A REGULAR MEETING

Of The

TRAVERSE CITY LIGHT AND POWER BOARD

Will Be Held On

Tuesday, May 14, 2019

At

5:15 p.m.

In The

COMMISSION CHAMBERS
(2nd floor, Governmental Center)
400 Boardman Avenue

Traverse City Light and Power will provide necessary reasonable auxiliary aids and services, such as signers for the hearing impaired and audio tapes of printed materials being considered at the meeting, to individuals with disabilities at the meeting/hearing upon notice to Traverse City Light and Power. Individuals with disabilities requiring auxiliary aids or services should contact the Light and Power Department by writing or calling the following.

Jennifer St. Amour
Administrative Assistant
1131 Hastings Street
Traverse City, MI 49686
(231) 932-4543

Traverse City Light and Power
1131 Hastings Street
Traverse City, MI 49686
231-922-4940

Posting Date:
5/10/2019
3:00 P.M.

AGENDA

Pledge of Allegiance

1. Roll Call

2. Disclosure of Recusal

3. Consent Calendar

The purpose of the consent calendar is to expedite business by grouping non-controversial items together to be dealt with by one Board motion without discussion. Any member of the Board, staff or the public may ask that any item on the consent calendar be removed therefrom and placed elsewhere on the agenda for full discussion. Such requests will be automatically respected. If an item is not removed from the consent calendar, the action noted in parentheses on the agenda is approved by a single Board action adopting the consent calendar.

a. Approval of Agenda.

b. Consideration of approving minutes of the Regular Meeting of April 9, 2019 and Special Meeting of April 23, 2019. (Approval Recommended (p.4)

c. Receive and file minutes of the City Renewable Energy Ad Hoc meeting of April 5, 2019, FTTP Ad Hoc meeting of April 29, 2019 and HR Ad Hoc meeting of May 10th, 2019. (Approval Recommended) (p.12)

d. Consideration of authorizing a professional engineering services agreement for the Barlow Switch Station Project. (Approval Recommended) (Chartrand) (p.15)

e. Consideration of authorizing a professional engineering services agreement for the Critical & Large Customer #3 Project. (Approval Recommended) (Chartrand) (p.16)

f. Consideration of authorizing the Executive Director to execute a Letter of Authorization with MPPA for renewable energy. (Approval Recommended) (Arends) (p.22)

g. Consideration of approving the amended Alcohol and Drug Testing Policy. (Approval Recommended) (Schroeder) (p.27)

h. Consideration of approving the City of Traverse City On Peak Demand Reduction Program Policy. (Approval Recommended) (Myers-Beman) (p.41)

i. Consideration of approving an updated organizational chart and updated ACT Group Salary Ranges. (Approval Recommended) (Menhart) (p.43)

j. Consideration of granting a private easement on utility owned property. (Approval Recommended) (Dixon) (p.46)

4. Unfinished Business

a. Consideration of an amended M-72 Power Purchase Agreement for Renewable Energy. (Arends) (p.51)

b. Presentation of the Cedar Run Property Phase 1 Study by Gosling Czubak. (Arends/Gosling Czubak) (p.54)

c. Consideration of amending the Gosling Czubak Consultant Agreement for Phase 2 services. (Arends) (p.68)

d. Presentation of the Fiber to the Premise Business Plan. (Menhart/Fujitsu) (p.74)

e. Consideration of a written attorney-client communication describing Traverse City Light & Power Department legal rights and responsibilities, which is exempt from disclosure by state statute. (Possible closed session-5 votes required) (Jeff Jocks) (p.92)

f. Consideration of next steps for the Fiber to the Premise (FTTP) Project. (Arends/Menhart)

5. New Business

None.

6. Reports and Communications

a. From Legal Counsel.

b. From Staff.

1. Executive Director's Annual Performance Evaluation. (Schroeder/verbal) (p.)

c. From Board.

7. Public Comment

a. General.

/js

TRAVERSE CITY
LIGHT AND POWER BOARD

Minutes of Regular Meeting
Held at 5:15 p.m., Commission Chambers, Governmental Center
Tuesday, April 9, 2019

Board Members -

Present: Pat McGuire, Ross Hammersley, John Taylor, Amy Shamroe, Tim Werner, Elysha Davila, Paul Heiberger

Absent:

Ex Officio Member -

Present: Marty Colburn, City Manager

Others: Tim Arends, Daren Dixon, Scott Menhart, Karla Myers-Beman, Kelli Schroeder, Tony Chartrand, Jacob Hardy, Jennifer J. St. Amour

ORGANIZATIONAL MEETING

The meeting was called to order at 5:15 p.m. by Secretary Arends.

Secretary Tim Arends opened the floor to nominations for Chairperson of the Light and Power Board:

Pat McGuire nominated John Taylor.

Tim Arends closed the floor to nominations.

CARRIED unanimously.

Tim Arends turned the meeting over to Chairperson Taylor.

Chairperson Taylor opened the floor to nominations for Vice Chairperson of the Light and Power Board:

Pat McGuire nominated Elysha Davila.

Chairman Taylor closed the floor to nominations.

CARRIED unanimously.

Chairman Taylor recommended Tim Arends be reappointed Secretary for the Light and Power Board. Consensus of the Board that Tim Arends be reappointed Secretary for the Light and Power Board.

Moved by Werner, seconded by McGuire, that Shamroe, Hammersley, and Taylor remain as delegates for the HR Ad Hoc committee for the term of 1 year.

CARRIED unanimously.

Item 2 on the Agenda being Disclosure of Recusal - None

Item 3 on the Agenda being Consent Calendar

The following individuals from the Public addressed the Board:

Gerald DeGrazia, 11604 Whittington Street, ratepayer

Gerald DeGrazia requested item 3(h) be pulled from Consent Calendar.

Tim Arends requested item 3(a) be pulled from Consent Calendar.

Barb Willing requested item 3(i) be pulled from Consent Calendar.

Moved by Shamroe, seconded by McGuire, that the following actions, as recommended on the Consent Calendar portion of the Agenda, be approved as amended:

a. *Removed.*

b. Approval of the minutes of the Regular Meeting of March 12, 2019.

c. Received and filed minutes of FTTP Ad Hoc Committee meeting of March 22, 2019, HR Ad Hoc Committee meeting of March 22, 2019, and City Renewable Energy Ad Hoc meeting of March 21, 2019

d. Approval of the cash reserves in accordance with the Minimum Cash Reserves Policy.

e. Approval of the contributions to the Municipal Employees' Retirement System and Traverse City Light and Power Other-Postemployment Benefit Fund.

f. Confirmed transfer of funds from Fiber Fund to Electric fund for the fiscal year ending June 30, 2019.

g. Forwarding of the Electric Utility 2019-20 Operating Budget to the City Commission for consideration of approval as required by Charter.

h. *Removed.*

i. *Removed.*

j. Terminated the existing Pole Attachment License Agreement with Extenet and approved a new Pole Attachment License Agreement including both small cell wireless and wireline pole attachments with Extenet Systems, Inc.

k. Approval of a construction contract for the Critical and Large Customer #4 Project.

CARRIED unanimously.

Items Removed from the Consent Calendar

a. Approval of Agenda

The following individuals addressed the Board:

Tim Arends requested the City Renewable Energy Goal Ad Hoc Committee report be added to Board reports.

Moved by Hammersley, seconded by Werner, that the Agenda be approved as amended.

CARRIED unanimously.

b. Forwarding of the Fiber 2019-20 Operating Budget to the City Commission for consideration of approval as required by Charter.

The following individuals addressed the Board:

Karla Myers-Beman, Controller

The following individuals from the Public addressed the Board:

Gerald DeGrazia, 11604 Whittington Street, ratepayer

Moved by Shamroe, seconded by Hammersley, that the Light & Power Board approves forwarding the 2019-20 Fiber Fund Budget as presented to the City Commission for its consideration of approval.

CARRIED unanimously.

c. Approval of the submission of a letter of intent to the United States Department of Agriculture Rural Energy Savings Program for their approval to participate in the financing and grant award application process relating to the project funding of the On-Bill Financing System.

The following individuals addressed the Board:

Tim Arends, Executive Director

Moved by Heiberger, seconded by Davila, that the Board approves submission of the letter of intent to the United States Department of Agriculture Rural Energy Savings Program for their approval to participate in the financing application process relating to the project funding of the On-Bill Financing Program.

The following individuals from the Public addressed the Board:

Barb Willing, Grant Street, ratepayer

CARRIED unanimously.

Item 4 on the Agenda being Unfinished Business

a. None.

Item 5 on the Agenda being New Business

a. Consideration of approving a Project Authorization Request for the Eighth Street Streetscape Lighting Project.

The following individuals addressed the Board:

Daren Dixon, Operations Manager

Moved by Shamroe, seconded by Hammersley, that the Board approve as presented the Eighth Street Underground Lighting Circuit Project and authorizes the Executive Director to enter into an agreement with the City in the amount of $221,861.18, more or less, for the construction of the underground lighting circuit infrastructure.

CARRIED unanimously.

b. Consideration of the Barlow Switch Station Project Authorization Request and authorizing staff to seek competitive bids.

The following individuals addressed the Board:

Tony Chartrand, System Engineer

Moved by McGuire, seconded by Shamroe, that the Board approve as presented the Barlow Switch Station Project and directs staff to solicit construction bids and material quotes for the Board's consideration of approval after design completion.

CARRIED unanimously.

c. Consideration of the Critical and Large Customer # 3 Project Authorization Request and authorizing staff to seek competitive bids.

The following individuals addressed the Board:

Tony Chartrand, System Engineer
Daren Dixon, Operations Manager

Moved by Hammersley, seconded by Davila, that the Board approve, as presented, the Critical and Large Customer #3 Project and directs staff to solicit construction bids and material quotes for the Board's consideration of approval after design completion.

CARRIED unanimously.

Item 6 on the Agenda being Reports and Communications

a. From Legal Counsel.

1. Consideration of a written attorney-client privileged letter describing Traverse City Light and Power Department legal rights and responsibilities which letter is exempt from disclosure by state statute. (Possible closed session-5 votes required)

The following individuals addressed the Board:

W. Peter Doren, General Counsel

Moved by McGuire, seconded by Heiberger, that the Board go into closed session immediately after general Public Comment to consider written attorney-client privileged letter and to adjourn the meeting immediately after that closed session.

Roll Call:

Yes – Hammersley, McGuire, Shamroe, Taylor, Werner, Davila, Heiberger

MOTION PASSES.

2. From Staff.

    1. Presentation by Venture North.

        The following individuals addressed the Board:

        Laura Galbraith, Executive Director, Venture North

    2. Presentation of Utility Rate Analysis Report.

        The following individuals addressed the Board:

        Karla Myers-Beman, Controller
        Tim Arends, Executive Director

    3. Update on traffic signal maintenance.

        The following individuals addressed the Board:

        Daren Dixon, Operations Manager
        Tim Arends, Executive Director

3. From Board

    1. Elysha Davila reported on her attendance at the Bloomberg New Energy Finance Summit.

    2. Tim Werner and John Taylor reported on the City Renewable Energy Goal Ad Hoc Committee meetings.

Item 7 on the Agenda being Public Comment

a. General

The following individuals from the Public addressed the Board:

None.

6:12 p.m. the Board entered in to closed session.
7:10 p.m. the Board ended the closed session and adjourned the meeting.

_____

Tim Arends, Secretary
LIGHT AND POWER BOARD

TRAVERSE CITY
LIGHT AND POWER BOARD

Minutes of Special Meeting
Held at 5:15 p.m., Large Conference Room, 1131 Hastings Street
Tuesday, April 23, 2019

Board Members -

Present: Pat McGuire, Ross Hammersley, John Taylor, Amy Shamroe, Tim Werner, Elysha Davila, Paul Heiberger

Absent:

Ex Officio Member -

Present: Marty Colburn, City Manager

Others: Tim Arends, Jeff Jocks, Daren Dixon, Scott Menhart, Karla Myers-Beman, Kelli Schroeder,

Item 2 on the Agenda being Disclosure of Recusal - None

Item 3 on the Agenda being Consent Calendar

None.

Items Removed from the Consent Calendar

None.

Item 4 on the Agenda being Unfinished Business

None.

Item 5 on the Agenda being New Business

None.

Item 6 on the Agenda being Reports and Communications

a. From Legal Counsel.

1. Consideration of a written attorney-client privileged letter describing Traverse City Light and Power Department legal rights and responsibilities which letter is exempt from disclosure by state statute. (Possible closed session-5 votes required)

   The following individuals addressed the Board:

   W. Peter Doren, General Counsel

   Moved by Shamroe, seconded by Werner, that the Board go into closed session to consider written attorney-client privileged letter and to adjourn the meeting immediately after that closed session.

Roll Call:

Yes – Hammersley, McGuire, Shamroe, Taylor, Werner, Davila, Heiberger

MOTION PASSES.

5:20 p.m. the Board entered in to closed session.

Moved by Heiberger, seconded by Shamroe, to end the closed session.

6:55 p.m. the Board ended the closed session.

Item 7 on the Agenda being Public Comment

a. General

The following individuals from the Public addressed the Board:

None.

There being no objection, Vice-Chairperson Davila declared the meeting adjourned at 6:55 p.m.

Tim Arends, Secretary
LIGHT AND POWER BOARD

TRAVERSE CITY
LIGHT AND POWER BOARD

Minutes
City Renewable Energy Goal Ad Hoc Committee
Held at 12:00 p.m., 1131 Hastings Street
Friday, April 05, 2019

Committee Members -

Present: Tim Werner, John Taylor, Jim Carruthers, Marty Colburn,

Others: Tim Arends, Karla Myers-Beman, Elysha Davila (via conference call)

The meeting was called to order at 12:05 p.m. by Tim Werner.

1. **Review and discuss topics relating to the City Renewable Energy Goal.**

2. **Public Comment.**

   None.

There being no objection, Tim Werner declared the meeting adjourned at 1:25 p.m.

Tim Werner, Chairperson
LIGHT AND POWER BOARD

/js

TRAVERSE CITY
LIGHT AND POWER BOARD

Minutes
Fiber to the Premise (FTTP) Ad Hoc Committee
Held at 11:00 a.m., 1131 Hastings Street
Monday, April 29, 2019

Committee Members -

Present: Ross Hammersley, Paul Heiberger, Amy Shamroe

Others: Scott Menhart, Tim Arends (via conference call), Karla Myers-Beman, Daren Dixon, Kelli Schroeder

The meeting was called to order at 11:05 a.m. by Amy Shamroe.

1. Discussion regarding Fiber to the Premise (FTTP).

Committee members reviewed and continued discussion on topics relating to Fiber to the Premise (FTTP).

2. Public Comment

The following individuals addressed the Ad Hoc Committee:

Gerald DeGrazia, 11604 Whittington Street, ratepayer

There being no objection, Amy Shamroe declared the meeting adjourned at 12:07 p.m.

_____
Amy Shamroe, Chairperson
LIGHT AND POWER BOARD

/js

TRAVERSE CITY
LIGHT AND POWER BOARD

Minutes
Executive Director's Performance Evaluation Ad Hoc Committee
Held at 12:00 p.m., Small Conference Room
1131 Hastings Street
Friday, May 10, 2019

Committee Members:

Present: **Amy Shamroe (Ad Hoc Chair), Ross Hammersley, John Taylor**

Others: **Jennifer Ewing (Facilitator)**

The meeting was called to order at 12:02 p.m. by Amy Shamroe.

1. **Discussion regarding the Executive Director's Performance Evaluation.**

2. **Public Comment.**

   No one from the public commented.

There being no objection, Amy Shamroe declared the meeting adjourned at 1:20 p.m.

_____
Amy Shamroe, Chairperson
LIGHT AND POWER BOARD

TRAVERSE CITY
LIGHT & POWER

To: **Light & Power Board**
From: Tony Chartrand, System Engineer
Date: May 9, 2019
Subject: Barlow Switch Station – Professional Engineering Services

The Barlow Switch Station Project is being undertaken to improve reliability to customers fed from Barlow and Parsons Substations by installing a new switchyard and control house at Barlow Substation. Staff issued a Request for Proposals (RFP) for the engineering design and project management assistance for this Project and received bids as follows:

Vendor	Price
GRP Engineering, Inc.	$96,000
Power Systems Engineering, Inc.	$166,480

Additional contract administration assistance for both bidders was a not to exceed price of $50,000. GRP Engineering have successfully completed many projects in the past for TCL&P, thus staff recommends that the TCL&P Board accept GRP's bid. The recommended bid is lower than projected project costs.

If the Board concurs, the following motion is recommended:

MOVED BY _____, SECONDED BY _____,

THAT THE BOARD AUTHORIZES THE CHAIRMAN AND SECRETARY TO ENTER INTO AN AGREEMENT WITH GRP ENGINEERING, INC. FOR PROFESSIONAL ENGINEERING SERVICES AND CONTRACT PROCUREMENT AT A LUMP SUM FEE OF $96,000, AND FOR REQUIRED CONTRACT ADMINISTRATION ASSISTANCE AT AN HOURLY FEE WITH A NOT TO EXCEED TOTAL OF $50,000 RELATING TO THE BARLOW SWITCH STATION PROJECT. AGREEMENT SUBJECT TO APPROVAL AS TO SUBSTANCE BY THE EXECUTIVE DIRECTOR AND AS TO FORM BY GENERAL COUNSEL.

TRAVERSE CITY
LIGHT & POWER

To: **Light & Power Board**
From: Tony Chartrand, System Engineer
Date: May 7, 2019
Subject: Professional Engineering Services – Critical and Large Customer #3 Project

At the last TCL&P Board meeting, the Board approved the project authorization for the Critical & Large Customer #3 Project. Staff is handling a small portion of this project this year for required work to fix damaged cable. The rest of the engineering work to be taking place starting in July will be contracted out. Due to the number of key accounts in the industrial park and TCL&P's experience with GRP Engineering, staff feels it is best to work with an engineering firm who has a proven record of professional accomplishment.

GRP has proposed a flat total cost of $71,500 for the engineering design phase of the project. This work includes creating a drawing package for bid, construction contract creation, and record drawings. Staff plans to handle much of the construction administration phase in house, but desires the full amount be approved for unforeseen circumstances. GRP has proposed a not to exceed cost of $42,500 for this phase of the project. This would include onsite visits, and coordination of outages. The combined amounts are less than the engineering and construction administration amounts originally estimated for this project.

This item is appearing on the Consent Calendar as it is deemed by staff to be non-controversial item. Approval of this item on the Consent Calendar means you agree with staff's recommendation.

If any member of the Board or the public wishes to discuss this matter, other than clarifying questions, it should be placed on the "Items Removed from the Consent Calendar" portion of the agenda for full discussion. If after Board discussion you agree with staff's recommendation the following motion would be appropriate:

MOVED BY _____, SECONDED BY _____,

THAT THE BOARD AUTHORIZES THE CHAIRMAN AND SECRETARY TO ENTER INTO A PROFESSIONAL ENGINEERING AGREEMENT WITH GRP ENGINEERING, INC. IN THE AMOUNT OF $71,500 FOR THE ENGINEERING DESIGN PHASE OF THE PROJECT, AND NOT TO EXCEED $42,500 FOR THE CONTRACT ADMINISTRATION PHASE OF THE PROJECT, SUBJECT TO APPROVAL AS TO SUBSTANCE BY THE EXECUTIVE DIRECTOR AND AS TO FORM BY GENERAL COUNSEL.

May 6, 2019

Mr. Tony Chartrand
System Engineer
Traverse City Light & Power
1131 Hastings St.
Traverse City, MI 49686

RE: AeroPark Underground Upgrade
Engineering Services Proposal

Dear Tony:

GRP Engineering, Inc. is pleased to present this proposal to Traverse City Light & Power (TCL&P) for engineering services associated with the AeroPark Industrial Park Underground Upgrade. This project is being undertaken to replace aging cable, to increase the ampacity of the circuit to 600A, to provide improved sectionalizing, and to construct a new circuit out of Parsons Substation.

Project scope includes construction of a 600A loop along AeroPark Drive including installation of 5,900 circuit feet of 750kCM 15kV CU cable in conduit from Parsons Road to Grand Traverse Industries then north back to the first switchgear south of Parsons Road, plus eleven (11) padmount switchgear and several T-tap cabinets. The two aerial rail crossings feeding this 600A loop are included in the project scope. Two bid alternates will be included in the project. The first will be to construct a new 600A circuit PC20 from Parsons Substation west to Aero Park Drive with 1,400 circuit feet of 750kCM 15kV CU cable including two padmount switchgear. This bid alternate will include a new substation recloser and circuit riser. The second bid alternate will be to replace the existing 200A underground "inner loop" along and west of AeroPark Court with new #4/0 AL 15kV cable and several T-tap cabinets. Spare conduits and handholes for fiber optic cabling will be included in the project design. Estimated total project cost for the underground upgrade and new circuit is $1,790,000.

GRP Engineering's understanding is that all work will be contracted out for this project. GRP will complete underground design, assist with material procurement, prepare and process one construction contract, and attend the preconstruction meeting. TCL&P will perform construction staking, construction observation, and outage coordination. GRP will assist TCL&P throughout the construction process on an hourly basis as needed including answering contractor questions, construction staking, field review meetings, and assisting with outages. Since this Contract Administration phase historically has been contracted out, GRP Engineering is including a total cost to perform these services in our proposal should TCL&P desire to contract them out. Proposed project schedule is to complete design by November 2019 and complete construction by November 15, 2020. Refer to the proposed construction dates noted in this proposal.

AeroPark Underground Upgrade Engineering Design Phase

Our scope of services for completing the engineering design include:

- Project administration (maintain correspondence & meeting minutes.)
- Project planning & control (design schedules & cost estimates.)
- Project kickoff meeting with TCL&P staff.
- Field inventory & mapping of the distribution circuits & site features within the project area.
- Complete design of the new 13.8kV underground system including 600A loop, 200A "Inner Loop", and new PC20 underground circuit, including all pulling tension calculations.
- Design underground system to meet all applicable standards including those of the current edition of the National Electric Safety Code (NESC).
- Prepare new construction and removal staking sheets for aerial reconductor at the rail crossings.
- Prepare underground layout, detail, and site restoration drawings.
- Update Parsons Substation drawings for circuit PC20 including one-line, plan view, elevations, foundation and conduit layout, schematics and wiring diagrams.
- Two (2) design review meetings with TCL&P staff.
- Prepare construction assembly drawings meeting TCL&P standards.
- Assist TCL&P with material procurement including bidding, evaluation and award. Separate material RFP's will be prepared for the substation recloser, padmount switchgear, MV underground cable, plus box pads, MV rubber goods, and line hardware.
- Assistance with verifying and securing (if necessary) two MDOT aerial rail crossing permits.
- Prepare new construction and removal unit lists for contractor bidding.
- Prepare construction specifications.
- Preparation of one (1) construction contract plus assistance with bid and award. Construction contract will include two bid alternates as described herein.
- Prepare construction contract including contractor's bid, bonds and insurance.
- Printing & shipping of four (4) construction drawings sets.
- Attendance at one preconstruction meeting.
- Provide record drawings including two (2) bound sets.

GRP Engineering, Inc. will provide the engineering design services for the AeroPark Underegground Upgrade project for a lump sum fee of $71,500 including expenses and all subcontracted services.

Aero Park Underground Contract Administration Phase – *Optional*

Should TCL&P desire to have GRP complete the construction administration phase of the project, our full scope of services and fee are provided below.

- Construction staking of all underground conduit centerlines, padmount equipment and riser poles.
- On-site observation of circuit construction at critical times.
    - Proposal based on ten (10) on-site visits during construction.
- Install settings into new PC20 SEL351 recloser controller.
- Function test PC20 recloser & controller utilizing MET tester.
- Assistance with SCADA checkout for new PC20 recloser.
- Coordination and on-site representation during primary distribution outages.
    - Proposal based on two (2) full weekend outages (4 – 12 hour days total for outages.)
- Final inventory, inspection and preparation of punch lists for the new 13.8kV underground system.
- Process of all contractor invoicing and change orders. *(if required)*
- Prepare all necessary contract close-out documents.

GRP Engineering, Inc. will provide the Contract Administration Phase services for the AeroPark Underground Upgrade Project on an hourly basis for a fee not to exceed $42,500, including expenses should TCL&P choose to contract these services out.

Deliverables & Proposed Schedule

Deliverables include the following:

- Construction drawing package for the underground circuits including one-line, layout, detail, and site restoration drawings.
- Updated substation drawing package for new PC20 circuit.
- New construction & removal staking sheets for overhead construction.
- Construction material lists.
- Material RFP documents.
- Construction bid documents and specifications.
- Project kickoff date 6/12/19
- Preliminary design proposed delivery date 10/31/19
- Final design & material package delivery date 11/22/19
- Construction Start Date 3/16/20
- Proposed construction completion date 11/15/20

This proposal does not include topographic survey, boundary survey, or easement acquisition services. TCL&P will handle communications to customers regarding outages which are planned to be grouped and occur during the weekends.

We appreciate the opportunity to submit this proposal and look forward to being of service to you. Please contact me should you have any questions.

Sincerely,
GRP Engineering, Inc.

Michael P. McGeehan, P.E.
President

Enclosures

cc: TCL&P
Mr. Daren Dixon

GRP ENGINEERING, INC.
HOURLY BILLING RATES

Employee Title	Engineer Level	Hourly Rate
Senior Project Manager	8	$155
Project Manager	7	$140
Senior Engineer	6	$130
Project Engineer	4 - 5	$120
Engineer II	3	$100
Engineer I	2	$ 90
Entry Level Engineer	1	$ 80
Field Staking Technician		$ 80
GIS Technician		$ 70
GIS Developer		$ 76
Senior Engineering Technician		$ 70
Engineering Technician		$ 65
Engineering Intern		$ 45
Administrative		$ 60

**Rates are subject to change.*

TRAVERSE CITY LIGHT & POWER
AERO PARK INDUSTRIAL PARK UNDERGROUND
CONSTRUCTION COST ESTIMATE

ITEM	ITEM DESCRIPTION	UNITS	LABOR	MATERIAL	TOTAL	EXTENDED TOTAL
1	Trenching (Feet)	1320	$12.00	$2.00	$14.00	$18,480
2	Directional Boring (Feet)	8970	$24.00	$6.00	$30.00	$269,100
3	4" or 6" Conduit	1320	$3.50	$3.25	$6.75	$8,910
4	Fiberglass Elbows & Misc Fittings	40	$50.00	$125.00	$175.00	$7,000
5	750MCM CU 15kV Cable (Circuit Feet)	7295	$13.50	$48.30	$61.80	$450,831
6	#4/0 AL 15kV Cable (Circuit Feet)	5875	$6.75	$8.40	$15.15	$89,006
7	S&C PME Switchgear	13	$1,550.00	$16,000.00	$17,550.00	$228,150
8	Sectionalizing Cabinet	5	$740.00	$600.00	$1,340.00	$6,700
9	Elbows, Terminations, & Arresters	337	$125.00	$75.00	$200.00	$67,400
10	Equipment Grounding	18	$365.00	$125.00	$490.00	$8,820
11	Fault Indicators (3Ø Installation)	36	$600.00	$800.00	$1,400.00	$50,400
12	Miscellaneous OH & UG Construction	1	$15,000.00	$8,000.00	$23,000.00	$23,000
13	Substation Recloser & Riser	1	$5,000.00	$22,000.00	$27,000.00	$27,000
14	3Ø Riser Pole	2	$2,800.00	$1,500.00	$4,300.00	$8,600
15	Outages	Lot	$25,000.00	$0.00	$25,000.00	$25,000
16	Site Restoration	Lot	$34,000.00	$10,000.00	$44,000.00	$44,000
17	Demolition & Removals	Lot	$26,000.00	$0.00	$26,000.00	$26,000
18	Insurance & Bonding	Lot	$18,000.00	$0.00	$18,000.00	$18,000
					Subtotal	$1,376,397
					Contingency (15%)	$206,000
					Engineering Design (10%)	$138,000
					Construction Inspection (5%)	$69,000
					Total Estimated Project Cost	**$1,789,397**

Notes:

1. All costs are estimated as 2018 construction costs.
2. Estimate is based on replacement of the underground circuit in the AeroPark Industrial Park with new 750kCM 15kV CU conductor from the riser pole at the railroad and N. Aero Park Drive around to the last cabient before 3 Mile Road. Twelve new PME switchgear will be installed with #4/0 AL 15kV cable connections to T-taps.
3. Costs for new PC-20 circuit construction from Parsons Substation to the corner or N. Aero Park and Aero Park Drive are included with two PME switchgear.
4. Costs for replacing 200A conductor between T-Taps on the inner loops are included.
5. The cost estimate submitted herein is based on time-honored practices within the construction industry. As such, the Engineer does not control the cost of labor, materials, equipment or a contractor's method of determining prices and competitive bidding practices or market conditions. The estimate contained represents our best judgement as design professionals using current information available at the time of preparation. The Engineer cannot guarantee that proposals, bids and/or construction costs will not vary from this cost estimate.

TRAVERSE CITY
LIGHT & POWER

To:	**Light & Power Board**
From:	Tim Arends, Executive Director
Date:	May 1, 2019
Subject:	Michigan Public Power Agency Purchase Power Commitment – Renewable Energy

Staff worked with the City Renewable Energy Goal Ad Hoc Committee on March 21 and April 5, 2019 for the purpose to assist the City of Traverse City ("City") in achieving their goal of obtaining 100% renewable energy for its operations by the calendar year end 2020.

At the last board meeting a memo was provided describing the various options and opportunities discussed by the City Renewable Energy Goal Ad Hoc Committee in how the City could obtain their goal. The committee concluded directing staff to work with Michigan Public Power Agency on a purchase power commitment ("PPC") for the expansion of the large-scale solar project in Shiawassee County.

The terms of the PPC are for 7.6MW of solar or 11,952 MWh of generation starting January 1, 2022. This commitment is a combination of replacing lost generation from the Pegasus Wind Project due to zoning issues in the amount of 3,739 MWh and providing sufficient generation for the City to meet their renewable goal in the amount of 6,579 MWh with the remaining amount of 1,714 MWh to be added to the utility's portfolio. The purchase power commitment includes energy, capacity and renewable energy credits for the cost of $36.95 per MWh with a 2% escalation over 25 years with a final year price of $59.43. The average avoided cost of solar for this contract period is $60.00. Based on 2018 generation, if we include the City dedicated energy, the renewable energy portfolio increases to approximately 26%.

This item is appearing on the Consent Calendar as it is deemed by staff to be a non-controversial item. Approval of this item on the Consent Calendar means you agree with staff's recommendation.

If any member of the Board or the public wishes to discuss this matter, other than clarifying questions, it should be placed on the "Items Removed from the Consent Calendar" portion of the agenda for full discussion.

If after Board discussion you agree with staff's recommendation the following motion would be appropriate:

MOTION ON NEXT PAGE

FOR THE LIGHT & POWER BOARD MEETING OF MAY 14, 2019

MOVED BY _____, SECONDED BY _____, THAT THE

LIGHT & POWER BOARD DIRECTS THE EXECUTIVE DIRECTOR TO EXECUTE THE ENERGY SERVICES PROJECT TRANSACTION AUTHORIZATION WITH MICHIGAN PUBLIC POWER AGENCY FOR SOLAR SUPPLY LOCATED IN SHIAWASSEE COUNTY, MICHIGAN WITH ASSEMBLY SOLAR, LLC.

ENERGY SERVICES PROJECT
TRANSACTION AUTHORIZATION

This Transaction Authorization ("Authorization") is made and entered into as of _____, 2019, by and between MICHIGAN PUBLIC POWER AGENCY ("MPPA"), a body corporate and politic of the State of Michigan, created pursuant to 1976 PA 448 and _____ (the "Participant").

WHEREAS, MPPA was organized under Act 448 to provide a means for those Michigan municipalities which are members of MPPA to secure electric power and energy for their present and future needs; and

WHEREAS, on March 11, 2009, the MPPA Board of Commissioners by action in open meeting created the Energy Services Project; and

WHEREAS, one of the services allowed under the Energy Services Project is that a Participant may agree to have MPPA enter into Power Purchase Commitments to meet a portion of the Participant's load requirements; and

WHEREAS, the service covered by this Authorization is a Power Purchase Commitment under the Energy Services Agreement between the Participant and MPPA ("Energy Services Agreement"):

NOW, THEREFORE, for and in consideration of the mutual covenants and agreements herein contained, it is agreed by and between the parties hereto as follows:

Section 1. **Solar Power Supply Agreement**

MPPA's Solar Power Supply Agreement for the solar facility located in Shiawassee County, Michigan is with Assembly Solar, LLC. MPPA will allocate a pro rata portion of MPPA's rights and obligations contained in the Agreement to the Participant as provided in this Transaction Authorization.

Section 2. Delivery Point

The delivery point for the solar power will be located at the solar facility's interconnection point with the METC transmission system at the Goss 138kV Substation.

Section 3. Term

The term of the Power Purchase Commitment will begin upon the declared commercial operation date of the solar facility, currently estimated to begin January 1, 2022 and continue for 25 years thereafter.

Section 4. Amount

The Participant is allocated a percentage of output from the solar facility as shown below.

Approximate Installed Capacity	Allocation Percentage
7.6 MW	18.95%

Section 5. Product

Upon commercial operation of the solar facility, MPPA will transfer to each Participant the Participant's allocated pro rata share of the output of the solar facility, as described below.

Section 6. Price

Participants will pay to MPPA a maximum rate of $36.95 per MWh delivered in year 1 depending on actual generation from the facility. This maximum rate will escalate by 2% each year thereafter.

Section 7. Energy Services Agreement

This Authorization for the purchase power commitments is subject to the terms and provisions of the Energy Services Agreement, including the MPPA Energy Risk Management Policy contained in Exhibit 2 thereto. In the event the terms of this Authorization conflict with the Energy Services Agreement, the provisions of the Energy Services Agreement shall control.

Section 8. Evidence

Authority of the Participant's Authorized Representative to execute this Authorization is evidenced through the Participant resolution passed appropriately by the Participant's governing body or through the meeting minutes of the Participant's governing body where approval was granted to the Authorized Representative to execute this Authorization.

Section 9. Effectiveness

This Transaction Authorization and the associated Purchase Power Commitment is not effective until MPPA has received sufficient MPPA member participation to enable the solar facility in Section 1 to proceed.

_____

Authorized Representative

By _____

Its _____

FOR THE LIGHT & POWER BOARD MEETING OF MAY 14, 2019

TRAVERSE CITY
LIGHT & POWER

To:	**Light & Power Board**
From:	**Kelli Schroeder, Manager of HR & Communications**
CC:	**Tim Arends, Executive Director**
Date:	May 6, 2019
Subject:	Alcohol & Drug Testing Policy Amendments

Included in your packet for review is a revised Alcohol and Drug Testing Policy that amends the policy to address the recent legalization of recreational marijuana in Michigan. Staff again utilized the assistance of East Bay Medical.

This item is appearing on the Consent Calendar as it is deemed by staff to be a non-controversial item. Approval of this item on the Consent Calendar means you agree with staff's recommendation.

If any member of the Board or the public wishes to discuss this matter, other than clarifying questions, the item should be placed on the "Items Removed from the Consent Calendar" portion of the agenda for full discussion.

If after Board discussion you agree with staff's recommendation, the following motions would be appropriate:

MOVED BY _____, SECONDED BY _____,

THAT THE BOARD ADOPTS THE AMENDED ALCOHOL AND DRUG TESTING POLICY AS PRESENTED WITH AN IMMEDIATE EFFECTIVE DATE.

Light and Power Department
City of Traverse City, MI
Approved: April 21, 1993
Amended: August 8, 2017
Amended: December 12, 2017
Amended:

ALCOHOL AND DRUG TESTING POLICY

This Policy is applicable to all Traverse City Light and Power Department (TCL&P) employees.

I. PURPOSE:

a. Traverse City Light & Power's (TCL&P) Alcohol and Drug Testing Policy is established to comply with the Federal Drug-Free Workplace Act of 1988, Americans with Disabilities Act, and the United States Department of Transportation (DOT) regulations, specifically 49 C.F.R. Parts 40, and 382. This policy is not intended to supersede any collective bargaining agreement except where Federal and State law takes precedence. Federal regulations regarding ~~medical~~ marijuana takes precedence over the state of Michigan's marijuana rules. Federal laws and policy do not recognize any legitimate medical use of marijuana. Even if ~~medical~~ marijuana is legally used in a state, the DOT regulations treat its use the same as the use of any other illicit drugs. In the absence of any Federal or State law, collective bargaining agreement or other legal requirement, this policy applies to all covered employees.

b. The Employer and the Union acknowledge that substance abuse is a serious complex, but treatable condition/disease that negatively affects the productive, personal and family lives of employees and the stability of companies.

c. The purpose of this policy is to maintain a safe, healthful and efficient working environment for our employees, to protect TCL&P property, equipment and operations, to protect the motoring public form the effects of alcohol, illegal drugs or drugs taken for non-medical purposes, and to provide employees with access to necessary treatment and rehabilitation assistance.

d. The Employer and the Union have defined a program of employee assistance and have provided coverage to assure that employees requiring treatment and rehabilitation resulting from their substance abuse can receive such services without undue financial hardship. Employees will be strongly encouraged and sometimes directed (after positive testing) to seek and receive services of the employee assistance program prior to such problems affecting job performance or resulting in on the job incidents.

e. The use and effects of controlled substances and alcohol pose very serious problems. This is particularly true in the trucking industry, which is subject to extensive government regulation. Not only can the use and/or abuse of drugs or alcohol jeopardize the health, safety and well-being of the individual user and all of our employees, it can also endanger the safety of the general public, jeopardize the safety of the highways and cause serious accidents and casualties. In view of these problems, TCL&P wants to clearly state its policy to accurately detect and to deter the use of drugs and alcohol in our transportation and work environment, either through testing, cessation of use or termination of employment.

II. POLICY:

The policy prohibits the:

1. Use, possession or being under the influence of a prohibited substance including marijuana while on duty or operating or in physical control of a motor vehicle or equipment and/or on premises, property or worksite.

2. Consumption or being under the influence of an intoxicating beverage, regardless of its alcohol content, within four (4) hours of reporting for work or operating or having physical control of a motor vehicle or equipment.

3. Possession, consumption or being under the influence of an intoxicating beverage, regardless of its alcohol content, while on duty or operating or in physical control of a motor vehicle or equipment and/or on the employer's premises, property or worksite.

4. Refusal to submit to an alcohol or controlled substances test, and for positions that require a Commercial Driver's License (CDL), a DOT alcohol or controlled substances test that includes but is not limited to refusing to sign a consent or release form authorizing the collection specimen, analysis of the specimen for designated prohibited substances, and release of the results to TCL&P.

5. Both medical and recreational marijuana will not be tolerated at TCL& P. Marijuana is still illegal at the Federal level and any employee who has a verified positive test for marijuana will be considered to have violated this policy. The Medical Review Officer, (MRO), under 49 CFR part 40.151, is prohibited from verifying any test as negative for the use of medical marijuana or recreational marijuana. Any covered employee who tests positive for marijuana, or its metabolite, will be subject to the company's substance abuse disciplinary policy up to and including discharge.

III. DEFINITIONS:

The following definitions shall be applicable to this policy:

ALCOHOL OR ALCOHOLIC BEVERAGE - means any beverage that may be consumed and that has an alcoholic content in excess of .5 percent by volume.

CHAIN OF CUSTODY - means procedures to account for the integrity of specimen by tracking its handling and storage from point of specimen collection to final disposition of the specimen.

COLLECTION CONTAINER - means any container into which an employee urinates or blood is collected to provide a specimen used for testing.

COLLECTION SITE - means any place designated by the employer where individuals present themselves for the purpose of providing a specimen to be analyzed for the presence of drugs and/or alcohol.

COLLECTION SITE PERSON - means a person who instructs and assists individuals at a collection site and who receives and makes an initial examination of specimens provided by those individuals.

COMMERCIAL MOTOR VEHICLE (CMV) - is any vehicle which has a GVWR of 26001 lbs or above, or any vehicle that hauls hazardous materials which requires placarding or transports 15 or more passengers including the driver.

DESIGNATED EMPLOYER REPRESENTATIVE (DER) - is an individual identified by the employer as able to receive communications and test results from service agents and who is authorized to take immediate actions to remove employees from safety-sensitive duties and to make required decisions in the testing and evaluation processes. The individual must be an employee of the company. Service agents cannot serve as DERs.

DRIVER - means an employee who is required by TCL&P to operate a company vehicle or a Commercial Motor Vehicle (CMV) that requires a Commercial Motor Vehicle License (CDL).

DRUG - means any substance (other than alcohol) capable of altering the mood, perception, pain, level, or judgment of the individual using it.

FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION (FMCSA) - is the Department of Transportation (DOT) agency which establishes the regulations for drivers required to have and maintain a Commercial Driver's License (CDL).

FOLLOW-UP TESTING - following a confirmed positive test, employee will agree to undergo follow-up drug testing. Follow-up drug testing for DOT drivers is required to be

a directly observed collection (see Section IV(H)). A minimum of 6 tests in a 12- month period will be required for all employees who operate a Commercial Motor Vehicle (CMV). The Substance Abuse Professional (SAP) may recommend a longer period of time, not to exceed five years and is in addition to the other types of testing. All other employees will be subject to a maximum of two (2) unannounced tests for a period of twelve (12) months. The employee is responsible for the cost of rehabilitation drug testing.

HEALTH AND HUMAN SERVICES (HHS) - certifies drug testing labs authorized to conduct DOT drug testing.

HE or HIS - also means "she" or "hers" in appropriate context.

MEDICAL REVIEW OFFICER (MRO) - is a person who is a licensed physician and who is responsible for receiving and reviewing laboratory results generated by an employer's drug testing program and evaluating medical explanations for certain drug test results.

PREMISES - includes but is not limited to all property, whether owned or leased or used by Traverse City Light & Power or the City of Traverse City. This policy also includes any other locations or modes of transportation to and from those locations while in the course and scope of employment.

PRESCRIBED DRUG - means any substance prescribed for the individual consuming it by a licensed medical practitioner.

PROHIBITED SUBSTANCES - All urine specimens are analyzed for the following drugs:

Marijuana (THC metabolite)
Cocaine metabolites
Amphetamines metabolites
- Amphehtamines
- Methampehtamines
- MDMA
- MDA

Opioids metabolites (including heroin)
- Codeine
- Morphine
- Heroin
- Hydrocodone
- Oxycodone
- Hydromorphone
- Oxymorphone

Phencyclidine (PCP)

REASONABLE CAUSE - includes, but is not limited to: Observation of behavior such as slurred speech, unsteady walking, abrupt mood swings, breath (alcohol), or odor; observation of physical manifestations frequently associated with some forms of substance abuse, e.g., needle marks, sudden nosebleeds, frequent illness not explained by other medical conditions; accidents; injuries; absenteeism; declining productivity; misconduct; excessive tardiness; and suspicious activity indicating possible involvement with prohibited substances or alcohol in violation of this Policy. Reports of drug or alcohol use or aberrant behavior which are not confirmed by supervisory observations shall not constitute reasonable suspicion.

REFUSE TO SUBMIT (to an alcohol or controlled substances test) - means that:

1. Fail to appear for any test (except a pre-employment test), after being directed to do so by the employer, within a reasonable time, as determined by the employer and, for all drivers required to maintain a CDL, is consistent with applicable DOT agency regulations. This includes the failure of an employee (including an owner-operator) to appear for a test when called by a consortium/third party administrator (C/TPA).

2. Fail to remain at the testing site until the testing process is complete. Provided, that an employee who leaves the testing site before the testing process commences a pre-employment test is not deemed to have refused to test.

3. Fail to provide a urine specimen for any drug test required by this part or DOT agency regulations. Provided, that an employee who does not provide a urine specimen because he or she has left the testing site before the testing process commences for a pre-employment test is not deemed to have refused to test.

4. In the case of a directly observed or monitored collection in a drug test, fails to permit the observation or monitoring of the driver's provision of a specimen.

5. Fail to provide a sufficient amount of urine when directed, and it has been determined, through a required medical evaluation, that there was no adequate medical explanation for the failure.

6. Fail or decline to take a second test the employer or collector has directed the employee to take.

7. Fail to undergo a medical examination or evaluation, as directed by the MRO as part of the verification process, or as directed by the DER. In the case of a pre-employment drug test, the employee is deemed to have refused to test on this basis only if the pre-employment test is conducted following a contingent offer of employment.

8. Fail to cooperate with any part of the testing process (e.g. refuse to empty pockets when so directed by the collector, behave in a confrontational way that disrupts the collection process etc.).

9. Is reported by the MRO as having a verified adulterated or substituted test result.

REPORTABLE ACCIDENT:

All Employees: means (a) an accident involving the death of a human being; or (b) where the driver of the company vehicle was issued a moving traffic violation as a result of the accident and there was bodily injury to any person who, as a result of the injury, immediately receives medical treatment away from the scene of the accident; or (c) an accident that results from the employee's negligence and will result in lost time from work; or (d) one or more motor vehicles incurring disabling damage as a result of the accident, requiring the motor vehicle to be transported away from the scene by a tow truck or other motor vehicle.

Exceptions include:

1. If it reasonably appears that an injury occurred solely as a result of actions of another employee or member of the public, testing will not be required.

These actions will result in a non-DOT drug and alcohol test to be conducted.

CDL Drivers: in addition to the above, the DOT defines an accident as any incident involving the loss of human life, or where the driver of the CMV was issued a moving traffic violation as a result of the accident and there was bodily injury to any person who, as a result of the injury, immediately receives medical treatment away from the scene of the accident; or one or more motor vehicles incurring disabling damage as a result of the accident, requiring the motor vehicle to be transported away from the scene by a tow truck or other motor vehicle.

These actions will result in a DOT drug and alcohol test to be conducted.

SHIPPING CONTAINER - means a container capable of being secured with a tamper proof seal that is used for transfer of one (1) or more specimen bottles and associated documentation from the collection site to the laboratory.

SPECIMEN BOTTLES - means the bottle which, after being labeled and sealed according to the procedure in this Policy, is used to transmit a sample to the laboratory.

SUBSTANCE ABUSE PROFESSIONAL (SAP) - A licensed physician M.D. or D.O. or a licensed or certified psychologist, social worker, or employee assistance professional; or an addiction counselor (certified by the National Association of Alcoholism and Drug Abuse Counselors Certification Commission). All must have knowledge of clinical experience in the diagnosis and treatment of alcohol and controlled substances related disorders.

UNDER THE INLUENCE OF ANY PROHIBITED SUBSTANCE - means any detectible level of a prohibited substance in an employee's system above the SAMHSA cut off limits.

UNDER THE INLUENCE OF ALCOHOL - means a blood alcohol level of .04 percent or greater.

IV. TESTING:

DRUG TESTING

The following procedures will be employed to assure compliance with this policy. For all drivers operating a Commercial Motor Vehicle (CMV), all testing will follow 49 CFR part 40.

A. Testing. Employees of TCL&P are required to submit to a urine analysis testing for prohibited substances under the following circumstances:

1. To be considered for employment. If a prospective employee fails the drug test, they will not be hired.

2. Where management has reasonable cause to believe that an employee is under the influence of a prohibited substance while on duty.

3. Following a reportable accident as outlined under Section III, *Definitions*.

4. When an employee gets transferred or promoted to a position that requires the operation of a Commercial Motor Vehicle (CMV).

5. As part of a random selection process for drivers operating a Commercial Motor Vehicle (CMV). FMCSA currently requires that 25% of the people from the company be tested in a calendar year or 25% of the people from the consortium be tested. The percentage may be adjusted annually by the DOT based on the number of positive tests reported nationwide.

6. Return-to-duty - following the completion of a substance abuse program the employee must take a drug test and pass the test before the employee may be returned to work. Testing for DOT drivers is required to be a directly observed collection (see Section IV(H)).

7. Follow-up testing - after an employee has a confirmed positive test, they will agree to undergo follow-up drug testing. A minimum of 6 tests in a 12- month period will be required for all employees who operate a Commercial Motor Vehicle (CMV). All other employees will be subject to a maximum of two (2) unannounced tests for a period of twelve (12) months. The employee is responsible for the cost of rehabilitation drug testing. Follow-up drug testing for DOT drivers is required to be a directly observed collection (see Section IV(H)).

B. Post-Accident Testing. Employees shall be tested for prohibited substances as soon as possible after a reportable accident but in no case later than thirty-two (32) hours after the accident.

C. Employee Privacy. Testing will be conducted with concern for the personal privacy of each employee. Results of urine tests performed under 49 CFR part 40 (CDL holders) and all others will be considered medical records and held confidential to the extent permitted by law. Tests shall only be performed for alcohol, marijuana metabolites, cocaine metabolites, opioid metabolites, amphetamines, and phencyclidine (PCP). Specimen validity testing will be conducted any time a specimen is thought to be tampered with or substituted. Specimen validity testing is the evaluation of the specimen to determine if it is consistent with normal human urine. The purpose of the validity testing is to determine whether certain adulterants or foreign substances were added to the urine, if the urine was diluted, or if the specimen was substituted.

D. Testing Procedures: All urine collections, including both CDL and non-CDL holders, will be conducted in accordance with DOT rules and regulations found in 49 CFR part 40, sections 40.63 through 40.73. If requested by the employee, a Union representative shall be allowed to accompany the employee, without a loss of time, to the testing facility.

Laboratories used for testing must be certified by Health and Human Services (HHS) under the National Laboratory Certification Program (NLCP).

E. Availability of Test Results: The results of any drug test and records connected with the testing procedure will be made available to the individual tested upon written request. The results of the test themselves are reviewed by a licensed physician who has the knowledge of substance abuse disorders (MRO). If the tests are positive the individual tested will be advised of the results and the type of drug or drugs discovered. For CDL holders, the MRO, under 49 CFR part 40.151 is prohibited from verifying any test as negative for the use of medical marijuana or recreational marijuana.. The individual tested will be given the opportunity to discuss the test results with the licensed physician prior to the time the test results are made available to the Employer. After notification of the MRO's final positive determination, the employee has seventy--two (72) hours to request a test of the "split specimen" at another certified laboratory.

The documentation of the results of the test will not be made available to other parties except upon written request of the individual tested, or when an applicable DOT regulation requires such disclosure, or if in the MRO's reasonable judgment the information could result in the employee being medically unqualified to perform the duties, or if the information would cause a safety risk.

F. Retesting of Original Specimen. The employee may request of the MRO either in writing or verbally, to have the "split specimen" of a positive test retested at another certified laboratory selected by the employee. The employee will be required to pay

for the retest, however, payment is not to hold up the testing of the split specimen. In the event that the employee is unwilling or unable to pay for the split specimen the employer must cover the cost of the test.

Should the results of such retest be negative, the Employer shall reimburse the employee for all costs related to such retesting of the split specimen. Further the employee shall not suffer any discipline as a result of the initial positive test and will be made whole for any lost time or benefits suffered as a result of preliminary actions taken by the Employer based on the initial positive tests results.

G. Voluntary Disclosure. Employees who seek voluntary assistance for alcohol and substance abuse may not be disciplined for seeking such assistance as along as the admission is (a) not done to avoid testing or (b) is made before performing safety sensitive duties (prior to reporting for duty) and safety sensitive duties are not performed until a treatment program has been completed. Requests from employees for such assistance shall remain confidential and shall not be revealed to other employees or management personnel without the employee's consent. Employee enrolled in substance abuse programs shall be subject to all employer rules, regulations and job performance standards with the understanding that an employee enrolled in such a program is receiving treatment for an illness.

Employees who successfully complete a substance abuse program as determined by the SAP will be allowed to return to safety sensitive duties once they have passed a drug and/or alcohol test.

H. Direct Observed Collection. Observed collections are authorized and required only when:

1. Tampering
   (a) the employee attempts to tamper with his or her specimen at the collection site;
   (b) the specimen temperature is outside the acceptable range;
   (c) the specimen shows signs of tampering, unusual color/odor;
   (d) the collector finds an item in the employee's pocket or wallet which appears to be brought into the site to contaminate a specimen;
   (e) the collector notes conduct suggesting tampering.

2. MRO ordered
   (a) because the employee has no legitimate reason for certain atypical laboratory results;
   (b) because the employee's positive or refusal [adulterated/substituted] test result had to be cancelled because the split specimen test could not be performed.

3. Employer ordered

(a) for a follow-up or a return-to-duty test required by the DOT for employees required to have and maintain a CDL who have already failed or refused to take a prior drug test.

ALCOHOL TESTING

The following procedures will be employed to assure compliance with this policy. For all drivers operating a Commercial Motor Vehicle (CMV), all testing will follow 49 CFR part 40.

A. Testing. Employees of TCL&P are required to submit to breath testing for alcohol under the following circumstances:

1. Where management has reasonable cause to believe that an employee is under the influence of alcohol while on duty.

2. Following a reportable accident as outlined under Section III, *Definitions*.

3. When an employee gets transferred or promoted to a position that requires the operation of a Commercial Motor Vehicle (CMV).

4. As part of a random selection process for drivers operating a Commercial Motor Vehicle (CMV). FMCSA currently requires that 10% of the people from the company be tested in a calendar year or 10% of the people from the consortium be tested. The percentage may be adjusted annually by the DOT based on the number of positive tests reported nationwide.

5. Return-to-duty - following the completion of a substance abuse program the employee must take an alcohol test and must pass the test before the employee may be returned to work.

6. Follow-up testing - after an employee has a confirmed positive test, they will agree to undergo follow-up testing. A minimum of 6 random tests in a 12-month period will be required for all employees who operate a Commercial Motor Vehicle (CMV). All other employees will be subject to a maximum of two (2) unannounced tests for a period of twelve (12) months. The employee is responsible for the cost of rehabilitation drug testing.

B. Post-Accident Testing. No employee required to take a post-accident alcohol test shall use alcohol for eight hours following the reportable accident or until he/she undergoes a post-accident alcohol test.

Post-accident alcohol tests should be administered as soon as practicable, but in no case later than two (2) hours following the accident. If the test is not administered within eight (8) hours all attempts to perform the test shall cease.

If the test is not administered within two (2) hours, the utility will prepare and maintain on file a record stating the reason(s) the test was not promptly administered. If the test is not performed within eight (8) hours, a report will be completed stating the reason(s) why and kept on file with the employer.

C. Testing Procedure. All alcohol tests will be conducted by a trained alcohol technician. For CDL holders, all tests are required to be administered using a DOT approved evidential breath testing device (EBT).

D. Penalties. Any employee who has a confirmed breath test greater than .02% but less than .04% will be removed from duty without pay for twenty-four (24) hours.

Any employee who has a confirmed breath test of .04% or greater will be removed from their duties without pay and deemed medically unqualified to perform those duties until they have completed a substance abuse program and tested negative for drugs and alcohol.

V. PRESCRIPTION AND NON-PRESCRIPTION MEDICINE

Before any drug test is given, the employee or prospective employee may note, the use of any prescription or non-prescription medications. The laboratory procedures will report the significant presence of all prescription and non-prescription drugs.

An employee may be suspended without pay for using medication, until TCL&P is provided with a copy of the prescription, the name of the physician prescribing the medication and a statement from the employee's physician describing the effects of the medication and indicating that the medication will not affect the employee's ability to safely operate a motor vehicle or otherwise perform the duties of his or her position without creating a risk of harm to himself or others.

VI. CONSEQUENCES FOR VIOLATION OF THIS POLICY

Employees who are known to have engaged in prohibited behavior, with regard to alcohol misuse or use of controlled substances, are subject to the following:

A. The employee shall not be permitted to perform duties of his or her position and will be removed from duty immediately without pay upon receiving the initial report of the verified test result. The employee shall not be allowed to resume duties until all return-to-duty procedures have been followed.

B. If notified of a verified adulterated or substituted drug test, the employer will remove the employee from duty without pay and consider this a refusal to be tested. Employee must successfully complete the return-to-duty procedures before resuming duties of the position.

C. As the employer who receives an alcohol test with a result greater than or equal to .04%, you must immediately remove the employee from duty and the employee must successfully complete the return-to-duty procedures before resuming work. If the test result is between .02% and .039%, the employee must be temporarily removed from duty and will stand down for twenty-four (24) hours.

D. The employee will be advised by TCL&P of the resources available to them in evaluating and resolving problems associated with misuse of alcohol or controlled substances.

E. The employee shall be evaluated by a substance abuse professional (SAP) who shall determine what assistance, if any, the employee needs in resolving problems associated with alcohol misuse and controlled substance abuse.

   For employees required to have and maintain a CDL, when DOT drug and alcohol regulations have been violated, the employee cannot again perform any DOT safety-sensitive duties for any employer until and unless he or she has completed a SAP evaluation, referral, and education/treatment process set forth in applicable DOT agency regulations. The first step in this process is a SAP evaluation.

F. Before an employee returns to duty, he/she shall undergo a return-to-duty alcohol test with a result indicating a breath alcohol level of less than .02% if the conduct involved alcohol, or a controlled substance test with a verified negative result if the conduct involved controlled substance use.

G. In addition, each employee identified as needing assistance in resolving problems associated with alcohol or controlled substances shall be evaluated by a SAP to determine that the employee followed the rehabilitation program prescribed.

H. The employee will be subject to unannounced follow-up alcohol and controlled substance testing as defined under Section III, *Follow-Up Testing*.

I. An employee who refuses to be tested or does not cooperate fully with the collection site personnel shall be treated as having a positive test result and, therefore, medically unqualified to perform his or her normal work tasks.

J. TCL&P reserves the right to impose disciplinary action up to and including termination of employment for any violation of the Alcohol and Drug Testing Policy. For employees required to have and maintain a CDL, additional penalties will be imposed by the Department of Transportation (DOT).

   If an employee tests positive for illegal drugs, and or controlled substances or is under the influence (.04% or greater of alcohol), the following disciplinary steps shall be taken under the authority of TCL&P.

FIRST OFFENSE
Five (5) day suspension without pay. Upon completion of the five-day suspension and before employee is allowed to return to work, he/she will submit to a drug/alcohol test at the employee's expense and be evaluated by a SAP. If the employee then tests negative, he/she will be allowed to return to work. If he/she again tests positive, the employee will continue leave without pay until he/she tests negative and the employee successfully completes an employer-approved drug rehabilitation program. Failure to complete the drug rehabilitation program will be cause for termination of employment.

For employees required to have and maintain a CDL, upon initial notification and confirmation that employee has tested positive, DOT regulations require employees undergo a substance abuse program as directed by the SAP per Section VI(E) above.

SECOND OFFENSE
Termination of employment.

VII. ASSISTANCE TO EMPLOYEE IN UNDERSTANDING ALCOHOL OR DRUG ABUSE

To assist employees in understanding alcohol and drug use and abuse, TCL&P has established an Employee Assistance Program (EAP).

A. Any employee who feels that he or she has developed an addiction to, dependence upon or problem with alcohol or drugs, legal or illegal, is encouraged to seek assistance, and may do so without fear of disciplinary action against him or her provided the assistance is sought as outlined in Section IV(G), *Voluntary Disclosure*, of this policy. Assistance may be sought in confidence by making an appointment with the Employee Assistance Program (EAP).

B. The EAP will be responsible for establishing a substance abuse program through the SAP, referring employees seeking assistance to the appropriate organization or to an alternate treatment program.

C. Employees undergoing rehabilitation treatment as determined by a SAP will be allowed to return to safety sensitive duties once they have passed a drug and/or alcohol test.

VIII. NOTICE TO EMPLOYEES

Compliance with TCL&P's Alcohol and Drug Testing Policy is a condition of employment. Failure or refusal of an employee to cooperate fully or to submit to any inspection or drug/alcohol test as outlined in this policy will be grounds for termination of employment.

FOR THE LIGHT & POWER BOARD MEETING OF MAY 14, 2019

TRAVERSE CITY
LIGHT & POWER

To: **Light & Power Board**
From: Tim Arends, Executive Director
Date: May 1, 2019
Subject: City On Peak Demand Reduction Program Policy

At the March meeting, staff brought forward and introduced the Voluntary Green Program Revenue Policy and received various feedback from the Board. Staff incorporated the Board and General Counsel comments and accordingly revised the policy that is included for your review.

The changes include modifying the name of the policy to reflect the actual purpose, incorporating all voluntary green rate revenues instead of solely the City's, and taking into consideration the 5% city fee regarding revenue.

Staff recommends the Board approves the attached policy, because as mentioned previously, by reinvesting these funds towards the City's energy waste reduction projects it will benefit the utility through reducing peak demand since the City operations are during the day coinciding with the utility's peak time.

This item is appearing on the Consent Calendar as it is deemed by staff to be a non-controversial item. Approval of this item on the Consent Calendar means you agree with staff's recommendation.

If any member of the Board or the public wishes to discuss this matter, other than clarifying questions, it should be placed on the "Items Removed from the Consent Calendar" portion of the agenda for full discussion.

If after Board discussion you agree with staff's recommendation the following motion would be appropriate:

MOVED BY _____, SECONDED BY _____, THAT THE

LIGHT & POWER BOARD ADOPTS THE CITY ON PEAK DEMAND REDUCTION POLICY AS PRESENTED WITH AN IMMEDIATE EFFECTIVE DATE.

Light and Power Department
City of Traverse City, MI
Adopted:

CITY OF TRAVERSE CITY ON PEAK DEMAND REDUCTION PROGRAM POLICY

The Board adopted the Renewable Electric Energy Rider Tariff Rate effective April 20, 2018 in accordance with Public Act 342 of 2016 that required all utilities in the State of Michigan to offer to its customers a voluntary renewable energy "green" rate.

In working with the City to achieve their 100% renewable goal, the Board would like to dedicate all net revenues generated from the Renewable Electric Energy Rider Tariff Rate towards approved City energy waste reduction projects that qualify for a rebate under Traverse City Light and Power's (TCL&P) energy waste reduction program.

Ninety-five percent of net revenues will be determined by taking the voluntary green rate revenues generated from all customer accounts less the cost of renewable energy credits purchased from the market.

The net revenues will be considered a rebate in addition to the rebate the City may qualify for under the TCL&P energy waste reduction program. All guidelines of the energy waste reduction program will be applicable. At no time will the combined rebate amount exceed the actual cost of the energy waste reduction project(s). A rebate application must be submitted and completed in order to qualify for the net revenues. A preapproval assessment must be completed by TCL&P before project begins.

Revenues generated from the June 30 fiscal year end will be available for project rebates beginning January 1st of the following year and will be available for two years. After the two years the funds will be considered expired and unavailable.

Timothy Arends
Executive Director and Secretary
Traverse City Light and Power Board

TRAVERSE CITY
LIGHT & POWER

To:	**Light & Power Board**
From:	**Scott Menhart, Manager of Telecommunications & Technology** **Kelli Schroeder, Manager of HR & Communications**
CC:	Tim Arends, Executive Director
Date:	May 7, 2019
Subject:	Administrative Position Change Amended Organizational Chart

Following the recent notification of Gabe Talaga's resignation, staff underwent a review of the current Computer Systems Specialist position. Staff determined that based on the needs of the utility as it relates to projects, ongoing support, and overall system maintenance this position will have a greater level of responsibility than what is currently required. Therefore, staff is proposing to change the position title to System Administrator and increase the wage range from a Grade 2 to a Grade 3. It is worth noting that Staff was looking to recommend this change over the next several months, prior to the resignation, but the resignation accelerated the timeframe so the updated job can be posted accurately. (Mr. Talaga was informed of this change and affirmed his decision to resign).

Included in your packet is a revised Organizational Chart along with an amended ACT Group Salary Range table that require board approval in accordance with city charter.

These items are appearing on the Consent Calendar as they are deemed by staff to be non-controversial items. Approval of the items on the Consent Calendar mean you agree with staff's recommendation.

If any member of the Board or the public wishes to discuss these matters, other than clarifying questions, the items should be placed on the "Items Removed from the Consent Calendar" portion of the agenda for full discussion.

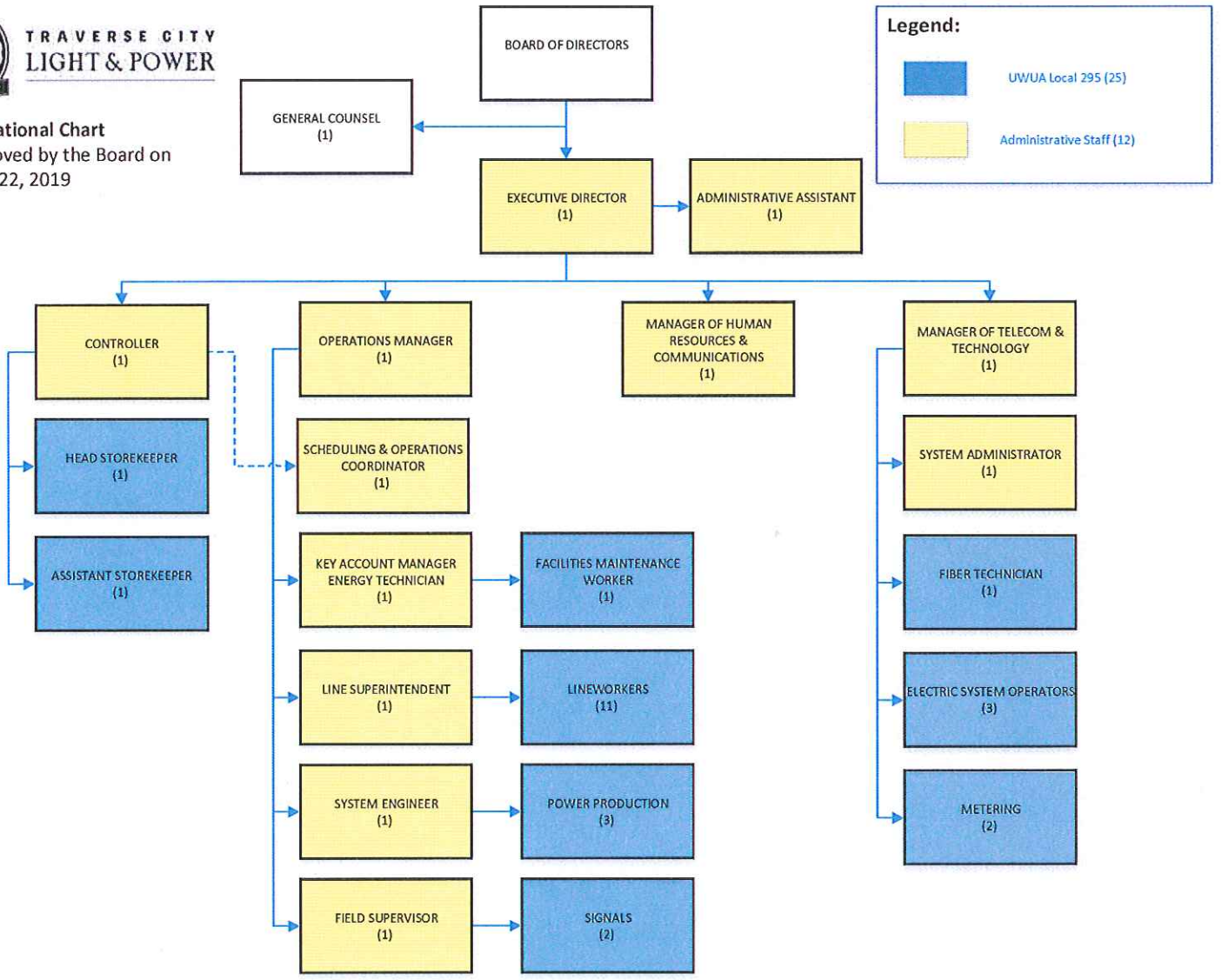
If after Board discussion you agree with staff's recommendation, the following motion would be appropriate:

MOVED BY _____, SECONDED BY _____,

THAT THE BOARD APPROVES THE CHANGES TO THE ORGANIZATIONAL CHART AND ACT GROUP SALARY RANGES AS PRESENTED.

TRAVERSE CITY LIGHT & POWER

Organizational Chart
As approved by the Board on
January 22, 2019



Traverse City Light & Power

ACT Group Salary Ranges

Effective July 1, 2018 (5/14/2019 Revision)

Grade	Minimum	Midpoint	Maximum	Position
1	$37,290	$42,884	$48,476	Administrative Assistant
2	$46,900	$62,000	$70,088	Scheduling & Operations Coordinator
				~~Computer Systems Specialist~~
3	$67,841	$78,017	$88,193	Field Supervisor
				System Administrator
				Energy Technician
4	$73,681	$84,734	$95,786	Manager of HR & Communications
				System Engineer
				Line Superintendant
5	$82,667	$95,067	$107,467	Controller
				Manager of Telecom & Technology
				Operations Manager
6	$97,485	$112,877	$128,269	
7	N/A	N/A	N/A	Executive Director

TRAVERSE CITY
LIGHT & POWER

To: **Light & Power Board**
From: Daren Dixon, Operations Manager
Date: May 9, 2019
Subject: Easement request - 743 Boyd Avenue

McLain Management, LLC, the owner of landlocked property located at 510 Barlow Street (Owner) has requested an easement be granted to build an access driveway across a lot at 743 Boyd Ave owned by the Traverse City Light and Power Department. The Traverse City Planning Department has informed the Owner that they must have 20' of roadway frontage in order to develop the property. The Owner also owns 750 Eighth Street and is planning to provide the 20' of frontage from that lot through a property line adjustment in order to fulfill this requirement. However, the City has expressed a desire to have fewer driveway accesses onto Eighth Street; therefore the request is for TCL&P to grant an easement that would allow ingress/egress and driveway construction on the western 20' of the 743 Boyd Avenue property. The easement would prohibit construction of above ground structures or any facilities that would impede TCL&P access. It would be non-exclusive, meaning that TCL&P could also use the driveway.

There are existing TCL&P and Consumer's Energy transmission and distribution facilities on or crossing the TCL&P lot, which is across Barlow from TCL&P's Barlow substation. This part of the lot is not considered by staff to be useable for future substation expansion. To ensure that unforeseen future needs may be met staff proposes that the easement be revocable with a one-year notification from TCL&P and the Owner is to pay all costs related to the easement creation and recording.

Since this easement is revocable it has minimal value. The City Assessor believes that $500 would be fair consideration.

This item is on the Consent Calendar as it is deemed non-controversial. Approval of this item on the Consent Calendar means you agree with the motion provided below.

If any member of the Board or the public wishes to discuss this matter, other than clarifying questions, it should be placed on the "Items Removed from the Consent Calendar" portion of the agenda for full discussion. If after Board discussion you agree with staff's recommendation, the following motion would be appropriate:

MOTION ON FOLLOWING PAGE

FOR THE LIGHT & POWER BOARD MEETING OF MAY 14, 2019

MOVED BY _____, SECONDED BY _____,

THAT THE BOARD ADOPTS THE RESOLUTION CERTIFYING PROPERTY TO BE SURPLUS AND APPROVES THE GRANTING OF A NON-EXCLUSIVE REVOCABLE EASEMENT FOR AN INGRESS/EGRESS DRIVEWAY ON TCL&P PROPERTY AT 743 BOYD AVENUE, SUBJECT TO THE CITY COMMISSION AFFIRMING THAT THE AFFECTED PROPERTY IS SURPLUS AND SUBJECT TO GENERAL COUNSEL'S APPROVAL OF THE FORM OF THE EASEMENT, AND FURTHER THAT THE EXECUTIVE DIRECTOR IS AUTHORIZED TO EXECUTE THE EASEMENT.

TRAVERSE CITY LIGHT AND POWER DEPARTMENT
RESOLUTION
CERTIFYING PROPERTY TO BE SURPLUS FOR
OPERATION OF THE TRAVERSE CITY LIGHT AND POWER DEPARTMENT

WHEREAS, the Traverse City Light and Power Department owns 743 Boyd Ave., Traverse City, Michigan, Grand Traverse County, which is Lot 6 and the North 2 feet of Lot 7, Block N, Hannah, Lay & Co's 7th Addition; and

WHEREAS, the west 20 feet of that property are not necessary or advantageous for the operation of the Traverse City Light and Power Department;

NOW, THEREFORE, BE IT RESOLVED that an ingress/egress easement over the west 20 feet of the above property is certified as not necessary for the operation of the Light and Power Department; and

BE IT FURTHER RESOLVED that the Executive Director is authorized to execute an Easement to McLain Management, LLC, Traverse City for a revocable, non-exclusive ingress/egress easement, conditioned upon the surplus status of this property being confirmed by the Traverse City Commission pursuant to City Charter Section 179(b).

I hereby certify that the above Resolution was adopted on _____, 2019, at the regular TCL&P Board meeting held in the Commission Chambers, Governmental Center, 400 Boardman Avenue, Traverse City, Michigan.

_____
Timothy J. Arends
Secretary
Traverse City Light & Power Board

Properties involved with 743 Boyd Ave Easement Request

Properties involved with 743 Boyd Ave Easement Request

TRAVERSE CITY
LIGHT & POWER

To: **Light & Power Board**
From: Tim Arends, Executive Director
Date: May 6, 2019
Subject: Heritage Option

After the update provided at the March board meeting, staff continued to work towards achieving the Board's strategic plan goal of providing 100% renewable power to its customers in a fiscally sound manner by working with Heritage Sustainable Energy LLC ("seller") on a new pricing schedule regarding the proposed expansion of the M-72 solar array.

The seller presented the following pricing offer to expand the M-72 array an additional 2 MW that includes capacity, energy and renewable energy credits: the first five years at a flat rate of $57.00 per MWh with a price increase to $71.41 in year 2025 and a 1.5% inflationary increase each year thereafter until year 2041 ending with a final year price at $90.62.

Included with the memo is an analysis showing the pricing of the project compared to the calculated avoided cost of solar. The average avoided cost of solar for this project is $58.30 and the average price of the contract is $74.94. This calculates to an average premium cost of approximately $40,000 a year or $16.27 per MWh or the amount estimated to be paid over market cost.

Staff inputted the average price of the contract in the next fiscal year's purchase power costs to provide a general idea of the impact it will have on the power service recovery rate. The result showed the power service recovery rate to increase less than .35% or $.0002 per kWh. Translated to annual costs for each major customer class the average residential customer bill will increase $1.31 per year, average commercial customer bill will increase $3.19, average commercial demand customer bill will increase $26.99, average industrial customer bill will increase $171.26, respectively.

Additionally, by constructing and generating this energy locally, the region will benefit from other quantifiable and non-quantifiable benefits including generating local economic activity and tax revenue for the region along with environmental and health benefits. In addition, it will provide sustainability to the utility's local distribution system.

Based on the minimal impact on the power service cost recovery rate, the benefits of local renewable generation, and achieving almost one percent to meet the Board's goal of 100% renewable power, staff recommends the Board approve staff to move forward with negotiating terms of the contract to be brought back at the June board meeting for approval.

If after Board discussion you agree with staff's recommendation the following motion would be appropriate:

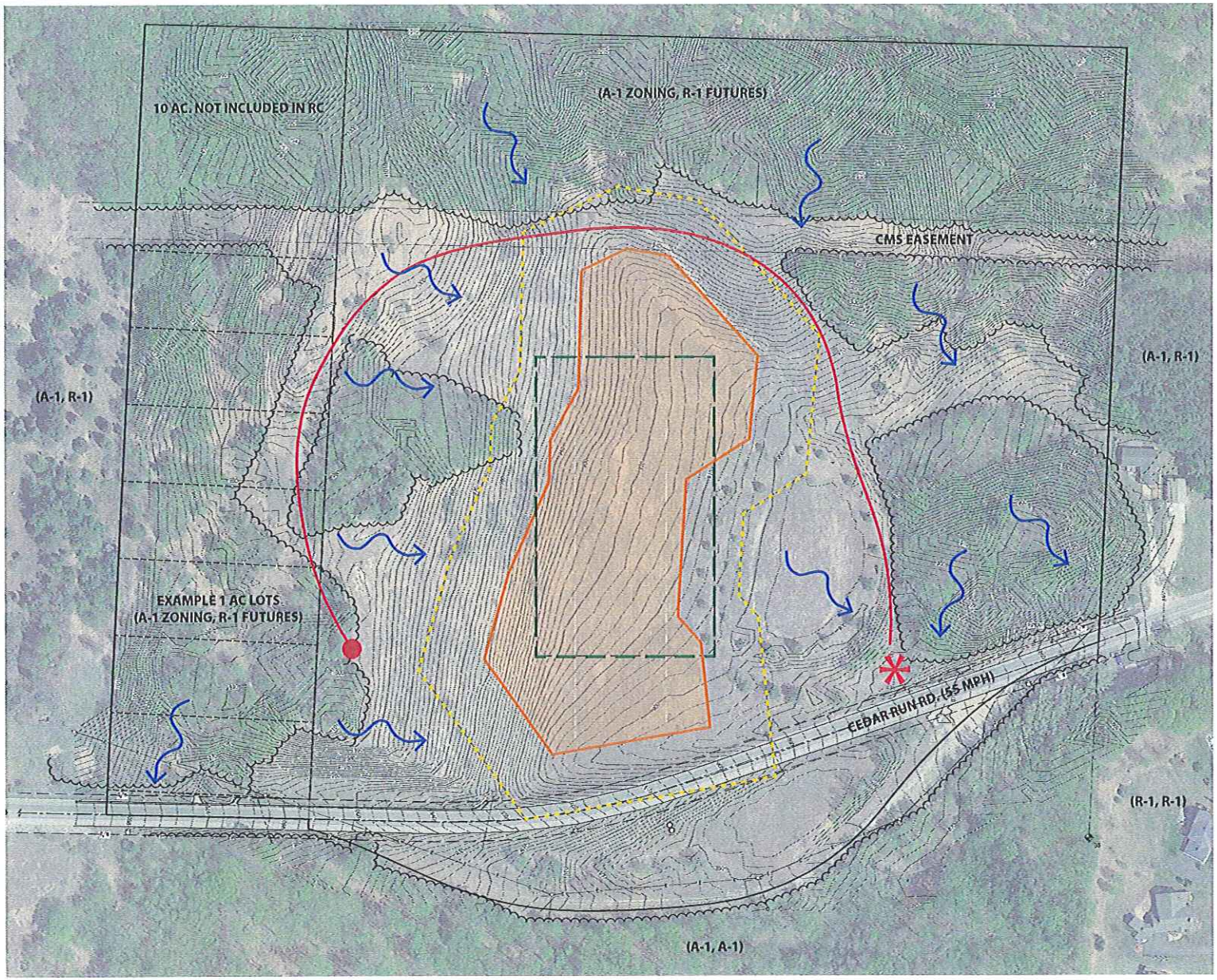
MOVED BY _____, SECONDED BY _____, THAT THE

LIGHT & POWER BOARD DIRECTS THE EXECUTIVE DIRECTOR TO NEGOTIATE AN AMENDED CONTRACT WITH HERITAGE SUSTAINABLE ENERGY, LLC TO INCORPORATE AN ADDITIONAL 2 MW OF SOLAR ENERGY WITHIN THE EXISTING CONTRACT BASED ON THE PRICE STRUCTURE PRESENTED ABOVE.

Traverse City Light and Power
Heritage Expansion
May 2019

OPTION - SEE PRICE SCHEDULE BELOW AND EXTENSION OF CURRENT CONTRACT TO 2041
ADDITIONAL - 2 MW SOLAR

		COST OF PROPOSED CONTRACT			AVOIDED COST OF SOLAR		
Year	Calendar year	Generation in MWh	Price per MWh	Total Cost	Avoided Cost per MWh	Avoided Cost in $	Difference between Contract and Avoided Cost
1	2020	2,619	$ 57.00	$ 149,280.23	$ 52.90	$ 138,542.52	$ 10,737.70
2	2021	2,606	$ 57.00	$ 148,533.82	$ 52.75	$ 137,458.93	$ 11,074.89
3	2022	2,593	$ 57.00	$ 147,791.15	$ 51.93	$ 134,645.52	$ 13,145.63
4	2023	2,580	$ 57.00	$ 147,052.20	$ 51.23	$ 132,166.39	$ 14,885.81
5	2024	2,567	$ 57.00	$ 146,316.94	$ 51.94	$ 133,328.10	$ 12,988.84
6	2025	2,554	$ 71.41	$ 182,390.35	$ 53.33	$ 136,211.70	$ 46,178.65
7	2026	2,541	$ 72.48	$ 184,197.65	$ 55.09	$ 140,003.43	$ 44,194.22
8	2027	2,529	$ 73.57	$ 186,032.90	$ 56.22	$ 142,160.79	$ 43,872.10
9	2028	2,516	$ 74.67	$ 187,870.34	$ 57.29	$ 144,142.12	$ 43,728.22
10	2029	2,503	$ 75.79	$ 189,734.83	$ 58.41	$ 146,225.25	$ 43,509.58
11	2030	2,491	$ 76.93	$ 191,625.79	$ 59.22	$ 147,511.76	$ 44,114.04
12	2031	2,478	$ 78.08	$ 193,517.89	$ 59.68	$ 147,914.29	$ 45,603.60
13	2032	2,466	$ 79.25	$ 195,435.59	$ 60.68	$ 149,640.78	$ 45,794.81
14	2033	2,454	$ 80.44	$ 197,378.36	$ 61.26	$ 150,315.74	$ 47,062.62
15	2034	2,441	$ 81.65	$ 199,345.64	$ 62.48	$ 152,542.75	$ 46,802.89
16	2035	2,429	$ 82.87	$ 201,312.61	$ 62.02	$ 150,662.58	$ 50,650.03
17	2036	2,417	$ 84.12	$ 203,327.43	$ 62.01	$ 149,885.10	$ 53,442.34
18	2037	2,405	$ 85.38	$ 205,341.13	$ 63.63	$ 153,031.81	$ 52,309.32
19	2038	2,393	$ 86.66	$ 207,377.47	$ 64.04	$ 153,247.78	$ 54,129.68
20	2039	2,381	$ 87.96	$ 209,435.93	$ 65.72	$ 156,481.69	$ 52,954.24
21	2040	2,369	$ 89.28	$ 211,516.00	$ 65.95	$ 156,244.18	$ 55,271.82
22	2041	2,357	$ 90.62	$ 213,617.18	$ 66.30	$ 156,288.01	$ 57,329.17
Total MWh generated/cost		**54,691**		**$ 4,098,431.44**		**$ 3,208,651.21**	**$ 889,780.22**
Average			**$ 74.94**	**$ 186,292.34**	**$ 58.67**	**$ 145,847.78**	**$ 40,444.56**



GoslingCzubak
engineering sciences, inc.
1280 Business Park Dr.
Traverse City, Michigan
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info@goslingczubak.com
www.goslingczubak.com

CIVIL ENGINEERING
SURVEYING
ENVIRONMENTAL SERVICES
GEOTECHNICAL
CONSTRUCTION SERVICES
DRILLING
LANDSCAPE ARCHITECTURE

No.	Date	Revision	By

SITE INVENTORY AND ANALYSIS
CEDAR RUN ROAD SITE
TRAVERSE CITY LIGHT & POWER

Date Issued	05/02/2019
Date Surveyed	
Designed By	
Drawn By	KSA
Checked By	BDH
Scale	AS NOTED

Original sheet size is 22x34

Location:
PT OF THE SW 1/4
SECTION 5
T27N-R11W
GARFIELD TWP.
GRAND TRAVERSE CO., MI

Project Number
2018720001.01

Sheet
2

TCL&P – Cedar Run Road Property
Environmental Issues Update
March 8, 2019

To: Tim Arends, TCL&P

From: Donald Conway, C.P.G.

The following provides updated information on environmental issues since the previous update dated

The following provides updated information on environmental issues since the previous update dated January 15, 2019.

The MDEQ files for this property have been reviewed. The files were in storage in Lansing and were shipped to and reviewed at the MDEQ office in Cadillac. After the file review, conversations were had with representatives of the MDEQ – Waste Management and Radiological Protection Division, Jim Staley (Environmental Engineer) and Phil Roycraft (District Supervisor). Phil is well versed in the history of this project as he was actively involved with the project in the 1980s and 1990s.

Based on my recent conversations with the MDEQ, TCL&Ps options for potential development of a portion of the Cedar Run Road property is as follows.

Modifying the Restrictive Covenant
Modifying and reducing the footprint of the current restrictive covenant remains feasible. However, the MDEQ's position is that based on the history the property, the scope work completed in the 1990's to close the disposal area, regulatory changes in the 25 years since the disposal area was closed, new site characterization work would be required in order for the MDEQ to agree to a reduction in the area subject to the restrictive covenant. This would likely include:

- Soil sampling of former outlying disposal areas where waste piles previously existed but were excavated during the closure work in 1994. The waste from these areas was moved to the area that was subsequently capped. There is no record of verification soil sampling to document that all waste was in fact moved. I assume that the limits of where to excavate and how much to excavate were based field observations.

- Groundwater sampling to assess current groundwater conditions. Post closure groundwater monitoring was conducted for five years. The last event was conducted in December 2000. Of the seven monitoring wells sampled in 2000, at least three had at least one parameter (iron), that exceeds current clean up criteria of 0.3 mg/L. For those wells, the iron concentrations were not exceptionally large (less than 2 mg/L). However, this would likely pose some regulatory challenges.

To collect new groundwater samples, it may necessary to install new monitoring wells. The old wells, if they still exist, have not been maintained in at least 18 years. If the wells are constructed from steel, as I suspect they are, this could lead to suspect metals analysis. Wells constructed from steel can be acceptable for producing samples for metals analysis, as long as they have been maintained. It is possible that groundwater sampling can be accomplished via temporary sampling points without the installation of additional or replacement wells. However, this method is best for groundwater sampling on a one-time basis. Pending the sampling results, the MDEQ may want to see additional groundwater sampling events. If so, groundwater sampling via temporary sampling points is not desirable.

In the event groundwater sampling results are unfavorable, the MDEQ could request more work.

We can make an argument to the MDEQ that groundwater sampling is not necessary since municipal water is available to the property and TCL&P could prohibit via a restrictive covenant installation of all water wells. Based on my initial conversations with the MDEQ, I am not confident they will agree.

To define the work necessary to modify the restrictive covenant, we would negotiate a scope of work with the MDEQ and provide a work plan for their review and approval. It is my understanding that ultimately any changes for the area subject to the restrictive covenant and changes in content to the restrictive covenant would have to be approved by the MDEQ in Lansing.

Work Within the existing Restrictive Covenant

In my conversation with the MDEQ, another less onerous option was discussed. This would allow the 10 western most acres that are not subject to the restrictive covenant, be sold and developed. The 40 acres subject to the RC and the RC itself would remain intact. However, work on the restricted 40 acres could take place to provide access to the 10 western acres. The MDEQ is willing to consider changes to the restricted 40 acre property but they require submission of specific plans for their review and approval. It is worth noting that approval for this level of work will likely come from the MDEQ district office in Cadillac and not Lansing.

Solar Panel Array

Under either option discussed above, installation of a solar panel array is feasible. Plans would have to be submitted for MDEQ approval. The MDEQ indicated they are receptive to this idea.

If any portion of the installation is over the capped area, the most significant issue at this time is "how much soil overlies the cap?". The cap was installed directly on top of the ash waste and consists of 40 mil PVC sandwiched between two layers of geotextile fabric. The cap was then covered with a 24-inch drainage sand layer. On top of the drainage layer a "landscape layer" was installed. The landscape layer was a way of making use of extra on-site soils and creating site topography favorable for surface water drainage. Within the final "Closure Report" dated November 1995 submitted by Earth Tech, there is conflicting information regarding the thickness of the landscape layer. The plan for installation of the landscape layer, as stated in the Closure Report, was that the layer will vary in thickness from approximately 5 to 10 feet. However, Appendix I of the of the same report shows a cross section of the cover system that contains a hand-written note that the landscape layer varies in thickness from 0 ft on the east side to 15 ft on the west side. This may pose a challenge regarding installation of a solar panel array depending upon what type of foundation system is required. Accordingly, if the solar panel array is to be installed on the cap area, the thickness of the soil overlying the cap would need to be confirmed so that subsurface work does not damage the cap.

Options to confirm the thickness of the soil overlying the cap include:

- Test pits via excavation. This might include a combination of hand digging plus using a backhoe that has a specialize bucket to reduce the chance of damaging the cap.

- Test pits via vacuum truck. The soil is removed by vacuum hose and discharges the soil into a truck. This accomplishes soil removal with a greatly reduced risk of penetrating the cap.

In both cases, soils are returned to the test pits.

Conclusions

The western 10 acres is not subject to the existing restrictive covenant and can be developed subject to Grand Traverse County and Garfield Township zoning and building regulations. The degree to which the 40 acres that are subject to the RC can be incorporated depends on pursing one of two options: 1) the restrictive covenant is modified to enhance development opportunities; or 2) the restrictive covenant remains intact and development activities on the restricted 40 acres is subject to MDEQ approval.

Option 1 – Modify Restrictive Covenant

The costs in both dollars and time for modifying the RC has the potential to be significant. The MDEQ will require additional site characterization (e.g., soil and groundwater sampling). MDEQ approval would come only after a scope of investigation

work has been negotiated and executed. Final approval depends in large part on the results of the investigation. Accordingly, the outcome of this strategy is not certain. There is a risk that the investigation produces unfavorable results and the MDEQ could then request additional work. Because of the factors that are not knowable at this time, coming up with a cost opinion for pursuing this option is problematic. Best case scenario would be in the range of $30,000 and it could easily go higher.

Option 2 – Work With Restrictive Covenant Intact
The second option is where the western 10 acres is sold for development and improvements are made on the restricted 40 acres subject to MDEQ approval. This does not necessarily require a great deal of additional environmental work that would not be done otherwise during the course of normal development. The critical step is getting the activities on the restricted 40 acres approved by the MDEQ. Cost Opinion for additional Environmental Services $5,000

Solar Panels
Installation of a solar panel array on the capped area would require the development of specifications for installation. Steps have to be taken to ensure that there is sufficient soil over the cap to accommodate any subsurface work. Determining the amount soil covering the cap might be best accomplished via test holes via vacuum truck. The work related to the installation of solar panel array, including test pit activity, would have to be submitted for MDEQ review and approval. Cost Opinion for test-pits via vacuum truck is $10,000, which includes submitting for MDEQ approval of test pits, staking pit locations, vacuum-truck for one day, returning soil to test pit.

TCL&P – Cedar Run Road Property
Environmental Issues Summary
January 15, 2019

1. HISTORY

Date	Description
1976-1988	Property used by TCL&P for disposal of fly ash
1988	State issues cease and desist order RE: fly ash disposal
9/27/1993	Consent Order - option to get license and continue operation, or close
3/22/1994	Restrictive Covenant on 40 acres for 50 years
1994	Closure of disposal pit -consolidate waste -install cap -cover with soil
11/28/1995	Final Closure Report submitted
2/14/1997	Closure approved by MDEQ
1995-2000	Post-closure groundwater monitoring
1999-2000	Road work completed on Cedar Run Road
9/2005	Consent Order dissolved

2. RESTRICTIVE COVENANT (RC)
    a. Current restrictions
        i. Cannot fill, grade, excavate, drill or mine until 50 years after completion of landfill activities unless approved by MDEQ.
        ii. Covers 40 acres
            1. Western most 10 acres not subject to RC

3. OTHER
    a. Status of groundwater monitoring wells
        i. Abandoned or still in place?

4. OPTIONS
    a. Options to modify RC
        i. Reduce area subject to surface restrictions
            1. capped ash area plus minimum of 100-ft buffer
            2. management of surface water runoff
        ii. Groundwater restrictions?
            1. Without groundwater restrictions, additional groundwater monitoring data will likely be required by MDEQ.

5. SOLAR PANELS
    a. MDEQ has favorable opinion on installation of solar panels at closed landfills
    b. If installation is on capped disposal area, need confirmation of fill over cap
        i. Interim Closure Report (12/1994) states that cap will be covered by 7.5–12.5 ft of soil. Soil was not installed as of date of report. Final Closure Report copy has not yet been located or reviewed to confirm.

DIVISION 2: CONCEPTUAL REVIEWS

PURPOSE

The intent of the conceptual review process is to provide an opportunity for an informal dialogue between an applicant and the Planning Commission to discuss a potential development project.

SECTION 410 CONCEPTUAL REVIEWS BY PLANNING COMMISSION

A. Generally

At the request of the applicant, the Planning Commission shall conduct a conceptual plan review to identify potential issues and concerns that should be addressed prior to formal review of any application requiring Planning Commission review and approval. Conceptual plan review shall not constitute an approval of the application, nor shall statements by the Planning Commission, Township Staff and/or Township consultants be construed as a position regarding the merits of the application.

B. Design Considerations and Public Input Encouraged

Prior to any conceptual review by the Planning Commission, the applicant is strongly encouraged to review and incorporate the design elements of the New Designs for Growth Development Guidebook. The applicant is also strongly encouraged to host an open meeting with property owners in the vicinity to introduce the project and identify potential issues and concerns of the vested stakeholders of the community. At the discretion of the applicant, the conceptual review before the Planning Commission may take place following public notice of the meeting. Opportunity for public comment shall be provided during the conceptual review process when public notice has been provided.

C. Adequate Information and Materials

The benefits of a conceptual review process are likely to be enhanced through the provision of sufficient information to enable the Planning Commission to reasonably understand a proposed project and the issues being presented for discussion. In order to appear before the Planning Commission for a conceptual review, an applicant shall therefore submit adequate information and materials that describe the potential development project and outline the concepts that are intended to be discussed by the Planning Commission. Sketch plans drawn to a reasonable scale are encouraged. In providing written and/or sketch plan information to the Planning Commission for the purposes of a conceptual review, submittal of the following information, when known, is encouraged:

(1) The boundaries of the development site;
(2) The total number of acres in the project;
(3) The number of acres to be developed by each type of use;
(4) The number of residential units;
(5) The number and/or square feet and type of nonresidential uses;
(6) A description of the proposal in terms of its relationship and intended connections to surrounding land uses, development projects, public lands, and existing and future street networks;
(7) The general topography of the site and its relationship to adjoining land;
(8) A general description of the natural resources and natural features of the site and, where known, an indication of which will be preserved and which will be removed;
(9) The number of acres to be preserved as open or recreational space, and its general location;

(10) Variations from ordinance regulations that are being sought and the reasons to support the requested changes; and
(11) The public facilities intended to serve the planned unit development, such as sewage disposal, water supply, storm water systems, etc.

SECTION 427 PLANNED UNIT RESIDENTIAL DEVELOPMENTS (PURD)

The purpose of this section is to provide for a degree of flexibility and creativity in the planning and design of residential development projects. The standards of this section invite efficient, clustered development on portions of a site so that developers are better able to provide amenities and infrastructure improvements.

Planned Unit Residential Developments may incorporate any residential use which is permitted by right, under conditions, or under Special Use Permit within the Township's various residential zoning districts. It is expected, however, that the proposed use or mix of uses will be compatible within the site itself, but more so be compatible with and similar to existing and planned residential uses in the surrounding area.

A. Eligibility

(1) Generally

An application for a planned unit residential development may be submitted for any property zoned for residential use, and is especially encouraged on properties designated for redevelopment by the Garfield Township Master Plan. In order to qualify for a PURD the project should be developed using clustered methods and innovative design while providing desirable open space and pedestrian connectivity. In exchange, the Township may authorize reductions in minimum lot size and increases in maximum density which would otherwise apply. Applications which do not meet the purpose and intent of this section will not be accepted. In addition to provisions of this Section, the provisions of § 425 Planned Developments shall also apply.

(2) Site Accessibility

A planned unit residential development shall be directly accessible from major thoroughfares as designated on the Major Thoroughfare Plan for the Township. The Township may authorize a project that does not have direct access to a major thoroughfare, provided appropriate findings of fact are made demonstrating that:

(a) The project is directly accessible from a public road of suitable design and construction to handle any anticipated traffic that will be generated by the project; and

(b) The anticipated traffic volumes are not reasonably expected to result in adverse impacts for those uses and properties along the public road system; and

(c) Access management controls and connectivity to adjacent properties are utilized to ensure the efficiency and safety of the public road system will not be negatively impacted.

B. Preliminary Review and Decision

(1) Generally

Preliminary review shall establish proposed land uses, project density, site layout and design, proposed vehicular and pedestrian circulation patterns, natural resource protection areas, open space, land use buffers, grading, storm water management patterns, and site servicing. Final engineering is not required for preliminary review and decision.

(2) Completeness Review

The Director of Planning or designee shall conduct a completeness review in accordance with § 403 and § 425.D.

(3) Planning Commission

(a) The Planning Commission shall hold a public hearing on the PURD.

(b) Following review and public hearing on the application, the Planning Commission shall approve or deny the request for preliminary planned unit residential development approval. Preliminary recommendation of a planned unit development shall specify all conditions that must be satisfied prior to submission of the planned unit residential development under § 426.C., Final Review and Decision.

(c) Preliminary plans may not be altered or amended except as required by final engineering and authorized by the Director of Planning.

(d) Pursuant to § 425.L(3), preliminary approvals are valid for 12 months and not subject to an extension. Preliminary approval shall expire automatically.

C. Final Review and Decision

(1) Generally

Final review shall address all conditions imposed by the Planning Commission in the preliminary decision on the planned unit residential development. Submissions for final review and decision shall not be considered until all conditions have been addressed.

(2) Completeness Review

The Director of Planning or designee shall conduct a completeness review to determine that all conditions of the preliminary decision have been addressed. Once the plans and conditions are deemed substantially complete the project shall be referred to the Planning Commission for its final review and decision. No application shall be referred to the Planning Commission until this standard has been satisfied.

(3) Planning Commission

(a) The Planning Commission may hold a public hearing on such application for final review and decision.

(b) Following review, the Planning Commission shall render a decision to approve, approve with final conditions, or deny the request. Approval of a planned unit residential development shall be incorporated in a Report and Decision Order that shall include the decision, the basis for the decision and any final conditions imposed.

D. Approval Criteria

In its review of an application the Township shall, at a minimum, consider the criteria as defined in § 427.D.(1) Scope of Authority - Uses through § 427.D.(4) Criteria.

(1) Scope of Authority - Uses

A planned unit residential development may include any residential use(s) permitted by right, permitted under special condition or permitted by special use permit in the various agricultural

or residential zoning districts within the Township, provided appropriate findings of fact are made demonstrating that:

(a) The proposed density is in accordance with the policies and objectives set out in the master plan; and

(b) In areas where the surrounding lands have been substantially developed in accordance with a particular land use character, pattern and density, the PURD shall be consistent and compatible with that existing residential uses, land use character, pattern and density.

(2) Scope of Authority – Dimensional Standards

A planned unit residential development may alter and establish lot size limits, buffers, open space areas, density limits, setback requirements, height limits, building size limits, landscaping rules, miscellaneous regulations, and intensity limits where such regulations or changes are consistent with the intent of this section and the standards set forth herein.

(3) Site Design Requirements

Generally, the design of a site must be found to meet the overall purpose and intent of this section. Additionally, the following specific design standards must be met.

(a) The site shall be designed in a compact, clustered manner which maximizes the preservation of usable and consolidated open space.

(b) Open spaces are intended to function as a public areas or parks to encourage neighborhood interaction and recreation opportunities. These areas incorporate amenities such as play structures, pedestrian circulation, pavilions, and other similar design features.

(c) Sidewalks shall be provided along all streets. Generally, sidewalks should be constructed on each side of the street except where found to serve no useful purpose, such as if there are no homes on one side of the street. Sidewalks along streets shall be constructed of concrete to a minimum width of four (4) feet and shall be separated from the street by a grassy lawn area.

(d) In addition to the street sidewalks, hard-surfaced pathways connecting open areas, parks and other points of interest shall be provided.

(e) In mixed-residential settings, each residential use (i.e. single family, multiple family, etc.) shall stand on its own in meeting the integrated site design requirements of this section. The intent of this requirement is for each area to resemble a traditional neighborhood with interior park areas. Useable open space shall be designed so that it is directly accessible to nearby residents.

(f) There shall be a direct relationship between the residential use, density, and useable space of each project area, and each such areas shall be self contained. For example, an open area located within a far corner of a high-density setting may not meet the intent of this requirement in providing open space and recreation for a neighboring low-density area of the site. However, centrally located open areas which encourage interaction between residential uses by creating shared park-like settings are supported and encouraged.

(g) The project shall be served by municipal water and sewer services.

(4) **General Criteria**

The PURD is intended to encourage well designed neighborhoods that emphasize safe movement of pedestrian traffic and open areas that encourage active lifestyles and quality of life. The Planning Commission shall determine if the project meets the following standards of approval:

(a) The project is compatible and harmonious with adjacent and surrounding land uses and properties;

(b) The project minimizes motorized / non-motorized conflict points and creates a separation of pedestrian and vehicular traffic;

(c) The development consolidates and maximizes useable open space while encouraging neighborhood interaction;

(d) The proposed use will retain as many natural features of the property as practicable, particularly where the natural features assist in preserving the general character of the neighborhood;

(e) The development is compatible with the intent and purpose of the adopted master plan.

E. Amendments

Amendments to an approved Planned Unit Residential Development shall be considered according to **the review procedure of §423.G and the review criteria of §427.D(4)** of this ordinance.

SECTION 428 OPEN SPACE PRESERVATION OPTION

Purpose: This section provides for Open Space Preservation developments in accordance with Section 506, Open Space Preservation, of the Michigan Zoning Enabling Act. The intent of this development option is to encourage and promote clustered development patterns in a manner that protects developable areas containing natural features and open space.

A. Eligibility

Any parcel or contiguous parcels may be developed under the Open Space Preservation option where the site meets all of the following criteria:

(1) The land is zoned at a density equivalent of two (2) or fewer dwelling units per acre or, if the land is served by the public sewer system, a density equivalent of three (3) or fewer dwelling units per acre;

(2) The development does not depend upon the extension of a public sewer or public water system, unless development of the land without exercising the Open Space Preservation development option would also depend upon such extension; and

(3) The open space preservation option has not been previously exercised with respect to the land.

B. Initiation

An owner of real property, or that owner's authorized representative, may apply for approval of an Open Space Preservation development by filing an application with the Zoning Administrator. The application shall include the material required by § 959 of this Ordinance.

C. Completeness Review

The Director of Planning shall conduct a completeness review in accordance with § 403.

D. Procedure

The Planning Commission shall act as the legislative body for the purposes of final review and approval. Upon receipt of a complete application and after public notice in accordance with applicable state laws, the Planning Commission shall hold at least one public hearing on the application. An Open Space Preservation development shall be approved by the Planning Commission if the application complies with all applicable provisions of this ordinance.

In its review of an application, the Planning Commission shall, at a minimum, consider the criteria of this Section.

(1) Scope of Authority - Uses

An Open Space Preservation development may include any residential use permitted by right in the underlying zoning district.

(2) Scope of Authority – Lot Size and Width Variation

The minimum lot area and lot width requirements of the underlying zoning district shall not apply to individual residential lots within an Open Space Preservation development, provided

that all rules relating to the suitability of groundwater for on-site water supply, for land not served by public water, and to the suitability of soils for on-site sewage disposal, for lands not served by public sewers, shall be complied with.

(3) Scope of Authority –Dimensional Standards

With the exception of minimum lot area and minimum lot width, any residential use permitted under the Open Space Preservation option shall comply with the minimum setbacks and other dimensional standards of the underlying zoning district.

(4) Density

The maximum number of residential dwelling units shall be equal to or less than the maximum number of residential dwelling units permitted by the underlying zoning district, as determined by the net acreage calculations of § 427.C(2)(b)(I).

(5) Required Open Space

Open space within an Open Space Preservation development shall meet all of the following criteria:

(a) Open space shall comprise not less than 50% of the land that could otherwise be developed under the standards and regulations of this ordinance;

(b) Open space shall remain perpetually dedicated in an undeveloped state by means of a conservation easement, plat dedication, restrictive covenant, or other legal means that runs with the land;

(c) Open space shall be a minimum of five (5) contiguous acres, or a contiguous 25% of the total development area, whichever is greater;

(d) Minimal areas between buildings and narrow strips along the perimeter of a development shall not be included in the open space required for an Open Space Preservation project; and

(6) Open Space Development Plan Approval Order

If the Planning Commission approves the open space development plan, it shall prepare a written order setting forth the conditions upon which such approval is based. Such order shall be entered into between the Township and applicant prior to the issuance of a land use permit for any construction in accordance with the approved development plan. All reasonable costs related to the preparation of said order, as established by the Township, shall be paid by the petitioner to the Township prior to Township signature and issuance of such order.

(7) Duration of Approval

Approval of the open space development plan by the Township shall be for a period of two (2) years from the date of execution of the Report and Decision Order, after which it shall expire automatically. Prior to expiring, the two (2) year approval period may be extended by the Planning Commission for an additional one (1) year if an extension is applied for in writing by the applicant. The applicant shall be required to demonstrate that the reasons for such extension are beyond their control and that the development will commence and continue meaningfully toward completion within the one (1) year extension.

FOR THE LIGHT & POWER BOARD MEETING OF MAY 14, 2019

TRAVERSE CITY
LIGHT & POWER

To: **Light & Power Board**
From: Tim Arends, Executive Director
Date: May 6, 2019
Subject: Cedar Run Property

Staff engaged Gosling Czubak for the purpose of evaluating the 40 acres held at the TCL&P ashpit on Cedar Run Road to determine if parcels could be developed and placed on the market for sale along with utilizing the former ashpit area for a potential solar array generation site.

Phase one services provided included background investigation/discovery of the recorded restrictive covenant, zoning review, topographic survey, and development of a preliminary site plan.

After Gosling Czubak's board presentation on Phase one, staff is requesting board approval to move forward with Phase two which will include site plan development zoning process, solar array constructability, environmental services/MDEQ approvals and land division. This board approval is for $19,800 and will require an amendment to the existing contract where $12,600 has been incurred to date.

Staff recognizes the amount is within the Executive Director's spending authority, however, staff is bringing this before the Board to ensure there is support for this project to move forward.

If after Board discussion you agree with staff's recommendation the following motion would be appropriate:

MOVED BY _____, SECONDED BY_____

THAT THE BOARD AUTHORIZES THE EXECUTIVE DIRECTOR TO EXECUTE AN AMENDMENT TO THE CONSULTANT AGREEMENT FOR PHASE TWO SERVICES PROVIDED BY GOSLING CZUBAK SUBJECT TO FORM BY GENERAL COUNSEL.

FIRST AMENDMENT TO CONSULTANT AGREEMENT

THIS Amendment to the Consultant Agreement is made and entered into as of the 1st day of Feb., 2019, by and between TRAVERSE CITY LIGHT & POWER DEPARTMENT, a Michigan municipal electric utility, whose address is 1131 Hastings Street, Traverse City, Michigan 49686 ("TCL&P"), and GOSLING CZUBAK SERVICES, INC., whose address is 1280 Business Park Dr., Traverse City, Michigan 49686 (the "Consultant").

RECITALS

WHEREAS, TCL&P and Consultant have entered into a Consultant Agreement dated November 20, 2018 for the purpose to furnish technical and professional assistance concerning the project which is described as Site Eval and Feasibility – Cedar Run Road and wish to further amend that Agreement by expanding the scope of that Agreement.

NOW THEREFORE, in consideration of the recitals and agreements contained herein and contained in the Consultant Agreement, TCL&P and Customer hereby agrees as follows:

1. The Consultant shall provide services in accordance with and as set forth in the amended Schedule A, Scope of Services as attached to this amendment. These services are described as Phase 1 – 1.4 MDEQ FOIA and Investigation.

2. The Owner shall pay the Consultant on a time and material basis, estimated to be a total of $3,100 in accordance with the Consultant's current rate charges which have been given to Owner in writing.

3. The services to be rendered under this Agreement have commenced on February 15, 2019 and shall be diligently pursued thereafter.

4. All other terms of the Consultant Agreement continue in full force and effect.

IN WITNESS WHEREOF, the parties below have entered into this Amendment on the date set forth above,.

OWNER

Timothy Arends
Executive Director

CONSULTANT

Mark J. Hurley, P.E.
Department Manager Civil Engineer

APPROVED AS TO FORM

W. Peter Doren
General Counsel

Schedule A

Proposed Scope of Services
TCL&P - 40 Acre Cedar Run Site

Project Description.

Gosling proposes to provide limited phased services to evaluate the 40-acre parcel owned by Traverse City Light & Power (TCL&P) for the purposes of determining highest and best future use pursuant to the existing restrictive covenant over the property. Services to include the following:

Phase 1

1.0 Background Investigation/Discovery. *(completed)*

1.1 Review of Declaration of Restrictive Covenant (R.C.).

1.2 DRAFT correspondence to MDNR director seeking authorization to shorten length of R.C. contingent on positive findings including but not limited to:

1.2.1 Review and status of monitoring wells/data
1.2.2 Review by TCLP attorney as to R.C. legal status and obligation (including 1.2.3 and 1.2.4)
1.2.3 Preliminary closure compliance plan (draft)
1.2.4 Review of State of MI Type III or Type II closure rules (Part 115 rules)

1.3 Meet and present findings to TCLP. ***(Initial findings memo 01/16/19)***

1.4 AMENDED services. Conduct full MDEQ FOIA investigation for RC including: (See Contract Amendment No. 1)

1.4.1 Submit FOIA request to MDEQ
1.4.2 Communications and correspondence with MDEQ J. Stayley and P. Roycraft with respect to modifying RC for future development.
1.4.3 Conduct full file review, assessment and generate findings.
- **Investigate engineering and fill records for the landfill cap relative to a future proposed solar array (footings)**
- **Groundwater monitoring and sampling.**
- **Option on the RC relative to possible proposed land uses.**
- **Develop recommendations and possible cost exposure for next phase.** ***(Completed 03/08/19)***

1.4.4 Present full findings and recommendations to the TCL&P Board at their regular meeting May 14, 2019.

2.0 Site Opportunities and Constraints. (Inventory and Analysis) *(completed)*

2.1 Zoning review – (Garfield Township zoning ordinance review inclusive of setbacks, ex. easements, road/drive access, context, future land use), site plan or PUD review process – including meeting with township planner/zoning administrator.

2.2 Topographic Survey *(completed)*

1.1 Topographic survey of the entire site including the following surface objects: Cedar Run Road features, gravel edges, utility poles, observed utility features, drainage features, fences, tree lines, monitoring wells, and spot elevations to produce 1-foot contours of the project site.
1.2 GCES will fly over the site with a UAS to obtain current aerial photography and supplemental topographic information.
1.3 Property lines, easements, fly ash outline, and right-of-way lines will be accurately depicted on the topographic survey.
1.4 The horizontal datum will be NAD83 State Plane Coordinates – Michigan Central Zone and the vertical datum will be NAVD88 (City of TC Datum).
1.5 Preparation of a topographic drawing depicting the surveyed features and 1-foot contours will be completed. The drawing will be delivered in PDF and hard copy format.
1.6

2.3 Meet and present findings to TCLP. *(Completed 01/16/19)*

3.0 Preliminary Site Plan. *(Completed)*

- Including possible parcel split; easement of overlay for closed landfill and maintenance zone and access; preliminary solar array (layout) as provided by TCLP (no solar array design included).
- Site circulation including access drive considerations with GTCRC input; interior development roads; possible developable lot layout (presume single family or condo type); preliminary region trail alignment through property (provided TART and Township Planning Commission input).
- Present preliminary site plan to TCLP. *(Completed 01/16/19 and through interoffice memo 02/04/19)*

Phase 2

1.0 Site Plan Development and Zoning Process.

1.1 Continue ongoing process with TCLP representatives at Garfield Township Planning commission based on input from the township planner. (anticipated to be 3-5-month process).

- Evaluate further development options for the residential development portion based FOIA findings and decision points to be vetted with TCL&P board.
- Evaluate utility extensions to residential portion (SNS, water); including extension of mean cost anticipated.
- Develop a preliminary development road /access including location/alignment; drive type, size and vetting with GTCRC, and necessary easement across CMS utility easement (locate power poles and indicate future easements for road and utilities).
- Develop conservation design (cluster) buildout model with industry with resultant highest yield under both zoning alternatives.
- Develop a prospectus for 10-Acre Split. Evaluate PURD ((with benefit of underlying zoning density) vs. Conventional Split for subdivision under zoning density.

2.0 Site Plan Development and Zoning Process.

2.1 Work with TCL&P reps and industry to evaluate and indicated solar array facility development for the capped land fill area.

2.2 Field Sample and observation. Conduct Vacuum truck to sample 'test' holes to verify depth to land fill membrane cap. (reference FOIA evaluation and available 'Closure Report Data')

3.0 Environmental Services / MDEQ Approvals

3.1 Work with TCL&P reps and industry to evaluate and indicated solar array facility development for the capped land fill area.

3.2 Conduct Vacuum truck to sample 'test' holes to verify depth to land fill membrane cap. (reference FOIA evaluation and available 'Closure Report Data')

4.0 Land Division.

4.1 Develop legal document and description for land split through the Garfield Township Planning Commission and Board.

- Land Division survey to create two new parcels out of the existing parcel 05-005-017-00. One parcel will be approximately 8 acres around the existing fly ash site and the second parcel will be that part of the existing parcel lying between existing Cedar Run Road and old Cedar Run Road. We will work out the parcel size and acreage with you prior to staking.

- This survey includes rebar and lath at the new corners, legal descriptions for the new parcel and remainder parcel and preparation of a Certificate of Survey drawing. We will also assist with the portions of the land division application that require surveyor input. A Certificate of Survey drawing will be prepared depicting the parcels, legal descriptions, easements, encroachments (if any), encumbrances (if any), and the required items per Garfield Township's land division application.
- TCL&P will provide current title search to ensure we have the correct existing parcel legal description and can plot existing easements of record on the survey.

PROPOSED PROJECT FEES AND SCHEDULE

Phase 1

1.0	**Background Investigation / Discovery**	$ 3500	Nov 2018
2.0	**Site Opportunities & Constraints**	$ 1500	Nov-Dec 2018
	(Topographic Survey)	$ 4000	Nov 2018
3.0	**Preliminary Site Plan**	$ 1500	Dec-Jan 2019
		$ 9500	
4.0	**Additional MDEQ FOIA and Investigation**	**$ 3100**	**Mar 2019**
	Total	**$12,600**	

Phase 2

1.0	**Site Plan Development Zoning Process**	$ 6500	May-Sept. 2019
2.0	**Solar Array Constructability***	$ 5200	May 2019
3.0	**Environmental Services / MDEQ Approvals**	$ 3600	May-Jun 2019
4.0	**Land Division**	$ 4500	(anticipated Jun-Jul.)
	Total	**$19,800**	

Note: *TCL&P may be able to utilize a City Department of Public Works (DPW) vacuum truck in order to minimize the cost of the rental unite estimated at $4000/day.

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shaping tomorrow with you

Cost Benefit Analysis

TCLP Fiber Project

Agenda

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- **Initiative Background**
- **Objectives**
- **Community Benefits**
- **Cost Analysis**
  - Assumptions
  - Scenarios
    - Break Even
    - Most Likely
    - Optimistic

Background

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- **TCLP Solicited "Partnership for Deployment of a Fiber-to-the-Premises (FTTP) Network"**
  - TCLP competitively elected Fujitsu Network Communications (FNC)
  - FNC is now delivering the Cost Benefit Analysis (May 14th Board Meeting)
  - FNC stands ready to begin deployment
- **Cost Benefit Analysis Delivery**
  - Summarized in this presentation for the Board Meeting purpose
  - The actual detailed document was submitted on May 8, 2019

Fiber Initiative Objectives

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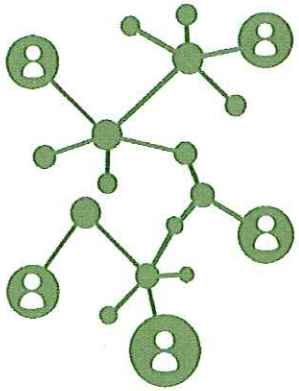
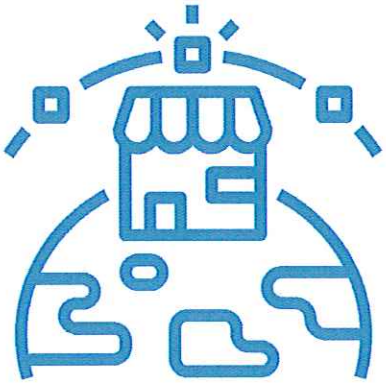
Enhance broadband connectivity for the city and region in an affordable manner



Build a fiber-based network to all residents and business in the TCLP service area



Promote economic development

Foster growth and innovation through technology

Cost Benefit Analysis Objectives

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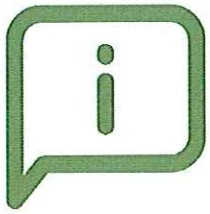
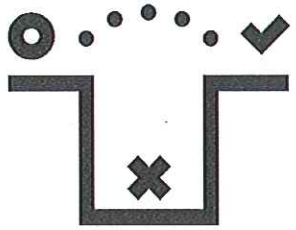
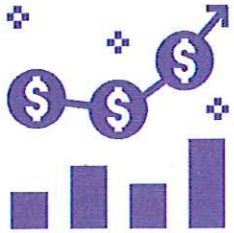


Inform the community of the benefits of a network and results of the cost benefit analysis

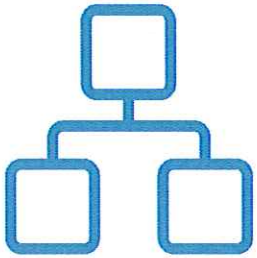
Understand the functions required to build and operate an ISP



Reveal typical risks associated with running an ISP and potential actions to mitigate them



Evaluate the financial viability of this new ISP organization



Understand options of ownership and operations, including Open Access (to be decided by the board in the future)

High Speed Broadband Is the New Utility

It Drives Prosperity

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ECONOMIC GROWTH

- **Attracts businesses** to relocate or expand into the community
- Spurs the creation and expansion of **small businesses**
- Encourages **entrepreneurship**
- Stimulates **residential growth**

WORKFORCE DEVELOPMENT

- **Web-based training**
- Continuing **education**
- On-line **university education**
- Remote work enablement

IMPROVED ACCESS TO SERVICES

- Banking
- Government services
- Education
- E-Health
- Shopping
- Staying socially connected
- Entertainment
- Fast access to information

THE BENEFITS

It Is as Vital to Economic Development as Electricity, Clean Water, Good Roads

What Does a Connected Community Look Like?

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1. 
Residents telework

2. 
Police use data to track & prevent crime

3. 
Schools use online resources, and increase safety

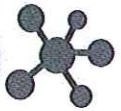
4. 
Libraries connect residents to online everything

5. 
Residents use e-government services

6. 
Government tracks traffic patterns to improve road planning

7. 
Small businesses in mixed-use developments participate in e-commence

8. 
Public agencies gather & use data to improve transportation (BATA), parking and travel info to users

9. 
Community members share and learn about local events & activities

10. 
Local governments host virtual town halls & build e-government platforms to share info & alerts

11. 
Patients have access to more health care info and options

12. 
Utilities use remote technology to monitor & improve performance & efficiency

13. 
Businesses relocate to the community, creating jobs

Source : USA Dept. of Commerce and the NTIA

What Do Other Experts Say?

Benefits Quantified

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450+

US Communities that Invested Public Broadband Infrastructure

Source: Muninetworks.org

84%

Job Seekers Completing Applications Online

Source: Pew Research

23%

Economic value from fiber is business efficiency improvement

Source: University of Tennessee at Chattanooga

4%

Increase in Household Income Due to Broadband

Source: Arthur D. Little and Chalmers University of Technology, "Socioeconomic effects of broadband speed," September 2013

1.1%

Growth in Per Capita GDP Due to Broadband

Source: Fiber to the Home Council, Washington, D.C.

3.1%

Rise in Home Values Due to Broadband Access

Source: US Dept. of Commerce, NTIA, National Study

It Is as Vital to Economic Development as Electricity, Clean Water & Good Roads

What Do Other Experts Say?

The Current View published this year

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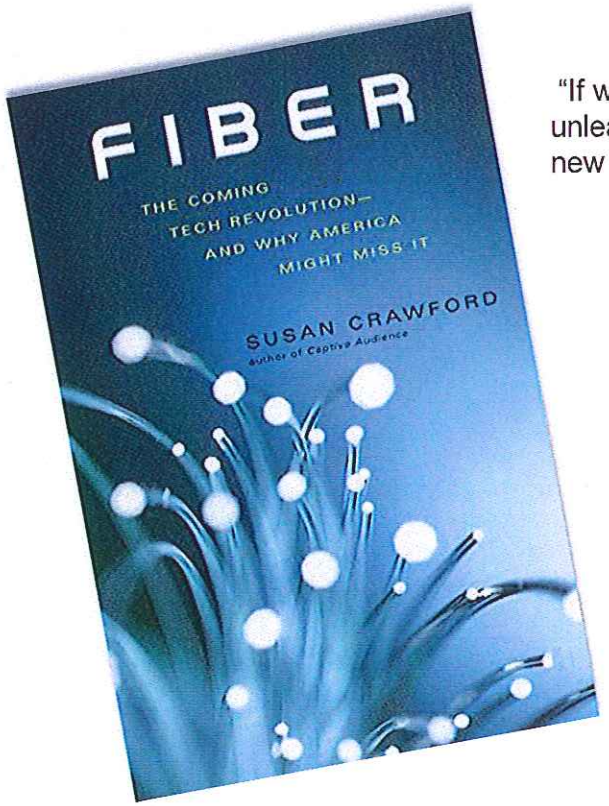


"If we can just finish the last mile for fiber to reach into households, Susan Crawford shows, we can unleash a revolution of economic growth, education, and health, and address inequality in a whole new way."— Anthony Marx, President, New York Public Library

"Fiber cities also know the difference between publicly overseen networks, aimed at providing a utility service, and a wholly private "demand-driven" communications networks." — Susan Crawford

"A utility is not a luxury. Utility services can be sold by private or public entities, but they are always subject to public obligations to reach everyone at a reasonable price, with a service meeting public quality standards." — Susan Crawford

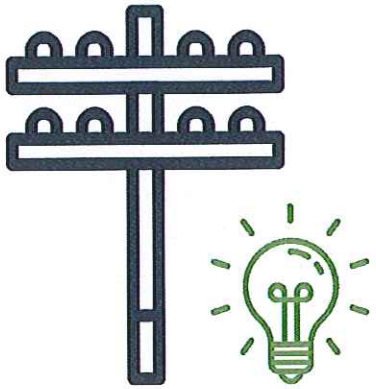
"It may sound paradoxical, but the future of advanced wireless services depends completely on how much fiber is in place." — Susan Crawford

"***Ultimately, last-mile fiber is a public good***." — Susan Crawford

Susan Crawford is the John A. Reilly Clinical Professor at Harvard Law School.

Electric Utility Benefits with a Fiber Network

FUJITSU



Advanced Technology Enablement

- AMI, HAN and Customer Engagement
- Teleprotection Upgrade
- Distribution Automation (DA)
- Distributed Generation Integration
- Enable Wireless & Mobile Applications (OMS, DMS)

Business Compelling Reasons to Act

- Major Application Deployments
- Performance / Availability
- Improving End User Experience Through Technology
- IT Control / Regulatory Compliance
- Cost Efficiencies

Network & Services Management

- Regulatory Compliances
- Business Process Alignment
- Predictive Maintenance
- Cyber Security

Support From the Community

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Traverse City Office of the City Clerk

TCAPS
Traverse City Area Public Schools
Great Community, Great Schools

Paul Soma,
Superintendent

TBA ISD LEADING LIFETIME LEARNING

Michael Hill, Superintendent
Carol Greilick, Asst. Superintendent
Jason Jeffrey, Asst. Superintendent
Stephanie Murray, Asst. Superintendent

MUNSON HEALTHCARE
Edwin Ness,
President and CEO

HAGERTY

McKeel Hagerty,
CEO

INTERLOCHEN
Center for the Arts

Jeffrey Kimpton, President
John McGarry, Chairman
Heather Cova, Corp. Secretary

LEELANAU COUNTY ESTABLISHED 1863

RJG

Networks Northwest
Elaine Wood, CEO
Gary Fedus, Chairman

Northwestern Michigan College

K. Ross Childs,
Board of Trustees

Traverse CONNECT
Achieve More. Together.

TCNewTech

Core Assumptions

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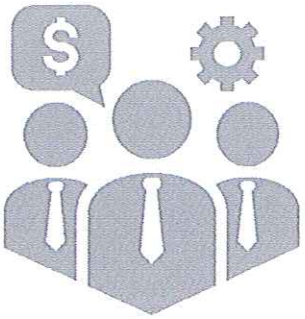
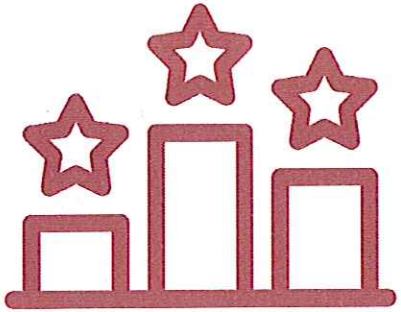
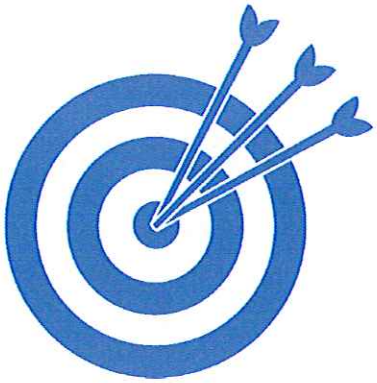


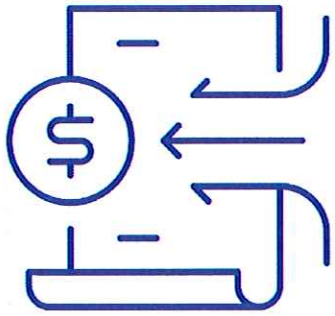
Fujitsu performs activities to market, sell, and provide services on behalf of TCLP. No designed TCLP headcount increase, or impact to electric business service



Services are based on technology capability, current competitive market offerings (not promotional offers), and industry standards on quality and service



Show multiple scenarios with reasonable expectations for take rate, pricing, build schedule, operations costs, and more, based on experience and other FTTH projects



Incorporate existing dark fiber business cash flow impact to projection

Project Assumptions

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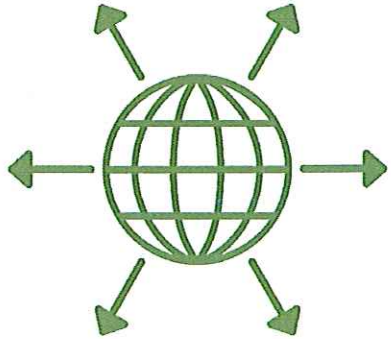
Phase 1 project area is a subset of the entire city, and the data is focused on just phase 1

TCLP direction on high mark for project funding, which includes the network build and 1st year of operations

Area selected based on holistic view of:

- Address Density
- Residential and Business Mixture
- Potential Location of Data Center
- Location of Existing Fiber
- Topology
- Expected Build Timeline



Phase 1 project allows for cost effective expansion into next phases

Organizational Assumptions

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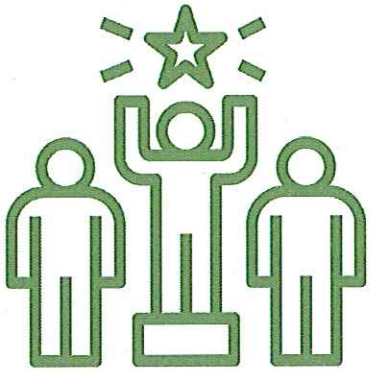
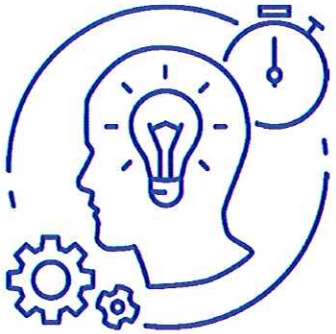


TCLP must run this as a competitive entity

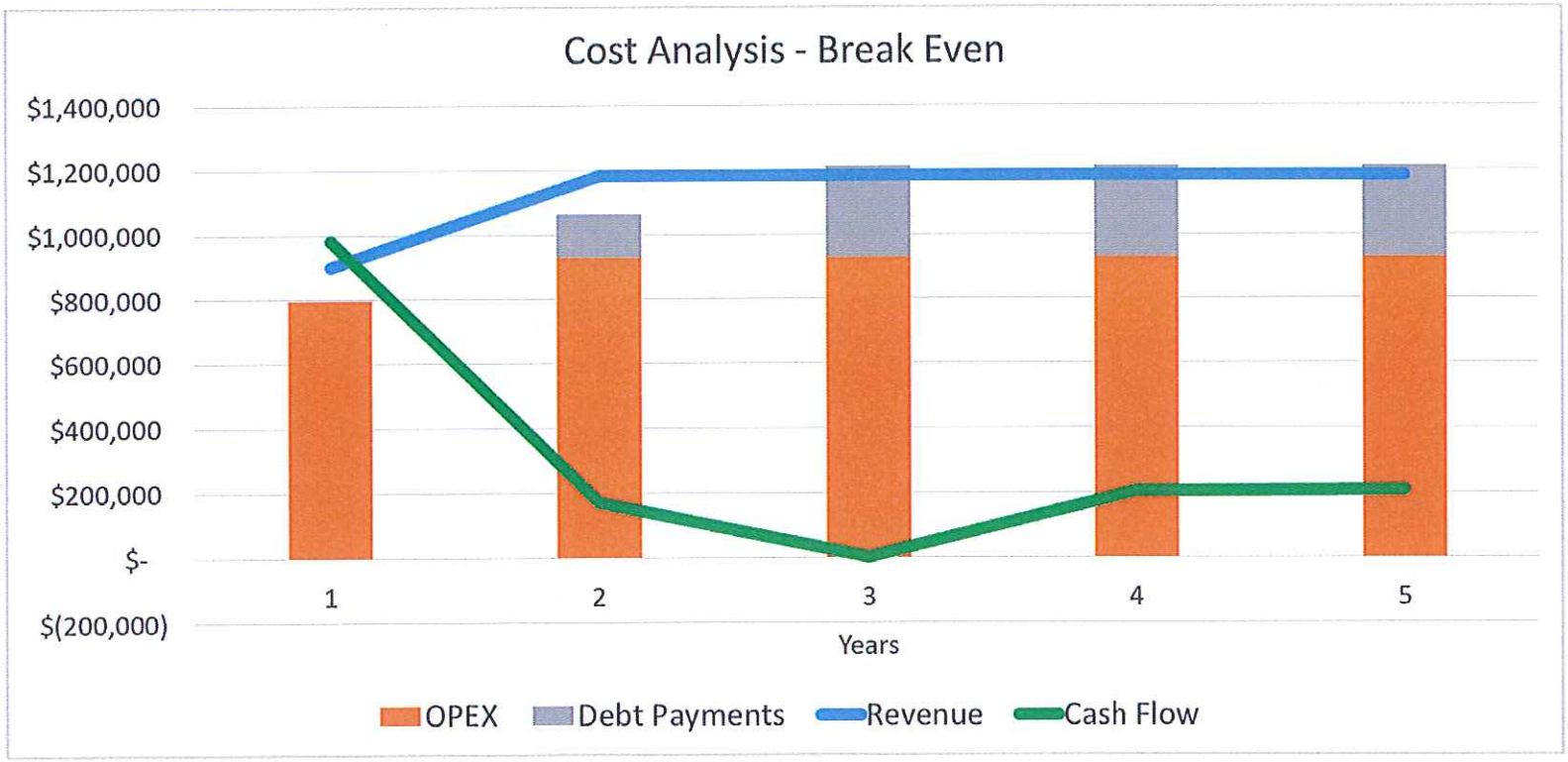
Sharing competitive information internally is key



Remain highly adaptive to market conditions

Continuously review and align the business to innovations

Break Even Scenario Summary

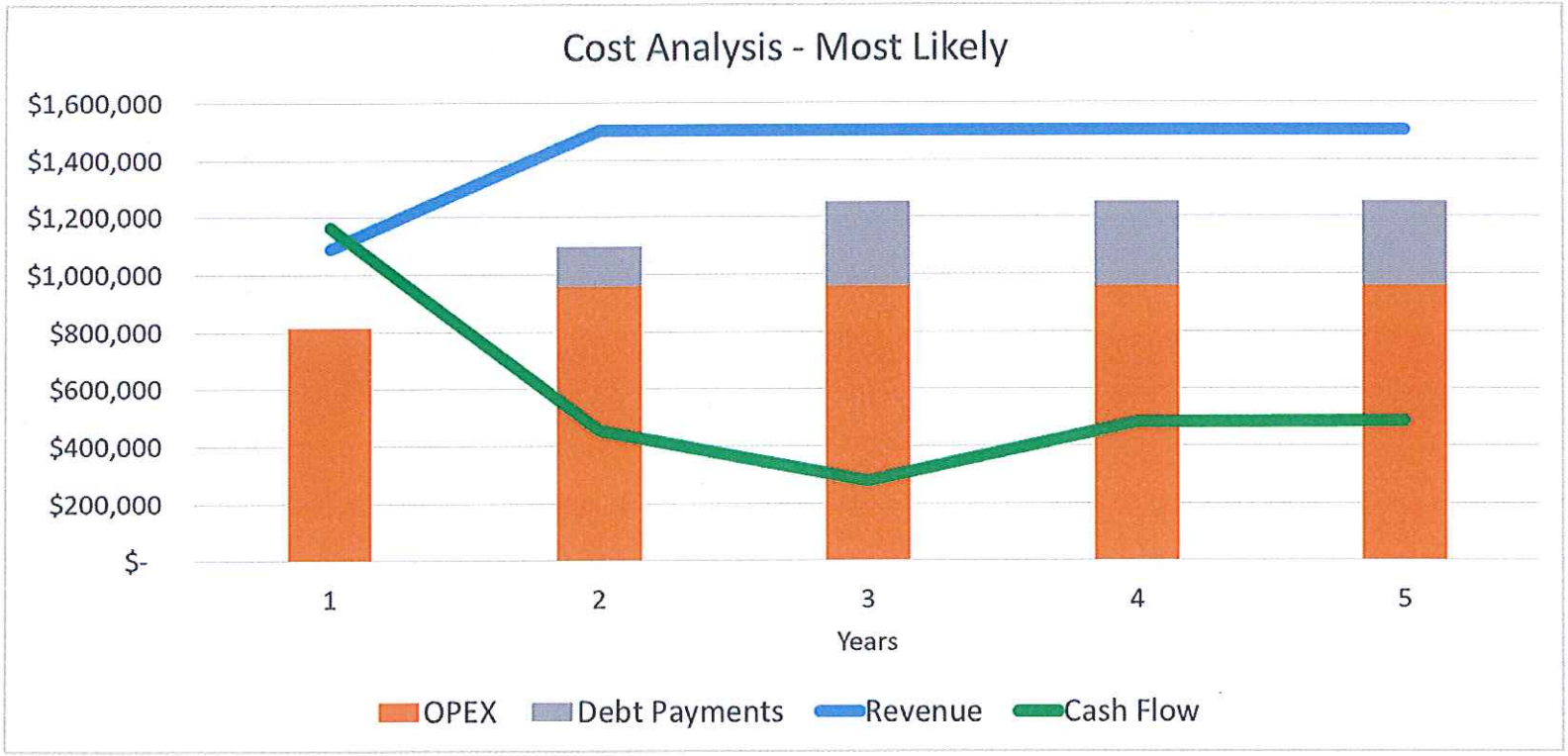


Take Rate:
Data: 40%
VoIP: 28% of Data Customers

Customers:
Residential: 402
Business: 378
VoIP: 219

Funding:
$4.0M

Most Likely Scenario Summary

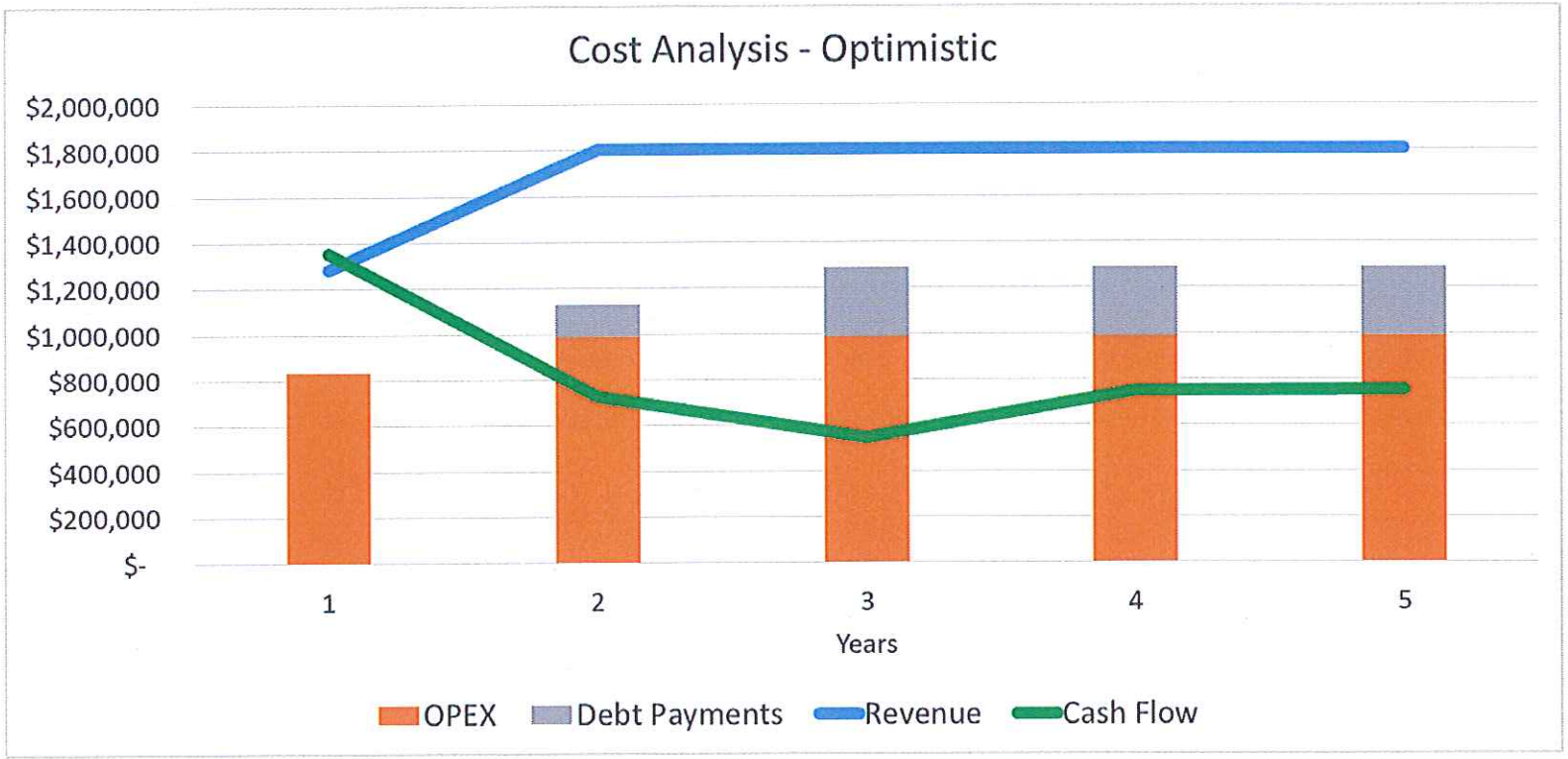


Take Rate:
Data: 50%
VoIP: 35% of Data Customers

Customers:
Residential: 503
Business: 473
VoIP: 341

Funding:
$4.2M

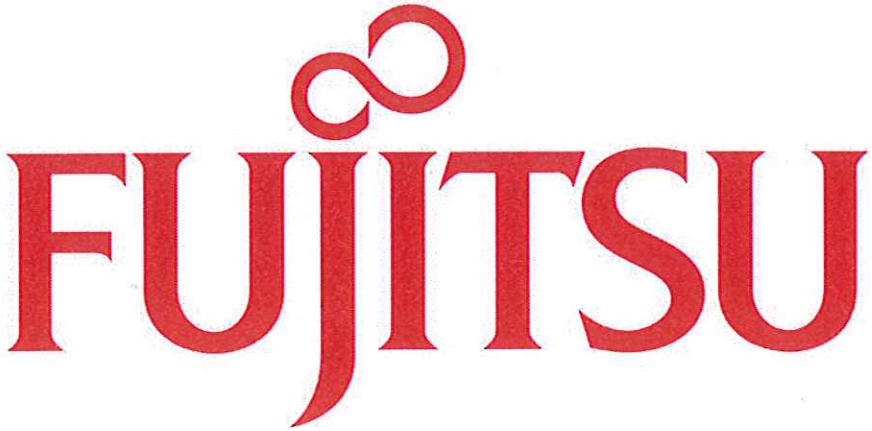
Optimistic Scenario Summary



Take Rate:
Data: 60%
VoIP: 35% of Data Customers

Customers:
Residential: 604
Business: 567
VoIP: 410

Funding:
$4.4M



shaping tomorrow with you

Traverse City Light and Power (TCLP)

Broadband Utility Cost Benefit Analysis

For: Scott Menhart

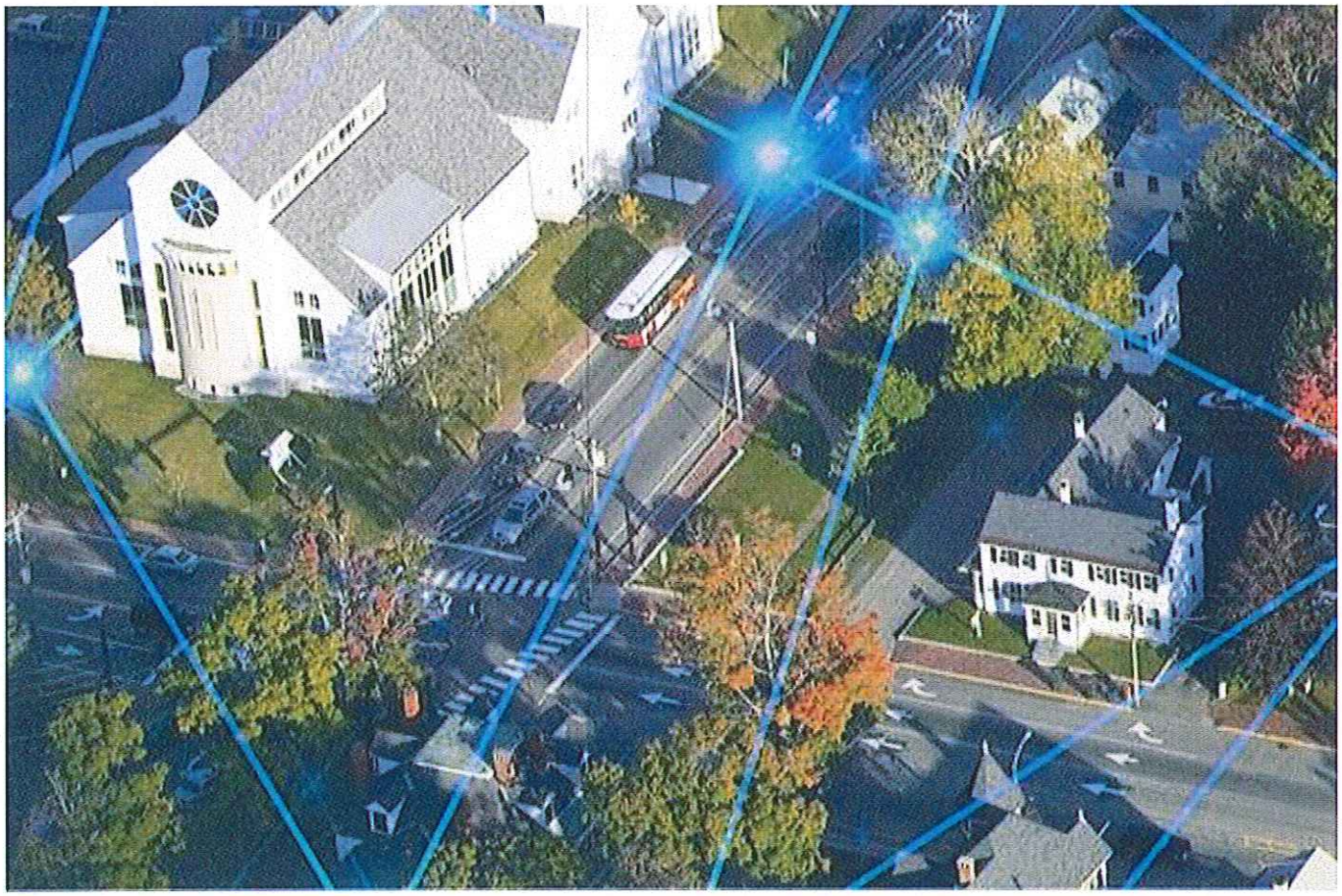
Traverse City Light and Power

Date: 05/07/2019

www.us.fujitsu.com/telecom

Fujitsu Practice Leader:
Anthony Bednarczyk

Fujitsu Network Communications is pleased to submit this Cost Benefit Analysis to TCLP. This document fulfills the agreed upon Objectives and Scope of Services as listed in Service Order, Schedule A, Req. 007873.



FUJITSU NETWORK COMMUNICATIONS | 2801 Telecom Parkway Richardson, Texas 75082 | Phone: (972) 479-6000

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Executive Summary

1. Executive Summary

In May of 2018, TCLP Staff issued an RFI at the direction of its Board of Directors to select a Partner to continue the development of a Fiber-to-the-Home Cost Benefit Analysis to enhance broadband connectivity for all City of Traverse City businesses, residents, and Community Anchor Institutions. Fujitsu was selected through a competitive bid process as the Partner best suited to deliver the full scope of services required by TCLP as well as the flexibility to meet the requirements of network ownership, control and the eventual take-over of broadband operations. TCLP Staff engaged Fujitsu to:

- Create a Cost Benefit Analysis
- Provide a View of Community and Utility Benefits of Fiber
- Design the Outside Plant Fiber Network
- Design the Operations Data Center
- Manage and Recommend Electronics Suppliers Through RFP
- Design the Operating Model and Staffing Requirements
- Design the Customer Service Model
- Develop the Marketing and Customer Education Campaign
- Plan for eventual Managed Takeover of the Operation by TCLP

This document, which is referred to as a Cost Benefit Analysis, includes content on all the items listed above. It contains some information that is confidential and unique to Fujitsu's business approach and may reveal competitive insights that might be used against TCLP should the project proceed. With that in mind, Fujitsu is committed to provide TCLP Staff and Directors, and the Board of Directors, with the information necessary to make the most informed decisions about how to meet the strategic goals of the broadband project.

Fujitsu believes strongly that for the analysis of this report to be most effective, TCLP must take steps to operate this fiber business as a competitive enterprise. This means TCLP should consider allowing for competitive information to be shared within TCLP only, remaining agile and highly responsive to competitive market events, and continuously review and align the business to innovations. Businesses change and evolve over time, and this proposed internet service provider is no different, as it requires skilled and continuous improvement to best deliver value to the community and ensure a financially stable and viable entity.

The cost benefit analysis is a culmination of several months of work by an experienced team of business strategist, telecom engineers, and network operations specialists. The Fujitsu team, working closely with TCLP staff, spent countless hours in interviews, field studies, site visits, vendor meetings and lab visits to arrive at the conclusion presented herein. This cost benefit analysis is highly customized and unique to TCLP.

Fujitsu applauds the City of Traverse City and TCLP Staff and Directors in setting timely and visionary goals for providing abundant and affordable broadband service in the region. Fujitsu recognizes that these projects are complex and costly and thorough due diligence is necessary. At the conclusion of this cost benefit analysis, Fujitsu will recommend that Board vote to proceed with the implementation of this plan as it is financially sound, operationally sustainable, risk averse and is designed to have no impact on Electrical service delivery.

Through this analysis it is clear that fiber infrastructure has key benefits to the community and utility, cited by source such as the US Department of Energy, Pew Research Center, and numerous studies with empirical evidence to that fact.

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1. Executive Summary

Executive Summary

The information shared in this study is backed by Traverse City unique data, direct Fujitsu customer project results, as well as publicly available empirical data showing the similarities of other organizations to TCLP's proposed efforts and the success they have had. As an organization, Fujitsu always takes a healthy view of all projects we are a part of, and base our recommendations on the conservative side of analysis. This report reflects that conservative view point, and recognizes that there are risk and challenges that must be met from all aspects of running an ISP organization, including design, construction, customer take rate, sales, marketing, and operations.

In this report, there are core assumptions that should be known to best put into perspective the results and approach taken. Fujitsu worked with TCLP staff and board of directors to align with these assumptions and approach.

- Fujitsu would perform activities to market, sell, and provider services on behalf of the TCLP ISP organization
- No additional TCLP headcount is being assumed
- This fiber business is considered separate from the TCLP electrical organization and is not designed to impact electric service quality being delivered
- Services proposed are based on technology capability, current competitive market offerings (not promotional offers), and industry standards on quality and service
- Multiple financial scenarios would be shown, that include reasonable expectations for take rate, pricing, construction schedule, operations, and ISP functions, based on TCLP specific market data, Fujitsu experience, and other FTTH project data
- Incorporate the existing dark fiber business into the financial projections

In cooperation with TCLP staff, the Phase 1 project area was determined. This report reflects only Phase 1 data, and was developed with the following assumptions:

- Phase 1 project area is a subset of the entire city, and the data is focused on just Phase 1
- The Phase 1 network build and year 1 of operations is being considered for project funding
- Area selected is based on a holistic view of community benefits, competition, address density, residential and business mixture, data center location, existing fiber footprint, topology, and expected build time
- Phase 1 project footprint allows for cost effective expansion into next phases, should TCLP decide to do so

1.1 Current State of the Network Assets

The network as displayed below is built with several factors that are guiding the deployment. First, it was constructed with monies from the local school district. The fiber itself in most areas is a DRAKA fiber optic cable. Testing and characterization of fiber will need to occur to ensure fiber is suitable for use for the deployment of the new GPON network. The termination of the fiber in these areas where we do not have or will not be able to provide network security will require the fiber cable to be spliced out of these locations and the main termination points need to be in a controlled environment and accessible by field technicians at all times.

The utility poles that the fiber is placed on are mostly in good condition. We don't expect structurally overloading any of the poles with the new fiber attachment.

1. Executive Summary

1.2 Goals and Objectives

Working with TCLP staff and board we have summarized the already stated objectives of the fiber initiative and Cost Benefit Analysis. Fujitsu believes these objectives are clear and achievable with the effort being performed by TCLP.

What are the objectives of this initiative?

- Enhance broadband connectivity for the city and region
- Build a fiber-based network to all residents and business in the TCLP service area
- Promote economic development
- Foster growth and innovation through technology availability

What are the objectives of this Cost Benefit Analysis?

- Understand the functions required to build and operate an ISP
- Inform the community and utility members of the benefits of a network and results of the Cost Benefit Analysis
- Reveal typical risks associated with running an ISP and potential actions to mitigate them
- Evaluate the financial viability of this new ISP organization
- Understand potential future options of network ownership and operations, including the Open Access business model

1.3 Guiding Principles

Fujitsu Network Communications is one of the Fujitsu Group companies who fully embrace "The Fujitsu Way." The Fujitsu Way embodies the philosophy of the Fujitsu Group, our reason for existence, values, and the principals that we follow in our daily activities.

We believe that by conducting our activities in accordance with the Fujitsu Way we maximize our value and better serve our customers and business partners and enhance our contribution to the communities in which we operate and to society as a whole.

1. Executive Summary

Corporate Vision

Through our constant pursuit of innovation, the Fujitsu Group aims to contribute to the creation of a networked society that is rewarding and secure, bringing about a prosperous future that fulfills the dreams of people throughout the world.

Corporate Values

What we strive for:

Society and Environment	In all our actions, we protect the environment and contribute to society.
Profit and Growth	We strive to meet the expectations of customers, employees and shareholders.
Shareholders and Investors	We seek to continuously increase our corporate value.
Global Perspective	We think and act from a global perspective.

What we value:

Employees	We respect diversity and support individual growth.
Customers	We seek to be their valued and trusted partner.
Business Partners	We build mutually beneficial relationships.
Technology	We seek to create new value through innovation.
Quality	We enhance the reputation of our customers and the reliability of social infrastructure.

Principles

Global Citizenship	We act as good global citizens, attuned to the needs of society and the environment.
Customer-Centric Perspective	We think from the customer's perspective and act with sincerity.
Firsthand Understanding	We act based on a firsthand understanding of the actual situation.
Spirit of Challenge	We strive to achieve our highest goals.
Speed and Agility	We act flexibly and promptly to achieve our objectives.
Teamwork	We share common objectives across organizations, work as a team and act as responsible members of the team.

Code of Conduct

- We respect human rights.
- We comply with all laws and regulations.
- We act with fairness in our business dealings.
- We protect and respect intellectual property.
- We maintain confidentiality.
- We do not use our position in our organization for personal gain.

Business Policy

- We use Field Innovation to find new approaches and the inspiration to improve ourselves, while delivering added value to our customers.
- We provide global environmental solutions in all our business areas.
- Fujitsu Group companies work together to accelerate our global business expansion.

1.4 Smart Grid: Electric Utility Benefits from Fiber Infrastructure

Smart Grid technology is enabled by fiber optic networks by allowing for critical new capabilities to be established to reduce cost, improve visibility of information, and increase safety for the electric utility and the consumers of electrical services.

[When power grids were designed in the past, it was based on certain understanding of current requirements that were somewhat simple:

- Localized power generation
- Energy demand of homes were low

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1. Executive Summary

- Electric delivery and billing was focused on set cadence and one way interaction

The new demands of an electric grid require two way communication between the customer and electric utility, exchanging electricity and information on a consistent basis. The new grid requires more interaction and visibility to enhance:

- Controls
- Communications
- Security
- Wind and Solar, and other green technology
- Electric vehicle enablement

Fujitsu believes, and the U.S. Department of Energy has said that fiber is a highly valuable addition to an electric utility:

"Utilities accrue additional advantages when they design communications networks that have the bandwidth, latency, and capacity to serve other needs, such as DA and DSM, in addition to metering and billing. Many utilities leveraged high-capacity communications networks to serve a variety of needs, including gas and water metering and to offer internet and file transfer services to customers."

– U.S. Department of Energy

"Fiber optic cables offer high bandwidth, low latency, and high reliability, but have relatively higher costs and may be better suited to urban deployments that build on legacy fiber networks already in place."

– U.S. Department of Energy

The Smart Home is an emerging requirement from electric utilities as customers are increasing their management of electricity and wish to manage their electric usage accordingly.[1] Smart appliances can be connected to the grid to allow for optimal timing of use to reduce the overall cost of electricity for that use.

Renewable power sources are growing in use and add complexity to the management and effectively utilizing their variable power generation. Solar and wind are two important power sources being increasingly utilized, which benefit from enhanced analytics on the data being produced from those sources and leading to greater automation of the grid.

Fiber Networks

[Smart Metering allows for greater and more frequent communication to be shared between utility and customer to enhance grid management and customer satisfaction to allow for the right relationship to be set. A report by the U.S. Department of Energy related to their Smart Grid Investment Grant Program showed powerful results and significant evidence of the value of AMI technology:

- Reduced costs for metering and billing from fewer truck rolls, labor savings, more accurate and timely billing, fewer customer disputes, and improvements in operational efficiencies.
- More customer control over electricity consumption, costs, and bills from greater use of new customer tools (e.g., web portals and smart thermostats) and techniques (e.g., shifting demand to off-peak periods).

[1] https://www.smartgrid.gov/the_smart_grid/smart_grid.html

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1. Executive Summary

- Lower utility capital expenditures and customer bill savings resulting from reduced peak demand and improvements in asset utilization and maintenance.
- Lower outage costs and fewer inconveniences for customers from faster outage restoration and more precise dispatching of repair crews to the locations where they are needed.
- Over a 3-year period, SGIG projects cumulatively:
  - Saved $316 million in O&M costs–an average of $16.6 million per project reporting
  - Avoided 13.7 million truck rolls and 68.3 million vehicle-miles traveled
  - Saved an estimated 15,160 tons of CO2 equivalent emissions

It is important to understand utility needs and capability requirements to best select the infrastructure that will meet those needs. Fiber infrastructure provides future ready ability given any innovations that come, as fiber is the fastest medium for transmitting data. These requirements may include:

- Bandwidth
- Latency
- Cost
- Reliability and coverage
- Backup power need
- Cyber security considerations

Case Studies on Fiber with Utilities:

A few communities that have relied on fiber to enhance their electric grid include:

- Centerpoint Energy, Houston TX
  - 2.3M customers
  - $24M in annual savings related to service orders
- Electric Power Board of Chattanooga, Chattanooga TN
  - 175K customers
  - $1.6M in annual operations cost savings
- Central Lincoln People's Utility District, Oregon
  - 38K customers
  - 50% reduction in meter operations costs
  - 85% reduction in truck rolls related to billing, and connect/disconnects[2]]

Energy Management

[2] *Advanced Metering Infrastructure and Customer Systems: Results from the Smart Grid Investment Grant Program PDF – Smartgrid.gov / U.S. Department of Energy (September 2016)*

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Given that energy being produced reaches the end customer within moments, it is critical that electric utilities have visibility into the end user electric requirements to best balance the production to deliver only required energy. Fiber optic networks allow for that information to be made visible and provide a powerful tool to electric utilities to best manage their grids, in real time. This greater insight reduces the chance of outages and lowers the overall need for peak power.

With additional information and capability of the fiber infrastructure, managing outages, and rerouting and restoring services is critical to customer satisfaction and continued success. When information is gathered and analyzed quickly, it can soon be transformed into the ability to predict electric events and act upon those prescriptive recommendations prior to a negative impact to service.

1.5 Community Benefits of Fiber Infrastructure:

Source : USA Dept. of Commerce and the NTIA

Telework

[According to the Bureau of Labor Statistics, telework is becoming a more important part of the economy and has significant benefits:

- Regular telecommuting grew 115% in the past decade, nearly 10 times faster than the rest of the workforce
- Average income for most telecommuters is $4,000 higher than that of non-telecommuters
- Half of telecommuters are 45 years of age or older
- Telecommuting grew the most in Chattanooga, TN (325%) from 2005 to 2015
- Employers can save over $11,000 per half-time telecommuter per year

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1. Executive Summary

- Half-time telecommuters gain back 11 days a year – time they would have otherwise spent community[3]]

Crime Prevention

Additional access to monitoring technology through a fiber network will enable police to more efficiency use resources to help protect the community. The cost of cameras to monitor high crime areas or highly trafficked areas is reduced significantly when a high speed infrastructure is in place. Community events that expand the population by a large amount will necessitate more flexible police capability without extra cost, which a fiber optic network enables.

School Resources

[The Digital Divide is everywhere and it is most importantly seen in the ability of school children to access resources and complete their homework. 7 in 10 teachers are assigning homework that must be complete online, yet over 15% of US households do not have access to affordable internet at home.

"Roughly one-third of households with children ages 6 to 17 and whose annual income falls below $30,000 a year do not have a high-speed internet connection at home." – Pew Research[4]]

Libraries and Institutions

Libraries are a critical part of the community that allow for access to the internet and improve the community by providing opportunities that some individuals may not have available.

["Underserved students with access to only one electronic device in their home – oftentimes only a cell phone – may face challenges that don't exist for their peers in terms of completing schoolwork." – Center for Equity in Learning[5]]

E-Government Services

E-Government Services allow for greater transparency and engagement for the citizens and community. Fiber optic networks allow for enhancements in accessing information that is provided by government, services that are critical to the daily life of citizens, and building trust with the community.

Traffic and Road Planning

Managing traffic and congestion is an important aspect of any size city, especially when cities see a swell of population during certain months of the year. Many cities across the nation have implemented traffic management plans. [One example is Pittsburgh PA, reducing travel time by 25%, and car emissions by 20% using smart traffic lights.[6]]

E-Commerce and Efficiency

With greater connectivity to businesses, both large and small, e-commerce is enhanced and made available. Selling products online and allowing employees to be more productive with higher speed internet can improve revenue and reduce costs.

[3] 2017 State of Telecommuting in the U.S Employee Workforce PDF – Presented by Global Workforce Analytics + Flexjobs
[4] https://www.pewresearch.org/fact-tank/2018/10/26/nearly-one-in-five-teens-cant-always-finish-their-homework-because-of-the-digital-divide/
[5] https://equityinlearning.act.org/wp-content/themes/voltron/img/tech-briefs/how-many-devices.pdf
[6] https://apolitical.co/solution_article/pittsburgh-cuts-travel-time-25-smart-traffic-lights/

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1. Executive Summary

["The existing broadband infrastructures (cable modem, wireless, and DSL, respectively) have significant limitations when compared to fiber-to-the-premises (FTTP), which reaches only a small fraction of the United States. The cable, wireless, and DSL networks will require extensive upgrades, such as the construction of fiber optics closer to the premises, in order to provide businesses the capacity many currently need and most will eventually need." – The Impact of Broadband Speeds and Price on Small Business, For Small Business Administration, Office of Advocacy[7]]

Healthcare Information and Options

High speed internet that is of high quality can directly impact the ability and desire of people to seek out important healthcare information.

["Despite IT support, participants still experienced internet connectivity issues that negatively impacted their health information seeking. Frustration in their search to find information may serve as an additional barrier to those who have medical issues...After initial internet access, a second-level digital divide emerged due to connectivity issues..." – JAMIA, Journal of Informatics in Health and Biomedicine[8]]

Business and Employment

[Business and employment is tied to internet connection and speeds:

"...for every one percentage point increase in broadband penetration in a state, employment is projected to increase by 0.2 to 0.3 percent per year." – The Brookings Institute

"Part time business who rely on the Internet employ 6.6M employees and pay $797M in wages the vast majority of which is spent and re-invested in their local economies." – Internet Enabled Part Time Small Businesses Bolster U.S. Economy, The Internet Association

"The Internet helps these kinds of part time businesses by increasing efficiency for 86%, productivity for 82% and by helping business owners to save money for 78%." – Internet Enabled Part Time Small Businesses Bolster U.S. Economy, The Internet Association[9]]

What Many Experts Say

Numerous studies and sources have shown significant reliance on high speed internet, and how it benefits the community and citizens themselves:

[7] The Impact of Broadband Speed and Price on Small Business PDF – Columbia Telecommunications Corporation prepared for SBA Office of Advocacy (November 2010 pg. 10)
[8] https://academic.oup.com/jamia/article/23/6/1053/2399232
[9] http://internetassociation.org/wp-content/uploads/2013/10/InternetAssociationExecutiveSummary-InternetEnabledPartTimeSmallBusinessesBolsterEconomypdf.pdf
https://www.brookings.edu/wp-content/uploads/2016/06/06labor_crandall.pdf

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1. Executive Summary

450+
US Communities that Invested Public Broadband Infrastructure
Source: Muninetworks.org

84%
Job Seekers Completing Applications Online
Source: Pew Research

23%
Economic value from fiber is business efficiency improvement
Source: University of Tennessee at Chattanooga

4%
Increase in Household Income Due to Broadband
Source: Arthur D. Little and Chalmers University of Technology, "Socioeconomic effects of broadband speed," September 2013

1.1%
Growth in Per Capita GDP Due to Broadband
Source: Fiber to the Home Council, Washington, D.C.

3.1%
Rise in Home Values Due to Broadband Access
Source: US Dept. of Commerce, NTIA, National Study

2. Competitive Analysis

The market assessment summarizes the competition in terms of competitor presence, technology, and speed tiers offered, as well as target customers based on population demographics and customer types (end consumer, property management, businesses) with additional layers of geographic detail included. In addition to providing a current state snapshot of the market, these insights uncover broadband availability and adoption gaps that spell opportunity for a new broadband provider.

2.1 Summary

- TCLP's broadband marketing and offering will have to focus on converting customers from Local Competitors and creating new broadband subscribers in the Traverse City area in order to build a substantial customer base. Both will be equally important.
- Local Competitors are the most significant players in Traverse City and have the most to lose to a new broadband competitor.
- Fujitsu expects competitors to also challenge, to the extent possible, with anti-competition tactics to slow or stall the project.

2.2 Recommendations

- TCLP should enter the broadband and voice services markets. Fiber-powered broadband should be the core focus of its service with respect to the current competition.
- TCLP should emphasize the technology benefits of fiber-powered broadband versus Local Competitors offerings in consumer messaging.
- TCLP should consider reducing customer switching costs and hassle as much as they can to make the offer all the more compelling to current Local Competitors customers.

Local Area Overview

Traverse City exhibits a relatively high broadband adoption rate as reported by the FCC. These adoption rates were measured at a census tract level for at least 10/1 Mbps speeds and are reported in terms of a range (e.g. 60-80%, 80-100%, etc.). When considering all census tracts that Traverse City occupies, approximately 90% of households have a broadband connection. A more recent update from the 2017 American Community Survey measures broadband adoption for Cable/Fiber/DSL. This approach shows that broadband adoption rates are still high, but range from 60-90% depending on the census tract. The fact of 90% at 10/1 demonstrates consumers rely on broadband and is a much needed service. Data also shows that speeds are well below 25/3 which is a strong indication that consumers will change service providers for much higher speeds as long as price remains competitive.

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2. Competitive Analysis

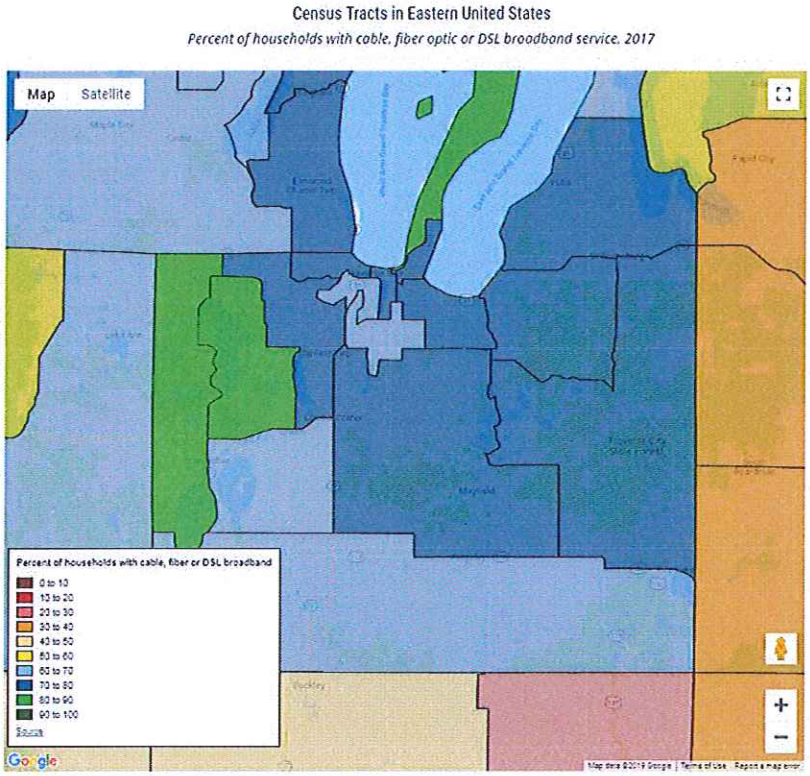

Figure 1: Measured in 2017, Traverse City exhibits a range of broadband adoption rates between 60% and 90%. Source: US Census, National Digital Inclusion Alliance (NDIA).

Fujitsu used TCLP's service area as a proxy for its targeted broadband network deployment area. The FCC collects detailed census block level information regarding every broadband provider's service presence across the country. This includes technology and advertised download and upload speeds by geography. By these measures, Fujitsu can conclude that no fiber-based competitor is currently deployed in TCLP's service area. Local Competitors represent the primary wired broadband competitors (Figure 2).

These findings generally correlate with advertised available speeds offered on Local Competitors respective consumer websites. However, Local Competitor does advertise 100 Mbps speeds in the central and northeastern sections of the city. More recently, Local Competitor has begun to offer near gigabit speeds with its DOCSIS 3.1 technology. However, Fujitsu believes that this is deployed to very limited areas. When comparing fiber to DOCSIS 3.1, fiber offers symmetrical speeds for downloading and uploading whereas DOCSIS 3.1 is asymmetrical, focused on only delivering increased download speeds.

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2. Competitive Analysis

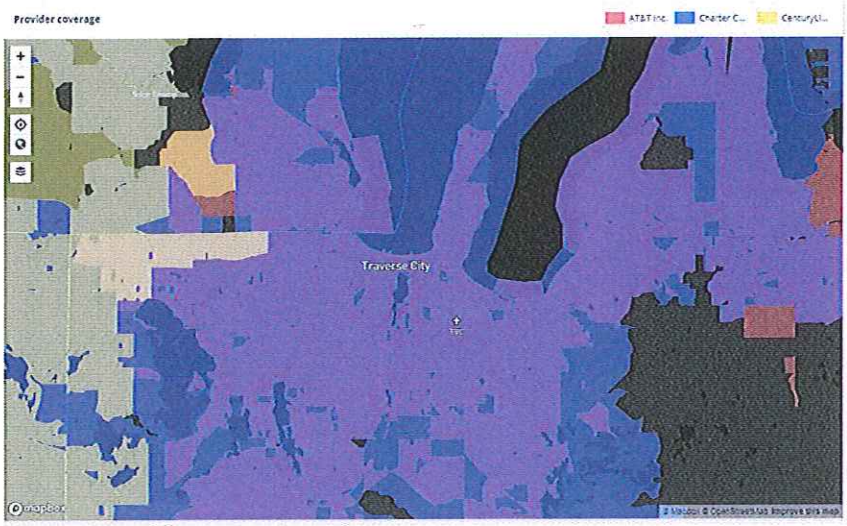

Figure 2: Source: FCC as of June 2017. The lighter purple shade indicates presence of Local Competitors. CenturyLink does have presence in the general area, but does not intersect with TCLP's service area.

Current Broadband Providers and Availability			
Provider	**Technology**	**Availability**	**Max Advertised Speed**
Spectrum*	Cable	99%	100 Mbps
AT&T	DSL	75%	24 Mbps
CenturyLink	DSL	4.5%	30 Mbps
Acentek	DSL	4%	10 Mbps
Windstream	DSL	2.8%	10 Mbps
CynergyComm	DSL	1.2%	1.5 Mbps

Source: Broadband Now for Traverse City, Michigan, March 2019

Note: Figures reported by Broadband Now tend to be over-reported. The maximum advertised speed does not necessarily correlate with the percentage availability within the city.

*As noted earlier, Spectrum has begun to offer near gigabit speeds with its DOCSIS 3.1 technology. However, Fujitsu believes that this is deployed to very limited areas.

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2. Competitive Analysis

2.3 Competitor count by technology & advertised speeds

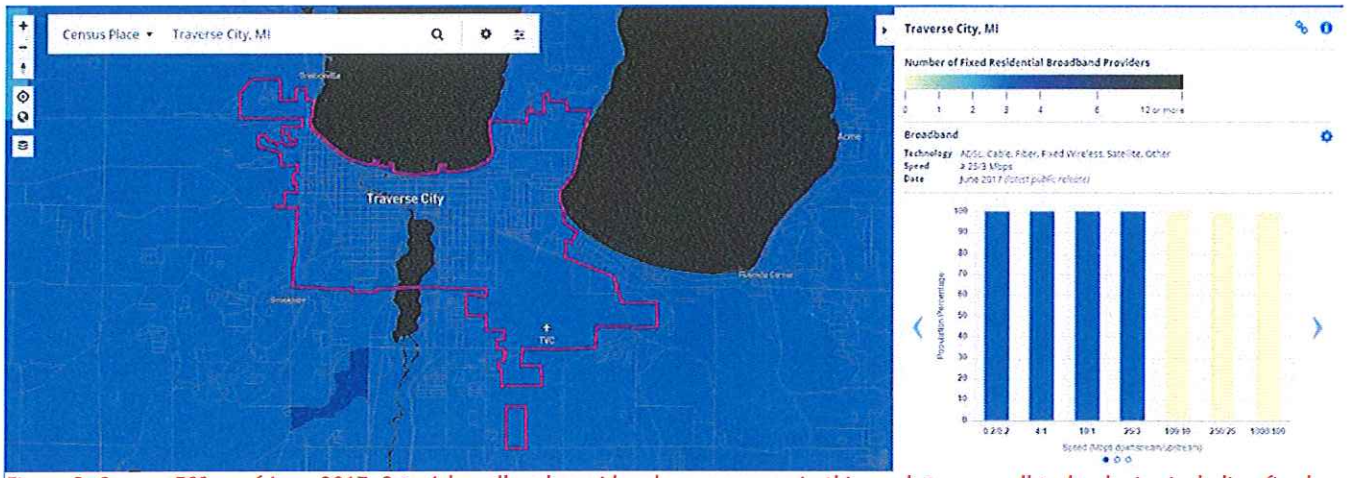

Figure 3: Source: FCC as of June 2017. 3 to 4 broadband providers have presence in this market across all technologies including fixed wireless and satellite. No competitor advertised more than 25/3 Mbps at the time of this dataset.

2.4 Current Customer Satisfaction

Fujitsu identified over 100 customer Google reviews for Local Competitor services tied to its local customer service location in Traverse City. Below is a sample set of ad verbatim commentary relevant to customer experience with Local Competitor services. The reviews have been anonymized and date from the last 2 years. The average customer satisfaction rating per Google reviews is 2.8 out of 5. Dissatisfaction stems from price increases, service reliability and scheduling installation.

"Still don't like their business model of valuing new customers over current ones."

"Terrible customer service, bad communication between representatives, late to hook up service, charged for extra months after I had asked for service to be removed and moved out of state. No help from them after moving. Have been a good paying customer of them my whole life and never had a good experience with them. Never again."

"Just spoke to Jennifer there today at TC location. Poor customer service/ in fact none at all. Very disappointed after being a loyal customer for many, many years. My high speed internet started at $49.99 and I was aware it was promotional for only a year and would increase by $10 but now it is up to $70.99 for just internet! They don't notify you, they sign you up for auto billing and try to steal from you unless you read every detail on the billing statement. They are unethically monopolizing people. Charter said originally it would only go up $10. But here we are 3 years later and it's $70.99. Bad business charter, as usual."

"The customer service is trash and the service in general is spotty at best. Go with your local provider. I gave them every opportunity to work with me. Only word I can use for this company is trash."

"Way too many problems for their high costs."

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2. Competitive Analysis

"I wish my internet worked full speed all the time not just on and off.... obviously I'm posting late; therefore that shows when it's not working. Not only does it quit during the night but also in the early evening. It is frustrating when I can't get things like Netflix or Hulu to work, let alone connect to the internet."

"Total rip off! Prices always going up!"

"Monopoly on the market, I must have had at least 20 visits out at my house in a year's time .. $140.00 for Cable just think of how many people have this besides me ...? Do the math ..."

"Like the service. Cost was just to[o] much"

"Customer service is nonexistent.....I moved my office and they gave me a date they could install cable, two weeks later they want to reschedule for another week. R[i]diculous! I'm losing business because of their incompetence."

"Not pleased with the pricing. They lie about the intro offer and the price going up after two years. We have no competition to push them lower in pricing. The northern experience, little choices and they're all to[o] expensive. "

"Hate charter. Always a pain to deal with. Wish there was an alternative. 2 years later still the same"

2.5 Competitor Pricing Research Approach - Disclaimer

Fujitsu researched competitor pricing for new residential and business broadband, video, and voice services as of March 2019. Fujitsu researched provider websites to learn the pricing, speeds, and financial incentives offered by competitors to sign up for services on their website. New customer pricing is subject to change based on the marketing campaigns competitors engage in. Current customer pricing will also vary from new customer pricing based on current residential/business agreements from a previous price agreement/contract, marketing campaign, promotional pricing, or customer satisfaction-induced pricing incentives to prevent the customer from switching providers.

2.5.1 Current Competitor Pricing – New Residential Customers

Broadband-only: With respect to broadband-only services, Local Competitors offer varying speeds across Traverse City neighborhoods. Speeds are given in terms of download.

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2. Competitive Analysis

Current Competitor Pricing – Residential -Advertised New Customer Pricing as of March 2019-		
Broadband Service Attributes	**Local Competitor**	**Local Competitor**
Advertised speeds	5-18 Mbps (varies by address)	30-100 Mbps (varies by address) Central and Northeast area have access up to 100 Mbps, Southwest area only 30 Mbps
Pricing	$40-$50/month	$14.99-$44.99/month. Modem included
Contract Agreement	Yes. 12 months. Early termination fee applies.	No, but pricing valid 12 months
Installation fees	$35 self, $99 technician	Yes, but amount unknown
Data cap	1 TB/month. $30/month unlimited data plan available	None.

Voice: Voice services are typically only offered if the customer bundles with broadband and/or cable services.

- Local Competitor: Bundling voice services with broadband adds approximately $20/month to the broadband service for the first year of service. This price can be effective for 2 years with a 1 year contract.
- Local Competitor: Bundling voice services with broadband adds approximately $10/month to the broadband service for the first year of service.

Broadband, Video and Voice:

- Local Competitor: $85-$170/month. Offers mostly vary based on channels included rather than broadband speed. Other installation fees and contract agreements are still required.
- Local Competitor: $99-$139/month. Prices are valid for 12 months as a bundle.

2.5.2 Current Competitor Pricing – New Business Customers

Local Competitors have similar business models between their residential and business customers. One Local Competitor offers higher speeds and clearly positions themselves as a no-contract alternative to another Local Competitor. The other Local Competitor charges a significant premium for voice services versus the other Local Competitor.

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2. Competitive Analysis

Current Competitor Pricing – Business **-Advertised New Customer Pricing as of March 2019-**		
Broadband Service Attributes	**Local Competitor**	**Local Competitor**
Advertised speeds	Up to 12 Mbps	100 Mbps, 400 Mbps
Pricing for Broadband + Voice	$70-$85/month (higher price includes tech support)	$65/month (100 Mbps) $110/month (400 Mbps)
Pricing for Broadband Only	$40/month	$60/month (100 Mbps)
Contract Agreement	12 month agreement	None, but prices are only effective for 1-2 years.
Installation fees	Not specified	Not specified

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2. Competitive Analysis

2.6 Market Trends for Voice Services

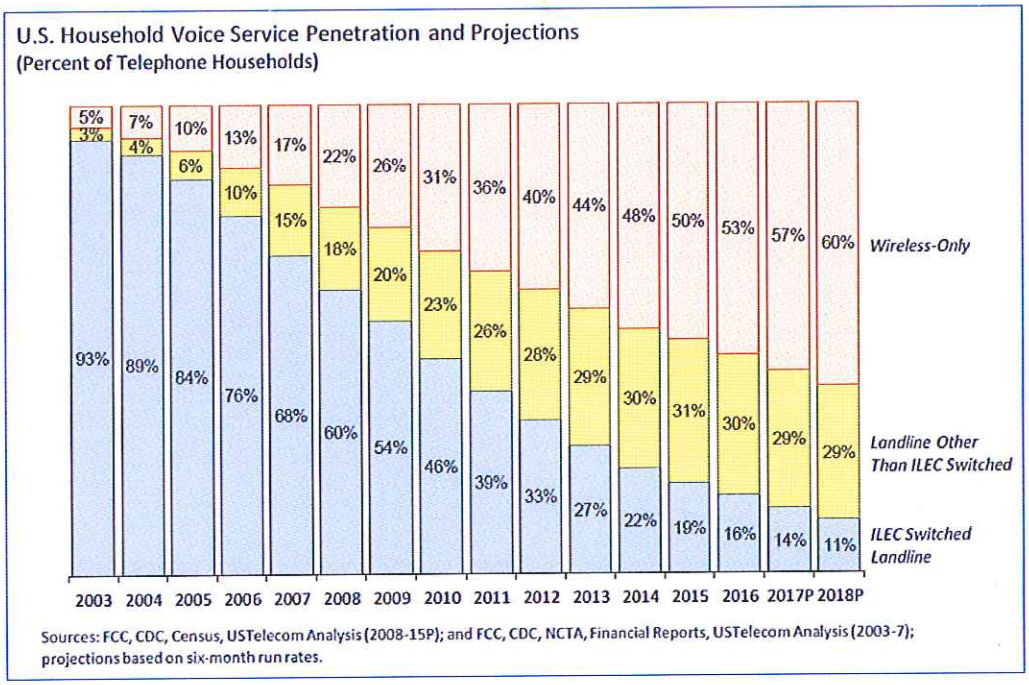


Figure 4: US Households Have Shifted to Wireless and IP Voice
Source: US Telecom | The Broadband Association 2018

Data suggests that the American consumer has trended towards reliance on mobile devices for all voice services. Based on insights found by US Telecom / The Broadband Association, 93% of American households had a landline voice service in 2003. That figure has plummeted to 16% in 2016 and is projected to continue its decline, ceding share to wireless-only voice connections and IP voice. Wireless-only voice connections are expected to grow market share to the tune of 60% in 2018.

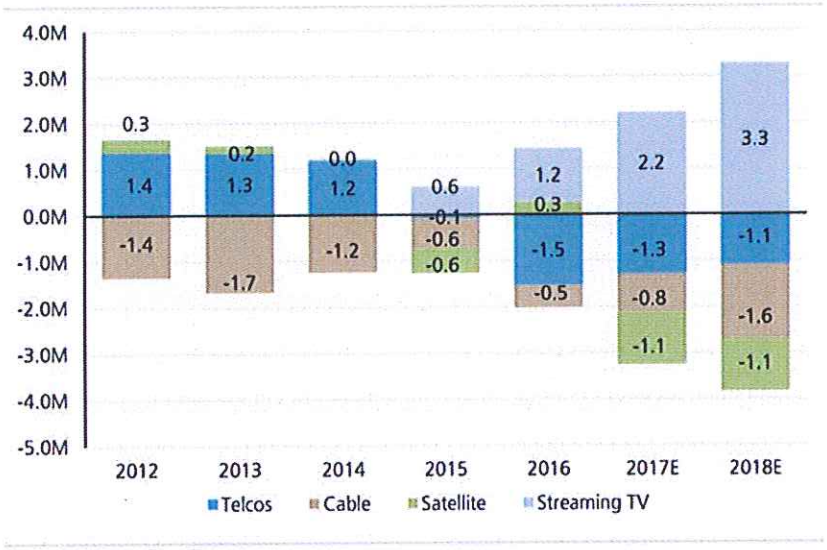
This pattern is evident from Grand Traverse county fixed voice subscriptions with respect to FCC's Form 477. In June 2015, 19,000 out of 35,000 residential households had a voice subscription. That figure has declined by approximately 1,000 subscriptions annually through June 2017, where it now stands at 17,000 subscriptions. This is an 11% decline over the past two years. The voice market size continues to decline. Despite the overall decline, voice service is a traditional service offered by the current competition and the lack of one may be an impediment to current Local Competitor customers switching to TCLP. Insights from Fujitsu's customer have shown that they were able to achieve a 28% take rate on voice services. Business customers would be more attractive from a voice services standpoint because cell phones may be insufficient to support their operational needs. These factors should be kept in mind in the rollout of a voice offering.

2.7 Market Trends for Video Services

As noted in several news outlets, including FierceVideo ("Cord Cutting Almost Doubled in 2018"), the decline in linear video services (traditional cable) has been well documented. Many subscribers are taking advantage of the various streaming services available. Cable companies are rushing to add streaming services to their own portfolio as they

2. Competitive Analysis

continue to hemorrhage customers of traditional services like cable and satellite. The below chart from UBS illustrates this trend for video providers themselves.



Source: Company data, UBS estimates

Figure 5: Pay TV Net Additions by Provider. Streaming services are cannibalizing cable provider traditional offerings

In addition, according to an article from FierceVideo ("Cord Cutting Almost Doubled in 2018"):

"The pay TV market saw net losses increase in 2018. Overall, the top pay TV providers lost 3.1% of subscribers in 2018 compared to a loss of 1.6% in 2017," said Bruce Leichtman, president and principal analyst for Leichtman Research Group, in a statement".

While overall customer preferences are trending towards streaming at the expense of traditional video, that trend is not uniform with respect to age demographics. A Pew Research study conducted in 2017 indicates that the older the age group, the increasing likelihood they still rely on traditional video relative to streaming as the primary means to watch video content. The majority of younger adults, 18-29 years old, are already firmly in the streaming camp at 61% versus cable at 31%.That trend is beginning to show in adults 30-49 years old where streaming at 37% is catching up to cable at 52%.

Based on the American Community Survey age population distribution recorded in 2017, Traverse City's profile has slightly higher representation for older age groups than the nation overall (Figure 6). Traverse City's median age is 40.6 years old whereas the United States median age is 37.8 years old. This emphasizes the importance of converting customers in older age groups with respect to their affinity with traditional video services.

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2. Competitive Analysis

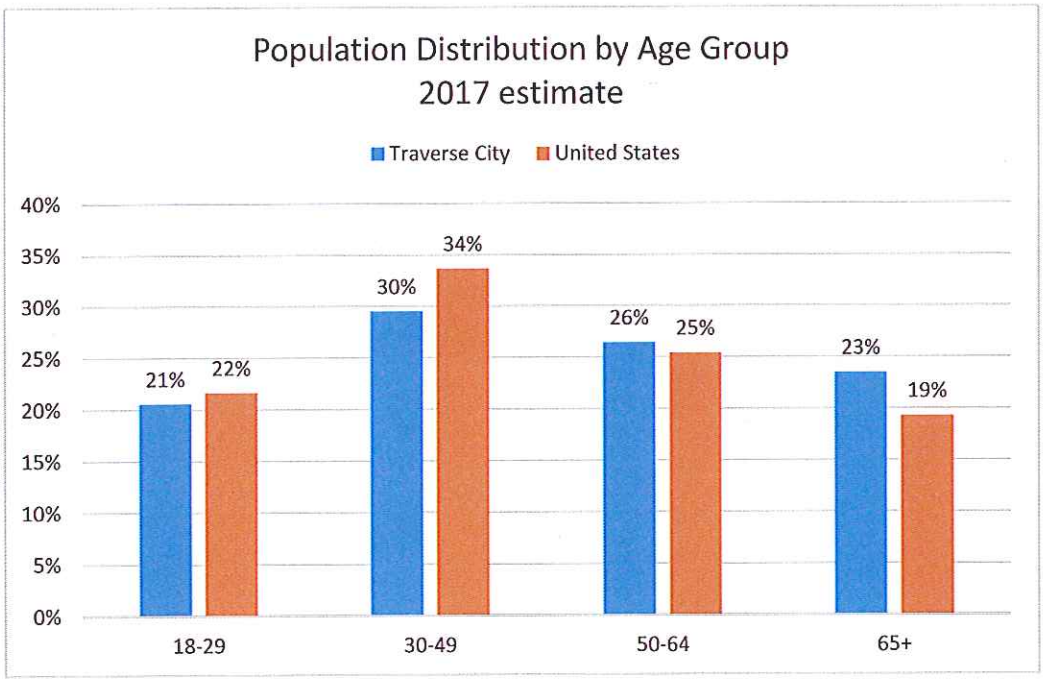

Figure 6: Traverse City population profile is slightly older than the nation. TCLP's successful entry into the market depends partly on converting customers from traditional video packages who are in older age groups. Source: American Community Survey 2017.

2.8 Competition Scenarios

Without investing into fiber-to-the-home (FTTH) technology themselves, Local Competitors do not have the physical network infrastructure to substantively compete with TCLP's FTTH offering. TCLP's entry into the competitive landscape will undoubtedly give Local Competitors cause for concern and they will be compelled to respond by less expensive means than investing into FTTH. While Fujitsu was able to collect insights from how Local Competitors are currently positioning themselves to prospective customers online, we also have access to Fujitsu's customer's experience competing with Local Competitors. As Local Competitors already compete with each other, it is likely they will have to extend these strategies to TCLP to reduce their own customer churn and convert from others.

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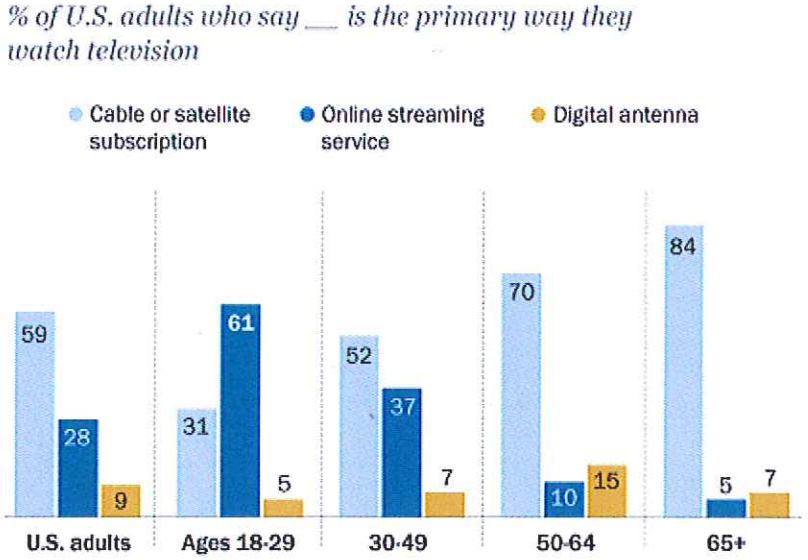
2. Competitive Analysis



Source: Survey conducted Aug. 15-21, 2017.

PEW RESEARCH CENTER

Figure 7: Young Adults Use Streaming Services Most to Watch TV

2.9 General competitor activities – Early Stages

- **Public Relations**: Local Competitors would be motivated to scale up advertising and overstate technology coverage saying that their network can offer higher connection speeds. Per feedback from another Fujitsu customer, residents were receiving mass mailings from providers. It is unlikely that Local Competitors will prioritize Traverse City among their other markets for fiber upgrades given its relatively small population.
- **Pricing/Incentives**: Local Competitors would reduce initial 1st year prices (bundles and a la carte services) and waive installation fees. This was observed by Fujitsu customers.

2.10 General competitor activities – Later Stages

- **Switching Hassle and Cost:** A previous FCC study ("Broadband Decisions - What Drives Consumers to Switch", 2010) indicates that the switching hassle and cost for consumers is a major impediment to switching to a new broadband connection. Approximately 23% of consumers switch their provider within 3 years of signing up for the service. In addition, just 21% of consumers said they would seriously consider switching providers if they had a choice of other providers. A summary of switching costs and hassles for current Local Competitor customers is shown in the below table.

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2. Competitive Analysis

Switching Costs and Hassles - Local Competitor		
Account Switching Item	**Local Competitor**	**Local Competitor**
Customer hassle for transition scheduling	Yes	Yes
Setup costs	Installation (self or technician), Modem	Installation (self or technician)
Contract agreements	Yes, with early termination fee	No
Switching incentives	$50 gift card for signing up	$500 applied to contract termination with competitor
Account transferrable if moving	Yes	Yes

- Many providers require new customers to schedule their day around the provider's technician availability. Some give a 2-hour window or an unpredictable all-day window. With a new provider, the customer is also typically hit with activation and installation fees, having to purchase a new modem and possibly a new router if it is incompatible. During the switch, the customer also has to be conscious of the transition. The customer may either have to overlap services (pay twice for a broadband connection) to avoid being without broadband or go for a few days without broadband. Neither is an attractive proposition for the typical customer.
- Local Competitors find ways to financially incentivize customers to switch or stay. Because Local Competitor requires customers to sign a 1 year agreement, Local Competitor competes by offering Local Competitor customers up to $500 to terminate their contract and switch to Local Competitor service offering. Other switching incentives includes gift cards provided the customer orders the service online (Local Competitor: $50) or the customer retains the provider for some stated period such as 6 months. The early termination fee as mentioned previously that Local Competitor customers would be subject to is another reason for a customer to remain with Local Competitor or delay their switch to someone else. Customers moving to the area have the opportunity to transfer their service if they already have a Local Competitors account from their previous residence.

- **Take Rate Results for Municipal/Utility Broadband**: Below is a listing of municipalities and utilities resulting take rates for residential broadband. Many exceed a 50% take rate. With an effective marketing campaign, these successful examples below illustrate the potential for TCLP to achieve these levels of take rates for its broadband offering. This list is not intended to be exhaustive, but does show a strong representation of empirical data to base recommended realistic scenarios for TCLP's ISP business.

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2. Competitive Analysis

- Longmont, CO: 54%[10]
- Oregon MINET: 85%[11]
- Kit Carson Electric, NM: 70%[12]
- Rio Blanco County, CO: 75-80%[13]
- Cedar Falls, IA: 90%[14]
- LightTUBe, TN: 39-50%[15]
- Spanish Fork, UT: 60-80%[16]
- Fairlawn, OH: 50%[17]

[10] Longmont - https://muninetworks.org/content/more-half-longmonters-choose-nextlight-fiber-because-nextlight-fiber
[11] Oregon MINET - https://muninetworks.org/content/oregons-minet-new-approach-new-expansion-community-broadband-bits-podcast-340
[12] Kit Carson - https://muninetworks.org/content/transcript-community-broadband-bits-episode-277
[13] Rio Blanco County - http://www.theheraldtimes.com/county-agrees-on-plan-to-finish-broadband-project/rio-blanco-county/
[14] Cedar Falls Utility - https://muninetworks.org/content/transcript-community-broadband-bits-episode-75
[15] LightTUBe - Broadband Communities Magazine "Fall 2016 - Community Success Stories" - https://bbcmag.epubxp.com/i/766692-2016-fiber-to-the-home-primer/24?m4=
[16] Spanish Fork - https://muninetworks.org/content/utahs-spanish-fork-city-network-incredible-success
[17] Fairlawn - https://efficientgov.com/blog/2018/04/20/fairlawn-proves-small-town-municipal-broadband-is-possible/

3. Financial and Business Models

The Financial and Business Models will detail the business strategy, planning, and analysis that is crucial for budgeting, forecasting, and analysis of major operations and network build activities that can be used to evaluate the viability of the network project.

For detailed financial information related to each scenario, please see **Appendix A**

3.1 Financial pro-forma

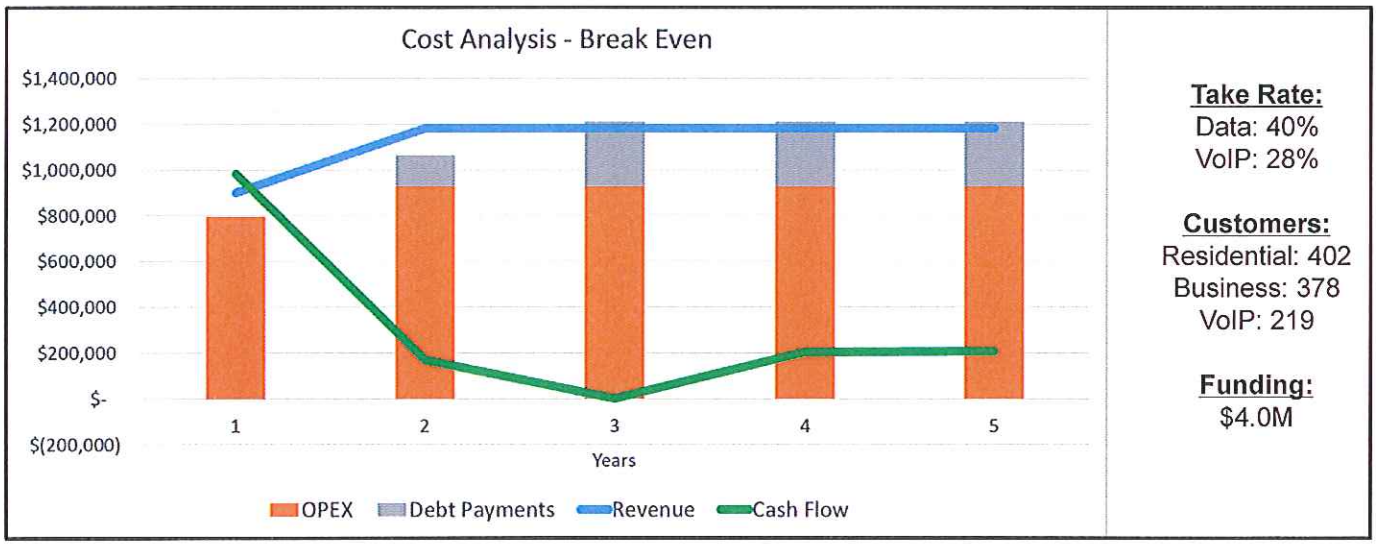

Figure 8: Break Even Scenario Summary

3. Financial and Business Models

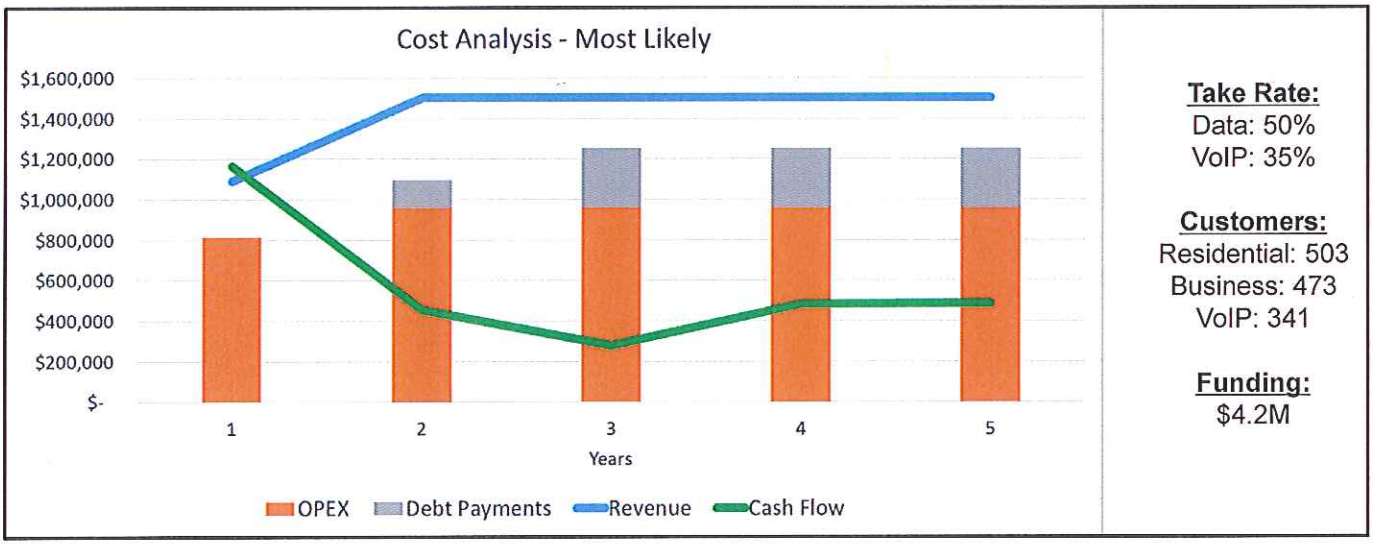

Figure 9: Most Likely Scenario Summary

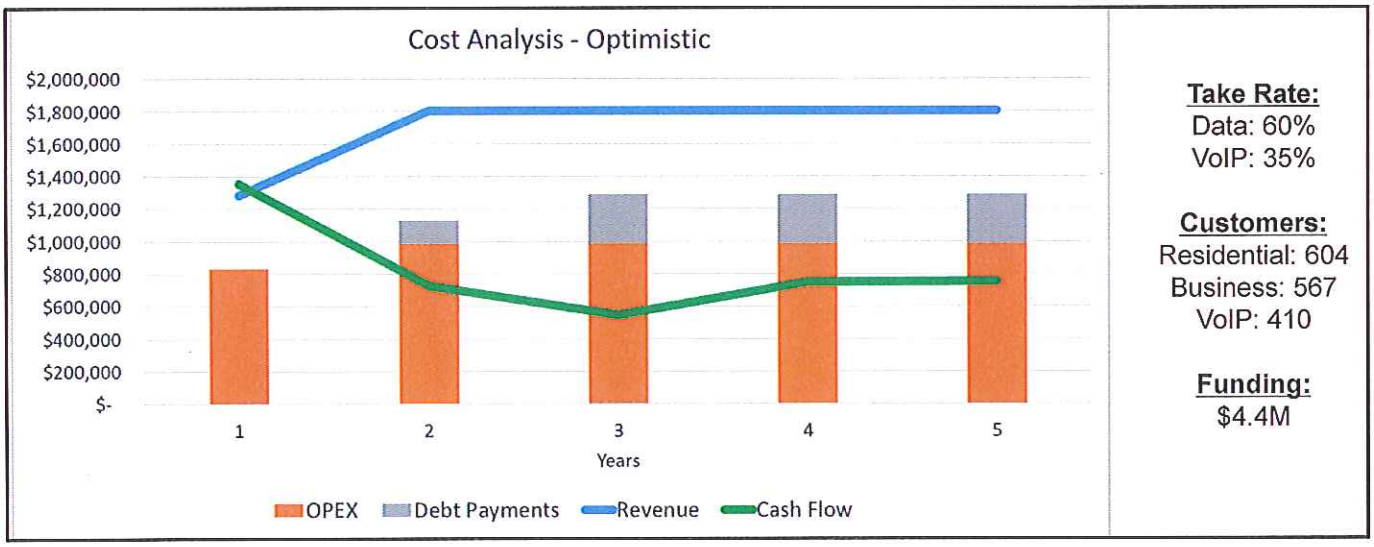

Figure 10: Optimistic Scenario Summary

3.2 Core Assumptions

In this report, there are core assumptions that should be known to best put into perspective the results and approach taken. Fujitsu worked with TCLP staff and board of directors to align with these assumptions and approach.

- Fujitsu would perform activities to market, sell, and provider services on behalf of the TCLP ISP organization
- No additional TCLP headcount is being assumed

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3. Financial and Business Models

- This fiber business is considered separate from the TCLP electrical organization and does not impact electric service quality being delivered
- Services proposed are based on technology capability, current competitive market offerings (not promotional offers), and industry standards on quality and service
- Multiple financial scenarios would be shown, that include reasonable expectations for take rate, pricing, construction schedule, operations, and ISP functions, based on TCLP specific market data, Fujitsu experience, and other FTTH project data
- Incorporate the existing dark fiber business into the financial projections

In cooperation with TCLP staff, the Phase 1 project area was determined. This report reflects only Phase 1 data, and was developed with the following assumptions:

- Phase 1 project area is a subset of the entire city, and the data is focused on just Phase 1
- The Phase 1 network build and year 1 of operations is being considered for project funding
- Area selected is based on a holistic view of community benefits, competition, address density, residential and business mixture, data center location, existing fiber footprint, topology, and expected build time
- Phase 1 project footprint allows for cost effective expansion into next phases, should TCLP decide to do so

4. Functional Requirements, Analysis and Recommendations

Fujitsu Solution Architect team followed a comprehensive comparative analysis based on the TCLP FTTx Project requirements based on the project objectives. Fujitsu further analyzed vendor data, equipment specifications, roadmap, product features and operational capabilities to form unbiased recommendations. These recommendations are discussed in detail in the following sections.

4.1 Core Network

The TCLP FTTx Core Network will be comprised of the essential components and infrastructure which houses the main active electronics for connectivity to the Internet cloud. The Core Network has three main components:

- Data Center
- Core WAN Gateway
- Core FTTx Electronics

Selection and design of the Core Network is highly dependent upon the technology selected, in this case namely Gigabit Passive Optical Network and its variants. Detailed analysis and recommendation are discussed in the following sections.

4.1.1 Data Center

Data Center (DC) also known as Point of Presence (PoP) is the main convergence and gateway location for the active electronics. The DC acts as the starting point for the optical fiber path to the subscriber and houses the active equipment racks (e.g. core routers, switches, IT infrastructure, FTTx Optical Line Termination (OLT)). The DC also has supporting inside plant infrastructure hosting optical distribution frame, racks, power, backup power, and splitters to name few.

Data Center primarily performs 2 functions in the FTTx context:

- Acts as WAN edge to connect to the Internet
- Acts as FTTx Core Point of Entry.

The physical size of the DC depends on the size of home served and varies based on the service provider and demography, from a few hundred to in excess of several thousand homes.

The Data Center can be built in an existing building or can be collocated in new building or shelter structure. Generally passive and active equipment bays/racks along with IT infrastructure are located in the same place, however if the number of homes exceeds tens of thousands, separate rooms and/or racks maybe required.

The Data Center should be classified as a secure area. Provision of fire and intrusion alarms, managed secure access, and protection against vandalism are paramount. Additionally uninterrupted power supply system (UPS) or backup rectifiers and essential climate control system need to be suitable and must be based on the equipment specification and environmental requirements.

4. Functional Requirements, Analysis and Recommendations

The below Figure 12 shows the logical connectivity between the Outside plant and the Data center Inside plant infrastructure.

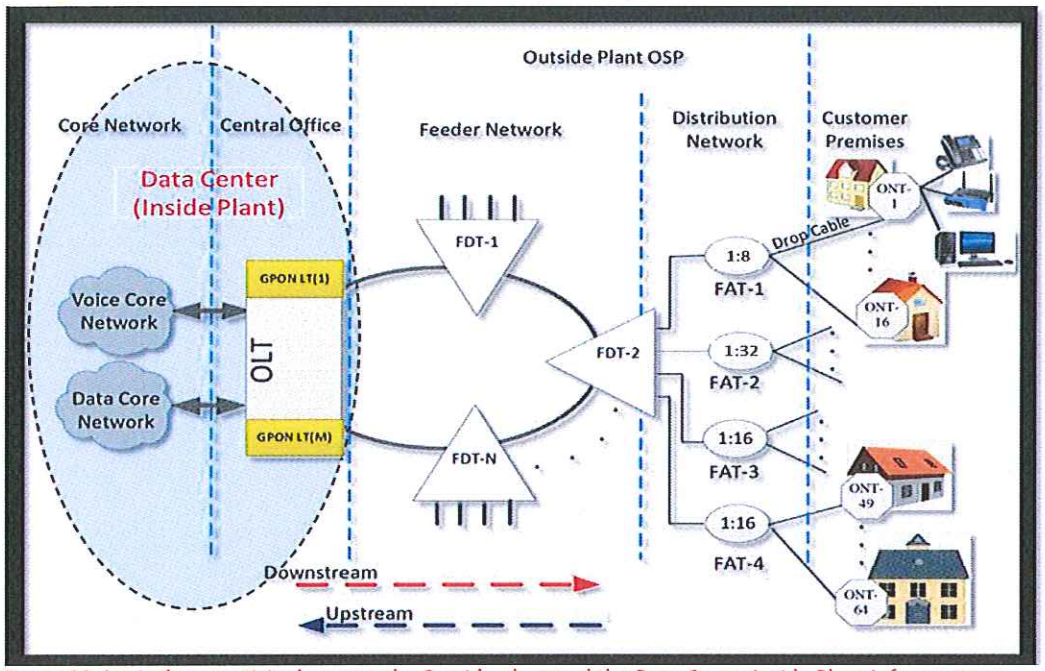

Figure 11: Logical connectivity between the Outside plant and the Data Center Inside Plant Infrastructure

The Data Center needs to make efficient connection of Outside Plant Infrastructure (OSP) to the Inside Plant Data Center Infrastructure (ISP) via Optical Distribution Frame (ODF). ODF patch panel connects Feeder Fiber to the OLT and WAN edge demarcation devices e.g. WAN routers and switches.

The connection method to ODF can be:

- Interconnection Method: Connects active OLT ports to the ODF ports (that terminates the feeder cable), using a simple patch cord.
- Cross-connection method: Mirrors the port of the active equipment in an additional ODF bay, essentially using 2 ODF bays to simplify visual complexity and operation. First ODF terminates Feeder cable just as in Interconnection Method. Both ODF are connected through fiber patch cables.

4.1.1.1 Requirements

- Phased out approach:
- DC Power Supply for the active electronic equipment
- Redundant Power supply, battery backups and rectifiers as per active electronics
- Secure Access to the site 24x7
- 2 redundant and separate Core and Feeder Fiber entries
- Preferred controlled access to the site
- Environmentally Controlled HVAC
- Closely located within broadband serving area

- WAN Internet Connection Point

4.1.1.2 Analysis

Please see **Appendix B** for detailed analysis information regarding the Data Center site selection criteria and how Fujitsu developed the following recommendation.

4.1.1.3 Recommendation

After considering the Requirements and analyzing the data, Fujitsu recommends to [redacted] Data Center Core sites to arrange full coverage of the TCLP boundaries and extended serving areas for adjacent neighborhoods. Furthermore additional benefits will be

- Redundant core connectivity
- No single point of site failure for the WAN Core
- Distributed architecture with extended reach
- Fewer number of Distribution Fiber

This architecture will require [redacted] of fibers at minimum to provide Data Center level redundancy.

4.1.2 Core Wan Gateway Electronics Requirements

Fujitsu has evaluated multiple vendors for the CORE WAN gateway Routers and Switches that are to be deployed at TCLP.

4.1.2.1 Analysis

Fujitsu compared various electronic vendors based on product availability, features, roadmap market reputation and deployment in the similar role in FTTx broadband markets.

The detailed product analysis is outlined in **Appendix C** regarding the Core Wan Gateway electronics and how Fujitsu developed the following recommendation.

4.1.2.2 Recommendation

After considering the Requirements and analyzing the data, Fujitsu recommends [redacted]

4.1.3 CORE FTTx ELECTRONICS REQUIREMENTS

The Core FTTx electronics comprise mainly of the Optical Line Terminals (OLT's) which serve as the heart of any FTTx network.

OLT is a device which serves as the service provider endpoint of a passive optical network. As shown in section 1.1, OLT is a GPON aggregation device that is usually located at the Inside Plant end within the data center. An OLT converts the optical signals transmitting over fiber to the electrical signals and presents them to a core Ethernet switch. The OLT replaces multiple layer 2 switches at distribution points. OLT distributing signal is connected with backbone cabling or horizontal cabling through optical splitters, which are connected to the optical network terminal (ONT) at each work area outlet.

4. Functional Requirements, Analysis and Recommendations

As shown in Figure 14, A GPON network consists of OLT (Optical Line Terminals), ONT (Optical Network Terminal), and a splitter. The splitter will divide the signal when needed. The OLT takes in all of the optical signals in the form of beams of light from ONUs and will convert it to an electrical signal.

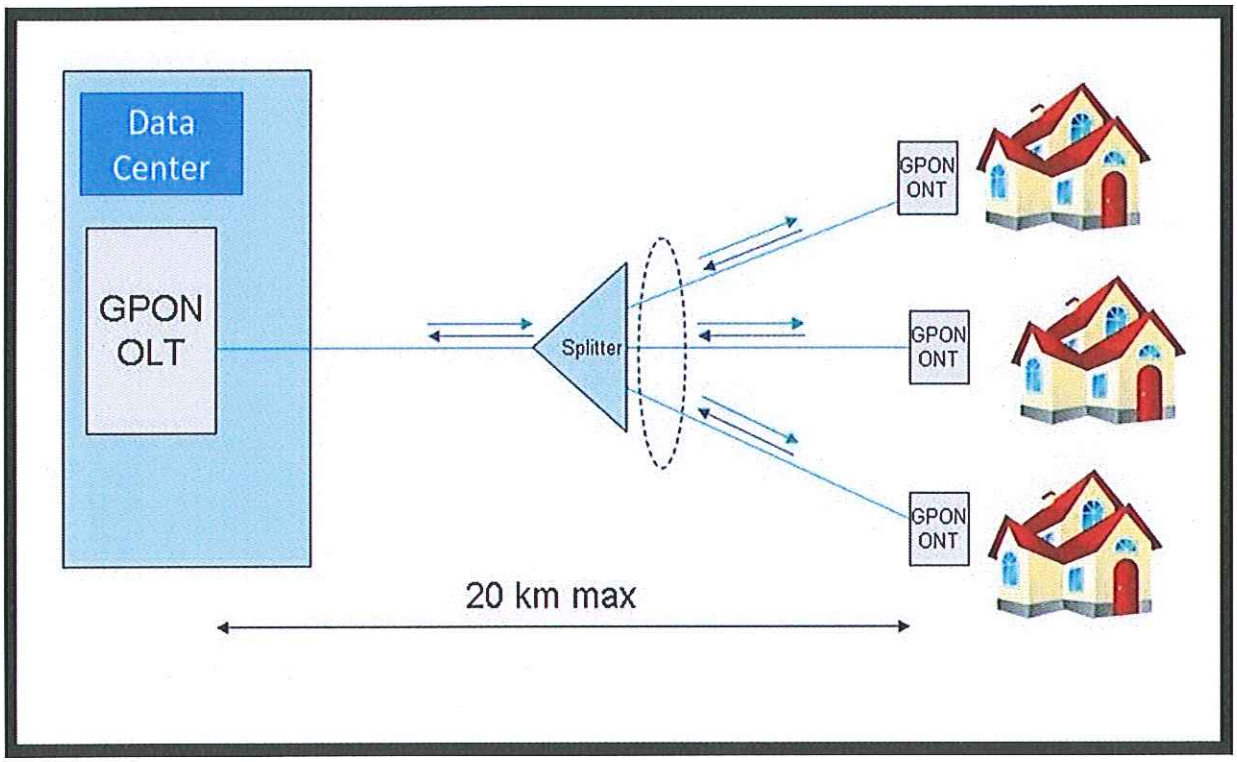

Figure 12: GPON Network with OLT, ONT, and Splitter

4.1.3.1 Analysis

See **Appendix D** for detailed analysis information regarding the FTTx Electronic and how Fujitsu developed the following recommendation.

4.1.3.2 Recommendation

Based on Fujitsu's analysis and comparison of the vendor products, we noted some products are modular in nature but provisioning system and operation system need to operate independently.

A holistic approach needs to take ONT selection and EMS/NMS ease of operation and provisioning into account. One vendor is still a standalone instance and less intuitive when compared to its competition.

With respect to hardened OLT options which may need to be deployed at TCLP remote locations; say for the MDU based requirements or for any kind of distance limitations, [redacted] OLT's offers much more robust portfolio with respect to hardened OLT options as compared with the other vendors that have been evaluated. These portfolios of hardened [redacted] OLT's can be deployed at such locations and can be integrated back to the Core WAN gateways at the Data centers.

After considering the Requirements and analyzing the data, Fujitsu recommends [redacted] **OLT's to be deployed at the TCLP Data Centers.**

4.2 Home Network Electronics

Since Fujitsu is recommending an architecture based on the distance and density of serving areas, there is no need to create an active Access Network. Data Center can connect direct to the home network electronics through LCP cabinets in the field, hence saving cost and eliminating the need of extra distributed electronic system. It is important to not only analyze OLT but also compare features and availability of various options for home electronics. Industry standards still use closed options for OLT/ONT, therefore both OLT and ONT need to be from the same vendor and be part of the same product line to function gracefully. In previous sections Fujitsu has recommended [redacted] OLT system, therefore we will carefully analyze ONT to make sure ONT recommendation is aligned with overall strategy of TCLP.

Home Network or Subscriber Network consists of primarily 2 pieces of equipment: the optical network terminal (ONT), where the fiber is terminated, and the subscriber premise equipment (CPE) providing the necessary networking and service support. As shown in Figure 15, this equipment may be integrated or separated depending on the demarcation point between service provider and the end user.

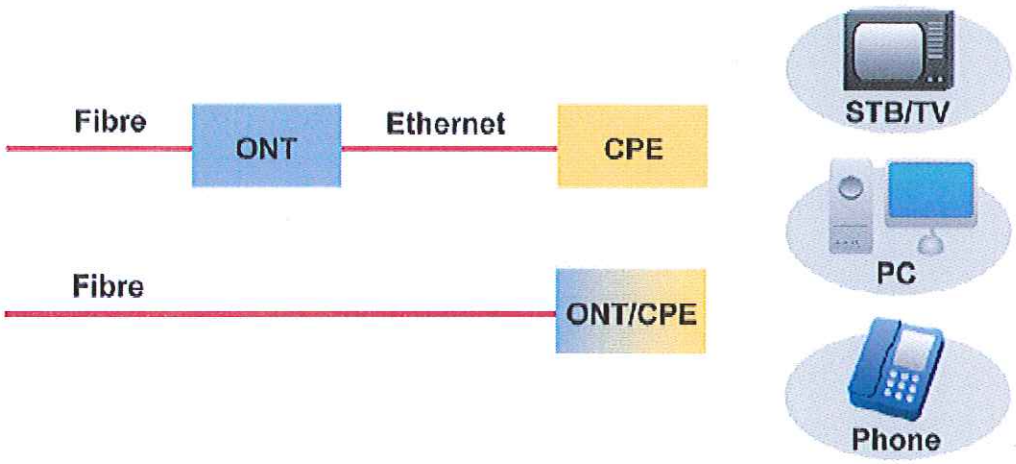

Figure 13: Subscriber Network

4.2.1.1 Requirements

Fujitsu considered and analyzed specific requirements while studying various vendor ONT options.

4.2.1.2 Analysis

Fujitsu, as part of FTTx system, not only analyzed GPON OLT system but also compared home ONT systems from several vendors. Fujitsu compared Indoor and outdoor ONTS with primary focus on integrated capabilities and rich in provisioning and troubleshooting capabilities. The features compared were based on TCLP objectives.

See **Appendix E** for detailed analysis information regarding the Home Electronics and how Fujitsu developed the following recommendation.

4.2.1.3 Recommendation

The Analysis shows one vendors approach introduces an additional point of failure and extra cost for the HW and additional installation and increased spare management.

4. Functional Requirements, Analysis and Recommendations

[redacted] has large number of product portfolio and is well positioned. EMS/NMS system for monitoring and provisioning is less intuitive than its competition but functions very well.

[redacted] products are currently on par with industry standards and show case an elegant EMS/NMS system, supports indoor integrated GPON at very reasonable price points. If combined with [redacted] Core routers, TCLP network will face lesser interoperability challenges.

After considering the Requirements in section 3.1.1, Fujitsu recommends [redacted] as the Home Premises equipment.

5. Design and Engineering

The Preliminary Network Design will provide a high-level architectural overview of the network solution and significant design decisions to satisfy business and services requirements. The document will summarize the overall preliminary design, product platforms, network services and various technical components of the proposed networks which consists of: Outside Plant (OSP) Design and Equipment Locations

In section 4 Fujitsu has evaluated GPON technology for TCLP. The telecommunication industry has adapted gigabit passive optical network ("GPON) topology, primarily to achieve cost efficiencies by simplifying deployment models. GPON architecture typically uses a splitter to transport the fiber optic signals from a passive Optical Line Terminal (OLT) to a termination point at the premise, known as an Optical Network Termination ("ONT"). The splitting ratio, often set at 1:32, reduces the fiber optic cabling required for a comparable active network, which has a dedicated fiber connection to each premise. Within the GPON deployments we reviewed two types of architecture Distributed and Centralized split architecture.

- The distributed split architecture has splitters placed in multiple areas of the network.
- Centralized split architecture has splitters located at a single point or central point within the network.

Backbone Fiber

Today TCLP has a tremendous amount of backbone fiber in place throughout the city and outside of the city boundaries.

Distribution fiber

We have designed for a distribution fiber to be placed from each data center to the 1:32 splitters in each of the LCP cabinets. Extra capacity is planned on the distribution fiber to allow for growth and expansion outside of the city boundaries. The LCP cabinets will be able to be placed on utility poles as well as located on large vaults or cement pads that is located in the right of way.

Access Fiber

There will be a single dedicated fiber for every address within the city. The fiber originates from the LCP cabinet and is designed to a network access point or NAP which is a connectorized multiport terminal as shown in the diagram below. This fiber equipment was chosen for two reasons. First, because of the weather in Traverse City, we wanted to ensure that drops could be placed during the winter months and a multiport terminal has connector allowing the fiber to be mechanically connected rather than requiring a fusion machine to splice the fiber. Second, with having all the fiber terminated it allows FNC to have complete test results for every fiber that is designed in the network. It gives the TCLP a completely tested system and that all fiber met the specification to deliver the service without interruption.

Figure 14 Recommended Network Architecture

5. Design and Engineering

Figure 15" Connectorized Multiport Terminal with Drop Fiber Connected

Drop Fiber

A single drop fiber is planned for every residential property, In MDU and Commercial buildings multiple fiber will be planned based on Commercial size and number of units within structure.

Below is an overview of the Data Center boundaries within the current reach of the electrical distribution areas for TCLP.

5.1 Engineering

Fujitsu will design and engineer the Traverse City TCLP Fiber-to-the-Home (FTTH) network using a multi-talented and functional team. FNC will employ an engineering staff comprised of OSP engineers, field survey engineers, aerial make ready engineers, GIS specialists, CAD drafters, permitting specialists, and site acquisition specialists. Major steps include Preliminary Engineering of the Backbone, Huts, and Distribution Fiber and Access Fiber (DF and AF); Permitting, Detailed Engineering, and As-Built documentation in standard GIS format after construction is completed.

Field Survey

Fujitsu deployed OSP field engineers to the area to perform a make ready assessment of existing utility poles. The field engineers' field assessed all of area 1. During the field walk the engineers looked for NESC violations and existing ground to low communication clearance as well as communication to power clearances. The evaluation determined what make ready construction would be required to facilitate a new attachment to the utility pole either within the communication space or within the power supply space. This assessment was to verify what type of aerial fiber to deploy, either an all-dielectric self-supporting (ADSS) cable placed in the power supply zone or fiber cable that is lashed to a support strand in the communication zone on the utility pole.

As illustrated in the figure below Traverse City is located in a heavy loading zone and placing additional lines higher on the utility pole increases the load on the poles thus increasing risk and potential maintenance on poles.

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5. Design and Engineering

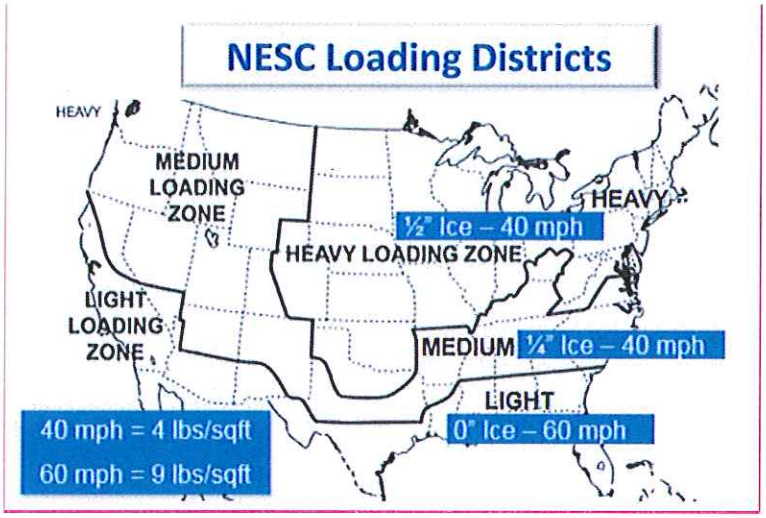

Figure 16: NESC Loading zones

In choosing to build the OSP network we considered the following factors: weather, reliability, cost, schedule and future operations and maintenance costs and time along with all other environmental concerns. It was also determined that having a flexibility within the network for future expansion and having access to the fiber cable is necessary to operate a network such as this.

6. Construction and Project Management

Construction of the network is tied to the engineering of the network. When Fujitsu hands off construction prints to the contractors we will have given them a punch list of every task by geographic location that has to be completed on the project. As the units get completed they are changed within the program management tool that was used in issuing out the work to the vendors. These two platforms communicate with each other and provides checks and balances of both groups. The biggest advantage of performing the work this way is it will enable a data driven analysis that for the rest of the build can be tailored to the most cost efficient deployment.

We have reviewed all upcoming projects with the city engineer and this Phase 1 project will not impact any other existing city projects planned for this year.

The design build team is a combination of dedicated in-market resources and shared (or pooled) resources that can travel into market when needed or work remotely.

Construction Management requires specialized focus and an extensive field presence. Fujitsu will staff a design build construction manager on-site in Traverse City for the duration of the major construction phases of the project. The assigned CM will create and maintain the construction schedules and report statuses of construction regularly. The CM will also manage all the risks, issues and changes and will coordinate with the Fujitsu program manager. He will manage and direct all construction subcontractors.

To finalize the design and for Phase 1 of the project Fujitsu intends on having several crews out performing data collection on utility poles in late spring early summer while at the same time the high level design will be field walked to evaluate all of the constructible design and make notes and confirm decisions that were made in the design phase. With informing the design of as found conditions a second iteration of design will be completed and reviewed by project team. If approval is given then ready for construction packages will created and delivered to the construction project management team.

The ready for construction packages will contain construction drawings that show the placement of the fiber both overhead and underground. It will contain a splice schematic and associated fiber call outs and fiber numbers that show what fibers are on each cables and where the fiber are spliced to other cables. There will be a complete Bill of Material issued for every serving area. This BOM will have detailed labor and material units associated with a specific location along with a summary of units being placed in a serving area or project area. Below is a typical example of detailed drawings.

6.1 Construction Operating Plan

Fujitsu is committed to providing outstanding products and services to our valued customers by utilizing industry best practice, by setting and attaining high quality standards, and through continual improvement of our business processes. Fujitsu's implementation of and adherence to a full-service quality assurance plan will facilitate success in meeting the expectations and requirements of TCLP. Fujitsu enables the utilization of detailed policies and procedures, enabling our managers and employees to establish and adhere to performance measurement systems designed to meet and exceed TCLP's objectives, requirements, and expectations.

Fujitsu places high value on and takes pride in the quality of workmanship and processes. This approach provides an orderly, methodical framework in which in which steps are taken to guarantee that all required tasks are accomplished on time and in conformance with TCLP and industry standards with the allocated resources, and with TCLP's satisfaction always in mind. This will be of mutual benefit to TCLP and of Fujitsu – by limiting rework impacting project success, and thereby increasing productivity and overall project profitability. The operational plan defines acceptable procedures and

processes that all team members must adhere to, and suggestions are encouraged from all team members to build on this program and continually improve and enhance our overall success.

The operating plan defines the operating guidelines that all Fujitsu employees and its subcontractors will follow when performing work for TCLP. It sets forth standards and references TCLP approved guidelines. The completed or associated work for the project will be a product of these guidelines, referenced documentation, best practices, and local rules and regulations.

At every level, adherence to this plan is essential to ensure strict compliance with contract specification. All subcontractors and other parties on the project will be advised of these procedures and are expected to incorporate these policies into their schedules to maintain compliance.

To ensure all parties are in line and understanding of the project a project specifications and a plan of record is being developed to instruct Contractors program management and TCLP project stake holders how the project will be constructed what key metrics will be reported on and how often. It will describe the efforts required for performing the work and the safety needed to perform the work. All environmental concerns will be taken into consideration and procedures and process in place to ensure best practices and industry standards are adhered to and installations guidelines are followed.

6.2 Project Management Process and Controls

Below are some high level processes that will be used when managing this project.

Communications Planning

The fundamental communication principles between the Fujitsu team and TCLP are based on an open forum consistent with good business and program management practices. The Fujitsu PM will develop a formal Communications Plan with TCLP to ensure stakeholders have the information (both content and format) they need at a frequency that is agreed to by all parties.

6. Construction and Project Management

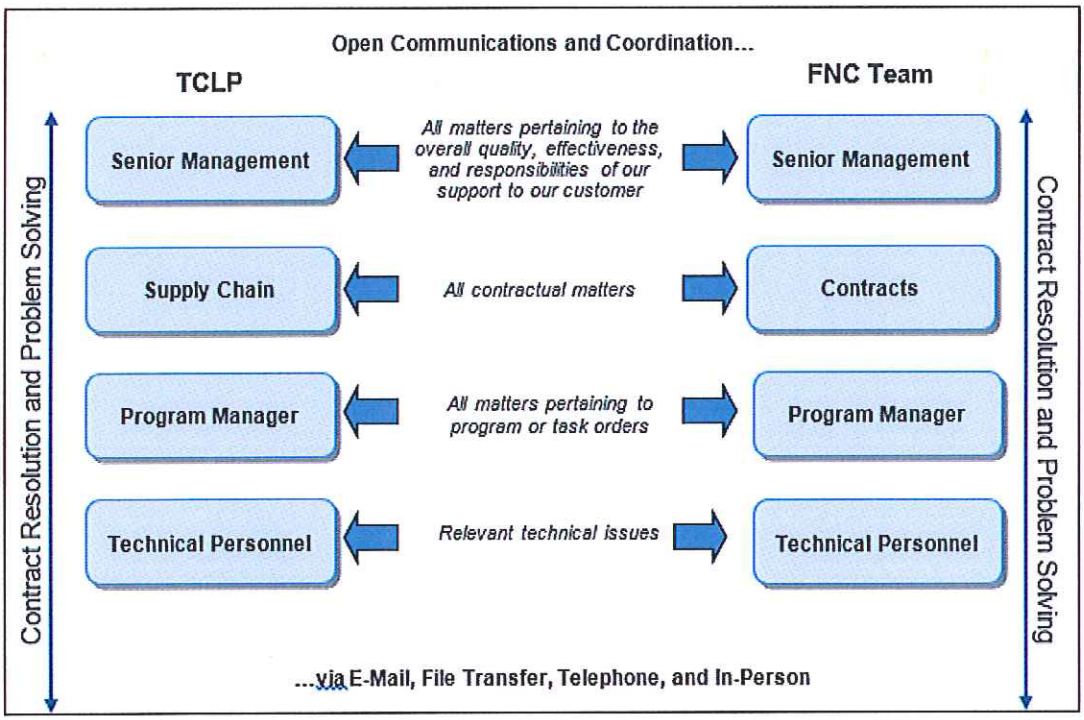

Figure 17: Communications Plan

Risk

Risk assessment and mitigation is an integral part of the overall approach to managing the program. To reduce the impact of uncertainties, the Fujitsu PM monitors risk elements by tracking performance against requirement and looking ahead to future requirements to make sure risks are identified and mitigated.

Monitor/Control

To facilitate program monitoring and control, Fujitsu will create schedules for each of the phases of the project. Each of these schedules has been integrated together to provide an overall program view that can be managed by our Program Management Office (PMO). The individual schedule view will enable the manager to examine only those tasks and activities that directly contribute to the accomplishment of major milestones and deliverables for the individual tasks. Additionally, the team will perform the following during monitor and control:

- Project Schedule will be referenced daily
- Schedule Performance Index (SPI) and resource utilization to be reviewed weekly with team leads
- Critical Path to be reviewed weekly with team leads and affected subcontractors
- Mid-Project baselines to be saved weekly and referenced regularly against current progress
- Data Date to be updated weekly
- Unfinished work is pushed up to status date

6. Construction and Project Management

- Activity Status (Actual Start/ Actual Finish / Percent Complete) will be driven primarily by Fujitsu's production software tool

Project schedules will be audited regularly by Project Controls Manager or assignee.

6.3 Material Vendor Selection

To ensure we are getting the best price for materials FNC recommends that all the material required for the build to be bid on by both material vendors and the manufacturers of the material. When the detailed design is complete a bill of material will be sent out with pricing requested for all the fiber equipment and materials. The best vendor(s) will be selected.

The critical evaluation factors will be cost, delivery timeframes, and manufacturer recommended specifications with regards to the environment within Traverse City.

6.4 Construction Vendor Selection Process

Fujitsu has spoken with and received high level pricing from multiple separate contractors who specialize in utility construction and fiber to the home construction. These contractors were a mix of regional and national contractors that boasted extensive fiber, construction and utility experience working with some of the largest providers in the United States.

Critical Evaluation Factors	
Fiber/ PPP Experience	Brownfield engineering and construction of a new network necessitates selection of an experienced contractor that is able to efficiently integrate the network design into the existing infrastructure. The GPON network topology is also relatively rare in the market, further increasing the importance of selecting an experienced contractor that can successfully implement this typology for both overhead and underground drops.
Project Understanding and Resources	Contractors that are local to the state and have the ability to support the build with both resources and experience to understand the network's topology, and tailor their response to consider the project's specific environment.
Contractor Engagement	Fujitsu is seeking contractor(s) that match our commitment to delivering a high quality solution to TCLP. Selecting two active and engaged contractors that demonstrate real appetite to complete the project should increase the competitive tension through the bid development process and deliver a more efficient proposal to Fujitsu.

Figure 18: Critical Evaluation Factors

6.5 High Level Process and Timelines / Schedule

Phase 1 of the project including engineering and construction is expected to be completed [redacted] of starting the detailed design. It incorporates all the engineering and pole permitting required along with the make ready and construction of the network. We have made assumptions in preparing this high level schedule and below will be a more detailed timeline and process flows for each engineering/design and construction portions of the project.

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6. Construction and Project Management

OSP Engineering and Construction Process

High level process flow to keep TCLP informed and up to date on current status and what is expected next within the design or construction phase of the network. Phase 1 of the project will begin immediately after approval and engineering is expected to take [redacted] to complete with the make ready process included within the engineering deliverable.

6. Construction and Project Management

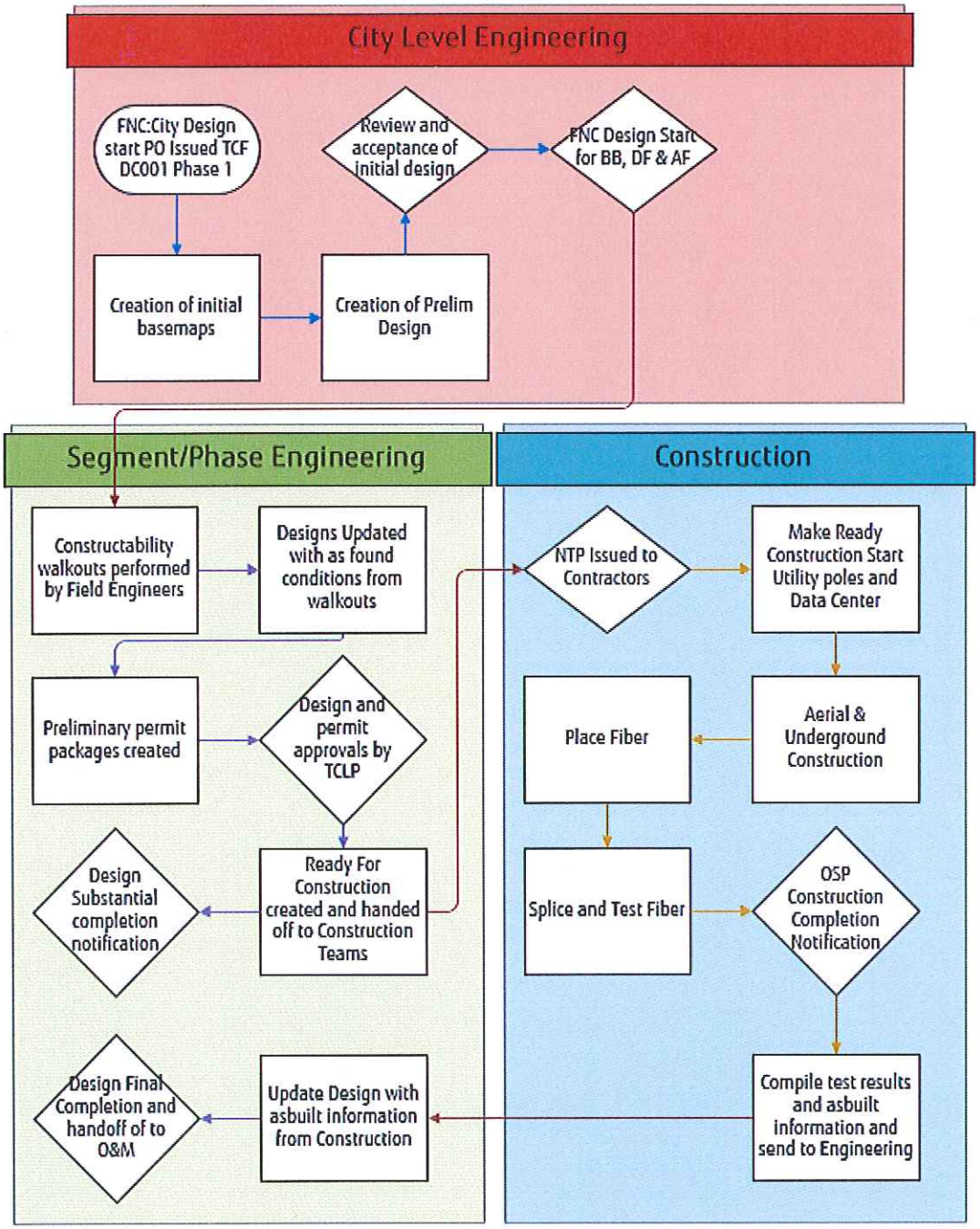

Figure 19: Fujitsu has a well-defined OSP process with clearly identified check points for TCLP to review and provide input.

6. Construction and Project Management

6.6 Typical Risks

During this time we have found that fiber demand is up and the wait time for the fiber as much as 12 weeks for delivery. We will need to order fiber as early in the process as possible to ensure timely delivery of the fiber.

Make ready construction of 3rd party attachers is and has been a problem all over the United States. We have planned for the least intrusive approach that has minimal dependency on 3rd parties in moving their attachment on the utility pole to facilitate the new Attachment. However it is still a risk and we hope through focusing on these risk we can mitigate any schedule delay associated with performing the work.

With a project like this there are a lot of concurrent processes and project moving at once and timely completion of the project requires complex planning. At any point during the project if any of these process fail or if subcontractors fail to meet the project schedule, the project cost and time will be impacted.

If the approval of the project from TCLP is not done within a reasonable timeframe to accommodate the proposed schedule, the winter months may impact the schedule and cost as city dictated construction moratoriums may go into place. Those environmental conditions could lead to a de-mobilization of network construction crews due to the moratorium, which would significantly impact cost and schedule. A re-mobilization of crews would be needed to be done once the moratorium is lifted, which is not ideal nor cost effective. Fujitsu believes this is a scenario that should be avoided if possible as it would impact the project negatively.

6.7 Key Project Assumptions

The proposed Engineering and Construction models are based on best practices and our experience to deliver FTTH builds along with data provided by TCLP. These assumptions will need to be validated through further engineering and field analysis and additional data gathering. Below is a list of assumptions that was used for deriving project costs schedule and estimated units.

- Fujitsu has created a high level design that incorporates [redacted] for the placement of the data center and associated electronics
- The existing backbone fiber has capacity to serve redundant fiber between data centers. There will be a short additional of back bone fiber that will be designed to offer full redundancy of the network. The existing fiber should be free from defects and will be tested to ensure the characteristics of the fiber are suitable for use of Core network traffic.
- A blanket permit will be acceptable and TCLP will be the recipients of our construction packages and they will submit packages to the city engineering department of work notification.
- Make Ready costs and percentages were estimated by performing make ready assessment on Utility poles. If loading and make ready substantially changes the make ready engineering will detail the exact work required for make reading the pole for a new attachment.
- Any make ready construction required by 3rd parties attachers will be completed within 30 days of notification.
- No rock adder was added to the underground construction because soil conditions are expected to be mostly sandy soil with some clay soil headed towards the west of the city

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6. Construction and Project Management

- High level pricing was obtained from materials vendors for the project as we finalize the project actual costs for material will be obtained.

7. Sales and Marketing Plan

Building a sales and marketing organization for an internet service provider requires important steps to be made and milestones to be met to ensure a successful launch and continued profitability. In general, Fujitsu believes it is broken into three parts:

- Strategy
- Operations and Execution
- Analytics and Metrics

Each part is important to build on each other and continuously refreshed to allow for the optimal go-to-market campaign to occur with the highest business success possible.

The focus of this sales and marketing plan is to provide strategic and tactical guidance on the core mandate of the organization's sales and marketing capability. The core objective of sales and marketing is to gain and retain customers. This main objective is accomplished by setting up the correct processes to follow, people to execute on those processes, and technology to assist and improve the capability of those people. A well-run internet service provider business utilizes every avenue to improve itself to remain competitive in an already highly competitive business.

7.1 Fujitsu's Recommendation

7. Sales and Marketing Plan

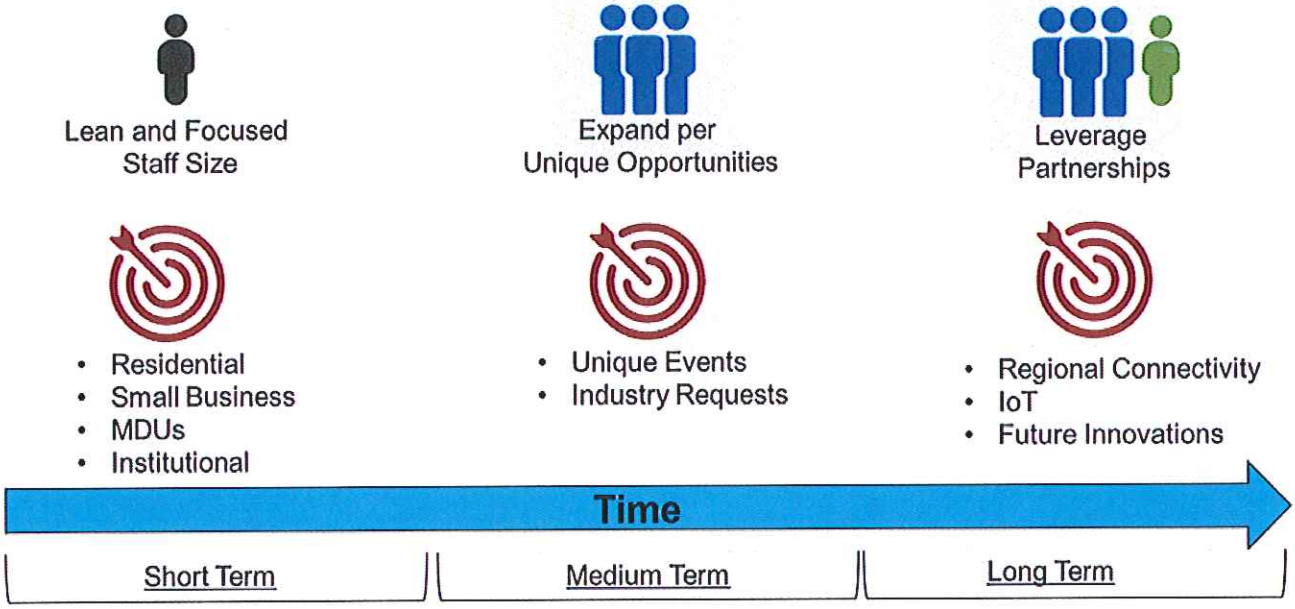

Figure 20: Recommended Go-To-Market Strategy

Fujitsu recommends that TCLP should become the sole retail ISP for Traverse City for phase 1. The sales and marketing efforts should ramp from an initial lean and focused staff size, focusing on residential, small business, multi-dwelling units, and institutional customers in the short term. At a time in the future to be determined by TCLP, unique events within the town of Traverse City such as the Cherry Festival will provide opportunities to expand the use of the network, as well as specific and unique industry requests from large customers like manufacturing. Tailored hiring should be taken when these unique requests present themselves. Long term opportunities like providing regional connectivity, internet of things (IoT), and other future innovations will allow for partnerships to be made that leverage the strengths of these organizations.

7.2 Retail Business Model

For Phase 1 of the TCLP broadband project, there are many reasons for TCLP to become the sole retail ISP. TCLP should focus on three (3) main areas to allow for the most successful ISP business. Those three areas include:

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7. Sales and Marketing Plan

Figure 21: Critical Business Model

Revenue Potential:

With TCLP being the sole ISP on the network, the highest revenue and profitability can be gained by collecting all revenue from the subscribers of services. This provides the greatest chance of profitability by having control of the price of services being offered over this new high speed network. Pricing is a critical aspect of competitive success and control of pricing will allow for agility in when this new ISP organization is formed.

Control of the service catalog is vital to expand and evolve to the needs of the customers within Traverse City. When TCLP has control of this catalog, by being the sole ISP, it provides another important ability to maintain competitiveness and serve the customers of Traverse City. While TCLP should be the sole ISP, it should also look at ways to allow other organizations that do not compete with TCLP to utilize the network for greater community success and higher profitability.

A challenge of the retail business model is that revenue attainment responsibility will be squarely placed on TCLP. This responsibility should be met by allowing experienced professionals within the telecommunications industry to provide advice and perform the activities needed to achieve the revenue goals laid out.

Service Quality:

Being the sole ISP allows for continued control of service quality offered to subscribers. TCLP's existing electrical business has a strong reputation of service quality and focus on the end user, and Fujitsu believes that quality can remain with this new broadband business line. Quality of service is a vital measure of success and has proven to be a driver of take rates and retention rates of subscribers. TCLP should keep service quality at the forefront when marketing this new service, and continuously monitor and improve service once broadband is being offered.

With this control of service comes the responsibility of caring for the subscriber regardless of the situation. It is the ultimate responsibility of TCLP to provide quality care to the subscribers, which can be done by setting up tested and proven processes to facilitate the best resolution for any situation. Speed and reliability of service connections routinely top considerations in Internet choice. Other quality items include fast network discovery, authentication and added value applications. Experienced professionals and technology can improve the ease of this customer care and is recommended.

Operational Costs:

An ISP organization requires skilled professionals all working in concert to achieve the goals achieving profitability. Staffing for a retail business model generally is highest due to all functions being provided and performed by the sole

ISP business. TCLP should be aware that this increases the minimum costs per year when trying to achieve profitability, compared to their existing dark fiber and wholesale business.

Robust back office systems and software, referred to as Operation Support Systems (OSS) and Business Support Systems (BSS), is critical to the success of any ISP business. This retail business model ensures the requirement of these systems to provide high quality service and at the same time automate tasks that provide no value when done by the ISP staff. TCLP must be aware that ISP OSS/BSS have unique capabilities not always seen in other business systems, and should understand that investment in this area provides great value.

Once a subscriber is gained, they must receive quality service and their network components must be maintained to allow for the greatest chance of retaining that customer. With the retail model, that maintenance falls to the sole ISP, through their staff or partners to provide for high reliability and service level agreements.

7.3 Other Business Models

Open Access:

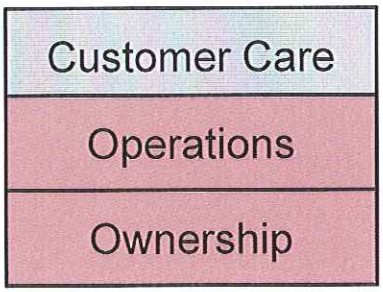

Figure 22: Open Access Model Components

Fujitsu believes that phase 1 of the TCLP project is not suited for an Open Access business model. The top challenges of an Open Access business model within phase 1 include issues relating to financial viability, operational complexity, and the health of ISPs to join the network.

Financially, the phase 1 footprint is too small to sustain multiple ISPs. Significant revenue dilution of this phase for multiple organizations will overall reduce the viability of all parties.

Operationally, the quality of service provided to the end subscriber will always be tied to TCLP regardless if another ISP is the brand name of the service. As a new entrant into the broadband business, it is critical TCLP's service be high quality and be successful. This success is made more difficult initially if that quality of service is not within TCLP's control.

Health of ISPs is important to understand, both initially and long term, to allow for this model to be successful. There are Open Access networks that have been successful in the US, but those networks are significantly larger in size and have established financial criteria that have not always focused on competitive market views. These factors do not provide enough evidence that existing or new Open Access ISPs would be able to initially sustain the competitive forces of this new network within Traverse City.

Fujitsu does believe the Open Access model is evolving quickly and has shown to be viable in certain circumstances. While an Open Access ISP is not viable for phase 1 of TCLP's network, other complementary services can and should be encouraged to be offered to utilize this network to improve profitability.

7. Sales and Marketing Plan

7.4 Potential Customers

Figure 23: Potential Customers to Pursue

Fujitsu's recommendation for target customers throughout the life of the new proposed network is laid out at the beginning of this section. The potential customers list is not exhaustive but should be seen as typical ones to focus on. Different customers have different needs, so it is necessary to break out those customers into segments to best serve them. Business, residential, and institutional customers are generally the major customer segments to be targeted in any network footprint. Each of these customers will have unique needs and require the sales team to provide that customer with their expected service offering. Each customer will have unique needs, including but not limited to, capacity, service level agreements, pricing, service quality expectation, and much more. The phase 1 footprint has quantified the reach to these potential customers, mostly covering single family homes, multi-dwelling units, small businesses, and select institutional customers.

7.5 Customer Care and Sales Team Formation

Hiring talent for the sales team is important as it directly impacts the financial goals of the company. When evaluating people to fill this team, these are a few things that should be looked at to have the right perspective:

- Ability to Listen to Customer Needs
- Empathy
- Enthusiasm
- Resilience
- Hunger to Succeed
- Confidence

Customer sales cycle, which is the time from initial contact to being signed up for service, is important to understand in forecasting the monthly revenues for the network business. Things such as business customers being locked into a long term contract can impact the overall success of take rates within a service area. This is critical to be aware of and have the team understand so they can best navigate the competitive landscape.

Setting targets for the sales team is important to establish expectations for the team, as well as financial projections for the organization. These targets and quotas should be established based on current and potential competitive offerings

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7. Sales and Marketing Plan

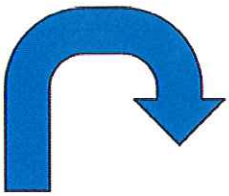
and customer market evaluation. A successful sales organization continues to build on the sales pipeline available within the market, and ensures that current customers are well served. This process of managing the pipeline directly leads to future success.

Online, over the phone, or in person, a customer expects to buy service through any method they wish. This is expected and will be allowed for the customers of TCLP's network. Through websites to access a catalogue of services, customer care representatives to provide high touch interaction and a physical presence in Traverse City to fulfil the service request, all customer types will be allowed to gain service. Potentially there is the ability for an agent sales channel, but that is to be determined in the future.

Every sales member is incentivized by their compensation, and that compensation plan drives action to benefit the organization. In general, a partial salary and partial incentive compensation framework is best to ensure a continuously motivated work force. This approach may change at different points in the life cycle of the network given the success and objectives of TCLP.

7.6 Marketing Tactics

Direct



Indirect

There are many marketing tactics to consider when looking to reach your targeted customer segments. A way to represent these tactics is by categorizing them into direct to customer actions, and indirect to customer actions.

Direct:

The main source of direct sales and marketing should be contact from the ISP sales team, either inbound or outbound, by customer services representatives or specialized staff to care for unique business needs. Achieving customer satisfaction especially early in launch is paramount. All customer touch points (retail center/call center, Tier 1 help desk, employees) should be measured at all times to ensure the pulse of the customer is known.

Indirect:

Other methods of engaging and obtaining new customers can include referral programs from existing organizations such as local interest, community involvement, or professional groups looking to socialize this new network and the benefits it can bring. Low cost social media tactics and collaborations can improve the reach of the TCLP brand beyond traditional methods. Social media has become a significant avenue of reaching new customers and it highly recommended to be utilized. This new service will also benefit significantly from utilizing the existing TCLP electric brand, but should have its own brand to differentiate slightly from the electric service. A TCLP brand must be chosen wisely, as it is the first thing a customer sees, and will be tied to the TCLP electric service as well as the broadband service. This brand must fit with the new organization and what potential it brings to the city and surrounding area.

7. Sales and Marketing Plan

7.7 Review and Refinement

Efficiency of sales and customer care activity is critical when running an ISP, and should be reviewed on a continuous basis. Utilizing industry standard KPI of success, such as those listed below, and review of customer acquisition and retention will allow for continuous improvement.

- Customer service quality
- Time to resolve customer issue
- Total revenue
- Market penetration (Take Rate)
- Profitability
- Year over year growth
- Per service and product offering financials

CRM systems allow for great visibility into the sales team and customer care activity. It should be the intent to utilize market leading CRM systems to best manage and review sales performance. Providing customer profile information to all TCLP team members is vital for the best execution of the sales plan and continuous customer care. Providing guidance and coaching to the sales and customer care team is just as important as setting goals. The competitive environment changes and must be handled with superior coordination and collaboration of the entire organization. Staffing for this agile structure and establishing efficient processes will ensure that changes can be made fluidly throughout the months and years to remain competitive.

7.8 Service Catalog

Multiple internet data tiers as well as voice are important to offer to ensure significant take rates of residential and business customers.

8. Back Office Functions and Staffing Plan

8.1 Introduction

Traverse City Light & Power (TCLP) will require a strong business structure of processes, people and systems to effectively manage and deliver competitive services in the most efficient and cost-effective way possible. Commonly referred to as back office functions, these processes, people and systems support the underlying business operations framework of the entire business. It is therefore critical that these functions be fully defined in the context of TCLPs operating structure, to develop an implementation strategy and to identify the needed staffing and associated costs to operate and deliver these back office functions.

This section will identify the needed functions, a recommended strategy for implementation and a complete 5-year staffing plan with associated costs. In developing the recommendations, we followed TCLPs guidance to (1) source to Fujitsu Managed Services those functions that cannot be internally supported; (3) minimize the need to hire additional internal resources and (4) provide a framework that flexes with TCLPs planned growth.

8.2 Back Office Functions

The back office functions are broken into two (2) major categories: Customer Management and Financial Management. Customer Management will include all of the functions related to managing addresses, Customer records (Service Orders, Trouble Tickets, customer and address history, and Billing). The financial Management includes all functions related to the financials: Capital projects, WOs, POs, inventory, AR/AP, and revenue management).

8.3 Implementation Strategy

The first year of operation will be focused on network build out and customer acquisition with customers coming online post-network activation. Back office expenses during this initial period need to be closely synchronized with the relatively small initial revenue stream. Outsourcing of back office functions of any kind is to be a flexible, volume-based model. The recommended business model is as follows:

- Utilize Fujitsu's Managed Services for Back Office Systems Support: Fujitsu can offer complete back office customer care and billing systems for broadband service providers. The features and functions of this service is customizable to TCLPs specific requirements and pricing is based on volume which enables TCLP to control expenses as its customer base expands. Combined with Fujitsu's Managed Service for TCLP Network Operation and Maintenance, TCLP will have an end-to-end integrated operations model.

- Build a Small Support Organization: Fujitsu can provide a small support organization to support this new ISP back office functions. Type of personnel assumptions, timing of hire and associated costs are covered in the Staffing Plan section. The strategy of creating a lean operations team that limits costs, coupled with the option of national economies of scale functions will keep the headcount in this organization relatively static over the next 5 years.

8.4 Staffing Plan

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8. Back Office Functions and Staffing Plan

The staffing plan shown below was developed based on industry-standard, direct Fujitsu experience, and personnel assumptions for the projected size of TCLPs business.

Years	1	2	3+
Broadband Specialist	1	1	1
Accounting Clerk	1	0	0
Customer Service Representative	2	2	3
Direct Sales (Commercial)	0	1	1
Installation and Repair Technician	2	2	3
OSP Engineer	0	1	1
Total	6	7	9

Figure 24: Staffing Plan Projection

9. Operations and Maintenance Plan

Operations and maintenance will summarize the overall preliminary design, product platforms, network services and various technical components of the proposed networks which consists of:

9.1 Site Addresses and Listings

Site address listings will be imported into [redacted] for the initial construction project and will be imported into the OSS/BSS system where the records are maintained with all of the Plant Records information related to each address within the serving area. The OSS/BSS system allows for reporting to identify which addresses have what services and those that do not. Custom reports can be generated to aid in marketing programs to onboard new customers, offer services, and manage notifications for maintenance work and more.

9.2 Roles and Responsibilities Matrix

Responsibility Matrix	P=Primary / S=Secondary / X=sole responsibility	
	TCLP	Fujitsu
Call Center		
Hire GM	S	P
Hire support staff	-	X
Service offering packages	S	P
Process Flows	S	P
Terms and Conditions Agreement for service	S	P
Managing Deposits	S	P
Billing intervals/mailing, messaging on bills	S	P
Daily cash drawers	S	P
Office Space	S	P
Building Access/Alarms	P	S
Dispatch	-	X
Order Intervals - Scheduling	-	X
Bank accounts	X	-
Deposits	P	S
Set Up General Ledger	P	S
Voice Service Provider	-	X
OSP		
Service Installation	-	X
Hiring Staff	-	X
Vehicles	-	X
Tool Tracking/Management system	-	X
Technician cell phones, laptops, HH devices	-	X
Fiber Splicing tools (Fusion Splicer, Cleaver, OTDR, Power Meter)	-	X
Inventory Tracking Process	-	X

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9. Operations and Maintenance Plan

Technician Training	-	X
Technician time reporting	-	X
Plant maintenance	-	X
Plant records keeping	-	X
Safety program for OSP/Construction	-	X
Technician time reporting	S	P
After hours technical support for OSP	-	X
After hours call out process	-	X
Cut UG cable construction support	-	X
Underground Service Alert	S	P
Test and turn-up	-	X
QA Acceptance	-	X
Records Retention	-	X
Circuit Assignment	-	X
Provisioning	-	X
Change Order Requests Process	S	P
Change Order Scope/Pricing	S	P
Change Order Approval	P	S
Facilities Moves (Road moves/widening, pole moves, pole replacements	S	P
Service reporting	-	X
Network Operations		
Network Assurance		
Network Monitoring	-	X
Capacity Management	-	X
Fault Isolation	-	X
SLA Performance Tracking/Reporting	-	X
Network Dispatch	-	X
Network Repair (including the network side of the ONT)	-	X
Service Assurance		
Service Monitoring	-	X
Capacity Management for Upstream Internet Connections	-	X
Network Fault Isolation	-	X
SLA Performance Tracking/Reporting	-	X
Service Dispatch	-	X
Service Repair	-	X
End-user Repair (Home/MDU/Commercial)	-	X
Tier 1 Help Desk/ Call center	-	X
Network Activation		
Network Service Orders	-	X
TAC Center	-	X
Tier 2 Help Desk (Network Device Management)	-	X
Service Activation		
Service Requests (FTTx)	-	X

Retail Center	-	X
Usage	-	P
Infrastructure Management		
Utility Joint Pole Attachments	-	X
Cable Locating Association Admin	-	X
Outside Plant Break / fix	-	X
Break / fix splicing	-	X
Fixed Wireless Tower Attachments	-	X
Data Center		
Access Control	P	S
Monitoring and Managing Environmentals	-	X
Managed Security (Antivirus, Vulnerability Scans)	-	X

9.3 Service Level Objectives

Service Level Objectives are established based on the priority level of the network devices and the role of the device in the sub-customer Network. Incident severity is defined as device condition and the degree of immediacy for diagnostics and resolution. Upon completion of the network design each device will be assigned a priority in the operations priority matrix which is communicated to the Network Operations Center to monitor maintain, and report accordingly. The Network Operations Center is manned by our trained professional staff 24X7X365 that is redundant to all functionality in multiple locations in the US.

9.4 Reporting Requirements

Critical to any operations are the means to report how well service is delivered and managed. Reporting must include the ability to monitor how customer's expectations are met with respect to service activation and service interruptions. The data is used to improve on delivering exceptional service to the customer. Primary service delivery metrics include:

- Commitments met & missed
- Service order intervals (number of days from the initial customer contact through completion of the order)
- Trouble Ticket Cause codes
- Trouble Ticket Completion Codes
- Technician activity codes (en-Route, On-Site, Completion time)
- Service Order, Trouble Ticket, and Technician activity are an integral part of the OSS.BSS System that are required fields to complete the SO/TT within the system. The system captures the data by the SO/TT number, customer's name, SO/TT initiation date, CSR and technician user ID etc. The reports are used to adjust force and workload, improve dispatch, and track faulty plant facilities and electronics to name a few. As the OSS/BSS system is integrated additional reports can be generated based on business needs,
- Also important to operations are the ability to monitor and manage the network. Through Fujitsu's Network Operations Center (NOC) are standard reports that include

- Monthly Service Report:
  - This report is designed to track and report the incidents that occur with each device and tracked by FNC NOC monitoring tools and team. This will include the current status of individual device incidents that are logged and tracked within the NOCs ticketing system
- Monthly Inventory Report
  - This report is designed to track and report the network elements identified by FNC's monitoring tools and team.
- Monthly Fault History Report
  - This report is designed to track and report the alarms that are being opened and tracked by the FNC NOC monitoring tools and team. This will include the current status by having the individual device alarms logged and tracked within the NOCs Siebel ticketing system. The information gathered will be reviewed and analyzed by FNC's NOC Problem Management Team. FNC's SDM will report any trends found by the Problem Management Team and provide recommendations to address findings such as chronic problem resolution

9.5 Plant Records Management Approach

Plant records management is an integral part of the OSS/BSS System and is the primary driver to all Service Orders and Trouble ticketing. The plant records will be downloaded from the TCLP records database and imported to [redacted] for the initial design build portion of the project. As-built records are imported into the OSS/BSS system where the service address will be retained. Each Serviceable address is assigned a Network Access Point, splitter, and port within the OSS/BSS System therefore allowing for automated Service activation. Likewise the Service Address with all of its associated plant facilities are utilized to generate and analyze trouble tickets. Periodical [redacted] updates are imported into the OSS/BSS system upon completion of new construction projects. The OSS/BSS system is designed to run periodical plant reports to proactively manage network capacity, damaged cable and repairs, as well as network expansions and changes.

9.6 Connectivity

Secure VPN

A virtual private network ("VPN") extends TCLPs private Network across the internet. It enables the managed device to send and receive data across internet as if it were directly connected to the private Network, while benefiting from the functionality, security and management policies of the private Network. This is done by establishing a virtual point-to-point connection through the use of dedicated connections back to the FNC NOC.

- FNC provides dedicated and redundant secure VPN connections to the two (2) geographically diverse FNC NOC data networks to two (2) geographically diverse Company gateway elements into the managed Network.
- TCLP must provide electrical connections, internet service provider ("ISP") connectivity, access to the gateway facilities, and routing to the managed Network.
- Third party network access may be required when TCLP has another support organization with whom it is necessary to collaborate, such as when a FNC NOC technician might wish to share remote access sessions with TCLP, multivendor technical support, and/or a third party helpdesk. Due to the

numerous physical, security, logistical and contractual issues whenever third parties are utilized; FNC's standard approach will be to limit all such access to the TCLP network. FNC will negotiate direct access on a case by case basis.

- FNC will ensure that the NOC technicians have full access to telephony in order to discharge operational functions. The NOC will interface with the service desk based on requirements to engage with external parties such as third parties, business partners, multivendor and technical support etc. via telephone

9.7 Change Control Procedures

The Network Operations Center will be responsible for engineering and provisioning changes within the Network. FNC requires notification of any changes prior to the required date to identify issues that may adversely affect the Network. When TCLP requires MACD (e.g. circuit deletion, configuration change to managed nodes) or has scheduled maintenance within the Network, out a request template (provided at new customer activation kick-off meeting) and submit to the NOC Change Control Administrator ("CCA"). Upon receipt, the CCA will confirm receipt with the requestor submitting the NOC change control request ("CCR") and will review the change request. As necessary, the CCA will contact the submitter for any clarification of the request or capture additional details. Once the change request is confirmed, the NOC CCA will coordinate with TCLP to create a schedule for implementation

9.8 Managed Service Takeover Plan

The TCLP Operations Plan identifies the functions, systems and people in place at the time Fujitsu transfers the managed service operations to a TCLP management of operations. The Plan needs to be structured to enable components to be transferred individually or collectively. This will require a comprehensive operations transfer plan that will be jointly developed between TCLP and Fujitsu. We recommend that the business have well documented processes, reporting, financials, etc. prior to transferring to lessen risk of negatively impacting on-going business operations and maintaining transparency to current customers. We will review with TCLP the level of overall preparedness as part of the plan; e.g. is the TCLP NOC staffed and equipped to operate 24x7x360 and build a plan to prepare the transfer.

10. Regulatory and Compliance Considerations

The services being introduced to TCLP, High-Speed Internet and Voice over Internet Protocol (VoIP) are classified as non-regulated services and therefore are not subject to regulatory oversight, either at the State or Federal level. However, the State does request that any company rolling out a facilities based network register their company on the Michigan PUC website. The State PUC has a Broadband monitoring role for the states broadband initiatives. Fujitsu has included a table below which shows the available service providers types that providers have available, and the definition and the services we plan to launch with on day one. As you will see only two service types.

During our due diligence we discovered TCLP provides broadband to schools, upon our interview with TCLP, it was conveyed that TCLP does not seek E-Rate funds for these customers. If they did then there would be regulatory reporting requirements.

Depending upon the funding sources TCLP would be required to report to the lending agency. This can and will be a non-trivial effort, once the source of funding is chosen Fujitsu as the network operator will ensure to participate with TCLP to ensure reporting requirements are met.

10. Regulatory and Compliance Considerations

Type of Provider	Definition	Applicable to TCLP
Broadband Provider	A Broadband provider is defined as retail service capable of transmitting data over an access line at a rate greater than 200 kilobits per second.	Yes
Competitive Access Provider	A Competitive Access Provider (CAP) offers to other providers an alternative means of connecting another carrier to an IXC, bypassing the ILEC. CAPs are facilities based and also known as a "carrier's carrier" or a wholesale provider of capacity. A tariff must be filed with the MPSC per Sec. 202 of the Michigan Telecommunications Act (MTA).	No
Competitive Local Exchange Carrier	A Competitive Local Exchange Carrier (CLEC) is a licensed basic local exchange provider that competes with an local exchange carrier by providing service through its own network and switching or by reselling service from an incumbent local exchange carrier. A tariff must be filed with the MPSC per Sec. 202 of the MTA.	No
Eligible Telecommunications Carrier	An Eligible Telecommunications Carrier (ETC) is a common carrier that has been designated to receive Lifeline and other universal service support in the area for which the carrier is designated an ETC. To be designated an ETC a carrier must file an application with the MPSC and meet all Federal and state ETC criteria.	No
Incumbent Local Exchange Carrier	An Incumbent Local Exchange Carrier (ILEC) is a licensed telephone company providing local service before competition was permitted by the Michigan Telecommunications Act. (See also Sec. 252 of the Telecommunications Act of 1996 - FCC.) A tariff must be filed with the MPSC per Sec. 202 of the MTA.	No
Interexchange Carrier	An Interexchange Carrier (IXC) is a long distance facilities based inter/intra-LATA service provider. Examples of IXCs include AT&T, Verizon and Sprint. A tariff must be filed with the MPSC per Sec. 202 of the MTA.	No
Lifeline Program	The Lifeline Program is a government approved program that provides telephone service discounts for eligible low-income customers. Qualified Michigan residents can receive a monthly credit on their basic local telephone bills. Wireless providers also offer various Lifeline discounts. Lifeline is one of four universal service programs authorized by the federal government.	No
Lifeline Provider	A Lifeline Provider is a telecommunications carrier that offers the Lifeline program discounts to its customers. In Michigan, although only basic local telephone service providers are required to offer the monthly Lifeline credit to their income-eligible customers, there are wireless carriers that also provide Lifeline discounts. Only telephone providers that have been authorized as ETCs, however, can be reimbursed for the federal Lifeline credits they give to their customers.	No
Operator Service Provider	An Operator Service Provider (OSP) is a company that provides long distance or local telephone service that includes automatic or live assistance to a person to arrange for completion and billing of a telephone call originating in the state that does not involve 1) a direct-dialed call, 2) a call dialed with an access code or proprietary account number or 3) call completion in association with directory assistance services. An OSP must file a registration form and pay a filing fee to the MPSC.	No
Pay Phone Provider	A Payphone Provider (PP) in Michigan provides telephone service from a public, semipublic or individually owned and operated telephone that is available to the public, and is accessed by the depositing of coin or currency or by other means of payment at the time the call is made. A payphone provider must file a registration form and pay a filing fee to the MPSC.	No
Toll Reseller	A Toll Reseller (TR) purchases blocks of long distance minutes from an interexchange carrier and resells those minutes to telephone customers. Toll resellers may bill customers directly or use a billing agency, or use the local carrier to bill a customer. A tariff is not required, but may be filed under Sec. 402 of the MTA.	No
Voice over Internet Protocol	A Voice over Internet Protocol (VoIP) carrier transmits voice conversations over a data network using the Internet Protocol such as the Internet or a corporate Intranet.	Yes
Wireless Provider	A Wireless Provider (WP) allows customers to transmit and receive information without wires, commonly via a "cell phone."	No

10. Regulatory and Compliance Considerations

10.1 Agencies to Engage

Regulatory activity will be a joint effort between TCLP and Fujitsu as regulatory environment changes frequently. At this time engaging the FCC is up to TCLP, and Fujitsu can assist if needed. As USDA/RUS is a federal entity, reporting will be a requirement, once the program is chosen, Fujitsu can be available to assist TCLP.

10.2 Expected Licenses

Fujitsu has investigated whether or not TCLP would need to become a licensed Competitive Local Exchange Carrier (CLEC), or not. At this stage Fujitsu does not see a reason for TCLP to become a CLEC. We continue to review Joint Pole Attachment agreements in an effort to ascertain whether or not a CLEC License is required to attach facilities (cable or drop cable) to incumbent carrier poles.

10.3 Continuous Regulatory and Compliance Effort

The regulatory environment consistently changes; therefore, it is a given that TCLP and Fujitsu monitor state and federal law making, notice of proposed rule makings, and notifications.

10.4 Regulatory Assumptions

The current assumption is TCLP already has necessary business licenses and pole attachment agreements to run this new business. This assumption is based upon TCLP having conducted Internet Service business for several years.

11. Key Assumptions

11.1 Break Even Scenario

- **Take Rate**
  - Based on industry low/medium average for similar areas and service offers
- **Miles of Fiber Constructed**
  - 11 Miles
- **Loan**
  - $4M
  - Rate: 3.25%
  - Term: 20 Years
  - Cost of Issuance: 1%
- **$3.2M CAPEX, $0.8M 1st year OPEX**
- **Outside Plant Depreciation**
  - Straight Line: 20 years
- **Equipment Depreciation**
  - Straight Line: 7 years
- **Pole Attachment Fees**
  - $8.5/pole/year
- **Preliminary Construction Timeline**
  - 6 Months
  - Single Mobilization
- **City Gross Revenue Take**
  - 5%
- **Dark Fiber Cash Flow Added**
  - Years 1-4 from provided projections
  - Years 5+ rolling 5 year average
- **Expected Initial Local Operations Headcount**
  - 6 (GM, CSRs, Techs, etc)
- **No equipment refresh modeled due to unknown technology status or competitive requirements in the future**
- **Model is generated with flat growth given unknown inflation in revenue or cost, future competitive environment, or available technology and innovation**

Market Size	
Residential	1,006
Business	945
VoIP	1,951

Take Rate		# of Customers
Residential	40% at steady state	402
Business	40% at steady state	378
VoIP	28% of data customers at steady state	219

Figure 25: Break Even Scenario Assumptions

11.2 Most Likely Scenario

- **Take Rate**
  - Based on industry low/medium average for similar areas and service offers
- **Miles of Fiber Constructed**
  - 11 Miles
- **Loan**
  - $4.2M
  - Rate: 3.25%
  - Term: 20 Years
  - Cost of Issuance: 1%
- **$3.4M CAPEX, $0.8M 1st year OPEX**
- **Outside Plant Depreciation**
  - Straight Line: 20 years
- **Equipment Depreciation**
  - Straight Line: 7 years
- **Pole Attachment Fees**
  - $8.5/pole/year
- **Preliminary Construction Timeline**
  - 6 Months
  - Single Mobilization
- **City Gross Revenue Take**
  - 5%
- **Dark Fiber Cash Flow Added**
  - Years 1-4 from provided projections
  - Years 5+ rolling 5 year average
- **Expected Initial Local Operations Headcount**
  - 6 (GM, CSRs, Techs, etc)
- **No equipment refresh modeled due to unknown technology status or competitive requirements in the future**
- **Model is generated with flat growth given unknown inflation in revenue or cost, future competitive environment, or available technology and innovation**

Market Size	
Residential	1,006
Business	945
VoIP	1,951

Take Rate		# of Customers
Residential	50% at steady state	503
Business	50% at steady state	473
VoIP	35% of data customers at steady state	341

Figure 26: Most Likely Scenario Assumptions

11. Key Assumptions

11.3 Optimistic Scenario

- **Take Rate**
  - Based on industry low/medium average for similar areas and service offers
- **Miles of Fiber Constructed**
  - 11 Miles
- **Loan**
  - $4.4M
  - Rate: 3.25%
  - Term: 20 Years
  - Cost of Issuance: 1%
- **$3.47M CAPEX, $0.8M 1st year OPEX**
- **Outside Plant Depreciation**
  - Straight Line: 20 years
- **Equipment Depreciation**
  - Straight Line: 7 years
- **Pole Attachment Fees**
  - $8.5/pole/year
- **Preliminary Construction Timeline**
  - 6 Months
  - Single Mobilization
- **City Gross Revenue Take**
  - 5%
- **Dark Fiber Cash Flow Added**
  - Years 1-4 from provided projections
  - Years 5+ rolling 5 year average
- **Expected Initial Local Operations Headcount**
  - 6 (GM, CSRs, Techs, etc)
- **No equipment refresh modeled due to unknown technology status or competitive requirements in the future**
- **Model is generated with flat growth given unknown inflation in revenue or cost, future competitive environment, or available technology and innovation**

Market Size	
Residential	1,006
Business	945
VoIP	1,951

Take Rate		# of Customers
Residential	60% at steady state	604
Business	60% at steady state	567
VoIP	35% of data customers at steady state	410

Figure 27: Optimistic Scenario Assumptions

12. Funding Methods

TCLP has several options to fund the entire project (self-funded, Bonds. Bank Loans, USDA/RUS loans and grants). Subsequent phases can be funded through USDA/RUS loans and grants if pursued. It is anticipated the TCLP, the electric utility, will apply for USDA loans through electrical efficiency program and or Rural E-Connect program for infrastructure and perhaps BB grants offered by RUS for electronics. The conventional RUS loans taken by TCLP can fund the fiber infrastructure up to and including drop and electronics inside the premise (home or commercial building). Fujitsu will assist TCLP with all necessary documents that support the build, and on-going operation of the network. The type of funding will be at the sole discretion of TCLP.

12.1 General Sources

Fujitsu concludes that these low-interest loans from federal sources are the most favored approach to debt due to the interest rate. USDA/RUS anticipates these programs will carry an interest rate at slightly higher than 2%.

APPENDICES

13. Appendix A – Detailed Financials for Each Scenario

13.1 Break Even Scenario

- **Take Rate**
  - Based on industry low/medium average for similar areas and service offers
- **Miles of Fiber Constructed**
  - 11 Miles
- **Loan**
  - $4M
  - Rate: 3.25%
  - Term: 20 Years
  - Cost of Issuance: 1%
- **$3.2M CAPEX, $0.8M 1st year OPEX**
- **Outside Plant Depreciation**
  - Straight Line: 20 years
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  - Straight Line: 7 years
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- **Dark Fiber Cash Flow Added**
  - Years 1-4 from provided projections
  - Years 5+ rolling 5 year average
- **Expected Initial Local Operations Headcount**
  - 6 (GM, CSRs, Techs, etc)
- **No equipment refresh modeled due to unknown technology status or competitive requirements in the future**
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Market Size		
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VoIP		1,951

Take Rate		# of Customers
Residential	40% at steady state	402
Business	40% at steady state	378
VoIP	28% of data customers at steady state	219

Figure 28: Break Even Scenario Assumptions

Capital Costs	Total Years 1-5	1	2	3	4	5
Professional and Contractual Services						
Outside Plant Capital						
Design, Engineering, Construction	$ 2,044,323	$ 2,044,323	$ -	$ -	$ -	$ -
Materials	$ 398,913	$ 398,913	$ -	$ -	$ -	$ -
Data Center	$ 252,131	$ 252,131	$ -	$ -	$ -	$ -
Equipment Capital	$ 465,150	$ 465,150	$ -	$ -	$ -	$ -
IP Addresses	$ 42,000	$ 42,000	$ -	$ -	$ -	$ -
Total	$ 3,202,516	$ 3,202,516	$ -	$ -	$ -	$ -

Figure 29: Break Even Scenario, Years 1-5 CAPEX

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13. Appendix A – Detailed Financials for Each Scenario

Income Statement	Total Years 1-5	1	2	3	4	5
REVENUE						
Sales						
Residential	$ 2,074,586	$ 331,389	$ 435,799	$ 435,799	$ 435,799	$ 435,799
Business	$ 3,152,615	$ 503,591	$ 662,256	$ 662,256	$ 662,256	$ 662,256
VoIP	$ 398,851	$ 63,711	$ 83,785	$ 83,785	$ 83,785	$ 83,785
Total Revenue	$ 5,626,052	$ 898,691	$ 1,181,840	$ 1,181,840	$ 1,181,840	$ 1,181,840
Cost of Goods						
	$ -	$ -	$ -	$ -	$ -	$ -
COGS	$ -	$ -	$ -	$ -	$ -	$ -
GROSS MARGIN	$ 5,626,052	$ 898,691	$ 1,181,840	$ 1,181,840	$ 1,181,840	$ 1,181,840
%		*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Operations Expenses						
Professional and Contractual Services						
Network Operations Center	$ 258,336	$ 43,704	$ 53,658	$ 53,658	$ 53,658	$ 53,658
Pole Attachements	$ 23,375	$ 4,675	$ 4,675	$ 4,675	$ 4,675	$ 4,675
Fiber Maintenance	$ 65,190	$ 13,038	$ 13,038	$ 13,038	$ 13,038	$ 13,038
Cable Locates	$ 25,056	$ 4,320	$ 5,184	$ 5,184	$ 5,184	$ 5,184
Staff and Fleet Expenses	$ 2,940,951	$ 501,779	$ 609,793	$ 609,793	$ 609,793	$ 609,793
Help Desk	$ 217,500	$ 37,500	$ 45,000	$ 45,000	$ 45,000	$ 45,000
Software	$ 241,875	$ 48,375	$ 48,375	$ 48,375	$ 48,375	$ 48,375
VoIP Service	$ 113,920	$ 28,701	$ 21,305	$ 21,305	$ 21,305	$ 21,305
Internet Backhaul	$ 140,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000
IP Addresses	$ 2,000	$ -	$ 500	$ 500	$ 500	$ 500
Misc Office	$ 30,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000
Marketing	$ 175,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000
City Fee	$ 281,303	$ 44,935	$ 59,092	$ 59,092	$ 59,092	$ 59,092
EBITDA	$ 1,111,546	$ 102,664	$ 252,220	$ 252,220	$ 252,220	$ 252,220
INTEREST EXPENSE	$ 501,164	$ -	$ 132,668	$ 127,855	$ 122,886	$ 117,755
EQUIPMENT DEPRECIATION	$ 332,250	$ 66,450	$ 66,450	$ 66,450	$ 66,450	$ 66,450
OSP DEPRECIATION	$ 673,842	$ 134,768	$ 134,768	$ 134,768	$ 134,768	$ 134,768
Net Income	$ (395,709)	$ (98,554)	$ (81,666)	$ (76,853)	$ (71,884)	$ (66,753)

Figure 30: Break Even Scenario, Years 1-5 Income Statement

13. Appendix A – Detailed Financials for Each Scenario

Cash Flow	Total Years 1-5	1	2	3	4	5
Net Income	$ (395,709)	$ (98,554)	$ (81,666)	$ (76,853)	$ (71,884)	$ (66,753)
Add: Equip Depreciation Expense	$ 332,250	$ 66,450	$ 66,450	$ 66,450	$ 66,450	$ 66,450
Add: OSP Depreciation Expense	$ 673,842	$ 134,768	$ 134,768	$ 134,768	$ 134,768	$ 134,768
CASH FROM OPERATIONS (after Interest)	$ 610,382	$ 102,664	$ 119,552	$ 124,365	$ 129,335	$ 134,466
Capital Expenses	$ (3,202,516)	$ (3,202,516)	$ -	$ -	$ -	$ -
Dark Fiber Business Cash Flow Add	$ 585,817	$ 39,100	$ 50,198	$ 27,910	$ 232,299	$ 236,310
Equity Contribution	$ -	$ -	$ -	$ -	$ -	$ -
Loan Proceeds with Cap Int	$ 4,082,100	$ 4,082,100	$ -	$ -	$ -	$ -
Less: Cost of Issuance	$ (40,821)	$ (40,821)	$ -	$ -	$ -	$ -
Less: Principal Paydowns	$ (473,791)	$ -	$ -	$ (152,907)	$ (157,877)	$ (163,008)
Cash Flow	$ 1,561,171	$ 980,528	$ 169,750	$ (632)	$ 203,757	$ 207,768
Ending Cash Balance	$ -	$ 980,528	$ 1,150,278	$ 1,149,646	$ 1,353,403	$ 1,561,171
Estimated Annual Pmt (Net of Capitalized Interest)		$ 132,668	$ 132,668	$ 280,762	$ 280,762	$ 280,762
Coverage (Net Debt Svc / Prior year ETITDA)		0.77	0.77	0.90	0.90	0.90

Figure 31: Break Even Scenario Years 1-5, Cash flow

13.2 Most Likely Scenario

- **Take Rate**
  - Based on industry low/medium average for similar areas and service offers
- **Miles of Fiber Constructed**
  - 11 Miles
- **Loan**
  - $4.2M
  - Rate: 3.25%
  - Term: 20 Years
  - Cost of Issuance: 1%
- **$3.4M CAPEX, $0.8M 1st year OPEX**
- **Outside Plant Depreciation**
  - Straight Line: 20 years
- **Equipment Depreciation**
  - Straight Line: 7 years
- **Pole Attachment Fees**
  - $8.5/pole/year
- **Preliminary Construction Timeline**
  - 6 Months
  - Single Mobilization
- **City Gross Revenue Take**
  - 5%
- **Dark Fiber Cash Flow Added**
  - Years 1-4 from provided projections
  - Years 5+ rolling 5 year average
- **Expected Initial Local Operations Headcount**
  - 6 (GM, CSRs, Techs, etc)
- **No equipment refresh modeled due to unknown technology status or competitive requirements in the future**
- **Model is generated with flat growth given unknown inflation in revenue or cost, future competitive environment, or available technology and innovation**

Market Size	
Residential	1,006
Business	945
VoIP	1,951

Take Rate		# of Customers
Residential	50% at steady state	503
Business	50% at steady state	473
VoIP	35% of data customers at steady state	341

Figure 32: Most Likely Scenario Assumptions

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13. Appendix A – Detailed Financials for Each Scenario

Capital Costs	Total Years 1-5	1	2	3	4	5
Professional and Contractual Services						
Outside Plant Capital						
Design, Engineering, Construction	$ 2,141,396	$ 2,141,396	$ -	$ -	$ -	$ -
Materials	$ 398,913	$ 398,913	$ -	$ -	$ -	$ -
Data Center	$ 252,131	$ 252,131	$ -	$ -	$ -	$ -
Equipment Capital	$ 502,089	$ 502,089	$ -	$ -	$ -	$ -
IP Addresses	$ 42,000	$ 42,000	$ -	$ -	$ -	$ -
Total	$ 3,336,528	$ 3,336,528	$ -	$ -	$ -	$ -

Figure 33: Most Likely Scenario Years 1-5, CAPEX

Income Statement	Total Years 1-5	1	2	3	4	5
REVENUE						
Sales						
Residential	$ 2,573,939	$ 394,943	$ 544,749	$ 544,749	$ 544,749	$ 544,749
Business	$ 3,911,450	$ 600,170	$ 827,820	$ 827,820	$ 827,820	$ 827,820
VoIP	$ 618,569	$ 94,913	$ 130,914	$ 130,914	$ 130,914	$ 130,914
Total Revenue	$ 7,103,957	$ 1,090,025	$ 1,503,483	$ 1,503,483	$ 1,503,483	$ 1,503,483
Cost of Goods						
	$ -	$ -	$ -	$ -	$ -	$ -
COGS	$ -	$ -	$ -	$ -	$ -	$ -
GROSS MARGIN	$ 7,103,957	$ 1,090,025	$ 1,503,483	$ 1,503,483	$ 1,503,483	$ 1,503,483
%		*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Operations Expenses						
Professional and Contractual Services						
Network Operations Center	$ 274,217	$ 45,726	$ 57,123	$ 57,123	$ 57,123	$ 57,123
Pole Attachments	$ 23,375	$ 4,675	$ 4,675	$ 4,675	$ 4,675	$ 4,675
Fiber Maintenance	$ 65,190	$ 13,038	$ 13,038	$ 13,038	$ 13,038	$ 13,038
Cable Locates	$ 25,056	$ 4,320	$ 5,184	$ 5,184	$ 5,184	$ 5,184
Staff and Fleet Expenses	$ 2,940,951	$ 501,779	$ 609,793	$ 609,793	$ 609,793	$ 609,793
Help Desk	$ 217,500	$ 37,500	$ 45,000	$ 45,000	$ 45,000	$ 45,000
Software	$ 241,875	$ 48,375	$ 48,375	$ 48,375	$ 48,375	$ 48,375
VoIP Service	$ 169,790	$ 36,634	$ 33,289	$ 33,289	$ 33,289	$ 33,289
Internet Backhaul	$ 140,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000
IP Addresses	$ 2,000	$ -	$ 500	$ 500	$ 500	$ 500
Misc Office	$ 30,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000
Marketing	$ 175,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000
City Fee	$ 355,198	$ 54,501	$ 75,174	$ 75,174	$ 75,174	$ 75,174
EBITDA	$ 2,443,805	$ 274,477	$ 542,332	$ 542,332	$ 542,332	$ 542,332
INTEREST EXPENSE	$ 519,413	$ -	$ 137,499	$ 132,511	$ 127,361	$ 122,043
EQUIPMENT DEPRECIATION	$ 358,635	$ 71,727	$ 71,727	$ 71,727	$ 71,727	$ 71,727
OSP DEPRECIATION	$ 698,110	$ 139,622	$ 139,622	$ 139,622	$ 139,622	$ 139,622
Net Income	$ 867,647	$ 63,128	$ 193,484	$ 198,472	$ 203,623	$ 208,940

Figure 34: Most Likely Scenario Years 1-5, Income Statement

13. Appendix A – Detailed Financials for Each Scenario

Cash Flow	Total Years 1-5	1	2	3	4	5
Net Income	$ 867,647	$ 63,128	$ 193,484	$ 198,472	$ 203,623	$ 208,940
Add: Equip Depreciation Expense	$ 358,635	$ 71,727	$ 71,727	$ 71,727	$ 71,727	$ 71,727
Add: OSP Depreciation Expense	$ 698,110	$ 139,622	$ 139,622	$ 139,622	$ 139,622	$ 139,622
CASH FROM OPERATIONS (after Interest)	$ 1,924,392	$ 274,477	$ 404,833	$ 409,821	$ 414,972	$ 420,289
Capital Expenses	$ (3,336,528)	$ (3,336,528)	$ -	$ -	$ -	$ -
Dark Fiber Business Cash Flow Add	$ 585,817	$ 39,100	$ 50,198	$ 27,910	$ 232,299	$ 236,310
Equity Contribution	$ -	$ -	$ -	$ -	$ -	$ -
Loan Proceeds with Cap Int	$ 4,230,747	$ 4,230,747	$ -	$ -	$ -	$ -
Less: Cost of Issuance	$ (42,307)	$ (42,307)	$ -	$ -	$ -	$ -
Less: Principal Paydowns	$ (491,044)	$ -	$ -	$ (158,475)	$ (163,626)	$ (168,943)
Cash Flow	$ 2,871,075	$ 1,165,488	$ 455,031	$ 279,256	$ 483,645	$ 487,656
Ending Cash Balance	$ -	$ 1,165,488	$ 1,620,518	$ 1,899,774	$ 2,383,419	$ 2,871,075
Estimated Annual Pmt (Net of Capitalized Interest)		$ 137,499	$ 137,499	$ 290,986	$ 290,986	$ 290,986
Coverage (Net Debt Svc / Prior year ETITDA)		2.00	2.00	1.86	1.86	1.86

Figure 35: Most Likely Scenario Years 1-5, Cash flow

13.3 Optimistic Scenario

- **Take Rate**
  - Based on industry low/medium average for similar areas and service offers
- **Miles of Fiber Constructed**
  - 11 Miles
- **Loan**
  - $4.4M
  - Rate: 3.25%
  - Term: 20 Years
  - Cost of Issuance: 1%
- **$3.47M CAPEX, $0.8M 1st year OPEX**
- **Outside Plant Depreciation**
  - Straight Line: 20 years
- **Equipment Depreciation**
  - Straight Line: 7 years
- **Pole Attachment Fees**
  - $8.5/pole/year
- **Preliminary Construction Timeline**
  - 6 Months
  - Single Mobilization
- **City Gross Revenue Take**
  - 5%
- **Dark Fiber Cash Flow Added**
  - Years 1-4 from provided projections
  - Years 5+ rolling 5 year average
- **Expected Initial Local Operations Headcount**
  - 6 (GM, CSRs, Techs, etc)
- **No equipment refresh modeled due to unknown technology status or competitive requirements in the future**
- **Model is generated with flat growth given unknown inflation in revenue or cost, future competitive environment, or available technology and innovation**

Market Size	
Residential	1,006
Business	945
VoIP	1,951

Take Rate		# of Customers
Residential	60% at steady state	604
Business	60% at steady state	567
VoIP	35% of data customers at steady state	410

Figure 36: Optimistic Scenario Assumptions

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13. Appendix A – Detailed Financials for Each Scenario

Capital Costs	Total Years 1-5	1	2	3	4	5
Professional and Contractual Services						
Outside Plant Capital						
Design, Engineering, Construction	$ 2,238,469	$ 2,238,469	$ -	$ -	$ -	$ -
Materials	$ 398,913	$ 398,913	$ -	$ -	$ -	$ -
Data Center	$ 252,131	$ 252,131	$ -	$ -	$ -	$ -
Equipment Capital	$ 539,028	$ 539,028	$ -	$ -	$ -	$ -
IP Addresses	$ 42,000	$ 42,000	$ -	$ -	$ -	$ -
Total	$ 3,470,541	$ 3,470,541	$ -	$ -	$ -	$ -

Figure 37: Optimistic Scenario Years 1-5, CAPEX

Income Statement	Total Years 1-5	1	2	3	4	5
REVENUE						
Sales						
Residential	$ 3,080,102	$ 465,306	$ 653,699	$ 653,699	$ 653,699	$ 653,699
Business	$ 4,680,632	$ 707,096	$ 993,384	$ 993,384	$ 993,384	$ 993,384
VoIP	$ 740,210	$ 111,822	$ 157,097	$ 157,097	$ 157,097	$ 157,097
Total Revenue	$ 8,500,943	$ 1,284,225	$ 1,804,180	$ 1,804,180	$ 1,804,180	$ 1,804,180
Cost of Goods						
	$ -	$ -	$ -	$ -	$ -	$ -
COGS	$ -	$ -	$ -	$ -	$ -	$ -
GROSS MARGIN	$ 8,500,943	$ 1,284,225	$ 1,804,180	$ 1,804,180	$ 1,804,180	$ 1,804,180
%		*100.0%*	*100.0%*	*100.0%*	*100.0%*	*100.0%*
Operations Expenses						
Professional and Contractual Services						
Network Operations Center	$ 290,315	$ 47,963	$ 60,588	$ 60,588	$ 60,588	$ 60,588
Pole Attachments	$ 23,375	$ 4,675	$ 4,675	$ 4,675	$ 4,675	$ 4,675
Fiber Maintenance	$ 65,190	$ 13,038	$ 13,038	$ 13,038	$ 13,038	$ 13,038
Cable Locates	$ 25,056	$ 4,320	$ 5,184	$ 5,184	$ 5,184	$ 5,184
Staff and Fleet Expenses	$ 2,940,951	$ 501,779	$ 609,793	$ 609,793	$ 609,793	$ 609,793
Help Desk	$ 217,500	$ 37,500	$ 45,000	$ 45,000	$ 45,000	$ 45,000
Software	$ 241,875	$ 48,375	$ 48,375	$ 48,375	$ 48,375	$ 48,375
VoIP Service	$ 200,721	$ 40,934	$ 39,947	$ 39,947	$ 39,947	$ 39,947
Internet Backhaul	$ 140,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000	$ 28,000
IP Addresses	$ 2,000	$ -	$ 500	$ 500	$ 500	$ 500
Misc Office	$ 30,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000	$ 6,000
Marketing	$ 175,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000	$ 35,000
City Fee	$ 425,047	$ 64,211	$ 90,209	$ 90,209	$ 90,209	$ 90,209
EBITDA	$ 3,723,913	$ 452,429	$ 817,871	$ 817,871	$ 817,871	$ 817,871
INTEREST EXPENSE	$ 537,230	$ -	$ 142,216	$ 137,056	$ 131,729	$ 126,229
EQUIPMENT DEPRECIATION	$ 385,020	$ 77,004	$ 77,004	$ 77,004	$ 77,004	$ 77,004
OSP DEPRECIATION	$ 722,378	$ 144,476	$ 144,476	$ 144,476	$ 144,476	$ 144,476
Net Income	$ 2,079,285	$ 230,950	$ 454,176	$ 459,335	$ 464,662	$ 470,163

Figure 38: Optimistic Scenario Years 1-5, Income Statement

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13. Appendix A – Detailed Financials for Each Scenario

Cash Flow	Total Years 1-5	1	2	3	4	5
Net Income	$ 2,079,285	$ 230,950	$ 454,176	$ 459,335	$ 464,662	$ 470,163
Add: Equip Depreciation Expense	$ 385,020	$ 77,004	$ 77,004	$ 77,004	$ 77,004	$ 77,004
Add: OSP Depreciation Expense	$ 722,378	$ 144,476	$ 144,476	$ 144,476	$ 144,476	$ 144,476
CASH FROM OPERATIONS (after Interest)	$ 3,186,684	$ 452,429	$ 675,655	$ 680,815	$ 686,142	$ 691,642
Capital Expenses	$ (3,470,541)	$ (3,470,541)	$ -	$ -	$ -	$ -
Dark Fiber Business Cash Flow Add	$ 585,817	$ 39,100	$ 50,198	$ 27,910	$ 232,299	$ 236,310
Equity Contribution	$ -	$ -	$ -	$ -	$ -	$ -
Loan Proceeds with Cap Int	$ 4,375,865	$ 4,375,865	$ -	$ -	$ -	$ -
Less: Cost of Issuance	$ (43,759)	$ (43,759)	$ -	$ -	$ -	$ -
Less: Principal Paydowns	$ (507,887)	$ -	$ -	$ (163,911)	$ (169,238)	$ (174,738)
Cash Flow	$ 4,126,179	$ 1,353,094	$ 725,853	$ 544,814	$ 749,203	$ 753,214
Ending Cash Balance	$ -	$ 1,353,094	$ 2,078,948	$ 2,623,762	$ 3,372,965	$ 4,126,179
Estimated Annual Pmt (Net of Capitalized Interest)		$ 142,216	$ 142,216	$ 300,967	$ 300,967	$ 300,967
Coverage (Net Debt Svc / Prior year ETITDA)		3.18	3.18	2.72	2.72	2.72

Figure 39: Optimistic Scenario Years 1-5, Cash flow

14. Appendix B – Data Center Analysis

Traverse City Light and Power has various substation and office locations around its currently serving areas. Both substation and office locations are strategically located to reach the neighborhood and ease of access and can act as either Data Center core or hub-site for fiber distribution area. Based on the phase 1 area and considering expansion to phase 2 Fujitsu considered and analyzed following sites to operate as FTTx Core Data Center location

Data Center Analysis		
Item	[redacted]	[redacted]
Centrally located Ph1	Yes	No
Centrally located Ph2	No	Partial
Phase 1 Homes Reachability	Yes	Partial
Phase 2 Homes Reachability	Partial	Partial
DC power supply	Yes	Yes
DC Redundant Power supply	Yes[1]	Yes[1]
Secure Access in the building	Yes	Yes
24x7 Access in the building	Yes[2]	Yes[2]
Controlled Access to Data Center for authorized personnel only	Yes[3]	Yes[3]
Environmentally Controlled	Yes	Yes
Space Availability (min 12' x 20')	Yes	Yes
EMI interference	Limited	No
Ease of Data Center Adaptability	Yes	Yes
WAN Internet Connectivity 1	To be confirmed	To be confirmed
WAN Internet Connectivity 2	To be confirmed	To be confirmed

1Redundant power supply to be arranged through rectifiers
2Access will need to be coordinated with TCLP
3Site modifications maybe required to arrange controlled access

15. Appendix C - Core Wan Gateway Electronics Analysis

Some of the Core WAN gateways along with their salient features are described below.

[redacted] support high density 100G, 40G, 10G and 1G interfaces to support the demanding requirements of Service provider, Cloud, Datacenter and Enterprise Networks. [redacted] software is feature rich in Layer 2 and Layer 3 technologies, SDN enabled and it features versatile programmability, scripting support, open APIs, and popular orchestration frameworks, while providing DevOps-style management for continuous service delivery and infrastructure as code. The [redacted] high end WAN Gateways like the [redacted] products support innovative architectures such as virtual-chassis, MC-LAG, Ethernet Fabric, IP Fabric and IP Fabric with overlay to support different sized datacenter and enterprise networks.

15.1 Vendor

[redacted] WAN gateway routers devices support high density 400G, 100G, 40G, 10G and 1G interfaces enabling support for wide range of applications such as Internet backbone routing, metro core, MPLS switching, data center interconnect and virtualized solutions. The [redacted] WAN gateway routers combine agility and scalability to help support Internet Service provider Edge (PE), Broadband Network Gateway (BNGs), Advanced Gateway functions like CGNAT, SecGW, WLANGW), Internet peering, data center gateways, backbone routers, DC/WAN aggregation applications and virtualized service router applications.

The vendor Operating System supports the industry's most comprehensive suite of IP, MPLS and segment routing features. Deployed in the field for more than a decade, it offers high-availability features such as non-stop routing and provides deterministic and scalable control plane performance through a 64-bit symmetric multiprocessing (SMP) architecture.

15.2 Analysis

15. Appendix C - Core Wan Gateway Electronics Analysis

CORE WAN ROUTER FEATURE COMPARISON		
Item	**Vendor**	**Vendor**
DC Power	Y	Y
AC Power	Y	Y (External AC option)
100G/400G Uplinks	Y	Y
System Capacity	4 Tb/s	4 Tb/s
Security Features – in built real time data analytics and DDOS protection	Y (optional service card required)	Y (Yes optional service card required)
High availability (NSS/NSR / ISSU)	Y	Y
High performance at scale (FP4) Flexipath Network Processing (2.4 Tb/s) latest silicon technology.	N	Y
Strict separation of control plane and data plane	Y	Y
Power Redundancy	Y	Y
Broad Portfolio span - WAN gateways	N	Y
Hardened Options	N	Y
Possible interoperability issues with other FTTx infrastructure	Y	N [redacted]
Single NMS / EMS for FTTx infrastructure	N	N
One Vendor Complete Solution	N	Y

16. Appendix D - Core FTTx Electronics Analysis

16.1 Vendor

The [redacted] Ethernet products provide cost-effective, flexible service delivery of advanced IP services across the entire access network and are designed to work in conjunction with existing Calix equipment.

16.2 Vendor

The [redacted] OLT product portfolio comprises of primarily the [redacted] series of platforms.

16.3 Vendor

The [redacted] Optical Line Terminals (OLT's) are high-capacity access nodes that addresses mass-market fiber deployments

17. Appendix E – Home Network Electronics Analysis

Item	[redacted]	[redacted]	[redacted]
Indoor GPON ONT	[redacted]	[redacted]	[redacted]
Outdoor GPON ONT	[redacted]	[redacted]	[redacted]
Integrated Indoor GPON ONT/R-GW	[redacted]	[redacted]	[redacted]
Integrated Indoor GPON ONT/R-GW/Wi-Fi	[redacted]	[redacted]	[redacted]
Integrated indoor XGS PON ONT/GWWi-Fi	[redacted]	[redacted]	[redacted]
Integrated Indoor NGPON2 ONT/GW	[redacted]	[redacted]	[redacted]
AC power option	[redacted]	[redacted]	[redacted]
DC Power Option	[redacted]	[redacted]	[redacted]
Auto Detect (optional)	[redacted]	[redacted]	[redacted]
AE support	[redacted]	[redacted]	[redacted]
One box solution	[redacted]	[redacted]	[redacted]

18. Appendix F – Marketplace Demographics[18]

Traverse City is a vibrant community whose population swells during summer months. Here is a look at full-time resident demographics that will be taken into consideration as we micro-target social media and advertising.

In 2017, in Traverse City median ages were:

All people: 40.6

Native-born citizens: 41

Foreign-born citizens: 39

(Most common countries of origin: Mexico, India, Iraq)

Population:

The breakdown by population is 15,515 (2017/ US Census Bureau):

Median age: 40.6

Marital status:

- 43.3% are married
- 16.0% are divorced
- 26.7% are married with children
- 17.4% have children, but are single

Median household income: $53,237

Number of households: 6,663

Median property value: $216,800

Homeownership: 63.3%

Median property taxes: $3,000+ range

Poverty rate: 10.2 %

Number of full-time employees: 8,173

Ethnicity (2017):

White residents: 14,300 (91.7%)

Hispanic or Latino residents: 392 (2.52%),

Two or More Races: 347 residents (2.23%)

African American: 276 residents (1.77%), 179

American Indian & Alaska Native residents: 179 (1.15%),

[18]ttps://www.census.gov/searchresults.html?q=traverse+city%2C+MI&page=1&stateGeo=none&searchtype=web&cssp=SERP&_charset_=UTF-8

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18. Appendix F – Marketplace Demographics

Asian residents: 94 (0.605%)

Misc/other: 6 (0.0386%)

Languages most commonly spoken besides English:

Spanish or Spanish Creole: 267

German: 92

French or Cajun/Patois; 28

Education levels:

In Traverse City, MI, 21.4% hold a high school degree; 22.6% of residents hold a two year degree; 44.9% of residents have a bachelor's degree; 2.5% master's degree; 2% professional degree.

Healthcare Coverage:

91.3% of the population of Traverse City carries healthcare insurance (48.3% employee plans)

13.5% on Medicare,

11.6% on Medicaid,

16.7% on non-group plans

1.16% on military or VA plans.

Housing:

The median property value in Traverse City, MI was $216,800 in 2017 (In 2019, it is estimated at $257,000), which is 0.996 times smaller than the national average of $217,600. Between 2016 and 2017 the median property value increased from $198,000 to $216,800, a 9.49% increase. The homeownership rate in Traverse City, MI is 63.3%, which is lower than the national average of 63.9%.

Large employers:

The largest employers (larger than 400 employees) in the Traverse City area besides the school systems and colleges include Munson Medical Center, Grand Traverse Resort & Spa, Interlochen Center for the Arts, Grand Traverse County Government, Grand Traverse Pavilions, Tyson foods, Hagerty Insurance, Britten Banners, Charter Communications, and smaller companies such as Grand Traverse Pie Company, Frontier Computer Corporation, Cherry Republic, Cherry Growers, Century, Clark Manufacturing, Lead Screws International, Quantum Sail Design, Salamander Technologies, Shoreline Fruit, Electro-Optics Technology etc. Additionally, around the time of the annual cherry harvest, the city hosts the annual week-long National Cherry Festival, approximately 500,000 visitors annually. The surrounding countryside is a key center of Midwest wine production, so the vineyards are a source of tourism year round.

Full Time Employment by Industry (2017):

Healthcare: 1,391

Retail: 1,156

Food service: 913

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18. Appendix F – Marketplace Demographics

Manufacturing: 825

Education: 585

Professional/technical services: 538

Administrative/support services/waste management: 459

Finance & Insurance: 402

Public Administration/misc: 376

Construction: 269

Information: 266

Wholesale trade: 219

Real Estate: 207

Arts/Entertainment/Recreation: 187

Transportation/warehousing: 124

Income levels:

Traverse City median household Income is $53,237 (less than US median household income of $60,336). The average male salary in Traverse City is $63,869 whereas the average female salary is $46,762.

Most common occupations:

Managers

Nurses

Sales workers

Truck drivers

Administrative assistants/secretaries

Cashiers.

Other Stats:

Unemployment rate: 3.80%

Recent job growth: 1.65%

The Sales Tax Rate for Traverse City is 6.0%. The US average is 7.3%.

The Income Tax Rate for Traverse City is 4.3%. The US average is 4.6%.

19. Appendix F – Living Wage Information

19.1 Grand Traverse County

Hourly Wages	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults (1 Working)	2 Adults (1 Working) 1 Child	2 Adults (1 Working) 2 Children	2 Adults (1 Working) 3 Children	2 Adults (1 Working Part Time) 1 Child*	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Living Wage	$11.27	$23.54	$28.71	$36.53	$18.69	$21.84	$24.44	$27.40	$25.19	$9.35	$12.93	$15.71	$18.67
Poverty Wage	$5.84	$7.91	$9.99	$12.07	$7.91	$9.99	$12.07	$14.14		$3.96	$5.00	$6.03	$7.07
Minimum Wage	$9.25	$9.25	$9.25	$9.25	$9.25	$9.25	$9.25	$9.25		$9.25	$9.25	$9.25	$9.25

Annual Expenses	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults (1 Working)	2 Adults (1 Working) 1 Child	2 Adults (1 Working) 2 Children	2 Adults (1 Working) 3 Children	2 Adults (1 Working Part Time) 1 Child*	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Food	$3,058	$4,508	$6,786	$9,001	$5,607	$6,979	$9,012	$10,972		$5,607	$6,979	$9,012	$10,972
Child Care	$0	$7,068	$12,287	$17,506	$0	$0	$0	$0		$0	$7,068	$12,287	$17,506
Medical	$2,214	$5,536	$5,192	$5,274	$4,749	$5,192	$5,274	$4,993		$4,749	$5,192	$5,274	$4,993
Housing	$6,900	$10,824	$10,824	$14,616	$9,072	$10,824	$10,824	$14,616		$9,072	$10,824	$10,824	$14,616
Transportation	$4,866	$8,867	$10,426	$12,063	$8,867	$10,426	$12,063	$11,925		$8,867	$10,426	$12,063	$11,925
Other	$2,785	$4,633	$5,030	$5,855	$4,633	$5,030	$5,855	$5,729		$4,633	$5,030	$5,855	$5,729
Required annual income after taxes	$19,824	$41,435	$50,546	$64,315	$32,927	$38,451	$43,027	$48,236		$32,927	$45,519	$55,314	$65,742
Annual taxes	$3,610	$7,522	$9,181	$11,672	$5,953	$6,979	$7,812	$8,746		$5,953	$8,266	$10,048	$11,932
Required annual income before taxes	$23,433	$48,958	$59,726	$75,987	$38,881	$45,430	$50,839	$56,982	$52,399	$38,881	$53,785	$65,362	$77,674

Source: http://livingwage.mit.edu/counties/26055

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19. Appendix F – Living Wage Information

19.2 Chicago-Naperville-Elgin Metro Area

Hourly Wages	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults (1 Working)	2 Adults (1 Working) 1 Child	2 Adults (1 Working) 2 Children	2 Adults (1 Working) 3 Children	2 Adults (1 Working Part Time) 1 Child*	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Living Wage	$13.34	$26.96	$31.50	$38.72	$20.96	$24.64	$27.26	$30.26	$28.53	$10.04	$14.65	$17.11	$19.77
Poverty Wage	$5.84	$7.91	$9.99	$12.07	$7.91	$9.99	$12.07	$14.14		$3.96	$5.00	$6.03	$7.07
Minimum Wage	$8.25	$8.25	$8.25	$8.25	$8.25	$8.25	$8.25	$8.25		$8.25	$8.25	$8.25	$8.25

Annual Expenses	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults (1 Working)	2 Adults (1 Working) 1 Child	2 Adults (1 Working) 2 Children	2 Adults (1 Working) 3 Children	2 Adults (1 Working Part Time) 1 Child*	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Food	$3,058	$4,508	$6,786	$9,001	$5,607	$6,979	$9,012	$10,972		$5,607	$6,979	$9,012	$10,972
Child Care	$0	$8,135	$12,186	$16,236	$0	$0	$0	$0		$0	$8,135	$12,186	$16,236
Medical	$2,473	$7,229	$6,885	$6,967	$5,817	$6,885	$6,967	$6,687		$5,817	$6,885	$6,967	$6,687
Housing	$10,181	$13,826	$13,826	$17,656	$11,784	$13,826	$13,826	$17,656		$10,181	$13,826	$13,826	$17,656
Transportation	$4,866	$8,867	$10,426	$12,063	$8,867	$10,426	$12,063	$11,925		$8,867	$10,426	$12,063	$11,925
Other	$2,785	$4,633	$5,030	$5,855	$4,633	$5,030	$5,855	$5,729		$4,633	$5,030	$5,855	$5,729
Required annual income after taxes	$23,364	$47,197	$55,140	$67,778	$36,709	$43,146	$47,722	$52,970		$35,105	$51,281	$59,908	$69,206
Annual taxes	$4,376	$8,881	$10,386	$12,769	$6,893	$8,113	$8,980	$9,963		$6,669	$9,655	$11,290	$13,040
Required annual income before taxes	$27,739	$56,078	$65,526	$80,548	$43,601	$51,260	$56,703	$62,933	$59,341	$41,774	$60,936	$71,198	$82,245

Source: http://livingwage.mit.edu/metros/16980

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19. Appendix F – Living Wage Information

19.3 Detroit-Warren-Dearborn Metro Area

Hourly Wages	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults (1 Working)	2 Adults (1 Working) 1 Child	2 Adults (1 Working) 2 Children	2 Adults (1 Working) 3 Children	2 Adults (1 Working Part Time) 1 Child*	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Living Wage	$11.44	$23.79	$28.97	$36.69	$18.50	$22.09	$24.69	$27.55	$25.44	$8.84	$13.06	$15.84	$18.75
Poverty Wage	$5.84	$7.91	$9.99	$12.07	$7.91	$9.99	$12.07	$14.14		$3.96	$5.00	$6.03	$7.07
Minimum Wage	$9.25	$9.25	$9.25	$9.25	$9.25	$9.25	$9.25	$9.25		$9.25	$9.25	$9.25	$9.25

Annual Expenses	1 Adult	1 Adult 1 Child	1 Adult 2 Children	1 Adult 3 Children	2 Adults (1 Working)	2 Adults (1 Working) 1 Child	2 Adults (1 Working) 2 Children	2 Adults (1 Working) 3 Children	2 Adults (1 Working Part Time) 1 Child*	2 Adults	2 Adults 1 Child	2 Adults 2 Children	2 Adults 3 Children
Food	$3,058	$4,508	$6,786	$9,001	$5,607	$6,979	$9,012	$10,972		$5,607	$6,979	$9,012	$10,972
Child Care	$0	$7,068	$12,287	$17,506	$0	$0	$0	$0		$0	$7,068	$12,287	$17,506
Medical	$2,214	$5,536	$5,192	$5,274	$4,749	$5,192	$5,274	$4,993		$4,749	$5,192	$5,274	$4,993
Housing	$7,220	$11,286	$11,286	$14,903	$8,727	$11,286	$11,286	$14,903		$7,220	$11,286	$11,286	$14,903
Transportation	$4,866	$8,867	$10,426	$12,063	$8,867	$10,426	$12,063	$11,925		$8,867	$10,426	$12,063	$11,925
Other	$2,785	$4,633	$5,030	$5,855	$4,633	$5,030	$5,855	$5,729		$4,633	$5,030	$5,855	$5,729
Required annual income after taxes	$20,143	$41,897	$51,008	$64,602	$32,582	$38,913	$43,489	$48,524		$31,075	$45,981	$55,776	$66,030
Annual taxes	$3,655	$7,587	$9,245	$11,712	$5,905	$7,044	$7,877	$8,786		$5,695	$8,330	$10,113	$11,972
Required annual income before taxes	$23,798	$49,484	$60,253	$76,314	$38,487	$45,956	$51,365	$57,309	$52,925	$36,770	$54,311	$65,889	$78,002

Source: http://livingwage.mit.edu/metros/19820

SONDEE RACINE & DOREN PLC
ATTORNEYS

MEMO

To: TCL&P Board for the meeting of May 14
From: Sondee, Racine & Doren, General Counsel
Re: Attorney-Client Privileged Communication
Date: May 9, 2019

A written, attorney-client privileged communication has been emailed to each of you. The following motion is recommended to consider it in closed session. A roll call vote and five votes are required to enter into closed session.

> Move to go into closed session immediately to consider a written attorney-client communication pursuant to MCL 15.268(h) and MCL 15.243(1)(g).