- Improves customer satisfaction as a result of greater service reliability
- Provides greater flexibility for power distribution, mechanical protection and durability of the underground cable through the use of concrete encased ducts
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems on the feeder(s) in question, and would subsequently lead to customer dissatisfaction and higher reactive maintenance costs. Specifically, there have been thirteen outages on this feeder in the past year, and deferral of this project would increase the probability of continued failures to the existing XLPE cable.

Portfolio:	Underground
Project Title:	Replace/Upgrade Feeder A53CS from PILC to 500KCMIL TRXLPE Cable
Project Number:	16004
Project Year:	2014
Estimate Cost:	$707,082

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace PILC cable on the trunk of feeder A53CS with the standard 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to enable the replacement and upgrade the existing 1,813m of existing PILC cable, of various sizes, to 500kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	CHARLES
STATION(S)	CHARLES TS
FEEDER(S)	A53CS

JUSTIFICATION

Project Background

This project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Moreover, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily

available TRXLPE cable.

Benefits

- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, THESL construction workers would continue to face health issues and environmental risk due primarily to the potential exposure of PCBs and lead. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL would not only face procurement concerns, but also have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Underground
Project Title:	Underground Lateral Cable Rehab Dufferin / Finch / Wilmington
Project Number:	14078
Project Year:	2014
Estimate Cost:	$694,520

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all primary XLPE underground service laterals along feeder NY85M6 with 1/0 AL TRXLPE primary cable from an overhead feeder to a connected transformer room or vault, in order to improve the reliability of the distribution in the area.

Scope:

The scope of work for this project is to install 3-1/0 AL XLPE primary service riser cables with 1/0 AL TRXLPE cable, along with any locations where direct buried cable and construction of concrete-encased ducts between the primary drop pole and the transformer. Furthermore, work on the overhead section of the feeder will also be replaced by adding three, new spans of 27.6/16kV 3/0 lines. Accordingly, this project will require the installation of approximately 235m of concrete-encased ducts, the replacement of 4,200m of primary cable and eight transformers.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DUFFERIN, FINCH & WILMINGTON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M6

JUSTIFICATION

Project Background

THESL has an ongoing WPF program. Its intention is to improve system reliability and asset performance by applying immediate adjustments to the planned program, with the intent of removing these problem feeders from the WPF list.

This project covers the streets of Dufferin Street, Finch Avenue and Wilmington Avenue fed by feeder NY85M6, and is deemed to be poor performing as it is a FESI-9 feeder. In terms of the THESL Worst Performing Feeder List, the feeder is ranked 25th. The majority of asset on this feeder are old and in poor condition, causing a high impact on feeder reliability. Lastly, the feeder was found to have the early vintage XLPE cable that has been identified as being poor performing, and THESL is proactively replacing this type of cable to reduce the outage duration times, frequency and system losses, in the event of an outage event.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			25
Feeders Experiencing Sustained Interruptions Count***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	118	576	1,831
Feeder CMO ***(Cumulative)***	13,021	2,304	46,929

Alternatives

An alternative approach would be to perform spot replacements. However, due to poor plant condition and the high concentration of failures in the identified areas, THESL considers it more efficient to rebuild this area to current standards.

Benefits

- Significantly improves feeder reliability through the replacement of direct buried XLPE primary cable
- Improves customer satisfaction as a result of greater service reliability
- Provides greater flexibility for power distribution, mechanical protection and durability of the underground cable through the use of concrete encased ducts
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems on the feeder(s) in question, and would subsequently lead to customer dissatisfaction and higher reactive maintenance costs. Specifically, there have been two outages along this portion of the feeder within the last two years, with one of the faults pertaining to defective equipment. As such, deferral of this project would increase the probability of continued failures to the aluminum XLPE cable.

Portfolio:	Underground
Project Title:	Underground Replacement 53M25 Trunk York Mills Road
Project Number:	23199
Project Year:	2014
Estimate Cost:	$688,679

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated primary cables installed around 1968 in concrete-encased ducts on the trunk of feeder NY53M25 along York Mills Road, and also in the three-phase distribution in the Sandover Drive area.

Scope:

The scope of work for this project is to remove all of the existing primary cables and install new, three-phase 1000 AL TRXLPE cables in existing concrete-encased ducts that runs between two switches from Valleywood and Parkwoods Village Drive. Existing primary cable in the Clayland-Sandover area would also be replaced with three-phase, 1/0 AL TRXLPE cable. As such, work for this project would require the replacement of approximately 7,230m of direct buried cable with the TRXLPE type cable in concrete-encased ducts. The project would also involve replacing four padmount switches with SF6 type switches that would serve as the termination points for the new primary cables, and have 140k fusing protection. Lastly, the new primary cables would also be terminated at seven, refurbished vault transformer locations in the project area, the mini-rupter arrangement would be reconfigured as per latest THESL standards, and fault indicators would be reinstalled on primary cables in splice vaults and customer-owned transformer(s).

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	YORK MILLS
STATION(S)	BERMONDSEY II TS
FEEDER(S)	NY53M25

JUSTIFICATION

Project Background

This subdivision was constructed with direct buried XLPE cable in 1968. Direct buried XLPE cable is subject to contamination and electrical treeing, and thus fail prematurely. Direct buried cables are also difficult to fault locate and require an extenstuve amount of time for power restoration. As such, the intent of this project is to replace these direct buried cables with new 500kcmil TRXLPE cable in concrete-encased ducts, as well as remove the old PMH switches with SF6 type switches in the scope area. Given that the old cables will be pulled out and new cables will be pulled in, there is no need for any excavation and the City moratorium will not be applicable.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			176
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	260	19,054	563
Feeder CMO ***(Cumulative)***	51,265	638,856	70,033

Benefits

- Replaces old and failing direct buried cables approximately 43 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Modernizes the system by removing the non-compliant, single-phase PMH switches
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the distribution in this area would face a higher risk of equipment failures and outages to customers in the area. Moreover, deferral of this work would not only represent a lost opportunity for THESL to modernize the system by replacing legacy and problematic issues such as the XLPE cable and PMH switches, but also prevents THESL from potentially reconfiguring and updating the distribution to improve service reliability and quality. Consequently, by not proceeding ahead with this project, THESL would be unable to realize the future benefits and return of investment intended through the rebuild.

Portfolio:	Underground
Project Title:	Underground Rebuild Prudential Drive SCNAE51M26 (Electrical)
Project Number:	22568
Project Year:	2014
Estimate Cost:	$678,675

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild a portion of feeder SCNAE5-1M26 on Prudential Drive, and replace old and deteriorated, direct buried cable in PVC duct with cable in concrete-encased duct. This part of the project will address the electrical work only.

Scope:

The scope of work for this project is to install the 3-1/0 AL primary TRXLPE cable in concrete-encased ducts and the replacement of 4,650m of direct buried cable. The project would also entail the refurbishment of six transformer vaults that would be fed between two overhead switches bounded by the area of Midland Avenue, Lawrence Avenue and Prudential Drive.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	PRUDENTIAL
STATION(S)	SCARBOROUGH TS
FEEDER(S)	SCNAE51M26

JUSTIFICATION

Project Background

This subdivision was constructed with early vintage, direct buried XLPE cable. Direct buried XLPE cable is subject to contamination and electrical treeing, and thus fail prematurely. Direct

buried cables are also difficult to fault locate and require an extenstuve amount of time for power restoration. Finally, direct buried cable in PVC piping can also collapse over time, and require additioanl construction work for repairs and replacement of the failed cable. As such, the intent of this project is to replace these direct buried cables with new 500kcmil TRXLPE cable in concrete-encased ducts.

Benefits

- Replaces old and failing direct buried cables in PVC pipes approximately 37 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers, given that the cable has exceeded its expected useful life. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Lateral Cable Rehab - Milvan
Project Number:	14148
Project Year:	2014
Estimate Cost:	$663,989

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all primary XLPE underground service laterals along feeder NY55M9 with 1/0 AL TRXLPE primary cable to improve service reliability and minimize the risk of outages due to failing equipment.

Scope:

The scope of work for this project is to replace all 3-1/0 ALXLPE primary service riser cables with 1/0 AL TRXLPE cable, along with any locations where direct buried cable has been installed between the primary drop pole and the transformer. Moreover, the project would also involve the planned replacement of four submersible vault transformers and 15 padmount transformers along Milvan Drive and the surrounding area and requires the removal of approximately 770m of three-phase cable.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	MILVAN
STATION(S)	FINCH I TS
FEEDER(S)	NY55M9

JUSTIFICATION

Project Background

THESL has an ongoing WPF program. Its intention is to improve system reliability and asset performance by applying immediate adjustments to the planned program, with the intent of removing these problem feeders from the WPF list.

This project covers the streets of Milvan Drive, Penn Drive, Toryork Drive and Weston Road fed by feeder NY55M9, and is deemed to be poor performing as it is a FESI-4 feeder. In terms of the THESL Worst Performing Feeder List, the feeder is ranked 206th. As such, THESL has initiated this project to improve the reliability of the distribution in this area. Lastly, the feeder was found to have the early vintage XLPE cable that has been identified as being poor performing, and THESL is proactively replacing this type of cable to reduce the outage duration times, frequency and system losses, in the event of an outage event.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			206
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	0	3,892	592
Feeder CMO ***(Cumulative)***	0	701,758	2,460

Alternatives

An alternative approach would be to perform spot replacements. However, due to poor plant condition and the high concentration of failures in the identified areas, THESL considers it more efficient to rebuild this area to current standards.

Benefits

- Significantly improves feeder reliability through the replacement of direct buried XLPE primary cable
- Improves customer satisfaction as a result of greater service reliability
- Provides greater flexibility for power distribution, mechanical protection and durability of the underground cable through the use of concrete encased ducts
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems on the feeder(s) in question, and would subsequently lead to customer dissatisfaction and higher reactive maintenance costs.

Portfolio:	Underground
Project Title:	Manse Road 209-245 Underground Rebuild (Civil)
Project Number:	23441
Project Year:	2014
Estimate Cost:	$650,822

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed in 1981, and supplied from feeder SCNAH9M29 with cable in concrete-encased ducts, as well as rebuild the cable chambers as required. This part of the project will address the civil work only.

Scope:

The scope of work for this project is to install concrete-encased ducts on the Manse Road townhouse development, which would be used to house the single-phase primary and secondary bus cables. Moreover, secondary infrastructure leading to the customers' meter base will be rebuilt as well, and THESL plans to reuse all submersible transformer vaults, where possible. Lastly, new concrete-encased ducts would be installed from new tap boxes and terminate near the pole base, as per the latest standard. Accordingly, this project will require the installation of approximately 850m of concrete-encased ducts.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MANSE
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M29

JUSTIFICATION

Project Background

This subdivision was constructed with direct buried XLPE cable in 1981. Direct buried XLPE cable is subject to contamination and electrical treeing, and thus fail prematurely. Direct buried cables are also difficult to fault locate and require an extenstuve amount of time for power restoration. As such, the intent of this project is to replace these direct buried cables with new 500kcmil TRXLPE cable in concrete-encased ducts.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			110
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,857	60	1,725
Feeder CMO ***(Cumulative)***	145,110	28,120	114,692

Benefits

- Replaces old, failing direct buried XLPE cables approximately 30 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the electrical component of this project cannot be executed, either in the same year of following year, without the completion of the civil work. Moreover, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Underground Direct Buried Rebuild Ingles Gate & Shenstone Road
Project Number:	22992
Project Year:	2014
Estimate Cost:	$635,170

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the underground and portions of overhead distribution bounded by Ingles Gate and Shenstone Road to improve reliability and faster restorations times to customers in the project area.

Scope:

The scope of work for this project is to replace the non-standard, direct buried distribution loop with standard civil infrastructure on Ingles Gate and Shenstone Road. As such, work for this project will require the installation of two new underground transformers, 350m of primary underground 1/0 TRXLPE cable and 350m of main ducts to better service reliability to the 41 residences supplied in the project area.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WESTMINSTER-BRANSON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M7

JUSTIFICATION

Project Background

Direct buried cable was installed in the outer area during the 1970's and 1980's. Due to the method of installation (i.e. burial in the ground), these cables are exposed to contaminants within the environment, and thus fail prematurely. As part of feeder reliability improvements at THESL, the direct buried distribution has been identified for replacement, in order to improve operational flexibility in the system. Moreover, fault locating on direct buried cables is difficult and can subsequently result in lengthy outage durations when restoring power.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			179
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,871	1,228	3,414
Feeder CMO ***(Cumulative)***	74,881	84,907	46,360

Benefits

- Replaces over 30 year old direct buried cables that are at risk of failing
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Major improvements in feeder reliability are expected as a result of rebuilding and optimally reconfiguring the lines
- Improves customer satisfaction as a result of greater service reliability
- Reduced emergency and reactive capital and maintenance costs due to significantly greater reliability

- Upgrades equipment to current THESL standards
- Provides greater flexibility for power distribution and mechanical protection and durability of the underground cabling

IMPACT OF DEFERRAL

Deferral of this project will generally lead to sustained or deteriorating reliability problems on the feeder in question, leading to customer dissatisfaction and high reactive investment costs. This is a result of aging direct buried cable (over 30 years) failing, and the difficulty to repair faults when they occur. If deferred the risk of failure will increase while the restoration time to these customers will remain high causing the reactive crew to invest in non-standard cable past its useful life.

Portfolio:	Underground
Project Title:	Replace/Upgrade Feeder A47GD from PILC to 500KCMIL TRXLPE Cable
Project Number:	14157
Project Year:	2014
Estimate Cost:	$566,072

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace PILC cable on the trunk of feeder A47GD with the standard 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to enable the replacement and upgrade the existing 1,000m of existing PILC cable, of various sizes, to 500kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	GEORGE & DUKE
STATION(S)	GEORGE & DUKE TS
FEEDER(S)	A47GD

JUSTIFICATION

Project Background

This project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Moreover, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily

available TRXLPE cable.

Benefits

- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, THESL construction workers would continue to face health issues and environmental risk due primarily to the potential exposure of PCBs and lead. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL would not only face procurement concerns, but also have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Underground
Project Title:	Replace/Upgrade Feeder A41GD from PILC to 500KCMIL TRXLPE Cable
Project Number:	14156
Project Year:	2014
Estimate Cost:	$554,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace PILC cable on the trunk of feeder A41GD with the standard 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to enable the replacement and upgrade the existing 1,511m of existing PILC cable, of various sizes, to 500kcmil TRXLPE.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	GEORGE & DUKE
STATION(S)	GEORGE & DUKE TS
FEEDER(S)	A41GD

JUSTIFICATION

Project Background

This project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Moreover, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily

available TRXLPE cable.

Benefits

- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Increases room for load growth and flexibility for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity 500kcmil TRXLPE cable
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, THESL construction workers would continue to face health issues and environmental risk due primarily to the potential exposure of PCBs and lead. Moreover, if the lone North American manufacturer stops producing PILC cable, THESL would not only face procurement concerns, but also have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Underground
Project Title:	Underground Rebuild H9M32 Milner B Crt Progress (Electrical)
Project Number:	22881
Project Year:	2014
Estimate Cost:	$619,651

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables off feeder SCNAH9M32 with cable in concrete-encased ducts. The project would also rebuild the cable chambers as required. The distribution feeds a number of small industries and commercial units. This part of the project will address the electrical work only.

Scope:

The scope of work for this project is to install the new three-phase 1000kcmil AL and 1/0 cables in the following areas: Milner Avenue from Neilson Road to a newly installed SF6 padmount switch on the west side of Novopharm Court, and from overhead risers at Sheppard-Lapsley along Lapsley-Burrows Hall, Dailing Gate to the same SF6 padmount switch. Accordingly, the work required for this project would involve the installation of four poles, replacement of six overhead switches, one padmount switch, four transformers and approximately 8,620m of primary cable.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	MARKHAM & MILNER
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M32

JUSTIFICATION

Project Background

The three-phase distribution in the area of the Milner Business Court and Progress Avenue was built primarily in 1984, and contains mostly direct buried cables. Due to many recent failures in the the distribution sytsem, THESL plans to replace the old, deteriorated wall mounted primary switches (with SF6 type indoor switchgear or mini-rupters) found in customer vaults in the project area, as well as all SF6 or sealed type pad switches. Accordingly, to improve the overall reliability of the system and update the distribution to current THESL standards, THESL will rebuild the subdivisions centered around Finch Avenue with cables in concrete-encased ducts. On a related note, the existing three-phase loop has connected load that requires greater fusing the the current 140k, maximum allowable size for protection coordination. As such , the loop will need to be split into two segments and 140A fuses will be required from the feeder trunk to the riser/dips. Currently, there is no moratorium in place for the affected streets in question.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			296
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,771	235	263
Feeder CMO ***(Cumulative)***	188,289	705	1,025

Benefits

- Replaces old and failing direct buried cables approximately 27 years of age to prevent future negative impact to commercial and industrial customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with

TRXLPE cable in concrete-encased ducts with standard fusing

- Modernizes the system by removing the non-compliant, single-phase PMH switches and existing padmount and submersible transformers
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers in the area. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	SS68-F10 Transformer Replacement
Project Number:	23367
Project Year:	2014
Estimate Cost:	$584,251

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace old and deteriorated transformers on feeder SS68-F10 to the current THESL standard, as well as address the associated direct buried cables feeding the transformers.

Scope:

The scope of work for this project includes replacing 52 transformers on feeder SS63-F10 with an average age of 40 years in the area surrounding McNicoll Avenue and Leslie Street

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	MCNICOLL & LESLIE
STATION(S)	LESLIE MS
FEEDER(S)	NYSS68-F10

JUSTIFICATION

Project Background

THESL recently determined that the majority of the transformers of feeder SS68-F10 required replacement, to supplement two other projects that had been scoped to rebuild direct buried cable in the area. As such, within the scopes of these two projects, transformers were planned for replacement as well. Accordingly, this particular scope is intended to address all remaining, identified transformers.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			101
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,574	156	8,003
Feeder CMO ***(Cumulative)***	136,102	4,356	137,674

Benefits

- Modernizes the system by replacing aged padmount and submersible transformers to the latest THESL standard
- Mitigates the risk of futher outages as a result of deteriorating and failing equipment

IMPACT OF DEFERRAL

If this project were deferred, THESL would lose the opportunity to replace aging, deteriorating assets in the system and modernize the distribution to the latest THESL standard. Moreover, THESL would also face a greater risk of sustained or increasing outages as is evident by the increasing trend in CI and CMO.

Portfolio:	Underground
Project Title:	Underground Replacement 53M25 Trunk Underhill Redwillow
Project Number:	23187
Project Year:	2014
Estimate Cost:	$554,105

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated primary cables installed around 1968 in concrete-encased ducts on the trunk of feeder NY53M25 along Underhill Drive, Cassandra Boulevard and Redwillow Drive.

Scope:

The scope of work for this project is to remove approximately 5,400m of the existing primary cables and install new, three-phase 1000 AL TRXLPE cables in existing concrete-encased ducts that runs between multiple switches along Brookbanks Drive, Underhill Drive, Cassandra Boulevard and Redwillow Dirve. The project would also involve replacing three padmount switches with SF6 type switches that would serve as the termination points for the new primary cables, and have 140k fusing protection. Lastly, an overhead switch would also be replaced with a SCADAMATE riser switch for added control and monitoring capabilities.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	UNDERHILL
STATION(S)	BERMONDSEY II TS
FEEDER(S)	NY53M25

JUSTIFICATION

Project Background

The feeder trunk that passes through the aforementioned project area was built in 1968, and the primary cables supplying the distribution are subsequently at or approaching end-of-life conditions. As such, THESL will look to replace the existing primary cable with the standard 1000kcmil TRXLPE cable. Moreover, the project area also contains the old, non-compliant single-phase PMH switches, and THESL intends to replace these switches with the SF6 type in the scope area. Given that the old cables will be pulled out and new cables will be pulled in, there is no need for any excavation and the City moratorium will not be applicable.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			176
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	260	19,054	563
Feeder CMO ***(Cumulative)***	51,265	638,856	70,033

Benefits

- Replaces old and failing direct buried cables approximately 43 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Modernizes the system by removing the non-compliant, single-phase PMH switches
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the distribution in this area would face a higher risk of equipment failures and outages to customers in the area. Moreover, deferral of this work would not only represent a lost opportunity for THESL to modernize the system by replacing legacy and problematic issues such as the XLPE cable and PMH switches, but also prevents THESL from potentially reconfiguring and updating the distribution to improve service reliability and quality. Consequently, by not proceeding ahead with this project, THESL would be unable to realize the future benefits and return of investment intended through the rebuild.

Portfolio:	Underground
Project Title:	Underground Rebuild H9M30 Kingston Mason (Electrical)
Project Number:	23300
Project Year:	2014
Estimate Cost:	$545,374

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed over the period of 1975 to 1977 off feeder SCNAH9M30 with cable in concrete-encased ducts, and rebuild the cable chambers as required. The distribution feeds a number of townhouses and residential units. This part of the project will address the electrical work only.

Scope:

The scope of work for this project is to install approximately 2,000m of single-phase 1/0 AL primary cables, and 1,000m of secondary bus wires along Mason Road, Rain Street, portions of Greendowns Drive and the TH complex on Kingston Road. The project would also involve the replacement of one existing padmount transformer and nine submersible transfomers to the latest THESL standards. The submersible transformers would be connected into a complex loop and be fitted with 65k fuse protection on the poles. Lastly, all secondary services wires along the trench routes would be rebuilt and replaced.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	KINGSTON & MASON
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M30

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder SCNAH9M30 has been reinstalled in concrete-encased ducts. However, there are some sections that are still direct buried. As such, this project has been planned to install and/or replace primary and secondary electrical equipment to the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			34
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,139	8,147	6,796
Feeder CMO ***(Cumulative)***	229,249	490,481	566,474

Benefits

- Replaces old and failing direct buried cables ranging from 34 to 36 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Modernizes the system by removing the non-compliant, single-phase PMH switches and existing padmount and submersible transformers
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers in the area. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	Ling Road Underground Rebuild SCNAH9M29 (Electrical)
Project Number:	22159
Project Year:	2014
Estimate Cost:	$538,687

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild a portion of feeder SCNAH9M29 that contains old and deteriorated, direct buried primary cables with cable in concrete-encased ducts. This part of the project will address the electrical work only.

Scope:

The scope of work for this project is to install approximately 4,500m of single-phase 1/0 AL primary cables in concerete-encased ducts along Ling Road. The project would also involve the replacement of a padmount switch with a new, SF6 padmount switch and the installation of three, 1000 AL TRXLPE cable in concrete-encased ducts beginning at an overhead switch and terminating at the SF6 padmount switch. Accordingly, the cable will be feeding four transformer vaults, which will subsequently be replaced and updated to the latest THESL standard. These four transformer vaults will be refurbished as part of this project.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	LING
STATION(S)	ELLESMERE TS
FEEDER(S)	SCNAH9M29

JUSTIFICATION

Project Background

This subdivision was constructed with early vintage, direct buried XLPE cable. Direct buried XLPE cable is subject to contamination and electrical treeing, and thus fail prematurely. Direct buried cables are also difficult to fault locate and require an extenstuve amount of time for power restoration. As such, the intent of this project is to replace these direct buried cables with new 500kcmil TRXLPE cable in concrete-encased ducts.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			110
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			2
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,857	60	1,725
Feeder CMO ***(Cumulative)***	145,110	28,120	114,692

Benefits

- Replaces old and failing direct buried cables approximately 30 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Modernizes the system by removing the non-compliant, single-phase PMH switches and existing padmount and submersible transformers
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers in the area. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground
Project Title:	E14201 UG Rebuild SS68-F10 McNicoll Michael (Electrical)
Project Number:	23356
Project Year:	2014
Estimate Cost:	$536,286

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the old and deteriorated, direct buried primary cables installed over the period of 1969 to 1986 of feeder NYSS68-F10 with cable in concrete-encased ducts, and rebuild the cable chambers as required. The distribution feeds a number of residential units. This part of the project will address the electrical work only.

Scope:

The scope of work for this project is to install the single-phase 1/0 AL cables and secondary bus wires along McNicoll Avenue (east of Leslie Street), Patina Drive, Myers Lane, portions of Michael Drive and Osmund Court. The project would also involve the replacement of 13 existing transformers and switches connected in the loop to the latest THESL standard and will be connected with the ends of the newly installed cable sections. In addition, THESL will also be removing a padmount switch along the loop and installing a new, fused 140k switch, as well as rebuild all of the secondary services of the affected residential units.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	MCNICOLL & LESLIE
STATION(S)	LESLIE MS
FEEDER(S)	NYSS68-F10

JUSTIFICATION

Project Background

The majority of the distribution cables of feeder NYSS68-F10 has been reinstalled in concrete-encased ducts. However, there are some sections that are still direct buried. As such, this project has been planned to install and/or replace primary and secondary electrical equipment to the latest THESL construction standard. Currently, there is no moratorium on these roads.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			101
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	1,574	156	8,003
Feeder CMO ***(Cumulative)***	136,102	4,356	137,674

Benefits

- Replaces old and failing direct buried cables ranging from 25 to 42 years of age to prevent future negative impact to customers
- Reconfigures the distribution for the latest THESL standard for operation and protection with TRXLPE cable in concrete-encased ducts with standard fusing
- Modernizes the system by removing the non-compliant, single-phase PMH switches and existing padmount and submersible transformers
- Allows for better operational flexibility and more reliable supply through the replacement and reconfiguration of distribution plant and equipment

IMPACT OF DEFERRAL

If this project was to be deferred, the civil work associated with this project would be at risk of being stranded and could impact future projects planned in the area. Consequently, this would extend the amount of time required for THESL to realize the benefit and return of the investment for this project. Moreover, delays in this work could also lead to a higher risk of equipment failures and outages to customers in the area. Lastly, deferral of this work may also cause this project to be in conflict with work from other utilities or the newly imposed city moratorium, as THESL has communicated this project to the city and other utilities.

Portfolio:	Underground Direct Buried
Project Title:	85M7 Torresdale Avenue Underground DB Rebuild
Project Number:	23006
Project Year:	2014
Estimate Cost:	$526,633

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the non-standard underground direct buried primary and secondary cables to improve reliability and increase restoration times to customers in the surrounding areas of Torresdale Avenue and Steeles Avenue West.

Scope:

The scope of work for this project is to improve the civil infrastrucure by replacing the direct buried primary and secondary services fed through two padmount transformers and one underground transformer. Moreover, the project would also involve reconfiguring the primary cable riser from Steeles Avenue West to Torresdale Avenue to correct non-standard lateral tie-point configuration. Lastly, the secondary service is to be repalced and installed in ducts to 58 residences in the development. As such, this project would entail the installation of approximately 1,300m of concrete-encased duct, the replacement of 400m of primary cables, 1,000m of secondary cables and one transformer.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WESTMINSTER-BRANSON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M7

JUSTIFICATION

Project Background

As part of the feeder reliability improvements it is recommended to replace the direct buired distribution in order to improve operational flexibility. These direct buried cables are subject to contamination thus pre-mature failure. They are also difficult to fault locate and takes a lengthy amount of time for power restoration.

Historical Performance

FEEDER PERFORMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			179
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			5
HISTORICAL RELIABILITY PERFORMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,871	1,228	3,414
Feeder CMO ***(Cumulative)***	74,881	84,907	46,360

Benefits

- Replaces over 30 years old direct buried cables that are at risk of failing
- Reconfigures the distribution for the latest THESL standard for operation and protection with 1/0 cable with standard fusing
- Major improvements in feeder reliability are expected as a result of rebuilding and optimally reconfiguring the lines
- Improved customer satisfaction as a result of greater service reliability
- Reduced emergency and reactive capital and maintenance costs due to significantly greater reliability
- Upgrades equipment to current THESL standards

- Provides greater flexibility for power distribution and mechanical protection and durability of the underground cabling

IMPACT OF DEFERRAL

The deferral of this project will generally lead to sustained or deteriorating reliability problems of this area due to the defective nature and the age of the direct buried cable. This will lead to customer dissatisfaction and high reactive investment costs to repair a fault if it were to occur on the cable. Lastly, the re-configuration of this loop will follow current design standards and will maintain a balanced load in the case of contingency.

PROJECTS $500K AND OVER FOR 2014

SUSTAINING PORTFOLIO – OVERHEAD SYSTEM

Table 1: Overhead Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
22034	Rear Lot Rebuild Underground R43M23 Clonmore Briar Dale (Electrical)	2.2
23358	B3DN Voltage Conversion	1.7
23361	30M7 Overhead Upgrade & ETRF2 Overhead Voltage Conversion	1.7
22990	Overhead Lateral Cable Rehab W/O Wilmington I	1.1
22998	Overhead Lateral Cable Rehab W/O Wilmington II	1.1
22890	Voltage Conversion of SS63F1 to 80M4 Between Yonge & Bayview	1.0
23435	Chapman EBF1 Overhead Voltage Conversion	1.0
22245	Goulding MS F1 and F2 Voltage Conversion Phase #1	1.0
23389	Rerouting of Trunk Feeder 38M6 Under QEW at Diesel	0.9
23307	Lambton MS Voltage Conversion Phase #1	0.9
22248	Goulding MS F1 and F2 VC Ph#2	0.8
23089	Overhead Feeder Rehab Milvan/Penn	0.8
23353	Trunk Feeder Rehab Dufferin/Finch	0.8
22994/ 22995	Overhead Upgrade R43M24 Hollis Milne Birchmount	0.7
22974	Overhead Trunk Feeder Rehab - Dufferin/Finch/Wilmington	0.8
22958	Overhead Rebuild R43M28 Aylesworth Kennedy	0.6
22859	Overhead Rebuild at Steeles Avenue West and Weston Road	0.6
23312	Rouge Park Overhead Rebuild SCXGF Phase #3	0.5
23093	Ovehead Feeder Rehab - Finch, Weston, Toryork	0.5
23323	Kingsway MS Overhead Voltage Conversion	0.5
	Total Cost	**19.2**

Portfolio:	Overhead
Project Title:	Rear Lot Rebuild Underground R43M23 Clonmore Briar Dale (Electrical)
Project Number:	22034
Project Year:	2014
Estimate Cost:	$ 2,206,356

PROJECT DESCRIPTION

Objective:

The purpose of this project is to construct the electrical phase of the conversion of the rear lot area bounded by Clonmore Drive, Briar Dale Drive, Woodland Park Drive, and Fallingbrook Road. It follows the civil project that is to accommodate this electrical equipment.

Scope:

The scope of work for this project involves the conversion of approximately 310 customers fed from the rear lot to the front underground with low profile transfromers in the area bounded by this project. In summary, this electrical phase entails installing primary and secondary cabling, padmount transfromers and making secondary connection to customers.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	CLONMORE & BRIAR DALE
STATION(S)	WARDEN TS
FEEDER(S)	SCNAR43M23

JUSTIFICATION

Project Background

The area bounded by this project is reaching the end of its servicable life and similar to other rear

lot areas, there is difficulty in accessing and repairing these rear-lot fed equipment. There is also the presence of old and non-standard assets and feeder configurations that THESL intends to proactively remove from the backyards of customer properties. This rear lot supply have become a source of concern for public and personnel safety. The age of this distribution coupled with the difficulty to access THESL owned equipment is the key driving force for implementing this work.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			127
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	5,797	532	5,295
Feeder CMO ***(Cumulative)***	535,773	78,146	141,958

Benefits

- Improves power quality as a result of higher primary voltages that has lower line losses and higher transmission efficiency.
- Increases reliability due to converting rear-lot fed areas and in turn, improving outage duration. Furthermore, replacing aging 4 kV infrastructure, as well as station circuit breakers and switchgear, also contributes to improved reliability.
- Enhances customer satisfaction as a result of improved restoration time in the event of outages
- Eliminates maintenance and inventory costs that are associated with obsolete and discontinued 4 kV distribution equipment
- Improves life-cycle costs that are attributed to the 27.6 kV distribution system as opposed to a 4 kV system.

- Enhances safety as a result of improved accessibility of front-lot equipment in the event of an outage as opposed to restricted rear-lots

IMPACT OF DEFERRAL

If the project is to be deferred, outages related to rear lot feeders tend to be, on average, approximately twice as long in duration than equivalent outages on front lot feeders. This is due to difficulty in accessing and repairing the equipment as well as the presence of old and non-standard assets and feeder configurations. The lack of access also presents safety hazards to crews during emergency outage situations. As such, the failure to keep up with required rear lot renewal will result in the increasing probability of relatively high-impact outages in these areas. This will significantly decrease reliability in the neighbourhoods and will expose THESL crews to the safety risks inherent when restoring power in rear lot area. Finally, customers will experience lengthy outages and complaints will gradually worsen while maintenance and capital costs will continue to increase as a result of deferring planned work for the eventual decommissioning of municipal stations.

Portfolio:	Overhead
Project Title:	B3DN Voltage Conversion
Project Number:	23358
Project Year:	2014
Estimate Cost:	$ 1,708,735

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder B3DN, originating from Dufferin MS, to 13.8kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Dufferin MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 13.8kV feeder A480DN to replace A490DN to replace B3DN. The expansion of these feeders includes approximately 2.60 circuit kilometers of overhead conductor, 90 poles and 12 transformer locations. The project area is bounded by Shanly Street in the north, Dufferin Street in the east, Sylvan Avenue in the south, and Brock Avenue in the west.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DUFFERIN
STATION(S)	DUFFERIN MS
FEEDER(S)	B3DN

JUSTIFICATION

Project Background

Dufferin MS was originally built in 1956 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

In addition, the existing feeder B3DN from Dufferin MS is of box construction design, which is no longer the distribution standard. Converting 4kV box construction will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Improves the aesthetics of the street

IMPACT OF DEFERRAL

If this project was to be deferred, safety concerns and risks regarding the box construction design will still persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching useful life.

Portfolio:	Overhead
Project Title:	30M7 Overhead Upgrade & ETRF2 Overhead Voltage Conversion
Project Number:	23361
Project Year:	2014
Estimate Cost:	$1,653,311

PROJECT DESCRIPTION

Objective:

The purpose of this project is to upgrade the feeder 30M7 from Horner TS and partially convert Brownsline and Burlingame MS from 4kV to 27.6kV. This project is one phase of a multi-phase program to convert the entire 4kV load at both Brownsline and Burlingame MS, with the final objective of decommissioning the stations.

Scope:

The scope of work for this project is to install 184 spans of primary conductor and 135 secondary conductor spans and 540 secondary services in order to upgrade customers from 4kV to 27.6kV in the area of Rimilton Avenue. This project also includes the installation of 125 new poles, 35 transformer and 1 transformer vault.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	RIMILTON AVENUE
STATION(S)	BROWNSLINE MS, BURLINGAME MS
FEEDER(S)	ETRF2, ETKEF1

JUSTIFICATION

Project Background

Brownsline MS and Burlingame MS was originally built in the 1950's to 1960's and has already

been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Furthermore, 4.16 kV assets are in need for replacement since they are past their useful life and in poor condition. The electrical industry is moving away from 4kV equipment and as a result, spare parts for these assets are very costly and difficult to attain. This will result in a further increase in outages and more lengthy outages due to lack of readily available spare parts as well as increased cost for reactive replacements.

ETRF2 has been identified as a FESI-3 feeder, with a worst perfroming feeder rank of 418 as of August 2011. The feeder's condition has been deteriorating according to reliability data. Many 4kV systems have been in service since the mid 1950's. Based on the age of this system, heath index information and feeder patrols most of these assets are past their useful life. There are currently a high number of assets past their useful life on these feeders, and needs to be addressed. Further improving the FESI status of ETRF2 and reducing the probability of failure requires installing proper fusing in the interim and a 4kV to 27.6kV overhead conversion capital project. In addition, the project needs to be carried out to accommodate residential load creep as well as load increase from future emerging businesses in the area.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			418
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	1,468	4,365	1,253
Feeder CMO (***Cumulative***)	29,193	270,561	70,459

Benefits

- Reduces maintenance costs by removing obsolete 4kV equipment

- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV
- Helps remove obsolete breaker and switchgear equipment in the MS station

IMPACT OF DEFERRAL

If this project was deferred, THESL would endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard equipment. Consequences of deferral will lead to high station costs since circuit breakers and station transformers will need to be replaced at the station due to deteriorated conditions. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program started in previous years in order to fully decommission

Portfolio:	Overhead
Project Title:	Overhead Lateral Cable Rehab E/O Wilmington I
Project Number:	22990
Project Year:	2014
Estimate Cost:	$1,133,466

PROJECT DESCRIPTION

Objective:

The purpose of this project is to refurbish the predominantly single-phase overhead lateral distribution system of feeder 85M6 east of Wilmington. There are two other projects that refurbish the feeder west of Wilmington and along the feeder trunk off Duffer in and Finch Avenues.

Scope:

The scope of work for this project is to refurbish the overhead lateral distribution system of feeder 85M6 east of Wilmington, by replacing 137 defective poles and non-standard equipment (including insulators, brackets and arrestors), replacing 44 Completely Self Protective transformers with appropriately sized equivalents and upgrading 140 spans of predominantly single-phase, undersized primary lines including "open bus" secondary lines identified on the NY85M6 feeder patrol list. Work will be done along Maxwell, Elder, Goddard Streets; Beaver Valley, Delbank, Pannahill Roads; Artreeva, Blue Forest Drives; Kennard Avenue, Overbrook Place, Cedar Springs Grove and Bayhampton Court.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	WILMINGTON
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M6

JUSTIFICATION

Project Background

The feeder 85M6 has had nine outages in the last 12 months and the WPF rank for this feeder has deteriorated from 242nd in 2010 to currently 25th on the THESL distribution system, as a result of very high CI and CMO values accumulated in the last two years. THESL has therefore deemed it high priority to execute the interventions (i.e. asset replacements, fault indicator replacements and system reconfiguration) in this project, as part of a series of projects that will improve long-term distribution reliability on the feeder.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			25
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	118	576	1,831
Feeder CMO (***Cumulative***)	13,021	2,304	46,929

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents

- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project was to be deferred, utility personnel and approximately 840 customers will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the pole top, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by the breakdown of insulation over time. Lastly, power quality to customers would also suffer if this project were deferred due to improper grounding of the feeder at approximately 137 poor condition poles.

Portfolio:	Overhead
Project Title:	Overhead Lateral Cable Rehab W/O Wilmington II
Project Number:	22998
Project Year:	2014
Estimate Cost:	$1,088,516

PROJECT DESCRIPTION

Objective:

The purpose of this project is to refurbish the predominantly single-phase overhead lateral distribution system of feeder 85M6 west of Wilmington. There are two other projects that refurbish the feeder east of Wilmington and along the feeder trunk off Dufferin and Finch Avenues.

Scope:

The scope of work for this project is to refurbish the overhead lateral distribution system of feeder 85M6 east of Wilmington, by replacing 146 defective poles and non-standard equipment (including insulators, brackets and arrestors), replacing 35 Completely Self Protective transformers with appropriately sized equivalents and upgrading 146 spans of predominantly single-phase, undersized primary lines including "open bus" secondary lines identified on the NY85M6 feeder patrol list. Work will be done along Kennard and Barksdale Avenues; Arlstan, Evanston, Purdon Drives; Overbrook Place and Cavotti Crescent.

DISTRICT	North York
DISTRICT NEIGHBOURHOOD	WILMINGTON AVE.
STATION(S)	Bathurst I TS
FEEDER(S)	NY85M6

JUSTIFICATION

Project Background

The feeder 85M6 has had nine outage in the last 12 months and the WPF rank for this feeder has deteriorated from 242nd in 2010 to currently 25th on the THESL distribution system, as a result of very high CI and CMO values accumulated in the last two years. THESL has therefore deemed it high priority to execute the interventions (i.e. asset replacements, fault indicator replacements and system reconfiguration) in this project, as part of a series of projects that will improve long-term distribution reliability on the feeder.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			25
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	118	576	1,831
Feeder CMO (***Cumulative***)	13,021	2,304	46,929

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents

- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project was to be deferred, utility personnel and approximately 840 customers will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the pole-top, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, power quality to customers would also suffer if this project were deferred due to improper grounding of the feeder that was found on approximately 146 poles found to be in poor condition on this part of the feeder.

Portfolio:	Overhead
Project Title:	Voltage Conversion of SS63F1 to 80M4 Between Yonge & Bayview
Project Number:	22890
Project Year:	2014
Estimate Cost:	$ 1,049,809

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild overhead line assets of the aged 4kV primary distribution system fed by the Estelle MS by upgrading assets on the feeder route to 27.6kV rating and sourcing power to the assets directly from the adjacent feeder 80M4. This project is one phase of a multi-phase program to convert the 4kV load from Estelle MS, with the final objective to decomission Estelle MS. Specifically this project covers the boundaries of Bayview Avenue in the east, Yonge Street in the west, Northwood Drive in the north, and Finch Avenue East in the south.

Scope:

The scope of work for this project involves voltage conversion of existing 4kV feeder NYSS63F1 to 27.6kV. Work will involve removing all existing 4kV primary transfromers, switches and replace with 27.6kV primary equipments and connect them to NY80M4 feeder. New primary line will need to be installed and 4kV line removed.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	YONGE STREET & BAYVIEW AVENUE
STATION(S)	ESTELLE MS
FEEDER(S)	NYSS63-F1

JUSTIFICATION

Project Background

The Estelle MS was built in 1958 and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. The transfromers and the circuit breakers are old, installed in 1958. The station has been maintained at high cost over the years and the oil circuit breakers as well as the step-down transfromers are outdated technology. The 4kV distribution system supplying the area was upgraded in 1993 but the system as a whole is frail from a reliability viewpoint.

The vulnerability of the substation is supported by the results of the most recent condition monitoring measurements in May 2011 that confirmed the presence of friable asbestos, corrosion, dirt, debris and contamination as well as damaged doors. To reduce maintenance costs from the station and to assure reliability, AM proposes to modernize the area by converting to 27.6kV by the latest THESL standards and practices.

Benefits

- Modernizes by replacing about 50 years' old 4kV distribution system
- Improves the safety of THESL crew workers and the public
- Reduces maintenance costs by removing obsolete 4kV equipment
- Lowers risk of failures due to the replacement of 4kV assets past useful life with existing standard 13.8kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Improves the aesthetics of the street
- Reduces system losses when 4kV is upgraded to 13.8kV

IMPACT OF DEFERRAL

Deferral of this project would subject customers supplied by this feeder to high risk of frequent power outages as equipments are old and passed their service life. In addition, it will force THESL to incure costly repair and maintenance expenditure for obsolete equipment. Brings the need of rebuilding the 4kV distribution supplied by MS stations with obsolete equipment. Moreover, If this project was deferred, THESL would endure higher maintenance costs associated with existing obsolete non-standard 4kV equipment, when compared to standard overhead 13.8kV equipment. Furthermore, deferral of this work would also result in THESL losing the opportunity to complete the multi-phase program in order to fully decommission Estelle MS.

Portfolio:	Overhead
Project Title:	Chapman EBF1 Overhead Voltage Conversion
Project Number:	23435
Project Year:	2014
Estimate Cost:	$988,171

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4 kV feeder EBF1, originating from Chapman MS, to 27.6 kV. This project is the first phase of a multi-phase program beginning in 2014 to convert the entire 4kV load at Chapman MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand the existing 27.6kV feeder 88M15 to replace EBF1. The expansion of this feeder includes approximately 5.50 circuit kilometres of overhead conductor, 95 new poles, 22 single-phase transformer and one three-phase transformer. The project area is bounded by Munhall Road in the north, Arcade Road in the east, La Rose Avenue in the south, and Royal York Road in the west.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	RICHVIEW
STATION(S)	CHAPMAN MS
FEEDER(S)	ETEBF1

JUSTIFICATION

Project Background

Chapman MS was originally built in 1968 and has been identified as a candidate for voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. It has also been identified that there are areas of direct buried cable being serviced by this MS.

In addition, the overhead plant in this area, particularly in the vicinity of Chapman Rd, is approaching the end of its serviceable life. THESL has identified frequent requests for asset replacements such as poor poles, non-standard cross-arms, insulators, and pin replacements.

The most reliable and cost-effective option is convert 4kV EBF1 to 27.6 kV and ultimately, prepare for a possible decommissioning of Chapman MS. Voltage upgrades sufficiently reduce system losses and the overall life-cycle cost. The voltage conversion is considered to be economical because the feeder needs a complete rebuild and the 27.6 kV feeders are readily available. This will avoid future costs of maintaining the 4kV station.

Benefits

- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 27.6kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 27.6kV

IMPACT OF DEFERRAL

The 4kV stations asset in Chapman MS have been in service since 1968. Based on the age of this system, heath index information, feeder patrols, and crew expertise, most of these assets are past their useful life. Consequences of deferral will lead to high station costs since circuit breakers and station transformers will need to be replaced at the station due to deteriorated conditions. Furthermore, 4kV distribution assets are in need for replacement since they are past their useful life and in poor condition. The electrical industry is moving away from 4kV equipment and as a result, spare parts for these assets are very costly and difficult to attain. This will result in a further increase in outages and more lengthy outages due to lack of readily available spare parts as well as increased cost for reactive replacements.

Portfolio:	Overhead
Project Title:	Goulding MS F1 & F2 Voltage Conversion Phase #1
Project Number:	22245
Project Year:	2014
Estimate Cost:	$982,647

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeders NYSS47F1 and NYSS47F2, originating from Goulding MS, to 27.6kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Goulding MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 27.6kV feeder 80M2 and 80M10 to replace NYSS47F1 and NYSS47F2. The expansion of these feeders includes approximately 1.20 circuit kilometers of overhead conductor, 25 poles and 20 transfromer locations. The project area is bounded by Hilda Avenue, Theresa Avenue, Moore Park Avenue and Tefley Road.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	MOORE PARK
STATION(S)	GOULDING MS
FEEDER(S)	NYSS47F1, NYSS47F2

JUSTIFICATION

Project Background

Goulding MS was originally built in 1967 and has already been undergoing voltage conversion in

order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

In addition, the existing feeders NYSS47F1 and NYSS47F2 from Goulding MS is of box construction design, which is no longer the distribution standard. Converting 4kV box construction will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 27.6kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, safety concerns and risks regarding the box construction design will still persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 27.6kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching useful life.

Portfolio:	Overhead
Project Title:	Rerouting of Trunk Feeder at QEW & Diesel
Project Number:	23389
Project Year:	2014
Estimate Cost:	$936,559

PROJECT DESCRIPTION

Objective:

The purpose of this project is to reroute an overhead segment of the feeder 38M6 to an underground path in the proximity of a major highway around the QEW, Algie Avenue and Diesel Drive and to replace the aged underground cable segment that passes across the highway.

Scope:

The scope of work for this project is to add an extra duct to the conduit currently along Algie Avenue area that ties into the existing 15 duct civil infrastructure across the QEW. New three-phase, 1000kcmil TRXLPE underground cabling will then be installed in the ducts and pulled through a newly constructed cable chamber to a new riser pole on Diesel Drive. The newly installed underground cabling will replace the existing 11spans of overhead conductors and aged underground cabling along the route on feeder 38M6 from Manby TS.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	DIESEL
STATION(S)	MANBY TS
FEEDER(S)	ET38M6

JUSTIFICATION

Project Background

This project is one of many phases intended to eventually relocate or reconfigure feeders in critical crossings such as railways and highways to improve SAIFI. Distribution assets in the proximity of major highways are highly susceptible to salt spray contamination. At these areas, the overhead distribution usually dips to an underground system in order to traverse the major highways. As such, many critical components such as switches and terminations are present. Should an outage occur on these components, all customers on the feeder will experience an outage. Expenditures are required in order to ensure overhead plant is sufficiently away from the salt spray. This investment addresses reliability concerns regarding the high probability of failure of overhead critical components that are exposed to highway contamination.

The feeder 38M6 supplied by Manby TS. through Diesel Road and Algie Avenue is located under the QEW but has an entire overhead portion going over the highway.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			794
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			0
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	10,264	0	0
Feeder CMO (***Cumulative***)	52,000	0	0

Benefits

- Increases reliability through the replacement of early vintage XLPE and optimally reconfiguring the system.

- Reduces the susceptiblility of salt spray contamination of critical assets in the proximity of major highways
- Improves the safety of THESL crew workers and the public

IMPACT OF DEFERRAL

If this project was to be deferred, THESL crew workers and the public would continue to face the safety hazard risks that a result from the entire overhead portion going over the QEW. Deferral of the project exposes the customers on the feeder to the possibility of sustained outages with large CMO as the affected project area is on the feeder trunk and will be difficult to access.

Project Title: Lambton MS Voltage Conversion PH#1
Project Number: 23307
Project Year: 2014
Estimate Cost: $876,450

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeder VBF2, originating from Lambton MS, to 27.6kV. This project is the first phase of a multi-phase program beginning in 2014 to convert the entire 4kV load at Lambton MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand the existing 27.6kV feeder 38M7 to replace VBF2. The expansion of this feeder includes approximately 30 spans of conductors, 30 poles and 16 single-phase transformers. The project area is bounded by Dundas Street West in the north, Humber River in the east, Kingsway Crescent in the south and Prince Edwards Drive in the west.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	SUMMERVILLE
STATION(S)	LAMBTON MS
FEEDER(S)	ETVBF2

JUSTIFICATION

Project Background

Lambton MS was originally built in 1957 and has been identified as a candidate for voltage conversion in order to address high maintenance costs, obsolete construction standards and

deteriorated plant condition.

In addition,the switch gear at Lambton MS along with a majority of distribution assets are old and approaching end of life. Reliability of the station and the distribution assets indicated that the 4kV in the area should be addressed through voltage conversion as it is the most cost-effective and reliable option. By converting the existing 4kV feeder, the switchgear replacement at this station can be cancelled and a long term conversion plan to decommission the MS should be implemented.

Benefits

- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 27.6kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 27.6kV

IMPACT OF DEFERRAL

The 4kV station assets in Lambton MS have been in service since 1957. Based on the age of this system, heath index information, feeder patrols, and crew expertise, most of these assets are past their useful life. Deferring this project will require THESL to purchase new station equipment for Lambton MS, as they have reached end of life. Furthermore, 4kV distribution assets are in need for replacement since they are past their useful life and in poor condition. The electrical industry is moving away from 4kV equipment and as a result, spare parts for these assets are very costly and difficult to attain. This will result in a further increase in outages and more lengthy outages due to lack of readily available spare parts as well as increased cost for reactive replacements.

Portfolio:	Overhead
Project Title:	Goulding MS F1 & F4 Voltage Conversion Phase #2
Project Number:	22248
Project Year:	2014
Estimate Cost:	$800,391

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4kV feeders NYSS47F1 and NYSS47F4, originating from Goulding MS, to 27.6kV. This project is one phase of a multi-phase program beginning in 2012 to convert the entire 4kV load at Goulding MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand existing 27.6kV feeder 80M2 and 80M10 to replace NYSS47F1 and NYSS47F2. The expansion of these feeders includes approximately 1.50 circuit kilometers of overhead conductor, 40 poles and 26 transformer locations. The project area is bounded by Cactus Avenue, Homewood Avenue, Marathon Crescent and Drewry Avenue.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	GOULDING
STATION(S)	GOULDING MS
FEEDER(S)	NYSS47F1, NYSS47F4

JUSTIFICATION

Project Background

Goulding MS was originally built in 1967 and has already been undergoing voltage conversion

in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition. Once the MS is decommissioned, THESL will then also have available infrastructure to plan and install future initiatives such as Downtown Contingency.

In addition, the existing feeders NYSS47F1 and NYSS47F2 from Goulding MS are of box construction design, which is no longer the distribution standard. Converting 4kV box construction will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 27.6kV
- Improves reliability by remote monitoring and control of the system feeding this location which will reduce restoration time

IMPACT OF DEFERRAL

If this project was to be deferred, safety concerns and risks regarding the box construction design will still persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 27.6kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching useful life.

Portfolio:	Overhead
Project Title:	Overhead Feeder Rehab - Milvan / Penn
Project Number:	23089
Project Year:	2014
Estimate Cost:	$817,435

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace defective poles and non-standard equipment along Milvan and Penn as part of a series of related projects that will refurbish the overhead distribution system of feeder 55M9. Another project refurbishes overhead laterals along the feeder on Finch Avenue, Toryork and Weston Roads.

Scope:

The scope of work for this project is to refurbish the overhead lateral distribution system on feeder 55M9 along Milvan and Penn Drives, by replacing 87 defective poles and non-standard equipment (including insulators, brackets, arrestors) replacing 22 CSP transfromers with appropriately sized equivalents and upgrading 112 spans of undersized primary lines (predominantly single-phase) including "open bus" secondary lines identified on the NY55M9 feeder patrol list.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	MILVAN & PENN
STATION(S)	FINCH I TS
FEEDER(S)	NY55M9

JUSTIFICATION

Project Background

The purpose of this project is to improve the reliability of the feeder. There were 4 outages on 55M9 in the last twelve months and the feeder is ranked as the 94th worst perfroming feeder in the THESL distribution area. Approximately 65% of the outages in the last ten years were due to overhead related faults and recent feeder patrol reports have shown that most of the poles in the project area are aged, feathered at the top and are at the risk of cracking, breaking and toppling over. Non standard equipment on the overhead distribution were also identified in the recent feeder patrols. Approximately 20% of the overhead related faults in the last ten years were related to defects on insulators, terminators and arrestors which underscores the need to replace the glass hardware on the lines. The 22 Completely Self Protected transfromers, which have a significant CMO contribuition, have to be replaced . The quality of power delivered to customers could worsen due improper grounding of feeder particularly on the 87 poles in poor condition that need to be replaced.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			206
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	0	3,892	8
Feeder CMO (***Cumulative***)	0	701,758	2,460

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference

- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project was to be deferred, utility personnel and approximately 237 customers will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the pole-top, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by the breakdown of insulation over time. Lastly, power quality to customers would also continue to suffer.

Portfolio:	Overhead
Project Title:	Overhead Trunk Feeder Rehab - Dufferin / Finch
Project Number:	23353
Project Year:	2014
Estimate Cost:	$842,078

PROJECT DESCRIPTION

Objective:

The purpose of this project is to refurbish the overhead distribution system of feeder 85M4 along Dufferin and Finch by replacing defective poles and non-standard equipment (including insulators, brackets, arrestors and transformers).

Scope:

The scope of work for this project is to refurbish the overhead lateral distribution system on feeder 85M4 in the Clifton Road, Dufferin Street, Tangiers Road and Finch Avenue area, by replacing 76 defective poles, non standard equipment including 12 CSP transfromers, upgrading 76 spans undersized primary lines and upgrading "open bus" secondary lines. The three-phase 556kcmil primary conductors on the overhead lines of this feeder were not considered for replacement within this project.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DUFFERIN & FINCH
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M4

JUSTIFICATION

Project Background

The feeder 85M4 has had six outages in the last 12 months and the WPF rank for this feeder has deteriorated from 90th in July 2011 to currently 86th in August 2011 on the THESL distribution system, as a result of worsening CI and CMO values accumulated in the last two years. In the last ten years, 55% of the sustained outage incidents on the feeder were caused by faults on the overhead system. THESL has therefore deemed it high priority to execute the interventions (i.e. asset replacements, fault indicator replacements and system reconfiguration) in this project, as part of a series of projects that will improve long-term distribution reliability on the feeder.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			90
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			6
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	3,261	524	26
Feeder CMO (***Cumulative***)	28,208	7,744	5,043

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents

- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project was to be deferred, utility personnel and approximately 819 customers will be negatively impacted due to increased exposure to safety hazards associated with this feeder. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the pole-top, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by the breakdown of insulation over time. Lastly, power quality to customers would also continue to suffer.

Portfolio:	Overhead
Project Title:	Overhead Upgrade R43M24 Hollis Milne Birchmount
Project Number:	22994, 22995
Project Year:	2014
Estimate Cost:	$ 720,993

PROJECT DESCRIPTION

Objective:

The purpose of this project is to refurbish the overhead distribution system of feeder R43M24 in the Hollis, Milner and Birchmount area by replacing undersized conductors, defective poles and non-standard equipment (including insulators, brackets, arrestors and transformers). The project aims to create new tie points on the feeder that will tie it to two adjacent feeders that will act as backup in the event of an outage on NAR43M24.

Scope:

The scope of work for this project is to refurbish the overhead lateral distribution system on feeder NAR43M24 feeder main. Approximately 2,060 m of three-phase 336kcmil sized conductors will be replaced with 556kcmil conductors on some sections of Birchmount Road, part of Mack Avenue, and Milner Avenue. Poles, transfromers and overhead switches will also be replaced as needed. Automated overhead switches are to be installed at the newly identified tie points to the adjacent feeders NAR43M23 and NAR43M28.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	BIRCHMOUNT
STATION(S)	WARDEN TS
FEEDER(S)	SCNAR43M24

JUSTIFICATION

Project Background

Feeder NAR3M24 currently has only one tie point which would be quite inadequate in the event of an outage. THESL has recognized the need to increase the number of tie points on feeder NAR43M24 to proactively reduce the outage durations by creating new tie points to adjacent feeders NAR43M23 and NAR43M28. However, conductors on Hollis Avenue, Milner Avenue, part of Mack Avenue and Birchmount Road sections of the feeder trunk that lead to the locations of the desired tie points have been identified as undersized 336kcmil and therefore will not be able to accommodate the increased power flows expected when backup is required from the adjacent feeders. During transfer of load, especially at peak load time, the undersized conductors constitute the weak sections. THESL plans to replace the weak sections of 336 kcmil conductors by THESL standard 556kcmil conductors. This will establish the full capacity feeder main of R43M24 and transfer tie with NAR43M23 and R43M28.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			150
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			1
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	3,592	60	1,769
Feeder CMO ***(Cumulative)***	317,346	4,587	242,353

Benefits

- Significantly improves feeder reliability as a result of rebuilding the overhead distribution
- Improves the reliability of the feeder with the creation of new backup tie points to adjacent feeders NAR43M23 and R43M28

- Improves customer satisfaction as a result of the greater service reliability and the increased capacity of the feeder mains also improves power quality Eliminates safety hazards the public is exposed to with the replacement of undersized conductors
- Improves feeder restoration times and therefore reduces CMO as it automates the feeder trunk with the installation of the two new automated overhead SCADAmate switches
- Improves on restoration times thereby reducing customer outage durations when all non-standard pole top transfromers are replaced with new 100kVA standard ones
- Improves reliability along the feeder by replacing fuses along laterals and poles with standard ones
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems and higher reactive maintenance costs. Delays in this work could also lead to a higher risk of equipment failures and lengthy outages to customers in the area. Deferral of this project increases the exposure of the public in the project area to safety hazards caused by the undersized conductors.

Portfolio:	Overhead
Project Title:	Overhead Trunk Feeder Rehab - Dufferin/Finch/Wilmington
Project Number:	22974
Project Year:	2014
Estimate Cost:	$770,138

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all defective poles along the three-phase, primary trunk line of feeder 85M6 off Dufferin and Finch Avenues. There are two other projects that refurbish the feeder east and west of Wilmington.

Scope:

The scope of work for this project is to install 100 new poles along 85M6 as well as replacing 18 non-standard overhead transformers on the trunk off Dufferin and Finch Avenues. New animal guards are to be installed at the appropriate overhead locations on the route.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	DUFFERIN
STATION(S)	BATHURST I TS
FEEDER(S)	NY85M6

JUSTIFICATION

Project Background

The feeder 85M6 has had nine outage in the last 12 months and the WPF rank for this feeder has deteriorated from 242nd in 2010 to currently 25th on the THESL distribution system, as a result of very high CI and CMO values accumulated in the last two years. THESL has therefore deemed it

high priority to execute the interventions (i.e. asset replacements, fault indicator replacements and system reconfiguration) in this project, as part of a series of projects that will improve long-term distribution reliability on the feeder. Failures on this section of 85M6 are primarily attributable to failed lightning arrestors, primary conductors, foreign interference by animals, transformers, and insulators.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			25
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			9
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	118	576	1,831
Feeder CMO (***Cumulative***)	13,021	2,304	46,929

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project was to be deferred, utility personnel up to 1725 customers will be impacted due to increased exposure to safety hazards associated with this feeder, particularly as since this project particularly deals with services off the trunk. Moreover, deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the pole-top, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, power quality to customers would also continue to suffer due to improper grounding of the feeder at approximately 100 poles locations.

Portfolio:	Overhead
Project Title:	Overhead Rebuild R43M28 Aylesworth Kennedy
Project Number:	22958
Project Year:	2014
Estimate Cost:	$ 614,924

PROJECT DESCRIPTION

Objective:

The purpose of this project is to refurbish the overhead distribution system of feeder R43M28 in the Kennedy Road area by replacing undersized conductors, defective poles and non-standard equipment (including insulators, brackets, arrestors and transformers). The project aims to create new tie points on the feeder that will tie it to two adjacent feeders that will act as backup in the event of an outage on NAR43M28.

Scope:

The scope of work for this project is to refurbish the overhead lateral distribution system on feeder NAR43M28 feeder main. About 1,000m of three-phase 336kcmil sized conductors will be replaced with 556kcmil conductors on some sections of Kennedy Road, Aylesworth Avenue, Highview Avenue and Aylesford Drive - of three-phase overhead lines of feeder NAR43M28. Poles, transfromers and overhead switches are also replaced as needed. Automated overhead switches are to be installed at the newly identified tie points to the adjacent feeders NAR43M24 and NAR43M30.

DISTRICT	Scarborough
DISTRICT NEIGHBOURHOOD	Kennedy Road
STATION(S)	Warden TS(27.6 kV)
FEEDER(S)	SCNAR43M28

JUSTIFICATION

Project Background

Feeder NAR3M24 currently has only one tie point which would be quite inadequate in the event of an outage. THESL has recognized the need to increase the number of tie points on feeder NAR43M24 to proactively reduce the outage durations by creating new tie points to adjacent feeders NAR43M23 and NAR43M28. However, conductors on Hollis Avenue, Milner Avenue, part of Mack Avenue and Birchmount Road sections of the feeder trunk that lead to the locations of the desired tie points have been identified to undersized at 336kcmil and therefore will not be able to accommodate the increased power flows expected when backup is required from the adjacent feeders. During transfer of load, especially at peak load time, the undersized conductors constitute the weak sections on the line. THESL plans to replace the weak sections of 336 kcmil conductors by THESL standard 556kcmil conductors. This will establish the full capacity feeder main of R43M24 and transfer tie with NAR43M23 and R43M28.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			12
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			8
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	7,534	3,973	22,328
Feeder CMO ***(Cumulative)***	160,073	11,919	1,180,409

Benefits

- Significantly improves feeder reliability as a result of rebuilding the overhead distribution
- Improves the reliability of the feeder with the creation of new backup tie points to adjacent feeders NAR43M24 and R43M30

- Improves customer satisfaction as a result of the greater service reliability and the increased capacity of the feeder mains also improves power quality Eliminates safety hazards the public is exposed to with the replacement of undersized conductors
- Improves feeder restoration times and therefore reduces CMO as it automates the feeder trunk with the installation of the two new automated overhead SCADAmate switches
- Improves on restoration times thereby reducing customer outage durations when all non-standard pole top transfromers are replaced with new 100kVA standard transformers
- Improves reliability along the feeder by replacing fuses along laterals and poles with standard ones
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems and higher reactive maintenance costs. Deferral of this project could result in extended customer outages on this feeder. Delays in this work could also lead to a higher risk of equipment failures and lengthy outages to customers in the area. Deferral of this project increases the exposure of the public in the project area to safety hazards caused by the undersized conductors.

Portfolio:	Overhead
Project Title:	Overhead Rebuild at Steeles Avenue West and Weston Road
Project Number:	22859
Project Year:	2014
Estimate Cost:	$ 620,500

PROJECT DESCRIPTION

Objective:

The purpose of this project is to refurbish the overhead lateral distribution system of feeder 55M31 in the area around the intersection of Weston Road and Steeles Avenue West.

Scope:

The scope of work for this project is to install 71 new poles along 55M31 as well as replacing 18 non-standard overhead transformers and 250 insulators on the feeder's overhead lateral off the Weston Road and Steeles Avenues Intersection. New animal guards are to be installed at the appropriate overhead locations on the route.

DISTRICT	North York
DISTRICT NEIGHBOURHOOD	Humber Summit
STATION(S)	Finch II TS
FEEDER(S)	NY55M31

JUSTIFICATION

Project Background

The feeder 55M31 has had five outages in the last 12 months and the feeder is currently ranked as the 57th worst performing on the THESL distribution system, as a result of very high CI and CMO values accumulated in the last two years. THESL has therefore deemed it high priority to execute

the interventions (i.e. asset replacements, fault indicator replacements and system reconfiguration). This project proposes to replace the equipment that is classified as non-standard and reaching end of life to improve reliability on this feeder.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			57
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	1,588	1,842	373
Feeder CMO (***Cumulative***)	18,364	50,112	16,443

Benefits

- Improves feeder reliability through the installation of animal guards and would reduce faults resulting from foreign interference
- Modernizes the system by replacing non-standard transformers to improve restoration times after fault events
- Would reduce outage durations and reverse SAIDI trends that have been worsening over the past few years
- Increases customer satisfaction due to reduced outage incidents
- Enhances safety to the public and utility personnel by replacing non-standard equipment such as porcelain insulators and arrestors that can fail catastrophically (i.e. cracking, fragmenting)
- Reduces the number of stressed assets by improving grid operating conditions

IMPACT OF DEFERRAL

If this project was to be deferred, utility personnel and approximately 170 customers will be

negatively impacted due to increased exposure to safety hazards associated with this feeder. Deferral of this work would also delay necessary interventions on the feeder that have a significant impact of feeder reliability, especially poles that are at risk of cracking, feathering on the poletop, breakage or loss of strength. This could also result in collateral damage, in the event of an outage situation. Deferral of this project would also increase the likelihood of assets failing, in particular, glass insulators and lightning arrestors caused by insulation breakdown. Lastly, power quality to customers would also suffer if this project were deferred due to improper grounding of the feeder at approximately 71 poles found to be in poor condition on this feeder.

Moreover, customers will also continue to experience poor reliability, as the number of outage events will increase.

Portfolio:	Overhead
Project Title:	Rouge Park Overhead Rebuild SCXGF Phase #3
Project Number:	23312
Project Year:	2014
Estimate Cost:	$ 513,892

PROJECT DESCRIPTION

Objective:

The purpose of this project is to implement a feeder tie on feeder 47M17 with a backup as feeder 47M16 as part of a series of projects designed to improve service reliability, stability and fault recovery in the distribution scheme of laterals in the area.

Scope:

The scope of work for this project is to convert 1900m of overhead lines on West Point Avenue, Taylor Road and Rouge Hills Drive from 13.8 kV to 27.6 kV and connect it to feeder 47M16. Approximately 21 single pole overhead transfromers and 2 three-phase underground transfromers on this circuit will be replaced with 27.6 kV equipment. Two automated SCADA switches and 4 manual overhead primary switch types will be installed for improved reliability and fault recovery.

DISTRICT	Scarborough
DISTRICT NEIGHBOURHOOD	Rouge Park
STATION(S)	East Ave. Tudor Glen(13.8 kV)
FEEDER(S)	SCXGF3

JUSTIFICATION

Project Background

A portion of feeder SCXGF3 that is quite close to 47M16 and 47M17 was converted to 47M17 (13.8kV to 27.6kV). The feeder SCXGF3 had three outages in the last twelve months and is raked 72nd in the THESL distribution system. The feeders 47M16 and 47M17 both had nine outages in the last twelve months. 47M17 is ranked as the 63rd worst performing feeder while 47M16 is ranked as the 274th worst performing feeder in the THESL distribution system. All three feeders are ranked quite high on the THESL WPF scale. In order to improve on the reliability of power distribution in the geographical area that encompasses 47M16, 47M17 and the SCXGF3, THESL has considered it necessary to convert the remaining overhead portion of feeder SCXGF3 on Rouge Hills Drive to 47M17 on 27.6kV. This will enable a feeder tie to be established between feeder 47M16 and 47M17 and also enable a loop feed of the underground neighbourhood in the area that is radially fed by feeder 47M17.. This project proposes to replace the equipment that is classified as non-standard and reaching end of life to improve reliability on this section of the feeder.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			72
Feeders Experiencing Sustained Interruptions ***(Worst Feeder)***			3
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI ***(Cumulative)***	2,608	2,192	15
Feeder CMO ***(Cumulative)***	466,281	142,660	2,385

Benefits

- Significantly improves feeder reliability as a result of rebuilding the overhead distribution

- Improves the operational flexibility and therefore the reliability of power distribution in the service area with the creation of new backup tie points between adjacent feeders 47M17 and 47M16
- Improves feeder restoration times and therefore reduces CMO as it automates the feeder trunk with the installation of the two new automated overhead SCADAmate switches at the tie points
- Improves on restoration times thereby reducing customer outage durations when all non-standard pole top transfromers are replaced with new 100kVA standard transformers
- Improves reliability along the feeder by replacing fuses along laterals and poles with standard ones
- Reduces emergency and reactive capital and maintenance costs dues to significantly greater reliability

IMPACT OF DEFERRAL

If this project was to be deferred, it would lead to sustained or deteriorating reliability problems on the feeder and higher reactive maintenance costs. Deferral of this project increases the exposure of the public in the project area to safety hazards caused by the undersized conductors.

Portfolio:	Overhead
Project Title:	Overhead Feeder Rehab - Finch / Weston / Toryork
Project Number:	23093
Project Year:	2014
Estimate Cost:	$517,846

PROJECT DESCRIPTION

Objective:

The purpose of this project is to refurbish the overhead distribution system of feeder 55M9 by replacing defective poles and non standard equipment along Finch, Toryork and Weston. In instances where poles are not replaced, THESL will ensure that all non-standard equipment (insulators, brackets, arrestors, transformers, etc.) is upgraded to the latest standard.

Scope:

Refurbish the overhead distribution of feeder 55M9 by replacing 65 defective poles, non standard equipment including 8 CSP transfromers, upgrading 40 spans of undersized primary lines and upgrading "open bus" secondary lines. The feeder refurbishment will be done along Weston Road, Toryork Drive, and Finch Avenue.

DISTRICT	NORTH YORK
DISTRICT NEIGHBOURHOOD	FINCH
STATION(S)	FINCH I TS
FEEDER(S)	NY55M9

JUSTIFICATION

Project Background

The purpose of this project is to improve the reliability of the feeder. The 5M9 is FESI-4 and

having 94 ranks in WPF list but in west district this feeder has number of overhead problems in last 10 years. Most poles for this feeder have poor condition that may impact on feeder reliability. In order to improve the reliability, System Reliability Planning Department proposed to replace the defective overhead equipment, lines, poles and CSP Transfromers.

Historical Performance

FEEDER PERFROMANCE			
Worst Performing Feeder Ranking ***(Worst Feeder)***			206
Feeders Experiencing Sustained Interruptions Count ***(Worst Feeder)***			4
HISTORICAL RELIABILITY PERFROMANCE			
	2008	**2009**	**2010**
Feeder CI (***Cumulative***)	0	3,892	8
Feeder CMO (***Cumulative***)	0	701,758	2,460

Benefits

- Improves feeder reliability by reducing both outage duration and frequency.
- Improves upon the worsening SAIDI trend over the last couple of years due to equipments related outage
- Reduces foreign interference and improve reliability by upgrading feeder with animals guard and non-standard poor switchable transformers
- Replaces primary assets at their end of service life
- Increase customer satisfaction and maintains the overhead system in a safe manner
- Reduction to stressed assets and improvement to grid operating conditions

IMPACT OF DEFERRAL

If this project is to be deferred, the potential safety hazard and reliability with this feeder will be worse and cause conflict with other utilities' projects or newly imposed moratoriums. The CMO will increase due to poor switching capability of CSP transformers. The deferral of this project

will increase the probability of failure of assets particularly glass insulator and lighten arresters due to total insulation breakdown. Power quality will remain poor due improper grounding of feeder.

Portfolio:	Overhead
Project Title:	Kingsway MS Overhead Voltage Conversion
Project Number:	23323
Project Year:	2014
Estimate Cost:	$533,400

PROJECT DESCRIPTION

Objective:

The purpose of this project is to completely convert the existing 4 kV feeder EF1, originating from Kingsway MS, to 27.6 kV. This project is the first phase of a multi-phase program beginning in 2014 to convert the entire 4kV load at Kingsway MS, with the final objective of decommissioning the station.

Scope:

The scope of work for this project is to expand the existing 27.6kV feeder 38M20 to replace EF1. The expansion of this feeder includes approximately 1.68 circuit kilometres of overhead conductor, 47 new poles and 13 single-phase transformers. The project area is bounded by The Kingsway in the north and the east, Bloor Street West in the south and Prince Edward Dr in the west.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	LAMBTON MILLS
STATION(S)	KINGSWAY MS
FEEDER(S)	ETEF1

JUSTIFICATION

Project Background

Kingsway MS was originally built in 1987 and has been identified as a candidate for voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, the overhead plant in this area is approaching the end of its serviceable life. THESL has identified frequent requests for asset-centric replacements such as poor poles, non-standard cross-arms, insulators, and pin replacements. The most reliable and cost-effective option is convert 4kV EF1 to 27.6 kV and ultimately, prepare for a possible decommissioning of Kingsway MS. Voltage upgrades sufficiently reduce system losses and the overall life-cycle cost. The voltage conversion is considered to be economical because the feeder needs a complete rebuild and the 27.6 kV feeders are readily available. This will avoid future costs of maintaining the 4kV station.

Benefits

- Lowers the risk of failures due to the replacement of 4kV assets past useful life with existing standard 27.6kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 27.6kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 27.6kV

IMPACT OF DEFERRAL

The 4kV station assets in Kingsway MS have been in service since 1987. Based on the age of this system, heath index information, feeder patrols, and crew expertise, most of these assets are past their useful life. Consequences of deferral will lead to high station costs since circuit breakers and station transformers will need to be replaced at the station due to deteriorated conditions.

Furthermore, 4kV assets are in need for replacement since they are past their useful life and in poor condition. The electrical industry is moving away from 4kV equipment and as a result, spare parts for these assets are very costly and difficult to attain. This will result in a further increase in outages and more lengthy outages due to lack of readily available spare parts as well as increased cost for reactive replacements.

PROJECTS $500K AND OVER FOR 2014

SUSTAINING PORTFOLIO – NETWORK

Table 1: Network Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
23326	Network Feeder Upgrade A55WR (Electrical)	3.4
23296	Network Feeder Upgrade A55H (Electrical)	3.4
23318	Network Feeder Upgrade A56H (Electrical)	3.2
23276	Network Feeder Upgrade A64WR (Electrical)	3.0
23331	Network Feeder Upgrade A62DX (Electrical)	2.7
23310	Network Feeder Upgrade A66WR (Electrical)	2.4
23299	Network Feeder Upgrade A64WR (Civil)	1.3
23298	Network Feeder Upgrade A55H (Civil)	1.3
23311	Network Feeder Upgrade A66WR (Civil)	1.3
23319	Network Feeder Upgrade A56H (Civil)	1.3
23327	Network Feeder Upgrade A55WR (Civil)	1.3
23332	Network Feeder Upgrade A62DX (Civil)	1.3
18836	Vault Relocation – St. Clair Avenue West/Yonge Street (Loc.4642)	0.8
20824	4KV Network Conversion – Queen Street West Between Portland Street/Bathurst Street	0.6
Total Cost		**27.3**

Portfolio:	Network
Project Title:	Network Feeder Upgrade A55WR (Electrical)
Project Number:	23326
Project Year:	2014
Estimate Cost:	$3,360,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to increase the feeder capacity on A55WR from the undersized Paper Insulated Lead Covered ("PILC") cable to the higher ampacity 500kcmil Tree Retardant Cross-link Polyethylene ("TRXLPE") cable, so that the feeder capacity is sufficient under first contingency.

Scope:

The scope of work for this project is to replace the sections of undersized PILC cable on A55WR with new 500kcmil TRXLPE cable, and about 3.7km of the circuit planned for replacement. The new cable is to be installed in new civil infrastructure constructed in related projects and terminated at the switchgear cell.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	TRINITY – SPADINA
STATION(S)	WINDSOR TS
FEEDER(S)	A55WR

JUSTIFICATION

Project Background

It was determined that feeder A55WR would be overloaded under first contingency. In addition, the trunk feeder must be 500kcmil, so that A55WR can be utilized for

inter-station feeder ties for contingency purposes. Moreover, this project was initiated with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Lastly, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A55WR would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A55WR to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A55H (Electrical)
Project Number:	23296
Project Year:	2014
Estimate Cost:	$3,360,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to increase the feeder capacity on A55H from the undersized PILC cable to the higher ampacity 500kcmil TRXLPE cable, so that the feeder capacity is sufficient under first contingency.

Scope:

The scope of work for this project is to replace the sections of undersized PILC cable on A55H with new 500kcmil TRXLPE cable, and about 3.7km of the circuit planned for replacement. The new cable is to be installed in new civil infrastructure constructed in related projects and terminated at the switchgear cell.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	YORKVILLE
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A55H

JUSTIFICATION

Project Background

It was determined that feeder A55H would be overloaded under first contingency. In addition, the trunk feeder must be 500kcmil, so that A55H can be utilized for inter-station feeder ties for contingency purposes. Moreover, this project was initiated

with the vision to ultimately improve safety and environmental conditions within cable chambers by replacing PILC cable, due mainly to lead and PCB exposure. Lastly, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A55H would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A55H to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A56H (Electrical)
Project Number:	23318
Project Year:	2014
Estimate Cost:	$3,185,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to increase the feeder capacity on A56H from the undersized PILC cable to the higher ampacity 500kcmil TTRXLPE cable, so that the feeder capacity is sufficient under first contingency.

Scope:

The scope of work for this project is to replace the sections of undersized PILC cable on A56H with new 500kcmil TRXLPE cable, and about 3.4km of the circuit planned for replacement. The new cable is to be installed in new civil infrastructure constructed in related projects and terminated at the switchgear cell.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	YORKVILLE
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A56H

JUSTIFICATION

Project Background

It was determined that feeder A56H would be overloaded under first contingency. In addition, the trunk feeder must be 500kcmil, so that A56H can be utilized for inter-station feeder ties for contingency purposes. Moreover, this project was initiated with the vision to ultimately improve safety and environmental conditions within cable

chambers by replacing PILC cable, due mainly to lead and PCB exposure. Lastly, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A56H would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A56H to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A64WR (Electrical)
Project Number:	23276
Project Year:	2014
Estimate Cost:	$2,970,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to increase the feeder capacity on A64WR from the undersized PILC cable to the higher ampacity 500kcmil TRXLPE cable, so that the feeder capacity is sufficient under first contingency.

Scope:

The scope of work for this project is to replace the sections of undersized PILC cable on A64WR with new 500kcmil TRXLPE cable, and about 3.1km of the circuit planned for replacement. The new cable is to be installed in new civil infrastructure constructed in related projects and terminated at the switchgear cell.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	TRINITY – SPADINA
STATION(S)	WINDSOR TS
FEEDER(S)	A64WR

JUSTIFICATION

Project Background

It was determined that feeder A64WR would be overloaded under first contingency. In addition, the trunk feeder must be 500kcmil, so that A64WR can be utilized for inter-station feeder ties for contingency purposes. Moreover, this project was initiated with the vision to ultimately improve safety and environmental conditions within cable

chambers by replacing PILC cable, due mainly to lead and PCB exposure. Lastly, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A64WR would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A64WR to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A62DX (Electrical)
Project Number:	23331
Project Year:	2014
Estimate Cost:	$2,730,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to increase the feeder capacity on A62DX from the undersized PILC cable to the higher ampacity 500kcmil TRXLPE cable so that the feeder capacity is sufficient under first contingency.

Scope:

The scope of work for this project is to replace the sections of undersized PILC cable on A62DX with new 500kcmil TRXLPE cable, and about 2.7km of the circuit planned for replacement. The new cable is to be installed in new civil infrastructure constructed in related projects and terminated at the switchgear cell.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	FOREST HILL
STATION(S)	DUPLEX TS
FEEDER(S)	A62DX

JUSTIFICATION

Project Background

It was determined that feeder A66WR would be overloaded under first contingency. In addition, the trunk feeder must be 500kcmil so that A62DX can be utilized for inter-station feeder ties for contingency purposes. Moreover, this project was initiated with the vision to ultimately improve safety and environmental conditions within cable

chambers by replacing PILC cable, due mainly to lead and PCB exposure. Lastly, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A62DX would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A62DX to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A66WR (Electrical)
Project Number:	23310
Project Year:	2014
Estimate Cost:	$2,410,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to increase the feeder capacity on A66WR from the undersized PILC cable to the higher ampacity 500kcmil TRXLPE cable, so that the feeder capacity is sufficient under first contingency.

Scope:

The scope of work for this project is to replace the sections of undersized PILC cable on A66WR with new 500kcmil TRXLPE cable, and about 2.2km of the circuit is planned fore replacement. The new cable is to be installed in new civil infrastructure constructed in related projects and terminated at the switchgear cell.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	TRINITY – SPADINA
STATION(S)	WINDSOR TS
FEEDER(S)	A66WR

JUSTIFICATION

Project Background

It was determined that feeder A66WR would be overloaded under first contingency. In addition, the trunk feeder must be 500kcmil, so that A66WR can be utilized for inter-station feeder ties for contingency purposes. Moreover, this project was initiated with the vision to ultimately improve safety and environmental conditions within cable

chambers by replacing PILC cable, due mainly to lead and PCB exposure. Lastly, potential procurement issues associated with a lone North American manufacturer of PILC cables is also prompting proactive replacement of this cable with readily available TRXLPE cable.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A66WR would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A66WR to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A64WR (Civil)
Project Number:	23299
Project Year:	2014
Estimate Cost:	$1,300,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to inspect and rebuild cable chambers containing feeder A64WR. This work is necessary for replacement of undersized PILC cable on the trunk of feeder A64WR to the higher ampacity, 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to inspect approximately 10 cable chambers along Wellington Street and King Street and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement of the existing PILC cable that is currently being run through them to the 500kcmil TRXLPE cable type.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	TRINITY – SPADINA
STATION(S)	WINDSOR TS
FEEDER(S)	A64WR

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers, in order to allow for the upgrade and installation of the higher capacity TRXLPE cable. Moreover, these cable chambers need to be rebuilt, as age and environmental conditions have led to deteriorated civil structures. Some of these cable chambers were found to have been constructed in the

1950's and THESL anticipates that clay or asbestos ducts with square cross-sections exist here, and subsequently need to be replaced as per current THESL standards. In addition, the rebuilt cable chambers will be larger in many cases and additional space is necessary, in cases where many feeders run through a chamber, as the TRXLPE cable and associated splices take more space compared to the PILC cable being replaced.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A64WR would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A64WR to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A55H (Civil)
Project Number:	23298
Project Year:	2014
Estimate Cost:	$1,300,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to inspect and rebuild cable chambers containing feeder A55H. This work is necessary for replacement of undersized PILC cable on the trunk of feeder A55H to the higher ampacity, 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to inspect approximately 10 cable chambers along Avenue Road and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement of the existing PILC cable that is currently being run through them to the 500kcmil TRXLPE cable type.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	YORKVILLE
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A55H

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers, in order to allow for the upgrade and installation of the higher capacity TRXLPE cable. Moreover, these cable chambers need to be rebuilt, as age and environmental conditions have led to deteriorated

civil structures. Some of these cable chambers were built in the 1940's and THESL anticipates that clay or asbestos ducts with square cross-sections exist here, and subsequently need to be replaced as per current THESL standards. In addition, the rebuilt cable chambers will be larger in many cases and additional space is necessary, in cases where many feeders run through a chamber, as the TRXLPE cable and associated splices take more space compared to the PILC cable being replaced.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A55H would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A55H to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral

of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A66WR (Civil)
Project Number:	23311
Project Year:	2014
Estimate Cost:	$1,300,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to inspect and rebuild cable chambers containing feeder A66WR. This work is necessary for replacement of undersized PILC cable on the trunk of feeder A66WR to the higher ampacity, 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to inspect approximately 10 cable chambers along Wellington Street and King Street and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement of the existing PILC cable that is currently being run through them to the 500kcmil TRXLPE cable type.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	TRINITY – SPADINA
STATION(S)	WINDSOR TS
FEEDER(S)	A66WR

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers, in order to allow for the upgrade and installation of the higher capacity TRXLPE cable. Moreover, these cable chambers need to be rebuilt, as age and environmental conditions have led to deteriorated civil structures. Some of these cable chambers were built in the 1920's and THESL

anticipates that clay or asbestos ducts with square cross-sections exist here, and subsequently need to be replaced as per current THESL standards. In addition, the rebuilt cable chambers will be larger in many cases and additional space is necessary, in cases where many feeders run through a chamber, as the TRXLPE cable and associated splices take more space compared to the PILC cable being replaced.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A66WR would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A66WR to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A56H (Civil)
Project Number:	23319
Project Year:	2014
Estimate Cost:	$1,300,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to inspect and rebuild cable chambers containing feeder A56H. This work is necessary for replacement of undersized PILC cable on the trunk of feeder A56H to the higher ampacity, 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to inspect approximately 10 cable chambers along Avenue Road and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement of the existing PILC cable that is currently being run through them to the 500kcmil TRXLPE cable type.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	YORKVILLE
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A56H

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers, in order to allow for the upgrade and installation of the higher capacity TRXLPE cable. Moreover, these cable chambers need to be rebuilt, as age and environmental conditions have led to deteriorated civil structures. Some of these cable chambers were built in the 1940's and THESL

anticipates that clay or asbestos ducts with square cross-sections exist here, and subsequently need to be replaced as per current THESL standards. In addition, the rebuilt cable chambers will be larger in many cases and additional space is necessary, in cases where many feeders run through a chamber, as the TRXLPE cable and associated splices take more space compared to the PILC cable being replaced.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A56H would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A56H to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A55WR (Civil)
Project Number:	23327
Project Year:	2014
Estimate Cost:	$1,300,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to inspect and rebuild cable chambers containing feeder A55WR. This work is necessary for replacement of undersized PILC cable on the trunk of feeder A66WR to the higher ampacity, 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to inspect approximately 10 cable chambers along Wellington Street and King Street and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement of the existing PILC cable that is currently being run through them to the 500kcmil TRXLPE cable type.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	TRINITY – SPADINA
STATION(S)	WINDSOR TS
FEEDER(S)	A55WR

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers, in order to allow for the upgrade and installation of the higher capacity TRXLPE cable. Moreover, these cable chambers need to be rebuilt, as age and environmental conditions have led to deteriorated civil structures. Original construction on some of these cable chambers are dated as early

the 1910's and contain some of the oldest vintage of cable chambers. Accordingly, THESL anticipates that clay or asbestos ducts with square cross-sections exist here, and need to be replaced as per current THESL standards. In addition, the rebuilt cable chambers will be larger in many cases and additional space is necessary, in cases where many feeders run through a chamber, as the TRXLPE cable and associated splices take more space compared to the PILC cable being replaced.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A55WR would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A55WR to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral

of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network
Project Title:	Network Feeder Upgrade A62DX (Civil)
Project Number:	23332
Project Year:	2014
Estimate Cost:	$1,300,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to inspect and rebuild cable chambers containing feeder A62DX. This work is necessary for replacement of undersized PILC cable on the trunk of feeder A62DX to the higher ampacity, 500kcmil TRXLPE cable.

Scope:

The scope of work for this project is to inspect approximately 10 cable chambers along Avenue Road and rebuild those in need of refurbishment. The rebuilding of these cable chambers will enable the replacement of the existing PILC cable that is currently being run through them to the 500kcmil TRXLPE cable type.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	FOREST HILL
STATION(S)	DUPLEX TS
FEEDER(S)	A62DX

JUSTIFICATION

Project Background

This project was initiated to inspect and rebuild cable chambers, in order to allow for the upgrade and installation of the higher capacity TRXLPE cable. Moreover, these cable chambers need to be rebuilt, as age and environmental conditions have led to deteriorated civil structures. These cable chambers had construction work dating back to the 1950's

and THESL anticipates that clay or asbestos ducts with square cross-sections exist here, and subsequently need to be replaced as per current THESL standards. In addition, the rebuilt cable chambers will be larger in many cases and additional space is necessary, in cases where many feeders run through a chamber, as the TRXLPE cable and associated splices take more space compared to the PILC cable being replaced.

Benefits

- Increases feeder capacity and allows for more efficient supply of service to customers
- Removes the risk of harmful effects of lead and potential PCB oil exposure
- Provides added flexibility and load growth for load transferring by upgrading PILC feeders whose trunk sizes are 350kcmil with higher ampacity, 500kcmil TRXLPE cable
- Allows for greater operational flexibility as greater feeder capacity enhances back up capability under contingency situations
- Addresses procurement issues associated with a lone North American manufacturer of PILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, the feeder capacity on A62DX would continue to be insufficient for future load growth and emergency supply under contingency situations. This would result in an inability to connect new load onto the feeder and would limit the ability for A62DX to provide supply to the network in the event of an outage. To an equal extent, deferral of this work would also continue to potentially expose THESL construction workers to PCBs and lead, and where the lone American manufacturer to stop producing PILC cable, THESL would not only face procurement concerns but have a significant volume of PILC cable replacement projects to execute. Therefore, deferral of this project would only increase the backlog of PILC replacement work that needs to be done.

Portfolio:	Network System
Project Title:	Vault Relocation – St. Clair Avenue West/Yonge Street (Loc.4642)
Project Number:	18836
Project Year:	2014
Estimate Cost:	$ 799,341

PROJECT DESCRIPTION

Objective:

The purpose of this project is to relocate the existing vault. In addition to this, network units will be replaced due to their condition, and would include automating the network vault.

Scope:

The scope of work for this project includes building a new vault and abandoning the existing vault, including associated work with supplying the customers of the secondary network temporarily, while the vault is being rebuilt. In addition, this project also includes the upgrading the two existing units from 500kVA to 750kVA with 3000A protectors, one for each transformer, and THESL plans to automate the network units at this location.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	DEER PARK
STATION(S)	HIGH LEVEL MS
FEEDER(S)	A48H, A55H

JUSTIFICATION

Project Background

The vault was initially built in 1966. Upon a recent civil inspection, it was found that the roof and walls of the vault are cracked. Given the structural and safety concerns of civil components of this vault, further deterioration could reduce the structural integrity of the vault and pose a safety hazard to the public. This project would also include the replacement of PILC and Asbestos Insulated Lead Covered ("AILC") cables.

Benefits

- Improves the structural strength and safety of the vault roof and walls through the construction of a new vault
- Mitigates the risk of collateral damage to network units (both transformers and protectors) failing due to the condition of the 45 years old equipment
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Addresses environmental and safety concerns through the removal of PILC and AILC cables

IMPACT OF DEFERRAL

If this project was to be deferred, safety risks associated with the vault walls and roof would continue to pose a hazard to THESL construction crews and the public. Moreover, deferral of this work would also increase the risk for collateral damage to the network equipment in the event of the vault, and would subsequently compromise system reliability and distribution supply to customers in the downtown core. Lastly, if this project was to be deferred, there is the added consequence of PILC and AILC cables not being removed from the system.

Portfolio:	Network System
Project Title:	4KV Network Conversion – Queen Street West Between Portland Street/Bathurst Street
Project Number:	20824
Project Year:	2014
Estimate Cost:	$ 572,551

PROJECT DESCRIPTION

Objective:

This project is part of a series of projects to expand the secondary network along Queen St. between Spadina and Bathurst and remove obsolete 4kV box construction. The purpose of this project is specifically to remove the 4kV overhead plant along Queen Street between Portland Street and Bathurst Street. This project is the fourth phase of four phases to expand the network on this section of Queen Street.

Scope:

The scope of work for this project includes removal of the obsolete 4kV overhead system and replacement of poles to the latest standard to be supplied from the underground secondary network.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	ENTERTAINMENT DISTRICT
STATION(S)	WINDSOR TS, DEFOE MS
FEEDER(S)	A64WR, A67WR, A68WR, A69WR, B7DF

JUSTIFICATION

Project Background

Defoe MS was originally built in the 1970s and has already been undergoing voltage conversion in order to address high maintenance costs, obsolete construction standards and deteriorated plant condition.

In addition, since feeder B7DF is of box construction type, by converting this 4kV feeder, it will significantly improve workplace safety for crews by inherently eliminating the associated hazards of multiple circuits going through a typical box pole, as well as eliminate the hazards of working in the vicinity of shielded primary cable (cable grounding and positioning below secondary cables).

The secondary network of Windsor West exist nearby and can be extended to improve the long term reliability of the area as the secondary network system is the most reliable system for this type of load. This area is ideal for network supply because of the high density of customers and is a small commercial and tourism area. By removing 4kV box construction and placing secondary network at this location, the asthetics would also be greatly improved.

Benefits

- Improves the safety of THESL crew workers and the public
- Lowers the risk of failures due to the replacement of approximately 30 years worth of 4kV assets with existing standard 13.8kV equipment
- Reduces maintenance costs by removing obsolete 4kV equipment
- Increases capacity with 13.8kV feeders to accommodate residential load creep as well as load increase from future emerging businesses in the area
- Reduces system losses when 4kV is upgraded to 13.8kV

- Improves reliability by the use of the most reliable system available for dispersed commercial loads
- Enables automation capabilities to allow remote monitoring and control from the Control Room for troubleshooting and addressing system problems
- Improves aesthetics of this commercial and tourism area by removing overhead wires and placing all infrastructure underground

IMPACT OF DEFERRAL

If this project were to be deferred, safety concerns and risks regarding the box construction design will still persist and THESL would face the added burden of maintaining obsolete, non-standard 4kV equipment, relative to the standard 13.8kV overhead system. Moreover, deferral of this project would also increase the risk of equipment-related failures, as a number of the 4kV assets are at or approaching useful life.

PROJECTS $500K AND OVER FOR 2014

SUSTAINING PORTFOLIO - STATIONS

Table 1: Stations Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
22719	Replace Wiltshire TS A5-6W Switchgear	6.5
21787	Replace Strachan A5-6T Switchgear	6.3
22724	Prepare Civil Work for Windsor TS A5-6WR	1.1
22804	Replace Islington MS 4KV Switchgear	1.0
22805	Replace Thornton MS 4KV Switchgear	0.8
21339	Replace Midland Lawrence MS Switchgear	0.5
20779	Replace Pharmacy CPR MS Switchgear	0.5
22808	Replace Etobicoke MOSCAD RTUs	0.5
Total Cost		17.2

Portfolio:	Stations
Project Title:	Replace Wiltshire TS A5-6W Switchgear
Project Number:	22719
Project Year:	2014
Estimate Cost:	$6,500,076

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing A5-6W switchgear at Wiltshire TS.

Scope:

The scope of work for this project is to replace the existing air insulated A5-6W switchgear at Wiltshire TS with air insulated, arc-resistant Type C switchgear.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	19 WILTSHIRE STREET
STATION(S)	WILTSHIRE TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The A5-6W switchgear is air insulated switchgear and was installed in 1954. This switchgear has reached end of its useful life. According to asset condition assessment, A5-6W switchgear has a Health Index of 47, indicating a poor health condition.

The A5-6W switchgear is of non-arc-resistant design and has an increased risk of collateral damage and personnel injury during an eventful failure. The switchgear enclosure was made

up of brick and mortar structure, as partitions between circuit breaker cells. The circuit breakers are of the air-blast type and are obsolete. Replacement parts are no longer being manufactured. Any parts required need to be custom manufactured, making the cost of maintenance high and the repair and return to service time long. The air-blast circuit breakers have additional maintenance costs due to the added expense of renewing and maintaining the air supply system needed for breaker operation, and subsequently makes the overall maintenance cost of the switchgear high. The project involves the replacement of the switchgear with 3000 A air insulated, arc-resistant, type C type switchgear with double bus, double breaker configuration in order to improve equipment performance, system reliability, and personnel safety, as well as achieve operating cost reductions.

Alternatives

Replacing the existing switchgear with gas insulated switchgear rather than with air insulated switchgear was considered as an alternative. However, due to the availability of floor space, the air insulated switchgear was chosen as it is more cost effective and easier to maintain.

Benefits

- Improves reliability due to the modern design of the enclosure that incorporates arc-resistance technology to prevent adjacent equipment from collateral damages
- Provides automation and control functions through digital relays, making suitable for future smart grid technology
- Considerably reduces the duration time of an outage due to circuit breaker failure to customers due to the double bus, double breaker configuration of the switchgear
- Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability risks
- Improves personnel safety through the arc-resistance feature that allows proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time

- Reduces considerably the maintenance and operational cost of the switchgear due to the double bus, double breaker configuration of the switchgear and due to the utilization of vacuum circuit breakers which have less maintenance requirement
- Increases bus capacity rating from 51MVA to 72MVA. The extra capacity will support any future load growth and or load transfer requirements from neighbouring substations during contingency events

IMPACT OF DEFERRAL

If this project was to be deferred, THESL will continue to rely on deteriorated switchgear that would increase the risk of failure, worsening system reliability and high maintenance costs associated with the air compressors system required for the operation of the air-blast circuit breaker. Furthermore, deferral of this work would increase safety risks to THESL personnel due to the lack of the arc-resistance design feature, and would limit the capability to meet future load growth and load transfers from adjacent station(s) in the event of an outage.

Portfolio:	Stations
Project Title:	Replace Strachan A5-6T Switchgear
Project Number:	21787
Project Year:	2014
Estimate Cost:	$6,261,996

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the existing A5-6T switchgear at Strachan TS.

Scope:

The scope of work for this project is to replace the existing air insulated A5-6T Switchgear at Strachan TS with arc-resistant, air insulated switchgear.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	6 MANITOBA DRIVE
STATION(S)	STRACHAN TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The A5-6T is air insulated switchgear and was installed in 1956. The switchgear has reached end of its useful life. According to Asset Condition Assessment, the Health index of A5-6T switchgear is 43, indicating a poor condition. The existing circuit breakers are of the air-blast type and are obsolete. Replacement parts are no longer being manufactured. Any spare parts required need to be custom manufactured, making the cost of maintenance high and the repair and return to service time long. The air-blast circuit breakers have additional

maintenance costs due to the added expense of renewing and maintaining the air supply system needed for breaker operation. The switchgear is of a non-arc-resistant design and has an increased risk of collateral damage and personnel injury during an eventful failure.

The project involves purchasing of new 3000A, air insulated, arc-resistant type C, switchgear with double bus, double breaker configuration in order to improve equipment performance, system reliability, and personnel safety as well as achieve operating cost reductions. Installation and commissioning of switchgear is to take place in 2015.

Alternatives

Replacing the existing switchgear with new gas insulated switchgear was considered as an alternative. However, the feasibility of this option is subject to investigation at detailed design stage, to determine if the existing space is adequate to accommodate the larger dimension of the air-insulated switchgear.

Benefits

- Improves reliability due to the modern design of the enclosure that incorporates arc-resistance technology to prevent adjacent equipment from collateral damages
- Provides automation and control functions through digital relays, making it suitable for future smart grid technology
- Considerably reduces outage restoration time if circuit breaker fails due to the double bus, double breaker configuration of the switchgear
- Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability risks
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Reduces maintenance and operational cost of the switchgear due to the double bus,

double breaker configuration of the switchgear and due to the utilization of vacuum circuit breakers which have less maintenance requirement as opposed to the existing air-blast circuit breakers which have high maintenance cost

- Increases bus capacity rating from 40 MVA to 72 MVA to meet future load growth and or load transfer requirements from neighbouring substations during contingency events

IMPACT OF DEFERRAL

If this project was to be deferred, THESL will continue to rely on deteriorated switchgear that would increase the risk of failure, worsening system reliability and increasing maintenance costs associated with the air compressors system required for the operation of the air-blast circuit breaker. Deferral of this work would also increase safety risks to THESL personnel due to the lack of the arc-resistance design feature, and would limit the capability to meet future load growth and transfers from adjacent station(s) in the event of an outage.

Portfolio:	Stations
Project Title:	Prepare Civil Work for Windsor TS A5-6WR
Project Number:	22724
Project Year:	2014
Estimate Cost:	$1,100,005

PROJECT DESCRIPTION

Objective:

The purpose of this project is to do civil work and electrical rearrangement at Windsor TS.

Scope:

The scope of work for this project is to prepare the site with civil work and electrical rearrangement at the high-voltage switchyard in 2014 to accommodate the new switchgear that will replace A5-6WR in 2015.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	241 WELLINGTON STREET
STATION(S)	WINDSOR TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The A5-6WR switchgear at Windsor TS is air insulated and was installed in 1956. The A5-6WR switchgear has reached the end of its useful life and is obsolete. The circuit breakers of this switchgear are air-blast type and they are obsolete. Spare parts for this type of equipment are no longer supported by manufacturers, any spare part required has to be custom made and is obtained at high cost. Furthermore, the air-blast circuit breakers at this

station have additional maintenance cost due to the added expense of renewing and maintaining the air supply system needed for breaker operation. Finally, the switchgear is of a non-arc-resistant design and has an increased risk of collateral damage and personnel injury during an eventful failure.

As a result, this project involves civil work to prepare the floor and electrical rearrangements at the high voltage switch-yard to accommodate the new switchgear in 2015 that will replace the existing A5-6WR switchgear.

Alternatives

Replacing the switchgear with gas insulated switchgear rather than with air insulated switchgear was considered as an alternative. However, due to the availability of floor space, the air insulated switchgear was chosen as it is more cost effective and easier to maintain.

Benefits

- Improves reliability due to the modern design of the enclosure that incorporates arc-resistance technology to prevent adjacent equipment from collateral damages
- Provides automation and control functions through digital relays, making it suitable for future smart grid technology
- Considerably reduces outage duration that could occur as a result of circuit breaker failure due to the double bus, double breaker configuration of the switchgear. Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability risks
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Reduces maintenance costs due to the utilization of vacuum circuit breaker technology which has less maintenance cost associated as opposed to the air-blast circuit breaker

which require air compressor to operate

- Increases bus capacity ratings from 48 MVA to 72 MVA to meet future load growth and to support future load transfer requirements from neighbouring substations during contingency events

IMPACT OF DEFERRAL

If this project was to be deferred, the replacement of A5-6WR would be delayed and THESL will continue to rely on the deteriorating A5-6WR switchgear, thereby increasing the risk of failure which would result in lengthy outages to massive number of customers. Moreover, the lack of the arc-resistance design feature, increases safety risk to THESL personnel, and the overall maintenance cost of the aging equipment will continue to rise. Furthermore, deferral of the A5-6WR switchgear replacement would result in the deferral of the replacement of the subsequent switchgears at Windsor TS since all the switchgears at Windsor TS are at the end of their service life.

Portfolio:	Stations
Project Title:	Replace Islington MS 4KV Switchgear
Project Number:	22804
Project Year:	2014
Estimate Cost:	$965,420

PROJECT DESCRIPTION

Objective:

The purpose of the project is to replace the existing switchgear at Islington MS.

Scope:

The scope of work for this project is to replace the 4kV air insulated switchgear with arc-resistant air insulated switchgear at Islington MS.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	67 CORDOVA AVENUE
STATION(S)	ISLINGTON MS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The switchgear at Islington MS was installed in 1955 and has reached end of its useful life. The switchgear is obsolete and spare parts for the switchgear are no longer being manufactured; any spare part required is obtained in a special order at high cost, making the cost of maintenance high. Additionally, the circuit breakers that are fitted in the switchgear are oil circuit breakers. The maintenance of oil circuit breakers is generally labour-intensive, making the overall maintenance cost of the switchgear high. There is also high risk of

collateral damage associated during eventful failure of the oil circuit breakers that could lead to the loss of the entire switchgear, which in turn could result in outages to a large number of customers.

Alternatives

An alternative to switchgear replacement that was considered was to convert the Islington MS area to 27.6KV and decommission the station entirely. However, this alternative is not feasible since Islington MS is required to support other neighbouring substations during contingency.

Benefits

- Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability and outage risks
- Reduces the risk of low probability, high impact station events as failure of the existing oil circuit breaker could result in collateral damage in the substation
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Reduces maintenance costs associated through the replacement of the oil circuit breakers where maintenance is labour-intensive compared to the new vacuum circuit breakers which require less maintenance

IMPACT OF DEFERRAL

If this project was to be deferred, THESL would continue to depend on the deteriorating switchgear which will increase the risk of equipment failure hence, power outage to customers supplied by the station. If the switchgear fails, the cost of unplanned switchgear replacement would be much higher and given that the lead time to procure and deliver the switchgear ranges from 6-12 months and this would result in unnecessary load pressure on

the adjacent municipal substation(s) to support the load of Islington MS, while the switchgear is being repaired and/or replaced. Furthermore, deferral of this work would also increase safety risks to THESL personnel due to the lack of the arc-resistance design feature and the high maintenance cost required to keep the switchgear in working condition will keep on increasing.

Portfolio:	Stations
Project Title:	Replace Thornton MS 4KV Switchgear
Project Number:	22805
Project Year:	2014
Estimate Cost:	$758,288

PROJECT DESCRIPTION

Objective:

The purpose of the project is to replace the existing switchgear at Thornton MS.

Scope:

The scope of work for this project is to replace the 4kV air insulated switchgear with arc-resistant air insulated switchgear at Thornton MS.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	59 GLEN AGAR DRIVE
STATION(S)	THORNTON MS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The switchgear at Thornton MS was installed in 1955 and has reached end of its useful life. The switchgear is obsolete; spare parts for the switchgear are no longer being manufactured; any spare part required is obtained in a special order at high cost, making the cost of maintenance high. Moreover, the circuit breakers that are fitted in the switchgear are oil circuit breakers. The maintenance of oil circuit breakers is generally labour-intensive, making the overall maintenance cost of the switchgear high. There is also high risk of

collateral damage associated during eventful failure of the oil circuit breakers that could lead to the loss of the entire switchgear, which in turn could result in outages to a large number of customers.

Alternatives

The alternative to switchgear replacement at Thornton MS that was considered was decommissioning the substation entirely. This alternative requires the distribution load served by the station to be converted to a higher voltage or for the load to be transferred to neighbouring stations. However Thornton MS is required to support adjacent substations during contingency therefore, this alternative is not recommended.

Benefits

- Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability and outage risks
- Reduces the risk of low probability, high impact station events as failure of the existing oil circuit breaker could result in collateral damage in the substation
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Reduces maintenance cost as a result of the replacement of the existing switchgear with oil circuit breakers which have high maintenance cost by a switchgear with vacuum circuit breakers which have less maintenance requirement

IMPACT OF DEFERRAL

If this project was to be deferred, THESL would continue to depend on the deteriorating switchgear which will increase the risk of equipment failure hence, power outage to customers supplied by the station. If the switchgear fails, the cost of unplanned switchgear replacement would be much higher and given that the lead time to procure and deliver the

switchgear ranges from 6-12 months and this would result in unnecessary load pressure on the adjacent station(s) to support the load of Thornton MS while the switchgear is being repaired and/or replaced. Finally, deferral of this work would increase safety risks to THESL personnel due to the lack of the arc-resistance design feature and the maintenance cost required to keep the aging switchgear in working condition will continue to rise.

Portfolio:	Stations
Project Title:	Replace Midland Lawrence MS Switchgear
Project Number:	21339
Project Year:	2014
Estimate Cost:	$540,885

PROJECT DESCRIPTION

Objective:

The purpose of the project is to replace the switchgear at Midland Lawrence MS.

Scope:

The scope of work for this project is to replace the existing 4.16 kV switchgear and to install a new remote monitoring and control system at Midland Lawrence MS.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	1365 MIDLAND AVENUE
STATION(S)	MIDLAND LAWRENCE MS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The switchgear at Midland Lawrence MS was installed in 1961 and has reached end of its useful life and is obsolete. Spare parts for the switchgear are no longer being manufactured; any spare part required is obtained in a special order at high cost, making the cost of maintenance high. In addition, the circuit breakers that are fitted in the switchgear are oil circuit breakers and the maintenance of oil circuit breakers is generally labour-intensive. There is also high risk of collateral damage associated during eventful failure of the oil

circuit breakers that could lead to the loss of the entire switchgear, which in turn could result in outages to a large number of customers. Lastly, the operational cost of the equipment will also continue to rise as the switchgear ages, since the substation has no remote SCADA operating and controlling system.

Alternatives

The alternative to rebuilding the station that was considered was decommissioning the substation entirely. This alternative requires the distribution load served by the substation to be converted to a higher voltage or for load to be transferred to neighbouring substations. However, this alternative is not feasible at the same time Midland Lawrence MS is necessary to support the adjacent substations during contingency.

Benefits

- Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability and outage risks
- Reduces the risk of low probability, high impact station events as failure of the existing oil circuit breaker could result in collateral damage in the substation
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Reduces maintenance costs associated by replacing the existing switchgear with oil circuit breakers whose maintenance is labor-intensive by a switchgear with vacuum circuit breakers which have less maintenance requirement
- Enables remote controlling and monitoring of vital substation equipment, which increases operational flexibility thus, reducing the operational cost since system operators would be able to manage outages and planned work more effectively

IMPACT OF DEFERRAL

If this project was to be deferred, THESL would continue to depend on the deteriorating switchgear which will increase the risk of equipment failure hence, power outage to customers supplied by the station. If the switchgear fails, the cost of unplanned switchgear replacement would be much higher and given that the lead time to procure and deliver the switchgear ranges from 6-12 months and this would result in unnecessary load pressure on the adjacent substation(s) to support the load of Midland Lawrence MS, while the switchgear is being repaired and/or replaced. Furthermore, deferral of this work would increase safety risks to THESL personnel due to the lack of the arc-resistance design feature and the high maintenance cost required to keep the switchgear in working condition will continue to rise. The operational cost of the aging switchgear will also continue to rise since the substation has no SCADA remote controlling and operating system that enables THESL operators to manage outages.

Portfolio:	Stations
Project Title:	Replace Pharmacy CPR MS Switchgear
Project Number:	20779
Project Year:	2014
Estimate Cost:	$540,630

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace the switchgear at Pharmacy CPR MS.

Scope:

The scope of work for this project is to replace the existing 4.16 kV switchgear and to install a new SCADA remote monitoring and controlling system at Pharmacy CPR MS.

DISTRICT	SCARBOROUGH
DISTRICT NEIGHBOURHOOD	7 TRESTLESIDE GROVE
STATION(S)	PHARMACY CPR MS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The switchgear at Pharmacy CPR MS was installed in 1959, has reached the end of its useful life and is obsolete. Spare parts for the switchgear are no longer being manufactured; any spare part required is obtained in a special order at high cost, making the cost of maintenance high. The circuit breakers that are fitted in the switchgear are oil circuit breakers. Moreover, the maintenance of oil circuit breakers is generally labour-intensive, making the overall maintenance cost of the switchgear generally high. There is also high risk of collateral

damage associated during eventful failure of the oil circuit breakers that could lead to the loss of the entire station, which in turn could result in outages to a large number of customers. Lastly, Pharmacy CPR MS has no remote monitoring and control system. Subsequently, THESL system operators cannot remotely obtain real-time information on the vital station equipment nor are they able to remotely operate the station equipment to reconfigure and or to restore power outages.

Alternatives

The alternative to rebuilding the substation that was considered was decommissioning the entire substation. However, Pharmacy CPR MS is required to support the adjacent substations during contingency. Therefore, this alternative is not recommended.

Benefits

- Reduces the risk of failure by removing aged equipment and subsequently lowers potential system reliability and outage risks
- Reduces the risk of low probability, high impact station events as failure of the existing oil circuit breaker could result in collateral damage in the substation
- Improves personnel safety through the arc-resistance feature that allows for proper venting of air pressure out of the switchgear compartment when a circuit breaker experiences a failure and would allow THESL personnel to work safely in the vicinity of the equipment at any time
- Reduces maintenance costs associated with the equipment by replacing the switchgear with oil circuit breakers whose maintenance is labor-intensive by switchgear with vacuum circuit breakers which have less maintenance requirement
- Enables remote controlling and monitoring of vital substation equipment, which increases operational flexibility thus, reducing the operational cost since system operators would be able to manage outages and planned work more effectively

IMPACT OF DEFERRAL

If this project was to be deferred, THESL would continue to depend on the deteriorating switchgear which will increase the risk of equipment failure hence, power outage to customers supplied by the station. If the switchgear fails, the cost of unplanned switchgear replacement would be much higher and given that the lead time to procure and deliver the switchgear ranges from 6-12 months and this would result in unnecessary load pressure on the adjacent station(s) to support the load of Pharmacy CPR MS while the switchgear is being repaired and/or replaced. Lastly, deferral of this work would also increase safety risks to THESL personnel due to the lack of the arc-resistance design feature and the maintenance cost to keep the switchgear in working condition will continue to rise. The operational cost of the aging switchgear will also continue to rise since the substation has no SCADA remote controlling and operational system that enables THESL system operators manage outages efficiently.

Portfolio:	Stations
Project Title:	Replace Etobicoke MOSCAD RTUs
Project Number:	22808
Project Year:	2014
Estimate Cost:	$514,500

PROJECT DESCRIPTION

Objective:

The purpose of the project is to replace the MOSCAD RTUs and MOSCAD DARCOM radios.

Scope:

The scope of work for this project is to replace 14 obsolete Motorola MOSCAD RTUs and MOSCAD DARCOM radios with new modern RTUs, as there is no longer technical support from the supplier.

DISTRICT	ETOBICOKE
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

THESL has been informed by the Motorola supplier that Motorola will no longer provide technical support for the MOSCAD RTUs and DARCOM radios that are deployed at various locations in Etobicoke. Furthermore, Motorola will stop the production of the IPGATEWAY, which is a major component used by the Master Radio Site. All spare parts are from limited

sources of decommissioned stations. These parts may not be reliable and may be used up. In general, the MOSCAD RTUs were made in 1997 and its technology is no longer effective for present operations. The MOSCAD RTU uses MDLC proprietary communication protocol, whereas the new equipment will be equipped with a more modern DNP communication protocol. There are 71 stations and 164 pole-mounted SCADA switches in Etobicoke that are equipped with the MOSCAD RTUs and DARCOM radios. Accordingly, this project is one of a series of projects planned over a five-year window to replace the MOSCAD RTUs and DARCOM equipment, starting in 2012.

Alternatives

The status quo is not a viable alternative. Without replacements parts and technical support from the supplier, THESL could lose some or all SCADA communications to stations that will reduce operational effectiveness and increase costs due to manual switching in the event of a failure.

Benefits

- Reduces the risk of losing SCADA monitor and control functions on MOSCAD RTUs
- Modernizes the system by replacing the MOSCAD RTUs with modern equipment and therefore decreases the risks of losing control of station equipment
- Reduces maintenance and operational costs associated with procuring parts, maintenance and troubleshooting support for the obsolete SCADA RTUs
- Increases operational flexibility by providing operations with the ability to remotely control the switching of the circuit breakers

IMPACT OF DEFERRAL

If both DARCOM master radios fail, all SCADA functions in Etobicoke would be lost. System controllers would not be able to administer work protection via SCADA and response crew would have to be dispatched to the substation(s) to prevent the breaker(s) from reclosing. As a result, a two-minute operation could subsequently become a two-hour

operation. Furthermore, as the MOSCAD RTUs are ageing, deferral of this project could lead to more failures in the future and would take up Protection and Control resources to repair them.

PROJECTS $500K AND OVER FOR 2014

STANDARDIZATION PORTFOLIO

Table 1: Standardization Projects

Estimate Number	Project Title	Estimated Cost ($ Millions)
23591	Grounding Compliance Program	2.2
23589	Porcelain Insulator Replacement Program	0.5
Total Cost		**2.7**

Portfolio:	Standardization
Project Title:	Grounding Compliance Program
Project Number:	23591
Project Year:	2014
Estimate Cost:	$2,200,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to rebuild the grounding system of select submersible transformer vaults and pole-mounted transformers across the system, according to THESL currently approved construction standards. This program is required to ensure safe and proper operation of distribution system equipment, thus protecting workers and the public from potentially hazardous step and touch potentials in the event of a fault.

Scope:

The scope of work for this project is to rebuild the grounding system of about 444 submersible transformer vaults in the former distribution service area of Scarborough and 689 pole-mounted transformers within the downtown core and older system designs.

For a submersible transformer vault, each location would require the following: excavation around the vault, driving four ground rods one at each corner, forming a ground loop around the vault and bonding the loop to the existing ground grid inside the vault at two points. Similarly, for a pole-mounted transformer, each location would require the following: installation of a ground rod, upgrading any insufficient wire sizes and connectors, and bonding the transformer case, H2 ground connection and X2 terminal (when used as a ground point) separately to the system neutral.

DISTRICT(S)	TORONTO (SUBMERSIBLE), SCARBOROUGH (POLE-MOUNTED)
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

For submersible vaults, the grounding was investigated and identified to be insufficiently constructed as per current THESL grounding standards. Subsequently, the possibility of step and touch potential has initiated upgrades of the existing grounding to ensure conformance with the Ontario Electrical Safety Code ("OESC") and THESL construction standards.

For pole-mounted transformers, improper grounding has been found where grounding connections were contained within one connector. This is not compliant to THESL currently approved construction standards. Furthermore, the system ground to the ground rod had been compromised, which created insufficient ground path to earth. This has created an initiative to investigate the integrity of THESL pole-mounted transformer grounding systems and rectify any deficiencies.

Benefits

- Establishes a sufficiently low resistance path to earth
- Limits system voltage in fault conditions and ensures fuses and circuit breakers operate properly
- Increases safety of workers and the public
- Eliminates any non-conformance to THESL currently approved construction standards and Ontario Regulation 22/04

IMPACT OF DEFERRAL

Compliance with grounding requirements is critical, and deferral of this work would increase the risk of step and touch potentials exceeding safe levels for workers and the public. Moreover, deferral of this work would also affect THESL's ability to ensure proper arrester operation, and thus system protection. Proper arrester operation shunts excess current to ground, thereby protecting system assets from potentially damaging levels of energy. This operation also increases public safety by reducing the chances of catastrophic failure of equipment. Lastly, THESL is mandated by Section 4 of Ontario Regulation 22/04 to ensure that all metal parts of an installation not intended to be energized should be effectively grounded.

Portfolio:	Standardization
Project Title:	Porcelain Insulators Replacement Program
Project Number:	23589
Project Year:	2014
Estimate Cost:	$520,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all existing porcelain insulators with polymer insulators on overhead distribution system.

Scope:

The scope of work for this project is to replace about 400 porcelain insulators located across all of the former distribution service areas with polymer based materials. THESL will focus on replacing porcelain insulators for the following: worst performing feeders, other areas deemed to be under-performing such as older system configurations, and congested, heavily treed areas where the potential for failure is high and there may be associated public safety risks. The program is intended to supplement the overhead projects where porcelain hardware is being removed.

DISTRICTS	TORONTO, NORTH YORK, SCARBOROUGH, ETOBICOKE, EAST YORK AND YORK
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Over the previous decade, porcelain has been phased out for new installations in favour of polymer based materials. Polymeric hardware offers several advantages over porcelain. Porcelain forms water film on the surface that makes flashovers easier to occur, and has to be cleaned, washed and greased for maintenance purposes. Porcelain insulators are also susceptible to fracture and breakages due to their highly fragile properties. Moreover, hairline cracks can also develop in the porcelain that will lead to failure, and these cracks generally can not be seen from the ground. Lastly, porcelain can fail catastrophically, resulting in shards of jagged material being released into high-traffic areas. Subsequently, sharp, damaged porcelain would then pose a safety hazard to workers handling or working on this equipment.

Benefits

- Polymer insulators are compatible with tree-proof conductors that are designed to eliminate outages caused by tree contact, animal contact, short term phase-to-phase and phase-to-ground contact
- Lower tracking and leakage current would result in lower system losses
- Polymer insulators have superior mechanical strength, flexibility and not susceptible to fracture
- Polymer insulators would pose less of a safety concern in the event of a failure

IMPACT OF DEFERRAL

If this work was to be deferred, it will increase public and worker safety risks as porcelain insulators continue to deteriorate and fail at higher rates. When subjected to lightning or surge voltage stresses, porcelain insulators can puncture and subsequently breakdown completely, not only causing flashover between the energized element and the supporting structure, but may fracture causing porcelain fragmentation in the process. Falling debris, jagged shards, pole fires and environmental risks are also associated with these aging assets. Finally, deferral of this work would also result in THESL losing this window of opportunity to effectively modernize the distribution system.

PROJECTS $500K AND OVER FOR 2014

STATIONS SYSTEM ENHANCEMENTS PORTFOLIO

Table 1: Stations System Enhancements Project

Estimate Number	Project Title	Estimated Cost ($ Millions)
22996	Bremner TS THESL Investments	6.0
Total Cost		6.0

Portfolio:	Stations System Enhancement
Project Title:	Bremner TS THESL Investments
Project Number:	22996
Project Year:	2014
Estimate Cost:	$6,000,000

PROJECT DESCRIPTION

Objective:

The objective of this project is to develop a new station, Bremner TS, to be located at Bremner Boulevard and Rees Street in downtown Toronto. The new station will provide the required capacity needed to facilitate staged replacements of end-of-life, air-blast switchgear at the existing Windsor TS, as well as provide additional capacity for anticipated load growth in downtown Toronto.

Scope:

As part of the Bremner TS project, an additional 13.8 kV switchgear is required in 2014 in order to accommodate load growth anticipated for the Waterfront area. Due to its close proximity to the area, infrastructure requirements from Bremner TS to the Waterfront are expected to be substantially lower than that required from the existing stations in downtown Toronto. This project will involve the supply and installation of a new 13.8 kV switchgear within one of the designated bays of the new Transformer Station building.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	SPADINA
STATION(S)	BREMNER TS
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Windsor TS was built in 1950 and expanded in 1968 and has since become one of the largest 13.8kV substations in Toronto. The 13.8kV air-blast switchgear, installed in 1956, is approaching its end-of-life and needs to be supplied from a new source first. In addition, a new source is needed to reduce the overall loading levels at Windsor TS, as spare feeder positions are neither available nor is there room for additional switchgear. The supply to existing downtown customers also needs to be diversified to mitigate the effects of low-probability high-impact events such as fire or flooding. In addition, a significant new load of 90 MVA is anticipated in the coming years along the Toronto Waterfront area, as a result of the Waterfront Revitalization and East Bay Front Developments. Therefore, new capacity will need to be provided, ideally in the vicinity of the planned load increase to serve these new customers.

Alternatives

THESL considered these other alternatives before proceeding ahead with the decision to build Bremner TS station: status quo, bus-to-bus load transfer and/or addition within Windsor TS. If THESL chose to remain at the status quo, THESL will need to have custom-made parts replaced and air supply systems rebuilt at a significant cost. Subsequently, as there is no alternate supply to customers, switchgear failure at Windsor TS would have a major impact on the 55 MVA of existing loads in the area, and includes many of the downtown business towers and financial district. For the second option, it was determined that bus-to-bus load transfer or additions within Windsor TS cannot be supported as there is not enough bus capacity to support load growth, and it was also determined that there is insufficient physical space to accommodate additional capacity by way of a new switchgear. The other alternative of transferring load onto existing, adjacent stations was not preferred as only two stations (Strachan TS and Esplanade TS) have the space for expansion required to provide the new capacity. However, both of

these stations are further away from Windsor TS and its existing supply area. Thus, installation work for underground cables to pickup the Windsor TS feeders would have to cross existing supply areas and the disruption due to construction along city streets would be more disruptive.

Benefits

- Provides the required capacity needed to facilitate staged replacements of end-of-life air-blast switchgear at Windsor TS in the short-term
- Reduces overall loading levels at Windsor TS by diversifying customer supply and would mitigate the impact of low-probability high-impact events in the long-term
- Reduces the risk of customer outages due to equipment failures
- Provides capacity relief to neighboring stations by enabling distribution load transfers to occur and provide increased capacity to accommodate the expected large-scale customer growth in downtown Toronto

IMPACT OF DEFERRAL

If installation of the second switchgear was to be deferred to later years, new customer loads in the Bremner TS area would have to be accommodated through connection at stations located outside their immediate vicinity, introducing additional infrastructure costs, both civil and electrical. In some cases, having to connect new loads to a station other than the Bremner TS may result in the installation of an additional, two kilometres of new cabling, introducing technical losses and cost inefficiencies. Furthermore, numerous load transfers would be required to accommodate new customer connections at stations other than Bremner TS, which introduces operational complications and cost requirements that could be avoided with the installation of the second switchgear at the Bremner TS.

PROJECTS $500K AND OVER FOR 2014

SECONDARY UPGRADE PORTFOLIO

Table 1: Secondary Upgrade Project

Estimate Number	Project Title	Estimated Cost ($ Millions)
23579	Contact Voltage Remediation	$9.8
Total Cost		**$9.8**

Portfolio:	Secondary Upgrade
Project Title:	Contact Voltage Remediation
Project Number:	23579
Project Year:	2014
Estimate Cost:	$9,800,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to replace all metallic and non-standard handwell units with non-conductive, polymer handwell units, in order to remediate contact voltage issues. Accordingly, as the program is intended to replace all identified non-standard handwell units across the THESL distribution system, the contact voltage remediate program will be taking place over multiple project years.

Scope:

The remediation work for 2014 continues to focus on the remaining areas outside the downtown core, mainly North York, East York, Scarborough and Etobicoke. Also for this period, handwells that are located where a city moratorium expires in 2014 will also be remediated. Thus, THESL will plan to replace approximately 1700 handwells, and anticipates that the subset of handwells with expiring city moratoriums to be around 680 units.

Within the program, the scope of work for this project would involve the excavation of the entire handwell assembly from the sidewalk and installation of the new standard of non-conductive, polymer concrete handwells. Additional scope items may include the following when encountered: repair of underground cable faults and the elimination of temporary overhead supply to street lighting, replacement of secondary bus cable in the handwells with dual protection cable, replacement of fuses to use in-line waterproof

fuses, as well as excavation and removal of abandoned handwells and odd-sized metal lids with non-conductive handwells.

DISTRICT(S)	NORTH YORK, EAST YORK, SCARBOROUGH, ETOBICOKE
DISTRICT NEIGHBOURHOOD	N/A
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

Secondary electrical plant installed in the field is constantly subjected to the elements of nature and the human environment. It endures water, salt and contamination ingress and wide variations in temperature. Corrosion and degradation of components occurs and, eventually, the integrity of connections may deteriorate to a point that live electrical wires may become exposed. This can result in a contact voltage hazard to the public, which was the case in February 2009 when THESL declared a level III emergency to secure all handwells and poles within the city in response to reports of several contact voltage incidents. As a long-term solution, THESL has initiated a program to replace metallic handwells with non-conductive handwells, and replace specific secondary cables and connections.

Benefits

- Mitigates the risks of additional contact voltage incidents by addressing underground faults and connection issues.
- Modernizes streetlighting connection standards.
- Increases safety of the THESL secondary network through the installation of non-conductive polymer handwells and waterproof fusing.
- Provides an opportunity to address abandoned handwells and non-standard lids in the system.

IMPACT OF DEFERRAL

Although contact voltage incidents are rare and typically isolated, deferral of this work would place THESL at risk of exposing the public to potentially unsafe equipment resulting from contact voltage incidents. As a result, THESL would then face greater public scrutiny and added consequences from appropriate agencies if it was found to be non-compliant with Section 8 of Regulation 22/04. Moreover, the planned work of work for 2012 would then represent approximately 68% of the total handwells to be replaced over the period of 2012 to 2014. As such, deferral of this work would result in undue backlog that may become unsustainable due to operational or logistical concerns.

PROJECTS $500K AND OVER FOR 2014

EXTERNALLY INITIATED PLANT RELOCATIONS PORTFOLIO

Table 1: Externally Initiated Plant Relocations Project

Estimate Number	Project Title	Estimated Cost ($ Millions)
23571	Eglinton LRT	0.7
Total Cost		0.7

Portfolio:	Externally Initiated Plant Relocations
Project Title:	Eglinton LRT
Project Number:	23571
Project Year:	2014
Estimate Cost:	$728,000

PROJECT DESCRIPTION

Objective:

The purpose of this project is to support the TTC project on building a Light Rail Transit ("LRT") line across Eglinton Avenue.

Scope:

The scope of work for this project is to perform relocations and support of THESL infrastructure in the vicinity of TTC excavations, where required. The majority of these relocations and support will be at the 19 proposed station locations along the 19 km route from Keele Street to Kennedy Station.

DISTRICT	TORONTO
DISTRICT NEIGHBOURHOOD	EGLINTON
STATION(S)	N/A
FEEDER(S)	N/A

JUSTIFICATION

Project Background

The Eglinton LRT project was initiated in 2011, with a planned completion date of 2020. To maintain this timeline, the TTC will be excavating the station locations in 2013 and 2014, while the actual tunnel is being bored out with a large tunnel boring machine,

starting in 2012. Due to the nature of the construction, the tunnel itself requires very few THESL relocations, whereas the stations are being constructed using the 'cut and cover' method. In this method, the area above the station is excavated completely, and then a temporary roof is installed to allow traffic continuity while construction of the station continues below. With this method, all utilities in the area of the vicinity must be relocated, or at a minimum, supported across the excavation. The TTC does not yet know the exact locations for the stations, and as such, detailed relocation and support plans is still pending as of the date of this submission. Accordingly, the estimate has been projected based on past experiences with similar projects.

Benefits

- Maintains the current customer and supply capacity
- Provides an opportunity to better coordinate and work with the TTC to accommodate their planned service expansion

IMPACT OF DEFERRAL

If this work were to be deferred, it would negatively impact the construction of the Eglinton LRT stations. Moreover, delays in funding would also result in a loss of resources and effort, as there is work currently ongoing or has been completed. Lastly, THESL would also lose the window of opportunity to better coordinate with appropriate utilities and agencies on infrastructure work to minimize project related costs.