

# ATTACHMENT F

## CONTRACT FOR DESIGNER SERVICES AMENDMENT NO. 7

**WHEREAS**, the Town of Belmont (“Owner”) and Perkins+Will, (the “Designer”) (collectively, the “Parties”) entered into a Contract for Designer Services for the Belmont High School 153003.001 at the Belmont High School on August 2, 2018 “Contract”; and

**WHEREAS**, effective as of March 5, 2021 the Parties wish to amend the Contract:

**NOW, THEREFORE**, in consideration of the promises and the mutual covenants contained in this Amendment, and other good and valuable consideration, the receipt and legal sufficiency of which are hereby acknowledged, the Parties, intending to be legally bound, hereby agree as follows:

1. The Owner hereby authorizes the Designer to perform the following additional services in accordance with Article 8:

- Proposed Service: Preparation of documents and implementation of additional building scope including a Loading Dock Canopy and Slab Heat Rejection system.  
Proposed Additional Fee: **\$22,990**
- Proposed Service: Production of additional Early Bid Packages not in original design and construction schedule; including Early Bid Package #5 for Geothermal/Civil, and Early Bid Package #6 for Building Radiant Phase 1.  
Proposed Additional Fee: **\$14,400**
- Proposed Service: Overseeing of the installation of geothermal test wells to understand existing ground conditions, and geothermal construction administration.  
Proposed Additional Fee: **\$180,400**
- Proposed Service: Request by Owner to add additional staff in order to keep up with demands of the CM for answers to RFIs and Submittals as a result of Skanska’s request to accelerate purchasing in light of anticipated supply chain issues due to Covid-19  
Proposed Additional Fee: **\$108,800**
- Proposed Service: Revisions to introduce mountable curbs at Concord Ave and Hittinger St.  
**Proposed Additional Fee: \$1,815**

2. For the performance of services required under the Contract, as amended, the Designer shall be compensated by the Owner in accordance with the following Fee for Additional Services:

### **Fee for Basic Services:**

<u>Fee For Basic Services</u>	<u>Original Contract</u>	<u>Previous Amendments</u>	<u>Amount of This Amendment</u>	<u>After This Amendment</u>
Feasibility Study Phase	\$500,000	0	0	\$500,000
FAS Other Expenses		\$25,000		\$25,000

Schematic Design Phase	\$650,000		0	\$650,000
Design Development Phase	0	\$4,390,000	0	\$4,390,000
Construction Doc Phase	0	\$7,902,000	0	\$7,902,000
Bidding Phase	0	\$1,756,000	0	\$1,756,000
Construction Phase	0	\$6,093,500	0	\$6,093,500
Completion Phase	0	\$658,500	0	\$658,500
<b>Total Basic Services Fee</b>	<b>\$1,150,000</b>	<b>\$20,825,000</b>	<b><u>0</u></b>	<b><u>\$21,975,000</u></b>

<b><u>Fee For Additional Service Allowances</u></b>	<b><u>Original Contract</u></b>	<b><u>Previous Amendments</u></b>	<b><u>Amount of This Amendment</u></b>	<b><u>After This Amendment</u></b>
Monitoring Removal of Hazardous Materials	0	\$275,000	0	\$275,000
Printing of Bid Documents and Record Documents over Base	0	\$45,000	0	\$45,000
Consultant Additional Service Contingency	0	0	0	0
Test Well Installation and Testing	0	\$84,700	0	\$84,700
Off Site Traffic Impact	0	\$36,878	0	\$36,878
Top Soil Testing	0	\$3,740	0	\$3,740
Ice Rink Design Study	0	\$15,000	0	\$15,000
Traffic Signalization	0	\$49,950	0	\$49,950
LEED Registration	0	\$1,200	0	\$1,200
Addition Surveys	0	\$8,525	0	\$8,525
LEED Submission Fees	0	\$26,706	0	\$26,706
IAQ Study	0	\$47,680	0	\$47,680
Orchestra Pit Structure	0	\$18,400	0	\$18,400
Orchestra Pit Final Design	0	\$23,470	0	\$23,470

## amendment #8

Loading Dock Canopy & Slab Heat Rejection	0	0	\$22,990	\$22,990
Additional Early Bid Packages	0	0	\$14,400	\$14,400
Geothermal Test Well & Construction Admin	0	0	\$180,400	\$180,400
Accelerated CA Review	0	0	\$108,800	\$108,800
Concord Ave Curbs	0	0	\$1,815	\$1,815
<hr/>				
Total Additional Services Fee	0	\$636,249	\$328,405	\$964,654

**\$219,605**

This Amendment is a result of:

- The request by Owner to design, document, and administer construction of a Loading Dock Canopy as well as a Slab Heat Rejection System that will provide snow melt at High School Entry, Loading Dock, and Middle School Entry.
- The request by Owner for additional Early Bid Packages not in original design and construction schedule. Cost for expediting coordination in the middle of Construction Document phase, as well as additional documentation and bidding processes. Including Early Bid Package #5 for Geothermal/Civil, and Early Bid Package #6 for Building Radiant Phase 1.
- The overseeing of the installation of geothermal test wells to understand existing ground conditions, and construction administration of geothermal well field installation; both of which are not included as part of Basic Services.
- The Owner requested that Perkins&Will add additional staff in order to keep up with the demands of the CM for answers to RFIs and Submittals as a result of Skanska's request to accelerate purchasing in light of anticipated supply chain issues due to Covid-19.
- The request by owner during Construction Administration for revisions to introduce mountable curbs at Concord Ave and Hittinger St.

3. The Construction Budget shall be as follows:

Original Budget:	<u>\$ N/A</u>
Amended Budget	<u>\$236,647,607</u>

4. The Project Schedule shall be as follows:

Original Schedule:	\$ N/A
Amended Schedule	<u>\$ Substantial Completion August 2023</u>

5. This Amendment contains all of the terms and conditions agreed upon by the Parties as amendments to the original Contract. No other understandings or representations, oral or otherwise, regarding amendments to the original Contract shall be deemed to exist or bind the Parties, and all other terms and conditions of the Contract remain in full force and effect.

IN WITNESS WHEREOF, the Owner, with the prior approval of the Authority, and the Designer have caused this Amendment to be executed by their respective authorized officers.

**OWNER**

William Lovallo  
(print name)  
Chairman, Belmont High School Building Committee  
(print title)

By \_\_\_\_\_  
(signature)

Date \_\_\_\_\_

**DESIGNER**

\_\_\_\_\_  
(print name)

\_\_\_\_\_  
(print title)

By \_\_\_\_\_  
(signature)

Date \_\_\_\_\_

**Certification of Available Funding:**

\_\_\_\_\_  
(signature)

\_\_\_\_\_  
(date)

\_\_\_\_\_  
(print name)

\_\_\_\_\_  
(print title)



February 26, 2021

William Lovallo, Chair  
Pat Brusch, Vice Chair  
Belmont Middle and High School Building  
Committee  
19 Moore Street  
Belmont, Ma 02478

**RE: Perkins & Will Contract Amendment #5**

Dear Bill and Pat:

Daedalus Projects / CHA has evaluated the additional fees requested in the Perkins & Will letter dated 5/29/20 (copy attached) and has the following recommendations:

- 1) *Survey Work at Concord Ave and MBTA: \$8,525*  
Previously approved by the Building Committee
  
- 2) *Additional Bid Alternates: \$45,140 not recommended (Loading Dock canopy and Slab Heat Rejection recommended \$5,760+\$4,800+\$7,000+\$4,300+ \$ 1130 = \$22,990 recommended for approval)*  
Partially recommended. This work was necessitated by the estimated cost of the work exceeding the budget for the project and was necessary in order to bring the project back closer to the budget. The Loading Dock Canopy and the Slab Heat rejection were requested late from the Facilities Director and approved by the committee as added scope.
  
- 3) *Additional Early bid Packages \$14,400*  
Recommended for approval. The early bid packages for Geothermal and Radiant flooring were not anticipated when the original contract terms and bid packages were discussed.
  
- 4) *Orchestra Pit Structure: \$18,400*  
Previously approved by the Building Committee.
  
- 5) *Geothermal Test Wells: \$298,640 not recommended (\$48,500 + \$ 115,500 + \$16,400 = \$180,400 recommended for approval)*  
Partially recommended. We believe that the design work and performed by CDM Smith was part of the Basic Services of the Contract and was anticipated to be part of the scope of work. I have spoken to other Architects in the MSBA program working on net-zero buildings and these services are part of base services in those cases.

However, we believe that the construction monitoring services by CDM Smith falls outside of the base services and therefore we recommend payment of these charges as additional services.

6) *Accelerated CA Review: \$108,800*

Recommended for payment. The Owner requested that P&W add additional staff in order to keep up with the demands of the CM for answers to RFIs and Submittals as a result of Skanska's request to accelerate purchasing in light of anticipated supply chain issues due to Covid-19.

7) *Concord Ave LOW: \$1,815*

Recommended for approval as additional work

8) LEED Submission Fees: \$26,706

Previously approved by the Building Committee.

We recommend that P&W contract be amended by an additional \$328,405 for items: 2(partial), 3, 5(partial), 6, 7.



Sincerely,

A handwritten signature in blue ink, appearing to read "Thomas G. Gatzunis", written over a light blue horizontal line.

Thomas G. Gatzunis  
Section Manager

Enclosure 1

5.29.2020

**Shane Nolan**

Daedalus Projects Incorporated  
 1 Faneuil Hall Marketplace South Floor 3  
 Boston, MA 02109

**Re: Contract Amendment #5**

Dear Shane,

The following is a summary of additional services and reimbursable expenses for the Belmont Middle & High School project since the last contract amendment. Once you have had a chance to review, please let us setup a time to discuss. Thank you.

**FEES FOR ADDITIONAL SERVICES**

**Survey Work at Concord Ave. & MBTA Line**

Additional survey work outside of project boundary at the intersection of Concord Ave and Goden St needed in order to design intersection and drainage. The need for additional survey work along MBTA tracks to design retaining wall behind existing school.

Description	Cost	Notes
Samiotes - Concord Ave Intersection	\$2,000	See attached Samiotes Proposal
Samiotes - MBTA Right of Way	\$5,750	See attached Samiotes Proposal
Consultant Subtotal	\$7,750	
P&W Markup	\$775	10%
<b>Total Cost</b>	<b>\$8,525</b>	

**Additional Bid Alternates**

Request by the Owner for the preparation of documents and implementation of additional Bid Alternates at the very end of Construction Documents. As discussed at the time, work for Bid Alternates approved after Bidding would be billed as an additional service given the late request for addition of scope of work not previously anticipated.

Description	Cost	Notes
Perkins&Will - Skylights	\$2,400	
Perkins&Will - Loading Dock Canopy	\$5,760	
Perkins&Will - Slab Heat Rejection	\$4,800	
Perkins&Will - Tile at Stairs	\$14,400	
Perkins&Will - Maker Space Glazing	\$4,800	
EDG - Skylights	\$500	See attached EDG proposal
EDG - Loading Dock Canopy	\$7,000	See attached EDG proposal
BALA - Slab Heat Rejection	\$4,300	See attached Bala proposal
Consultant Subtotal	\$11,800	
P&W Markup	\$1,180	10%
<b>Total Cost</b>	<b>\$45,140</b>	

**Additional Early Bid Packages**

The request for additional Early Bid Packages not in original design and construction schedule. Cost for expediting coordination in the middle of Construction Document phase, as well as additional documentation and bidding processes.

Description	Cost	Notes
EBP 5 - Goethermal / Civil	\$7,200	
EBP 6 - Building Radiant Phase 1	\$7,200	
<b>Total Cost</b>	<b>\$14,400</b>	

5.29.2020  
 Contract  
 Amendment #5

**Orchestra Pit Structure (does not include final design)**

Request by the Owner to design, document, and administor construction of structure required for potential future orchestra pit. Required preliminary investigation of several design options, and redesign of seating at front of stage in order to be able to accomodate potential orchestra pit.

Description	Cost	Notes
Perkins & Will	\$9,600	
EDG - Orchestra Pit	\$8,000	See attached EDG proposal
Consultant Subtotal	\$8,000	
P&W Markup	\$800	10%
<b>Total Cost</b>	<b>\$18,400</b>	

**Geothermal Test Well Installation, Design, and Construction Administration**

The cost for oversight of the installation of geothermal test wells to understand existing ground conditions; which was not included in Addendum #3. Cost for geothermal design and construction administration which is not included as part of Basic Services.

Description	Cost	Notes
CDM Smith - Test Well Oversight	\$48,500	See attached CDM Smith Proposal
CDM Smith - Design Services	\$107,500	See attached CDM Smith Proposal
CDM Smith - Construction Services	\$115,500	See attached CDM Smith Proposal
Consultant Subtotal	\$271,500	
P&W Markup	\$27,150	10%
<b>Total Cost</b>	<b>\$298,650</b>	

**Accelerated CA Review & Coordination**

The Owner requested that Perkins&Will add additional staff in order to keep up with the demands of the CM for answers to RFI's and Submittals as a result of Skanska's request to accelerate purchasing in light of anticipated supply chain issues due to Covid-19.

Description	Cost	Notes
Perkins & Will	\$108,800	1 Staff for 4 months; 1.5 staff for 3 months
<b>Total Cost</b>	<b>\$108,800</b>	

**Concord Ave L.O.W and Curbs**

Revision to introduce mountable curbs at Concord Ave and Hittinger St.

Description	Cost	Notes
Warner Larson - Landscap Design	\$1,650	See attached WL proposal
Consultant Subtotal	\$1,650	
P&W Markup	\$165	10%
<b>Total Cost</b>	<b>\$1,815</b>	

**ADDITIONAL REIMBURSABLE EXPENSE ALLOWANCE**

**LEED Submission Fees Reibursable Expense**

Reimbursable for LEED Design Submission and LEED Construction Submission Fees.

Description	Cost	Notes
LEED Design Submission Fee	\$20,030	See attached LEED Online Payment Invoice
LEED Construction Submission Fee	\$6,677	See attached LEED Online Payment Invoice
<b>Total Cost</b>	<b>\$26,706</b>	

Sincerely,



**Vital Albuquerque**  
 AIA, LEED BD+C





April 8, 2020

Via email only to [brooke.trivas@perkinswill.com](mailto:brooke.trivas@perkinswill.com)

Revised May 19, 2020

Brooke Trivas  
Associate Principal  
Perkins + Will  
225 Franklin Street, Suite 1100  
Boston, MA 02110

**Re: Belmont Middle and High School – Additional Services  
Belmont, Massachusetts  
Engineering Services Proposal – Orchestra Pit, Skylights and Loading dock Canopy  
EDG Project Number: 2017-066.AS.1**

Dear Brooke:

As stipulated in our base proposal on this project, we are requesting additional compensation for structural services outside of our originally proposed scope of work.

***SCOPE OF WORK/ PROPOSED FEE***

We understand our scope of services to be the following:

- Structural design of Orchestra Pit which was added after the early packages were released. The scope included design and detailing of the slabs grade beams and analysis of the loads on the mini piles which were located prior to addition of the orchestra pit.
- Structural design of the roof framing for the proposed skylights which were deleted in the base bid for the project.
- Structural design and detailing of adding a cantilevered canopy above the Loading Dock
- Review of Shop Drawings.
- Responses to questions from the Contractors during Construction.
- Visits to the site to review Construction progress.

We propose performing these services for a fixed fee of \$15,500.00 (Fifteen Thousand and Five Hundred) apportioned as follows for each item as follows:

- Orchestra Pit \$ 8,000.00 (Eight thousand Dollars)
- Skylights \$500.00 (Five Hundred Dollars)
- Loading Dock Canopy \$7,000.00 (Seven thousand Dollars)

**CONDITIONS**

Billing for services on the project will be based on the percentage of documents complete.

Any additional services required, unless otherwise negotiated, will be billed on an hourly basis at the rate of 2.5 times Direct Personnel Expense.

Payment of invoices is due 30 days from receipt of invoice. Overdue invoices will be subject to applicable interest charges.

**INSURANCE AND LIABILITY**

Engineers Design Group, Inc. is protected by Workers’ Compensation Insurance, General Public Liability Insurance, Automobile Insurance and Professional Liability Insurance. We will furnish information and certificates upon request.

Any additional insurance coverage required in excess of that normally carried by Engineer and requested by Client is considered a reimbursable expense.

The total, aggregate liability of Engineers Design Group, Inc. for all claims of the Client, consultants and all construction contractors and subcontractors on the project for any and all damages and costs arising from professional acts, errors or omissions, for which Engineers Design Group, Inc. is determined to be legally liable shall be limited to Engineers Design Group, Inc.’s total fee for the services rendered on this project.

If the above scope of work and fee schedule is acceptable to you, please return a signed copy of this proposal to our office.

We look forward to working with you on this project. If you have any questions, please do not hesitate to contact me.

Very truly yours,  
**ENGINEERS DESIGN GROUP, INC.**

Mehul V. Dhruv, P. E.  
Principal

**Accepted** \_\_\_\_\_

**Date** \_\_\_\_\_

/tmd

Copy: Vital Albuquerque *via email only to* [Vtial.Albuquerque@perkinswill.com](mailto:Vtial.Albuquerque@perkinswill.com)





April 7, 2020

Mr. Vital Albuquerque, AIA, LEED BD+C  
Project Manager, Senior Associate  
Perkins + Will  
225 Franklin Street  
Boston, MA 02110

Re: Belmont Middle and High School  
Entry and Loading Dock Radiant Piping Systems  
Project No. 60-17-427  
Additional Service Request # 01

Dear Mr. Albuquerque:

Thank you for the opportunity to submit our Additional Service Request (ASR) for the Belmont Middle and High School project. Our additional scope of work is outlined below. Please note that these services are not part of our original contract.

**SCOPE OF SERVICES**

The additional scope of work shall include the design of a radiant heating piping system for the high school entry area, middle school entry area and the loading dock. The additional work effort shall include the following:

1. Layout and sizing of the piping system
2. Documentation and specification
3. Review of documentation by senior engineer
4. Review of product and layout submittals

**COMPENSATION**

Compensation to Bala Consulting Engineers for the additional engineering services described above shall be a fixed fee of Four Thousand Three Hundred Dollars (\$ 4,300). A summary of our fees to date for this project is as follows:

Original Contract Value	\$ 1,976,650
Additional Service Request # 1	<u>\$ 4,300</u>
<b>TOTAL</b>	<b>\$ 1,980,950</b>

The terms and conditions of this ASR shall be the same as the original proposal dated November 9, 2018. This ASR must be signed and returned prior to the start of work.

Expenses for reproduction, express mail, delivery service, travel, and parking, shall be reimbursed at cost plus 10% for administrative handling. Reimbursables are not included in the fixed fee.

Thank you for the opportunity to offer our services. If you concur with the above, please sign and return one copy of this letter to our office. This letter will then constitute an agreement between Perkins + Will and TMP Consulting Engineers, Inc., doing business as Bala Consulting Engineers.

Should you have any questions, please advise.

Very truly yours,

BALA CONSULTING ENGINEERS

**PERKINS + WILL**



Edward Dolan, PE, LEED AP  
Senior Vice President

EGD/egd

\_\_\_\_\_  
Accepted

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

cc: KJC; MWM; Acctg. - Bala



75 State Street, Suite 701  
Boston, Massachusetts 02109  
tel: 617 452-6000

December 5, 2019

Mr. Vital Albuquerque  
Senior Associate  
Perkins+Will  
225 Franklin Street  
Boston, Massachusetts 02110

Subject: Proposal for Geothermal Engineering Construction Oversight and Administrative Services for the Belmont Middle and High School Project  
Belmont, Massachusetts

Dear Mr. Albuquerque:

Thank you for the opportunity to submit this proposal to provide construction oversight and administrative services for the geothermal well field system for the Belmont Middle and High School project, located at 221 Concord Avenue, Belmont, Massachusetts. CDM Smith Inc. (CDM Smith) provided engineering services for the design of geothermal well field system. As requested, CDM Smith prepared this proposal with our approach, scope of work, and budget for construction oversight and administrative services for the construction of geothermal well field system.

CDM Smith recently completed 90% CD design of the geothermal well field system. The geothermal well field system design consists of 280 geothermal closed-loop wells, each at 500 feet deep, with lateral piping to 3 geothermal vaults. Each geothermal well is 6 inches in diameter and consists of two 1.5-inch-diameter HDPE pipes with a connecting U-bent at the bottom to serve as supply and return lines. The wells will be grouted with a thermally enhanced grout with a minimum thermal conductivity of 1.4 Btu/hr-ft-°F. All the geothermal wells will be connected with 3-inch-diameter HDPE lateral pipes to form circuits of wells. Each circuit consists of 9 to 10 wells and is to be connected to a manifold inside one of the geothermal vaults. All the vaults will be connected to a manifold next to the building using 8-inch-diameter HDPE main supply and return lines, then consolidated into two 12-inch-diameter supply and return lines to connect to the building's mechanical room.

We understand that the geothermal well field construction is anticipated to take 180 working days to complete. Our proposed scope of work and cost was developed based on this understanding.



## Scope of Work

The performance of the geothermal well field system depends heavily on the quality of the construction and installation. Due to the uncertain nature of underground construction, quality control should be implemented at the time of construction since no post-construction testing can truly be done to verify the quality of the installation that is buried hundreds of feet below ground. Based on our experience with large geothermal well field construction on similar projects, construction oversight throughout the installation of the geothermal wells and system testing are very important to ensure proper construction and facilitate modifications during construction that may be required due to various difficulties in drilling and installation.

Considering the importance of the oversight while balancing the overall effort, we proposed the following construction oversight and administrative services based on our understanding of the project schedule for the construction of geothermal well field:

- CDM Smith will respond to Contractor RFI's, review and take action on submittals, and prepare Construction Bulletins and review Change Orders.
- CDM Smith will provide one full time inspector for the installation of the geothermal wells (drilling, looping and grouting) during the first 3 weeks of construction. After three weeks, CDM Smith will provide well installation oversight services at an average of 1 day per week.
- CDM Smith will review drilling logs and well installation reports from the geothermal drilling subcontractor to ensure proper documentation of the geothermal well construction.
- CDM Smith will provide one full time inspector for the oversight of the flushing, purging, and pressure testing of entire geothermal well field system. We have included an allowance of 12 days for the oversight of flushing, purging, and pressure testing of the geothermal well field system.
- CDM Smith will provide oversight of system charging with 30% propylene glycol. We have included an allowance for CDM Smith to conduct 2 site visits for the system charging.
- CDM Smith will attend up to 6 additional site visits or meetings with the CM, contractor, OPM and design team during construction for coordination.

## Cost

We propose to perform the above scope of work for a lump sum of \$115,500 as an Amendment to our current Agreement. The cost for additional work deemed outside the scope of this proposal, if needed, will be negotiated and conducted only after written approval.

We will work cooperatively and effectively with the project team to provide practical and effective services during construction that match the needs of the project. CDM Smith appreciates this





Mr. Vital Albuquerque  
December 5, 2019  
Page 3

opportunity to continue our relationship with you on this project. If you have any questions or require additional information, please do not hesitate to contact me at (617) 452-6586.

Sincerely,

A handwritten signature in blue ink that reads "Robert Button". The signature is written in a cursive style with a large initial "R".

Robert O. Button, P.E.  
Vice President  
CDM Smith Inc.





75 State Street, Suite 701  
Boston, Massachusetts 02109  
tel: 617 452-6000

September 21, 2018

Mr. Vital Albuquerque  
Senior Associate  
Perkins+Will  
225 Franklin Street  
Boston, Massachusetts 02110

Subject: Proposal for Geothermal Engineering Services for the  
Belmont High School Project

Dear Mr. Albuquerque:

Thank you for the opportunity to submit this proposal for geotechnical engineering services to support the Design and Construction of the geothermal system for the Belmont High School, located at 221 Concord Avenue, Belmont, Massachusetts. As requested, CDM Smith Inc. (CDM Smith) prepared this proposal with our approach, scope and budget for geothermal engineering services from design through construction and testing of the system. We understand that the Belmont High School project includes the construction of a new four-story school building for grades 7 to 12 (approximately 445,100 square feet) along with several athletic fields and site improvements.

To help attain net zero energy for sustainability design, a geothermal system is proposed for all heating and cooling of the new building. Based on the HVAC section of the Schematic Design Report, the ground loop geo-exchange system is estimated to consist of 400 vertical close-loop geothermal wells, each extending 400 to 500 feet deep. Each of the geothermal well will consist of HDPE pipes grouted inside an approximately 6-inch diameter borehole. The geothermal well field will be connected in circuits and to the manifolds inside four to six geothermal circuit vaults outside of the building. Main header piping from each vault will be routed into the building. The geothermal system design will be further developed during design development (DD), which is scheduled from November 2018 to April 2019. Construction document (CD) phase of the project is scheduled from April to December 2019.

It is our understanding that the new building construction will be constructed in two phases with the existing building largely remaining in operation initially and then phased out after phase 1 construction is completed. The geothermal well field for the entire heating and cooling system is anticipated to be constructed in the first phase, which is currently scheduled from April 2019 to September 2021.





Mr. Vital Albuquerque  
September 21, 2018  
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## Scope of Work

Based on our understanding of the proposed geothermal system and the overall project design, we proposed a scope of work consisting of the following:

- Installation of three geothermal test wells and execution of in-situ thermal conductivity tests at each well.
- Well field design based on the results of the thermal conductivity tests and final building heating/cooling loads.
- Development of contract drawings for the geothermal well field layout and details, as well as geothermal well field technical specifications
- Construction services including full time and part time oversight of the geothermal well installation, flushing, purging and pressure testing,

Our proposed scope associated with the geothermal services program is summarized below.

### **Test Well Installation and Thermal Conductivity Test**

Given the estimated size of the geothermal well field (about 400 wells to depth of 400 to 500 feet) and the associated cost and space requirements for such large well field, test wells and in-situ thermal testing are important as part of the geothermal design. The test wells not only will allow testing of thermal properties of the geologic formation for final sizing of the well field, but also provide information for construction considerations, like depth to bedrock, rock fractures, groundwater production, and borehole stability. This can result in a more efficient well field design and reduce the risk during construction.

Considering the site layout shown in the schematic design (SD) and estimated well field size, we propose three (3) geothermal test wells to be installed at different areas of the project site during the DD phase and thermal conductivity testing be conducted at each well. Each of the geothermal test well will be installed to a depth of approximately 500 feet below ground surface (bgs) with 1.25-inch HDPE piping and U-bend. The wells will then be backfilled with thermally enhanced grout. The test wells will be temporary covered to allow for incorporation into the well field as production wells.

The installation of the geothermal test wells and thermal conductivity test will include the following:

- CDM Smith will develop specification for the construction and installation of the geothermal test wells and the in situ thermal conductivity testing.



- CDM Smith will plan and coordinate with the Owner's Project Manager (OPM), Construction Manager (CM) and Architect for the locations of the test wells. CDM Smith will mark the proposed test well locations and coordinate with the geothermal well drilling subcontractor to contact Dig Safe.
- CDM Smith will procure and subcontract a geothermal well drilling contractor to perform the installation of the geothermal test wells. The installation of each geothermal test well will include drilling of 6-inch diameter well to a depth of approximately 500 ft bgs; installation of the HDPE U-bent; and grouting of the geothermal well with thermally enhanced grout using tremie installation methods for the full depth of the boring. The spoil material (cuttings) from the geothermal test well be removed upon completion of the test well. The drilling contractor will contain the material and remove it from the site for disposal. It is assumed that water produced from the well installation will be filtered with filter bags and discharged on-site. The area disturbed will be backfilled with excavated materials. It is assumed that no sodding or repaving or further site restoration will be required.
- CDM Smith will provide a geotechnical engineer for the oversight of the geothermal test well installation on a full-time basis. The field engineer will log the soil and rock formation during drilling, drilling process, and oversee the installation of the HDPE vertical piping, U-bent and grouting operations. It is assumed that the installation of the three test wells will take up to 12 days total.
- CDM Smith will coordinate and provide part-time oversight for the in-situ thermal conductivity testing for each of the three test wells.
- CDM Smith will attend up to two coordination meetings for the implementation and construction of the test well and thermal testing.

### **Well Field Design**

CDM Smith will conduct analyses and design the geothermal well field design based on the heating and cooling loads provided by others and the results from the geothermal test wells. Specifically, the design tasks will include the following:

- Review of heating and cooling loads, proposed heat exchanger performance data and HVAC system operation and design parameters, which are assumed to be provided by HVAC designer,
- Design of geothermal well field based on loading and equipment information, thermal testing results and site layout. Design will include sizing of the geothermal well field, design of the well field pipe sizing, grout material, well configuration and well field layout. Design ground loop fluid temperature profile will be provided for evaluation of overall system performance or life-cycle cost analysis by HVAC or sustainability designer as needed.

- Development of up to two drawings for geothermal well field layout drawing and geothermal well details. It is assumed that base survey and all existing and new site utilities will be provided in AutoCAD format for the development of the geothermal well field layout.
- Development of specification for the geothermal well field, including specification for geothermal circuit vault. Specifications for site preparation, earthwork, dewatering and drainage, material disposal, all civil and landscape site work, plumbing or indoor HVAC system or piping are assumed to be provided by others.
- Attend up to 6 meetings with the Town, design team, CM, OPM or others as requested.
- It is assumed that all HVAC design and construction oversight, including all mechanical equipment, piping, valves and other appurtenances inside building, as well as pipe penetration into building will be conducted by others.
- One submittal at the end of DD phase and one submittal at the end of CD phase are assumed.

### **Construction Services**

The performance of the geothermal well field system depends heavily on the quality of the construction and installation. Due to the nature of underground construction, quality control must be implemented at the time of construction since no post construction testing can truly be done to verify the quality of the installation that is buried hundreds of feet below ground. Based on our experience with large geothermal well field construction on similar project with a public owner, construction oversight throughout the installation of the geothermal wells and system testing are very important to ensure proper construction and facilitate modification during construction that are common due to various difficulties in drilling and installation.

Considering the importance of the oversight while balancing the overall effort, we proposed the following as construction services:

- CDM Smith will review submittals and prepare responses to RFIs. We have included an allowance of 80 hours for the review of up to 15 submittals and up to 5 RFIs.
- CDM Smith will provide one full time inspector for the installation of the geothermal wells (drilling, looping and grouting) during the first 3 weeks of construction; after this time, CDM Smith will provide well installation oversight services at an average of 1 day per 2 weeks. An installation rate of 4 wells per week using two drill rigs is assumed for a total of 100 weeks of construction.
- CDM Smith will review drilling logs from the geothermal drilling subcontractor to ensure proper documentation of the geothermal well construction.



Mr. Vital Albuquerque  
 September 21, 2018  
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- CDM Smith will provide one full time inspector for the oversight of the purging and pressure testing of each individual geothermal circuit and for the pressure test of the system at the vaults. Two days of purging and pressure test of circuit piping and one day of performance test per vault is assumed for each of the 6 vaults as indicated in the SD report. We have included an allowance for CDM Smith to conduct 18 site visits during purging and pressure testing of the geothermal system.
- Attend up to 6 additional site visits or meetings with the CM, contractor, OPM and design team during construction for coordination.

### Costs

We estimate the cost of geotechnical and environmental services as follows:

#### Geothermal Test Well Installation

CDM Smith Oversight	\$48,500
Test Well Installation and Testing (3 wells)	\$76,500
<b>TOTAL</b>	<b>\$125,000</b>

**Geothermal Design Services** **\$107,500**

**Geothermal Construction Services (Estimated)** **\$160,000**

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**Total Cost** **\$392,500**

We have assumed that the professional engineering services will be provided in accordance with our standard terms and conditions for geotechnical services. We will work cooperatively and effectively with your design team to leverage our expertise to provide practical and effective geothermal engineering services that match the needs of the project. CDM Smith appreciates this opportunity to contribute to this exciting school development project. If you have any questions or require additional information, please do not hesitate to contact me at (617) 452-6586.

Sincerely,

Robert O. Button, P.E.  
 Vice President  
 CDM Smith Inc.





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**Perkins + Will**

225 Franklin Street, Suite 1100  
Boston, MA 02110  
Brooke S. Trivas, Principal

**INVOICE**

No. 21711.03-01  
05/20/2020

**Belmont High School Add Service Concord Ave**  
**21711.03**  
Contract  
For Services Rendered Through 4/30/2020

**Professional Services**

	<u>Hours</u>	<u>Rate</u>	<u>Amount</u>
Principal	2.25	200.00	\$450.00
Senior Landscape Architect	8.00	150.00	\$1,200.00
<b>Total Professional Services</b>	<b>10.25</b>		<b>\$1,650.00</b>
<b>Invoice Amount</b>			<b>\$1,650.00</b>

**Prior Billing Information**

<u>Invoice</u>	<u>0 - 30</u>	<u>31 - 60</u>	<u>61-90</u>	<u>Over 90</u>	<u>Balance</u>
<b>Total Prior Billing</b>					

**Billing Backup**

			<b>Hours</b>	<b>Rate</b>	<b>Amount</b>
TBJ	Johnson, Tileston	4/13/2020	1.00	150.00	\$150.00
	<i>concord ave</i>				
TBJ	Johnson, Tileston	4/14/2020	1.00	150.00	\$150.00
TBJ	Johnson, Tileston	4/15/2020	3.00	150.00	\$450.00
	<i>concord ave SKs</i>				
TBJ	Johnson, Tileston	4/16/2020	2.00	150.00	\$300.00
TBJ	Johnson, Tileston	4/17/2020	1.00	150.00	\$150.00
DJW	Warner, David	4/14/2020	.50	200.00	\$100.00
	<i>Concord Ave add svcs</i>				
DJW	Warner, David	4/16/2020	1.00	200.00	\$200.00
	<i>Mountable curbs</i>				
DJW	Warner, David	4/17/2020	.75	200.00	\$150.00
<b>Total Professional Services</b>			<b>10.25</b>		<b>\$1,650.00</b>