Engineering and Design Proposal

City of Hudson
Project Name: FIBER ENGINEERING CONSULTING SERVICES
Date: 6/19/2025

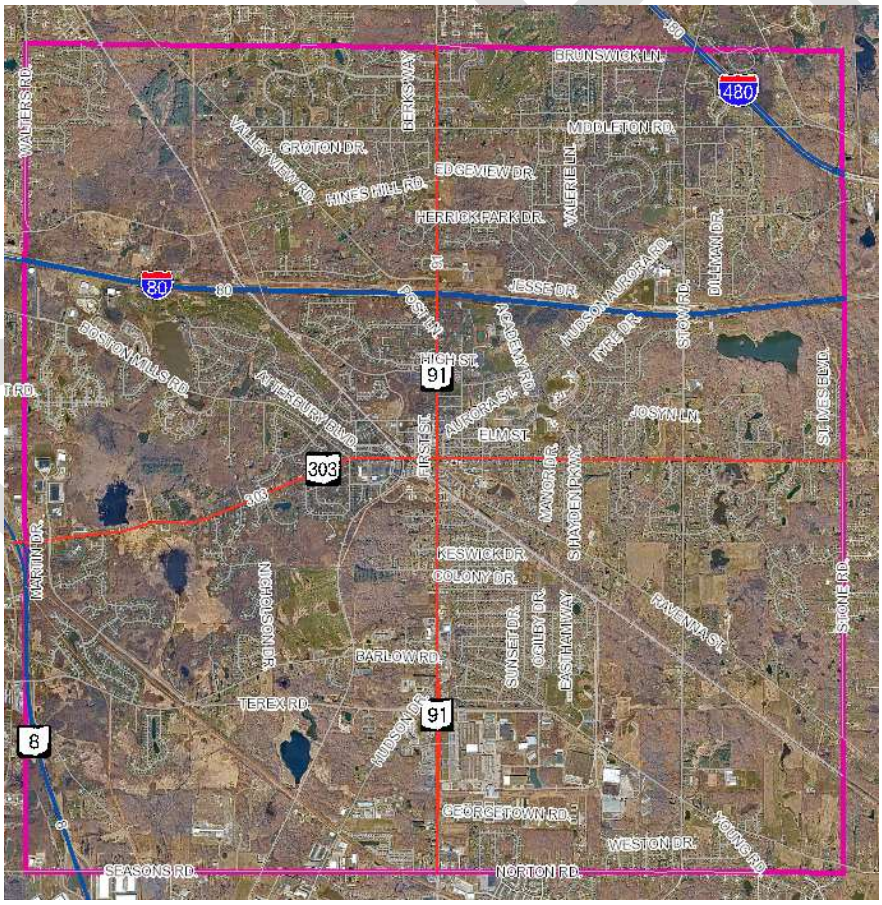
Contents

Introduction

On Trac Communications (OTC) is pleased to submit our proposal in response to the City of Hudson's Request for Proposals for Fiber Engineering Consulting Services. With over two decades of experience designing and managing fiber broadband deployments, OTC has engineered projects covering more than one million homes across the United States. We offer unmatched expertise in high-level design (HLD), low-level design (LLD), permitting, construction documentation, and project management. Our team includes professionals with deep experience from leading firms such as Atlantic Engineering Group and Entrust Solutions, bringing a legacy of successful municipal fiber initiatives.

Project Overview

The City of Hudson seeks assistance with engineering and design services to expand its municipal fiber network, Velocity Broadband, to approximately 6,500 additional homes, spanning roughly 140 miles of new fiber routes. The project will leverage existing GIS data and tools such as Esri ArcGIS and Vetro Fiber Mapping. OTC will be tasked with delivering a range of services including design documentation, permitting packages, construction prints, quality review, and as-built documentation over an expected project duration of 3 to 4 years. The first phase of the project is for 120,000ft of design for the first year.



Proposed Solution

We propose a comprehensive fiber network design and deployment tailored to the specific needs of the City of Hudson and Summit County. Our solution includes:

- **High-Level Design (HLD) and Low-Level Design (LLD):** Detailed planning and design to ensure optimal network performance and scalability.
- **Fielding and Permitting:** Efficient handling of all regulatory requirements and site assessments.
- **Construction Package Creation:** Comprehensive documentation for construction teams, including BOMs, splice sheets, and construction drawings.

Network Design and Technical Expertise

Our engineering capabilities are extensive, covering:

- **High-Level and Low-Level Design (HLD and LLD)**
- **Pole Loading Analysis (PLA) and Make-Ready Engineering (MRE)**
- **Aerial and Underground Construction:** Expertise in OPGW, ADSS Power Zone, Lash and Strand, and various underground methods including conduit and duct bank installations.
- **Advanced Data Integration:** Utilizing detailed end-user and site condition data for optimized installation processes.
- **Proactive Future-Proofing:** Designing networks with scalability in mind, incorporating spare fibers and infrastructure for future growth.

Cost Proposal

On Trac Communications is committed to transparency and integrity in our cost proposals. Our detailed cost proposal is included as an attachment at the end of this document. Our approach includes:

- **Detailed and Accurate Cost Estimates:** Comprehensive breakdown of all costs associated with the project, avoiding hidden fees or unexpected expenses.
- **Value Engineering:** Identifying cost-saving opportunities without compromising quality or performance.
- **Commitment to Transparency:** We deliver precisely what we promise, with no hidden costs or surprise change orders.

Prior Experience

Our extensive experience includes:

- **Successful Fiber Deployments:** Over two decades of deploying fiber networks for various clients, servicing over one million addresses.
- **Comprehensive Project Portfolio:** Involvement in diverse projects, from high-density urban areas to challenging rural deployments.
- **Client Testimonials:** Positive feedback from clients, who value our dedication to quality and seamless project execution.

Why Choose On Trac?

- **Proactive Future-Proofing:** Our designs incorporate scalability, ensuring your network can expand as needed without costly upgrades.
- **Advanced Data Integration:** We optimize installation processes through detailed site and user data, ensuring efficient and correct installations.
- **Comprehensive Experience:** Our seasoned team anticipates challenges and implements solutions to keep projects on track and within budget.
- **Seamless Departmental Coordination:** Our holistic project management approach reduces the total cost of ownership by preemptively addressing potential issues.
- **Unified and Seamless Management:** We provide a single point of accountability, ensuring swift and efficient issue resolution.
- **End-to-End Support:** If selected to build and install the network, On Trac is able to support throughout the project lifecycle, ensuring consistent quality and performance.
- **Commitment to Transparency and Integrity:** We pride ourselves on delivering exactly what we promise, building trust through accurate assessments and transparent bids.

Detailed Project Plan

On Trac has outlined the design processes below, broken into the following segments: High-Level Design (HLD), Fielding, Low-Level Design (LLD), Construction Ride Out (CRO), Deliverables, Permitting, and Project Management. On Trac will use the preliminary route as a baseline and consider field conditions and permitting requirements to design the most cost-effective solution. Our extensive operating experience plays a crucial role in developing designs that consider the total cost of ownership. On Trac will work to develop the HLD as quickly as possible while incorporating these factors. We will follow the sign-off process defined below to report design progress and plans back to Hudson regularly.

On Trac will review the proposed design area with the City and create a plan to build Aerially or underground or both depending on what options are available. On Trac is creating the estimate based on 120,000ft of design for the first year and can adjust depending on additional areas to design. Additionally, On Trac will:

- Verify continuity for the fiber path or modify the fiber path to avoid obstacles and obstructions.
- Validate the proposed route and identify any make-ready improvements and costs required to complete each fiber segment.
- Conduct site surveys to determine the status of proposed anchor or secondary lateral sites and identify any potential issues.
- Outline the proposed locations for handholes, slack spans, and potential aggregation points for network expansion.
- Consider permitting requirements to avoid delays and additional costs.

On Trac's approach to this project is methodical and structured, ensuring each phase is completed efficiently and to the highest standards. On Trac will assign a dedicated Project Manager to track and manage the timeline and deliverables. Our project plan includes the following activities and timelines:

Project Activity	Type	2025						2026											
		JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Contract Execution	Contract																		
High Level Design (HLD)	Engineering																		
Fielding	Engineering																		
Low Level Design (LLD)	Engineering																		
Construction Ride Out (CRO)	Engineering																		
Post-CRO Edits to Design	Engineering																		
Splice Document Creation	Engineering																		
Construction Prints	Engineering																		
Bill of Materials (BOM)	Engineering																		
Permitting	Engineering																		
Project Management	Engineering																		

1. **High-Level Design (HLD)**
    - **Start Date:** August 1, 2025
    - **End Date:** October 1, 2025
    - **Deliverables:**
        - Creation of the initial network architecture
        - Review and adjustment of preliminary HLD routes
        - Development of HLD cost estimate
        - Establishment of design standards
        - Mapping of Design Areas (DA) and Fiber Serving Areas (FSA)
        - Creation of site list, cabinet list, and POP site list with locations
        - Assessment of off-grid routes for joint-use areas or private easements
        - Identification of environmental impact areas and permittable areas
        - Modify design to limit needs for permitting.
2. **Fielding**
    - **Start Date:** October 1, 2025
    - **End Date:** December 1, 2025
    - **Deliverables:**
        - Field verification of proposed routes
        - Data collection to validate design assumptions
        - Identify any existing City owned conduit and structures
3. **Low-Level Design (LLD)**
    - **Start Date:** November 1, 2025
    - **End Date:** February 1, 2026
    - **Deliverables:**
        - Detailed network planning
        - Specification of exact placement of fiber cables, network equipment, and infrastructure
        - Attribute design to account for all material, Das, and prep design for prints and BOM creation.
4. **Construction Ride Out (CRO)**
    - **Start Date:** February 1, 2026
    - **End Date:** March 1, 2026
    - **Deliverables:**
        - Final verification of construction plans
        - Necessary adjustments based on site conditions
        - Proof existing empty conduit (Note the cost of proofing conduit is included but a qty of 0 is quoted. On Trac is unable to give a cost estimate of proofing conduit until the amount of conduit is collected)
5. **Post-CRO Edits to Design**
    - **Start Date:** March 1, 2026
    - **End Date:** April 1, 2026

- **Deliverables:**
  - Updates to design documents based on CRO findings

6. **Splice Document Creation**
   - **Start Date:** April 1, 2026
   - **End Date:** May 1, 2026
   - **Deliverables:**
     - Detailed splice documents outlining fiber cable connections
7. **Construction Prints**
   - **Start Date:** April 1, 2026
   - **End Date:** May 1, 2026
   - **Deliverables:**
     - Creating construction drawings used to build the network
     - Break out prints into DA's
8. **Bill of Materials (BOM)**
   - **Start Date:** April 1, 2026
   - **End Date:** May 1, 2026
   - **Deliverables:**
     - Comprehensive list of materials and equipment needed for the project
     - Estimated Costs of the project
9. **Permitting**
   - **Start Date:** May 1, 2026
   - **End Date:** August 1, 2026
   - **Deliverables:**
     - Drafting all permits to submit for any required permits
10. **Project Management**
    - **Start Date:** August 1, 2025
    - **End Date:** August 1, 2026
    - **Deliverables:**
      - Overseeing the entire project
      - Regular progress updates
      - Risk management and coordination

Client Involvement:

At On Trac Communications, we prioritize transparent and collaborative communication throughout the project lifecycle. On Trac will provide a dedicated Project manager that will be responsible for delivering and managing the project. We believe in actively involving our clients to ensure alignment with project goals and expectations. Here's how we propose to involve you:

1. **Kickoff Meeting:**
   - We start with a comprehensive kickoff meeting to align on project objectives, timelines, and deliverables.
   - Discuss roles and responsibilities, ensuring clarity on both sides.
   - Set plan to complete all standards and deliverables.
2. **Regular Progress Meetings:**
   - **Weekly Meetings:** Scheduled every week to provide updates on project progress.
     - **Agenda:** The project manager will present:
       - Timelines: Reviewing milestones achieved and upcoming deadlines.
       - Costs: Tracking expenditures against the budget.

        - Issues: Identifying any challenges encountered.
        - Proposed Solutions: Presenting solutions or mitigation strategies.
    - **Client Input:** Your feedback and decisions will be integral to adjusting course as necessary to meet project goals effectively.
3. **Ad Hoc Meetings:**
    - Beyond weekly meetings, we're available for ad hoc discussions as needed.
    - Promptly address urgent matters or changes in project scope.
4. **Reporting:**
    - **Progress Reports:** Regularly provide detailed reports outlining progress, expenditures, and any adjustments made.
    - **Issues Log:** Maintain an issues log to track and resolve concerns efficiently.
    - **Change Requests:** Document and review any changes to scope or requirements promptly.
5. **Project Documentation:**
    - Ensure all documentation, including meeting minutes, action items, and decisions, is shared promptly.
    - Keep you informed about project status and next steps.
6. **Decision-Making:**
    - Collaborate on key decisions, ensuring alignment with project objectives and budget constraints.
    - Provide recommendations based on expertise while respecting your preferences and requirements.
7. **Project Review and Closure:**
    - Conduct a thorough review of the project upon completion.
    - Solicit feedback to improve future engagements and ensure satisfaction.

By fostering a culture of open communication and proactive client engagement, we aim to deliver successful outcomes while maintaining transparency and accountability throughout the project. Your active involvement ensures that we meet your expectations and achieve project success together.

Risk Management

On Trac employs a proactive approach to risk management, identifying potential risks early and implementing mitigation strategies to ensure project success. On Trac collects a lot of data at the kickoff of a project to identify potential issues and guide the entire process. In subsequent sections of our response we have included some sample standards. On Trac's project manager will work with Hudson to define all these standards and use them to create the most efficient and custom fit delivered project. Key risks and mitigation strategies include:

1. Regulatory and Permitting Delays:

Risk: Potential delays in obtaining necessary permits.

Mitigation Strategies:

- **Early Engagement:**

    - **Implementation:** Start the permitting process immediately upon project initiation. Establish communication with local, state, and federal regulatory authorities to understand specific requirements and timelines.
    - **Contingency Plan:** Maintain a checklist and timeline for all permits. If delays occur, escalate to higher authorities or political representatives if necessary.
- **Thorough Preparation:**
    - **Implementation:** Prepare and submit complete and accurate permit applications with all required documentation to minimize review time.
    - **Contingency Plan:** Prepare contingency routes and alternative plans for site work that can proceed while waiting for permits.
- **Suggest Reroutes:**
    - **Implementation:** Analyze potential reroutes during the planning phase to avoid areas with complex permitting requirements.
    - **Contingency Plan:** Pre-approve reroutes with local authorities so work can continue in case primary routes face delays.

2. Design Adjustments:

Risk: Need for design changes due to unforeseen site conditions.

Mitigation Strategies:

- **Comprehensive Engineering Ride-Outs:**
    - **Implementation:** Conduct thorough site surveys and engineering ride-outs to gather detailed information about site conditions.
    - **Contingency Plan:** Maintain flexibility in the design process and keep alternative designs ready to quickly address any unforeseen conditions.
- **Flexibility in Design Planning:**
    - **Implementation:** Use adaptable and modular design principles that can be easily adjusted based on site feedback.
    - **Contingency Plan:** Establish a rapid-response team to implement design changes without significantly impacting the project timeline.

3. Supply Chain Disruptions:

Risk: Delays in the procurement of materials and equipment. On Trac would implement many of these mitigation strategies after being selected as the construction contractor. However during the design phase of the project On Trac will work with Hudson to select materials and vendors with higher availability of products.

Mitigation Strategies:

- **Early Identification of Materials:**
    - **Implementation:** Identify and secure all necessary materials and equipment early in the project. Develop a detailed procurement plan with lead times and delivery schedules.

    - **Contingency Plan:** Create a list of alternate suppliers and materials that can be used if primary sources fail.
- **Establishment of Reliable Supply Chains:**
    - **Implementation:** Partner with multiple reliable suppliers and negotiate On Tracts that include penalties for late deliveries to ensure accountability.
    - **Contingency Plan:** Keep a buffer stock of critical materials to cover any short-term supply chain disruptions.
- **Inclusion of Buffer Time:**
    - **Implementation:** Incorporate buffer periods into the project schedule to accommodate potential delays in material procurement.
    - **Contingency Plan:** Develop a phased implementation plan that allows for certain parts of the project to proceed independently of delayed materials.

4. Environmental Impacts:

Risk: Environmental factors affecting construction. As part of the permitting process On Trac will ID any permits that may require additional environmental studies. If any long lead time permits or environmental studies are required we will attempt to reroute the design around these areas.

Mitigation Strategies:

- **Detailed Environmental Assessments:**
    - **Implementation:** Conduct comprehensive environmental impact assessments before starting construction to identify potential environmental issues.
    - **Contingency Plan:** Develop environmental management plans that include specific measures for mitigation, monitoring, and remediation of environmental impacts.
- **Incorporation of Environmentally Sustainable Practices:**
    - **Implementation:** Implement best practices for sustainable construction, such as using eco-friendly materials and minimizing waste.
    - **Contingency Plan:** Have an adaptive environmental management plan that can be adjusted based on real-time environmental monitoring and feedback. If selected for construction of the project On Trac's construction team will implement an environmental management plan if needed for the project.

Scope of Work (SOW)

This SOW outlines the project's general framework. It does not detail all operational parameters and deliverables; additional ones will be defined and approved through the change order process. On Trac offers the following services. If a needed service is not listed, it should be discussed and agreed upon as a Change Order with cost and time impacts.

On Trac will create the following, in agreement with Hudson:

- OSP Design
- OSP Design Standard
- Make Ready Engineering (MRE) Standard

- Pole Loading Analysis (PLA) Standard
- Site List/Cabinet List and Location Signoff
- As-built Standard

These documents will guide the project's design and execution, subject to revisions via the Change Order process. For phased projects, subsequent phases will be quoted separately as new SOWs or Change Orders.

OSP Design

On Trac will provide detailed OSP design using customer shapefiles, field walkthroughs, and Hudson-specified design criteria, following standard design specifications. The design specifications document will be developed after the kickoff of the project and will detail what is being designed. If any changes are required to the design specifications once design starts, a change order will be required to implement those changes.

Once the design is completed for a design area, the deliverables will be sent to Hudson for approval. Once approved, any changes or additional engineering support will be billed separately for the design area.

On Trac uses an ESRI-based mapping system to create its designs. With an active contract, Hudson receives:

- Electronic Copies of design in shapefile or KMZ of the design per Hudson request
- Copies of PDF construction prints and splicing documents when completed

In the event Hudson desires to have access to design in another system, the translation of the design shapefiles to another system is the sole responsibility of Hudson. On Trac will provide support where feasible. Splicing and design imports into other Fiber Management systems are the sole responsibility of Hudson.

Key Tasks

- Create High-Level Design (HLD)
- Review and adjust preliminary HLD routes
- Create HLD Cost estimate
- Establish design standards
- Map Design Areas (DA) and Fiber Serving Areas (FSA)
- Create Site List, Cabinet List, Pop Site list with locations
- Assess off-grid routes for Joint-Use areas or private easements
- Identify environmental impact areas and permittable areas
- Fielding
- Create Low-Level Design (LLD)
- MRE Value Engineering
- Dimensioning (Optional)
- Construction Ride Out (CRO)
- Post CRO Edits

- Create preliminary BOM for initial orders (e.g., fiber)
- Plan and schedule DA design for construction
- Create and submit Permits, TCPs, and Pole Attachment Agreements
- Create splicing design
- Release DA deliverables (BOM, splicing docs, construction table, routes)
- Update redlines to as-built

Summary of Design Process

OSP Pre-Verification

- Create/Review Standards with Hudson (Design, MRE, PLA, Etc)

High-Level Design (HLD)

- Desktop design of initial fiber routes using Hudson's existing mapping data
- Review routes with Hudson and complete signoff of routes

Fielding and Pole Data Collection

- Using Katapult or similar software to collect pole data
- Other field conditions and constructability will be collected via ESRI collector or similar software
- Pole data collection and Fielding are both billed separately

Adjust HLD to Match Field Conditions

Complete Site List

- Includes any sites, POPs, or Cabinets with locations

Make Ready Engineering (MRE)

- Answer MRE/PLA questionnaire
- Follow base On Trac MRE standard. If additional requirements are needed, a change order will be required
- MRE design and submissions are billed separately
- Joint use pole attachment agreements are billed separately

Pole Loading Analysis (PLA)

- Answer MRE/PLA questionnaire
- Follow base On Trac PLA standard. If additional requirements are needed, a change order will be required
- PLA design and submissions are billed separately

Permitting

- Permitting is dependent on local jurisdictions
- Permitting design is billed hourly and separately as required
- Permitting submissions are billed separately
- Permitting fees are the responsibility of Hudson. On Trac can pay fees for Hudson during submission, but a markup of fees for administration will be added
- If subsurface utility engineering (SUE) is required, billing will be at a separate rate due to additional fielding costs. SUE locating will be done per the ASCE Standard 38 for QL A-D

Subsurface Utility Engineering (SUE)

- SUE is not included in the proposal
- If required, On Trac completes SUE based on the ASCE Standard 38. Standard 38 identifies four different levels of quality to identify existing utilities
- SUE can be quoted separately and priced depending on the quality level required

Traffic Control Plans (TCP)

- Traffic Control Plans will be completed as required by the city and DOT

Low-Level Design (LLD)

- Placement of underground and aerial facilities per design standard
- Fielding data is used to create a first LLD draft
- Once first LLD draft is completed, a CRO will be conducted to validate constructability
- Apply Fielding and CRO data to design
- QC

Splicing Deliverables

- Backbone and Feeder networks will be drawn via single line diagrams and used by construction
- Single line diagrams will be delivered to Hudson with as-built documents
- Individual splice sheets per closure are not included
- A splicing matrix or a single line diagram will be used on FTTH distribution networks

Construction Deliverables

- Typicals
- PDF plots per DA via 24x36 grids
- Bill of Materials per DA

As-Builts

- Redlines submitted via a third-party contractor within 60 days of completion will be updated into the design per the standard as-built document. Only completed redlines will be included in as-built deliverables
- If On Trac is also the contractor, as-built redlines will be included in the as-built deliverables per the standard as-built

- As-built requirements beyond the standard as-built scope will be billed separately (i.e., drawing as-builts into Hudson Fiber Management System (FMS))

Multi Dwelling Units (MDU)

- The LLD will include fibers to serve MDUs, but design of the MDU is not included
- Additional MDU designs can be supplied in a separate scope document

Not Included Services

- GPS locating of as-built facilities
- Pole Testing
- Asset Inventory
- Custom design schema, annotation, or symbology
- ROW mapping, other custom mapping. If these services are required for permitting, they will be charged according to the permitting fee
- Subsurface Utility Engineering (SUE) is not included in the proposal. If SUE is required, a separate quote can be submitted depending on the quality level required
- Profile drawing for aerial or underground designs. If these services are required for permitting, they will be charged according to the permitting fee
- Civil Engineering for any facilities, POP buildings, bridges, or other structures
- Environmental studies/reports
- Private Easements

Permitting

A completed fiber route design is necessary to determine the required permits and associated fees. An estimate of permitting has been provided. The cost of permitting will vary depending on the permit requirements. Permit drawing and submissions will be billed separately.

Permitting fees from Federal, State, County, City, Railroad, etc., are the sole responsibility of Hudson.

Permitting Administration

- State, County, City, Railroad crossings, and Federal (USACE/USDA) permits: Hudson reviews and approves; On Trac submits and tracks approvals.

Included

- Backbone, Lateral, and Pigtail fiber permitting. Drop permitting priced case-by-case.

On Trac Permitting Management Services

- State, County, City, Federal permits
- Railroad Crossing Permit
- Right-of-Way (ROW) Agreement Support (agreements are between Hudson and ROW owner)
- Pole Attachment Application Support (excludes full administration)

- Notification to Hudson of the need for private easements (negotiation is Hudson's responsibility)

Support Workflow

- Fielding by On Trac
- Submission to On Trac Permitting
- On Trac Permitting generates and submits permits for Hudson review
- Upon Hudson approval, On Trac submits permits to authorities
- On Trac escalates outstanding issues or delays reported by authorities

Not Included (Optional Additional Services Available)

- Drop Permitting
- Private Easements (between Hudson and ROW owner)
- Pole attachment agreements (e.g., Joint-use poles)
- Environmental Studies/Reports

Make Ready Engineering (MRE) and Pole Loading Analysis (PLA)

MRE

- Identify poles in field to capture attachment heights of existing communication and power facilities
- Process collected pole data to markup each pole with existing attachment heights
- Using the MRE standard, create make-ready recommendations for compliance with NESC, NEC, or Hudson requirements (Code violations, electric clearance, structure clearance)
- Upon completion, deliver make-ready recommendations for review
- Cost breakdown of MRE activities:

PLA

- Process collected pole data for a full structural analysis
- Using PLA standard, create models for structural compliance with NESC, NEC, or Hudson requirements
- Verify the existing pole plant data is accurate and meets code compliance
- Verify placement of the new communication cable and equipment complies with code
- Upon completion, deliver pole loading recommendations for review

Additional Requirements

On Trac will provide additional services as needed on a case-by-case basis. These services include, but are not limited to:

- Notification of Electrical Plant Changes:

    - Hudson must notify On Trac of any changes to the existing electrical plant made by Hudson or its affiliates after On Trac Fielding and before Construction to ensure quality placement and safety.
- Local Municipality Requirements:
    - Hudson is responsible for the cost and arrangement of any required Police or safety escorts for road crossings, including State and Interstate.
- Physical Marking Policy:
    - Hudson must provide any custom markings and placement requirements, such as tape or reflective tape for enclosures or cable identification.
- Parcel Data:
    - Hudson should provide any available parcel data to assist On Trac with designs.
- Subdivisions:
    - All existing, planned, and potential subdivisions must be discussed during the design prep phase. Hudson should provide any parcel or lot information to On Trac in a format usable in ESRI ArcMap (e.g., shapefiles, KMZ, etc.). PDFs are helpful for viewing purposes. Hudson should also clearly identify power feed data for subdivisions in a compatible format. On Trac will not start Subdivision design without this information to avoid delays and costly redesigns.
- Other Special Considerations:
    - Hudson must provide any other acceptance policies/procedures to On Trac as soon as possible. Updates submitted after the project start will be reviewed and discussed if they impact timelines or incur additional costs. On Trac will quote a Change Order for any additional costs and proceed upon mutual agreement.

Detailed Deliverables

On Trac will provide the following deliverables as part of the project, each defined with specific details on what will be provided, in what format, and by when. On Trac's assigned project manager will be a single point of contact for all of these deliverables and will report on the progress of each during regular meetings.

1. **OSP Design**
    - **What:** Detailed Outside Plant (OSP) design
    - **Format:** Electronic copies in shapefile or KMZ, PDF construction prints, and splicing documents
    - **When:** Upon completion of each design area, sent for Hudson's approval
2. **OSP Design Standard**
    - **What:** Document outlining the design standards for the OSP
    - **Format:** PDF
    - **When:** Developed after project kickoff, subject to Hudson's approval
3. **Make Ready Engineering (MRE) Standard**
    - **What:** Standards document for Make Ready Engineering
    - **Format:** PDF
    - **When:** Developed and delivered after project kickoff
4. **Pole Loading Analysis (PLA) Standard**
    - **What:** Standards document for Pole Loading Analysis
    - **Format:** PDF

- **When:** Developed and delivered after project kickoff

5. **Site List/Cabinet List and Location Signoff**
   - **What:** Detailed list of sites and cabinet locations
   - **Format:** spreadsheet
   - **When:** Created during the High-Level Design (HLD) phase and finalized post Fielding
6. **As-built Standard**
   - **What:** Document detailing the standard for as-built deliverables
   - **Format:** PDF
   - **When:** Developed during the initial project phase
7. **High-Level Design (HLD)**
   - **What:** Initial desktop design of fiber routes
   - **Format:** Shapefiles/KMZ
   - **When:** After Fielding, adjustments made to match field conditions
8. **Low-Level Design (LLD)**
   - **What:** Detailed design for placement of underground and aerial facilities
   - **Format:** Shapefiles, PDFs
   - **When:** Post Fielding and Construction Ride Out (CRO)
9. **Construction Deliverables**
   - **What:** PDF plots per Design Area (DA), Bill of Materials (BOM)
   - **Format:** PDFs, spreadsheets
   - **When:** Prior to the start of construction in each DA
10. **Splicing Deliverables**
    - **What:** Backbone and feeder network diagrams, single line diagrams
    - **Format:** PDFs
    - **When:** Upon completion of LLD
11. **As-Builts**
    - **What:** Updated redlines and as-built documents
    - **Format:** PDFs, shapefiles
    - **When:** Within 60 days of project completion
    - **Note:** Only if selected as construction contractor. This would not be part of the engineering effort.

Validation and Approval

Process for Hudson to Review and Approve Each Deliverable:

1. **Initial Review:**
   - **Action:** On Trac submits the deliverable to Hudson for initial review.
   - **Format:** Electronic copies in specified formats (shapefiles, KMZ, PDFs).
   - **Timeline:** Upon completion of the deliverable.
2. **Feedback and Adjustments:**
   - **Action:** Hudson reviews the deliverable and provides feedback or requests adjustments.
   - **Timeline:** Hudson will have a specified period (e.g., 10 business days) to review and provide feedback.
   - **Implementation:** On Trac makes necessary adjustments based on Hudson's feedback.
3. **Approval:**
   - **Action:** Hudson formally approves the deliverable after any necessary adjustments.

- **Documentation:** Written approval via email or project management system.
- **Timeline:** Within 5 business days after receiving the adjusted deliverable.

4. **Change Orders:**
   - **Action:** If substantial changes are needed that impact scope, time, or cost, a Change Order will be issued.
   - **Process:** On Trac and Hudson will discuss and agree on the changes, and a formal Change Order document will be signed.
   - **Timeline:** As agreed upon between both parties.
5. **Final Approval:**
   - **Action:** Once all deliverables for a project phase are approved, Hudson provides final sign-off.
   - **Documentation:** Formal sign-off document or email confirmation.
   - **Timeline:** Upon completion of all review and adjustment cycles for the phase.

Change Order Process

Any changes to the scope, timeline, or budget will be documented through a formal Change Order process. Change Orders must be approved by both On Trac and Hudson and will include details on the nature of the change, the rationale, and any associated costs or schedule impacts.

Change Orders may include:

- New routes requested by Hudson.
- Off-grid route changes after initial planning and Fielding has started.
- Re-fielding previously Fielded routes.
- Specification changes after project start (OSP Materials, Fiber Placement, Electronics, etc.).
- Any changes requiring re-working completed work or work-in-progress.
- Note: All Change Order requests impacting budget estimates for materials, labor, and time must be recorded in On Trac's tracking system. Any Change Order requests not covered in this SOW will require formal approval from Hudson before work begins.

Sample Change Order fees are provided for reference. Actual fees will depend on the specifics of the Change Order.

Item #	Estimated Quantity	UOM	DESCRIPTION	Unit Price	Extended Price	Notes
ENGINEERINGCHANGE ORDERS						
	1	Hour	Map Customization	$100.00	$100.00	
	1	Hour	Splice Changes	$100.00	$100.00	
	1	Hour	As-Built Customization	$100.00	$100.00	
	1	Hour	GIS Support	$150.00	$150.00	
TOTAL ENGINEERING CHANGE ORDERS						$450

Pricing

On Trac believes in building long-term partnerships with our clients, which have often spanned decades. To accommodate both the initial route proposed and any additional routes without impacting design costs, we have developed a pricing model based on route miles. Our cost estimate is based on 6500

homes passed and a total distance of 140 miles. Actual units will be billed, if the project comes in less than expected only the units used will be billed.

The pricing structure for this project is based on specific tasks and services outlined in the SOW. Below a detailed pricing breakdown is provided, specifying costs for each task, including OSP design, permitting, MRE, PLA, and any additional services requested by Hudson. All costs will be itemized and subject to approval by Hudson before commencement.

All pricing is unit-based and will be billed according to the actual units completed during the design phase. The units listed in the pricing are estimates and are subject to change depending on what the final design is. Detailed estimates for each unit are included for each line item. Our pricing structure is straightforward, featuring unit pricing for design services while permitting, traffic control, and project management are billed hourly. As part of our project management services, On Trac will work diligently to minimize the need for permits by collaborating closely with Hudson and local authorities, ensuring efficient and streamlined project execution.

Proofing existing conduit and structures will be billed on a unit basis. During the Fielding existing infrastructure will be identified. Separate units will be billed for proofing the conduits and HH's. Because the amount of proofing is unknown theses quantities were left at zero in the included estimates.

Pricing Proposal

Item #	Estimated Quantity	UOM	DESCRIPTION	Unit Price	Extended Price	Notes
ESTIMATED ENGINEERING						
	739,200	HHP	High Level Design (HLD)	$0.20	$147,840.00	
	739,200	HHP	Engineering Ride Out (ERO)	$0.10	$73,920.00	
	739,200	HHP	Low Level Design (LLD)	$0.35	$258,720.00	
	0	FT	Dimensioning (optional)	$0.05	$0.00	
	0	FT	Subsurface Utility Engineering (SUE) (optional)	$0.00	$0.00	
	739,200	HHP	Construction Ride Out (CRO)	$0.10	$73,920.00	
	739,200	HHP	Post-CRO Edits to Design	$0.05	$36,960.00	
	18,534	Splice	Splice Document Creation	$5.00	$92,670.00	
	33	DA	Construction Prints (Each DA each revision)	$200.00	$6,600.00	
	33	DA	Bill of Materials (BOM) (Each DA, each revision)	$100.00	$3,300.00	
	1,629	Pole	Pole Data Collection	$50.00	$81,450.00	
	1,629	Pole	Make-Ready Engineering	$30.00	$48,870.00	
	0	Pole	Pole Loading Analysis (optional)	$50.00	$0.00	
	739,200	HHP	Make-Ready Value Engineering Edits (Each)	$0.05	$36,960.00	
	0	HHP	As-Builts (Each)	$0.08	$0.00	
	0	HHP	Wireless Engineering and Associated Fiber Design	$5.10	$0.00	
	385	Hour	Traffic Control Plan Drafting (TCP)	$75.00	$28,875.00	
	770	Hour	Permitting Labor	$75.00	$57,750.00	
	420	Hour	Permitting/MRE/PLA/TCP Submissions	$75.00	$31,500.00	
	140	MI	Permitting Pass Through Fees (Actual Fees for RR, etc. will apply)	$100.00	$14,000.00	
	0	Hour	Engineering Project Manager - Run Time Engineering	$90.00	$0.00	
	0	Hour	Professional Engineer Review	$250.00	$0.00	
	0	Hour	Engineering Services for Out of Scope Activities	$75.00	$0.00	
	0	FT	Proof Existing Conduit	$1.50	$0.00	
	0	EA	Proof Existing HH	$50.00	$0.00	
TOTAL ESTIMATED ENGINEERING						$993,335
ESTIMATED MISC						
	2,080	Hour	Project Management Fee	$90.00	$187,200.00	
TOTAL ESTIMATED MISC						$187,200

TOTAL ESTIMATED PRICING	$1,180,535
ENGINEERING	$993,335
MISC	$187,200

GENERAL NOTES

1. Dimensioning costs are not included, but the price per foot is provided if dimensioning is required.
2. Subsurface utility locating is not included and would be calculated in a separate scope of work if required.
3. The design assumes no aerial work. Unit costs for aerial work are included in case it is required.
4. Permitting and traffic control plan designs are estimated. Actual hours for permitting and traffic control plan creation and submission will be billed once they occur.
5. Engineering project manager run-time engineering is not included. If an engineering resource is needed during construction, they will be billed separately at the time of construction.
6. No professional Engineer hours are included in the estimate. If a PE is required hours will be billed at the rate listed.
7. Demarcation points for Ontrac are the vaults outside the hut/CO to the NAP/MST enclosure.
8. This quote does not include an estimate for make-ready construction which may vary based on pole owner(s).

Attachments

- Attachment 1: Insurance
- Attachment 2: Reference List