BEFORE THE
STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET NO. DE 21-030

IN THE MATTER OF: UNITIL ENERGY SYSTEMS, INC.

REQUEST FOR CHANGE IN RATES

DIRECT TESTIMONY

OF

Jay E. Dudley
Utilities Analyst IV
New Hampshire Department of Energy

November 23, 2021

[redacted]

3. Concord Downtown Conversion Projects:

Project #	Description	Budget	Actual
SPBC02	Gulf St. 13kV Additions	$ 2,925,000	$ 3,164,045
DPBC04	Conversion Concord Part 1	$ 250,000	$ 194,714
DPNC05	Reconductor 1H6 Pleasant	$ 197,798	$ 161,963
DPNC07	Reconductor 1H6 Thomp.	$ 128,720	$ 137,385
DPNC12	Reconductor 1H6 S.Spring	$ 138,870	$ 371,975
DPNC13	374 Line Rebuild	$ 1,066,000	$ 787,358
DPBC07	Conversion Concord Part 2	$ 721,847	$ 447,840
	Total	$ 5,428,235	$ 5,265,280

Overall Budget v. Actual: $162,955

Attachment JED-7

Construction Authorization Form:

- The Concord Downtown Conversion project is characterized as a significant project by Unitil at $5.2 million and involved seven individual projects listed above. DOE reviewed of the related and CAF's and they are attached to my testimony as part of Attachment JED-7.

[24] *See* Attachment JED-6, data response Energy TS 2-4, Attachment 2.
[25] Final 2020 cost for Exeter (not including land purchase, artwork, 2021 expenditures) of $15,639,471 less $9,800,000 equals $5,839,471.

- The project as a whole was intended to accommodate actual and projected load growth in the Concord Downtown area over the next five to eight years. The additional growth is projected by Unitil to be up to 10 MVA.
- Development in the Concord Downtown area has included or will include a mix of apartments, retail stores, offices, restaurants, and a bank.
- In order to meet the new load growth, the Company considered five options to connect with the new load and initiate the conversion:
    1) Upgrade Gulf Street Substation to 13kV.
    2) Create a 13.8 kV transformer grid.
    3) Upgrade and replace Bridge Street Substation.
    4) Install second transformer at Iron Works Substation.

  Unitil ultimately chose Option 1, upgrade and expand the Gulf Street Substation, since the other options were not considered viable due to space limitations at existing substations or were not within the Company's design guidelines.[27]
- Aside from the Gulf Street Substation project, the other conversion projects involved reconductoring and undergrounding of existing lines, padmount transformer replacements and new switch installations.
- The Company based its buildout for the various construction projects on the five-year load forecast and conditions assessment contained in the Concord Downtown Area Study 2018.[28]
- The project was completed in 2020.

[26] *See* Attachment JED-6, data response Energy TS 2-4, Attachment 3 at 1-3.

Work Orders:

- No work orders were provided by Unitil as requested in DOE 3-47.

Engineering Work Requests:

- Engineering Work Requests were not required for the project.

Change Orders: No change orders were submitted for this project.

DOE's Review:

In discovery, Unitil represents that the projected load growth for the Concord Downtown area has not materialized and that many projects have been either delayed, put on hold, or cancelled.[29] As justification for this project, the Company relied exclusively on its own internal study, the Concord Downtown Area Study 2018. The only other studies considered by Unitil were system impact studies performed for specific interconnection requests. The focus of the study was limited to projected loads and needed systems improvements to meet those loads. The study does not specifically mention or review known and verified load increases nor does it address the potential of some new loads not materializing. Unitil's most recent load projection reports a total projected load of 5380 kVA and a current realized load of 1310 kVA, leaving 4070 kVA or 75% of projected load unrealized.[30]

DOE's Conclusions & Recommendations:

Like many of the projects reviewed in the sample, DOE found the initial justification for the project reasonable in terms of the upgrades and additions that were driven by increasing development in the Concord Downtown area and the insufficient capacity of

[27] Testimony of Kevin E. Sprague at 21-24 (Bates 371-374).
[28] *See* Attachment JED-7.
[29] *See* Attachment JED-7, Staff Data Request 1-2 (Docket DE 20-002), and DOE Request 4-71.
[30] *Id.* DOE Request 4-71.

existing substations and conductors. However, DOE is becoming increasingly concerned with projects built to serve highly speculative loads without the necessary background research to critically examine whether those load projections are reasonable and credible, and without considering different scenarios under which those loads may or may not occur. In this instance, the Company's Concord Downtown Area Study 2018 does not address those critical issues but relies exclusively on its own load projections. Given that only 25% of the predicted load increase has materialized service, DOE concludes that only 25% of the installed capacity is used and useful at this time. In addition, there is no certainty as to when the entire load, or a portion thereof, will come online in the near term given the number development projects that are currently on hold, and Unitil has provided no such assurances in its filings. Despite the fact that 100% of the new capacity for the Concord Downtown project has been constructed and is now in place, it has long been held that utilities are entitled to a return only upon that portion of an investment that is used and useful during the test year. Accordingly, in applying a needs based test, DOE finds that only 25% of the installed plant is used and useful as of the 2020 test year and that the remaining 75% constitutes excess capacity at this time. As a result, DOE recommends disallowance of the excess capacity portion which is equivalent to $3,948,960 (75% x $5,265,280) for purposes of this case. The DOE proposes to review the plant additions in Unitil's next rate case to see if the load has materialized and the remaining plant has become used and useful.

[redacted]

Unitil Energy Systems, Inc.
Docket No. DE 20-002
PUC Staff Information Requests – Set 1

Received: May 20, 2020 Date of Response: June 4, 2020
Request No. Staff 1-2 Witness: Jacob Dusling

Request:

Reference Company Least Cost Integrated Resource Plan at Page 18-19 of 590, describing the Concord Downtown Conversion project as necessary to accommodate unforeseen customer load additions in the downtown area. Please provide a narrative describing the unforeseen load additions and whether that load actually materialized. Please also provide any supporting documentation that is available relating to the load increases.

Response:

The below table details the unforeseen customer additions and the current status of each of these load additions. At this time the Company cannot confirm if the expected load increase for the locations in service has materialized. These loads were placed in service after typical peak load times and many of the locations are not fully occupied.

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Location	Expected Load (kVA)	Current Status of Project
16-18 South Main Street Concord Theatre	250	In-Service
20 South Main Street Restaurants and Luxury Apartments	500	Planned In-Service Late 2021/Early 2022
5-7 Pleasant Street Apartments	800	In-Service
32-34 South Main Street Retail, Restaurants, Apartments	1000	Cancelled
97 Storrs Street Retail and Luxury Apartments	500	On Hold
80 Storrs Street Restaurants	500	Company currently working with development of plan to serve
34-42 North Main Street Phoenix Hall	300	Company currently working with development of plan to serve
76-82 North Main Street Bank, Restaurant, Offices and Apartments	280	In-Service
1 Eagle Square Offices	300	Under construction
Dubois Ave South Side Lot 7 Story Mixed Use Building	700	Proposed plans received by City
8-14 Dixon Ave Retail	200	On Hold
120-146 North Main Street Mixed Used	300	On-going

In addition to projects listed above there are three other projects that Unitil has been made aware of that are expected to be placed in-service within the next five to eight years. These projects are expected to total approximately 1,000kVA of additional load in the area.

Unitil Energy Systems - Capital

Concord Downtown Area Study 2018

Prepared By:

Tyler Glueck
Unitil Service Corp.
1/7/2019

1. Executive Summary

This study is an evaluation of the Unitil Energy Systems-Capital (UES-Capital) electric system in the vicinity of downtown Concord. This study was performed separate from the annual distribution planning study, because these additional loads were brought to Unitil's attention after the annual analysis was complete.

The purpose of this study is to identify system constraints due to unanticipated customer load additions that are expected to be in service by the end of spring, 2020. In addition, this study details project options and proposes system improvement projects to resolve the identified planning violations. This study covers examines the known, expected loading within the five year period from 2019 to 2023.

The following system improvements are recommended as detailed in section 6:

1. Combine circuits 1H6 and the underground portion of 1H1
2. Convert combined circuits to 15kV construction
3. Transfer circuit 3H3 to 7X1
4. Install a new 34.5kV/13.8kV transformer at the Gulf St S/S
5. Install two new 13.8kV circuit positions at Gulf St
6. Populate one circuit position to supply the converted 1H6 and 1H1 as a new circuit, "3W4"

The following table is a comparison of capacity versus expected load in 2019.

	Present Peak Load	Present available Capacity	Expected Additional Load	% Load over Avail. Capacity	Total load after Addition
1T2	4698	3492	4750	115%	9448
1H1	2453	775	2950	167%	5403
1H6	1110	1196	1800	126%	2910

2. Study Focus

This study is an extension of the UES-Capital 2019-2023 distribution planning process. It is an area review of the downtown Concord area that is being performed due to the identification of additional customer growth that was not known when the analysis for the 2019-2023 planning process was completed.

This study is primarily focused on the planned load expected to require service by the spring of 2020. The first objective of this study is to identify the system constraints that do not meet planning criteria. The second objective is to develop options and recommendations to serve the downtown Concord area over the next five years. The final objective is to effectively develop an improvement plan that will accommodate the immediate load increases, as well as enable future system load growth. The projects proposed are based upon economy, reliability, and potential for future development.

This study does not attempt to identify or address all loading and/or voltage concerns throughout the entire downtown Concord area; however some of the recommendations within this report will provide added benefit to the overall distribution system in this area.

3. Area Description

For the purposes of this study, the UES-Capital downtown Concord area is comprised of the power transformer and distribution circuit positions at Bridge Street, Gulf Street, Storrs Street and Montgomery Street substations (S/S) and the distribution circuits they supply.

The subtransmission system was not reviewed in detail as part of this study. The anticipated load increase is not anticipated to cause subtransmission planning violations. Alternatives were reviewed to determine if subtransmission upgrades could be required for any of the options to address distribution constraints.

Load projections within this report are based on the 2019-2023 five year distribution load forecasts that were developed as part of the 2019-2023 distribution planning process. Additional details regarding the load projections can be found in the UES Capital 2019-2023 Distribution Planning Study.

The 2019 and 2023 projections were increased based upon that anticipated customer load additions. The estimated load is approximately 4.75MW, split up between 1H1 and 1H6. The projected annual load can be found in Appendix A.

4. Analysis and Findings

This section details the results from a detailed review of the UES-Capital Concord downtown Area. It describes concerns associated with the distribution substation and mainline distribution equipment. It does not attempt to identify all loading and voltage concerns throughout the area. Isolated concerns, such as low voltage on a lateral that is not associated with the customer load addition will be addressed under the UES-Capital Distribution Planning Study. The projections listed here are a summation of potential new load and the load projected in the UES-Capital Distribution Planning Study.

a. Distribution Substation Loading Concerns

Distribution substation elements which are expected to exceed their normal summer ratings are listed in the table below.

	Projected KVA	Rating of Overloaded Elements					
	2019	Element	Rating	% of rating	Element	Rating	% of rating
1T2	9448	Xfmr	8186.4	115%	-	-	-
1H1	5403	Trip	3225.6	168%	REG	3456	156%
1H6	2910	Trip	2304	126%	REG	3456	84%

	Projected KVA	Rating of Overloaded Elements					
	2019	Element	Rating	% of rating	Element	Rating	% of rating
1T2	9448	-	-	-	-	-	-
1H1	5403	Wire	3823.2	141%	Recloser	4032	134%
1H6	2910	-	-	-	-	-	-

b. Distribution Circuit Loading and Voltage Concerns

The following summarizes mainline distribution equipment which is expected to be loaded above normal ratings during the study period. It also identifies the lowest voltage on the circuit.

	Element	Projection	Rating	% of rating
1H1	336 AA	5403	3823	136%
1H6	336 AA SP	2910	3226	90%

	Element	Projection	Rating	% of rating
1H1	1/0 Al UG	1159	1080	107%
1H6	2/0 ACSR	2748	2038	135%

	Element	Projection	Rating	% of rating
1H1	#2 Al UG	1159	828	140%
1H6	#2 Cu	2748	1728	159%

	Lowest Voltage
1H1	-
1H6	112.8V

c. Other Concerns

The following additional concerns shall be considered when developing system improvement options and evaluating alternatives

i. I-93

The concord downtown area is in the close proximately of I-93. The State of NH is currently in the process of evaluating options for the widening of I-93. The widening project has the potential to impact Unitil infrastructure, including Bridge Street and Gulf Street substations.

ii. Downtown Underground

The downtown underground was built to have a primary (21W1P) and alternate (21W1A) feed to allow one of the circuits to back the other one up completely. Due to load growth in the area this is no longer the case. Depending on the fault location, portions of the downtown underground need to be restored from overhead distribution circuits. The Capital Master Plan details the future goal of returning the downtown underground to its original purpose.

iii. Space Constraints

Available land in the downtown Concord is very limited. Combined with the unknowns of the I-93 widening and the timeframe in which upgrades are required, finding locations for new substation infrastructure will be extremely difficult.

5. Improvement Options

This section details improvement options that were considered to address the identified constraints above.

5.1 Option 1 – Replace Gulf St. 3T2 with 34.5kV/13.8kV Transformer
5.2 Option 2 – Create a 13.8kV Transformer "Grid"
5.3 Option 3 – Upgrade the Bridge St. S/S or Build a New S/S
5.4 Option 4 – Add Transformation at the Iron Works S/S
5.5 Option 5 – Upgrade 21W1A and 21W1P

All projects detailed below address the identified constraints for the duration of the five-year planning horizon.

5.1 Option 1 – Replace Gulf St. 3T2 with 34.5kV/13.8kV Transformer

The main portion of this plan is to install a new 13.8kV transformer, build two new circuit positions, and run two 13.8kV circuits from the new transformer to connect one with 1H1 and the other 1H6. Both of these 4kV circuits will be converted to 13.8kV. The following options are proposed to eliminate one of the 4kV transformers at Gulf St.

Option 1A – Transfer 3H2

The first option is to transfer 3H2 to the Langdon S/S using 14H1. 14H1 will be extended for four spans to tie in to 14H2 at a new location, removing load from 14H2. 14H2 will now close the tie with 3H2 and assume its load. 3H2 will be removed from the Gulf St S/S. 3H3 will be transferred from 3T2 to 3T1. 3T2 will be replaced with a new 13.8kV transformer.

Option 1B – Transfer 3H3

The second option is to transfer 3H3 to Bow Junction S/S using 7X1. 3H3 will be connected to new step down transformers at the junction of 3H3 and 7X1. 3H3 will be removed from Gulf St S/S. An alternative is to convert 3H3 to 34.5kV and create a 34.5kV position at Gulf St, as well as a tie with 7X1. The 3T2 transformer will be replaced with a 13.8kV transformer.

5.2 Option 2 – Create a 13.8kV Transformer "Grid"

The 374 and 34 corridor through Concord may allow enough space to create several new 34.5-13.8 kV transformer locations. Instead of trying to rebuild an entire substation or trying to find space to locate a new substation, several "substation-style" padmount transformers can be installed along the 374/34 corridor. There are four locations where existing circuits extend out of the transmission corridor to serve load in the city. This project would involve installing one 12,400 kVA transformer at each of these locations and converting the existing 4.16 kV distribution infrastructure in the area to 13.8 kV operations. A one-line is located in Appendix A. Bridge St can be used as a switching station.

Distribution upgrade information is located in the following table:

	1H6	**1H2**	**1H1**
Transformers	33	25	29
Poles	57	30	27
Conversion (ft)	6,300	9,300	7,000
Reconductor (ft)	2,050	3,500	700

Benefits

New property rights would be minimal. This proposal can easily be done in pieces, as needed. This proposal fits the timeline set forth by incoming load.

Constraints

There are many unknowns related to a newer type of project like this. I-93 expansion is an unknown at this time. Other constraints include the purchase of land and/or easement rights.

Open Questions

Would transmission poles need to be replaced? Can power transformers fit in the ROW? What else would be needed to complete this project?

What would be needed for regulation? High-side regulation or should we consider low-side regulators or LTCs?

Long-term Plan

This would ultimately accommodate the removal or conversion of the 4.16 kV portions of Bridge Street, Gulf Street and West Concord substations and the conversion of all the 4.16 kV downtown

circuits to 13.8 kV operations. An alternative to converting these stations is to remove the existing 4 kV infrastructure and install padmounted transformers.

5.3 Option 3 – Upgrade an existing S/S to 13.8 kV or Build a new 13.8kV S/S

Option 2 involves the conversion of an existing substation to 13.8 kV or constructing a new 34.5-13.8 kV substation in the downtown area. . The following sections discuss various options where the construction would take place.

This option sets the stage for converting/rebuilding all the substations (Gulf Street, Bridge Street and West Concord) and distribution circuits in the downtown area to 13.8 kV.

Option 3A –Bridge Street S/S

Upgrade the 1T2, 1H1, 1H2, 1H1 portion of Bridge St S/S from 4kV to 13.8kV. The new equipment ratings shall be set to accommodate the existing load, switching capabilities, and leave room for growth. The peak amp load is expected to be 395A. Therefore, the transformer size will need to be 12,400 kVA. To accommodate the rebuild of this portion of Bridge Street S/S circuits, 1H1, 1H2 and 1H6 will be converted to 13.8 kV operations.

Distribution upgrade information is located in the following table:

	1H6	**1H2**	**1H1**
Transformers	33	25	29
Poles	70	30	27
Conversion (ft)	8,600	9,500	7,000
Reconductor (ft)	2,050	3,500	700

Benefits

No new substation locations would need to be found. The affected circuits would be immediately targeted. Bridge St is an ideal location, being right in the middle of the north and south ends of Concord. There are right-of-ways and easements established, eliminating the immediate need for more land access. The three affected circuits are on one transformer, so only half of Bridge St would need to be upgraded within the shorter timeframe.

Constraints

There may not be enough space in the current S/S footprint to upgrade. How to serve existing load while upgrades are completed? Can the 1T1, 1H3, 1H4, 1H5 remain until future load deems upgrades are required? How do we back-up / install mobile for failure of 1T1 or new transformer? I-93 expansion is an unknown at this time.

Open Questions

Rights granted by easements or Rights of Way need to be investigated

Option 3B– Construct a New S/S

Due to space limitations at Bridge St, it may be preferable to find a new location for a substation. Space for a new S/S in Concord is limited and would require purchase of land or rights. The S/S would be built for 13.8kV and three circuits. The distribution equipment would need to be upgraded to 13.8kV as well.

This option is not viable due to land space and timeframe.

5.4 Option 4 – Add Transformation at Iron Works S/S

Install a 2nd 7.5/10.5 MVA, 34.5-13.8 kV transformer at Iron Works S/S, construct a fourth circuit position and upgrade the existing circuit regulators at Iron Works S/S. 22W3 will be split into two circuits and significant reconstruction of multiple distribution circuits will be required as part of this project.

Distribution upgrade information is located in the following table:

	1H6	1H2	1H1	22W1	22W2	3H1
Transformers	33	25	29	-	-	34
Poles	57	30	27	-	-	65
Conversion (ft)	6,300	9,300	7,000	-	-	6,800
Reconductor (ft)	2,050	3,500	700	5,000	12,500	6,800

The combination of 22W1, 21W1P (OH portion), 1H2, and half of 1H1 will cause the new 22W1 circuit to be loaded at 10.5MW, which is the upper rating of the new transformer. The other three circuits, 22W2 (and part of 7W4, 3H1, 1H6, and half of 1H1) and 22W3 will overload the original transformer. The total loading at this location will be 22.3 MW. For these reasons, the Ironworks option is not viable.

5.5 Option 5 – Upgrade 21W1P and 21W1A

Upgrading 21W1P and 21W1 and transferring additional load to the downtown underground was considered as an option to address the identified constraints. The issue is that the purpose of the downtown circuits is to back each other up. The max rating we can achieve in the existing infrastructure is 300A per cable. There is already 200A on the underground circuits. The new and transferred load will total about 400A. This would leave the circuits both fully loaded to their rating, eliminating tie capability completely and leaving no room for growth. There are not spares enough to run more circuits. The additional load would also require a new substation transformer and a location for it, as well as a place to tie it in, but there are not enough empty conduits to utilize another circuit configuration.

6. Selected Proposal Details

The selected proposal is a reduced version of option 1 (outlined in section 5.1.B), which is converting part of the Gulf St S/S. The planned project will convert part of Gulf St and re-organize the leftover 4kV portion. Note that the second load transfer, option B, has been selected. Therefore, 3H3 will be shifted to 7X1 with a set of step down transformers. 1H6 and half of 1H1 will be converted to 13.8kV and fed from a single new circuit at Gulf St.

Distribution Plan:

1. Install stepdown transformers on 7X1 and transfer 3H3 to 7X1. Consider adding a recloser on the low side of the step down transformers.
2. Install stepdown transformers on 1H6 at the intersection of Pleasant St. and S. State St. in the western direction on Pleasant St. This is due to a customer owned transformer on this lateral.
3. Rebuild 1H6 from P.13 S. Main St. to P.4 Warren St. to 15kV insulation and 336AAC conductor. The portion from P.13 S. Main St. to P.1 N. State St. must be completed by summer 2019 to meet loading and voltage requirements. It will remain 4kV until the substation work is complete.
4. Transfer a portion of 1H1 from P.13 S. Main St. to P.3 Storrs St. onto the new 13.8kV circuit (designation to be determined). This section of 1H1 is already built to 15kV standards.
5. Replace all affected distribution transformers with dual 4.16kV/13.8kV transformers.
6. Extend 3H1 and 3H2 from where they currently exist to the new 4kV circuit positions in the new 3T1 position.
7. Build a new tie between 3H1 and 3H2 right outside the substation or in the substation. The existing tie between 3H3 and 3H2 will remain.
8. Develop a plan to allow for conductor isolation in the underground portion of the new circuit.

Substation Plan:

9. Move 3T1 to the 3T2 position, removing 3T2.
10. Build a new 4kV position and re-tool the current 3H3 position. The circuits located on these two positions will be 3H1 and 3H2. The existing circuit, 3H3, will be transferred to 7X1.
11. Install new breaker/reclosers and regulators in the new 3H1 and 3H2 positions.
12. Purchase and install a new 34.5kV/13.8kV transformer, to be located in the existing 3T1 position.
13. Build one new 13.8kV bus and two new 13.8kV circuit positions with new breaker/reclosers and regulators.
14. The existing maintenance project of replacing all 34.5kV pin and cap insulators, substation fence, and a new recloser for 3H3 will be encompassed in this project.

Right of Way Plan:

15. Build one new 13.8kV circuit from a new 13.8kV position at Gulf St S/S to the crossover to Theatre St.
16. Cutover 1H6 to the new circuit (this includes the portion of 1H1 being transferred as well).
17. Build a new tie between the remnant of 1H6 (it will only go from Bridge St S/S to the crossover location) and 3H1.

Unitil Energy Systems, Inc.
Docket No. DE 20-002
PUC Staff Information Requests – Set 2

Received: June 11, 2020 Date of Response: June 22, 2020
Request No. Staff 2-4 Witness: Jacob Dusling

Request:

Reference Company Response to Staff 1-2 describing 5,630kVA expected load associated with customer additions necessitating the Concord Downtown Conversion project, including 1,700 kWA of expected load which has been cancelled or is on hold.

a. Please provide an update on the status of the Concord Downtown Conversion as of June 2020.

b. Please provide any planning documents associated with the Downtown Conversion project (business cases, solutions selection forms, etc.)

c. Please describe how the 1,700 kVA of expected load that has been cancelled or placed on hold impacts the need for the Concord Downtown Conversion.

d. Please provide a narrative describing the 1,000kVA project which has been cancelled.

e. Please provide the annual peak loading in the area associated with the Concord Downtown Conversion for each of the past five years.

f. Please provide the hourly loading in the area associated with the Concord Downtown Conversion on the peak day during 2019.

Response:

a. As of June 15, 2020, the Concord Downtown Conversion is essentially complete. The expansion to Gulf Street substation is in service and all conversion from 4.16kV to 13.8kV operation is complete. Some minor cleanup work remains (switching to place circuits into their new normal configurations, final signage and equipment labelling, etc.) and is expected to be complete by the end of the June.

b. Unitil's Concord Downtown Area Study is attached as Staff 2-4 Attachment 1.

c. This would have reduced the anticipated loading on substation equipment as follows:

- 1T2 transformer to approximately 95% of normal instead of 115%
- 1H1 Circuit Position to approximately 136% of normal instead of 167%
- 1H6 Circuit Position to approximately 96% of normal instead of 126%

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Additionally, many of the distribution loading and voltage violations are expected to remain, but be less severe without the load that was cancelled or placed on hold

d. 32-34 South Main Street in Concord's Central Business District and was acquired from the State of NH by the City for the purposes of economic development. The City desires to sell the property to a private developer for redevelopment in order to expand the City's tax base, job base, housing base, and overall economic vitality.

In January of 2018, the City entered into a Purchase and Sales / Development Agreement with The Dolben Company to develop a 180,000SF, $30M mixed use building featuring 125 apartments, an internal parking garage and 5,000 SF restaurant at 32-34 South Main Street.

Unitil worked with the City and Dolben to develop a plan to relocate aerial utilities underground to support development of 32-34 South Main Street, as well as abutting properties affected by the development.

As the Dolben Company conducted its due diligence and prepared development permitting applications, it was determined that additional financial support would be required from the City, in an amount of upwards of $3.5 million, to make the developer's project economically viable.

In August of 2019, the City Council voted to not amend its Purchase and Sales / Development Agreement with The Dolben Company to provide the additional financial support for the developer's project. Consequently, The Dolben Company subsequently terminated the Purchase and Sales / Development Agreement and withdrew from the project.

The City continues to actively market the property. However, the onset of the COVID 19 "Coronavirus" Pandemic – and associated economic challenges related thereto, has complicated efforts to find a suitable partner for development of the property.

e. The table below displays the historical summer peak loading of the Concord Downtown area as defined in the attached study. Combined loading is provided for circuits 21W1A and 21W1P, because these are underground circuits that are designed to back one another up for an underground fault.

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PUC Staff Information Requests – Set 2

Received: June 11, 2020 Date of Response: June 22, 2020
Request No. Staff 2-4 Witness: Jacob Dusling

	Load (kVA) / % or Normal Rating				
	2015	2016	2017	2018	2019
1T1 Transformer	3,868 / 47.2%	4,032 / 49.2%	no data	4,266 / 51.2%	3,055 / 37.3%
Circuit 1H3	1,505 / 64.3%	1,578 / 67.4%	1,518 / 64.8%	1,518 / 64.8%	1,429 / 61.0%
Circuit 1H4	no data	980 / 45.9%	no data	no data	620 / 29.1%
Circuit 1H5	1,536 / 51.4%	1,573 / 52.6%	1,525 / 51.0%	1,669 / 55.8%	1,189 / 39.8%
1T2 Transformer	4,323 / 52.8%	4,150 / 50.7%	4,266 / 52.1%	4,611 / 56.3%	3,747 / 45.7%
Circuit 1H1	2,435 / 81.6%	no data	2,306 / 77.2%	2,407 / 80.6%	2,024 / 67.8%
Circuit 1H2	1,153 / 49.2%	1,038 / 44.3%	1,009 / 43.1%	1,326 / 56.6%	922 / 39.4%
Circuit 1H6	1,110 / 37.2%	no data	1,052 / 35.2%	1,196 / 40.1%	893 / 29.9%
3T1 Transformer	3,094 / 61.1%	3,267 / 64.6%	2,959 / 58.5%	3,266 / 64.5%	2,613 / 51.6%
Circuit 3H1	1,815 / 81.1%	1,830 / 64.6%	1,701 / 76.0%	1,816 / 81.1%	1,499 / 66.9%
Circuit 3H2	1,254 / 56.0%	1,355 / 60.5%	1,239 / 55.3%	1,369 / 61.1%	1,023 / 45.7%
3T2 Transformer	no data	1,059 / 25.6%	949 / 23.0%	992 / 24.0%	656 / 15.9%
Circuit 3H3	no data	1,059 / 45.2%	949 / 40.5%	992/ 42.4%	656 / 28.0%
Circuits 21W1A/21W1P Combined Load (Downtown Underground)	4,064 / 103.0%	4,160 / 105.5%	4,240 / 107.5%	4,112 / 104.3%	3,298 / 83.6%

f. Hourly load data is not available for the Concord Downtown area, because Unitil does not have SCADA telemetry information for the associated circuits.

Unitil Energy Systems, Inc.
Docket No. DE 20-002
PUC Staff Information Requests – Set 3

Received: July 9, 2020 Date of Response: August 4, 2020
Request No. Staff 3-4 Witness:John Bonazoli

Request:

Reference Response 2-4 and related attachments describing the Concord Downtown Area Study

a. The Concord Downtown Area Study does not provide cost estimates for the various alternatives considered. Please explain how the Company arrived at an informed decision regarding the least-cost and best fitting solution for the need without this information. If the Company used its engineering and procurement expertise to approximate costs and determine which alternative provided the best-fitting, least-cost solution for the need, possible replicate those estimates in response to this request.

b. Please provide any other studies for projects considered outside the annual distribution planning study process in the past five years and a brief narrative of any projects the Company plans to consider through similar processes in the next five years.

c. Similar to Question 3-2:

   i. Please provide all of the load sheet data associated with the additional load in Downtown Concord that was utilized to justify this project.

   ii. Please provide all final load determinations that were utilized in the Circuit Analysis, Windmil or otherwise, and the incremental contribution (kW, kVA, amperage) this load had on Concord Downtown circuits.

Response:

a. Options 2 -5 listed in the Concord Downtown Area Study were presented to and discussed among the engineering and operations departments and were not selected as the recommended solution for the following reasons:

   Option 2 - Create a 13.8kV Transformer “Grid”:

   This option was outside of the Company’s distribution design practices and it was determined the required land and/or easements could not be acquired within the required timeline for the project. Additionally, it was thought some of these transformers may need to be relocated again in the near future due to the potential widening of Interstate highway I-93.

   Option 3 - Upgrade or replace Bridge St. substation:

Unitil Energy Systems, Inc.
Docket No. DE 20-002
PUC Staff Information Requests – Set 3

Received: July 9, 2020 Date of Response: August 4, 2020
Request No. Staff 3-4 Witness:John Bonazoli

There were a number of concerns with the option of upgrading the existing Bridge St. substation.

1) The available space within the Bridge St. Substation would not accommodate a 15kV upgrade without rebuilding the entire substation. The scope (and cost) of rebuilding the entire substation (13.8kV and 4 kV), was much greater than building a new substation at Gulf St. because there are fewer number of circuits at the Gulf St. substation.
2) The available land at the Gulf St. location allowed a new substation to be built beside the existing one, while the existing substation was left In service. This was not an option at Bridge St. location.
3) The time required to locate and procure adequate land for a new substation was outside the required timeline for project. Additionally, a new location for the Bridge St substation would require four subtransmission lines to be re-routed.
4) It is unknown how the widening of Interstate Highway I-93 will affect the Bridge St. substation.

Option 4 – Install a second transformer at Iron Works Substation:

It was determined that the added capacity of a second transformer installed at Iron Works Substation (of the same rating as the present transformer), would not be adequate for the expected needed load. A transformer of a greater rating was not feasible, because it would not be able to be backed-up by the existing mobile substation or spare substation transformer. Therefore, a new mobile substation and spare transformer would also need to be purchased.

Option 5 – Upgrade 21W1P and 21W1A lines:

21W1A and 21W1P are underground lines located in downtown Concord. It was determined that rebuilding these lines would not be adequate to serve the required load and allow expansion for future load. There are no spare conduits in the existing conduit bank and the size of the existing conduit does not allow the installation of adequate cable size. Therefore a new a new conduit bank with underground vaults and switchgear would need to be constructed downtown Concord. With past experience of designing and constructing underground circuits in downtown Concord, it was determined that the required time to design this option, receive required approval from the City, and construct the necessary facilities would be more than the allowed timeline. The cost was also expected to be greater than the selected substation option. The final design would also allow less flexibility for future load growth in the area.

Unitil Energy Systems, Inc.
Docket No. DE 20-002
PUC Staff Information Requests – Set 3

Received: July 9, 2020 Date of Response: August 4, 2020
Request No. Staff 3-4 Witness:John Bonazoli

b. The only other studies for projects considered outside the annual distribution planning study process in the past five years were System Impact Studies performed for specific requests to interconnect customer owned generator facilities. Please reference Staff 3-4 Attachment 1, Staff 3-4 Attachment 2, and Staff 3-4 Attachment 3 for studies that were performed for large generator interconnection requests. These studies are confidential as they include confidential customer information.

c. Staff 3-4 Attachment 4 through Staff 3-4 Attachment 8 contain load information Unitil received from customers for new load to be served.

Staff 3-4 Attachment 4 is electrical load analysis provided by the customer indicating 374 kVA of demand.

Staff 3-4 Attachment 5 is electrical load analysis provided by the customer indicating 1,255 kVA of demand.

Staff 3-4 Attachment 6 is electrical load analysis provided by the customer indicating 305 kVA of demand.

Staff 3-4 Attachment 7 is electrical load analysis provided by the customer indicating 175 kW of connected load.

Staff 3-4 Attachment 8 is electrical load analysis provided by the customer indicating 384 kVA of demand.

Capital Budget 2019 UES Capital

Project Description

Year: 2019
Company: UES Capital
Status: [A] Accepted
Priority: 1
Budget Category: SPBC02 Substation Project
Project Name: Gulf Street - 13kV Additions and Upgrades
Submitted By: J. Goudreault / P. Krell

Project Categorizations

Load

Project Estimates

Labor Time to Install (Man Hours):	40
Labor Time for Removal (Man Hours):	
Transportation Expenses (Heavy Truck Hours):	20
Transportation Expenses (Light Truck Miles):	
Material OH Electric Construction (from Stockroom):	
Material UG Electric Construction (from Stockroom):	
Material Gas Construction (from Stockroom):	
Material Direct Charge (Ordered directly to job.):	150000
Material Hot Water Heaters:	
Contract Labor Hours (Man Hours):	
Contract Services:	270000
Other Specific Charges ($):	211000
Overhead on Specific Charges (%):	30
Customer Contribution (%) (before OH's applied):	
EDP? (Yes or No):	No
Retirement:	
Salvage:	

Description/Scope

Increase the overall capacity at Gulf Street substation by eliminating the existing 4.16kV upper yard supplied by the 3T1 transformer, and building two new 13.8 kV circuit positions supplied from a new 13.8kV power transformer, including:

- new 10/14 MVA, 34.4 kV-13.8 kV power transformer,
- 38 kV high-side transformer breaker,
- two 13.8 kV circuit positions, each with breaker/recloser and regulators,
- and the removal of all 4.16 kV equipment and dismantling of existing structures associated with the 3T1 transformer.

This is the first year of a two year project. This first year includes costs for any design services and permitting, purchase of all major equipment (some planned to be invoiced in 2020), and preliminary contractor installation costs.

Total cost of this substation project over the full two years is estimated at approximately $1.5M without direct or indirect overheads.

Justification

Capacity additions needed for anticipated load additions in the Concord downtown area.

Printed: 7/12/2021 8:49:37 AM

Capital Budget 2020 UES Capital

Project Description

Year: 2020
Company: UES Capital
Status: [A] Accepted
Priority: 1
Budget Category: SPCC01 Substation Project, Carryover
Project Name: Gulf Street - 13kV Additions and Upgrades
Submitted By: J. Goudreault / P. Krell

Project Categorizations

Load

Project Estimates

Labor Time to Install (Man Hours):	120
Labor Time for Removal (Man Hours):	
Transportation Expenses (Heavy Truck Hours):	60
Transportation Expenses (Light Truck Miles):	
Material OH Electric Construction (from Stockroom):	12000
Material UG Electric Construction (from Stockroom):	
Material Gas Construction (from Stockroom):	
Material Direct Charge (Ordered directly to job.):	228000
Material Hot Water Heaters:	
Contract Labor Hours (Man Hours):	
Contract Services:	730000
Other Specific Charges ($):	180000
Overhead on Specific Charges (%):	30
Customer Contribution (%) (before OH's applied):	
EDP? (Yes or No):	No
Retirement:	
Salvage:	

Description/Scope

Increase the overall capacity at Gulf Street substation by eliminating the existing 4.16kV upper yard supplied by the 3T1 transformer, and building two new 13.8 kV circuit positions supplied from a new 13.8kV power transformer, including:

- new 10/14 MVA, 34.4 kV-13.8 kV power transformer,
- 38 kV high-side transformer breaker,
- two 13.8 kV circuit positions, each with breaker/recloser and regulators,
- and the removal of all 4.16 kV equipment and dismantling of existing structures associated with the 3T1 transformer.

This is the second year of a two year project. This second all remaining equipment and material costs, and remaining installation, removal, testing and commissioning costs.

Total cost of this substation project over the full two years is estimated at approximately $1.5M without direct or indirect overheads.

Justification

Capacity additions needed for anticipated load additions in the Concord downtown area.

UES Capital
Construction Authorization

AUTH: **190118**
Date: **1/31/2019**
Budgeted Amount: **$924,588.59**

Budget Item No: **SPBC02**
Budget Year: **2019**
Description: **Gulf Street - 13kV Additions and Upgrades**
Project Supervisor: **Sherwood, Nathan**
Crew Days: **11**
Start Date:
Completion Date:

Type: **Original**
Sequence: **1**
Status: **Completed**
Initiated Date: **1/31/2019 11:32:22 AM**
Initiated By: **Krell, Paul**
Finalized Date: **4/30/2019 8:17:35 AM**
Finalized By: **Lydon, Lisa**

APPROVALS

Action Date	Approved	Approver/Title
4/22/2019	YES	**Lydon, Lisa** *Plant Accountant*
4/29/2019	YES	**Bickford, Tressa** *Utility Acctng And Budgeting Mgr*
4/25/2019	YES	**Goudreault, James** *Manager, Electric Dispatch & Substations*
4/23/2019	YES	**Sherwood, Nathan** *Sr. Design Engineer*
4/25/2019	YES	**Krell, Paul** *Manager Energy Sys. Engineer.*
4/23/2019	YES	**Letourneau, Raymond** *VP, Electric Operations*
4/25/2019	YES	**Bonazoli, John** *Manager Distribution Engineer*
4/26/2019	YES	**Sprague, Kevin** *VP, Engineering*
4/29/2019	YES	**Main, Dan** *Assistant Controller*
4/29/2019	YES	**Brock, Laurence** *Chief Accounting Officer & Controller*
4/29/2019	YES	**Vaughan, Christine** *SVP, CFO and Treasurer*

ESTIMATED COST SUMMARY

Description	Amount
Total Project Cost:	$2,925,000.00
Less Customer Contribution:	$0.00
Net Authorized Cost:	$2,925,000.00
Retirement:	$400,000.00
Cost Of Removal:	$162,000.00
Salvage:	$0.00
CWO Total:	$2,763,000.00

DESCRIPTION/SCOPE

Increase the overall capacity at Gulf Street substation by building two new 13.8 kV circuit positions, installing a new 34.4-13.8 kV power transformer, eliminating the existing 4.16 kV upper yard and removing the 3T1 transformer, rebuilding the 4.16 kV lower yard and replacing the 3T2 transformer. This work includes:

- new 13.8 kV structures and buswork
- two (2) new 13.8 kV circuit positions w/ breakers/reclosers and voltage regulators
- new 10/14 MVA, 34.4 kV-13.8 kV power transformer
- new 38 kV high-side transformer breaker
- rebuild of existing 4.16 kV lower yard
- install of 4.2/5.25 MVA, 34.4-4.36 kV power transformer removed from Hampton Beach S/S
- replace existing recloser at remaining 4.16 kV 3H3 circuit position, and install of voltage regulators removed from Hampton Beach S/S
- removal of existing 4.16 kV upper yard
- removal of existing 3T1 and 3T2 transformers (3T1 to be kept as spare, 3T2 to be disposed)

This will be a two-year project. The first year includes surveying & permitting, design, most major equipment purchases, and preliminary construction. The second year includes any remaining equipment and material, the completion of construction, testing, and placing into service.

JUSTIFICATION

Capacity additions needed for anticipated load additions in the Concord downtown area.

NOTES

Straight 30% overhead on the following:
CWO #20191608 (Outside Services)
CWO #20191609 (Power Transformer)

AUTHORIZATION COMMENTS

Estimated Spending By Year:
2019: $1,397,000
2020: $1,528,000
Total: $2,925,000

The total project cost of $2,925k compares to the sum of the following amounts in the 2019 capital budget:
$ 924,589 Gulf Street - 13kV Additions and Upgrades (2019 SPBC02)
+ $1,869,068 Gulf Street - 13kV Additions and Upgrades (carryover) (2020 SPCC21)

+ $ 132,172 Gulf Street - Replace 3H3 Recloser (2020 SPBC25)
= $2,925,829 Total

CWO Summary

CWO	Description	Amount
20191607	Gulf Street - 13kV Additions and Upgrades	$0.00
20191608	Gulf Street - Outside Services	$132,000.00
20191609	Gulf Street - Power Transformer	$510,000.00
20191610	Gulf Street - Equipment & Material (excl. Power Transformer)	$724,000.00
20191611	Gulf Street - Construction	$1,390,000.00
20191612	Gulf Street - other	$7,000.00
	Total	$2,763,000.00

Capital Budget 2019 UES Capital

Project Description

Year: 2019
Company: UES Capital
Status: [A] Accepted
Priority: 1
Budget Category: DPBC04 Distribution Projects
Project Name: Conversion in Downtown Concord
Submitted By: T. Glueck

Project Categorizations

Load

Project Estimates

Labor Time to Install (Man Hours):	2669
Labor Time for Removal (Man Hours):	
Transportation Expenses (Heavy Truck Hours):	1334
Transportation Expenses (Light Truck Miles):	
Material OH Electric Construction (from Stockroom):	28853
Material UG Electric Construction (from Stockroom):	
Material Gas Construction (from Stockroom):	
Material Direct Charge (Ordered directly to job.):	67900
Material Hot Water Heaters:	
Contract Labor Hours (Man Hours):	
Contract Services:	164080
Other Specific Charges ($):	
Overhead on Specific Charges (%):	
Customer Contribution (%) (before OH's applied):	
EDP? (Yes or No):	??
Retirement:	
Salvage:	

Description/Scope

Re-conductor and re-insulate 1H6 to 336AAC and 15kV BIL to simultaneously eliminate overloading, low voltage, and prepare for a conversion to a higher voltage class. This will take place from P.13 S. Main St. to P.1 S. State St. (roughly 1400ft).

It also includes a new circuit from Gulf St S/S to the crossover into the city at Theatre St.

1H1 will have a new open point and the southern end of 1H1 will be placed on the new 13.8kV circuit, as well as all load on 1H6.

Justification

Development in the city of Concord expected to be in service by summer of 2020 requires infrastructure upgrades.

Two buildings at the corner of S. State St. and Pleasant St. in Concord are in the process of being renovated into apartments and retail space. Modeling shows that the additional load will cause the 2/0 ACSR and #2 Cu to be overloaded in the summer of 2019.

The 2/0 ACSR and the #2 Cu is expected to be loaded to 102% and 114%, respectively, of their summer normal amp rating. Voltage may also be as low as 116V in 2019. Converting the circuit will eliminate these issues and prepare for the conversion to a higher voltage class.

Phase swaps have been completed where possible to defer the conversion to 2019.

UES Capital
Construction Authorization

AUTH: **190149**
Date: **3/28/2019**
Budgeted Amount: **$803,450.03**

Budget Item No: **DPBC04**
Budget Year: **2019**
Description: **Conversion in Downtown Concord**
Project Supervisor: **Balch, Stanley**
Crew Days: **0**
Start Date:
Completion Date:

Type: **Original**
Sequence: **1**
Status: **Completed**
Initiated Date: **3/28/2019 10:35:18 AM**
Initiated By: **Balch, Stanley**
Finalized Date: **4/11/2019 12:34:22 PM**
Finalized By: **Lydon, Lisa**

APPROVALS

Action Date	Approved	Approver/Title
4/4/2019	YES	**Lydon, Lisa** *Plant Accountant*
4/4/2019	YES	**Bickford, Tressa** *Utility Acctng And Budgeting Mgr*
4/4/2019	YES	**Lloyd, Charles** *Manager Electric Operations*
4/5/2019	YES	**Letourneau, Raymond** *VP, Electric Operations*
4/9/2019	YES	**Bonazoli, John** *Manager Distribution Engineer*
4/9/2019	YES	**Sprague, Kevin** *VP, Engineering*
4/9/2019	YES	**Main, Dan** *Assistant Controller*
4/9/2019	YES	**Brock, Laurence** *Chief Accounting Officer & Controller*
4/11/2019	YES	**Vaughan, Christine** *SVP, CFO and Treasurer*

ESTIMATED COST SUMMARY

Description	Amount
Total Project Cost:	$250,000.00
Less Customer Contribution:	$0.00
Net Authorized Cost:	$250,000.00
Retirement:	$0.00
Cost Of Removal:	$45,000.00
Salvage:	$0.00
CWO Total:	$205,000.00

DESCRIPTION/SCOPE

Re-conductor and re-insulate 1H6 to 336AAC and 15kV BIL to simultaneously eliminate overloading, low voltage, and prepare for a conversion to a higher voltage class. This will take place from P.13 S. Main St. to P.4 N. State St. (roughly 1900ft).

This work being completed is a portion of the work included in the original budget amount. Separate authorizations will be written as the additional work is identified and work requests are written.

JUSTIFICATION

Development in the city of Concord expected to be in service by summer of 2020 requires infrastructure upgrades.

Two buildings at the corner of S. State St. and Pleasant St. in Concord are in the process of being renovated into apartments and retail space. Modeling shows that the additional load will cause the 2/0 ACSR and #2 Cu to be overloaded in the summer of 2019.

The 2/0 ACSR and the #2 Cu is expected to be loaded to 102% and 114%, respectively, of their summer normal amp rating. Voltage may also be as low as 116V in 2019. Converting the circuit will eliminate these issues and prepare for the conversion to a higher voltage class.

Phase swaps have been completed where possible to defer the conversion to 2019.

NOTES

AUTHORIZATION COMMENTS

Intake# 37660

Costs from CWO# 20193088 to be transferred to this CWO when authorization is approved

CWO Summary

CWO	Description	Amount
20191623	Re-conductor and re-insulate circuit 1H6	$205,000.00
	Total	$205,000.00

UES Capital
Construction Authorization

AUTH: **190174**
Date: **7/25/2019**
Budgeted Amount: **$0.00**

Budget Item No: **DPNC05**
Budget Year: **2019**
Description: **Reconductor 1H6 - Pleasant and Green Street, Concord**
Project Supervisor: **Balch, Stanley**
Crew Days: **0**
Start Date:
Completion Date:

Type: **Original**
Sequence: **1**
Status: **Completed**
Initiated Date: **7/25/2019 11:46:25 AM**
Initiated By: **Balch, Stanley**
Finalized Date: **8/5/2019 8:43:56 AM**
Finalized By: **Lydon, Lisa**

APPROVALS

Action Date	Approved	Approver/Title
7/25/2019	YES	**Lydon, Lisa** *Plant Accountant*
7/25/2019	YES	**Bickford, Tressa** *Utility Acctng And Budgeting Mgr*
7/25/2019	YES	**Lloyd, Charles** *Manager Electric Operations*
7/29/2019	YES	**Letourneau, Raymond** *VP, Electric Operations*
7/30/2019	YES	**Bonazoli, John** *Manager Distribution Engineer*
7/29/2019	YES	**Sprague, Kevin** *VP, Engineering*
7/29/2019	YES	**Main, Dan** *Assistant Controller*
7/31/2019	YES	**Brock, Laurence** *Chief Accounting Officer & Controller*
8/2/2019	YES	**Vaughan, Christine** *SVP, CFO and Treasurer*

ESTIMATED COST SUMMARY

Description	Amount
Total Project Cost:	$197,798.00
Less Customer Contribution:	$0.00
Net Authorized Cost:	$197,798.00
Retirement:	$0.00
Cost Of Removal:	$64,277.00
Salvage:	$0.00
CWO Total:	$133,521.00

DESCRIPTION/SCOPE

This authorization is to cover the cost of converting a portion of circuit 1H6 along Pleasant St., Green St., and Blake St. in Concord. The three phase primary line along Pleasant St. will be reconductored to 1/0 ACSR with 1/0 ACSR neutral and reinsulated to15 kV. Approximate distance to be reconductored is 700' and includes 7 pole sections. Six poles along Pleasant St. are scheduled to be replaced in the Consolidated Telephone maintenance area.
The single phase primary line along Green St. and Blake St. will be reconductored to 1/0 ACSR with 1/0 ACSR neutral and reinsulated to 15kV. Approximate distance for these two streets to be reconductored is 685' and includes 7 pole sections. These poles are Unitil maintenance and will be replaced with 40' CL3 poles.
Construction will be Standard Overhead 15kV Pole Top. Along this circuit there are (6) single phase transformers and (2) three phase banks that will be installed or replaced with Dual ratio transformers.

JUSTIFICATION

This reconductoring is a portion of the Downtown Concord Conversion under DPBC04.

Development in the city of Concord expected to be in service by summer of 2020 requires infrastructure upgrades. The projection analysis and modeling shows that multiple elements will be in violation of projection guidelines, including conductor, solid blade disconnects, and substation regulators.

For the summer of 2019, two buildings at the corner of S. State St. and Pleasant St. in Concord are in the process of being renovated into apartments and retail space. Modeling shows that the additional load will cause the 2/0 ACSR and #2 Cu along S.State St to be overloaded in the summer of 2019. This portion of the circuit was re-conductored with 336 AAC Primary and 4/0 neutral in May 2019

NOTES

AUTHORIZATION COMMENTS

Although this is a non-budget authorization, the costs will off set the remaining balance of budgeted funds for Budget item DPBC04. This project is a portion of the original scope for that budget item.

CWO Summary

CWO	Description	Amount
20191651	Reconductor 1H6 - Pleasant and Green Street, Concord	$133,521.00
	Total	$133,521.00

UES Capital
Construction Authorization

AUTH: **190181**
Date: **8/13/2019**
Budgeted Amount: **$0.00**

Budget Item No: **DPNC07**
Budget Year: **2019**
Description: **Reconductor/Convert Circuit 1H6 - Thompson Street, Concord**
Project Supervisor: **Balch, Stanley**
Crew Days: **0**
Start Date:
Completion Date:

Type: **Original**
Sequence: **1**
Status: **Completed**
Initiated Date: **8/13/2019 9:05:57 AM**
Initiated By: **Balch, Stanley**
Finalized Date: **8/20/2019 7:25:51 AM**
Finalized By: **Lydon, Lisa**

APPROVALS

Action Date	Approved	Approver/Title
8/13/2019	YES	**Lydon, Lisa** *Plant Accountant*
8/19/2019	YES	**Bickford, Tressa** *Utility Acctng And Budgeting Mgr*
8/13/2019	YES	**Lloyd, Charles** *Manager Electric Operations*
8/14/2019	YES	**Letourneau, Raymond** *VP, Electric Operations*
8/19/2019	YES	**Bonazoli, John** *Manager Distribution Engineer*
8/19/2019	YES	**Sprague, Kevin** *VP, Engineering*
8/19/2019	YES	**Main, Dan** *Assistant Controller*
8/19/2019	YES	**Brock, Laurence** *Chief Accounting Officer & Controller*
8/19/2019	YES	**Vaughan, Christine** *SVP, CFO and Treasurer*

ESTIMATED COST SUMMARY

Description	Amount
Total Project Cost:	$128,720.00
Less Customer Contribution:	$0.00
Net Authorized Cost:	$128,720.00
Retirement:	$0.00
Cost Of Removal:	$23,584.00
Salvage:	$0.00
CWO Total:	$105,136.00

DESCRIPTION/SCOPE

This authorization is to cover the cost of converting a portion of circuit 1H6 along Thompson St., South St., Wall St., and Fayette St. in Concord. The three phase primary line along Thompson St. and South St. will be reinsulated to15 kV. The single phase primary line along Wall St. and Fayette St. will be reconductored to 1/0 ACSR with 1/0 ACSR neutral and reinsulated to 15kV. Approximate distance to be reconductored is 900' and includes 7 pole sections. Twelve poles within the scope of this project are scheduled to be replaced in the Consolidated Telephone maintenance area. Construction will be Standard Overhead 15kV Pole Top. Along this circuit there are (14) single phase transformers and (1) three phase bank that will be installed or replaced with Dual ratio transformers.
Two step-down transformers banks will be installed, one on South St. and another on Thompson St, to keep the remaining portion of circuit 1H6 4.16/2.4kV.

JUSTIFICATION

This reconductoring and reinsulating is a portion of the Downtown Concord Conversion under DPBC04.

Development in the city of Concord expected to be in service by summer of 2020 requires infrastructure upgrades. The projection analysis and modeling shows that multiple elements will be in violation of projection guidelines, including conductor, solid blade disconnects, and substation regulators.

For the summer of 2019, two buildings at the corner of S. State St. and Pleasant St. in Concord are in the process of being renovated into apartments and retail space. Modeling shows that the additional load will cause the 2/0 ACSR and #2 Cu along S.State St to be overloaded in the summer of 2019. This portion of the circuit was re-conductored with 336 AAC Primary and 4/0 neutral in May 2019

NOTES

AUTHORIZATION COMMENTS

Although this is a non-budget authorization, the costs will off set the remaining balance of budgeted funds for Budget item DPBC04. This project is a portion of the original scope for that budget item.

CWO Summary

CWO	Description	Amount
20191656	Reconductor/Convert Circuit 1H6 - Thompson Street, Concord	$105,136.00
	Total	$105,136.00

UES Capital
Construction Authorization

AUTH: **190192**
Date: **11/4/2019**
Budgeted Amount: **$0.00**

Budget Item No: **DPNC12**
Budget Year: **2019**
Description: **Reconductor/Convert Circuit 1H6 - S Spring St., Concord**
Project Supervisor: **Balch, Stanley**
Crew Days: **0**
Start Date:
Completion Date:

Type: **Original**
Sequence: **1**
Status: **Completed**
Initiated Date: **11/4/2019 12:41:52 PM**
Initiated By: **Raymond, Gary**
Finalized Date: **11/5/2019 3:40:38 PM**
Finalized By: **Lydon, Lisa**

APPROVALS

Action Date	Approved	Approver/Title
11/4/2019	YES	**Lydon, Lisa** *Plant Accountant*
11/4/2019	YES	**Bickford, Tressa** *Utility Acctng And Budgeting Mgr*
11/4/2019	YES	**Lloyd, Charles** *Manager Electric Operations*
11/4/2019	YES	**Letourneau, Raymond** *VP, Electric Operations*
11/5/2019	YES	**Bonazoli, John** *Manager Distribution Engineer*
11/5/2019	YES	**Sprague, Kevin** *VP, Engineering*
11/5/2019	YES	**Main, Dan** *Assistant Controller*
11/5/2019	YES	**Brock, Laurence** *Chief Accounting Officer & Controller*
11/5/2019	YES	**Vaughan, Christine** *SVP, CFO and Treasurer*

ESTIMATED COST SUMMARY

Description	Amount
Total Project Cost:	$138,870.00
Less Customer Contribution:	$0.00
Net Authorized Cost:	$138,870.00
Retirement:	$0.00
Cost Of Removal:	$29,587.00
Salvage:	$0.00
CWO Total:	$109,283.00

DESCRIPTION/SCOPE

This authorization is to cover the cost of converting a portion of circuit 1H6 along South Spring Street in Concord. The three phase primary line along South Spring Street will be reinsulated to 15kV. At South Spring Street and Pleasant Street, circuit 1H6 will be extended two sections and a pipe operated gang switch will be installed to create a circuit tie with 21W1P.
Construction will be Stand Overhead 15kV Pole Top.
There will be six pole replacements in the Consolidated Telephone maintenance area that Consolidated Telephone has notified UES that they are not authorized to set. The cost of these pole sets are calculated into this authorization.

JUSTIFICATION

This reconductoring is a portion of the Downtown Concord Conversion under DPBC04.

Development in the city of Concord expected to be in service by summer of 2020 requires infrastructure upgrades. The projection analysis and modeling shows that multiple elements will be in violation of projection guidelines, including conductor, solid blade disconnects, and substation regulators.

For the summer of 2019, two buildings at the corner of S. State St. and Pleasant St. in Concord are in the process of being renovated into apartments and retail space. Modeling shows that the additional load will cause the 2/0 ACSR and #2 Cu along S. State St to be overloaded in the summer of 2019. This portion of the circuit was reconductored with 336 AAC Primary and 4/0 neutral in May 2019

NOTES

AUTHORIZATION COMMENTS

Although this is a non-budget authorization, the costs will off set the remaining balance of budgeted funds for Budget item DPBC04. This project is an addition to the original scope for that budget item.

CWO Summary

CWO	Description	Amount
20191670	Reconductor/Convert Circuit 1H6 - S Spring St., Concord	$109,283.00
	Total	$109,283.00

UES Capital
Construction Authorization

AUTH: **190198**
Date: **11/22/2019**
Budgeted Amount: **$0.00**

Budget Item No: **DPNC13**
Budget Year: **2019**
Description: **374 Line Rebuild with 15kV Underbuild**
Project Supervisor: **Sherwood, Nathan**
Crew Days: **3**
Start Date:
Completion Date:

Type: **Original**
Sequence: **1**
Status: **Completed**
Initiated Date: **11/22/2019 3:08:30 PM**
Initiated By: **Sherwood, Nathan**
Finalized Date: **12/13/2019 2:36:32 PM**
Finalized By: **Lydon, Lisa**

APPROVALS

Action Date	Approved	Approver/Title
12/6/2019	YES	**Lydon, Lisa** *Plant Accountant*
12/6/2019	YES	**Bickford, Tressa** *Utility Acctng And Budgeting Mgr*
12/9/2019	YES	**Lloyd, Charles** *Manager Electric Operations*
12/6/2019	YES	**Letourneau, Raymond** *VP, Electric Operations*
12/9/2019	YES	**Krell, Paul** *Manager Energy Sys. Engineer.*
12/12/2019	YES	**Bonazoli, John** *Manager Distribution Engineer*
12/9/2019	YES	**Sprague, Kevin** *VP, Engineering*
12/9/2019	YES	**Main, Dan** *Assistant Controller*
12/12/2019	YES	**Brock, Laurence** *Chief Accounting Officer & Controller*
12/12/2019	YES	**Vaughan, Christine** *SVP, CFO and Treasurer*

ESTIMATED COST SUMMARY

Description	Amount
Total Project Cost:	$1,066,000.00
Less Customer Contribution:	$0.00
Net Authorized Cost:	$1,066,000.00
Retirement:	$0.00
Cost Of Removal:	$48,000.00
Salvage:	$0.00
CWO Total:	$1,018,000.00

DESCRIPTION/SCOPE

Construct (2) new 13.8kV circuits underbuilt along the 374 line from Gulf Street substation to Theatre St., and rebuild the 374 pole line to accommodate the new circuits.

This project is a portion of the work being completed for the downtown Concord upgrades and conversions included in the original (2019) DPBC04 - Conversion in Downtown Concord capital budget item.

JUSTIFICATION

Development in the city of Concord expected to be in service by summer of 2020 requires infrastructure upgrades.

NOTES

Straight 30% overhead on the following:
CWO #20191675 (Outside Services, Fees, etc.)

Total project cost includes transfer of costs from the 2019 Preliminary Survey (374 Line Survey).

AUTHORIZATION COMMENTS

Estimated Spending By Year:
2019: $ 60,000
2020: $1,006,000
Total: $1,066,000

CWO Summary

CWO	Description	Amount
20191674	374 Line Rebuild with 15kV Underbuild	$927,000.00
20191675	374 Line Rebuild with 15kV Underbuild - Outside Services, Fees, Etc.	$91,000.00
	Total	$1,018,000.00

Capital Budget 2020 UES Capital

Project Description

Year: 2020
Company: UES Capital
Status: [A] Accepted
Priority: 1
Budget Category: DPBC07 Distribution Projects
Project Name: Conversion in Downtown Concord - Part 2
Submitted By: T. Glueck/C. Lloyd

Project Categorizations

Load, Voltage

Project Estimates

Labor Time to Install (Man Hours):	514
Labor Time for Removal (Man Hours):	
Transportation Expenses (Heavy Truck Hours):	257
Transportation Expenses (Light Truck Miles):	
Material OH Electric Construction (from Stockroom):	57548
Material UG Electric Construction (from Stockroom):	
Material Gas Construction (from Stockroom):	
Material Direct Charge (Ordered directly to job.):	91311
Material Hot Water Heaters:	
Contract Labor Hours (Man Hours):	
Contract Services:	194564
Other Specific Charges ($):	
Overhead on Specific Charges (%):	
Customer Contribution (%) (before OH's applied):	
EDP? (Yes or No):	No
Retirement:	
Salvage:	

Description/Scope

This is part 2 of the downtown conversion project. The scope is to finish the conversion work, particularly switching the transformer dual ratio switch, connecting circuits to their new circuit positions, and tapping other already installed devices.

The scope of this project has expanded. Additional conversion work is necessary for 1H1 and there are two new 13.8kV circuits instead of one.

Additional work includes: padmount transformer replacements, new switch installations, and building new circuit getaways from the converted Gulf St substation.

In addition to the distribution work to be done, some of the funds in this budget item are referenced in Auth #190198, which is the sub-transmission/374 line right-of-way rebuild portion of the overall Gulf St Conversion Project.

Justification

Development in the city of Concord expected to be in service by summer of 2020 requires infrastructure upgrades.

Two buildings at the corner of S. State St. and Pleasant St. in Concord are in the process of being renovated into apartments and retail space. Modeling shows that the additional load will cause the 2/0 ACSR and #2 Cu to be overloaded in the summer of 2019.

The 2/0 ACSR and the #2 Cu is expected to be loaded to 102% and 114%, respectively, of their summer normal amp rating. Voltage may also be as low as 116V in 2019. Converting the circuit will eliminate these issues and prepare for the conversion to a higher voltage class.

Phase swaps have been completed where possible to defer the conversion to 2020.

UES Capital
Construction Authorization

AUTH: **200124**
Date: **2/4/2020**
Budgeted Amount: **$721,846.64**

Budget Item No:	**DPBC07**	Type:	**Original**
Budget Year:	**2020**	Sequence:	**1**
Description:	**Conversion in Downtown Concord - Part 2**	Status:	**Completed**
Project Supervisor:	**Balch, Stanley**	Initiated Date:	**2/4/2020 1:32:45 PM**
Crew Days:	**0**	Initiated By:	**Balch, Stanley**
Start Date:		Finalized Date:	**2/24/2020 7:34:23 AM**
Completion Date:		Finalized By:	**Lydon, Lisa**

APPROVALS

Action Date	Approved	Approver/Title
2/18/2020	YES	**Lydon, Lisa** *Plant Accountant*
2/20/2020	YES	**Bickford, Tressa** *Utility Acctng And Budgeting Mgr*
2/19/2020	YES	**Lloyd, Charles** *Manager Electric Operations*
2/19/2020	YES	**Letourneau, Raymond** *VP, Electric Operations*
2/21/2020	YES	**Bonazoli, John** *Manager Distribution Engineer*
2/21/2020	YES	**Sprague, Kevin** *VP, Engineering*
2/21/2020	YES	**Diggins, Todd** *Director, Finance*
2/21/2020	YES	**Brock, Laurence** *Chief Accounting Officer & Controller*
2/23/2020	YES	**Vaughan, Christine** *SVP, CFO and Treasurer*

ESTIMATED COST SUMMARY

Description	Amount
Total Project Cost:	$721,846.64
Less Customer Contribution:	$0.00
Net Authorized Cost:	$721,846.64
Retirement:	$0.00
Cost Of Removal:	$144,369.00
Salvage:	$0.00
CWO Total:	$577,477.64

DESCRIPTION/SCOPE

This is part 2 of the Downtown Conversion Project. Circuit 1H1 out of Bridge Street substation will be converted to 13.7/7.97kV. The current spacer out of Bridge Street substation will be fed from one the new Gulf Street 13.8/7.97kV circuits. Storrs Street will be re-insulated and Depot Street and Kennedy Lane will need to be reinsulated and re-conductored. This will provide a back-up to the radial underground that feeds from Storrs Street to South Main Street. The additional scope is to finish the conversion work, connecting circuits to their new circuit positions, and tapping other already installed devices.

The scope of this project has expanded. Additional conversion work is necessary for 1H1 and there are two new 13.8kV circuits instead of one.

Additional work includes: padmount transformer replacements, new switch installations, and building new circuit getaways from the converted Gulf St substation.

In addition to the distribution work to be done, some of the funds in this budget item are referenced in Auth #190198, which is the sub-transmission/374 line right-of-way rebuild portion of the overall Gulf St Conversion Project.

JUSTIFICATION

Development in the city of Concord expected to be in service by summer of 2020 requires infrastructure upgrades.

Two buildings at the corner of S. State St. and Pleasant St. in Concord are in the process of being renovated into apartments and retail space. Modeling shows that the additional load will cause the 2/0 ACSR and #2 Cu to be overloaded in the summer of 2019.

The 2/0 ACSR and the #2 Cu is expected to be loaded to 102% and 114%, respectively, of their summer normal amp rating. Voltage may also be as low as 116V in 2019. Converting the circuit will eliminate these issues and prepare for the conversion to a higher voltage class.

Phase swaps have been completed where possible to defer the conversion to 2020.

NOTES

AUTHORIZATION COMMENTS

CWO Summary

CWO	Description	Amount
20201606	Conversion in Downtown Concord - Part 2	$577,477.64
	Total	$577,477.64

Unitil Energy Systems, Inc.
Docket No. DE 21-030
DOE Data Requests – Set 4

Date Request Received: 08/05/2021 Date of Response: 08/19/2021
Request No. DOE 4-71 Witness: Kevin E. Sprague

REQUEST:

Reference Sprague Testimony, discussing Concord Downtown Conversion.

a. Please provide a comparison of the peak loading by expected customer at the time of the decision to expand the system as compared to the most recent seasonal by loading by those customers. See, also, Company response to Staff 1-2 and 2-4 in DE 20-002.

b. Please describe any planned customer additions, including kVA by customer or development, expected for the area served by the Concord Downtown conversion, providing any supporting materials which lead the company to believe those additions will occur.

RESPONSE:

Part a:

The table below identifies the load additions expected at the time of the decision compared to the most recent load of those customers. The table also provides some indication of the status of the customer.

	Proposed (kVA)	In-service?	Previous Year's Recorded Peak Load (kVA)	Notes
18 S Main St	250	Yes	60	Concord theatre (business impacted by pandemic and expects to increase load)
20 S Main St	500	No	-	multi-use restaurants, retail, and apartments in the design phase
5-7 Pleasant St	800	Yes	-	Apartments do not have demand meters. Approximately ½ of units rented at this point
32-34 S Main St	1000	No	-	Discussions in progress with City for funding opportunities
1-5 Depot St	200	No	-	Project schedule delayed due to pandemic
97 Storrs St	500	No	-	Project schedule delayed due to pandemic
80 Storrs St	200	No	-	Development seeking city approval for construction
34-42 N Main St	300	No	-	Mixed use, project schedule delayed due to pandemic
56 N Main St	400	No	-	CVS and mixed use in design phase

Unitil Energy Systems, Inc.
Docket No. DE 21-030
DOE Data Requests – Set 4

Date Request Received: 08/05/2021 Date of Response: 08/19/2021
Request No. DOE 4-71 Witness: Kevin E. Sprague

58-68 N Main St	75	Yes	40	Apartment renovations and new penthouse
76-82 N Main St	280	Yes	27	Bank, restaurant, and apartments; only bank in service, rest is active construction
Eagle Square	300	No	-	Office space was to be renovated, but project schedule delayed due to pandemic
Dubois Ave	unknown	No	-	5-7 story mixed use building; conceptual planning phase
18-22 Low Ave	75	Yes	48	Concord brewery upgrade
8-14 Dixon Ave	200	No	-	Status tied to the 97 Storrs St work, project schedule delayed due to pandemic
120-146 N Main St	300	Yes	-	Mixed-use renovations ongoing;

The pandemic had an impact on the timing of the planned load additions. However, the total load increase from 2018 to 2020 is approximately 1,400kVA for 3W3, which supports the need for the conversion.

The Gulf Street conversion project converted the load originally served from 1H1 to 3W1 and the load from 1H6 to 3W3.

Loads at the time of planning:

	2018 Peak Load (MVA)	Expected Additional Load (MVA)	Total Load After Addition (MVA)
1T2	4,698	4,750	9,448
1H1	2,453	2,950	5,403
1H6	1,110	1,800	2,910

2020 peak load and expected additional load:

	2020 Peak Load (MVA)	Expected Additional Load (MVA)	Total Load After Addition (MVA)
3T1	6,054	225	6,279
3W1	3,821	225	4,046
3W3	2,233	-	2,233

Unitil Energy Systems, Inc.
Docket No. DE 21-030
DOE Data Requests – Set 4

Date Request Received: 08/05/2021 Date of Response: 08/19/2021
Request No. DOE 4-71 Witness: Kevin E. Sprague

Part b:

As stated above, the pandemic had an impact on project schedules. The Company had no way of knowing this at the time of the decision. The Company expects the load to continue to increase in the Concord Downtown area as indicated in the table.