

PROFESSIONAL ENGINEERING SERVICES AGREEMENT

ENGINEER & CITY OF DULUTH

THIS AGREEMENT, effective as of the date of attestation by the City Clerk, is made by and between the City of Duluth, Minnesota hereinafter referred to as the "City" and:

Name: TRC Environmental Corporation
Address: 230 W. Monroe St., Suite 630, Chicago, IL 60606

hereinafter referred to as the "Engineer", in consideration of the mutual promises contained herein.

Payments hereunder, in the estimated amount of five hundred seventy-thousand, five hundred seventy-one and 00/100 dollars (\$575,571.00) shall be made from Funding 225-125-1815-5310, Strm1018; and Resolution No. 19-0393R passed on June 10, 2019.

The professional engineering services obtained by the City under this agreement concern the following described project hereinafter referred to as the "Project":

Project Name: Lakewalk and Shoreline Repairs from October 2018 Storm
Project Description: **Engineering services for repair of the Lakewalk and shoreline from damage caused by the October 2018 storm, including study, report, survey, design, bidding assistance and full contract administration.**

The professional engineering services to be provided under this agreement consist of those phases A through H checked below. A more particular description of each phase is contained in Section II, "Basic Services", of the agreement.

	<u>Phase</u>	<u>Description</u>
☒	A.	Study and Report Phase
☒	B.	Preliminary Survey Phase
☒	C.	Preliminary Design Phase
☒	D.	Final Design Phase
☒	E.	Bidding Phase
☒	F.	Construction Survey and Layout Phase
☒	G.	Construction Administration and Inspection Phase
☐	H.	Additional Services

SECTION I. GENERAL

A. ENGINEER

The Engineer shall provide professional engineering services for the City in all phases of the Project to which this agreement applies, serve as the City's professional engineering representative for the Project as set forth below and shall give professional engineering consultation and advice to the City during the performance of services hereunder. All services provided hereunder shall be performed by the Engineer in accordance with generally accepted Engineering standards to the satisfaction of the City.

B. NOTICE TO PROCEED

The Engineer shall only begin performance of each Phase of work required hereunder upon receipt of a written Notice to Proceed by City representative with that Phase.

C. TIME

The Engineer shall begin work on each successive phase promptly after receipt of the Notice to Proceed and shall devote such personnel and materials to the Project so as to complete each phase in an expeditious manner within the time limits set forth in Section II. Time is of the essence to this agreement.

D. CITY'S REPRESENTATIVE

The City's representative to the Engineer shall be the City Engineer or his or her designees assigned in writing.

E. ENGINEERING GUIDELINES

All work performed as part of this project shall conform to the most current edition of the Engineering Guidelines for Professional Engineering Services and Developments as approved by the City Engineer and on file in the office of the City Engineer.

F. SUBCONSULTANTS

Engineer may contract for the services of sub-consultants to assist Engineer in the performance of the services to be provided by Engineer hereunder but the selection of any sub-consultant to perform such services shall be subject to the prior written approval of the City Engineer. Engineer shall remain responsible for all aspects of any services provided by such sub-consultants to City under this Agreement. City shall reimburse Engineer for sub-consultant services under the categories of services to be provided by Engineer under Phases A through H as applicable and within the amounts allocated for such services pursuant to Section V.D below.

SECTION II. BASIC SERVICES

A. STUDY AND REPORT PHASE

- ☒ Included in this Agreement
☐ Not included in this Agreement

The Engineer shall:

1) City's Requirements

Review available data and consult with the City to clarify and define the City's requirements for the Project.

2) Advise Regarding Additional Data

Advise the City as to the necessity of the City's providing or obtaining from others data or services of the types described in Section III.C, in order to evaluate or complete the Project and, if directed by the City's representative, act on behalf of the City in obtaining other data or services.

3) Technical Analysis

Provide analysis of the City's needs, planning surveys, site evaluations, and comparative studies of prospective sites and solutions.

4) Economic Analysis

~~Provide a general economic analysis of various alternatives based on economic parameters and assumptions provided by the City.~~

5) Report Preparation

Prepare a report containing schematic layouts, sketches and conceptual design criteria with appropriate exhibits to indicate clearly the considerations involved and the alternative solutions available to the City and setting forth the Engineer's findings and recommendations with opinions of probable total costs for the Project, including construction cost, contingencies, allowances for charges of all professionals and consultants, allowances for the cost of land and rights-of-way, compensation for or damages to properties and interest and financing charges (all of which are hereinafter called "Project Costs").

6) Report Presentation

Furnish three copies of the report and present and review the report in person with the City as the City Representative shall direct.

7) Supplementary Duties

The duties and responsibilities of Engineer during the Study and Report Phase shall also include any additional duties and responsibilities to be provided pursuant to the Engineer's proposal attached as Exhibit A.

8) Completion Time

The Study and Report Phase shall be completed and report submitted by August 30, 2019.

B. PRELIMINARY SURVEY PHASE

- ☒ Included in this Agreement
☐ Not included in this Agreement

After written authorization by the City's representative to proceed with the preliminary survey phase, the Engineer shall:

1) General

Perform topographic survey as necessary to prepare the design and provide Construction Survey and Layout as described in Section II.F

~~2) Boundary Survey~~

~~Perform boundary survey if checked.~~

3) Document Presentation

Furnish a CADD file of the survey base map to the City. Files shall be in the software specified in the Engineering Guidelines for Professional Engineering Services and Developments described in Section I.E.

4) Supplementary Duties

The duties-responsibilities of the Engineer during the preliminary survey phase shall also include any additional duties and responsibilities to be provided pursuant to the Engineer's proposal attached as Exhibit A.

5) Completion Time

The preliminary survey phase shall be completed and submitted by August 30, 2019.

C. PRELIMINARY DESIGN PHASE

- ☒ Included in this Agreement
☐ Not included in this Agreement

After written authorization by the City's Representative to proceed with the Preliminary Design Phase, the Engineer shall:

1) Preliminary Design Documents

Prepare preliminary design documents consisting of final design criteria, preliminary drawings and outline specifications.

2) Revised Project Costs

Based on the information contained in the preliminary design documents, submit a revised opinion of probable Project costs.

~~3) Preparation of Grants; Environmental Statements~~

~~Preparation of applications and supporting documents for governmental grants, loans or advances in connection with the Project; preparation or review of environmental assessments and impact statements; review and evaluation of the effect on the design requirements of the Project of any such statements and documentation prepared by others; and assistance in obtaining approvals of authorities having jurisdiction over the anticipated environmental impact of the Project.~~

4) Renderings and Models

Providing renderings or models for the City's use.

~~5) Economic Analysis~~

~~Investigations involving detailed consideration of operations, maintenance and overhead expenses; providing value engineering during the course of design; the preparation of feasibility studies, cash flow and economic evaluations, rate schedules and appraisals; assistance in obtaining financing for the Project;~~

~~evaluating processes available for licensing and assisting the City in obtaining licensing; detailed quantity surveys of material, equipment and labor; and audits of inventories required in connection with construction performed by the City.~~

6) Document Presentation

Furnish three copies of the above preliminary design documents and present and review such documents in person with the City as the City Engineer may direct.

7) Supplementary Duties

The duties and responsibilities of the Engineer during the Preliminary Design Phase shall also include any additional duties and responsibilities to be provided pursuant to the Engineer's proposal attached as Exhibit A.

8) Completion Time

The Preliminary Design Phase shall be completed and report or plan submitted by September 30, 2019.

D. FINAL DESIGN PHASE

- ☒ Included in this Agreement
☐ Not included in this Agreement

1) Drawings and Specifications

On the basis of the accepted preliminary design documents and the revised opinion of probable Project costs, prepare for incorporation in the contract documents Construction Plans to show the character and extent of the Project and specifications.

2) Approvals of Governmental Entities

Furnish to the City such documents and design data as may be required for, and prepare the required documents so that the City may apply for approvals and permits of such governmental authorities as have jurisdiction over design criteria applicable to the Project, and assist in obtaining such approvals by participating in submissions to and negotiations with appropriate authorities.

3) Adjusted Project Costs

Advise the City of any adjustments to the latest opinion of probable Project costs, identify cause of change and furnish a revised opinion of probable Project cost based on the drawings and specifications.

4) Contract Document Preparation

Prepare for review and approval by the City, its Attorney and other advisors, contract agreement forms, general conditions and supplementary conditions and (where requested) bid forms, invitations to bid and instructions to bidder, including for federally funded Projects, all documentation, including wage determinations, in order to comply with Davis-Bacon Act or City code requirements, and assist in the preparation of other related contract documents. To the extent possible, the Engineer will follow the document format supplied by the City and use the standard terms and conditions supplied by the City in preparation of these documents.

~~5) Real Estate Acquisition: Legal Description~~

~~Based on preliminary design documents, furnish a legal description and recordable reproducible 8 1/2" X 11" plat of each parcel of real estate in which the City must acquire an interest in order to proceed with construction of the Project.~~

6) Document Presentation

Furnish three copies of the above documents and present and review them in person with the City.

7) Supplementary Duties

The duties and responsibilities of the Engineer during the Final Design Phase shall also include any additional duties and responsibilities to be provided pursuant to the Engineer's proposal attached as Exhibit A.

8) Completion Time

The Final Design Phase shall be completed and contract documents submitted by February 28, 2020.

E. BIDDING PHASE

- ☒ Included in this Agreement
☐ Not included in this Agreement

The Engineer shall:

1) Assist in Bidding

Assist the City in obtaining bids for each separate City contract for construction, materials, equipment and services.

2) Advise Regarding Contractors and Subcontractors

Consult with and advise the City as to the acceptability of subcontractors and other persons and organizations proposed by the City's contractor(s) (hereinafter called "Contractor(s)" for those portions of the work as to which such acceptability is required by the bidding documents).

3) Consult Regarding Substitutes

Consult with and advise the City as to the acceptability of substitute materials and equipment proposed by the contractor(s) when substitution prior to the award of contracts is allowed by the bidding documents.

4) Evaluation of Bids

Assist the City in evaluating bids or proposals and in assembling and awarding contracts.

5) Supplementary Duties

The duties and responsibilities of the Engineer during the Bidding Phase shall also include any additional duties and responsibilities to be provided pursuant to the Engineer's proposal attached as Exhibit A.

6) Completion Time

The bidding phase shall be completed by March 13, 2020.

F. CONSTRUCTION SURVEY AND LAYOUT PHASE

- ☒ Included in this Agreement
☐ Not included in this Agreement

1) General

This phase of work may or may not be performed in conjunction with Phase G, "Construction Administration and Inspection Phase" of this agreement. Inclusion of this phase in the agreement does not imply that services identified under Phase G are to be provided unless specifically indicated in this agreement.

2) Duties

The Engineer shall provide horizontal and vertical control line and grade to enable construction of the improvement as depicted in the Project plans. The number of control points to be established by the Engineer shall be sufficient to permit the construction contractor to construct the improvement within the construction tolerances established in the Project specifications. In addition, the number of control points shall be consistent with standard engineering practice.

3) Accuracy

The Engineer shall provide the horizontal and vertical control points within the same measurement tolerances as the construction tolerances established in the Project specifications. The Engineer shall be responsible for the accuracy of the control points which are established. The Engineer shall be responsible for costs which may result from errors in placement of control points. The Engineer shall be required to establish control points at Engineer's costs only one time. Control points which are lost, damaged, removed or otherwise moved by the Contractor or others shall be promptly replaced by the Engineer and costs for such replacement shall be computed on a time and materials basis, and reimbursed by the City. The Engineer shall take all reasonable and customary actions to protect the control points established by the Engineer.

4) Supplementary Duties

The duties and responsibilities of the Engineer during the construction survey and layout phase shall also include any additional duties and responsibilities to be provided pursuant to the Engineer's proposal attached as Exhibit A.

5) Completion Time

The construction survey & layout phase shall be completed by March 13, 2020.

G. CONSTRUCTION ADMINISTRATION AND INSPECTION PHASE

- ☒ Included in this Agreement
☐ Not included in this Agreement

1) General Duties

Consult with and advise the City and act as its representative as provided herein and in the General Conditions of the construction contract for the Project. This phase of the work may or may not be performed in conjunction with Phase F "Construction Survey and Layout Phase" of this agreement. Inclusion of this phase in the agreement does not imply that services identified under Phase F are to be provided unless specifically indicated in this agreement.

2) Construction Inspection and Reporting

Make visits to the site with sufficient frequency at the various stages of construction to observe as an experienced and qualified design professional the progress and quality of the executed work of the contractor(s) and to insure that such work is proceeding in accordance with the contract documents. During such visits and on the basis of on-site observations, the Engineer shall keep the City informed of the progress of the work, shall endeavor to guard the City against defects and deficiencies in such work and may disapprove or reject work failing to conform to the contract documents.

3) Warranty Inspection

Eleven months following construction completion, conduct an inspection to document any items to be repaired by the contractor under the conditions of the construction contract warranty. Submit work to be corrected to the Contractor and the City.

4) Review of Technical and Procedural Aspects

Review and approve (or take other appropriate action in respect to Shop Drawings), the results of tests and inspections and other data which each contractor is required to submit, determine the acceptability of substitute materials and equipment proposed by the contractor(s), and receive and review (for general content as required by the specifications) maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection which are to be assembled by the contractor(s).

5) Contract Documents

Receive from each contractor and review for compliance with contract documents all required document submissions including but not limited to performance and payment bonds, certificates of insurance report forms required by any City, State or Federal law or rule or regulation and submit the forms to the City for final approval.

6) Conferences and Meetings

Attend meetings with the contractor, such as preconstruction conferences, progress meetings, job conferences and other Project-related meetings, and prepare and circulate copies of the minutes thereof including to the City.

7) Records

- a) Maintain orderly files for correspondence, reports of job conferences, shop drawings and samples, reproductions of original contract documents, including all work directive changes, addenda, change orders, field orders, additional drawings issued subsequent to the execution of the contract, the Engineer's clarifications and interpretations of the contract documents, progress reports, and other Project-related documents.
- b) Keep a diary or log book, recording the contractor's hours on the job site, weather conditions, data

relative to questions of work directive changes, change orders, or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail, as in the case of observing test procedures and send copies to the City. Take multiple photographs of the Work and keep a log and file of the photos. Specifically maintain records of acceptance and rejection of materials and workmanship.

c) Record names, addresses and telephone numbers of all the contractors, subcontractors, and major suppliers of materials and equipment.

8) Reports

a) Furnish the City periodic reports, as required, on progress of the work and of the contractor's compliance with the progress schedule and schedule of shop drawings and sample submittals.

b) Consult with the City, in advance of scheduled major tests, inspections, or start of important phases of the Work.

c) Draft proposed change orders and work directive changes, obtaining back-up material from the contractor, and make recommendations to the City regarding change orders, work directive changes and field orders.

d) Report immediately to the City upon the occurrence of any accident.

9) Contract Interpretation, Review of Quality of Work

Issue all instruction of the City to the contractor(s); issue necessary interpretations and clarifications of the contract Documents and in connection therewith prepare change orders as required, subject to the City's approval; have authority, as the City's representative, to require special inspection or testing of the work; act as initial interpreter of the requirements of the contract documents and judge of the acceptability of the work there under and make decisions on all claims of the contractor(s) relating to the acceptability of the work or the interpretation of the requirements of the contract documents pertaining to the execution and progress of the work.

10) Change Orders and Revisions

Prepare change orders to reflect changes in the Project requested or approved by the City, evaluate substitutions proposed by the contractor(s) and make revisions to drawings and specifications occasioned thereby, and provide any additional services necessary as the result of significant delays, changes or price increases occurring as a direct or indirect result of material, equipment or energy shortages.

11) Review of Applications for Payment

Based on the Engineer's on-site observations as an experienced and qualified design professional and on review of applications for payment and the accompanying data and schedules, determine the amount owing to the contractor(s) and recommend in writing payments to the contractor(s) in such amounts; such recommendations of payment will constitute a representation to the City, based on such observations and review, that the work has progressed to the point indicated, that, to the best of the Engineer's knowledge, information and belief, the quality of such work is in accordance with the contract documents (subject to an evaluation of such work as a functioning Project upon substantial completion, to the results of any subsequent tests called for in the contract documents, and to any qualifications stated in his recommendation), and that payment of the amount recommended is due the contractor(s).

12) Determination of Substantial Completion

Conduct an inspection to determine if the Project is substantially complete and a final inspection to determine if the work has been completed in accordance with the contract documents and if each contractor has fulfilled all of his obligations there under so that the Engineer may recommend, in writing, final payment to each contractor and may give written notice to the City and the contractor(s) that the work is acceptable (subject to any conditions therein expressed).

13) Authority and Responsibility

The Engineer shall not guarantee the work of any contractor or subcontractor, shall have no supervision or control as to the work or persons doing the work, shall not have charge of the work, shall not be responsible for safety in, on, or about the job-site or have any control of the safety or adequacy of any equipment, building component, scaffolding, supports, forms or other work aids. If the Engineer determines that there are deficiencies in materials or workmanship on the Project, or otherwise deems it to be in the best interest

of the City to do so, the Engineer shall be responsible to stop any contractor or subcontractor from performing work on the Project, until conditions giving rise to this need, therefore, are rectified.

14) Engineer Not Responsible for Acts of Contractor

The Engineer shall not be responsible for the supervision or control of the acts or omissions or construction means, methods or techniques of any contractor, or subcontractor, or any of the contractor(s)' or subcontractors' or employees or any other person (except the Engineer's own employees and agents) at the site or otherwise performing any of the contractor(s) work; however, nothing contained in this paragraph shall be construed to release the Engineer from liability for failure to properly perform duties undertaken by him in these contract documents or this agreement.

15) Preparation of Record Drawings

The Engineer shall prepare a set of record drawings in accordance with the Engineering Guidelines for Professional Engineering Services and Development described in Section I.E.

16) Manuals

The Engineer shall furnish operating and maintenance manuals; protracted or extensive assistance in the utilization of any equipment or system (such as initial start-up, testing, and adjusting and balancing); and training personnel for operation and maintenance.

17) Supplementary Duties

The duties and responsibilities of the Engineer during the construction administration and inspection phase shall also include any additional duties and responsibilities to be provided pursuant to the Engineer's proposal attached as Exhibit A.

18) Completion Time

The construction administration and inspection phase shall be completed by October 30, 2021.

H. ADDITIONAL SERVICES

- ☐ Included in this Agreement
☒ Not included in this Agreement

If authorized in writing by the City, the Engineer shall furnish or obtain other additional services of the following types which are not considered normal or customary basic services except to the extent specifically provided in Section II; these will be paid for by the City as indicated in Section V.

1) Significant Changes

Services resulting from significant changes in extent of the Project or its design including, but not limited to, changes in size, complexity, City's schedule or character of construction or method of financing; and revising previously accepted studies, reports, design documents or contract documents when such revisions are due to causes beyond the Engineer's control.

2) Alternate Bid Documents

Preparing documents for alternate bids requested by the City for contractor(s)' work which is not executed or documents for out-of-sequence work.

3) Services Resulting from Acts Beyond Engineer's Control

Additional or extended services during construction made necessary by (1) work damaged by fire or other cause during construction, (2) a significant amount of defective or neglected work of the contractor(s) as determined by the city representative, (3) prolongation of the contract time due to delays by the contractor, (4) acceleration of the progress schedule involving services beyond normal working hours, and (5) default by the contractor.

4) Services After Construction Phase

Services after completion of the construction phase excluding the warranty inspection.

5) Legal Proceedings

Preparing to serve or serving as a consultant or witness for the City in any litigation, public hearing or other

legal or administrative proceeding involving the Project (except as agreed to under Basic Services).

6) Services Not Otherwise Provided

Additional services in connection with the Project, including services normally furnished by the City and services not otherwise provided for implicitly or by fair implication of this agreement.

7) Supplementary Duties

The following additional services have been identified and are included in the Additional Services Phase any additional duties and responsibilities to be provided pursuant to the Engineer's proposal attached as Exhibit A.

8) Completion Time

The time limit to complete additional services cannot be fully specified in this agreement because the full nature and full extent of additional services are unknown.

SECTION III. CITY'S RESPONSIBILITIES

A. FURNISH REQUIREMENTS AND LIMITATIONS

Provide all criteria and full information as to the City's requirements for the Project, including design objectives and constraints, space, capacity and performance requirements, flexibility and expendability, economic parameters and any budgetary limitations; and furnish copies of all design and construction standards which the City will require to be included in the Drawings and Specifications.

B. FURNISH INFORMATION

Assist the Engineer by placing at the Engineer's disposal all available information reasonably known to and in possession of the City.

C. REVIEW DOCUMENTS

Examine all studies, reports, sketches, drawings, specifications, proposals and other documents presented by the Engineer.

D. OBTAIN APPROVALS AND PERMITS

Furnish approvals and permits from all governmental authorities having jurisdiction over the Project and such approvals and consents from others as may be necessary for completion of the Project.

E. ACCOUNTING, LEGAL AND INSURANCE SERVICE

Provide such accounting, independent cost estimating and insurance counseling services as may be required for the Project, such auditing service as the City may require to ascertain how or for what purpose any contractor has used the monies paid to him under the construction contract, and such inspection services as the City may require to ascertain that the contractor(s) are complying with any law, rule or regulation applicable to their performance of the work except as otherwise provided in Section II.

F. NOTIFY THE ENGINEER OF DEFECTS OR DEVELOPMENT

Give prompt written notice to the Engineer whenever the City observes or otherwise becomes aware of any development that affects the scope or timing of the Engineer's services, or any defect in the work of the contractor(s).

G. COSTS OF THE CITY'S RESPONSIBILITIES

Bear all costs incident to compliance with the requirements of this Section III.

SECTION IV. GENERAL CONSIDERATIONS

A. SUCCESSORS AND ASSIGNS

The City and the Engineer each binds their respective partners, successors, executors, administrators and assigns to the other party of this agreement and to the partners, successors, executors, administrators, and assigns of such other party, in respect to all covenants of this agreement; the Engineer shall not assign, sublet, or transfer their respective interests in this agreement without the written consent of the City. Nothing herein shall be construed as creating any personal liability on the part of any officer or agent of any public body which may

be a party hereto, nor shall it be construed as giving any rights or benefits hereunder to anyone other than the City and the Engineer.

B. OWNERSHIP OF DOCUMENTS

All drawings, specifications, reports, records, and other work product developed by the Engineer in connection with this Project shall remain the property of the City whether the Project is completed or not. Reuse of any of the work product of the Engineer by the City on extensions of this Project or any other Project without written permission of the Engineer shall be at the City's risk and the City agrees to defend, indemnify and hold harmless the Engineer from all damages and costs including attorney fees arising out of such reuse by the City or others acting through the City.

C. ESTIMATES OF COST (COST OPINION)

Estimates of construction cost provided are to be made on the basis of the Engineer's experience, qualifications and the best of their professional judgment, but the Engineer does not guarantee the accuracy of such estimates as compared to the contractor's bids or the Project construction cost.

D. INSURANCE

- 1) Engineer shall provide the following minimum amounts of insurance from insurance companies authorized to do business in the state of Minnesota unless Engineer shall have successfully demonstrated to the City Attorney, in the reasonable exercise of his or her discretion that such insurance is not reasonably available in the market. If the Engineer demonstrates to the reasonable satisfaction of the City Attorney that such insurance requires hereunder is not reasonably available in the market, the City Attorney may approve an alternative form of insurance which is reasonably available in the market which he or she deems to provide the highest level of insurance protection to the city which is reasonably available.
 - a) Workers' compensation insurance in accordance with the laws of the State of Minnesota.
 - b) Public Liability Insurance and Automobile Liability Insurance with limits not less than **\$1,500,000** Single Limit, and twice the limits provided when a claim arises out of the release or threatened release of a hazardous substance; shall be in a company approved by the city of Duluth; and shall provide for the following: Liability for Premises, Operations, Completed Operations, Independent Contractors, and Contractual Liability.
 - c) Professional Liability Insurance in an amount not less than **\$1,500,000** Single Limit; provided further that in the event the professional malpractice insurance is in the form of "claims made," insurance, Engineer hereby commits to provide at least 60 days' notice prior to any change to the Professional Liability Insurance policy or coverage ; and in event of any change, Engineer agrees to provide the City with either evidence of new insurance coverage conforming to the provisions of this paragraph which will provide unbroken protection to the City, or, in the alternative, to purchase at its cost, extended coverage under the old policy for the period the state of repose runs; the protection to be provided by said "claims made" insurance shall remain in place until the running of the statute of repose for claims related to this Agreement.
 - d) **City of Duluth shall be named as Additional Insured** under the Public Liability and Automobile Liability, or as an alternate, Engineer may provide Owners-Contractors Protective policy, naming himself and City of Duluth. Engineer shall also provide evidence of Statutory Minnesota Workers' Compensation Insurance. Engineer to provide Certificate of Insurance evidencing such coverage with notice to City of cancellation in accordance with the provisions of the underlying insurance policy included. The City of Duluth does not represent or guarantee that these types or limits of coverage are adequate to protect the Engineer's interests and liabilities.
 - e) If a certificate of insurance is provided, the form of the certificate shall contain an unconditional requirement that the insurer notify the City without fail not less than the notice provisions contained in the underlying insurance policy or policies. In addition, Engineer commits to provide to City notice to City at least 30 days prior to any change of the policy or coverages.
- 2) The insurance required herein shall be maintained in full force and effect during the life of this Agreement and shall protect Engineer, its employees, agents and representatives from claims and damages including but not limited to personal injury and death and any act or failure to act by Engineer, its

employees, agents and representatives in the performance of work covered by this Agreement.

3) Certificates showing that Engineer is carrying the above described insurance in the specified amounts shall be furnished to the City prior to the execution of this Agreement and a certificate showing continued maintenance of such insurance shall be on file with the City during the term of this Agreement.

4) The City shall be named as an additional insured on each liability policy other than the professional liability and the workers' compensation policies of the Engineer.

5) The certificates shall provide that the policies shall not be cancelled during the life of this Agreement without advanced notice being given to the City at least equal to that provided for in the underlying policy of insurance.

6) Except as provided for in Section IV D.1.d) above, Engineer hereby commits to provide notice to City at least 30 days in advance of any change in the insurance provided pursuant to this Section IV or in advance of that provided for in the underlying insurance policy or policies whichever is longer. For the purposes of Section IV. D of this Agreement, the term, "changed", shall include cancellation of a policy of insurance provided hereunder and any modification of such policy which reduces the amount of any coverage provided thereunder below the amounts required to be provided hereunder or otherwise reduces the protections provided under such policy to City.

E. HOLD HARMLESS

The Engineer agrees that it shall defend, indemnify and hold harmless the City of Duluth and its officers, agents, servants and employees from any and all claims including claims for contribution or indemnity, demands, suits, judgments, costs and expenses asserted by any person or persons including agents or employees of the City of Duluth or the Engineer by reason of death or injury to person or persons or the loss or damage to property arising out of, or by reason of, any act, omission, operation or work of the Engineer or its employees while engaged in the execution or performance of services under this Agreement except to the extent that such indemnification is specifically prohibited by Minnesota Statutes Chapter 337 or Section 604.21. Engineer shall not be required to indemnify City for claims of liability arising out of the sole negligent or intentional acts or omission of the City but shall be specifically required to and agrees to defend and indemnify City in all cases where claims of liability against the City arise out of acts or omissions which are passive or derivative of the negligent or intentional acts or omissions of Engineer, including but not limited to, the failure of the City to supervise, the failure to warn, the failure to prevent such acts or omission by Engineer and any other such source of liability. On ten days' written notice from the City of Duluth, the Engineer shall appear and defend all lawsuits against the City of Duluth growing out of such injuries or damages.

F. TERMINATION

1) This agreement may be terminated in whole or in part in writing by either party in the event of substantial failure by the other party to fulfill its obligation under this agreement through no fault of the terminating party; provided that no such termination may be affected unless the other party is given not less than fifteen (15) calendar days' prior written notice (delivered by certified mail, return receipt requested) of intent to terminate.

2) This agreement may be terminated in whole or in part in writing by the City for its convenience; provided that the Engineer is given (1) not less than fifteen (15) calendar days' prior written notice (delivered by certified mail, return receipt requested) of intent to terminate and (2) an opportunity for consultation with the City prior to termination.

3) Upon receipt of a notice of intent to terminate from the City pursuant to this agreement, the Engineer shall (1) promptly discontinue all services affected (unless the notice directs otherwise), and (2) make available to the City at any reasonable time at a location specified by the City all data, drawings, specifications, reports, estimates, summaries, and such other information and materials as may have accumulated by the Engineer in performing this agreement, whether completed or in process.

4) Upon termination pursuant to this agreement, the City may take over the work and prosecute the same to completion by agreement with another party or otherwise.

G. LAWS, RULES AND REGULATIONS

The Engineer agrees to observe and comply with all laws, ordinances, rules and regulations of the United States

of America, State of Minnesota, the City of Duluth and their respective agencies and instrumentalities which are applicable to the work and services to be performed hereunder.

H. INDEPENDENT CONTRACTOR STATUS

Nothing contained in this agreement shall be construed to make the Engineer an employee or partner of the City. The Engineer shall at all times hereunder be construed to be an independent contractor.

I. FEDERAL FUNDING

If Federal Funds (i.e. HUD, FEMA, Revenue Sharing) are utilized as a source of Project funding, the Engineer shall abide by the terms of all Federal requirements in the performance of duties hereunder.

J. AMENDMENT OF AGREEMENT

This agreement shall be amended or supplemented only in writing and executed by both parties hereto.

SECTION V. PAYMENT

A. BASIS OF BILLING

City shall pay the Engineer an amount based on hourly rates for all services rendered under Section II Phases A through H, including any and all Project-related expenses such as travel, reproduction of reports and drawings, tolls, mileage, etc. For the purposes of this agreement, the principals and employees of the Engineer and their hourly rates are set forth in Exhibit A.

B. PAYMENT FOR WORK COMPLETED

- 1) Monthly progress payments may be requested by the Engineer for work satisfactorily completed and shall be made by the City to the Engineer as soon as practicable upon submission of statements requesting payment by the Engineer to the City. When such progress payments are made, the City may withhold up to five percent (5%) of the vouchered amount until satisfactory completion by the Engineer of all work and services within a phase called for under this agreement. When the City determines that the work under this agreement for any specified phase hereunder is substantially complete, it shall release to the Engineer any retainage held for that phase.
- 2) No payment request made pursuant to subparagraph 1 of this Section V shall exceed the estimated maximum total amount and value of the total work and services to be performed by the Engineer under this agreement without the prior authorization of the City. These estimates have been prepared by the Engineer and supplemented or accompanied by such supporting data as may be required by the City.
- 3) Upon satisfactory completion of the work performed hereunder, and prior to final payment under this agreement, and as a condition precedent thereto, the Engineer shall execute and deliver to the City a release of all claims against the City arising under or by virtue of this agreement.
- 4) In the event of termination by City under Section IV.F., upon the completion of any phase of the Basic Services, progress payments due Engineer for services rendered through such phase shall constitute total payment for such services. In the event of such termination by City during any phase of the Basic Services, Engineer also will be reimbursed for the charges of independent professional associates and consultants employed by Engineer to render Basic Services, and paid for services rendered during that phase on the basis of hourly rates defined in Exhibit A of this agreement for services rendered during that phase to date of termination by Engineer's principals and employees engaged directly on the Project. In the event of any such termination, Engineer will be paid for all unpaid additional services plus all termination expenses. Termination expenses mean additional expenses directly attributable to termination, which, if termination is at City's convenience, shall include an amount computed as a percentage of total compensation for basic services earned by Engineer to the date of termination as follows: 10% of the difference between the amount which the Engineer has earned computed as described in paragraphs A and B of this section and the maximum payment amount described in paragraph D of this section. The above applies only if termination is for reasons other than the fault of the Engineer.

C. STANDARD PAYMENT

The Engineer shall complete all services described in Section II.A through G including all attachments to

Section II for an amount including all Project-related expenses for the estimated amounts shown hereunder:

<u>Section II</u>	<u>Description</u>	<u>Estimated Compensation</u>
A.	Study and Report Phase	\$ 50,689.00
B.	Preliminary Survey Phase	\$ 44,621.00
C.	Preliminary Design Phase	\$ 72,535.00
D.	Final Design Phase	\$ 103,228.00
E.	Bidding Phase	\$ 32,030.00
F.	Construction Survey and Layout Phase	\$ 11,077.00
G.	Construction Administration and Inspection Phase	\$ 261,391.00
TOTAL		\$ 575,571.00

The maximum compensation for all phases A through G shall not exceed FIVE HUNDRED SEVENTY-FIVE THOUSAND, FIVE HUNDRED SEVENTY-ONE AND 00/100 DOLLARS.

D. PAYMENT FOR ADDITIONAL SERVICES

City shall pay the Engineer for all additional services rendered under Section II.H an amount based on hourly rates shown in Exhibit A for services rendered by principals and employees assigned to the Project. The maximum payment described in Section V.C shall not apply to additional services.

The Engineer and City agree that the full extent of additional services may be unknown. Those additional services which have been identified are described in Section II.H, and that payment for those additional services is estimated to be \$0.00.

This agreement is made between the City and the Engineer entered into on the last date below written. In witness, the parties have executed this agreement.

E. TOTAL NOT TO EXCEED:

All payments under this Contract are not to exceed \$575,571.00 payable under fund 225-125-1815-5310, Strml018.

SECTION VI. SPECIAL PROVISIONS

The following exhibits are attached to and made part of this agreement:

- 1) Exhibit A, Engineer's Hourly Rates and Proposal

In the event of a conflict between the agreement and any Exhibit, the terms of the Agreement will be controlling.

SECTION VII. COUNTERPARTS

This Agreement may be executed in two or more counterparts, each of which shall be deemed to be an original as against any party whose signature appears thereon, but all of which together shall constitute but one and the same instrument. Signatures to this Agreement transmitted by facsimile, by electronic mail in "portable document format" (".pdf"), or by any other electronic means which preserves the original graphic and pictorial appearance of the Agreement, shall have the same effect as physical delivery of the paper document bearing the original signature.

[Remainder of page intentionally left blank. Signature page to follow.]

IN WITNESS WHEREOF, the parties have hereunto set their hands on the date of attestation shown below.

CITY OF DULUTH-Client

By: _____
Mayor

Attest:

By: _____
City Clerk

Date: _____

Countersigned:

City Auditor

Approved as to Form:

City Attorney

**TRC ENVIRONMENTAL
CORPORATION**

By: _____

Its: _____
Title of Representative

Date: _____



230 W. Monroe Street
Suite 630
Chicago, IL 60606

May 30, 2019

City of Duluth
ATTN: Purchasing Division
City Hall, Room 120
411 West 1st Street
Duluth, MN 55802

**Subject: Proposal for Engineering Services – October 2018 Storm Damages Including Lakewalk and Shoreline, RFP Number 19-99347
TRC Proposal No. 343356.9990.0000**

Attn: City of Duluth Representatives

We are pleased to submit this proposal *for Engineering Services, October 2018 Storm Damages Including Lakewalk and Shoreline, RFP Number 19-99347*. We are well aware of the critical importance of immediately restoring and protecting the shoreline, which was significantly damaged by the October 10/11, 2018 storm. Enhancing public safety, providing public access, protecting public and private property are of utmost importance to the project. Toward that end, we have assembled a customized team of Great Lakes experts in the disciplines relevant to this important project, including Coastal, Marine Structural, Civil, and Geotechnical Engineers. Individually and collectively, we are committed to meeting and exceeding your expectations by providing the timely and on-budget delivery of an outstanding project that responds to all aspects of the RFP.

The TRC Team will be led by Dan Veriotti, MSc, PE (Project Manager, Principal Coastal Engineer and Engineer of Record), working closely with Chad Scott, PE (Principal, AMI Consulting Engineers). Dan is a specialized Coastal Engineer with over 23 years of experience and has led numerous similar projects. Chad has over 22 years of similar experience and is a founding partner of AMI. The TRC Team is assisted by Resolution Studio, LLC (Ben Yahr, RLA) leading the landscape architecture design services. Resolution Studio is a Federal registered Small Business. All the project members listed in this proposal have been working together on City of Duluth shoreline projects as a cohesive team.

We appreciate the opportunity to submit this proposal and to continue working with you. You can reach us via the phone numbers provided below.

Sincerely,

TRC

A handwritten signature in blue ink, appearing to read "D. Veriotti".

Dan Veriotti, MSc, PE
Chicago Principal Engineer
Phone: 312.800.5916

A handwritten signature in blue ink, appearing to read "Kristopher Krause".

Kristopher Krause, PE
Vice President, National Practice Leader
608.826.3637

Proposal for Engineering Services – October 2018 Storm Damages Including Lakewalk and Shoreline

RFP Number 19-99347 | May 30, 2019



Prepared by:
TRC
230 W. Monroe Street, Suite 2300
Chicago, IL 60606



Prepared for:
City of Duluth
ATTN: Purchasing Division
City Hall, Room 120
411 West 1st Street
Duluth, MN 55802



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List of TRC Attachments

Appendix A: Signed Cover Sheet

1.0 Project Understanding and Objectives

A. Overview

The TRC Team is pleased to respond to the City of Duluth's Request for Proposal (RFP) 19-99347, titled *Engineering Services, October 2018 Storm Damages Including Lakewalk and Shoreline*, dated May 13, 2019". We look forward to the opportunity to apply our decades of Great Lakes-specific expertise to the challenge of restoring the Duluth shoreline. We plan to leverage our previous and on-going shoreline projects in Duluth to efficiently evaluate the site conditions/damages from recently recorded storms, collect new site data, prepare repair alternatives with construction cost estimates, prepare design development drawings, coordinate with the regulatory agencies, and prepare final construction plans, assist with bidding and perform full time construction administration.

B. Project Understanding

Between October 2017 and October 2019, three major Lake Superior storms were recorded.

A summary of the three recorded storms is provided below:

- During October 26 and 27, 2017, sustained winds at 40 to 49 miles per hour (mph) from the NE produced significant waves up to 15.7 feet at buoy 45028 in deep water (161 feet), while the water level increase (due to storm surge) was 1.3 feet, superimposed on a Lake Superior high-water level (604.4 feet total) exacerbated the damage potential. This storm met, or exceeded the typical design criteria used for design of shoreline protection structures, and resulted in significant Canal Park shoreline erosion, damage to existing coastal stone revetment, boardwalk, and residential basement flooding;
- On April 14, 2018, another significant storm was documented, with sustained 40 to 50 mph winds from the NE and significant waves up to 15 feet, with a storm surge of 0.8 feet on top of Lake Superior high-water level (603.14 ft total). This resulted in additional shoreline erosion and damage to the existing Canal Park stone revetment and boardwalk, and basement flooding;
- On October 10 and 11, 2018, NE sustained winds over 40 mph were recorded, with 15.4 feet significant wave heights in deep water, with storm surge of 1.0 foot, and water level of 604.4 feet. This storm resulted in very significant damage to the Canal Park stone revetment and lightning poles, complete destruction of the boardwalk supports concrete beams, erosion of the gravel base material under the paved walkway, and basement flooding.

The most impacted areas due to the three storms are:

- Canal Park (damages described above, over approximately 3,100 feet of shoreline),



- The Lakewalk (revetment displaced stone/damage and boardwalk scour, approximately 1,100 feet); the project Phase I Emergency construction repairs is complete, with Phase II on-going;
- The DECC Sidewalk and Bayfront Observation Deck (local sidewalk damage, stone displacements, approximately 200 feet);
- The Ledges (stone revetment and trail damage, approximately 320 feet);
- Lakewood Water Treatment Plant (revetment damage and wave scour, approximately 350 feet);
- Western Waterfront Trail (shoreline erosion and trail damage, approximately 95 feet).

The Lake Superior Low Water Datum (LWD) is 601.1 ft IGLD85. During the October 2017 storm, the water level rose from 603.1 to 604.4, or from +2.0 LWD to +3.3 LWD. During the October 2018 storm, the water level rose from 603.4 to 604.4, or from +2.3 LWD to +3.3 LWD. The water levels are expressed as a percent probability of occurrence (a 100-Year level has an annual probability of occurrence of 1%). The 10-Year level for Duluth is approximately +2.6 feet LWD, the 20-Year is +2.8 feet LWD, while the 100-Year is +3.15 feet LWD. ***The October 2017 and 2018 storms maximum water level of 604.4 feet therefore exceeded the 100-Year level.***

Waves undergo transformations as they approach shallower water in the near-shore; they will typically break (waves are “depth limited”) when the ratio of water depth to wave height is approximately 0.8. In other words, in 10 feet of water depth during the storm water level and superimposed surge, an 8-foot wave height is possible at the breaking point on a typical, gently sloped shoreline or beach. However, the open, rocky and steep Lake Superior shorelines of Minnesota commonly exhibit ratios of 1.0, where in 10 feet of water depth, a 10-foot wave height is possible. The stone revetments and sea walls are subject to significant wave loading forces and overtopping, which will produce erosion and structure damage. The Great Lakes coastal structures are typically designed using a combination of (10, 20) and (20, 10), or the most conservative estimate of the near-shore waves produced by the offshore wave height and the water level for the 10-Year and 20-Year, respectively. ***Considering that the 100-Year water level was exceeded twice in two years, the project’s Coastal analysis and design procedure will have to select a robust set of design conditions for the construction plans and construction, to ensure Coastal Resiliency.***



The City of Duluth staff and the TRC Team documented the October 2018 storm damages and provided documentation in support of the Federal Disaster Declaration (February 1, 2019). The City of Duluth will select a team to assist with project engineering and construction administration services.

C. Project Goals

The project's main goals are to:

- Refine the initial City assessment and detail the severity of damages produced by the storms, with a focus on the October 10/11, 2018 storm;
- Prioritize the areas for repairs, based on identified site conditions and risks. More importantly, develop long-term resilient solutions that will protect the shoreline, infrastructure, and public safety, in close collaboration with the City; and
- Identify the most feasible project implementation phasing and create design development and construction plans, which will be implemented with FEMA provided funds.

2.0 TRC Team Resources, Capabilities and Responsibilities

A. Resources and Capabilities

With hundreds of regionally based and available professionals, the TRC Team offers a comprehensive range of services for this study, including:

- **Coastal and Civil Engineering** (experience with site investigations and assessments, data collection and analysis, coastal processes-water levels, wind waves, wave transformations, sediment transport, conceptual and final design of proposed improvements, Opinion of Probable Construction Costs, preparation of construction plans and construction administration);
- **Geotechnical and Structural Engineering** (data collection and analysis, calculation in support of design development and construction plans);
- **Landscape Architecture** (harmonious integration of land-based improvements with the Coastal shoreline protection program, conceptual and final design of public improvements, recreational opportunities, and habitat restoration, Opinion of Probable Construction Costs, and construction administration);
- **Data Collection** (bathymetric and topographic surveys, specialized aerial survey, underwater investigation, and creation of a project Digital Elevation Model-DEM);
- **Regulatory Coordination** (preparation of permit applications and coordination with the regulatory agencies); and
- **Support for State and Federal Funding Sources** (familiarity with project reporting procedures).

We are a regionally-based team highly accessible to the City of Duluth. Our customized team features project principals that live and work in the Great Lakes area. We are available (on short notice) to meet in-person with the City members to discuss project approach, progress and outcomes.

We offer Subject Matter Experts in all relevant disciplines. This project requires the services of highly experienced professionals in multiple disciplines that include (among others) Coastal and Marine Engineering, Marine Structural, Survey and Landscape Architecture. We assembled our team to provide the City of Duluth with Subject Matter Experts that not only have technical credentials but are also intimately familiar with the Lake Superior Basin.

The project main responsibilities are summarized below:

- **TRC** will provide the overall project management, design development and construction plan for the Coastal shoreline protection, site amenities and stormwater management, permitting, bidding, lead the construction administration support (office) and support the field construction administration. Dan Veriotti, PE is the Project Manager and Engineer of Record. Dan is a specialized Coastal Engineer, with over 23 years of experience with similar work around the Great Lakes and has managed hundreds of relevant projects. On Lake Superior, Dan managed the City of Duluth studies and projects listed below, the National Park Service Pictured Rocks-Sand Point Shoreline Restoration, Marquette Lakeshore Shoreline Restoration projects and conducted a Coastal Analysis and evaluation of design repairs to the Lutsen water intake. Dan will periodically be in Duluth during key meetings, presentations and construction progress meetings. Scott Weyandt, PE (local to Duluth area with 30 years of experience) will assist with field construction administration services.
- **AMI** will provide the Marine Structural design, site surveying, and assistance with design development and construction plan, bidding and lead the field construction administration and assist with construction administration-office. Chad Scott, PE is a Project Principal, with over 22 years of Marine Civil Engineering experience, and will oversee the AMI structural design, along with all other tasks. Zac Morris, PE will be in charge with the field construction administration and support the project design; Zac is a Coastal Engineer with over 6 years of professional experience.
- **Resolution Studio (an SBA certified Small Business)** will provide assistance with data collection (aerial survey), design development for all the land-based proposed site improvements, assist with the preparation of construction plans, and natural restoration of the Western Waterfront Trail. Ben Yahr, RLA has 14 years of experience and is the lead professional in charge of landscape architecture and land-based site design and will support the construction administration for the Western Waterfront Trail.

The three firms and senior professionals listed above, have cohesively worked together as a team on the City of Duluth shoreline restoration projects summarized below. Detailed team resumes are available upon request.

B. Relevant Selected Projects

The TRC team is intimately familiar with the City of Duluth shoreline conditions. The following is a summary of the recent TRC team projects performed, or on-going in Duluth:

- *Shoreline Assessment Study* (completed March 15, 2018): documenting damages due to the October 2017 storm. The study included new data collection, Coastal analysis, and the development of repair alternatives with construction costs estimates for: Canal Park, Lakewalk-South, Lakewalk-North, Beacon Pointe, North Shore, Park Point, Lake Superior and Mississippi Railroad, and Duluth Harbor;
- *Shoreline Assessment to Inspect Damage for Health and Public Safety* (completed February 14, 2019): documenting damages due to the October 2018 storm. The assessment included new data collection, Coastal analysis, and the development of repair alternatives with construction costs estimates for: Canal Park, Lakewalk-South, Lakewalk-North, the Ledges, North Shore, Inner Harbor and Western Waterfront Trail. Tasks included assistance with FEMA support materials and documentation, attendance and presentations with FEMA personnel, and site visits to clarify questions and identify priority areas for repairs.
- *Duluth Shoreline Rehabilitation 4th Avenue E to 7th Avenue E, Phase I Emergency Repairs* (construction plans completed August 21, 2019, construction complete January 2019). The project included data collection, Coastal analysis, design development, regulatory permitting, preparation of construction plans, bidding and full-time construction administration.
- *Duluth Shoreline Rehabilitation 4th Avenue E to 7th Avenue E, Phase II* (construction plans completed April 18, 2019, bids received May 16, 2019). The project included data collection, Coastal analysis, design development, regulatory permitting, preparation of construction plans, bidding. Construction is anticipated to start first week in June, with project substantial completion by September 30, 2019. Full time construction administration services will be provided.
- *Duluth Shoreline Rehabilitation: Canal Park (in progress)*. The project included data collection (topographic and bathymetric survey, side scan sonar, underwater investigation), Coastal analysis, design development, and regulatory permitting.

Additional relevant project abstracts are presented below.

Duluth Shoreline Rehabilitation, 4th Avenue to 7th Avenue E, Phase I-Emergency Repairs and Phase II

Very significant damages were recorded as a result of the October 2017 storm. The TRC Team (TRC, AMI, Resolution Studio) was commissioned to design: emergency repairs for 370 feet of shoreline in the vicinity of Fitger's (Phase I, construction complete) and 670 feet south of the Vietnam Memorial to Phase I (construction starts in June 2019). Without immediate repairs, the shoreline was at increased risk of failure, impacting the public safety and significant damage to public and private property, including City infrastructure.

Services provided include:

- Data collection (topographic and bathymetric survey, aerial survey);
- Coastal analysis-water levels, waves, wave transformation, evaluation of design set of conditions, wave overtopping; a resilient design condition was selected for the 100-Year water level and 50-Year offshore wave;
- Geotechnical and Structural analysis;
- Regulatory coordination; regulatory permitting application and supporting materials have been submitted and permits obtained;
- Design development of repair alternatives, preparation of construction plans. The selected shoreline protection design includes a reinforced concrete wall anchored to the bedrock and armor stone revetment;
- Bidding assistance; and
- Full time construction observations.

By the completion of Phase II in September 2019, the Lakewalk will be improved with a new 12-foot wide paved trail, a new 8-foot wide lpe boardwalk, 18-inch wide concrete seat wall and restored landscaping with new lighting over approximately 1,100 feet of shoreline.



Racine Harbor Monitoring Study – Racine Harbor, Racine, WI

Racine County commissioned TRC (along with Resolution Studio) to conduct a comprehensive Coastal evaluation of all Harbor structures and provide recommendation for improvements/repairs with construction cost estimates. The Harbor breakwaters are frequently subject to significant wave heights over 10 feet; rehabilitation is needed periodically, due to wave overtopping and ice loading forces. The North breakwater is provided with a concrete cap, in severely deteriorated condition, and needs replacement. The breakwater was originally constructed as a timber crib filled with stone and a reinforced concrete cap. This far exceeded its useful design life and needs replacement. Various other repairs are needed, due to individual armor stone displacements, and settling of the concrete cap (South breakwater). The project included:

- Data collection (bathymetric and topographic survey, aerial survey-drone for the parking lots and access roads, underwater investigation);
- Site assessment/evaluation and detailed observations with measurements of South Breakwater, North Breakwater, Yacht Club structures, Reef Point Marina structures, boat launch basin structures, data analysis, computer volumetric calculations for sedimentation and erosion, structure settlement, conceptual design of identified improvements, preliminary construction cost estimates, and recommendations for improvements and priorities, identifying applicable Coastal Grants; and
- Environmental assessment, study to improve terrestrial and aquatic habitat within the Harbor footprint.



Dan Veriotti, PE, is the TRC project manager and principal Coastal Engineer for this project. Ben Yahr, RLA provided lead aerial survey, data analysis, and Landscape Architecture for this project.

Wisconsin Point Shoreline Repairs, FEMA Disaster Declaration 2016-Superior, WI

In July of 2016, more than 8 inches of rain fell in many locations of northern Wisconsin causing significant damage and prompting the establishment of disaster relief for Douglas, Bayfield, Ashland, and Iron Counties. Areas damaged included the bayside of Wisconsin Point where wind driven waves scoured the unprotected shoreline on the south side of Wisconsin Point. This area is not exposed to open reaches of Lake Superior, but, in this case, the wind direction out of the southwest and the significant reach combined to create a condition in which wave action, high water levels, and soil saturation caused erosion and roadway failures at numerous locations along Wisconsin Point road where the road is directly adjacent to the shoreline.

An initial on-site review and subsequent discussions with FEMA, Wisconsin DNR, and USACE brought consensus that repairing and protecting the roadway would incorporate a living shoreline into any hard armoring that was proposed. The design included a large stone breakwater with a crest 1-2 feet above design water elevation, followed by a flat vegetated section 10-15 wide behind the breakwater, and a geogrid reinforced slope to the edge of the roadway. This work was completed in the summer of 2017 with vegetative planting installed in 2018. Monitoring of the performance and vegetative establishment will be ongoing.

Concept development, agency coordination, permitting support, detailed design, specifications, estimates, and construction support were provided.

Scott Weyandt, PE, was the Principal Engineer for this project.



St. Paul Port Authority (SPPA) – FEMA Flood Repairs, Red Rock Terminal-St. Paul, MN

AMI was commissioned to assess the condition of 7,250 lineal feet of sheet pile dockwall and 9 loading cells for the SPPA Port facilities along the Mississippi River in St. Paul, MN.

The purpose of the inspection was to determine if any damaged had occurred after a record setting flood event in the Spring of 2014. AMI visually inspected the dock walls and loading cells for any signs of damage or deterioration above and below the waterline. After the inspection, AMI summarized the results of the inspection in a detailed dive inspection report. As part of the report AMI determined if the documented damaged was a direct result of the flood. After the report was completed, AMI assisted the SPPA and another contractor with providing the necessary documentation for requesting funding from the Federal Emergency Management Agency (FEMA). After the funds were appropriated, AMI assisted the SPPA with bidding the project out to prospective contractors.

The project was awarded in early November 2017 with construction being performed in late 2017 & early 2018. AMI will be performing construction oversight services to ensure the repairs are completed according to the project specifications & drawings.

Chad Scott, PE was the Project Manager and Principal Engineer for this project.

**City of Duluth Entertainment Convention Center (DECC) Dockwall-Duluth, MN**

This project includes the rehabilitation of a historic 1865 Minnesota Slip and Harbor dockwall which are home to the William A. Irvin, Vista Cruises and waterfront boardwalks that host millions of tourists annually. As the Project Manager, AMI Consulting Engineers took the lead in both stakeholder and private meetings to address the issues along the 2500 linear foot dockwall and surrounding public areas. The project is located in a highly-traveled tourist area and AMI worked closely with the City of Duluth, DECC and the current businesses located along the project site to meet the needs of all parties.



AMI performed emergency investigations and rehabilitation planning for multiple sections of the harbor wall and dockage. AMI provided all the design engineering for new dockwall structures to replace the old and failing timber dock wall. This design included site renderings, complete plan set and specs, cost estimating and demolition planning for the dockwalls and the surrounding tourist areas to minimize construction impacts on streets, the new steel sheet piling dock wall and tie back system utilized transfer plug and helical anchors. New bollards and their foundations were also designed to accommodate the facilities needs from vessel traffic, along with the design of a temporary vessel docking platform.

The rehabilitation included of a complete environmental investigation of the area behind the existing dockwall and building for demolition, all permitting for the site, electrical utility upgrades for the Irvin and Vista Cruises, corrosion protection and reinforcement panel system, wood boardwalk, asphalt trail, and concrete gathering space. AMI is also working in conjunction with MPCA/ EPA/ USACE for slip restoration and clean-up. This project is expected to be complete in 2019.

- Chad Scott is the Project Manager and Principal Engineer for this project.

Kinnickinnic River-Pulaski Park, Milwaukee, WI

Resolution Studio, LLC was part of a multidisciplinary team completing final design and engineering for the restoration of the Kinnickinnic River in Milwaukee. The project includes the removal of over 1,800 feet of deteriorating concrete channel through active and passive land managed by Milwaukee County Parks and the Milwaukee Metropolitan Sewerage District. Construction began in 2018.

Project goals include reducing flood risk, maintaining public access, enhancing trail systems, improving public safety, improving aquatic habitat within the stream, improving aesthetics of the channel, and leveraging additional community objectives.

The existing concrete channel was removed and replaced with a naturalized river channel that includes a base flow channel and a floodplain bench within the flood conveyance corridor. A multiuse trail was designed to provide continuous access through the site.



Approximately half of the channel restoration project will be revegetated with native wetland, wet meadow, and prairie vegetation. The remaining portion of the project will be restored to match the character of Pulaski Park.

Resolution Studio served as the lead Landscape Architect for the project, with tasks including spatial design, preparation of vegetation plans for channel restoration alternatives, development of construction documents, operations and maintenance manuals, plans and costs for vegetation, engineering services during construction, and post construction monitoring of vegetation establishment.



Ben Yahr, RLA was the principal Landscape Architect for this project.

Additional project information and abstracts can be provided upon request.

3.0 Proposed Work Plan

We believe that a good understanding of the existing conditions and close coordination with the City will be key elements to the project. The success of providing a successful project also depends on identifying the most efficient and economical construction methods, incorporate locally available materials, and including key local team members for the construction administration services.

In general terms, TRC's approach will be to rely on all completed work to date and the Coastal analysis, use the previously collected data (leveraged to the maximum extent), and our site knowledge. This previous experience will be supplemented by updated and/or check surveys; a Design Development phase to validate and refine the design elements; preparation of construction plans; and bidding and construction administration services, which are described in the next sections.

The project will have four main proposed tasks, as follows:

- Task 1: Study, Report and Coastal Analysis;
- Task 2: Design Development;
- Task 3: Final Design and Bidding Phase;
- Task 4: Construction Administration and Inspection Phase.

3.1 Task 1: Study, Report, and Coastal Analysis

A *Shoreline Assessment Study* report will be prepared to include:

- Documented conditions of the shoreline and land-based amenities in the five project areas (Canal Park, DECC Sidewalk and Bayfront Observation Deck, The Ledges, Lakewood Water Treatment Plant, and Western Waterfront Trail);

- Bathymetric, aerial and topographic surveys collected by the TRC Team in 2017/2018;
- Underwater investigation-Canal Park completed by the TRC Team in 2018;
- Soil sampling and geotechnical analysis;
- October 2018 storm quantified damages based on previous measurements and aerial survey DEM's (digital elevation models);
- Formulate alternatives to restore the shoreline to pre-storm conditions with construction cost estimates; and
- Recommendations based on identified priorities and a proposed schedule for project implementation, including construction timelines.

The TRC Team prepared a *Coastal Analysis Report* (February 12, 2019), which includes the following:

- Review of survey and underwater investigation findings;
- Water level analysis;
- Wave climate;
- Wave transformations-by standard desktop tools and 2-Dimensional computer model;
- Standard USACE methodology for stone revetment design (Hudson's equation), wave overtopping analysis (Van Der Meer and Besley equations);
- Evaluation of various design conditions and calculations for material sizes; selection of the 100-Year water level and 50-Year offshore wave as resilient project design condition; and
- Results and design requirements at various locations along the Canal Park and Lakewalk areas.

The TRC Team will perform a new bathymetric survey at the Lakewood Water Treatment Plant and The Ledges; a new aerial survey will be performed for the Ledges. The offshore waves will be transformed, and we will calculate the design near-shore wave height at these two locations, along with stone revetment design requirements (slope, armor stone sizes, crest elevation and width).

For the Western Waterfront Trail, a new topographic/aerial survey will be collected. We will use standard desktop procedures to calculate the maximum wave height based on the St. Louis River Estuary water depths and fetch (distance over open water), for various sustained design wind speeds.

The Coastal Report will be updated with the new collected data and analysis.

3.2 Task 2: Design Development

In the Design Development phase, we will conduct a Value Engineering study based on the Coastal analysis, materials search (TRC Team, 2018/2019) and field investigation findings. We will summarize alternatives with advantages and disadvantages and discuss them with the City for the selection of the final design alternative in each project area. The main items to address in this task are:

Canal Park

- Optimized revetment cross-section, slope, crest elevation and width;
- Concrete wall elevation;
- Stormwater analysis and design; and
- Public access points, overlooks, seating areas and site amenities.

DECC Sidewalk and Bayfront Observation Deck

- Design of scour protection and concrete repairs.

The Ledges

- Stone revetment details;
- Trail repairs; and
- Stone revetment anchoring to bedrock.

Lakewood Water Treatment Plant

- Extents of new stone revetment, and design details; and
- Protection of existing stormwater outfall.

Western Waterfront Trail

- Alternatives for shoreline restoration, including bio-engineering and vegetated slopes; and
- New access trail alignment and width.

The Design Development phase will include preparation of 50% and 75% plans with construction cost estimates. We will attend two (2) meetings with the City, to discuss project progress and items with input needed at the 50% and 75% document completion.

Preliminary quantities and construction cost estimates will be developed; the unit prices will be derived from our in-house database and recent regional bids and will include production, transportation, and placement of materials. We will assume land- or water-based construction, depending on the different project areas and work required.

We will also conduct a Constructability Study to identify marine (from a barge) versus land-based (from the revetment with choke stone causeway) construction, contractor staging, and phasing for Canal Park. A construction methodology (equipment, sequencing, site access, and staging) will be developed to provide a buildable design for all project areas. We will identify opportunities for Canal Park material offloading from a barge (such as using the north jetty for mooring and land-based material transfer). We will provide a summary of construction-related items such as: equipment requirements and current means of material placing. We expect that land-based construction will be used for all project areas (except Canal Park as discussed above). Up to four quarry site visits are included for material availability and quality documentation.

The TRC Team secured construction permits from MNDNR and USACE for Canal Park. Applications for permits will be prepared with supporting materials for the other project areas during the Design Development phase.

3.3 Task 3: Final Design and Bidding Phase

The TRC Team will develop 90% and 100% construction documents (two deliverables) ready for contractor bidding, to include the following:

- Construction drawing preparation with an updated and detailed Engineering Opinion of Probable Construction Cost;
- Prepare technical specifications and include supplementary contract conditions not part of the Construction Drawings or in the City of Duluth front end bid and construction documents. Also prepare a project description and bid sheet for the bid documents. We assume that the City of Duluth will provide the front-end construction contract documents. We will review these documents to help develop our Plans and Specifications to be compatible;
- Bid ready sealed plans and specifications;
- Contractor Request for Clarification (RFC);
- Preparation of Addenda if needed;
- Attendance at mandatory pre-bid meeting;
- Attendance at bid opening; and
- Evaluation of the bids and written recommendation for contract award.

3.4 Task 4: Construction Administration and Inspection Phase

We assume that the five sites will have the following construction durations and man-hours:

- Canal Park: 26 weeks; we are budgeting 40 hours in the field and 8 hours in the office, for a total of 1,248 man-hours;
- DECC Sidewalk and Bayfront Observation Deck: 2 weeks; 40 hours in the field and 8 hours in the office, for a total of 96 man-hours;
- The Ledges: 4 weeks; 40 hours in the field and 8 hours in the office, for a total of 192 man-hours;
- Lakewood Water Treatment Plant: 3 weeks; 40 hours in the field and 8 hours in the office, total of 144 man-hours; and
- Western Waterfront Trail: 4 weeks; 40 hours in the field and 8 hours in the office, for a total of 192 man-hours.

The TRC Team will provide the following field and office construction administration services:

- Conduct a pre-construction meeting for each site;
- Inspect test sections built by contractor for construction drawings conformance;

- Provide responses and clarifications to Contractor questions;
- Evaluate Contractor request for Charge Orders;
- Preparation of Change Orders, if approved;
- Full time observation of the Work (as described in greater details above per site) for contractor performance oversight, measurement of materials quantities placed, and in-office of review contractor submittals, pay application and change order requests and respond to clarification questions;
- Weekly construction progress report, 2 hours per week;
- Review and recommendation of approval or denial of the Contractor's Requests for Payment;
- The performance of a walk-through and preparation of a punch list upon the Contractor's request for a determination of Substantial Completion;
- A determination of completion and recommendation for final payment upon satisfaction of the project punch list and completion of all Work; and
- Project close-out and As-Built plans.

4.0 Assumptions

The following is a list of assumptions used in the preparation of this proposal:

- Some soil borings were performed under separate direct contract with the City in 2017/2018. Five additional borings will be completed in 2019 under separate contract with the City, with three borings at Canal Park, two south of Vietnam Memorial locations, each to a minimum depth of 30 feet below ground; the results of the borings will be available to the TRC Team;
- Boundary or legal surveys are not required;
- Public coordination and presentations/meetings with the public are not required;
- The City will provide official public notice and coordinate with stakeholders for the projects;
- Coordination meetings with the City personnel and State/Federal agencies will be local in Duluth; and
- Permitting fees will be paid separately by the City of Duluth.

5.0 References

We are providing the following references, with additional information available upon request.

1. Project: City of Duluth Shoreline Rehabilitation, Phase I and Phase II

Michael LeBeau

Construction and Energy Project Supervisor, City of Duluth Property and Facilities Management

1532 West Michigan Street, Duluth MN 55806

T: 218.730.4434 (o), 218.340.0221 (m).

E: mlebeau@duluthmn.gov

2. **Project: City of Duluth DECC Dockwall**
Erik Birkeland
Manager, City of Duluth Property and Facilities Management
1532 West Michigan Street, Duluth MN 55806
T: 218.730.4430 (o)
E: ebirkeland@duluthmn.gov

3. **Project: Superior, WI Shoreline FEMA Repairs**
Todd Janigo
Director, City of Superior Public Works
1316 N 14th St #210, Superior, WI 54880
T: 715.395.7373 (o)
E: harkera@ci.superior.wi.us

4. **Project: St. Paul Port Authority (SPPA) FEMA Repairs**
Kathryn Sarnecki, PE
Vice President of Redevelopment and Harbor Management
380 St. Peter Street, Suite 850, St. Paul MN 55102
T: 651.204.6221 (o)
E: KLS@sppa.com

5. **Project: MnDOT Duluth Outfalls Re-Design**
David Mohar, PE
MNDOT Hydraulics Engineer
1123 Mesaba Avenue, Duluth MN 55811
T: 218.725.2796 (o)
E: David.mohar@state.mn.us

6. **Project: Racine Harbor Studies**
Nathan Plunkett
Racine County Engineer
14200 Washington Avenue, Sturtevant, WI 53177
T: 262.886.8442 (o)
E: Nathan.plunkett@racinecounty.com

6.0 Schedule

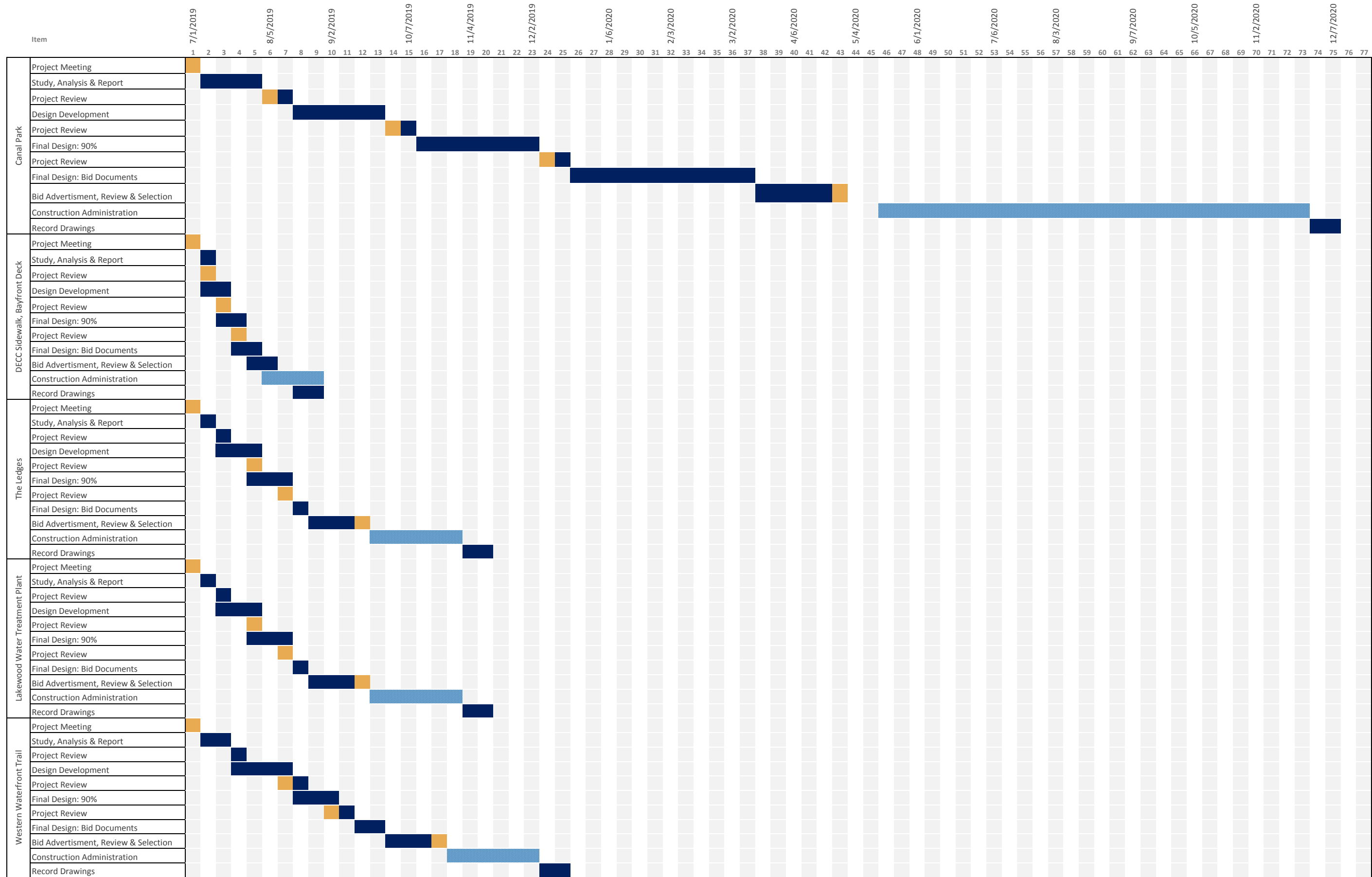
The following represents a draft schedule, assuming that:

- The regulatory permitting, Design Development, preparation of construction plans, bidding and construction administration for DECC Sidewalk and Bayfront Observation Deck, The Ledges, Lakewood Water Treatment Plant, and the Western Waterfront Tail can be completed in 2019;

- The Design Development for Canal Park can be completed in 2019, while the preparation of construction plans, bidding and construction administration will be completed in 2020.

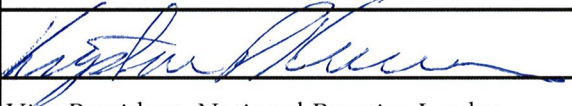
We can also accommodate an accelerated schedule based on our staff availability and will coordinate with the City of Duluth as needed to expedite the completion of the main tasks presented below. There are some unknowns regarding regulatory permitting. We will update the City if there are any delays to our anticipated schedule.

October 20178 Storm Damages RFP 19-99347 Draft Proposed Schedule



Appendix A
Signed Cover Sheet

**APPENDIX A - PROPOSAL COVER SHEET
CITY OF DULUTH
RFP# 19-99347**

Bidder Information:	
Bidder Name	TRC Environmental Corporation
Mailing Address	230 W. Monroe St., Ste. 630, Chicago, IL 60606
Contact Person	Dan Veriotti, PE
Contact Person's Phone Number	312-800-5916 (o) 312-203-4125
Contact Person's E-Mail Address	dveriotti@trccompanies.com
Federal ID Number	06-0861618
Authorized Signature	
Title	Vice President, National Practice Leader



230 W. Monroe Street
Suite 630
Chicago, IL 60606

May 30, 2019

City of Duluth
ATTN: Purchasing Division
City Hall, Room 120
411 West 1st Street
Duluth, MN 55802

**Subject: COST Proposal for Engineering Services – October 2018 Storm Damages Including Lakewalk and Shoreline, RFP Number 19-99347
TRC Proposal No. 343356.9990.0000**

Attn: City of Duluth Representatives

We are pleased to submit this cost proposal *for Engineering Services, October 2018 Storm Damages Including Lakewalk and Shoreline, RFP Number 19-99347.*

Our team will complete all services described in this proposal for a lump sum of \$575,571.00, including all direct work and expenses. Our proposal fees are detailed in the attached table and includes:

- 4,097 man-hours, with 1,872 construction administration man-hours (field and office);
- A total of 13.4% of the contract value for Resolution Studio, a Federal registered Small Business.

Please note that our proposed fees represent 3.8% of the total estimated minimum reference of \$15,000,000 construction costs for the five areas included in the project.

We appreciate the opportunity to submit this proposal and to continue working with you. You can reach us via the phone numbers provided below.

Sincerely,

TRC

A handwritten signature in blue ink, appearing to read "D. Veriotti".

Dan Veriotti, MSc, PE
Chicago Principal Engineer
312.800.5916

A handwritten signature in blue ink, appearing to read "Kristopher Krause".

Kristopher Krause, PE
Vice President, National Practice Leader
608.826.3637

	Veriotti PM, Principal	Scott Weyandt Senior Civil Eng.	Brian Iwanicki Civil Eng.	Roberta Hendriksen Administrative		Zac Morris Engineer II	Mat Burich Engineer I	Brady Korwin Surveyor	Chad Scott Principal	Seth Johnson Permit Specialist		Ben Yahr Land. Arch.
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		TRC Team																				Travel	Eq. Rental, Misc.	Total		Total			
Line	I: SITE ASSESSMENT	Labor Hours	Labor Rate 188.00	Labor Hours	Labor Rate 137.50	Labor Hours	Labor Rate 121.00	Labor Hours	Labor Rate 89.00	Labor Hours	Labor Rate 137.50	Labor Hours	Labor Rate 115.50	Labor Hours	Labor Rate 165.00	Labor Hours	Labor Rate 231.00	Labor Hours	Labor Rate 126.50	Labor Hours	Labor Rate 115.50	Direct Costs	Direct Costs		Total Labor Hours	Expenses	Total Labor Cost Plus Expenses		
CANAL PARK (28 weeks constr.)	Site visits, design meetings, management	48	\$ 9,024.00		\$ -	1	\$ 121.00	10	\$ 890.00	32	\$ 4,400.00	8	\$ 924.00		\$ -	4	\$ 924.00		\$ -	24	\$ 2,772.00				127	\$ 1,254	\$ 20,309.00		
	Study, data collection, post processing	40	\$ 7,520.00		\$ -	8	\$ 968.00		\$ -		\$ -	16	\$ 1,848.00	16	\$ 2,640.00		\$ -		\$ -	24	\$ 2,772.00				104	\$ -	\$ 15,748.00		
	Design Development 50%, 75%	40	\$ 7,520.00		\$ -	40	\$ 4,840.00		\$ -	12	\$ 1,650.00	48	\$ 5,544.00		\$ -	2	\$ 462.00		\$ -	60	\$ 6,930.00				202	\$ -	\$ 26,946.00		
	90%, 100% Plans and Estimates	40	\$ 7,520.00		\$ -	40	\$ 4,840.00		\$ -	12	\$ 1,650.00	48	\$ 5,544.00		\$ -	2	\$ 462.00		\$ -	120	\$ 13,860.00				262	\$ -	\$ 33,876.00		
	Bidding Services	40	\$ 7,520.00		\$ -	16	\$ 1,936.00		\$ -	16	\$ 2,200.00		\$ -		\$ -	2	\$ 462.00		\$ -	16	\$ 1,848.00				90	\$ -	\$ 13,966.00		
	Construction Administration	244	\$ 45,872.00	208	\$ 28,600.00		\$ -		\$ -	260	\$ 35,750.00	520	\$ 60,060.00		\$ -		\$ -		\$ -	16	\$ 1,848.00				1,248	\$ -	\$ 172,130.00		
	Record Drawings	1	\$ 188.00		\$ -	8	\$ 968.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	48	\$ 5,544.00				57	\$ 660	\$ 7,360.00		
	Quarry Visits	8	\$ 1,504.00		\$ -		\$ -		\$ -	16	\$ 2,200.00	4	\$ 462.00		\$ -		\$ -		\$ -		\$ -				28	\$ -	\$ 4,166.00		
	Stormwater Calcs and Design	30	\$ 5,640.00		\$ -	40	\$ 4,840.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -				70	\$ -	\$ 10,480.00		
			\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -					-	\$ -	\$ -	
1	Sub-Total	491	\$ 92,308.00	208	\$ 28,600.00	153	\$ 18,513.00	10	\$ 890.00	348	\$ 47,850.00	644	\$ 74,382.00	16	\$ 2,640.00	10	\$ 2,310.00	0	\$ -	308	\$ 35,574.00	\$ -	\$ -	\$ -	2188	\$ 1,914.00	\$ 304,981.0		
II: REPAIR ALTERNATIVES																													
THE LEDGES (4 weeks constr.)	Site visits, design meetings, management	24	\$ 4,512.00		\$ -		\$ -	10	\$ 890.00	16	\$ 2,200.00	8	\$ 924.00		\$ -	2	\$ 462.00		\$ -	12	\$ 1,386.00				72	\$ 627	\$ 11,001.00		
	Study, data collection, post processing	24	\$ 4,512.00		\$ -		\$ -		\$ -		\$ -	4	\$ 462.00	6	\$ 990.00		\$ -		\$ -	36	\$ 4,158.00				70	\$ -	\$ 10,122.00		
	DD 75% Plans and Estimates	20	\$ 3,760.00		\$ -	24	\$ 2,904.00		\$ -	8	\$ 1,100.00	24	\$ 2,772.00		\$ -		\$ -		\$ -	16	\$ 1,848.00				92	\$ -	\$ 12,384.00		
	90%, Final Plans and Estimates	20	\$ 3,760.00		\$ -	24	\$ 2,904.00		\$ -	8	\$ 1,100.00	24	\$ 2,772.00		\$ -	2	\$ 462.00		\$ -	40	\$ 4,620.00				118	\$ -	\$ 15,618.00		
	Bidding Services	8	\$ 1,504.00		\$ -	16	\$ 1,936.00		\$ -	8	\$ 1,100.00	4	\$ 462.00		\$ -		\$ -		\$ -	4	\$ 462.00				40	\$ -	\$ 5,464.00		
	Construction Administration	48	\$ 9,024.00	32	\$ 4,400.00		\$ -		\$ -	40	\$ 5,500.00	80	\$ 9,240.00		\$ -		\$ -		\$ -	8	\$ 924.00				208	\$ -	\$ 29,088.00		
	Permitting		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	24	\$ 3,036.00		\$ -			24	\$ -	\$ 3,036.00			
	Record Drawings		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	8	\$ 924.00				8	\$ 220	\$ 1,144.00		
	2	Sub-Total	144	\$ 27,072	32	\$ 4,400	64	\$ 7,744	10	\$ 890	80	\$ 11,000	144	\$ 16,632	6	\$ 990	4	\$ 924	24	\$ 3,036	124	\$ 14,322	0	\$ -	\$ -	632	\$ 847	\$ 87,857.0	
LAKEWOOD (3 weeks constr.)	Site visits, design meetings, management	24	\$ 4,512.00		\$ -		\$ -	10	\$ 890.00	8	\$ 1,100.00	4	\$ 462.00		\$ -		\$ -		\$ -	12	\$ 1,386.00				58	\$ 627	\$ 9,977.00		
	Study, data collection, post processing	24	\$ 4,512.00		\$ -	24	\$ 2,904.00		\$ -		\$ -	4	\$ 462.00	16	\$ 2,640.00		\$ -		\$ -		\$ -			68	\$ -	\$ 10,518.00			
	DD 75% Plans and Estimates	20	\$ 3,760.00		\$ -	24	\$ 2,904.00		\$ -	8	\$ 1,100.00		\$ -		\$ -		\$ -		\$ -	16	\$ 1,848.00				68	\$ -	\$ 9,612.00		
	90%, Final Plans and Estimates	20	\$ 3,760.00		\$ -	15	\$ 1,825.8		\$ -	8	\$ 1,100.00		\$ -		\$ -	2	\$ 462.00		\$ -	32	\$ 3,696.00				77	\$ -	\$ 10,843.77		
	Bidding Services	8	\$ 1,504.00		\$ -		\$ -		\$ -	4	\$ 550.00		\$ -		\$ -		\$ -		\$ -	4	\$ 462.00				16	\$ -	\$ 2,516.00		
	Construction Administration	38	\$ 7,144.00	24	\$ 3,300.00		\$ -		\$ -	30	\$ 4,125.00	60	\$ 6,930.00		\$ -		\$ -		\$ -		\$ -			152	\$ -	\$ 21,499.00			
	Permitting		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	24	\$ 3,036.00		\$ -			24	\$ -	\$ 3,036.00			
	Record Drawings		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	8	\$ 924.00				8	\$ 825	\$ 1,749.00		
	3	Sub-Total	134	\$ 25,192	24	\$ 3,300	63	\$ 7,634	10	\$ 890	58	\$ 7,975	68	\$ 7,854	16	\$ 2,640	2	\$ 462	24	\$ 3,036	72	\$ 8,316	0	\$ -	\$ -	471	\$ 1,452	\$ 68,750.8	
TRAIL (4 weeks constr.)	Site visits, design meetings, management	24	\$ 4,512.00		\$ -		\$ -	10	\$ 890.00	8	\$ 1,100.00	4	\$ 462.00		\$ -		\$ -		\$ -	24	\$ 2,772.00				70	\$ 627	\$ 10,363.00		
	Study, data collection, post processing	16	\$ 3,008.00		\$ -		\$ -		\$ -		\$ -	4	\$ 462.00	6	\$ 990.00		\$ -		\$ -	40	\$ 4,620.00				66	\$ -	\$ 9,080.00		
	DD 75% Plans and Estimates	20	\$ 3,760.00		\$ -		\$ -		\$ -	8	\$ 1,100.00		\$ -		\$ -	2	\$ 462.00		\$ -	50	\$ 5,775.00				80	\$ -	\$ 11,097.00		
	90%, Final Plans and Estimates	16	\$ 3,008.00		\$ -		\$ -		\$ -	8	\$ 1,100.00		\$ -		\$ -		\$ -		\$ -	60	\$ 6,930.00				84	\$ -	\$ 11,038.00		
	Bidding Services	8	\$ 1,504.00		\$ -		\$ -		\$ -	4	\$ 550.00		\$ -		\$ -		\$ -		\$ -	8	\$ 924.00				20	\$ -	\$ 2,978.00		
	Construction Administration	44	\$ 8,272.00	32	\$ 4,400.00		\$ -		\$ -	32	\$ 4,400.00	64	\$ 7,392.00		\$ -		\$ -		\$ -	20	\$ 2,310.00				192	\$ -	\$ 26,774.00		
	Permitting	4	\$ 752.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	24	\$ 3,036.00		\$ -			28	\$ -	\$ 3,788.00			
	Record Drawings	8	\$ 1,504.00		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	16	\$ 1,848.00				24	\$ 660	\$ 4,012.00		
	4	Sub-Total	140	\$ 26,320	32	\$ 4,400	0	\$ 0	10	\$ 890	60	\$ 8,250	72	\$ 8,316	6	\$ 990	2	\$ 462	24	\$ 3,036	218	\$ 25,179	0	\$ -	\$ -	564	\$ 1,287	\$ 79,130.00	
DESC (2 weeks constr.)	Site visits, design meetings, management	24	\$ 4,512.00		\$ -		\$ -	10	\$ 890.00	8	\$ 1,100.00	4	\$ 462.00		\$ -		\$ -		\$ -		\$ -				46	\$ 627	\$ 7,591.00		
	Study, data collection, post processing		\$ -		\$ -		\$ -		\$ -		\$ -	4	\$ 462.00	6	\$ 990.00		\$ -		\$ -		\$ -				10	\$ -	\$ 1,452.00		
	DD 75% Plans and Estimates		\$ -		\$ -		\$ -		\$ -	8	\$ 1,100.00	16	\$ 1,848.00		\$ -	2	\$ 462.00		\$ -		\$ -				26	\$ -	\$ 3,410.00		
	90%, Final Plans and Estimates		\$ -		\$ -		\$ -		\$ -	8	\$ 1,100.00	16	\$ 1,848.00		\$ -		\$ -		\$ -		\$ -				24	\$ -	\$ 2,948.00		
	Bidding Services		\$ -		\$ -		\$ -		\$ -	4	\$ 550.00		\$ -		\$ -		\$ -		\$ -		\$ -				4	\$ -	\$ 550.00		
	Construction Administration	36	\$ 6,768.00		\$ -		\$ -		\$ -	20	\$ 2,750.00	40	\$ 4,620.00		\$ -		\$ -		\$ -		\$ -				96	\$ -	\$ 14,138.00		
	Permitting		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -		\$ -	24	\$ 3,036.00		\$ -			24	\$ -	\$ 3,036.00			
	Record Drawings		\$ -		\$ -		\$ -		\$ -	2	\$ 275.00	4	\$ 462.00	6	\$ 990.00		\$ -		\$ -		\$ -			12	\$ -	\$ 1,727.00			
	5	Sub-Total	60	\$ 11,280	0	\$ 0	0	\$ 0	10	\$ 890	50	\$ 6,875	84	\$ 9,702	12	\$ 1,980	2	\$ 462	24	\$ 3,036	0	\$ 0	0	\$ -	\$ -	242	\$ 627	\$ 34,852.00	
PROJECT TOTAL (Add lines 1-13)		969	\$ 182,172.00	296	\$ 40,700.00	280.089	\$ 33,890.77	50	\$ 4,450.00	596	\$ 81,950.00	1012	\$ 116,886.00	56	\$ 9,240.00	20	\$ 4,620.00	96	\$ 12,144.00	722	\$ 83,391.00	0	\$ -	\$ -	4,097	\$ 6,127	\$ 575,571		
																								TOTAL MAN-HOURS		4,097			
																								Project Total		\$ 575,571			