APPENDIX J

NHPA Section 106 Documentation

Department of Energy
Washington, DC 20585

13 January 2011

Ms. Charlene Dwin Vaughn, Assistant Director
Federal Permitting, Licensing, and Assistance Section
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 20004

SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project

Dear Ms. Vaughn:

The purpose of this letter is to ensure that the Advisory Council on Historic Preservation (ACHP) is aware of the subject project, and to inquire as to whether you wish to be considered, or participate, in the conduct of our ongoing analysis of potential environmental impacts of this proposed project.

On January 5, 2010, Champlain Hudson Power Express, Inc. (CHPEI) applied to the Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential permit to construct, operate, and maintain the Champlain Hudson Power Express Transmission Line Project. As described in the application, the project would comprise a high-voltage direct current (HVDC) transmission line extending south from an HVDC converter station near Montreal, Quebec, to a HVDC converter station in the New York City metropolitan area. This project would be installed within existing waterways and along railroad rights-of-way, either buried beneath the lake or riverbed, or buried within the existing railroad.

By letter dated August 5, 2010, CHPEI submitted an addendum to the Presidential permit application modifying the number of circuits and the project's proposed alignment. The project currently under review by DOE includes a single circuit extending from the U.S./Canada border to an HVDC converter station within the vicinity of Yonkers, New York. From the Yonkers converter station, above-ground alternating current (AC) cables would carry electricity to a Consolidated Edison Company of New York, Inc., substation, currently under construction near the site of the former Charles Poletti Power Plant in Astoria, Queens, New York.

We have determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA) for this proposed project, as was documented in our *Federal Register* Notice of Intent to prepare an EIS on June 18, 2010 (75 FR 34720). All of these documents, along with background information, an opportunity to subscribe to our mailing list, and more, are available at http://www.chpexpresseis.org.

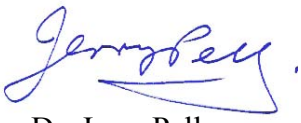
The proposed project has the potential to affect historic properties either listed in, or eligible for, inclusion in the National Register of Historic Places. Resources within the project's prospective area of potential effects (APE) include historic properties designated by the Secretary of the Interior as National Historic Landmarks (NHLs). As of now, the following NHLs have been identified as potentially located within or immediately adjacent to the project's APE:

- Fort Crown Point
- Fort Ticonderoga
- Hudson River Heritage District
- U.S. Military Academy
- Old Croton Aqueduct

Accordingly, we are inviting the ACHP to participate in the ongoing environmental analysis of this proposed project. Should your office have a material interest in this project, or if you have additional information that we should consider, please contact HDR, Inc., our contractor for the preparation of the EIS; to that end, I am designating regulatory specialist Robert Quiggle of HDR to follow-up with you in the near future. He can be reached at (315) 414-2216 or by e-mail at Robert.Quiggle@hdrinc.com.

I look forward to hearing from your office; please feel free to contact me at any time either by e-mail at Jerry.Pell@hq.DOE.gov (preferred), by phone at (202) 586-3362, or by fax at (202) 318-7761.

Yours very truly,



Dr. Jerry Pell
Principal NEPA Document Manager
Permitting, Siting, and Analysis, OE-20
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

cc: Robert Quiggle (HDR, Inc.)

Department of Energy
Washington, DC 20585

June 21, 2012

Charlene Dwin Vaughn
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 20004

SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project

Dear Ms. Vaughn:

As you are aware, Champlain Hudson Power Express, Inc. ("CHPEI" or "Applicants") has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project). In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).[a] Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

By letter dated January 13, 2011, the DOE formally initiated the Section 106 consultation process with the ACHP, the New York State Historic Preservation Officer (NYSHPO), the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding portions of the Project within the United States. Specifically, we invited the Consulting Parties to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking, and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800.

CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. The Project currently under review by the DOE would consist of a 1,000-megawatt (MW) high-voltage direct current (HVDC) Voltage Source Converter controllable transmission system extending from the Canadian Province of Quebec to New York City. From the international border between the United States and Canada, two cables (comprising a single bipole) would extend south to an HVDC Converter Station to be located near Luyster Creek, north of 20th Avenue in Astoria, Queens. From the Converter Station, a 345-kilovolt (kV) underground alternating current (AC) circuit would connect to the existing 345-kV gas-insulated substation owned by the New York Power Authority (NYPA) and situated near NYPA's

[a] 16 USC 470 *et seq.*

Charles Poletti Power Project in Astoria. The Applicants also propose to construct a 3-mile buried 345-kV HVAC cable circuit from the Astoria Substation to Consolidated Edison's Rainey Substation in Queens. The Applicants have proposed to install the cables within waterways, and within the rights-of-way of existing transportation infrastructure, including railroads and roadways. Sections of the transmission line installed within waterways will generally be buried beneath the lake or riverbed. Overland sections of the Project will be buried within existing ROW corridors.

The DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA) for the proposed project, as was documented in our *Federal Register* Notice of Intent to prepare an EIS on June 18, 2010 (75 FR 117). The Notice of Intent, along with background information, an opportunity to subscribe to our mailing list, and more, are available on our EIS-specific website at http://www.chpexpresseis.org.

At this time, we wish to clarify the name and contact information for the DOE's contractor for preparation of the EIS and our representative for purposes of consultation pursuant to Section 106. In accordance with 36 CFR Part 800.2(a)(3), the DOE has authorized our contractor, HDR Environmental, Operations and Construction, Inc. (HDR EOC), to prepare the EIS. The EIS will include an analysis of the Project's potential for adverse effects on cultural resources, including historic properties as defined by Section 106 of the NHPA and its implementing regulations (36 CFR Part 800). Specifically, I am designating Dr. Greg Lockard, RPA of HDR EOC as the point-of-contact for preparing this information on behalf of the DOE. He can be reached at (571) 327-5815 or by e-mail at Gregory.Lockard@hdrinc.com. Coordination of consultation activities under the Section 106 process will be completed by Mr. Robert Quiggle, RPA, of HDR Engineering, Inc., who is working on behalf of the Applicants. Mr. Quiggle can be contacted at (315) 414-2216 or by e-mail at Robert.Quiggle@hdrinc.com. As provided in 36 CFR Part 800, the DOE remains legally responsible for findings and determinations and for the DOE's government-to-government relationships with Indian tribes.

As noted above, the DOE has formally initiated Section 106 consultation in accordance with 36 CFR Part 800.3. We anticipate additional consultation activities in the coming weeks regarding the ongoing identification of historic properties in the Project's area of potential effects (APE), assessment of adverse effects on these properties, and minimization and/or mitigation of these adverse effects. As described in our January 13, 2011 letters to the Consulting Parties, we intend to develop a Programmatic Agreement (PA) pursuant to 36 CFR Part 800.14(b) to address the proposed Project's potential effects on historic properties. The PA will be developed in consultation with federally recognized Indian tribes, the NYSHPO, the ACHP, the public, and other interested parties, as appropriate.

Please feel free to contact me directly at any time at Brian.Mills@hq.DOE.gov, or by phone at (202) 586-8267.

Very truly yours,

Mr. Brian Mills
Permitting, Siting, and Analysis, OE-20
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

Cc: G. Lockard (HDR EOC)
R. Quiggle (HDR Engineering, Inc.)

CHPE EIS NHPA Section 106 Consultation Distribution List

Agencies

Charlene Dwin Vaughn
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 20004

Franklin Keel
Regional Director
Bureau of Indian Affairs
Eastern Region Office
545 Marriott Drive, Suite 700
Nashville, TN 37214

Diane Rosen
Regional Director
Bureau of Indian Affairs
Midwest Region Office
Norman Pointe II Building
5600 W. American Blvd., Suite 500
Bloomington, MN 55347

The Honorable Ken Salazar, Secretary
U.S. Department of the Interior
1849 C Street, N.W.
Washington DC 20240

Mary K. (Missy) Morrison
Resource Planning Specialist, External Review Coordinator
Division of Resource Planning and Compliance
National Park Service, Northeast Region
200 Chestnut Street
Philadelphia, PA 19106

Honorable Randy King, Chairperson
Ruth Pierpont, Director
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Native American Tribes

Delaware Nation
Anadarko, OK

St. Regis Mohawk Tribe
Akwesasne, NY

Shinnecock Indian Nation
Southampton, NY

Stockbridge-Munsee Community of Wisconsin
Bowler, WI

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United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Eastern Regional Office
545 Marriott Drive, Suite 700
Nashville, TN 37214

JUL 18 2012

IN REPLY REFER TO:
Trust Services
Environment, Safety, and Cultural Resources Division

Mr. Brian Mills
Senior Planning Advisor
Permitting, Siting, and Analysis, OE-20
Electricity Delivery and Reliability Office
U.S. Department of Energy
1000 Independence Avenue, SW
Washington DC 20585

RE: Champlain Hudson Power Express Transmission Line Project, New York

Dear Mr. Mills:

Thank you for contacting the Bureau of Indian Affairs (BIA), Eastern Regional Office, about tribal consultation information regarding the Champlain Hudson Power Express Transmission Line Project. Tribal consultation contact information is provided on the following page for National Historic Preservation Act compliance purposes.

Tribal consultation information is available to you on the internet. An annually updated tribal leaders directory for federally recognized tribes and nations can be found at *http://www.indianaffairs.gov/WhoWeAre/BIA/OIS/TribalGovernmentServices/TribalDirectory/index.htm*. A map titled *Indian Reservations in the Continental United States* is located at *http://www.nps.gov/history/nagpra/documents/resmap*, and a Native American Consultation Database is at *http://home.nps.gov/nagpra/onlinedb*. A current list of Tribal Historic Preservation Officers is at *http://www.nathpo.org*.

If you have questions, please contact David Saunders, Eastern Regional Archaeologist, at (615) 564-6840.

Sincerely,

Randall Trickey

Director, Eastern Region

Acting

Enclosure

Tribal Consultation Information for Champlain Hudson Power Express Transmission Line Project

Honorable Kerry Holton, President
Delaware Nation
P.O. Box 825
Anadarko, OK 73005
Telephone: (405) 247-2448
Fax: (405) 247-6329

Honorable Paula Pechonick, Chief
Delaware Tribe of Indians
170 N.E. Barbara
Bartlesville, OK 74003
Telephone: (918) 336-5272
Fax: (918) 337-6591

Honorable Kimberly Vele, President
Stockbridge Munsee Community of Wisconsin
P.O. Box 70.
Bowler, WI 54416
Telephone: (715) 793-4111
Fax: (715) 793-1307

Sherry White
Tribal Historic Preservation Officer
Stockbridge Munsee Community of Wisconsin
P.O. Box 70
Bowler, WI 54416
Telephone: (715) 793-3970
Fax: (715) 793-4437

Honorable Mark Garrow, Chief
Honorable Randy Hart, Chief
Honorable Ronald La France, Chief
St. Regis Mohawk Tribe
412 State Route 37
Akwesasne, NY 13655
Telephone: (518) 358-2272
Fax: (518) 358-4519

Arnold Printup
Tribal Historic Preservation Officer
St. Regis Mohawk Tribe
412 State Route 37
Akwesasne, NY 13655
Telephone: (518) 358-2272 extension 164
Fax: (518) 358-3203

Honorable Randy King, Chairperson
Shinnecock Indian Nation
P.O. Box 5006
Southampton, NY 11969
Telephone: (631) 283-6143
Fax: (631) 204-9253

1. SM
2. C Stranger

Department of Energy
Washington, DC 20585

June 21, 2012

Franklin Keel
Regional Director
Bureau of Indian Affairs
Eastern Region Office
545 Marriott Drive, Suite 700
Nashville, TN 37214

SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project

Dear Director Keel:

As you are aware, Champlain Hudson Power Express, Inc. ("CHPEI" or "Applicants") has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project). In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).[a] Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

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As noted above, the DOE has formally initiated Section 106 consultation in accordance with 36 CFR Part 800.3. We anticipate additional consultation activities in the coming weeks regarding the ongoing identification of historic properties in the Project's area of potential effects (APE), assessment of adverse effects on these properties, and minimization and/or mitigation of these adverse effects. As described in our January 13, 2011 letters to the Consulting Parties, we intend to develop a Programmatic Agreement (PA) pursuant to 36 CFR Part 800.14(b) to address the proposed Project's potential effects on historic properties. The PA will be developed in consultation with federally recognized Indian tribes, the NYSHPO, the ACHP, the public, and other interested parties, as appropriate.

Please feel free to contact me directly at any time at Brian.Mills@hq.DOE.gov, or by phone at (202) 586-8267.

Very truly yours,

Mr. Brian Mills
Permitting, Siting, and Analysis, OE-20
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

Cc: G. Lockard (HDR EOC)
R. Quiggle (HDR Engineering, Inc.)

November 26, 2012

MEMORANDUM

TO: Bill Helmer (TDI)

FROM: Robert Quiggle (HDR Engineering, Inc.)

SUBJECT: **Champlain Hudson Power Express Transmission Line Project Summary of September 12, 2012 Consultation Meeting with the New York State Historic Preservation Office**

1.0 Introduction and Background

This memorandum provides a summary of the September 12, 2012 consultation meeting with the New York State Historic Preservation Office (NYSHPO) regarding maritime archaeological resources (e.g., shipwrecks) and anomalies of potential cultural origin identified within the prospective area of potential effects (APE) for the proposed Champlain Hudson Power Express Transmission Line Project (Project). Specifically, the purpose of this meeting was to determine appropriate avoidance measures and/or additional information needs through a review of a representative subset of maritime archaeological resources and anomalies.

The consultation meeting was held from 10:30 AM – 2:00 PM at the offices of Hartgen Archaeological Associates, Inc. (HAA, Inc.) in Rensselaer, New York. Representatives from the NYSHPO, Champlain Hudson Power Express, Inc. (CHPEI), HAA, Inc., and HDR Engineering, Inc. (HDR) participated in the consultation meeting. Specifically, meeting participants included:

- Brian Yates (NYSHPO)
- Bill Helmer (CHPEI)
- Matt Kirk (HAA, Inc.)
- Tracy Miller (HAA, Inc.)
- Robert Quiggle (HDR)

Henningson, Durham & Richardson Architecture and Engineering, P.C.
in association with HDR Engineering, Inc.

1304 Buckley Road
Suite 202
Syracuse, NY 13212-4311

Phone: (315) 451-2325
Fax: (315) 451-2429
www.hdrinc.com

2.0 Meeting Summary

- CHPEI and HDR provided the NYSHPO with a status update on ongoing cultural resources studies and the overall permitting process for the Project.
- HDR noted that CHPEI had previously consulted with the NYSHPO to identify a suitable buffer distance for avoiding adverse effects on maritime archaeological resources. Based on this consultation a 50-meter (164-foot) buffer around maritime archaeological resources was originally proposed. Based on a review of data provided by CHPEI in 2011, the NYSHPO determined in May 2012 that this buffer area could be reduced to a distance of 40 meters (131 feet) from the Project's APE. For the maritime sections of the Project, the APE will include a 4.6-meter-wide (15-foot-wide) corridor where disturbance of lake or river bottoms may occur during installation of the transmission cables.
- The NYSHPO confirmed that a 40-meter buffer from the APE was generally appropriate to avoid adverse Project-related effects on maritime archaeological resources. However, the NYSHPO noted that this could be adjusted on a case-by-case basis depending on the nature of the identified resource, the analyses previously conducted by the Lake Champlain Maritime Museum (LCMM), and/or the sonar signature of the resource or anomaly.
- HDR briefly summarized the process that was completed for identifying maritime archaeological resources and anomalies within the Project's APE. Maritime archaeological resources and anomalies were identified by the LCMM and HAA, Inc. through an analysis of side scan sonar data collected along the extent of proposed maritime sections of the Project's APE. The side scan sonar data was compared to information available from existing archaeological site files, historical records regarding shipwrecks, previous studies conducted by the LCMM and others within Lake Champlain and the Hudson River, and other sources of information regarding known, reported, or potential cultural resources within the Lake Champlain, Hudson River, Harlem River, and East River sections of the Project's APE.
- The comprehensive analysis conducted by the LCMM and HAA, Inc. resulted in the development of a geographic information system (GIS) database of maritime archaeological resources and anomalies identified by the LCMM within approximately 300 meters (984 feet) of the Project's centerline. In 2011, modifications to the Project's alignment along an 80-kilometer (50-mile) segment of the proposed transmission cable corridor within the Hudson River required a reanalysis of side scan sonar data provided by the New York State Department of Environmental Conservation (NYSDEC). This analysis of NYSDEC data identified maritime archaeological resources and anomalies and within 100 meters (328 feet) along sections of the Hudson River.
- In preparation for the September 12, 2012 consultation meeting, HAA, Inc. developed 40-meter buffers around maritime archaeological resources and potential cultural anomalies to identify resources that would be avoided by Project construction.
- Based on the results of this GIS analysis, HAA, Inc. prioritized identified archaeological resources or potential cultural anomalies. Those resources or anomalies within 40 meters of the APE were assigned a higher potential for Project-related effects. This information was combined with data compiled from the background literature review and LCMM's analyses of the side scan sonar data to develop a preliminary assessment of significance for high-

potential maritime resources and anomalies. If analyses or documentary evidence indicated that a high-potential resource or anomaly may represent a potentially significant cultural features (e.g., a documented shipwreck or remnants of a historic bridge), the resource or anomaly was ranked as a higher priority. However, if the LCMM's analysis of side scan sonar data indicated that the identified high-potential resource or anomaly likely represented a non-cultural feature (e.g., tree stump, bedrock outcropping, etc.), the resource or anomaly was given a lower classification in regards to potential priority.

- HDR explained that, for purposes of discussion, HAA, Inc. had selected a subset of high priority maritime archaeological resources and potential cultural anomalies that generally represented high-potential locations categorized by HAA, Inc. as having a high potential significance (typically documented or suspected shipwrecks within proximity to the Project's APE).
- The NYSHPO, CHPEI, HDR, and HAA, Inc. reviewed approximately 40 high priority archaeological resources and anomalies on a case-by-case basis. For each of these resources, the NYSHPO made recommendations regarding avoidance or the need for additional information.
- In most cases, the proposed transmission cable installation corridor will sufficiently avoid high priority resources.
- In other cases, potential modifications to the Project's alignment were proposed that would allow the Project to avoid adverse effects on maritime archaeological resources or potential cultural anomalies. CHPEI agreed to consult with their engineering staff to determine if potential modifications to the Project's route were feasible.
- The NYSHPO recommended that CHPEI complete the ongoing marine route survey and prepare additional information regarding proposed anomalies that may be unavoidable. This information could be used to provide additional information regarding the nature of these anomalies and whether they actually represent cultural features.
- CHPEI agreed to review the recommendations provided by the NYSHPO and consult the results of the ongoing marine route survey (expected to be completed in Q1 of 2013). Based on this information, CHPEI will present recommendations for each site and/or anomaly within the APE and consult with the NYSHPO to determine whether proposed avoidance measures are appropriate or additional data collection or mitigation measures may be necessary.

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November 26, 2012

MEMORANDUM

TO: Bill Helmer (TDI)

FROM: Robert Quiggle (HDR Engineering, Inc.)

SUBJECT: **Champlain Hudson Power Express Transmission Line Project Summary of October 24, 2012 Consultation Meeting with the Advisory Council on Historic Preservation**

1.0 Introduction and Background

This memorandum provides a summary of the October 24, 2012 consultation meeting with the Advisory Council on Historic Preservation (ACHP) regarding the proposed Champlain Hudson Power Express Transmission Line Project (Project). Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the Project. The purpose of this meeting was to provide the ACHP with an overview of the Project, describe the cultural resources studies conducted to date, and discuss the approach to fulfilling the DOE's responsibilities pursuant to Section 106 of the National Historic Preservation Act (Section 106).

The consultation meeting was held from 11:00 AM – 11:45 AM at the ACHP's office located in the Old Post Office Pavilion in Washington, D.C. Representatives from the ACHP, DOE, HDR Environmental, Operations and Construction, Inc. (HDR EOC), and HDR Engineering, Inc. (HDR Engineering) participated in the consultation meeting. Specifically, meeting participants included:

- Charlene Dwin Vaughn (ACHP)
- Lee Webb (ACHP)
- Brian Mills (DOE)
- Greg Lockard (HDR EOC)
- Robert Quiggle (HDR Engineering)

Henningson, Durham & Richardson Architecture and Engineering, P.C.
in association with HDR Engineering, Inc.

1304 Buckley Road
Suite 202
Syracuse, NY 13212-4311

Phone: (315) 451-2325
Fax: (315) 451-2429
www.hdrinc.com

2.0 Meeting Summary

- HDR Engineering provided an introduction to the Project and the meeting participants.
  - As noted above, the Project will require a Presidential Permit from the DOE. CHPEI filed an application for a Presidential Permit on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012.
  - The DOE has authorized HDR EOC to prepare an Environmental Impact Statement (EIS) for this Project pursuant to the National Environmental Policy Act (NEPA). The EIS will include an analysis of the Project's potential effects on cultural resources, including historic properties.
  - HDR Engineering is coordinating consultation activities pursuant to the Section 106 process.
- HDR Engineering presented a PowerPoint presentation detailing the technical aspects of the Project, the Project's proposed route, and transmission cable installation methods. This presentation is enclosed as an attachment to this meeting summary.
- The presentation also included information regarding the permitting process.
  - In addition to the Presidential Permit, HDR Engineering also noted that the Project will require a permit from the U.S. Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act and a permit form the U.S. Coast Guard (USCG). The DOE explained that the DOE is the lead federal agency for purposes of consultation under Section 106, but that the USACE and the USCG are cooperating agencies.
  - HDR Engineering explained that the Project will require a Certificate of Environmental Compatibility and Public Need (Certificate) from the New York State Public Service Commission (PSC) pursuant to Article VII of the New York State Public Service Law.
  - Settlement discussions regarding the Certificate resulted in a Joint Proposal (JP) signed by New York State agencies, non- governmental organizations, the City of New York and the City of Yonkers.
  - The JP includes guidelines for the Environmental Management and Control Plan(s) (EM&CP) as well as Best Management Practices (BMP) for Project construction. Both the EM&CP and BMP guidance documents include provisions for addressing cultural resources.
  - The JP also includes a proposed Water Quality Certificate pursuant to Section 401 of the Clean Water Act.
  - The PSC has received the JP and the hearing process regarding the Certificate has been completed.
- The ACHP asked if consultation pursuant to Section 106 was being coordinated with the NEPA process. HDR Engineering explained that consultation under Section 106 was initiated in January 2011, but consultation activities were delayed to allow the settlement parties to reach a JP.
- The ACHP noted that, given the existing JP and the consensus regarding the Project, the DOE may wish to coordinate compliance with Section 106 with the steps taken to meet the NEPA process. The ACHP explained that 36 CFR § 800.8 of the ACHP's regulations describes the regulatory process for coordinating Section 106 and NEPA, although no applicant for a federal license or permit has pursued this coordinated approach. The ACHP is preparing new

guidance for coordinating the Section 106 and NEPA processes, with the goal of encouraging federal agencies and applicants for federal permits or licenses to follow the regulatory approach described in 36 CFR § 800.8.

- The ACHP noted that the coordinated process would allow the record of decision prepared pursuant to NEPA to satisfy the DOE's responsibilities under Section 106.
- The ACHP agreed to provide the DOE with the new guidance regarding coordination of the NEPA and Section 106 processes following approval (anticipated to occur during the ACHP's November 15, 2012 meeting).
- HDR Engineering described the cultural resources studies conducted to date. The studies have been conducted by an experienced local team including HDR Engineering, Hartgen Archaeological Associates, Inc., and the Lake Champlain Maritime Museum. The studies were developed in consultation with the New York State Historic Preservation Officer (NYSHPO), and have included background literature reviews, analyses of side scan sonar data, and subsurface testing conducted along portions of the Project's prospective area of potential effects (APE). Information regarding these studies is included in the presentation enclosed with this meeting summary.
- HDR Engineering noted that the DOE has identified consulting parties, and that formal consultation with these parties has been initiated. CHPEI intends to convene a meeting in November 2012 to finalize the definition of the APE and to review the results of the studies conducted to date.
- The DOE intends to develop a Programmatic Agreement pursuant to 36 CFR § 800.14(b) to address the Project's potential effects on historic properties. The PA will require development of a Cultural Resources Management Plan (CRMP) in consultation with the consulting parties prior to the initiation of Project construction activities. HDR Engineering noted that a CRMP is also required by the JP.
- The ACHP indicated that development of a PA could be facilitated by coordinating the NEPA and Section 106 processes. The Draft EIS could include a list of activities and issues to be addressed in the PA, as well as a schedule and milestones for PA development. This approach would also facilitate a holistic approach to potential mitigation activities to address the adverse effects of the Project as a whole rather than on a resource-specific basis. The ACHP noted that a PA should address a public education component, and provide opportunities for Indian tribes to participate in cultural resources studies.
- The ACHP also recommended that the PA include language to allow other federal agencies (in addition to the DOE, USACE, and USCG) to be included in the PA. The ACHP agreed to provide the DOE with recommended language.
- The ACHP noted that coordination of the NEPA and Section 106 processes should be initiated by notifying the NYSHPO, Indian tribes, and the ACHP.
- The DOE agreed to consider coordination of the NEPA and Section 106 processes and to review the forthcoming guidelines from the ACHP.

Attachment: October 2012 Champlain Hudson Power Express
Advisory Council on Historic Preservation Presentation

Note: The latest version of the presentation is provided following the July 2013 Section 106 meeting announcement letter subsequently provided in this appendix.

Department of Energy
Washington, DC 20585

November 20, 2012

TO: **Attached Cultural Resources Working Group Distribution List**

SUBJECT: **Proposed Champlain Hudson Power Express Transmission Line Project Section 106 Consultation Meeting**

Dear Cultural Resources Working Group:

Champlain Hudson Power Express, Inc. has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the portions of the proposed Champlain Hudson Power Express Transmission Line Project located within the United States (Project). In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).[1] Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

The DOE has formally initiated the Section 106 consultation process with the ACHP, the New York State Historic Preservation Officer, the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, the Shinnecock Indian Nation, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding the Project. Specifically, the DOE invited the Consulting Parties to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800.

At this time, we would like to invite the Consulting Parties, federal agencies involved in this undertaking, and other potentially interested parties (collectively, the "Cultural Resources Working Group") to participate in a consultation meeting on November 28, 2012. The purpose of this meeting will be to (a) determine and document the area of potential effects (APE) for this undertaking, (b) describe the studies that have been conducted to identify historic properties that may be affected by the Project, and (c) discuss the process for completing the Section 106 process, including measures to resolve any Project-related adverse effects. This Section 106 consultation meeting will be held from 9:00 AM–12:00 PM at the offices of Hiscock and

[1] 16 USC 470 *et seq.*

Barclay, located at 80 State Street (6th floor) in Albany, New York 12207. Those wishing to participate but unable to attend in person are invited to participate via conference call. The dial-in number for the call will be 866-994-6437. Please enter conference code 989-014-9046 when prompted.

The DOE has established a website to provide information regarding the ongoing environmental review of this Project. Additional background information regarding the Project, an opportunity to subscribe to our mailing list, and more, are available at http://www.chpexpresseis.org.

Please feel free to contact me directly at any time at Brian.Mills@hq.DOE.gov, or by phone at (202) 586-8267. I look forward to meeting with you on November 28, 2012.

Very truly yours,

Mr. Brian Mills
Permitting, Siting, and Analysis, OE-20
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

Cc: Attached Distribution List

L. Jackson (DOE)
G. Lockard (HDR EOC)
R. Quiggle (HDR Engineering, Inc.)

Champlain Hudson Power Express Transmission Line Project
Cultural Resources Working Group
Distribution List

Franklin Keel, Regional Director
U.S. Bureau of Indian Affairs
Eastern Region Office
545 Marriott Drive, Suite 700
Nashville, TN, 37214

Diane Rosen, Regional Director
U.S. Bureau of Indian Affairs
Midwest Region Office
Norman Pointe II Building
5600 W. American Boulevard, Suite 500
Bloomington, MN 55347

Dan Deerinwater, Regional Director
U.S. Bureau of Indian Affairs
Southern Plains Region Office
WCD Office Complex
P.O. Box 368
Anadarko, OK 73005

Arnold Printup
Saint Regis Mohawk Tribe
Tribal Historic Preservation Office
412 State Route 37
Akwesasne, NY 13655

Kerry Holton, President
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Randy King, Chairperson
Shinnecock Indian Nation
P.O. Box 5006
Southampton, NY 11969

Robert Chicks, President
Stockbridge Munsee Community of Wisconsin
N8476 Mo He Con Nuck Road
Bowler, WI 84416

Charlene Dwin Vaughn, Assistant Director
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 2004

Lee Webb
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 2004

Stephen A. Ryba
Regulatory, Western Section
NY District U.S. Army Corps of Engineers
26 Federal Plaza, Room 1937
New York, NY 10278

Jeff Yunker
Waterways Management Coordinator
U.S. Coast Guard Sector New York
212 Coast Guard Drive
Staten Island, NY 10305

Mary K. (Missy) Morrison
Resource Planning Specialist, External Review Coordinator
National Park Service, Northeast Region
Division of Resource Planning and Compliance
200 Chestnut Street
Philadelphia, PA 19106

Donald Jessome, MBA, P.Eng
President and CEO
Transmission Developers, Inc.
600 Broadway
Albany, NY 12207

Hon. Robert B. Tierney, Chair
New York City Landmarks Preservation Commission
Municipal Building
1 Centre Street, 9th Floor
New York, NY 10007

Rose Harvey, Commissioner
New York State Office of Parks, Recreation and Historic Preservation
Albany, NY 12238

Ruth Pierpont
Deputy Commissioner/Deputy SHPO
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

John Bonafide, Director
Bureau of Technical Preservation Services
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Nancy Herter
Program Leader/Native American Liaison
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Brian Yates
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

William Helmer, Esq.
Sr. Vice President, General Counsel, and Secretary
Transmission Developers, Inc.
600 Broadway
Albany, NY12207

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December 12, 2012

MEMORANDUM

TO: Bill Helmer (TDI)

FROM: Robert Quiggle (HDR Engineering, Inc.)

SUBJECT: **Champlain Hudson Power Express Transmission Line Project**
Summary of November 28, 2012 Consultation Meeting

1.0 Introduction and Background

This memorandum provides a summary of the November 28, 2012 consultation meeting for the proposed Champlain Hudson Power Express Transmission Line Project (Project). Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the Project. In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA). Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. As the lead federal agency for purposes of consultation pursuant to Section 106 for this Project, the DOE convened the November 28, 2012 consultation meeting to (a) discuss the area of potential effects (APE) for this undertaking, (b) describe the studies that have been conducted to date to identify historic properties that may be affected by the Project, and (c) discuss the process for completing the Section 106 process, including measures to resolve any Project-related adverse effects..

The consultation meeting was scheduled from 9:00 AM – 12:00 PM at the offices of Hiscock & Barclay, LLP in Albany, New York. As described in Attachment 1 to this memorandum, representatives from the U.S. Bureau of Indian Affairs, the National Park Service, the ACHP, the New York State Historic Preservation Office (NYSHPO), the New York City Landmarks Preservation Commission, the U.S. Army Corps of Engineers (USACE), the U.S. Coast Guard (USCG), and federally recognized Indian tribes were invited to participate in the meeting. Invited participants also included representatives from AECOM, HDR Engineering, Inc. (HDR Engineering), HDR Environmental, Operations and Construction, Inc. (HDR EOC), Hartgen Archaeological Associates, Inc. (HAA, Inc.), and Van Ness Feldman, LLP (VNF). A conference line was made available for those unable to attend in person.

Henningson, Durham & Richardson Architecture and Engineering, P.C.
in association with HDR Engineering, Inc.

1304 Buckley Road
Suite 202
Syracuse, NY 13212-4311

Phone: (315) 451-2325
Fax: (315) 451-2429
www.hdrinc.com

Participants in the November 28, 2012 consultation meeting included:

- Brian Yates (NYSHPO)
- Lamont Jackson (DOE)
- Lee Webb (ACHP)
- Bill Helmer (CHPEI)
- Ed Alkiewicz (AECOM)
- Jay Ryan (VNF)
- Chuck Sensiba (VNF)
- Matt Kirk (HAA, Inc.)
- Tracy Miller (HAA, Inc.)
- Greg Lockard (HDR EOC)
- Robert Quiggle (HDR Engineering)

2.0 Meeting Summary

- HDR Engineering provided an introduction to the Project and the meeting participants.
  - As noted above, the Project will require a Presidential Permit from the DOE. CHPEI filed an application for a Presidential Permit on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010, July 7, 2011, and February 28, 2012.
  - The DOE has authorized HDR EOC to prepare an Environmental Impact Statement (EIS) for this Project pursuant to the National Environmental Policy Act (NEPA). The EIS will include an analysis of the Project's potential effects on cultural resources, including historic properties.
  - HDR Engineering is coordinating consultation activities pursuant to the Section 106 process.
- HDR Engineering presented a PowerPoint presentation detailing the technical aspects of the Project, the Project's proposed route, and transmission cable installation methods. This presentation is enclosed as Attachment 2 to this meeting summary.
- The presentation also included information regarding the permitting process.
  - In addition to the Presidential Permit, HDR Engineering also noted that the Project will require a permit from the USACE pursuant to Section 404 of the Clean Water. The DOE is the lead federal agency for purposes of consultation under Section 106, but that the USACE and the USCG are cooperating agencies.
  - HDR Engineering explained that the Project will require a Certificate of Environmental Compatibility and Public Need (Certificate) from the New York State Public Service Commission (PSC) pursuant to Article VII of the New York State Public Service Law.
  - Settlement discussions regarding the Certificate resulted in a Joint Proposal of Settlement (JP) signed by New York State agencies, non-governmental organizations, the City of New York and the City of Yonkers.

  - The JP includes guidelines for the Environmental Management and Control Plan(s) (EM&CP) as well as Best Management Practices (BMP) for Project construction. Both the EM&CP and BMP guidance documents include provisions for addressing cultural resources.
  - The JP also includes a proposed Water Quality Certificate pursuant to Section 401 of the Clean Water Act.
  - The PSC has received the JP and the hearing process regarding the Certificate has been completed.

- HDR Engineering provided a summary of cultural resources studies and consultation activities, including the Phase IA Addendum Study currently being completed.
- In regards to the status of studies, HDR Engineering noted that:
  - A complete Phase IA study of the Project's entire terrestrial alignment has been completed. For this study, the Phase IA "study corridor" was developed in consultation with the NYSHPO and included an area encompassing 500 feet on either side of the Project's centerline (a total of 1,000 feet).
  - Phase IB and Phase II studies have been conducted along 66 miles of the 142-mile-long overland route. This represents approximately 46 percent of the terrestrial portion of the Project.
  - CHPEI previously consulted with the NYSHPO to identify a suitable buffer distance for avoiding adverse effects to maritime archaeological resources. The NYSHPO defined a 40-meter (130-foot) buffer from the APE as generally appropriate to avoid adverse Project-related effects on maritime archaeological resources. However, the NYSHPO noted that this could be adjusted on a case-by-case basis depending on the nature of the identified resource, the analyses previously conducted by the Lake Champlain Maritime Museum, and/or the sonar signature of the resource or anomaly.
  - An analysis of previously reported shipwrecks, maritime archaeological sites, and side scan sonar data for the entire maritime portion of the Project's alignment has been completed. In most cases, the proposed transmission cable installation corridor will sufficiently avoid high priority resources.
  - In other cases, potential modifications to the Project's alignment have been proposed by NYSHPO that would allow the Project to avoid adverse effects on maritime archaeological resources or potential cultural anomalies. CHPEI is currently consulting with engineering staff to determine if potential modifications to the Project's route were feasible.
- HDR Engineering noted that the DOE has identified consulting parties, and that formal consultation with these parties has been initiated.
- The DOE proposes to develop a Programmatic Agreement (PA) pursuant to 36 CFR § 800.14(b) to address the Project's potential effects on historic properties. The PA will require development of a Cultural Resources Management Plan (CRMP) in consultation with the consulting parties prior to the initiation of Project construction activities. HDR Engineering noted that a CRMP is also required by the JP. A draft PA is anticipated in Q1 of 2013.
- The ACHP asked if the DOE could briefly address the process for meeting the requirements of Section 106. Specifically, the ACHP noted in an October 24, 2012 consultation meeting with the DOE that the DOE might wish to coordinate compliance with Section 106 with the

steps taken to meet the NEPA process. The ACHP explained during the October 24, 2012 consultation meeting that the regulations implementing Section 106 at 36 CFR § 800.8 describe the regulatory process for coordinating Section 106 and NEPA, although no applicant for a federal license or permit has pursued this coordinated approach.

- The ACHP is preparing new guidance for coordinating the Section 106 and NEPA processes, with the goal of encouraging federal agencies and applicants for federal permits or licenses to follow the regulatory approach described in 36 CFR § 800.8. During the November 28, 2012 consultation meeting, the ACHP noted that this guidance is currently under review by the Council on Environmental Quality and is expected to be released after January 1, 2013.

- At this time, the DOE does not intend to integrate compliance with Section 106 with the steps being taken to meet the NEPA process. The guidance document under development by the ACHP has not been released, and HDR EOC noted that the development of the Draft EIS (DEIS) has advanced to the point where coordination of the Section 106 and NEPA processes may require significant revisions to the DEIS. For these reasons, the DOE does not intend to pursue the consultation process described at 36 CFR § 800.8 at this time. However, the DOE agreed to revisit this issue following distribution of the ACHP's anticipated guidance document after January 1, 2013.
- At the ACHP's request, the DOE agreed to notify (in writing) Charlene Dwin Vaughn, the ACHP's Assistant Director for the Office of Federal Agency Programs, regarding the DOE's decision to intend to pursue the consultation process described at 36 CFR § 800.8 at this time.
- At the request of the NYSHPO, CHPEI also agreed to provide the NYSHPO with an electronic copy of the JP.
- The DOE noted that, although no Indian tribes participated in the meeting, the DOE would continue to invite their participation in any future Section 106 consultation meetings. CHPEI agreed to provide the Indian tribes identified by the DOE with study reports and other information relevant to the Section 106 process.
- The meeting adjourned at approximately 10:45 AM.

ATTACHMENT 1

LETTER FROM THE U.S. DEPARTMENT OF ENERGY INVITING THE CULTURAL RESOURCES WORKING GROUP TO PARTICIPATE IN THE NOVEMBER 28, 2012 CHAMPLAIN HUDSON POWER EXPRESS SECTION 106 CONSULTATION MEETING

Department of Energy
Washington, DC 20585

November 20, 2012

TO: **Attached Cultural Resources Working Group Distribution List**

SUBJECT: **Proposed Champlain Hudson Power Express Transmission Line Project Section 106 Consultation Meeting**

Dear Cultural Resources Working Group:

Champlain Hudson Power Express, Inc. has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the portions of the proposed Champlain Hudson Power Express Transmission Line Project located within the United States (Project). In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).[1] Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

The DOE has formally initiated the Section 106 consultation process with the ACHP, the New York State Historic Preservation Officer, the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, the Shinnecock Indian Nation, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding the Project. Specifically, the DOE invited the Consulting Parties to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800.

At this time, we would like to invite the Consulting Parties, federal agencies involved in this undertaking, and other potentially interested parties (collectively, the "Cultural Resources Working Group") to participate in a consultation meeting on November 28, 2012. The purpose of this meeting will be to (a) determine and document the area of potential effects (APE) for this undertaking, (b) describe the studies that have been conducted to identify historic properties that may be affected by the Project, and (c) discuss the process for completing the Section 106 process, including measures to resolve any Project-related adverse effects. This Section 106 consultation meeting will be held from 9:00 AM–12:00 PM at the offices of Hiscock and

[1] 16 USC 470 *et seq.*

Barclay, located at 80 State Street (6th floor) in Albany, New York 12207. Those wishing to participate but unable to attend in person are invited to participate via conference call. The dial-in number for the call will be 866-994-6437. Please enter conference code 989-014-9046 when prompted.

The DOE has established a website to provide information regarding the ongoing environmental review of this Project. Additional background information regarding the Project, an opportunity to subscribe to our mailing list, and more, are available at http://www.chpexpresseis.org.

Please feel free to contact me directly at any time at Brian.Mills@hq.DOE.gov, or by phone at (202) 586-8267. I look forward to meeting with you on November 28, 2012.

Very truly yours,

Mr. Brian Mills
Permitting, Siting, and Analysis, OE-20
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

Cc: Attached Distribution List

L. Jackson (DOE)
G. Lockard (HDR EOC)
R. Quiggle (HDR Engineering, Inc.)

Champlain Hudson Power Express Transmission Line Project
Cultural Resources Working Group
Distribution List

Franklin Keel, Regional Director
U.S. Bureau of Indian Affairs
Eastern Region Office
545 Marriott Drive, Suite 700
Nashville, TN, 37214

Diane Rosen, Regional Director
U.S. Bureau of Indian Affairs
Midwest Region Office
Norman Pointe II Building
5600 W. American Boulevard, Suite 500
Bloomington, MN 55347

Dan Deerinwater, Regional Director
U.S. Bureau of Indian Affairs
Southern Plains Region Office
WCD Office Complex
P.O. Box 368
Anadarko, OK 73005

Arnold Printup
Saint Regis Mohawk Tribe
Tribal Historic Preservation Office
412 State Route 37
Akwesasne, NY 13655

Kerry Holton, President
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Randy King, Chairperson
Shinnecock Indian Nation
P.O. Box 5006
Southampton, NY 11969

Robert Chicks, President
Stockbridge Munsee Community of Wisconsin
N8476 Mo He Con Nuck Road
Bowler, WI 84416

Charlene Dwin Vaughn, Assistant Director
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 2004

Lee Webb
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 2004

Stephen A. Ryba
Regulatory, Western Section
NY District U.S. Army Corps of Engineers
26 Federal Plaza, Room 1937
New York, NY 10278

Jeff Yunker
Waterways Management Coordinator
U.S. Coast Guard Sector New York
212 Coast Guard Drive
Staten Island, NY 10305

Mary K. (Missy) Morrison
Resource Planning Specialist, External Review Coordinator
National Park Service, Northeast Region
Division of Resource Planning and Compliance
200 Chestnut Street
Philadelphia, PA 19106

Donald Jessome, MBA, P.Eng
President and CEO
Transmission Developers, Inc.
600 Broadway
Albany, NY 12207

Hon. Robert B. Tierney, Chair
New York City Landmarks Preservation Commission
Municipal Building
1 Centre Street, 9th Floor
New York, NY 10007

Rose Harvey, Commissioner
New York State Office of Parks, Recreation and Historic Preservation
Albany, NY 12238

Ruth Pierpont
Deputy Commissioner/Deputy SHPO
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

John Bonafide, Director
Bureau of Technical Preservation Services
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Nancy Herter
Program Leader/Native American Liaison
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Brian Yates
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

William Helmer, Esq.
Sr. Vice President, General Counsel, and Secretary
Transmission Developers, Inc.
600 Broadway
Albany, NY12207

Attachment: November 2012 Champlain Hudson Power Express
Section 106 Consultation Meeting Presentation

Note: The latest version of the presentation is provided following the July 2013 Section 106 meeting announcement letter subsequently provided in this appendix.

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Department of Energy
Washington, DC 20585

May 14, 2013

TO: **Consulting Parties**

SUBJECT: **Champlain Hudson Power Express Transmission Line Project**
Cultural Resources Study Reports and Area of Potential Effects

Dear Consulting Parties:

Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project) across the U.S. border. In considering a Presidential Permit for the Project, the DOE evaluates the proposed transmission line as a connected action under the National Environmental Policy Act (NEPA) and is currently preparing an environmental impact statement (EIS). The DOE has the responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).[1]

The DOE formally initiated the Section 106 consultation process with the Advisory Council on Historic Preservation (ACHP), the New York State Historic Preservation Officer (NYSHPO), the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, the Shinnecock Indian Nation, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding the Project. Specifically, the DOE invited the Consulting Parties to participate in the analysis of potential environmental impacts of this Project and to formally consult with the agency pursuant to Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800. The DOE has designated Mr. Robert Quiggle, RPA, of HDR Engineering, Inc. (HDR) to coordinate consultation activities under Section 106. This letter represents consultation with the Consulting Parties identified in Attachment A to this letter regarding the proposed area of potential effects (APE) for this Project, the attached Cultural Resources Study Reports, and the proposed development of a Programmatic Agreement to address potential adverse effects of the Project.

I. BACKGROUND

CHPEI proposes to construct the Project to connect renewable sources of power generation in central and eastern Canada with the New York City load center. CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. Settlement discussions conducted under the New York State Public Service Commission's Article VII process from November 2010 through February 2012 resulted in development of a Joint Proposal that was signed by seven New York State agencies, three non-

[1] 16 USC 470 *et seq.*

governmental organizations (NGO), the City of New York, and the City of Yonkers. The Joint Proposal describes the route currently under evaluation by the DOE and other parties in the EIS.

The proposed Project under evaluation by the DOE would consist of a 1,000-megawatt (MW) underwater/underground high-voltage direct current (HVDC) controllable transmission system extending from the Canadian Province of Quebec to New York City. From the international border between the United States and Canada, two cables (consisting of a single bipole) would extend south to an HVDC converter station near Luyster Creek, north of 20th Avenue in Astoria, Queens. The converter station would be constructed on land that is currently owned by Consolidated Edison Company of New York, Inc. (ConEd).

From the Luyster Creek converter station, high-voltage alternating current (HVAC) cables would extend through Astoria, Queens, for a distance of approximately 3 miles to ConEd's Rainey Substation. In total, approximately 333 miles of proposed transmission cables would be located within the United States. CHPEI would not own or operate the Canadian portion of the transmission cables.

To the extent possible, CHPEI proposes to bury the transmission cable within existing waterways or transportation rights-of-way (ROW). CHPEI believes that this approach will minimize the visual and landscape impacts associated with traditional overhead transmission lines, while simultaneously providing the additional capacity required to meet the increasing clean energy demands of the greater New York City metropolitan area.

The ACHP's regulations at 36 CFR Part 800-Protection of Historic Properties define how federal agencies meet their statutory responsibilities pursuant to Section 106. The process described in 36 CFR Part 800 is intended to accommodate historic preservation concerns with the needs of federal undertakings through a process of consultation among agency officials, federally recognized Indian tribes, State Historic Preservation Officers, Tribal Historic Preservation Officers, and other parties, including the public, as appropriate. Pursuant to 36 CFR § 800.4, CHPEI has initiated cultural resource studies to assist the DOE and other federal agencies in identifying historic properties that may be affected by the Project.

II. AREA OF POTENTIAL EFFECTS (APE)

The DOE has initiated consultation with the NYSHPO, federally recognized Indian tribes, and other interested parties regarding the proposed APE for this Project. The DOE has defined an APE that includes the geographic area or areas within which the Project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE includes all areas along the transmission cable corridor where ground-disturbing activities will be conducted. The APE will also include areas outside the transmission cable corridor, including the converter station site, the HVAC cable alignment, transmission interconnection sites, laydown areas, access roads, and other locations that may be affected by Project construction and operations. Additionally, the APE will take into account standing historic properties (i.e., buildings, structures, individual objects, and districts) that may be indirectly affected by the use of heavy equipment, particularly along the overland sections of the Project's proposed route.

The width of the construction corridor varies based on installation techniques and environment. The excavation of the cable trench, installation of erosion and sediment control measures, installation of the cables, and stockpiling of excavated materials are expected to occur within a 25-foot-wide corridor, or 12.5 feet on either side of the Project's centerline. To accommodate additional areas beyond the footprint of the trench that may be necessary for laydown/staging areas, and to accommodate indirect effects of Project construction activities, the APE for this undertaking has been defined to include an area encompassing 25 feet on either side of the Project's centerline. The APE may be further refined through

additional engineering analyses. Table 1 describes the location, distance, and installation methods for each section of the Project.

TABLE 1.
LOCATION, DISTANCE, AND INSTALLATION METHODS FOR SECTIONS OF THE PROJECT

Section	Distance	Description
US/Canadian border to Town of Dresden	101 miles	Marine installation within Lake Champlain
Town of Dresden to Village of Whitehall	11 miles	Upland installation within the ROW of NYS Route 22
Village of Whitehall to the City of Schenectady	65 miles	Upland installation primarily along CP ROW
City of Schenectady to the Town of Rotterdam	1.3 miles	Upland installation along surface streets and within CP ROW
Town of Rotterdam to the Town of Selkirk	24 miles	Upland installation primarily along CSX ROW
Town of Selkirk to Hamlet of Cementon	29 miles	Upland installation primarily along CSX ROW
Hamlet of Cementon to Town of Stony Point	67.05 miles	Marine installation within Hudson River
Stony Point to point south of Rockland Lake State Park	7.66 miles	Upland installation including CSX ROW, NYS Route 9 and HDD beneath parkland
south of Rockland Lake State Park to Spuyten Duyvil	20.07 miles	Marine installation within Hudson River
Spuyten Duyvil to the Bronx	6.58 miles	Marine installation within Harlem River
Bronx to East River	1.1 miles	Upland installation primarily along railroad ROW
East River to Converter Station in Astoria, Queens	River crossing	Marine installation in East River
Converter Station to Rainey Substation	3 miles	HVAC installation along surface streets

In total, the Project's APE includes a 50-foot-wide corridor extending along the Project's 333-mile-long alignment from the U.S./Canadian border to ConEd's Rainey Substation. The approximate area of the APE is 20,200 acres.

On November 20, 2012, the DOE invited the Consulting Parties to participate in a consultation meeting to discuss the APE for the Project. The meeting was held on November 28, 2012 in Albany, New York, and

a teleconference line was made available to those Consulting Parties unable to attend in person. The ACHP, NYSHPO, and DOE participated in the consultation meeting.

III. CULTURAL RESOURCES STUDIES

At this time, the DOE is distributing the following reports to the Consulting Parties:

- *Phase IA Literature Review and Archaeological Sensitivity Assessment, Champlain Hudson Power Express*;
- *Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Champlain Hudson Power Express, Canadian Pacific Railway Segment*; and
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Each of these studies is described below.

Early in the permitting process CHPEI initiated cultural resources studies and informal consultation to identify historic properties within the Project's prospective area of potential APE that may be affected by this undertaking. On February 22, 2010, HDR, on behalf of CHPEI, distributed a letter to state and federal agencies, NGOs, Indian tribes, and other potential stakeholders with a prospective interest in the Project's potential effects on cultural and historic resources. The letter provided an overview of the proposed Project and included a request for additional information. The letter also described the need for additional studies to identify historic properties within the Project's vicinity and to determine the Project's potential effects on these resources.

CHPEI subsequently completed a cultural resources screening report that was distributed to resource agencies, Indian tribes, and other stakeholders on April 9, 2010. The report, entitled: *Pre-Phase IA Cultural Resources Screening Report, Champlain Hudson Power Express, Lake Champlain to Long Island*, was prepared by Hartgen Archeological Associates, Inc. (HAA, Inc.) of Albany, New York, under the direction of HDR. The screening report was developed through documentary research, including a review of information collected from the NYSHPO, the New York State Department of Environmental Conservation, the Lake Champlain Maritime Museum, and the New York State Museum. The pre-fieldwork report provided details concerning previously reported archaeological and historic resources within the Project's vicinity, as well as information regarding those resources that are potentially located within or immediately adjacent to the transmission cable corridor proposed at that time.

Based on discussions with the NYSHPO, CHPEI subsequently prepared a Phase IA literature review and archaeological sensitivity assessment of the Project's prospective APE. The Phase IA literature review and archaeological sensitivity assessment included nearly 400 linear miles of diverse environments in New York State and a proposed terminus in Connecticut. The resulting report, entitled *Phase IA Literature Review and Archaeological Sensitivity Assessment, Champlain Hudson Power Express*, was distributed to the NYSHPO, Indian tribes, and other stakeholders on September 3, 2010. The Phase IA report presented an assessment of the archaeological sensitivity and potential of the Project's prospective APE. The report also included detailed recommendations regarding additional Phase IB testing along the proposed transmission cable alignment. The Study Plan included as Appendix 1 of the Phase IA report described the recommended testing strategy for each section of the Project's proposed alignment. The testing strategy proposed in the Study Plan was developed through initial, informal consultation and discussions with the NYSHPO. The NYSHPO reviewed the Phase IA report and concurred with the methodologies proposed for the Phase IB studies (with minor modifications) in a letter dated March 14, 2010. CHPEI subsequently modified the Project's proposed alignment to avoid environmentally sensitive

areas and other resources and to remove the sections of the Project's alignment extending into Connecticut from further consideration.

At the request of CHPEI, HAA, Inc. completed Phase IB archaeological field investigations in 2010 that included subsurface testing along approximately 66 miles of the Project's proposed alignment (as proposed in August 2010) following the Canadian Pacific (CP) Railway right-of-way (ROW). The CP ROW segment of the Project investigated during 2010 segment begins at a point in Whitehall, New York, 1,850 feet north of the Poultney Street overpass, and ends at a point 197 feet southwest of the Princetown Road overpass in Rotterdam, New York. Testing indicated significant prior disturbance associated with construction of the railroad. A total of 11 archaeological sites were identified within the prospective APE. At CHPEI's request, HAA conducted Phase II archaeological site evaluations of these 11 sites to provide additional information suitable for the NYSHPO to make a determination of NRHP eligibility. Of the 11 sites, one was recommended as eligible for the NRHP, and three were recommended for avoidance or additional archaeological investigations. The results of the Phase IB and Phase II investigations were presented in HAA, Inc.'s June 2012 report, entitled *Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Champlain Hudson Power Express, Canadian Pacific Railway Segment*. The Phase IB report was submitted in draft form to the NYSHPO for review in July 2012. The NYSHPO provided comments concurring with the recommendations and findings of the draft report.

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The DOE intends to develop a PA pursuant to 36 CFR § 800.14(b) to resolve the proposed Project's potential effects on historic properties. The PA will be developed in consultation with the Consulting Parties, the public, and other interested parties, as appropriate. The PA will require CHPEI to develop a

Cultural Resources Management Plan (CRMP) for this Project in consultation with the Consulting Parties prior to initiation of Project construction activities.

The DOE is seeking written comments from the Consulting Parties regarding the Project's APE and the enclosed reports. We are also seeking your views regarding the development of a PA for this Project that will resolve any adverse effects on historic properties. We respectfully request that the Consulting Parties provide written comments on the enclosed reports, the APE, and any views regarding the development of a PA for this Project within 30 days of this letter (June 13, 2013). The DOE intends to hold a meeting or conduct a conference call with the Consulting Parties to discuss the enclosed reports, the Project's APE, and the development of a PA during the 30-day review period. Additional information regarding this proposed meeting will be distributed to the Consulting Parties within the next few weeks. Should you have any additional questions or comments regarding the Project, please feel free to contact me directly at any time at Brian.Mills@hq.DOE.gov, or by phone at (202) 586-8267.

Very truly yours,

Mr. Brian Mills
National Electricity Delivery Division
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

Cc: L. Jackson (DOE)
G. Lockard (HDR EOC)
R. Quiggle (HDR)

APPENDIX A
Champlain Hudson Power Express Transmission Line Project
Consulting Parties
Distribution List

Franklin Keel, Regional Director
U.S. Bureau of Indian Affairs
Eastern Region Office
545 Marriott Drive, Suite 700
Nashville, TN, 37214

Diane Rosen, Regional Director
U.S. Bureau of Indian Affairs
Midwest Region Office
Norman Pointe II Building
5600 W. American Boulevard, Suite 500
Bloomington, MN 55347

Dan Deerinwater, Regional Director
U.S. Bureau of Indian Affairs
Southern Plains Region Office
WCD Office Complex
P.O. Box 368
Anadarko, OK 73005

Arnold Printup
Saint Regis Mohawk Tribe
Tribal Historic Preservation Office
412 State Route 37
Akwesasne, NY 13655

Kerry Holton, President
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Randy King, Chairperson
Shinnecock Indian Nation
P.O. Box 5006
Southampton, NY 11969

Charlene Dwin Vaughn, Assistant Director
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 2004

Lee Webb
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 2004

Stephen A. Ryba
Regulatory, Western Section
NY District U.S. Army Corps of Engineers
26 Federal Plaza, Room 1937
New York, NY 10278

Mary K. (Missy) Morrison
Resource Planning Specialist, External Review Coordinator
National Park Service, Northeast Region
Division of Resource Planning and Compliance
200 Chestnut Street
Philadelphia, PA 19106

Robert Chicks, President
Stockbridge Munsee Community of Wisconsin
N8476 Mo He Con Nuck Road
Bowler, WI 84416

Donald Jessome, MBA, P.Eng
President and CEO
Transmission Developers, Inc.
600 Broadway
Albany, NY 12207

Rose Harvey, Commissioner
New York State Office of Parks, Recreation and Historic Preservation
Albany, NY 12238

Ruth Pierpont
Deputy Commissioner/Deputy SHPO
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

John Bonafide, Director
Bureau of Technical Preservation Services
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Nancy Herter
Program Leader/Native American Liaison
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Brian Yates
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

William Helmer, Esq.
Sr. Vice President, General Counsel, and Secretary
Transmission Developers, Inc.
600 Broadway
Albany, NY12207

Stockbridge-Munsee Tribal Historic Preservation Office

Sherry White - Tribal Historic Preservation Officer
W13447 Camp 14 Road
P.O. Box 70
Bowler, WI 54416

Date 5/30/13
Project Number Champlain Hudson Power Express
TCNS Number
Company Name Department of Energy

We have received your letter for the above listed project. Before we can process the request we need more information. The additional items needed are checked below.

Additional Information Required:

___ Site visit by Tribal Historic Preservation Officer
___ Archeological survey, Phase 1
___ Colored maps
___ Pictures of the site
___ Any reports the State Historic Preservation Office may have
___ Review fee of $300.00 must be included with letter
___ Has site been previously disturbed, please explain what the use was and when it was disturbed

After reviewing your letter:

___ We are in the process of gathering more information on this site and will respond to your project request once all information has been gathered.
X This project has the potential to affect a Mohican cultural site, please contact us
___ This project is not within Mohican area of interest
___ This project is within Mohican territory, but we are not aware of any cultural site within the project area.

Additional comments Please provide us with any documents we currently have the Phase IA & IA addendum Phase IB and Phase 2 Reports

Should this project inadvertently uncover a Native American site, we require you to halt all construction and notify the Stockbridge-Munsee Tribe immediately.

Please do not resubmit projects for changes that are not ground disturbance

Sherry White
Sherry White, Tribal Historic Preservation Officer

(715) 793-3970 *Email: sherry.white@mohican-nsn.gov*

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Department of Energy
Washington, DC 20585

July 12, 2013

Paula Pechonick, Chief
Delaware Tribe of Indians
170 N.E. Barbara
Bartlesville, OK 74006

SUBJECT: Proposed Champlain Hudson Power Express Transmission Line Project

Dear Ms. Pechonick:

Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the portions of the proposed Champlain Hudson Power Express Transmission Line Project across the U.S.-Canada border in northeastern New York State. In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).[a] Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. With this letter, the DOE is formally inviting the Delaware Tribe of Indians to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800. This letter also represents consultation with your office regarding the proposed Area of Potential Effects (APE) for this Project, the attached Cultural Resources Study Reports, and the proposed development of a Programmatic Agreement (PA) to address potential adverse effects of the Project on historic properties.

I. BACKGROUND

CHPEI proposes to construct the Project to connect renewable sources of power generation in central and eastern Canada with the New York City load center. CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012. Settlement discussions conducted under the New York State Public Service Commission's Article VII process from November 2010 through February 2012 resulted in development of a Joint Proposal that was signed by seven New York State agencies, three non-governmental organizations

[a] 16 USC 470 *et seq.*

(NGO), the City of New York, and the City of Yonkers. The Joint Proposal describes the route currently under evaluation by the DOE and other parties in the EIS.

The proposed Project under evaluation by the DOE would consist of a 1,000-megawatt (MW) underwater/underground high-voltage direct current (HVDC) controllable transmission system extending from the Canadian Province of Quebec to New York City. From the international border between the United States and Canada, two cables (consisting of a single bipole) would extend south to an HVDC converter station near Luyster Creek, north of 20th Avenue in Astoria, Queens. The converter station would be constructed on land that is currently owned by Consolidated Edison Company of New York, Inc. (ConEd).

From the Luyster Creek converter station, high-voltage alternating current (HVAC) cables would extend through Astoria, Queens, for a distance of approximately 3 miles to ConEd's Rainey Substation. In total, approximately 333 miles of proposed transmission cables would be located within the United States. CHPEI would not own or operate the Canadian portion of the transmission cables.

To the extent possible, CHPEI proposes to bury the transmission cable within existing waterways or transportation rights-of-way (ROW). CHPEI believes that this approach will minimize the visual and landscape impacts associated with traditional overhead transmission lines, while simultaneously providing the additional capacity required to meet the increasing clean energy demands of the greater New York City metropolitan area.

The ACHP's regulations at 36 CFR Part 800-Protection of Historic Properties define how federal agencies meet their statutory responsibilities pursuant to Section 106. The process described in 36 CFR Part 800 is intended to accommodate historic preservation concerns with the needs of federal undertakings through a process of consultation among agency officials, federally recognized Indian tribes, State Historic Preservation Officers (SHPO), Tribal Historic Preservation Officers, and other parties, including the public, as appropriate.

By letter dated January 13, 2011, the DOE formally initiated the Section 106 consultation process with the ACHP, New York SHPO (NYSHPO), Delaware Nation, St. Regis Mohawk Tribe, Stockbridge-Munsee Community, and the U.S. Bureau of Indian Affairs (BIA) (collectively the "Consulting Parties") regarding the Project. Specifically, we invited the Consulting Parties to participate in the conduct of our ongoing analysis of potential environmental impacts of this undertaking and to formally consult with us pursuant to Section 106 and its implementing regulations at 36 CFR Part 800. By letter dated November 20, 2012, the DOE also invited the Shinnecock Indian Nation to participate as a Consulting Party.

Based on subsequent consultation with BIA, the DOE has also identified the Delaware Tribe of Indians as an Indian tribe recognized and eligible to receive services from the BIA that may have a potential interest in the Project's effects on historic properties. Therefore, we are inviting the Delaware Tribe of Indians to participate as a Consulting Party and to formally consult with us regarding this undertaking pursuant to Section 106.

The DOE has determined that an Environmental Impact Statement (EIS) is the appropriate level of review under the National Environmental Policy Act (NEPA)[b] for the proposed Project, as

[b] 42 USC 4321-4347

was documented in our June 18, 2010 Notice of Intent (NOI) to prepare an EIS (75 Federal Register [FR] 34720) and the amended NOI issued on April 30, 2012 (77 FR 10304). The NOI, and amended NOI, along with background information, an opportunity to subscribe to our mailing list, and more, are available on our EIS-specific website at http://www.chpexpresseis.org.

In accordance with 36 CFR § 800.2(a)(3), the DOE has authorized our contractor, HDR Environmental, Operations and Construction, Inc. (HDR EOC), to prepare the EIS, including the analysis of the Project's potential for adverse effects on cultural resources, including historic properties as defined by Section 106 of the NHPA and its implementing regulations (36 CFR Part 800). Specifically, we have designated Dr. Greg Lockard, RPA of HDR EOC as the point-of-contact for preparing this information on behalf of the DOE. He can be reached at (571) 327-5815 or by e-mail at Gregory.Lockard@hdrinc.com. Coordination of consultation activities under the Section 106 process will be completed by Mr. Robert Quiggle, RPA, of HDR Engineering, Inc., who is working on behalf of CHPEI. Mr. Quiggle can be contacted at (315) 414-2216 or by e-mail at Robert.Quiggle@hdrinc.com. As provided in 36 CFR Part 800, the DOE remains legally responsible for findings and determinations and for the DOE's government-to-government relationships with Indian tribes.

II. AREA OF POTENTIAL EFFECTS

The DOE has defined a proposed APE that includes the geographic area or areas within which the Project may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE includes all areas along the transmission cable corridor where ground-disturbing activities will be conducted. The APE will also include areas outside the transmission cable corridor, including the converter station site, the HVAC cable alignment, transmission interconnection sites, laydown areas, access roads, and other locations that may be affected by Project construction and operations. Additionally, the APE will take into account standing historic properties (i.e., buildings, structures, individual objects, and districts) that may be indirectly affected by the use of heavy equipment, particularly along the overland sections of the Project's proposed route.

The width of the construction corridor varies based on installation techniques and environment. The excavation of the cable trench, installation of erosion and sediment control measures, installation of the cables, and stockpiling of excavated materials are expected to occur within a 25-foot-wide corridor, or 12.5 feet on either side of the Project's centerline. To accommodate additional areas beyond the footprint of the trench that may be necessary for laydown/staging areas, and to accommodate indirect effects of Project construction activities, the APE for this undertaking has been defined to include an area encompassing 25 feet on either side of the Project's centerline. The APE may be further refined through additional engineering analyses. Table 1 describes the location, distance, and installation methods for each section of the Project.

TABLE 1.
LOCATION, DISTANCE, AND INSTALLATION METHODS FOR SECTIONS OF THE PROJECT

Section	Distance	Description
US/Canadian border to Town of Dresden	101 miles	Marine installation within Lake Champlain
Town of Dresden to Village of Whitehall	11 miles	Upland installation within the ROW of NYS Route 22
Village of Whitehall to the City of Schenectady	65 miles	Upland installation primarily along CP ROW
City of Schenectady to the Town of Rotterdam	1.3 miles	Upland installation along surface streets and within CP ROW
Town of Rotterdam to the Town of Selkirk	24 miles	Upland installation primarily along CSX ROW
Town of Selkirk to Hamlet of Cementon	29 miles	Upland installation primarily along CSX ROW
Hamlet of Cementon to Town of Stony Point	67.05 miles	Marine installation within Hudson River
Stony Point to point south of Rockland Lake State Park	7.66 miles	Upland installation including CSX ROW, NYS Route 9 and HDD beneath parkland
south of Rockland Lake State Park to Spuyten Duyvil	20.07 miles	Marine installation within Hudson River
Spuyten Duyvil to the Bronx	6.58 miles	Marine installation within Harlem River
Bronx to East River	1.1 miles	Upland installation primarily along railroad ROW
East River to Converter Station in Astoria, Queens	River crossing	Marine installation in East River
Converter Station to Rainey Substation	3 miles	HVAC installation along surface streets

In total, the Project's APE includes a 50-foot-wide corridor extending along the Project's 333-mile-long alignment from the U.S./Canadian border to ConEd's Rainey Substation. The approximate area of the APE is 20,200 acres.

On November 20, 2012, the DOE invited the Consulting Parties to participate in a consultation meeting to discuss the APE for the Project. The meeting was held on November 28, 2012 in Albany, New York, and a teleconference line was made available to those Consulting Parties unable to attend in person. The ACHP, NYSHPO, and DOE participated in the consultation meeting.

III. CULTURAL RESOURCES STUDIES

Pursuant to 36 CFR § 800.4, CHPEI has initiated cultural resource studies to assist the DOE and other federal agencies in identifying historic properties that may be affected by the Project. By letter dated May 14, 2013, the DOE distributed the following cultural resources study reports to

the ACHP, (NYSHPO), Delaware Nation, St. Regis Mohawk Tribe, Stockbridge-Munsee Community, Shinnecock Indian Nation, and the BIA:

- *Phase IA Literature Review and Archaeological Sensitivity Assessment, Champlain Hudson Power Express*;
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- *Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum, Champlain Hudson Power Express Terrestrial Route Modifications.*

At this time, the DOE is transmitting a copy of the above-referenced study reports to the Delaware Tribe of Indians. Each of these studies is described below.

Early in the permitting process CHPEI initiated cultural resources studies and informal consultation to identify historic properties within the Project's prospective area of potential APE that may be affected by this undertaking. On February 22, 2010, HDR, on behalf of CHPEI, distributed a letter to state and federal agencies, NGOs, Indian tribes, and other potential stakeholders with a prospective interest in the Project's potential effects on cultural and historic resources. The letter provided an overview of the proposed Project and included a request for additional information. The letter also described the need for additional studies to identify historic properties within the Project's vicinity and to determine the Project's potential effects on these resources.

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The DOE is seeking written comments from the Delaware Tribe of Indians regarding the Project's APE and the enclosed reports. We are also seeking your views regarding the development of a PA for this Project that will resolve any adverse effects on historic properties. We respectfully request that the Delaware Tribe of Indians provide written comments on the enclosed reports, the APE, and any views regarding the development of a PA for this Project within 30 days of this letter (August 9, 2013). The DOE intends to hold a meeting or conduct a conference call with the Consulting Parties to discuss the enclosed reports, the Project's APE, and the development of a PA. Additional information regarding this proposed meeting will be distributed to the Consulting Parties within the next few weeks. Should you have any additional questions or comments regarding the Project, please feel free to contact me directly at any time at Brian.Mills@hq.DOE.gov, or by phone at (202) 586-8267.

Very truly yours,

Mr. Brian Mills
National Electricity Delivery Division
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

Cc: L. Jackson (DOE)
G. Lockard (HDR EOC)
R. Quiggle (HDR)

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Department of Energy
Washington, DC 20585

July 12, 2013

TO: **Consulting Parties**

SUBJECT: **Proposed Champlain Hudson Power Express Transmission Line Project**

Dear Consulting Parties:

Champlain Hudson Power Express, Inc. has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the portions of the proposed Champlain Hudson Power Express Transmission Line across the U.S.-Canada border in northeastern New York State. In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA).[1] Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.

The DOE formally initiated the Section 106 consultation process with the ACHP, the New York State Historic Preservation Officer (NYSHPO), the Delaware Nation, the St. Regis Mohawk Tribe, the Stockbridge-Munsee Community, the Shinnecock Indian Nation, the Delaware Tribe of Indians, and the U.S. Bureau of Indian Affairs (collectively the "Consulting Parties") regarding the Project (see Attachment A to this letter). Specifically, the DOE invited the Consulting Parties to participate in the analysis of potential environmental impacts of this Project and to formally consult with the agency pursuant to Section 106 of the NHPA and its implementing regulations at 36 CFR Part 800.

At this time, we would like to invite the Consulting Parties to participate in an upcoming consultation meeting on July 31, 2013. The purpose of this meeting will be to discuss the proposed Area of Potential Effects (APE) for this Project, the Cultural Resources Study Reports, and the proposed development of a Programmatic Agreement (PA) to address potential adverse effects of the Project on historic properties. This Section 106 consultation meeting will be held from 9:00 AM–12:00 PM (EST) at the offices of Hiscock and Barclay, located at 80 State Street (6th floor) in Albany, New York 12207. Those wishing to participate but unable to attend in person are invited to participate via conference call. The dial-in number for the call will be 866-994-6437. Please enter conference code 989-014-9046# when prompted.

[1] 16 USC 470 *et seq.*

The DOE has established a website to provide information regarding the ongoing environmental review of this Project. Additional background information regarding the Project, an opportunity to subscribe to our mailing list, and more, are available at http://www.chpexpresseis.org.

Please feel free to contact me directly at any time at Brian.Mills@hq.DOE.gov, or by phone at (202) 586-8267. I look forward to meeting with you on November July 31, 2013.

Very truly yours,

Mr. Brian Mills
National Electricity Delivery Division
Office of Electricity Delivery and
Energy Reliability
U.S. Department of Energy

Cc: L. Jackson (DOE)
G. Lockard (HDR EOC)
R. Quiggle (HDR)

APPENDIX A
Champlain Hudson Power Express Transmission Line Project
Consulting Parties
Distribution List

Franklin Keel, Regional Director
U.S. Bureau of Indian Affairs
Eastern Region Office
545 Marriott Drive, Suite 700
Nashville, TN, 37214

Diane Rosen, Regional Director
U.S. Bureau of Indian Affairs
Midwest Region Office
Norman Pointe II Building
5600 W. American Boulevard, Suite 500
Bloomington, MN 55347

Dan Deerinwater, Regional Director
U.S. Bureau of Indian Affairs
Southern Plains Region Office
WCD Office Complex
P.O. Box 368
Anadarko, OK 73005

Arnold Printup
Saint Regis Mohawk Tribe
Tribal Historic Preservation Office
412 State Route 37
Akwesasne, NY 13655

Mark Garrow, Chief
Randy Hart, Chief
Ronald La France, Chief
St. Regis Mohawk Tribe
412 State Route 37
Akwesasne, NY 13655

Randy King, Chairperson
Shinnecock Indian Nation
P.O. Box 5006
Southampton, NY 11969

Charlene Dwin Vaughn, Assistant Director
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 2004

Lee Webb
Advisory Council on Historic Preservation
Office of Federal Agency Programs
Old Post Office Building
1100 Pennsylvania Avenue NW, Suite 803
Washington, DC 2004

Robert Chicks, President
Stockbridge Munsee Community of Wisconsin
N8476 Mo He Con Nuck Road
Bowler, WI 84416

Mary K. (Missy) Morrison
Resource Planning Specialist, External Review Coordinator
National Park Service, Northeast Region
Division of Resource Planning and Compliance
200 Chestnut Street
Philadelphia, PA 19106

Sherry White
Tribal Historic Preservation Officer
Stockbridge Munsee Community of Wisconsin
P.O. Box 70
Bowler, WI 54416

Paula Pechonick, Chief
Delaware Tribe of Indians
170 N.E. Barbara
Bartlesville, OK 74006

Rose Harvey, Commissioner
New York State Office of Parks, Recreation and Historic Preservation
Albany, NY 12238

Ruth Pierpont
Deputy Commissioner/Deputy SHPO
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

John Bonafide, Director
Bureau of Technical Preservation Services
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

Nancy Herter
Program Leader/Native American Liaison
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

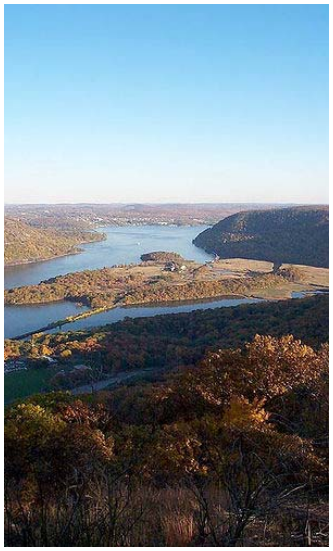
Brian Yates
New York State Historic Preservation Office
Peebles Island Resource Center
Delaware Avenue
Cohoes, NY 12047

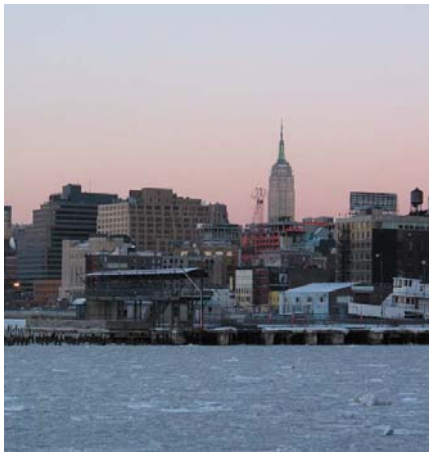
Kerry Holton, President
Delaware Nation
P.O. Box 825
Anadarko, OK 73005

Attachment: July 2013 Champlain Hudson Power Express
Section 106 Consultation Meeting Presentation

Champlain Hudson Power Express

Section 106 Consultation Meeting





July 31, 2013

Agenda

- Champlain Hudson Power Express Project
  - Project Overview
  - Regulatory Framework
- Cultural Resources
  - Regional Overview
  - Status of Cultural Resources Studies
- Next Steps
  - Programmatic Approach
  - Cultural Resources Management Plan
- Questions and Discussion

Project Introduction

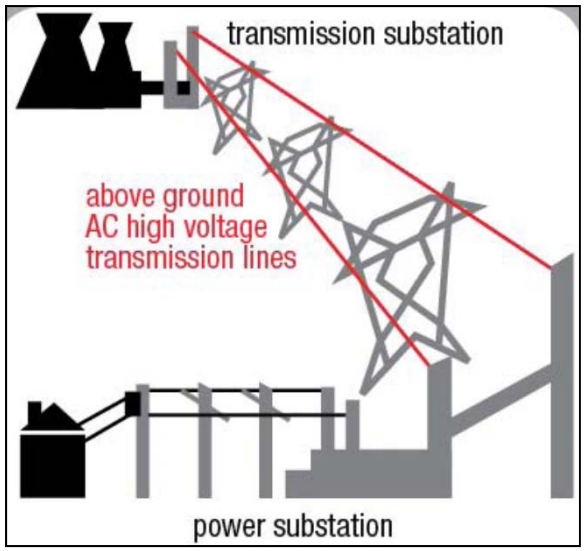
Project Introduction

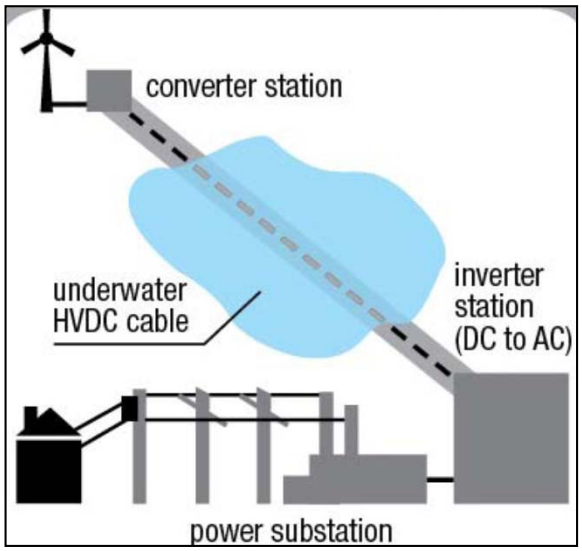
- Champlain Hudson Power Express, Inc. (CHPEI) has applied to the U.S. Department of Energy's (DOE) Office of Electricity Delivery and Energy Reliability for a Presidential Permit to construct, operate, maintain, and connect the proposed Champlain Hudson Power Express Transmission Line Project (Project).
  - The proposed Project consists of a 1,000-megawatt (MW) high-voltage direct current (HVDC) Voltage Source Converter-controllable transmission system extending from the Canadian Province of Quebec to New York City.
  - CHPEI's application for a Presidential Permit was submitted to the DOE on January 27, 2010. CHPEI subsequently modified its application on August 6, 2010; July 7, 2011; and February 28, 2012.
  - The Project will bridge the gap between renewable sources of generation in Canada and the New York City load center.

Project Introduction

Project Introduction

- Selection of HVDC technology for this Project offers significant benefits over traditional alternating current (AC) transmission systems
  - HVDC technology allows high-voltage transmission over greater distances with minimal line loss and without generation of EMF.
  - CHPEI proposes to install the cables within waterways, and within the rights-of-way (ROW) of existing transportation infrastructure, including railroads and roadways.
  - This innovative routing will avoid the adverse impacts to viewscapes associated with traditional transmission infrastructure.



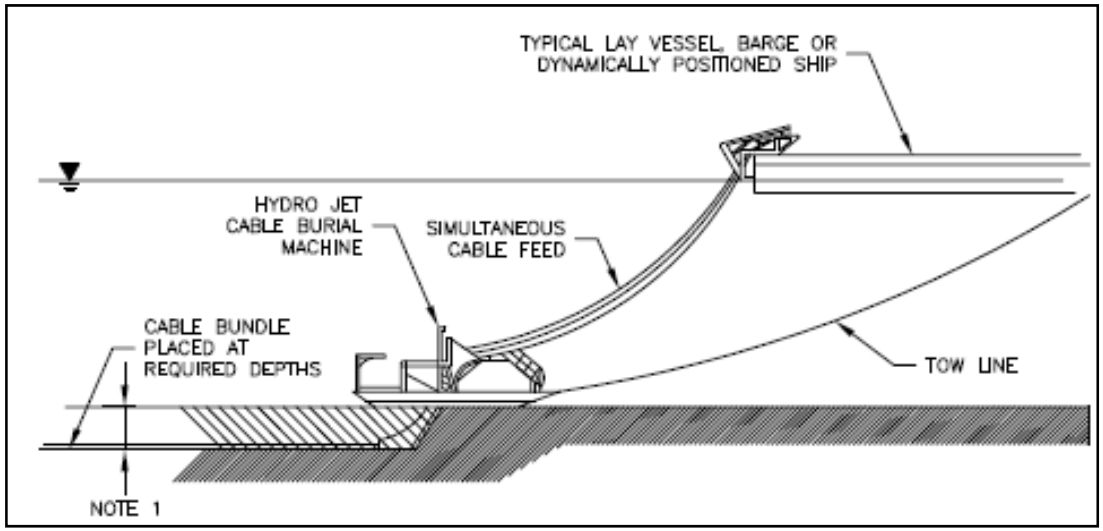


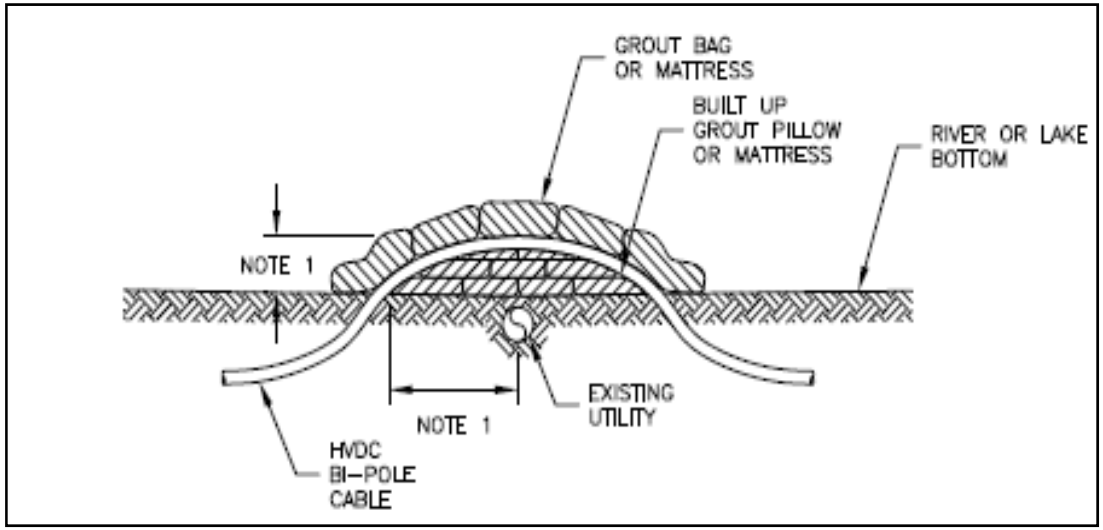
Project Introduction

- From the international border between the United States and Canada, two cables (comprising a single bipole) would extend south approximately 330 miles to an HVDC Converter Station to be located near Luyster Creek, north of 20th Avenue in Astoria, Queens.
  - Where possible, the Project will be installed along existing waterways, including Lake Champlain, the Hudson River, the Harlem River, and the East River.
  - Installation within waterways will primarily be accomplished by jet plow.
  - Shear plow or remote-operated vehicles (ROV) may be used for installation in deeper waters.
  - Target burial depth is an anticipated at 3-4 feet in Lake Champlain, 6 feet in the Hudson River, and various depths in the Harlem River. However, burial depth vary if conditions permit.
  - The maritime construction corridor is approximately 15 feet wide along lake/river bottoms.
  - If existing utilities or other infrastructure are present on the lake/river bottom, or if other conditions do not permit burial, the cable will be installed on the lake/river bottom and armored.

HDR

Project Introduction





Project Introduction

- The cables will follow an upland route when necessary to avoid environmentally sensitive areas or areas undergoing polychlorinated biphenyl (PCB) mitigation.
  - The upland sections of the Project will generally follow existing transportation infrastructure ROW, including:
    - Canadian Pacific (CP) Railway ROW
    - CSX Railroad ROW
    - New York State (NYS) Route 22
    - NYS Route 9
    - Surface Streets
  - CHPEI has also proposed to install cables via horizontal directional drilling (HDD) techniques to avoid impacts to Rockland Lakes State Park and Hook Mountain State Park
- Upland installation will generally use a cut-and-fill technique and will encompass an area within 12.5 feet from either side of the centerline. Burial depths will be approximately 3-5 feet.
- Transitions from marine to upland sections of the Project's route will be accomplished via HDD
- High-voltage AC cables will connect the Luyster Creek Converter Station to Consolidated Edison's Rainey Substation

HDR

Project Introduction

Section	Distance	Description
US/Canadian border to Town of Dresden	101 miles	Marine installation within Lake Champlain
Town of Dresden to Village of Whitehall	11 miles	Upland installation within the ROW of NYS Route 22
Village of Whitehall to the City of Schenectady	65 miles	Upland installation primarily along CP ROW
City of Schenectady to the Town of Rotterdam	1.3 miles	Upland installation along surface streets and within CP ROW
Town of Rotterdam to the Town of Selkirk	24 miles	Upland installation primarily along CSX ROW
Town of Selkirk to Hamlet of Cementon	29 miles	Upland installation along CSX ROW
Hamlet of Cementon to Town of Stony Point	67.05 miles	Marine installation within Hudson River
Stony Point to point south of Rockland Lake State Park	7.66 miles	Upland installation including CSX ROW, NYS Route 9 and HDD beneath parkland
south of Rockland Lake State Park to Spuyten Duyvil	20.07 miles	Marine installation within Hudson River
Spuyten Duyvil to the Bronx	6.58 miles	Marine installation within Harlem River
Bronx to East River	1.1 miles	Upland installation primarily along railroad ROW
East River to Converter Station in Astoria, Queens	River crossing	Marine installation in East River
Converter Station to Rainey Substation	3 miles	HVAC installation along surface streets

HDR

Project Introduction

- In addition to the Presidential Permit, the Project will require federal permits from the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act.
- The Project will also require a Certificate of Environmental Compatibility and Public Need from the NYS Public Service Commission (PSC) Pursuant to Article VII of the NYS Public Service Law. The Article VII Certificate was issued on April 18, 2013.
- Settlement discussions conducted from November 2010 through February 2012 resulted in development of a Joint Proposal that was signed by 7 NYS agencies, three non-governmental organizations (NGOs), the City of New York, and the City of Yonkers.
  - The Joint Proposal includes guidelines for the Environmental Management and Control Plan(s) (EM&CP) as well as Best Management Practices (BMP) for Project construction. Both the EM&CP and BMP guidance documents include provisions for addressing cultural resources.
  - The Joint Proposal also includes a proposed Water Quality Certification pursuant to Section 401 of the Clean Water Act.
  - The PSC approved the Joint Proposal in April 2013.

Cultural Resources

Regulatory Overview

- In considering a Presidential Permit for the Project, the DOE has the lead responsibility for compliance with applicable federal laws, regulations, and policies pertaining to historic properties, including the National Historic Preservation Act of 1966, as amended (NHPA). Section 106 of the NHPA (Section 106) directs federal agencies to take into account the effects of their undertakings on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment.
  - The DOE is the lead federal agency for purposes of consultation under Section 106.
  - The Project corridor includes portions of southeastern New York, the Hudson River Valley, and the Lake Champlain regions that have a rich history dating from the precontact period through the 20th century.
  - Early in the permitting process CHPEI initiated cultural resources studies and informal consultation to identify historic properties within the Project's prospective area of potential effects (APE) that may be affected by this undertaking.

Cultural Resources Studies

- CHPEI assembled a local and experienced team of archaeologists, architectural historians, and experts in maritime archaeology to lead the identification of historic properties.

HDR

HARTGEN
archeological associates inc

Lake Champlain
MARITIME MUSEUM

Cultural Resources Studies

- On February 22, 2010 CHPEI distributed a letter to state and federal agencies, NGOs, Indian tribes, and other potential stakeholders with a prospective interest in the Project's potential effects on cultural and historic resources.
- The letter provided an overview of the proposed Project and included a request for additional information. The letter also described the need for additional studies to identify historic properties within the Project's vicinity and to determine the Project's potential effects on these resources.
- CHPEI initiated informal consultation with the New York State Historic Preservation Officer (NYSHPO) in 2010 to discuss the Project and identify specific concerns.

Cultural Resources Studies

- Cultural resources studies were initiated in 2010.
- The study team initially compiled information from a variety of resources:
  - New York State Museum and New York State Office of Parks, Recreation, and Historic Preservation (OPRHP) site files
  - Shipwreck data from the Lake Champlain Maritime Museum (LCMM)
  - Side scan sonar images of the Hudson River provided by the New York State Department of Environmental Conservation (NYSDEC)
  - Previous cultural resources studies conducted in the Project's vicinity
  - Information regarding properties listed in the National Register of Historic Places (NRHP) or determined eligible for the NRHP
  - Information regarding National Historic Landmarks within the Project's vicinity
  - Historic maps
  - Cultural contexts for the Project area
- This information was presented in the April 9, 2010 *Pre-Phase IA Cultural Resources Screening Report* which was distributed to NYSHPO, Indian tribes, and other parties.

Cultural Resources Studies

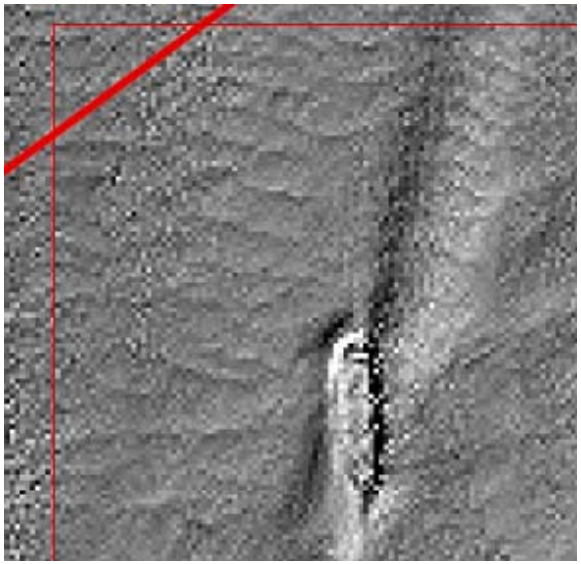
- CHPEI consulted with the NYSHPO to develop an approach to completing additional studies of the Project's prospective APE.
- A Phase IA Literature Review and Archaeological Sensitivity Assessment was prepared and distributed to the NYSHPO, Indian tribes, and other parties in September 2010. The Phase IA report included recommendations for additional studies.
  - Appendix A of the Phase IA report included a Study Plan that described the recommended testing strategy for each section of the Project's proposed alignment.
  - The testing strategy proposed in the Study Plan was developed through initial, informal consultation and discussions with the NYSHPO. The NYSHPO reviewed the Phase IA report and concurred with the methodologies proposed for the Phase IB studies (with minor modifications) in a letter dated March 14, 2011.

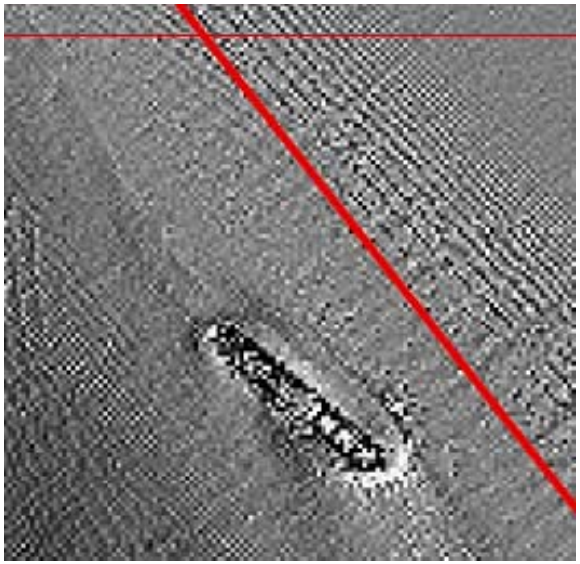
Cultural Resources Studies

- Concurrent with the Phase IA study, CHPEI undertook additional analyses to identify potential maritime archaeological resources within or adjacent to the Project's alignment.
- The LCMM and Hartgen Archaeological Associates, Inc. (HAA) conducted a comprehensive review of side scan sonar data collected for the Project's maritime route to identify known shipwrecks, potential shipwrecks, and other anomalies that may represent cultural deposits.
- Maritime archaeological resources and anomalies were identified by the LCMM and HAA, Inc. through an analysis of side scan sonar data collected along the extent of proposed maritime sections of the Project's prospective APE.
  - The side scan sonar data was compared to information available from existing archaeological site files, historical records regarding shipwrecks, previous studies conducted by the LCMM and others within Lake Champlain and the Hudson River, and other sources of information regarding known, reported, or potential cultural resources within the Lake Champlain, Hudson River, Harlem River, and East River sections of the Project's APE.

Cultural Resources Studies

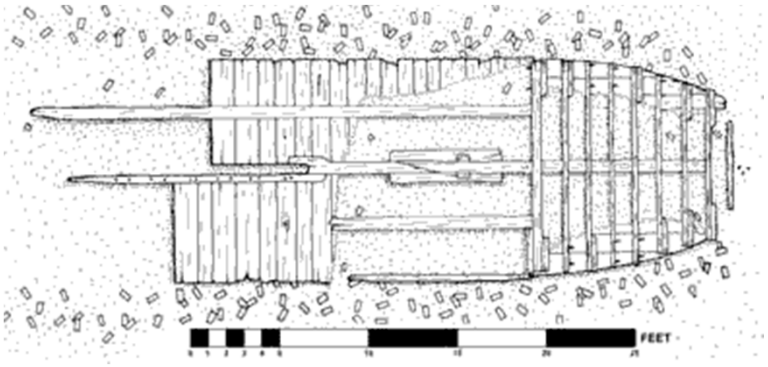
- The comprehensive analysis conducted by the LCMM and HAA, Inc. resulted in the development of a geographic information system (GIS) database of maritime archaeological resources and anomalies identified by the LCMM within approximately 300 meters (984 feet) of the Project's centerline.
- In 2011, modifications to the Project's alignment along an 80-kilometer (50-mile) segment of the proposed transmission cable corridor within the Hudson River required a reanalysis of side scan sonar data provided by the NYSDEC. This analysis of NYSDEC data identified maritime archaeological resources and anomalies and within 100 meters (328 feet) along sections of the Hudson River.

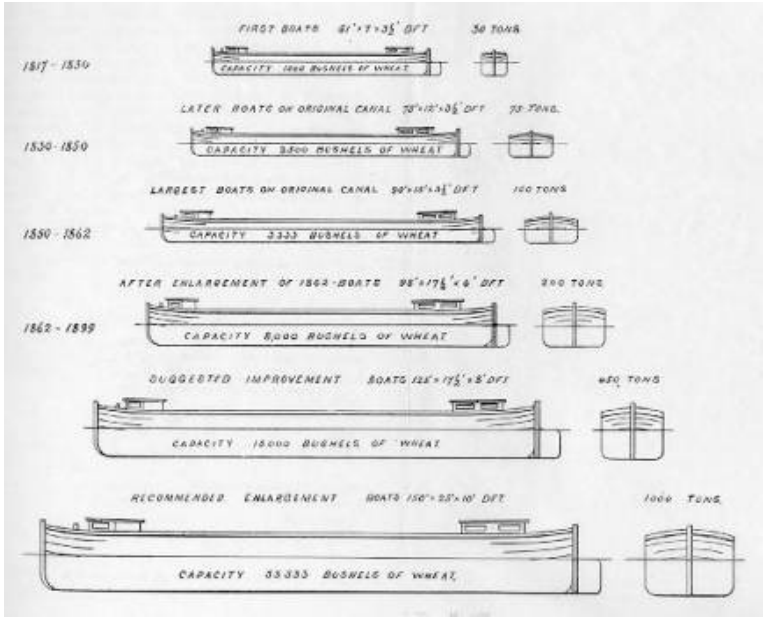




Cultural Resources Studies

- CHPEI consulted with the NYSHPO to identify a suitable buffer distance for avoiding adverse effects on maritime archaeological resources.
- The NYSHPO determined that a 40-meter (131-foot) buffer from the APE was generally appropriate to avoid adverse Project-related effects on maritime archaeological resources.
  - NYSHPO noted that this buffer could be adjusted on a case-by-case basis depending on the nature of the identified resource, analyses conducted by the LCMM, and/or the sonar signature of the resource or anomaly.

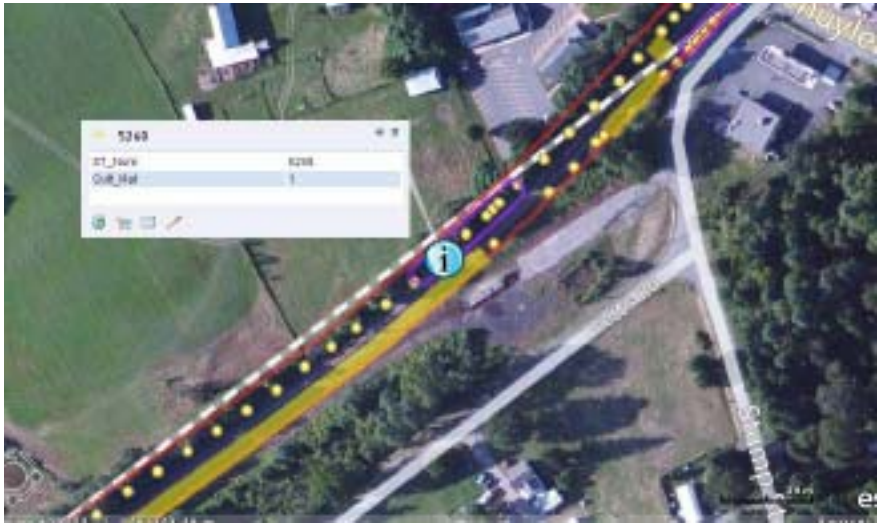




Cultural Resources Studies

- Based on the study methodology approved by the NYSHPO, CHPEI conducted Phase IB Archaeological Field Reconnaissance along portions of the Project's alignment in 2010.
  - HAA conducted subsurface testing along approximately 66 miles of the CP ROW.
  - Testing indicated significant prior disturbance associated with construction of the railroad.
  - A total of 11 archaeological sites were identified within the prospective APE.
  - At CHPEI's request, HAA conducted Phase II Archaeological Evaluations of these 11 sites to provide additional information suitable for the NYSHPO to make a determination of NRHP eligibility.
  - Of the 11 sites, 1 was recommended as eligible for the NRHP, and 3 were recommended for avoidance or additional archaeological investigations.
- The Phase IB report was submitted in draft form to the NYSHPO for review in July 2012. The NYSHPO provided comments concurring with the recommendations and findings of the draft report.

Cultural Resources Studies



Cultural Resources Studies

- In 2012, HAA conducted a Phase IA Addendum Study to identify reported archeological sites, historic properties, and previously completed archeological investigations along new sections of the Project's alignment that were not considered in the 2010 Phase IA report.

Route Segment	Approximate Length (miles)
NY Route 22 (Dresden to Whitehall)	11
Rotterdam to Selkirk (CSX Railroad ROW)	22
Selkirk to Cementon	29
Haverstraw Bay Bypass	8
Hell Gate Bypass	1.2
Total	**71.2 miles**

Cultural Resources Studies

- Study Status
  - A complete Phase IA study of the Project's entire terrestrial alignment has been completed. For this study, the Phase IA "study corridor" was developed in consultation with the NYSHPO and includes an area encompassing 500 feet on either side of the Project's centerline (a total of 1,000 feet).
    - The broad study corridor assists in documenting the cultural setting and archaeological sensitivity of the Project Area.
  - Phase IB and Phase II studies have been conducted along 66 miles of the 142-mile long overland route. This represents approximately 46 percent of the terrestrial portion of the Project.
  - An analysis of previously reported shipwrecks, maritime archaeological sites, and side scan sonar data for the entire maritime portion of the Project's alignment has been completed.

Cultural Resources Studies

- Summary of Findings (Terrestrial Sections)
  - A total of 268 resources have been reported within the 1,000-foot-wide study corridor, including archaeological sites, properties listed in the NRHP, and properties previously determined eligible for the NRHP.
  - Of these, only 68 are located within 25 feet of the terrestrial sections Project's centerline (12.5 feet on either side of the centerline).

Reported Terrestrial Resources within 25 feet of the Project's Centerline	
Resource Type	Number
Archaeological Sites*	47
NRHP-eligible properties	13
NRHP-listed properties	8
National Historic Landmarks	0
Total	**68**

*Represents reported number. Only 4 archaeological sites recommended as eligible or potentially eligible for the NRHP have been confirmed through field investigations

Cultural Resources Studies

- Summary of Findings (Maritime Sections)
  - The NYSHPO has established a 40-meter buffer for avoidance around shipwrecks or anomalies.
  - CHPEI, HDR, and HAA reviewed shipwreck and anomaly data with the NYSHPO in September 2012 to identify shipwrecks and anomalies along the maritime sections of the route that may require avoidance or mitigation.
  - The buffer area for over 100 shipwrecks or anomalies may intersect with the prospective APE.
    - CHPEI's preference is to avoid these shipwrecks and/or anomalies. Additional side scan sonar data is currently being collected to identify certain anomalies and to determine if avoidance or mitigation of these is required.
    - CHPEI is currently assessing the engineering feasibility for avoidance, and has identified avoidance options for a majority of these resources in consultation with the NYSHPO.

Cultural Resources Studies

- The DOE formally initiated consultation under Section 106 by letter dated January 13, 2011. The DOE has identified the following Consulting Parties:
  - ACHP
  - NYSHPO
  - St. Regis Mohawk Tribe
  - Delaware Nation
  - Stockbridge-Munsee Community
  - Shinnecock Indian Nation (November 20, 2012)
  - Delaware Tribe (July 12, 2013)
  - Bureau of Indian Affairs
- By letter dated May 14, 2013, the DOE initiated formal consultation with the Consulting Parties* regarding the Project's APE.
  - The APE is defined to include a 25-foot area on either side of the Project's centerline.
  - The APE includes the construction corridor (approximately 12.5 feet on either side of the Project's centerline), as well as additional areas that may be necessary for laydown, staging, and to accommodate indirect effects.

*Consultation with the Delaware Tribe regarding the APE was initiated on July 12, 2013

Cultural Resources Studies

- The DOE distributed the following study reports to the Consulting Parties on May 14, 2013*:
  - Phase IA Literature Review and Archaeological Sensitivity Assessment
  - Phase IB Archaeological Field Reconnaissance and Phase II Archaeological Site Evaluation, Canadian Pacific Railway Segment
  - Phase IA Literature Review and Archaeological Sensitivity Assessment Addendum
- To date, the DOE has not received any comments regarding the results or recommendations presented in these study reports.

*The reports were distributed to the Delaware Tribe on July 12, 2013

Next Steps

- The DOE currently intends to develop a Programmatic Agreement (PA) pursuant to 36 CFR Part 800.14(b) to address the proposed Project's potential effects on historic properties.
- A PA is appropriate for this undertaking:
  - Cultural resources studies are ongoing, but significant data characterizing historic properties within or potentially within the APE has been collected.
  - CHPEI anticipates that the DOE will issue a Presidential Permit prior to completion of all cultural resources studies, and therefore the effects on all properties cannot be fully determined prior to approval of this undertaking.
  - A PA is consistent with the provisions in the Joint Proposal, including the EM&CP and BMPs.
- The DOE will consult with the Consulting Parties to develop a PA.
- The PA will require the development of a Cultural Resources Management Plan (CRMP) for this Project in consultation with the Consulting Parties prior to the initiation of construction activities.
- A CRMP is also required under the Joint Proposal.

Next Steps

- At minimum, the CRMP will address:
  - Completion of additional studies, as necessary, to assess potential Project effects
  - Control measures to avoid Project effects on identified archaeological resources.
  - The process for conducting additional evaluations, as necessary, to determine the NRHP eligibility of archaeological sites that cannot reasonably be avoided by Project construction activities.
  - Procedures for determining the appropriate measures to minimize or mitigate adverse effects on historic properties that cannot reasonably be avoided by Project construction activities.
  - Procedures for the unanticipated discovery of archaeological resources.
  - Procedures for the unanticipated discovery of human remains.
  - Identification and proposed treatment, avoidance, or mitigation of Project effects on properties of traditional religious or cultural significance.
  - Parties responsible for coordinating activities conducted under the CRMP, including coordinating consultation and maintenance of relevant records.
  - The use of qualified cultural resources professionals.
  - CHPEI staff/contractor training requirements.
  - Appropriate standards for cultural resources investigations.
  - Standards and processes for artifact curation and/or repatriation.
  - Procedures for amendment to the CRMP.
  - Consultation requirements and contacts.
  - Scheduling considerations.

Questions/Discussion

APPENDIX K

Visual and Recreational Resources along Proposed CHPE Project Route

Appendix K
Visual and Recreational Resources along Proposed CHPE Project Route

The aesthetic and recreational resources found along the proposed CHPE Project route are described in the following tables:

- **Table K-1.** Lake Champlain Segment Recreational Activities
- **Table K-2.** Overland Segment Recreational Activities
- **Table K-3.** Hudson River Segment Recreation Activities
- **Table K-4.** New York City Metropolitan Area Segment Recreation Activities

Table K-1. Lake Champlain Segment Recreational Activities

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Lakes to Locks Passage Scenic Byway	1 to 90	Byway follows Lake Champlain	National Scenic Byway	Boating, fishing, swimming, sailing, kayaking, canoeing, waterskiing, boating, golfing, hiking and biking trails, bird watching areas, cross-country skiing, ice fishing, ice skating, and snowshoeing (LCR 2012a, LCR 2012b).
Adirondack Park	1 to 145	Borders Lake Champlain, New York State Route 22, and CP railroad ROW	State Park	Boating, camping, picnicking, hiking, cycling, hunting, fishing, swimming, downhill and cross-country skiing, ice skating, and snowshoeing (ARTC 2012).
Kings Bay Wildlife Management Area	2 to 5	Kings Bay, NY	State Wildlife Management Area	Walking and hiking trails, hunting, fishing, and bird watching (NYSDEC 2012cc)
Point Au Roche State Park	17 to 19	Point Au Roche, NY	State Park	Swimming, boating, picnicking, hiking, biking, cross-country skiing, snowshoeing, ice fishing, sports fields, boat launches, and playgrounds (NYS OPRHP 2012e)
Valcour Island Primitive Area	28 to 30	Plattsburg, NY	State Nature and Historical Preserve	Hiking, wildlife viewing and hunting, bird watching (NYSDEC 2006b)
Schuyler Island Primitive Area	37 to 38	Port Douglass, NY	State Nature and Historical Preserve	Kayaking, camping, and hiking (ARTC 2012)
Split Rock Wild Forest	56 to 62	Westport, NY	State Nature and Historic Preserve	Hiking, camping, mountain biking, rock climbing, fishing, hunting, cross-country skiing, ice climbing, trapping, and snowmobiling (NYSDEC 2012dd)
Kingsland Bay State Park	57 to 58	Ferrisburg, VT	State Park	Canoeing, kayaking, swimming, fishing, sailing, picnicking, and hiking/walking (VTSP 2009a)

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Button Bay State Park	63	Vergennes, VT	State Park	Swimming, picnicking, boating, fishing, sailing, and hiking (VTSP 2009b)
D.A.R. State Park	72	Chimney Point, VT	State Park	Camping, picnicking, hunting, and fishing (VTSP 2009c)
Crown Point Campground	73	Crown Point, NY	State Nature and Historical Preserve	Camping, boating, fishing, and picnicking (NYSDEC 2012ee)
Chimney Point State Historic Site	73	Chimney Point, VT	State Historic Site	Educational programs, walking tours, and a museum (VSHS 2012)
Crown Point State Historic Site	73 to 75	Crown Point, NY	State Park	Educational programs, biking, hiking, a museum, picnicking, and cross-country skiing (NYS OPRHP 2012a)
Putts Creek Wildlife Management Area	79	Putts Creek, NY	State Wildlife Management Area	Fishing, hiking, snowshoeing, cross-country skiing, bird watching, and hunting (NYSDEC 2012ff)
Lake George Wild Forest	93 to 94, 96 to 97	Putnam, NY	State Nature and Historical Preserve	Fishing, ice fishing, snowmobiling, camping, hiking/walking trails, picnicking, and horseback riding (NYSDEC 2012gg)

Sources: CHPEI 2010, NYSDEC 2012m, NPS 2012a, USDOT-FHWA 2012a

Table K-2. Overland Segment Recreational Activities

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
South Bay Boat Launch and Pier	110	Whitehall, NY	State Park	Fishing (NYSDEC 2012s)
Champlain Canalway Trail	112 to 135	Whitehall, NY to Fort Edward, NY	Local Park	Jogging and walking trails (CCTWG 2011)
McIntyre Park and Bradley Park	135	Fort Edward, NY	Local Park	Playground, picnicking, tennis courts, and sports fields (Village of Walden 2011)
Ganesvoort Town Park, Bertha Smith Park	141	Gansevoort, NY	Local Parks	Playground, picnicking, and sports fields (Northumberland 2006)
Wilton Wildlife Preserve and Park	145 to 146	Ballard Corners, NY	State Wildlife Management Area	Walking trails, science-based habitat restoration, management activities, and recreational opportunities for children and the general public (WWPP 2012)
Gavin Park	149	Saratoga Springs, NY	Local Park	Playground, gymnasium, sports fields, and tennis courts (Town of Wilton 2006)
Geyser Park	154	Saratoga Springs, NY	Local Park	
Saratoga Spa State Park	154 to 158	Saratoga Springs, NY	State Park	Biking, hiking, fishing, swimming, tennis, golf, snowshoeing, cross-country skiing and ice skating, museum/visitor center, playgrounds, and picnicking (NYS OPRHP 2012b).
Saratoga State Tree Nursery	156	Saratoga Springs, NY	State tree nursery	Tree nursery
Woods Hollow Nature Preserve	157	North Ballston Spa, NY	Local Park	Hiking trails, ice skating, and fishing (Town of Milton 2012)
William S. Kelley Park/Spensieri Park	158	North Ballston Spa, NY	Local Parks	Playgrounds and sports fields

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Indian Kill Nature Preserve	168	Burnt Hills, NY	Local Park	Hiking, nature study, fishing, cross-country skiing, and snowshoeing (Schenectady County 2007)
Clifton Park	168	Burnt Hills, NY	Local Park	
Rexford Aqueduct	170	Schenectady, NY	Local Park	Hiking, walking, and jogging trails (Trails.com 2012)
Carrie St. Park	172	Schenectady, NY	Local Park	
Mohawk Towpath Byway	172 to 174	Schenectady, NY	National Scenic Byway	Walking, picnicking, and biking (MTSBC 2012)
South Ave. Park, Front St. Park, Riverside Park, Liberty Park, Pulaski Park, and Veterans' Park	173	Schenectady, NY	Local Parks	Swimming, walking, and playgrounds (City of Schenectady 2006)
Orchard Park	174	Schenectady, NY	Local Park	
Hillhurst Park, Fairview Park, Westinghouse Park	175	Schenectady, NY	Local Parks	
Roger Keenholts Park, Tawasentha Park	184	Guilderland, NY	Local Parks	Sports fields, picnicking, tennis courts, swimming, hiking and biking trails, fishing, kayaking, canoeing, gardening, and snowshoeing (Town of Guilderland 2012a, Town of Guilderland 2012b)
Black Creek Marsh Wildlife Management Area	187	Voorheesville, NY	State Wildlife Management Area	Walking and bird watching (NYSDEC 2012ii)
Jim Nichols Park, Evergreen Park, New Scotland Town Park, Scotch Pine Park	188 to 189	Voorheesville, NY	Local Parks	Playgrounds and sports fields (Village of Voorheesville 2009)
Five Rivers Environmental Education Center	191	New Scotland, NY	Outdoor Education Center	Walking, skiing, and bird watching (NYSDEC 2012r)

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Feura Bush Park	193	Feura Bush, NY	Local Park	Amusement Park
Selkirk Park	199	Selkirk, NY	Local Park	Biking, picnicking, and playgrounds (Town of Bethlehem 2013)
Mosher Park	203	Ravena, NY	Local Park	
Schodack Island State Park	2 to 8 miles southeast of 199	Schodack Landing, NY	State Park	Biking, boating, fishing, hiking, hunting, picnicking, playgrounds, ice skating, sports fields, and cross-country skiing (NYS OPRHP 2012g)
Columbia-Greene North SASS	2 to 20 miles southeast of 199	Schodack Landing, NY to Hudson, NY	Scenic Area of Statewide Significance	Aesthetic resource
Hudson River Islands State Park	15 to 16 miles southeast of 199	Coxsackie, NY	State Park	Camping, fishing, picnicking, hunting, hiking, nature trails, and boating (NYS OPRHP 2012h)
Four Mile Point Park	16 miles southeast of 199	Coxsackie, NY	Local Park	Bird watching, fishing, kayaking, canoeing, picnicking, walking, cross-country skiing, and snowshoeing (Scenic Hudson 2012c)
Middle Grounds Flat Unique Area	10 to 12 miles north of 228	Athens, NY	State Nature and Historical Preserve	Aesthetic resource
Green Port Town Park and Athens Boat Launch	11 miles north of 228	Athens, NY	Local Parks	Playgrounds, sports fields, and boat launches
Brandow Point Unique Area	9 miles north of 228	Athens, NY	State Nature and Historical Preserve	Aesthetic resource
Rogers Island Wildlife Management Area	7 to 8 miles north of 228	Athens, NY	State Wildlife Management Area	Boating, bird watching, snowshoeing, hunting, fishing, and trapping (NYSDEC 2012t)
Dutchman's Landing Park	6 miles north of 228	Catskill, NY	Local Park	Boating and playgrounds (Catskill.com 2012)

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Olana State Historic Site	6 miles north of 228	Catskill, NY	National Register of Historic Places and State Park	Aesthetic resource
Ernest R. Lasher Memorial Park	1 mile north of 228	Catskill, NY	Local Park	Boating, swimming, and picnicking (Town of Germantown 2009)
New Baltimore Detached Parcel	210	Coxsackie, NY	State Park	
Elliot Park	222	Catskill, NY	Local Park	
Catskill-Olana SASS	222 to 226	Catskill, NY	Scenic Area of Statewide Significance	Aesthetic resource

Sources: CHPEI 2010, NYSDEC 2012m, NPS 2012a, USDOT-FHWA 2012a

Table K-3. Hudson River Segment Recreation Activities

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Ulster-North SASS	230 to 246	Various	Scenic Area of Statewide Significance	Aesthetic resource
Estates District SASS	230 to 257	Various	Scenic Area of Statewide Significance	Aesthetic resource
Bristol Beach State Park	232	Maiden, NY	State Park	Swimming (PPC 2012a)
Seamon Park	233	Saugerties, NY	Local Park	
Clermont State Historic Site	233	Tivoli, NY	State Park	
Tivoli Bays Wildlife Management Area	235 to 238	Tivoli, NY	State Wildlife Management Area	Educational programs and canoeing (NYSDEC 2012y)
Town of Saugerties Glasco Mini Park	237	Glasco, NY	Local Park	
Ulster Landing State Park	238	Ulster Landing, NY	State Park	
Poet's Walk Park	239	Barrytown, NY	Local Park	
Charles Rider Park, Robert E. Post Memorial Park	240	East Kingston, NY	Local Parks	
Kingston Point Park	244	Kingston, NY	Local Park	
George H. Freer Memorial Park	245	Port Ewen, NY	Local Park	
Esopus Lloyd SASS	247 to 265	Various	Scenic Area of Statewide Significance	Aesthetic resource
Ogden Mills and Ruth Livingston Mills Memorial State Park	249 to 251	Staatsburg, NY	State Park	
Maragaret Lewis Norrie State Park	250 to 252	Staatsburg, NY	State Park	
Vanderbilt Mansion National Historic Site	254	Hyde Park, NY	National Register of Historic Places	Cultural resource

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Home of Franklin D. Roosevelt National Historic Site	256	Hyde Park, NY	National Register of Historic Places	Cultural resource
Quiet Cove Riverfront Park	259	Poughkeepsie, NY	Local Park	
Walkway Over the Hudson State Historic Park	260	Poughkeepsie, NY	National Register of Historic Places	
Victor C. Waryas Park, Kaal Rock Park, Eastman Park	261	Poughkeepsie, NY	Local Parks	
Dutchess County Bowdoin Park	267 to 268	Wappinger Falls, NY	Local Park	
Castle Point Park	272	Beacon, NY	Local Park	
Riverfront Park	275	Beacon, NY	Local Park	
Hudson Highlands SASS	276 to 298	Various	Scenic Area of Statewide Significance	Aesthetic resource
Washington's Headquarters	276	Newburgh, NY	National Register of Historic Places and State Park	Cultural resource
Dutchess Junction Park	276	Dutchess Junction, NY	Local Park	
Hudson Highlands State Park	277 to 281, 289 to 292	Various	State Park	
Knox Headquarters	279	Cornwall-on-Hudson, NY	National Register of Historic Places and State Park	Cultural resource
Donahue Memorial Park	279	Cornwall-on-Hudson, NY	Local Park	
Storm King State Park	280 to 282	Various	State Park	
Bear Mountain State Park	289 to 294	Fort Montgomery, NY	State Park	
Iona Island Marsh National Natural Landmark	290	Fort Montgomery, NY	National Natural Landmark	Cultural resource
Riverfront Green Park	292	Peekskill, NY	Local Park	

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Stony Point Battlefield State Historic Site	296	Stony Point, NY	National Register of Historic Places and State Park	Walking tours and educational programs (NYS OPRHP 2012c)
George's Island County Park	1 mile south of 296	Montrose Point, NY	Local Park	Picnicking, playgrounds, athletic fields, biking, boating, and fishing (Westchester County 2012)
Oscawana County Park	2 miles south of 296	Montrose Point, NY	Local Park	Camping, hiking, biking, fishing, boating, and nature trails (RecreationParks.net 2012)
Bowline Point Town Park	298	Haverstraw, NY	Local Park	Swimming, playgrounds, tennis courts, and fishing
Haverstraw Baseball Fields	298	Haverstraw, NY	Local Park	Baseball fields
High Tor State Park	299 to 301	Haverstraw, NY	State Park	Picnicking, swimming, and hiking
Hook Mountain State Park, Hook Mountain National Natural Landmark, Haverstraw Beach State Park	301 to 306	Haverstraw, NY	State Parks and National Natural Landmark	Swimming, biking, walking, bird watching, and picnicking (NY-NJ TC 2012, PPC 2012b)
Rockland Lake State Park, Nyack Beach State Park	304 to 307	Haverstraw, NY	State Parks	Swimming, tennis courts, boating, bird watching, walking, biking, and golfing (PPC 2012c)
Rockwood Hall State Park	306	Sleepy Hollow, NY	State Park	Running, hiking, picnicking, and horseback riding (Westchester Secret Gardens 2012)
DeVries Park, Losee Park	309	Tarrytown, NY	Local Parks	Picnicking and playground (Village of Tarrytown 2012)
Tallman Mountain State Park	312 to 314	Sparkill, NY	State Park	Biking, picnicking, playgrounds, athletic fields, and cross-country skiing (NYS OPRHP 2012i)

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Palisades Park	314 to 323	Various	National Register of Historic Places and National Natural Landmark	Cultural resource
Untermyer Park	317	Yonkers, NY	Local Park	Gardening
Trevor Park, JFK Marina and Park	318	Glenwood, NY	Local Parks	Boating
Philipse Manor Hall	319	Yonkers, NY	National Historic Landmark and State Park	Educational programs and tours (NYS OPRHP 2012d)
War Memorial Field	319	Yonkers, NY	Local Park	Sports fields and playgrounds (City of Yonkers 2012)
Esplanade Park	319	Yonkers, NY	Local Park	Walking and picnicking (Scenic Hudson 2012a)
Habirshaw Park	319	Yonkers, NY	Local Park	Walking, bird watching, and picnicking (Scenic Hudson 2012b)
Riverdale Park	322	Yonkers, NY	Local Park	Dog park (NYC Parks 2012c)
Inwood Hill Park	324	Washington Heights, NY	Local Park	Picnicking, sports fields, dog park, kayaking, playgrounds, tennis courts, and a marina (NYC Parks 2012d)

Sources: CHPEI 2010, NYSDEC 2012m, NPS 2012a, USDOT-FHWA 2012a

Table K-4. New York City Metropolitan Area Segment Recreation Activities

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Fort Tryon Park	326	Washington Heights, NY	Local Park	Basketball courts, dog park, playgrounds, and exercise equipment (NYC Parks 2012e)
Roberto Clemente State Park	326 to 327	Washington Heights, NY	State Park	Water park, swimming, gymnasium, picnicking, and sports fields (NYS OPRHP 2012f)
Swindler Cove, Sherman Creek Park	327	Washington Heights, NY	Local Park	Boating, nature center, walking trails, gardens, and bird watching (NYRP 2013)
Highbridge Park	326 to 328	Harlem, NY	Local Park	Picnicking, sports fields, dog park, exercise equipment, and a recreation center (NYC Parks 2012f)
Fort Washington Park	326 to 328	Washington Heights, NY	Local Park	Picnicking, sports fields, dog park, and playgrounds (NYC Parks 2012g)
Randall's Island Park	330 to 331	Queens, NY	Local Park	Picnicking, biking and walking trails, golfing, sports fields, and tennis courts (NYC Parks 2012a)
Wards Island Park	South of 331	Queens, NY	Local Park	Picnicking, sports fields, and playgrounds (NYC Parks 2012h)
Federation of Italian American Organizations of Queens, Inc., soccer fields	333	Queens, NY	Private athletic fields	Sports fields (soccer) (FIAOQ 2013)
Immaculate Conception Youth Program of Astoria baseball fields	333	Queens, NY	Private athletic fields	Sports fields (baseball) (ICYP 2013)
Woodtree Playground	334	Queens, NY	Local Park	Handball courts and playgrounds (NYC Parks 2013a)
Steinway Playground	334	Queens, NY	Local Park	Handball courts and playgrounds (NYC Parks 2013b)

Aesthetic Resource	Milepost	Location	Resource Type	Recreational Facility/Activity
Astoria Park	334	Queens, NY	Local Park	Picnicking, dog park, exercise equipment, swimming, skate park, sports courts, running tracks, and playgrounds (NYC Parks 2012i)
Chappetto Square	335	Queens, NY	Local Park	Sports courts (hockey rink) (NYC Parks 2013c)
Triborough Bridge Playgrounds B and C	335	Queens, NY	Local Park	Playground
Astoria Health Playground	335	Queens, NY	Local Park	Playground
Rainey Park	336	Queens, NY	Local Park	Sports fields (baseball) and playground

Sources: CHPEI 2010, NYSDEC 2012m, NPS 2012a, USDOT-FHWA 2012a

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APPENDIX L

Environmental Justice Analysis Background Information

Appendix L
Environmental Justice Analysis Background Information

Appendix L presents demographic data for census tracts along the proposed CHPE Project route. Tables are broken down by county and contain information relating to population, percent minority, percent white, median income, and percent of families below the poverty level. Census tracts along the terrestrial portions of the CHPE Project route are shaded in gray.

Appendix L contains the following tables:

- **Table L-1.** Lake Champlain Segment Census Tract Data
- **Table L-2.** Overland Segment Census Tract Data
- **Table L-3.** Hudson River Segment Census Tract Data
- **Table L-4.** New York City Metropolitan Area Segment Census Tract Data

Table L-1. Lake Champlain Segment Census Tract Data

Geographies	County	Population	Percent Minority	Percent White	Median Income	Percent Family Below Poverty Level
New York State	n/a	19,378,102	41.7	58.3	$55,217	11.0
Clinton County	Clinton	82,128	8.9	91.1	$46,843	9.4
Census Tract 1001	Clinton	5,754	4.0	96.0	$50,833	7.9
Census Tract 1002	Clinton	4,284	3.1	96.9	$55,733	5.3
Census Tract 1006	Clinton	5,545	4.0	96.0	$70,709	3.2
Census Tract 1008	Clinton	4,412	6.7	93.3	$56,585	7.5
Census Tract 1019	Clinton	6,998	4.7	95.3	$54,707	7.5
Census Tract 1020	Clinton	3,146	4.5	95.5	$38,688	14.6
Census Tract 1021	Clinton	2,120	10.0	90.0	$54,423	15.6
Essex County	Essex	39,370	7.1	92.9	$44,734	7.4
Census Tract 9601	Essex	2,445	2.4	97.6	$49,470	7.2
Census Tract 9607	Essex	2,053	3.4	96.6	$47,625	9.8
Census Tract 9608	Essex	2,025	2.8	97.2	$45,020	8.3
Census Tract 9609	Essex	3,580	3.5	96.5	$51,438	8.6
Census Tract 9610	Essex	4,798	5.0	95.0	$40,169	9.1
Census Tract 9611	Essex	2,024	2.8	97.2	$53,378	4.3
Census Tract 9612	Essex	5,042	3.5	96.5	$35,608	12.7
Washington County	Washington	63,216	6.7	93.3	$48,565	9.3
Census Tract 820.02	Washington	1,261	2.7	97.3	$41,800	16.8

Source: USCB 2012b

Table L-2. Overland Segment Census Tract Data

Geographies	County	Population	Percent Minority	Percent White	Median Income	Percent Family Below Poverty Level
New York State	n/a	19,378,102	41.7	58.3	$55,217	11
Albany County	Albany	304,204	24.0	76.0	$56,424	7.3
Census Tract 143.01	Albany	2,852	16.5	83.5	$68,482	2.6
Census Tract 143.02	Albany	7,792	11.1	88.9	$90,136	1.3
Census Tract 144.01	Albany	4,151	7.1	92.9	$68,165	1.5
Census Tract 144.02	Albany	3,267	14.0	86.0	$52,714	0.0
Census Tract 145.01	Albany	2,380	4.3	95.7	$83,625	1.4
Census Tract 145.02	Albany	3,479	5.0	95.0	$67,785	6.4
Census Tract 145.03	Albany	2,789	5.3	94.7	$76,587	5.2
Census Tract 146.06	Albany	3,675	10.3	89.7	$82,724	0.0
Census Tract 146.11	Albany	1,818	10.8	89.2	$67,237	11.2
Census Tract 146.13	Albany	2,863	8.0	92.0	$63,219	0.0
Greene County	Greene	49,221	12.9	87.1	$45,921	8.8
Census Tract 801	Greene	3,370	5.3	94.7	$56,094	5.0
Census Tract 806	Greene	3,156	5.9	94.1	$49,152	9.2
Census Tract 807	Greene	2,988	9.8	90.2	$58,172	6.8
Census Tract 808	Greene	2,774	77.9	22.1	$0	0.0
Census Tract 810	Greene	4,568	25.1	74.9	$43,539	15.7
Census Tract 811.02	Greene	2,993	11.6	88.4	$46,901	2.0
Saratoga County	Saratoga	219,607	7.3	92.7	$65,613	4.2
Census Tract 601.01	Saratoga	6,199	8.9	91.1	$57,866	7.6
Census Tract 606.01	Saratoga	2,715	4.4	95.6	$50,560	5.0
Census Tract 607.01	Saratoga	7,078	5.9	94.1	$62,454	0.9

Geographies	County	Population	Percent Minority	Percent White	Median Income	Percent Family Below Poverty Level
Census Tract 607.02	Saratoga	9,095	6.2	93.8	$88,780	4.1
Census Tract 608	Saratoga	5,087	5.4	94.6	$61,984	4.7
Census Tract 613.02	Saratoga	6,588	8.1	91.9	$65,772	5.0
Census Tract 614.03	Saratoga	5,930	5.6	94.4	$73,000	3.1
Census Tract 617.01	Saratoga	4,367	7.6	92.4	$72,500	7.9
Census Tract 617.02	Saratoga	4,271	3.2	96.8	$74,469	10.4
Census Tract 618	Saratoga	5,684	7.7	92.3	$42,304	3.7
Census Tract 626.01	Saratoga	2,480	6.1	93.9	$103,162	0.0
Schenectady County	Schenectady	154,727	22,8	77.2	$53,322	7.9
Census Tract 202	Schenectady	2,596	48.4	51.6	$36,313	18.7
Census Tract 203	Schenectady	1,683	26.9	73.1	$26,563	43
Census Tract 212	Schenectady	2,999	19.9	80.1	$44,000	10.6
Census Tract 325.02	Schenectady	3,535	3.8	96.2	$82,788	2.6
Census Tract 326.01	Schenectady	2,064	5.2	94.8	$83,571	1.1
Census Tract 326.02	Schenectady	4,005	5.4	94.6	$56,042	3.8
Census Tract 327	Schenectady	3,742	7.4	92.6	$52,763	7.6
Census Tract 330.02	Schenectady	2,303	5.6	94.4	$74,200	0.0
Census Tract 330.04	Schenectady	2,852	6.9	93.1	$59,022	8.0
Census Tract 335	Schenectady	1,975	22.6	77.4	$35,119	10.8
Washington County	Washington	63,216	6.7	93.3	$48,565	9.3
Census Tract 803	Washington	5,390	4.3	95.7	$53,297	3.2
Census Tract 810	Washington	6,190	32.4	67.6	$51,361	4.5
Census Tract 820.01	Washington	4,980	4.5	95.5	$43,071	9.1
Census Tract 880	Washington	6,371	4.1	95.9	$42,852	10.5

Source: USCB 2012b

Table L-3. Hudson River Segment Census Tract Data

Geographies	County	Population	Percent Minority	Percent White	Median Income	Percent Family Below Poverty Level
New York State	n/a	19,378,102	41.7	58.3	$55,217	11
Bronx County	Bronx	1,385,108	89.1	10.9	$33,742	26.2
Census Tract 293.01	Bronx	1,875	25.5	74.5	$100,776	0.0
Census Tract 309	Bronx	3,891	18.0	82.0	$86,053	1.7
Census Tract 319	Bronx	751	38.5	61.5	$0	0.0
Columbia County	Columbia	63,096	11.8	88.2	$52,140	5.6
Census Tract 19	Columbia	1,965	9.9	90.1	$65,682	8
Dutchess County	Dutchess	297,488	25.4	74.6	$69,739	6.1
Census Tract 601	Dutchess	4,799	38.0	62.0	$79,020	0.0
Census Tract 602.02	Dutchess	3,997	19.7	80.3	$65,583	1.7
Census Tract 701.01	Dutchess	4,373	14.6	85.4	$63,654	7.1
Census Tract 702.01	Dutchess	2,860	13.2	86.8	$60,152	0.0
Census Tract 704.01	Dutchess	4,623	23.2	76.8	$61,875	4.4
Census Tract 1401.01	Dutchess	5,126	25.4	74.6	$58,490	0.8
Census Tract 1406.02	Dutchess	2,840	29.0	71.0	$77,536	6.6
Census Tract 1408.01	Dutchess	2,804	20.9	79.1	$64,617	9.7
Census Tract 1500.03	Dutchess	3,027	13.6	86.4	$61,250	9.8
Census Tract 1600.03	Dutchess	2,361	10.0	90.0	$62,917	5.8
Census Tract 1903.01	Dutchess	3,439	29.9	70.1	$70,000	4.2
Census Tract 2201	Dutchess	6,011	45.3	54.7	$25,551	36.5
Census Tract 2207	Dutchess	2,517	65.7	34.3	$31,203	29.3
New York County	New York	1,585,873	52.0	48.0	$65,184	13.8
Census Tract 297	New York	161	72.7	27.3	$0	0.0

Geographies	County	Population	Percent Minority	Percent White	Median Income	Percent Family Below Poverty Level
Orange County	Orange	372,813	31.8	68.2	$69,144	7.3
Census Tract 4	Orange	4,957	86.8	13.2	$26,888	35.5
Census Tract 5.02	Orange	4,578	90.7	9.3	$36,953	37.9
Census Tract 101.02	Orange	4,856	29.4	70.6	$86,588	7.3
Census Tract 131	Orange	5,094	12.9	87.1	$66,650	0.0
Census Tract 136	Orange	6,763	25.1	74.9	$92,841	0.0
Census Tract 138	Orange	2,983	18.8	81.2	$75,547	1.5
Putnam County	Putnam	99,710	17.1	82.9	$88,619	3.0
Census Tract 108	Putnam	3,449	14.4	85.6	$82,179	2.6
Rockland County	Rockland	311,687	34.7	65.3	$82,245	7.5
Census Tract 101.01	Rockland	5,813	18.0	82.0	$120,833	1.3
Census Tract 102	Rockland	4,473	21.6	78.4	$81,250	1.0
Census Tract 106.02	Rockland	6,588	70.2	29.8	$54,057	3.5
Census Tract 107.01	Rockland	4,079	68.0	32.0	$57,412	5.1
Census Tract 107.02	Rockland	4,309	89.7	10.3	$41,830	11
Census Tract 107.03	Rockland	3,522	84.4	15.6	$39,034	22.9
Census Tract 109.02	Rockland	4,117	35.6	64.4	$88,872	3.5
Census Tract 110	Rockland	2,063	15.7	84.3	$111,167	4.1
Ulster County	Ulster	182,493	13.3	86.7	$56,434	7.4
Census Tract 9514	Ulster	3,334	15.4	84.6	$45,571	6.3
Census Tract 9517	Ulster	4,782	35.4	64.6	$44,231	12.9
Census Tract 9525	Ulster	3,411	12.4	87.6	$62,875	4.2
Census Tract 9501	Ulster	5,336	7.9	92.1	$56,336	8.1
Census Tract 9513	Ulster	4,337	12.1	87.9	$49,869	4.5
Census Tract 9526	Ulster	5,630	14.6	85.4	$67,303	0.7

Geographies	County	Population	Percent Minority	Percent White	Median Income	Percent Family Below Poverty Level
Census Tract 9549	Ulster	1,585	8.8	91.2	$71,111	1.4
Westchester County	Westchester	949,113	42.6	57.4	$77,881	6.3
Census Tract 132.01	Westchester	4,366	18.5	81.5	$211,250	3.1
Census Tract 2.02	Westchester	4,175	73.6	26.4	$57,212	9.5
Census Tract 1.04	Westchester	100	0.0	0.0	$0	0.0
Census Tract 2.03	Westchester	3,329	58.2	41.8	$49,635	5.6
Census Tract 4.02	Westchester	5,902	91.5	8.5	$38,906	22.5
Census Tract 7.02	Westchester	4,096	68.6	31.4	$60,293	2.0
Census Tract 103	Westchester	3,111	28.5	71.5	$83,287	3.3
Census Tract 104	Westchester	3,916	29.7	70.3	$82,361	13.7
Census Tract 113	Westchester	6,413	17.1	82.9	$115,875	1.8
Census Tract 114	Westchester	6,368	30.3	69.7	$107,909	0.7
Census Tract 115	Westchester	4,916	45.3	54.7	$53,558	6.5
Census Tract 116	Westchester	6,848	77.5	22.5	$56,918	12.4
Census Tract 117	Westchester	2,926	20.7	79.3	$148,958	5.5
Census Tract 118	Westchester	5,626	16.4	83.6	$198,452	0.0

Source: USCB 2012b

Table L-4. New York City Metropolitan Area Segment Census Tract Data

Geographies	County	Population	Percent Minority	Percent White	Median Income	Percent Family Below Poverty Level
New York State	n/a	19,378,102	41.7	58.3	$55,217	11.0
Bronx County	Bronx	1,385,108	89.1	10.9	$33,742	26.2
Census Tract 19	Bronx	1,917	90.2	9.8	$25,093	38.5
New York County	New York	1,585,873	52.0	48.0	$65,184	13.8
Census Tract 210	New York	6,637	98.0	2.0	$36,922	22.6
Census Tract 236	New York	6,404	99.0	1.0	$36,791	22.0
Census Tract 242	New York	3,396	98.1	1.9	$21,276	28.3
Census Tract 243.02	New York	7,370	99.2	0.8	$16,505	42.2
Census Tract 297	New York	161	72.7	27.3	$0	0.0
Census Tract 299	New York	3,834	98.4	1.6	$21,909	34.8
Census Tract 311	New York	2	0.0	0.0	$0	0.0
Queens County	Queens	2,230,722	72.4	27.6	$54,878	11.0
Census Tract 37	Queens	0	0.0	0.0	$0	0.0
Census Tract 39	Queens	1,592	78.1	21.9	$33,750	35.9
Census Tract 43	Queens	2,437	91.8	8.2	$16,638	53.9
Census Tract 45	Queens	2,975	45.4	54.6	$61,667	12.7
Census Tract 69	Queens	4,611	55.0	45.0	$52,549	10.4
Census Tract 71	Queens	3,963	46.3	53.7	$44,653	4.7
Census Tract 77	Queens	1,478	62.3	37.7	$64,732	0.0
Census Tract 79	Queens	3,493	68.9	31.1	$42,333	14.1
Census Tract 81	Queens	1,188	70.0	30.0	$55,917	0.0
Census Tract 85	Queens	1,270	72.8	27.2	$51,413	24.0
Census Tract 95	Queens	2,289	28.6	71.4	$54,533	14.4

Geographies	County	Population	Percent Minority	Percent White	Median Income	Percent Family Below Poverty Level
Census Tract 97	Queens	3,580	25.5	74.5	$66,058	14.5
Census Tract 101	Queens	2,552	31.3	68.7	$57,097	2.6
Census Tract 103	Queens	3,934	38.3	61.7	$48,106	9.7
Census Tract 105	Queens	4,244	59.3	40.7	$33,211	21.2
Census Tract 111	Queens	3,050	42.5	57.5	$79,948	6.8
Census Tract 113	Queens	4,234	41.3	58.7	$52,810	13.4
Census Tract 107.01	Queens	0	0.0	0.0	$0	0.0

Source: USCB 2012b

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APPENDIX M

Air Quality Analysis Background Information

Appendix M
Air Quality Analysis Background Information

Appendix M contains detailed lists of construction equipment, and associated emissions calculations for the four proposed CHPE Project route segments. This appendix also contains various emissions factors that were used in the air quality analysis.

Lake Champlain Segment

- **Table M-1.** Estimated Equipment and Vehicle Use During Aquatic Cable Installation
- **Table M-2.** Emissions Factors
- **Table M-3.** Estimated Total Emissions

Overland Segment

- **Table M-4.** Estimated Equipment and Vehicle Use During Terrestrial Cable Installation
- **Table M-5.** Estimated Equipment and Vehicle Use During Construction of Cooling Stations
- **Table M-6.** Emissions Factors
- **Table M-7.** Fugitive Dust Estimation Calculations – Earthmoving
- **Table M-8.** Fugitive Dust Estimation Calculations – Road Dust
- **Table M-9.** Estimated Total Emissions

Hudson River Segment

- **Table M-10.** Estimated Equipment and Vehicle Use During Aquatic Cable Installation
- **Table M-11.** Estimated Equipment and Vehicle Use During Terrestrial Cable Installation
- **Table M-12.** Estimated Equipment and Vehicle Use During Construction of Cooling Stations
- **Table M-13.** Aquatic Cable Installation Emissions Factors
- **Table M-14.** Terrestrial Cable Installation and Cooling Station Construction Emissions Factors
- **Table M-15.** Fugitive Dust Estimation Calculations – Earthmoving
- **Table M-16.** Fugitive Dust Estimation Calculations – Road Dust
- **Table M-17.** Estimated Total Emissions

New York City Metropolitan Area Segment

Table M-1. Estimated Equipment and Vehicle Use During Aquatic Cable Installation, Lake Champlain Segment

Activity	Equipment and Vehicles			Hours per Day	Working Days	LF	trips	cables	Total hours
	Type	BHP	Qty						
Cable installation	Primary Cable Vessel								
	2 azimuth units	2,640	2	24	68	0.25	1	2	1,632
	azimuth unit	1,360	1	24	68	0.25	1	2	816
	retractable azimuth unit	2,475	1	24	68	0.1	1	2	326.4
	tunnel unit	1,300	1	24	68	0.25	1	2	816
	generators (500 kVA)	536	4	24	68	0.75	1	2	9,792
	generators (600 kVA)	643	1	24	68	0.5	1	2	1,632
	Survey boat	1,131	1	24	68	0.5	1	2	1,632
	Crew boat	425	1	24	68	0.2	1	2	652.8
Installation of Cable Protection	Tugboat, Towboat	1,970	1	12	68	0.25	1	2	408
	Crew boat	425	1	12	68	0.2	1	2	326.4
Cable Shipments	Main propulsion	8,201	1	10		0.5	19		95
	Auxiliary engine	1,776	1	10		0.17	19		32.3

Notes:

BHP: Brake-horsepower. The maximum rated load of the vehicle or vessel engine(s).

LF: Load Factor

68 work-days based on 1.49 miles per day from mileposts 0 to 101.3.

Cable shipments emission duration of 10 hours per trip based on 12 mph for 120 miles.

120 miles is the average distance for each of the 19 cable shipments (6 miles of cable per shipment) round trip.

Table M-2. Emissions Factors[1], Lake Champlain Segment

Activity	Equipment and Vehicles			VOC lb/hr	CO lb/hr	NO_x lb/hr	SO_x lb/hr	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	CO_2 lb/hr	CH_4 lb/hr[2]	N_2O lb/hr[2]
	Type	Category	BHP									
Cable Installation	2 azimuth units	Marine	2,640	2.07	10.48	29.64	0.03	1.41	1.37	3,118.31	0.12	0.02
	azimuth unit	Marine	1,360	1.06	5.40	15.27	0.01	0.73	0.70	1,606.40	0.06	0.01
	retractable azimuth unit	Marine	2,475	1.94	9.82	27.79	0.03	1.32	1.28	2,923.41	0.11	0.02
	tunnel unit	Marine	1,300	1.02	5.16	14.60	0.01	0.69	0.67	1,535.53	0.06	0.01
	generators (500 kVA)	Marine	536	0.33	1.47	5.46	0.01	0.23	0.23	626.53	0.02	0.00
	generators (600 kVA)	Marine	643	0.40	1.76	6.55	0.01	0.28	0.27	751.60	0.03	0.01
	Survey boat	Marine	1,131	0.89	4.49	12.70	0.01	0.60	0.59	1,335.91	0.05	0.01
	Crew boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Installation of Cable Protection	Tugboat, Towboat	Marine	1,970	1.67	8.66	23.20	0.02	1.18	1.14	2,326.55	0.09	0.02
	Crew boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Cable Shipment[3]	OGV main propulsion	Marine (kW)	8,201	10.85	25.31	307.36	65.45	8.14	7.59	10,645.38	0.11	0.56
	OGV auxiliary engine	Marine (kW)	1,776	1.57	4.31	54.42	16.60	1.92	1.76	2,704.41	0.02	0.12

Notes:

[1] Emissions factors weighted for calendar year 2013 (USEPA 2003, USEPA 2006, USEPA 2009b).

[2] Offroad N_2O and CH_4 emissions are based on 40 CFR 98, Subpart C.

[3] Cable Shipment emissions based on USEPA 2009b.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engines(s).

Table M-3. Estimated Total Emissions[1], Lake Champlain Segment

Activity	Equipment and Vehicles			VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[2]
	Type	Category	hrs										
Cable Installation	2 azimuth units	Marine	1632	3,372	17,102	48,373	45	2,303	2,233	5,089,079	199	40	5,105,635
	azimuth unit	Marine	816	869	4,405	12,460	12	593	575	1,310,823	51	10	1,315,088
	retractable azimuth unit	Marine	326.4	632	3,207	9,070	8	432	419	954,202	37	7	957,306
	tunnel unit	Marine	816	830	4,211	11,910	11	567	550	1,252,993	49	10	1,257,069
	Generators (500 kVA)	Marine	9792	3,279	14,374	53,462	54	2,276	2,208	6,134,933	243	49	6,155,101
	generators (600 kVA)	Marine	1632	656	2,874	10,689	11	455	441	1,226,605	49	10	1,230,637
	Survey boat	Marine	1632	1,445	7,326	20,723	19	986	957	2,180,208	85	17	2,187,300
	Crew boat	Marine	652.8	136	941	2,270	3	124	120	327,947	13	3	329,013
Installation of Cable Protection	Tugboat, Towboat	Marine	408	680	3,535	9,466	8	480	465	949,232	37	7	952,321
	Crew boat	Marine	326.4	7	47	112	0	6	6	16,227	1	0	16,279
Cable Shipment	OGV	Marine	95	1,031	2,405	29,199	6218	773	721	1,011,311	10	53	1,028,033
	OGV	Marine	32.3	51	139	1,758	536	62	57	87,352	1	4	88,578
Total Underwater Cable Laying Emissions, lbs				**12,988**	**60,564**	**209,492**	**6925**	**9,056**	**8,753**	**20,540,911**	**776**	**210**	**20,622,361**
Total Underwater Cable Laying Emissions, tons				**6.49**	**30.28**	**104.75**	**3.46**	**4.53**	**4.38**	**10,270**	**0.39**	**0.11**	**10,311**

Notes:

[1] Emissions weighted for calendar year 2013 (USEPA 2003, USEPA 2006, USEPA 2009a).

[2] Carbon dioxide equivalents (CO_2 eqv) are calculated by summing the products of mass GHG emissions by species times their respective GWP coefficients (USEPA 2009a).

Table M-4. Estimated Equipment and Vehicle Use During Terrestrial Cable Installation, Overland Segment

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (127 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/8-hour day	BHP	Qty		hours	VMT		
Vegetation Clearing	Brush Hog	1	11	1	127	8		1,016	
Topsoil removal and storage	Small Bulldozer	1	285	1	127	8		1,016	
	Bobcat	1	73	1	127	8		1,016	
Access path prep (gravel)	Small Bulldozer	0.5	285	1	254	8		2,032	
	18-yard dump	0.5		2	254	8	20,320	4,064	5
	Backhoe	0.25	73	1	508	8		4,064	
	Bobcat	0.25	73	1	508	8		4,064	
	Ram Hoe	0.25	330	1	508	4		2,032	
	Hard Rock Trencher	0.25	335	1	508	2		1,016	
Deliver Cable @ 3 reels per	Flatbed Truck, 30 mph	0.5		1	254	8	60,960	2,032	30
	Crane	0.5	300	1	254	2		508	
HDD[1,2]	Drilling Unit				282	8		2,256	
	Drilling Power Unit		800		282	8		2,256	
	Generator		50		282	8		2,256	
	Water Pumps				282	8		2,256	
	Mud Pump				282	8		2,256	
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	0.5		1	254	8	60,960	2,032	30
	Crane, 40-ton	0.5		1	254	2		508	
	Puller/Tensioner	0.5	165	2	254	8		4,064	
	Mid-pull caterpillars	0.5	165	2	254	8		4,064	
Splice Cable	Generators	0.25	48	1	508	8		4,064	
	Propane heaters	0.25	0.5	1	508	8		4,064	
Deliver and install Thermal Backfill	18-yard dump	0.25		2	508	8	243,840	8,128	30
	Backhoe	0.25	73	1	508	8		4,064	
	Bobcat	0.25	73	1	508	8		4,064	

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (127 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/8-hour day	BHP	Qty		hours	VMT		
Install Native Backfill	Backhoe	0.5	73	1	254	8		2,032	
	Bobcat	0.5	73	1	254	8		2,032	
	Shaker/screen	0.5	110	1	254	8		2,032	
	Compressor for tampers	0.5		1	254	8		2,032	
Remove Excess Native Fill from Site	18-yard dump	1		2	127	8	10,160	2,032	5
	Backhoe	1	73	1	127	8		1,016	
Replace Topsoil, York Rake Vegetation	Small Bulldozer	0.5	285	1	254	8		2,032	
	Hydroseed Sprayer	0.5	115	1	254	8		2,032	
Miscellaneous	Pickup trucks			10	220	4	264,000	8,800	30

Notes:

HDD: Horizontal Directional Drilling

[1] HDD includes 44 Upland Streams, 1 Champlain exit, 2 Hudson Entrance/Exit, 47 Locations, and 6 equipment days per location.

[2] Support for HDD includes 3 Locations, 12 Working Days (4 Equipment Days per location) at 8 hours per day, and 96 equipment hours of operation.

Table M-5. Estimated Equipment and Vehicle Use During Construction of Cooling Stations, Overland Segment

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		Hours	VMT		
Site Preparation (pavement and foundations)	4.5 days (half a day at each cooling station)	Bulldozer	285	1	4.5	8		36	
		Backhoe	73	1	4.5	8		36	
		Loader	150	1	4.5	8		36	
		18-yard dump		1	4.5	8	180	36	5
Site Prep Grading	4.5 days (half a day at each cooling station)	Bulldozer	285	1	4.5	8		36	
		Backhoe	73	1	4.5	8		36	
		Loader	150	1	4.5	8		36	
		18-yard dump		2	4.5	8	360	72	5
Building Foundations, Floor	4.5 days (half a day at each cooling station)	Backhoe	73	1	4.5	8		36	
		Bobcat	73	1	4.5	8		36	
		Loader	150	1	3	8		24	
		Bulldozer	285	1	3	8		24	
		Small crane-forms	155	2	0	8		0	
		Medium crane-concrete bucket	300	2	0	8		0	
		Concrete Mixer, offsite delivery		1	2	8	40	16	2.5
Building	18 days (2 days at each station)	Small crane	155	1	13.5	8		108	
		Forklifts, offloading equipment	75	1	9	8		72	
		Generators	50	2	9	8		144	
		Propane heaters	58.9	2	9	8		144	
HDD, transmission cables		Drilling Power Unit, 9 locations @ 6 equipment days/location	800		54	8		432	
		Generator	50		54	8		432	

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		Hours	VMT		
Final Site Preparation, traprock, vegetation paving, plantings	9 days (1 day at each cooling station)	Bulldozer		1	2	8		16	
		18-yard dump		1	2	8	80	16	5
		Hotbox with truck		1	2	8	40	16	2.5
		Roller	100	1	2	8		16	
		Flatbed Truck, 30 mph		1	1	8	240	8	30
		Backhoe, plantings	73	1	1	8			
Miscellaneous	7 weeks	Craft utility, delivery trucks		2	35	4	8,400	280	30
		Pickup trucks		1	35	4	4,200	140	30

Notes:

* Calendar days are used to provide for long workdays and weekend work.

HDD: Horizontal Directional Drilling

Table M-6. Emissions Factors[1], Overland Segment

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	$PM_{2.5}$ lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Installation of Terrestrial Transmission Cables												
Vegetation Clearing	Brush Hog	offroad	11	0.02	0.11	0.11	0.00	0.01	0.01	14.27	0.00	0.00
Topsoil Removal and Storage	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Access Path Prep (gravel)	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Trench Excavation	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Ram Hoe	offroad	330	0.14	0.94	2.35	0.00	0.13	0.13	390.14	0.01	0.00
	Hard Rock Trencher	offroad	335	0.24	1.61	3.40	0.00	0.22	0.21	395.76	0.02	0.00
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane, 40 ton	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
HDD[7]	Drilling Power Unit	offroad	800	0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	offroad	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane, 40-ton	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Puller/Tensioner	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
	Mid-pull caterpillars	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
Splice Cable	Generators	offroad	48	0.03	0.18	0.51	0.00	0.03	0.03	62.37	0.00	0.00
	Propane heaters	offroad	58.9	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	$PM_{2.5}$ lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Installation of Terrestrial Transmission Cables (continued)												
Install Native Backfill	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Shaker/screen	offroad	110	0.07	0.22	0.90	0.00	0.05	0.05	128.57	0.01	0.00
	Compressor for tampers	offroad	20	0.03	0.12	0.22	0.00	0.02	0.02	25.94	0.00	0.00
Remove Excess Native Fill from site	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Hydroseed Sprayer	offroad	115	0.27	0.99	1.64	0.00	0.17	0.17	158.04	0.01	0.00
Miscellaneous	Pickup trucks	onroad LD		0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00
Construction of Cooling Stations												
Site Preparation (pavement and foundations)	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	18-yard dump	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
Site Prep Grading	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	18-yard dump	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	$PM_{2.5}$ lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Construction of Cooling Stations (continued)												
Building Foundations (floor)	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Bobcat	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Small crane-forms	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Medium crane-concrete bucket	offroad	300	0.2	0.5	2.2	0.0	0.1	0.1	350.7	0.0	0.0
	Concrete Mixer, offsite delivery	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
Building	Large crane	offroad	450	0.2	1.1	4.2	0.0	0.2	0.2	526.1	0.0	0.0
	Small crane	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Forklifts, offloading equipment	offroad	75	0.1	0.6	0.7	0.0	0.1	0.1	98.4	0.0	0.0
	Small crane, offloading equipment	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Generators	offroad	50	0.0	0.2	0.5	0.0	0.0	0.0	65.0	0.0	0.0
	Propane heaters	offroad	58.9	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad		0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	18-yard dump	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Hotbox with truck	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Roller	offroad	100	0.1	0.8	0.9	0.0	0.1	0.1	131.2	0.0	0.0
	Flatbed Truck, 30 mph	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Backhoe, plantings	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	$PM_{2.5}$ lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Construction of Cooling Stations (continued)												
HDD	Drilling Power Unit, 9 locations @ 6 equipment days/location	offroad	800	0.9	3.4	11.7	0.0	0.5	0.5	933.9	0.0	0.0
	Generator	offroad	50	0.0	0.2	0.5	0.0	0.0	0.0	65.0	0.0	0.0
Miscellaneous	Craft utility, delivery trucks	onroad MD		0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
	Pickup trucks	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0

Notes:

Overland Equipment estimate includes mileposts 101.3 to 228.4.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engine(s).

HDD: Horizontal Directional Drilling. LD: Light Duty. HD: Heavy Duty. HHD: Heavy Heavy Duty

[1] Emissions factors weighted for calendar year 2013.

[2] Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

[3] Offroad diesel exhaust $PM_{2.5}$ = 92% of PM_{10}; Onroad HHD particulate emission factors include allowances for tire and brake wear.

[4] Offroad N_2O and CH4 emissions are based on 40 CFR 98, Subpart C.

[5] Onroad N_2O and CH_4 emissions are based on the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (USEPA 2009b).

[6] Onroad CO_2 emissions are based on EPA420-F-05-001 which rates gasoline emissions at 19.4 lb/gal and diesel at 22.2 lb/gal (USEPA 2005).

[7] HDD includes 44 Upland Streams, 1 Champlain exit, 2 Hudson Entrance/Exit, 47 Locations, and 6 equipment days per location.

Table M-7. Fugitive Dust Estimation Calculations - Earthmoving, Overland Segment

Construction Earthmoving	Project hours	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	PM_{10} lbs	$PM_{2.5}$ lbs
Topsoil Removal and Storage					
Small bulldozer	1,016	16.64	4.91	16,911.15	4,993.17
Bobcat	1,016	0.00034	0.000052	0.35	0.05
Access path prep (gravel)					
Small bulldozer	2,032	16.64	4.91	33,822.29	9,986.33
18-yard dump	4,064	0.00034	0.000052	1.38	0.21
Trench Excavation					
Backhoe	4,064	0.00034	0.000052	1.38	0.21
Bobcat	4,064	0.103	0.005126	419.71	20.83
Ram Hoe	2,032	0.103	0.005126	209.85	10.42
Hard Rock Trencher	1,016	0.103	0.005126	104.93	5.21
HDD					
Drilling Unit	2,256	0.00034	0.000052	0.77	0.12
Generator	2,256	0.00034	0.000052	0.77	0.12
Deliver and Install Thermal Backfill					
18-yard dump	8,128	0.00034	0.000052	2.77	0.42
Backhoe	4,064	0.00034	0.000052	1.38	0.21
Bobcat	4,064	16.64	4.91	67,644.58	19,972.67
Install Native Backfill					
Backhoe	2,032	0.00034	0.000052	0.69	0.10
Bobcat	2,032	16.64	4.91	33,822.29	9,986.33
Shaker/screen	2,032	0.00034	0.000052	0.69	0.10
Compressor for tampers	2,032	0.00034	0.000052	0.69	0.10
Remove Excess Native Fill from Site					
18-yard dump	2,032	0.00034	0.000052	0.69	0.10
Backhoe	1,016	0.00034	0.000052	0.35	0.05
Replace Topsoil, York Rake Vegetation					
Small bulldozer	2,032	16.64	4.91	33,822.29	9,986.33
Hydroseed Sprayer	2,032	0.103275	0.005126	209.85	10.42
Site Preparation					
Bulldozer	36	16.64	4.91	599.21	176.92
Backhoe	36	0.00034	0.000052	0.01	0.00
Loader	36	0.00034	0.000052	0.01	0.00
18-yard dump	36	0.00034	0.000052	0.01	0.00

Construction Earthmoving	Project hours	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	PM_{10} lbs	$PM_{2.5}$ lbs
Site Prep Grading					
Bulldozer	36	16.64	4.91	599.21	176.92
Backhoe	36	0.00034	0.000052	0.01	0.00
Loader	36	0.00034	0.000052	0.01	0.00
18-yard dump	72	0.00034	0.000052	0.02	0.00
Building Foundations					
Backhoe	36	0.00034	0.000052	0.01	0.00
Bobcat	36	0.10328	0.00513	3.72	0.18
Loader	24	0.00034	0.000052	0.01	0.00
Bulldozer	24	16.64	4.91	399.48	117.95
Concrete Mixer, offsite delivery	16	0.00034	0.000052	0.01	0.00
Final Site Preparation					
Bulldozer	16	16.64	4.91	266.32	78.63
18-yard dump	16	0.00034	0.000052	0.01	0.00
Hotbox with truck	16	0.00034	0.000052	0.01	0.00
Roller	16	0.10328	0.00513	1.65	0.08
HDD					
Drilling Power Unit	432	0.00034	0.000052	0.15	0.02
TOTAL (lbs)				**186,979**	**54,974**
Total Earthmoving Emissions, tons				**93.49**	**27.49**

Notes:
HDD: Horizontal Directional Drilling
Based on USEPA 2006 (USEPA 2006).
AP-42 Section 11.9 for dozing (Table 11.9-1):
$E = 0.75 * (s)^{1.5} / (M)^{1.4}$ for PM_{10}
$E = 0.105 * 5.7 \times (s)^{1.2} / (M)^{1.3}$ for $PM_{2.5}$
E = lb/hr fugitive
s = Silt Content assumed to be 55% for construction sites. (CHPEI 2010)
M = moisture content = 8% (assumes unwatered subsoil)

AP-42 Section 11.9 for grading, rolling, and excavating (Table 11.9-1) (USEPA 2006)
$E = S * 0.60 * 0.051 \times (S)^{2.0}$ for PM_{10}
$E = S * 0.031 * 0.040 \times (S)^{2.5}$ for $PM_{2.5}$
Simplifies to $E = 0.60 * 0.051 \times (S)^{3.0}$ for PM_{10}
Simplified to $E = 0.031 * 0.040 \times (S)^{3.5}$ for $PM_{2.5}$
E = lb/VMT * VMT/hr = lb/hr fugitive
S = Mean Vehicle Speed assumed to be 3 mph for graders, 1.5 mph for excavators & rollers
Assumes VMT = S * hours of use

AP-42 Section 13.2.4 Loading/Handling (digger, driller, backhoe, loader): (USEPA 2006)
$E = 0.35 * 0.0032 * (U/5)^{1.3}/(M/2)^{1.4}$ for PM_{10}
$E = 0.053 * 0.0032 * (U/5)^{1.3}/(M/2)^{1.4}$ for $PM_{2.5}$
E = lb/ton * tons/hr = lb/hr fugitive
U = average wind speed is 8.9 mph for Albany, New York (NOAA 2002)
M = moisture content = 8% (assumes unwatered subsoil)

Table M-8. Fugitive Dust Estimation Calculations - Road Dust, Overland Segment

Construction Road Dust	Project VMT	PM_{10} lb/VMT	$PM_{2.5}$ lb/VMT	PM_{10} lbs	$PM_{2.5}$ lbs
All Roads					
Pickup Truck	268,200				
18-yard dump Truck	0				
Flatbed Truck	122,160				
Subtotals	**390,360**				
Unpaved Roads					
Pickup Truck	80,460	0.06820	0.00682	5,487	549
18-yard dump Truck	0	0.10604	0.01060	0	0
Flatbed Truck	12,216	0.19222	0.01922	2,348	235
Subtotals	**92,676**			**7,836**	**784**
Paved Roads					
Pickup Truck	187,740	0.00622	0.00076	1,168	143
18-yard dump Truck	0	0.02802	0.00403	0	0
Flatbed Truck	109,944	0.20521	0.03061	22,561	3,365
Subtotals	**297,684**			**23,729**	**3,509**
Total Road Dust Emissions, tons				**15.78**	**2.15**

Notes:
Based on USEPA 2006 and USEPA 2003.
Unpaved Road Dust (AP-42 Section 13.2.2):
$E = 1.5 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1\text{-}CE)$ for PM_{10}
$E = 0.15 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1\text{-}CE)$ for $PM_{2.5}$
E = lb/VMT fugitive
s = surface silt content = 9%
(average for unpaved roads and construction sites, AP-42 Table 13.2.2-1)
W = average vehicle weight (see below)
PC=(365-P/365)
CE = Control Efficiency for watering = 90% for M between 4 and 5
(AP-42 Figure 13.2.2-2)

Based on USEPA 2006.
Paved Road Dust (AP-42 Section 13.2.1)
$E=0.016*(sL/2)^{0.65}*(W/3)^{1.5}-0.00047*PC$ for PM_{10}
$E=0.0024*(sL/2)^{0.65}*(W/3)^{1.5}-0.00036*PC$ for $PM_{2.5}$
E = lb/VMT fugitive
sL=Silt Loading assumed to be 0.5 g/m^2 for average ADT categories from Table 13.2.1-3
Note: precipitation correction not used (PC=1) for worst case day calculations
PC=(1-P/4N)
P = number of wet days over 0.01 in precipitation for averaging period
(150 days/year average for New York State)
N=days of period = 365 days

Vehicle Weights based on USEPA 2010.
Light Duty = 3 tons average
Medium Duty = 8 tons average
Heavy Heavy Duty = 30 tons average (loaded 40 tons, unloaded 20 tons)
18-yard dump assumes 70% unpaved mileage, and 30% paved mileage.
Pickup Truck assumes 30% unpaved mileage, and 70% paved mileage.
Flatbed Truck assumes 10% unpaved mileage, and 90% paved mileage.

Table M-9. Estimated Total Emissions[1], Overland Segment

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Installation of Terrestrial Transmission Cables														
Vegetation Clearing	Brush Hog	offroad	1,016		15	109	110	0	11	10	14,500	1	0	14,543
Topsoil Removal and Storage	Small Bulldozer	offroad	1,016		148	621	1,830	3	118	114	342,255	13	3	343,368
	Bobcat	offroad	1,016		202	1,031	928	1	153	149	113,203	3	1	113,488
Access Path Prep (gravel)	Small Bulldozer	offroad	2,032		297	1,242	3,661	6	236	229	684,510	27	5	686,735
	18-yard dump	onroad HHD	4,064	20,320	48.83	281.74	387.14	0.59	7.54	5.89	75,184	0.22	0.22	75,255
Trench Excavation	Backhoe	offroad	4,064		810	4,122	3,714	4	613	595	452,811	14	3	453,951
	Bobcat	offroad	4,064		810	4,122	3,714	4	613	595	452,811	14	3	453,951
	Ram Hoe	offroad	2,032		284	1,908	4,766	7	262	255	792,768	28	6	795,110
	Hard Rock Trencher	offroad	1,016		244	1,640	3,454	4	219	213	402,093	16	3	403,401
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD	2,032	60,960	47.85	169.47	601.00	1.77	22.62	17.68	225,552	0.671	0.65	225,766
	Crane, 40 ton	offroad	508		85	237	1,127	2	48	47	178,170	7	1	178,756
HDD	Drilling Power Unit	offroad	2,256		2015	7,645	26,366	19	1,209	1,173	2,106,975	84	17	2,113,910
	Generator	offroad	2,256		78	417	1,187	1	74	72	146,578	5	1	147,012
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD	2,032	60,960	47.85	169.47	601.00	1.77	22.62	17.68	225,552	0.67	0.65	225,766
	Crane, 40-ton	offroad	508		85	237	1,127	2	48	47	178,170	7	1	178,756
	Puller/Tensioner	offroad	4,064		1,362	5,202	8,226	8	927	900	922,194	31	6	924,770
	Mid-pull caterpillars	offroad	4,064		1,362	5,202	8,226	8	927	900	922,194	31	6	924,770
Splice Cable	Generators	offroad	4,064		135	721	2,053	2	128	125	253,487	9	2	254,236
	Propane heaters	offroad	4,064		7	50	87	0	5	5	83,868	1	6	85,768
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD	8,128	243,840	585.95	3,380.84	4,645.64	7.07	90.46	70.71	902,208	2.68	2.58	903,066
	Backhoe	offroad	4,064		810	4,122	3,714	4	613	595	452,811	14	3	453,951
	Bobcat	offroad	4,064		810	4,122	3,714	4	613	595	452,811	14	3	453,951

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Installation of Terrestrial Transmission Cables (continued)														
Install Native Backfill	Backhoe	offroad	2,032		405	2,061	1,857	2	307	297	226,406	7	1	226,976
	Bobcat	offroad	2,032		405	2,061	1,857	2	307	297	226,406	7	1	226,976
	Shaker/screen	offroad	2,032		143	452	1,830	2	107	104	261,260	10	2	262,119
	Compressor for tampers	offroad	2,032		59.17	246.01	449.68	0.48	36.62	35.52	52,717.80	1.88	0.38	52,874
Remove Excess Native Fill from site	18-yard dump	onroad HHD	2,032	10,160	24.41	140.87	193.57	0.29	3.77	2.95	37,592	0.11	0.11	37,628
	Backhoe	offroad	1,016		202	1031	928	1	153	149	113,203	3	1	113,488
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	2,032		297	1,242	3,661	6	236	229	684,510	27	5	686,735
	Hydroseed Sprayer	offroad	2,032		556	2,007	3,339	3	349	338	321,130	11	2	322,028
Miscellaneous	Pickup trucks	onroad LD	8,800	264,000	383.06	6,250.99	354.55	5.02	14.52	6.60	256,080	9.50	3.8544	257,474
Emissions from Construction of Cooling Stations														
Site Preparation (pavement and foundations)	Bulldozer	offroad	36		5.3	22.0	64.9	0.1	4.2	4.1	12,127.1	0.5	0.1	12,167
	Backhoe	offroad	36		7.2	36.5	32.9	0.0	5.4	5.3	4,011.1	0.1	0.0	4,021
	Loader	offroad	36		11.0	41.9	66.2	0.1	7.5	7.2	7,426.4	0.3	0.1	7,447
	18-yard dump	onroad HHD		180	0.4	2.5	3.4	0.0	0.1	0.1	666.0	0.0	0.0	667
Site Prep Grading	Bulldozer	offroad	36		5.3	22.0	64.9	0.1	4.2	4.1	12,127.1	0.5	0.1	12,167
	Backhoe	offroad	36		7.2	36.5	32.9	0.0	5.4	5.3	4,011.1	0.1	0.0	4,021
	Loader	offroad	36		11.0	41.9	66.2	0.1	7.5	7.2	7,426.4	0.3	0.1	7,447
	18-yard dump	onroad HHD		360	0.9	5.0	6.9	0.0	0.1	0.1	1,332.0	0.0	0.0	1,333
Building Foundations (floor)	Backhoe	offroad	36		7.2	36.5	32.9	0.0	5.4	5.3	4,011.1	0.1	0.0	4,021
	Bobcat	offroad	36		7.2	36.5	32.9	0.0	5.4	5.3	4,011.1	0.1	0.0	4,021
	Loader	offroad	24		7.3	27.9	44.2	0.0	5.0	4.8	4,950.9	0.2	0.0	4,965
	Bulldozer	offroad	24		3.5	14.7	43.2	0.1	2.8	2.7	8,084.8	0.3	0.1	8,111
	Forklifts, offloading equipment	offroad	72		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
	Generators	offroad	144		14.0	44.5	178.5	0.2	10.5	10.2	26,089.3	1.0	0.2	26,175
	Propane heaters	offroad	144		5.0	26.6	75.8	0.1	4.7	4.6	9,356.1	0.3	0.1	9,384

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Construction of Cooling Stations (continued)														
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	16		2.3	9.8	28.8	0.0	1.9	1.8	5,389.8	0.2	0.0	5,407
	18-yard dump	onroad HHD		80	0.2	1.1	1.5	0.0	0.0	0.0	296.0	0.0	0.0	296
	Hotbox with truck	onroad LD		40	0.1	0.6	0.8	0.0	0.0	0.0	148.0	0.0	0.0	148
	Roller	offroad	16		1.3	12.6	14.1	0.0	1.7	1.6	2,098.9	0.1	0.0	2,105
	Flatbed Truck, 30 mph	onroad HHD		240	0.2	0.7	2.4	0.0	0.1	0.1	888.0	0.0	0.0	889
	Backhoe, plantings	offroad	8		1.6	8.1	7.3	0.0	1.2	1.2	891.4	0.0	0.0	894
HDD	Drilling Power Unit, 9 locations @ 6 equipment days/location	offroad	432		385.8	1,463.9	5,048.9	3.6	231.5	224.6	403,463.3	16.0	3.2	404,791
	Generator	offroad	432		15.0	79.9	227.3	0.3	14.2	13.8	28,068.2	1.0	0.2	28,151
Miscellaneous	Craft utility, delivery trucks	onroad MD		8,400	22.6	276.9	19.5	0.2	0.5	0.2	10,864.0	0.6	0.2	10,954
	Pickup trucks	onroad LD		4,200	6.1	99.4	5.6	0.1	0.2	0.1	4,074.0	0.2	0.1	4,096

TOTAL Combustion Emissions By Activity (tons)	VOC lbs	CO lbs	NOx lbs	SOx lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
Vegetation Clearing	0.01	0.05	0.05	0.00	0.01	0.01	7.25	0.00	0.00	7.27
Topsoil Removal and Storage	0.18	0.83	1.38	0.00	0.14	0.13	227.73	0.01	0.00	228.43
Access Path Prep (gravel)	0.17	0.76	2.02	0.00	0.12	0.12	379.85	0.01	0.00	381.00
Trench Excavation	1.07	5.90	7.82	0.01	0.85	0.83	1,050.24	0.04	0.01	1,053.21
Cable Delivery	0.07	0.20	0.86	0.00	0.04	0.03	201.86	0.00	0.00	202.26
HDD	1.05	4.03	13.78	0.01	0.64	0.62	1,126.78	0.04	0.01	1,130.46
Site Deliver and Pull Cable	1.43	5.41	9.09	0.01	0.96	0.93	1,124.05	0.03	0.01	1,127.03
Splice Cable	0.07	0.36	1.03	0.00	0.06	0.06	126.74	0.00	0.00	127.12
Deliver and Install Thermal Backfill	1.10	5.81	6.04	0.01	0.66	0.63	903.92	0.02	0.00	905.48
Install Native Backfill	0.51	2.41	3.00	0.00	0.38	0.37	383.39	0.01	0.00	384.47
Remove Excess Native Fill from site	0.11	0.59	0.56	0.00	0.08	0.08	75.40	0.00	0.00	75.56
Replace Topsoil, York Rake Vegetation	0.43	1.62	3.50	0.00	0.29	0.28	502.82	0.02	0.00	504.38
Miscellaneous	0.19	3.13	0.18	0.00	0.01	0.00	128.04	0.00	0.00	128.74

TOTAL Combustion Emissions By Activity (tons)	**VOC lbs**	**CO lbs**	**NOx lbs**	**SOx lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**CO_2 lbs**	**CH_4 lbs**	**N_2O lbs**	**CO_2 eqv lbs[3]**
Site Preparation	0.01	0.05	0.08	0.00	0.01	0.01	12.12	0.00	0.00	12.15
Site Prep Grading	0.01	0.05	0.09	0.00	0.01	0.01	12.45	0.00	0.00	12.48
Building Foundations	0.01	0.06	0.08	0.00	0.01	0.01	10.53	0.00	0.00	10.56
Final Site Preparation, traprock, paving, vegetation plantings	0.00	0.02	0.03	0.00	0.00	0.00	4.86	0.00	0.00	4.87
HDD	0.20	0.77	2.64	0.00	0.12	0.12	215.77	0.01	0.00	216.47
Subtotal	6.62	32.05	52.22	0.06	4.39	4.24	6,493.78	0.21	0.04	6,511.94
Total Combustion Emissions, lbs	**15,782**	**78,441**	**122,699**	**141**	**10,863**	**10,502**	**15,664,926**	**510**	**113**	**15,710,761**
Total Combustion Emissions, tons	**8**	**39**	**61**	**0**	**5**	**5**	**7,832**	**0**	**0**	**7,855**
Total Fugitive Dust emissions, earthmoving tons[4]	**-**	**-**	**-**	**-**	**93**	**27**	**-**	**-**	**-**	**-**
Total Fugitive Dust emissions, road dust, tons[4]	**-**	**-**	**-**	**-**	**16**	**2**	**-**	**-**	**-**	**-**
Combined Combustion and Fugitive Dust emissions, tons	**7.89**	**39.22**	**61.35**	**0.07**	**114.70**	**34.88**	**7,832**	**0.26**	**0.06**	**7,855**

Notes:

No underwater cable laying in segment.

Overland Equipment estimate includes mileposts 101.3 to 228.4.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engines(s).

HDD: Horizontal Directional Drilling.

[1] Emissions factors weighted for calendar year 2013 (USEPA 2003, USEPA 2009b).

[2] Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

[3] Carbon dioxide equivalents (CO_2 eqv) are calculated by summing the products of mass GHG emissions by species times their respective GWP coefficients (USEPA 2009a).

[4] See Fugitive Dust Estimation Calculations tables for more detailed information.

Table M-10. Estimated Equipment and Vehicle Use During Aquatic Cable Installation, Hudson River Segment

Activity	Equipment and Vehicles			Hours per Day	Working Days	LF	trips	cables	Total hours
	Type	BHP	Qty						
Cable installation	Primary Cable Vessel								
	2 azimuth units	2,640	2	24	59	0.25	1	2	1,416
	azimuth unit	1,360	1	24	59	0.25	1	2	708
	retractable azimuth unit	2,475	1	24	59	0.1	1	2	283.2
	tunnel unit	1,300	1	24	59	0.25	1	2	708
	generators (500 kVA)	536	4	24	59	0.75	1	2	8,496
	generators (600 kVA)	643	1	24	59	0.5	1	2	1,416
	Survey boat	1,131	1	24	59	0.5	1	2	1,416
	Crew boat	425	1	24	59	0.2	1	2	566.4
Installation of Cable Protection	Tugboat, Towboat	1,970	1	12	59	0.25	1	2	354
	Crew boat	425	1	12	59	0.2	1	2	283.2
Cable Shipments	Main propulsion	8,201	1	10.5		0.5	20		105
	Auxiliary engine	1,776	1	10.5		0.17	20		35.7

Notes:

BHP: Brake-horsepower. The maximum rated load of the vehicle or vessel engine(s).

LF: Load Factor

59 work days based on 1.49 miles per day from mileposts 228.4 to 295.4 and 302.8 to 324.0.

Cable shipments emission duration of 10.5 hours per trip based on 12 mph for 125.7 miles.

125.7 miles is the average distance for each of the 20 cable shipments (6 miles of cable per shipment) round trip.

Table M-11. Estimated Equipment and Vehicle Use During Terrestrial Cable Installation, Hudson River Segment

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (7.6 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/ 8-hour day	BHP	Qty		Hours	VMT		
Vegetation Clearing	Brush Hog	1	11	1	7.6	8		60.80	
Topsoil removal and storage	Small Bulldozer	1	285	1	7.6	8		60.80	
	Bobcat	1	73	1	7.6	8		60.80	
Access path prep (gravel)	Small Bulldozer	0.5	285	1	15.2	8		121.60	
	18-yard dump	0.5		2	15.2	8	1,216	243.20	5
Trench Excavation	Backhoe	0.25	73	1	30.4	8		243.20	
	Bobcat	0.25	73	1	30.4	8		243.20	
	Ram Hoe	0.25	330	1	30.4	4		121.60	
	Hard Rock Trencher	0.25	335	1	30.4	2		60.80	
Deliver Cable @ 3 reels per	Flatbed Truck, 30 mph	0.5		1	15.2	8	3,648	121.60	30
	Crane	0.5	300	1	15.2	2		30.40	
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	0.5		1	15.2	8	3,648	121.6	30
	Crane, 40 ton	0.5		1	15.2	2		30.4	
	Puller/Tensioner	0.5	165	2	15.2	8		243.2	
	Mid-pull caterpillars	0.5	165	2	15.2	8		243.2	
Splice Cable	Generators	0.25	48	1	30.4	8		243.2	
	Propane heaters	0.25	0.5	1	30.4	8		243.2	
Deliver and install Thermal Backfill	18-yard dump	0.25		2	30.4	8	14,592	486.4	30
	Backhoe	0.25	73	1	30.4	8		243.2	
	Bobcat	0.25	73	1	30.4	8		243.2	
Install Native Backfill	Backhoe	0.5	73	1	15.2	8		121.6	
	Bobcat	0.5	73	1	15.2	8		121.6	
	Shaker/screen	0.5	110	1	15.2	8		121.6	
	Compressor for tampers	0.5		1	15.2	8		121.6	

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (7.6 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/ 8-hour day	BHP	Qty		Hours	VMT		
Remove Excess Native Fill from Site	18-yard dump	1		2	7.6	8	608	121.6	5
	Backhoe	1	73	1	7.6	8		60.8	
Replace Topsoil, York Rake Vegetation	Small Bulldozer	0.5	285	1	15.2	8		121.6	
	Hydroseed Sprayer	0.5	115	1	15.2	8		121.6	
Miscellaneous	Pickup trucks			10	30.4	4	36,480	1216	30

Table M-12. Estimated Equipment and Vehicle Use During Construction of Cooling Stations, Hudson River Segment

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		Hours	VMT		
Site Preparation (pavement and foundations)	3 days (half a day at each cooling station)	Bulldozer	285	1	3	8		24	
		Backhoe	73	1	3	8		24	
		Loader	150	1	3	8		24	
		18-yard dump		1	3	8	120	24	5
Site Prep Grading	3 days (half a day at each cooling station)	Bulldozer	285	1	3	8		24	
		Backhoe	73	1	3	8		24	
		Loader	150	1	3	8		24	
		18-yard dump		2	3	8	240	48	5
Building Foundations, floor	3 days (half a day at each cooling station)	Backhoe	73	1	3	8		24	
		Bobcat	73	1	3	8		24	
		Loader	150	1	2	8		16	
		Bulldozer	285	1	2	8		16	
		Small crane-forms	155	2	0	8		0	
		Medium crane-concrete bucket	300	2	0	8		0	
		Concrete Mixer, offsite delivery		1	1.5	8	30	12	2.5
Building	12 days (2 days at each station)	Small crane	155	1	9	8		72	
		Forklifts, offloading equipment	75	1	6	8		48	
		Generators	50	2	6	8		96	
		Propane heaters	58.9	2	6	8		96	
HDD, transmission cables		Drilling Power Unit, 6 locations @ 6 equipment days/location	800		36	8		288	
		Generator	50		36	8		288	
Final Site Preparation, Paving	6 days	Bulldozer		1	1.5	8		12	
		18-yard dump		1	1.5	8	60	12	5
		Hotbox with truck		1	1.5	8	30	12	2.5
		Roller	100	1	1.5	8		12	

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		Hours	VMT		
Final Site Preparation, Plantings	(1 day at each cooling station)	Flatbed Truck, 30 mph		1	0.5	8	120	4	30
		Backhoe, plantings	73	1	0.5	8		4	
Miscellaneous	4.5 weeks	Craft utility, delivery trucks		2	22.5	4	5,400	180	30
		Pickup trucks		1	22.5	4	2,700	90	30

Notes:

* Calendar days are used to provide for long workdays and weekend work.

HDD: Horizontal Directional Drilling

Table M-13. Aquatic Cable Installation Emissions Factors[1], Hudson River Segment

Activity	Equipment and Vehicles			VOC lb/hr	CO lb/hr	NOx lb/hr	SOx lb/hr	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	CO_2 lb/hr	CH_4 lb/hr[2]	N_2O lb/hr[2]
	Type	Category	BHP									
Cable Installation	2 azimuth units	Marine	2,640	2.07	10.48	29.64	0.03	1.41	1.37	3,118.31	0.12	0.02
	azimuth unit	Marine	1,360	1.06	5.40	15.27	0.01	0.73	0.70	1,606.40	0.06	0.01
	retractable azimuth unit	Marine	2,475	1.94	9.82	27.79	0.03	1.32	1.28	2,923.41	0.11	0.02
	tunnel unit	Marine	1,300	1.02	5.16	14.60	0.01	0.69	0.67	1,535.53	0.06	0.01
	generators (500 kVA)	Marine	536	0.33	1.47	5.46	0.01	0.23	0.23	626.53	0.02	0.00
	generators (600 kVA)	Marine	643	0.40	1.76	6.55	0.01	0.28	0.27	751.60	0.03	0.01
	Survey boat	Marine	1,131	0.89	4.49	12.70	0.01	0.60	0.59	1,335.91	0.05	0.01
	Crew boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Installation of Cable Protection	Tugboat, Towboat	Marine	1,970	1.67	8.66	23.20	0.02	1.18	1.14	2,326.55	0.09	0.02
	Crew boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Cable Shipment[3]	OGV main propulsion	Marine (kW)	8,201	10.85	25.31	307.36	65.45	8.14	7.59	10,645.38	0.11	0.56
	OGV auxiliary engine	Marine (kW)	1,776	1.57	4.31	54.42	16.60	1.92	1.76	2,704.41	0.02	0.12

Notes:

[1] Emissions factors weighted for calendar year 2013 (USEPA 2003, USEPA 2006).

[2] Offroad N_2O and CH_4 emissions are based on 40 CFR 98, Subpart C.

[3] Cable Shipment emissions based on USEPA 2009b.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engines(s).

Table M-14. Terrestrial Cable Installation and Cooling Station Construction Emissions Factors[1], Hudson River Segment

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	$PM_{2.5}$ lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Installation of Terrestrial Transmission Cables												
Vegetation Clearing	Brush Hog	offroad	11	0.02	0.11	0.11	0.00	0.01	0.01	14.27	0.00	0.00
Topsoil Removal and Storage	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Access Path Prep (gravel)	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	4.22	0.00	0.00
Trench Excavation	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Ram Hoe	offroad	330	0.14	0.94	2.35	0.00	0.13	0.13	390.14	0.02	0.00
	Hard Rock Trencher	offroad	335	0.24	1.61	3.40	0.00	0.22	0.21	395.76	0.02	0.00
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD	0	0.00	0.00	0.01	0.00	0.00	0.00	4.22	0.00	0.00
	Crane	offroad	300	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD	0	0.00	0.00	0.01	0.00	0.00	0.00	4.22	0.00	0.00
	Crane, 40 ton	offroad	0	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Puller/Tensioner	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
	Mid-pull caterpillars	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
Splice Cable	Generators	offroad	48	0.03	0.18	0.51	0.00	0.03	0.03	62.37	0.00	0.00
	Propane heaters	offroad	0.5	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	4.22	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Install Native Backfill	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Shaker/screen	offroad	110	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor for tampers	offroad	0	0.03	0.12	0.22	0.00	0.02	0.02	25.94	0.00	0.00
Remove Excess Native Fill from site	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	4.22	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	$PM_{2.5}$ lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Installation of Terrestrial Transmission Cables (continued)												
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Hydroseed Sprayer	offroad	115	0.27	0.99	1.64	0.00	0.17	0.17	158.04	0.01	0.00
Miscellaneous	Pickup trucks	onroad LD	0	0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00
Construction of Cooling Stations												
Site Preparation (pavement and foundations)	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Site Prep Grading	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Building Foundations (floor)	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Small crane-forms	offroad	155	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
	Medium crane-concrete bucket	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Concrete Mixer, offsite delivery	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Building	Small crane	offroad	155	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
	Forklifts, offloading equipment	offroad	75	0.07	0.60	0.69	0.00	0.08	0.08	98.37	0.00	0.00
	Generators		50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
	Propane heaters	offroad	58.9	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	$PM_{2.5}$ lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Construction of Cooling Stations (continued)												
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	0	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Hotbox with truck	onroad LD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Roller	offroad	100	0.08	0.79	0.88	0.00	0.11	0.10	131.18	0.00	0.00
	Flatbed Truck, 30 mph	onroad HHD	0	0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe, plantings	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
HDD	Drilling Power Unit, 6 locations @ 6 equipment days/location	offroad	800	0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	offroad	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
Miscellaneous	Craft utility, delivery trucks	onroad MD	0	0.00	0.03	0.00	0.00	0.00	0.00	1.29	0.00	0.00
	Pickup trucks	onroad LD	0	0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00

Notes:

Overland Equipment estimate includes 7.6 miles.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engines(s).

HDD: Horizontal Directional Drilling. LD: Light Duty. HD: Heavy Duty. HHD: Heavy Heavy Duty.

[1] Emissions factors weighted for calendar year 2013.

[2] Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

[3] Offroad diesel exhaust $PM_{2.5}$ = 92% of PM_{10}; Onroad HHD particulate emission factors include allowances for tire and brake wear.

[4] Offroad N_2O and CH_4 emissions are based on 40 CFR 98, Subpart C.

[5] Onroad N_2O and CH_4 emissions are based on the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (USEPA 2009b).

[6] Onroad CO_2 emissions are based on EPA420-F-05-001 which rates gasoline emissions at 19.4 lb/gal and diesel at 22.2 lb/gal (USEPA 2005).

Table M-15. Fugitive Dust Estimation Calculations - Earthmoving, Hudson River Segment

Construction Earthmoving	Project hours	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	PM_{10} lbs	$PM_{2.5}$ lbs
Site Preparation (pavement and foundations)					
Bulldozer	24	16.64	4.91	399.48	117.95
Backhoe	24	0.00034	0.000052	0.01	0.00
Loader	24	0.00034	0.000052	0.01	0.00
18-yard dump	24	0.00034	0.000052	0.01	0.00
Site Prep Grading					
Bulldozer	24	16.64	4.91	399.48	117.95
Backhoe	24	0.00034	0.000052	0.01	0.00
Loader	24	0.00034	0.000052	0.01	0.00
18-yard dump	48	0.00034	0.000052	0.02	0.00
Building Foundations, floor					
Backhoe	24	0.00034	0.000052	0.01	0.00
Bobcat	24	0.10328	0.00513	2.48	0.12
Loader	16	0.00034	0.000052	0.01	0.00
Bulldozer	16	16.64	4.91	266.32	78.63
Concrete Mixer, offsite delivery	12	0.00034	0.000052	0.00	0.00
Final Site Preparation					
Bulldozer	12	16.64	4.91	199.74	58.97
18-yard dump	12	0.00034	0.000052	0.00	0.00
Hotbox with truck	12	0.00034	0.000052	0.00	0.00
Roller	12	0.10328	0.00513	1.24	0.06
HDD, transmission cables					
Drilling Power Unit, 6 locations @ 6 equipment days/location	288	0.00034	0.000052	0.10	0.01
Topsoil Removal and Storage					
Small bulldozer	60.80	16.64	4.91	1012.01	298.80
Bobcat	60.80	0.00034	0.000052	0.02	0.00
Access path prep (gravel)					
Small bulldozer	121.60	16.64	4.91	2024.01	597.61
18-yard dump	243.20	0.00034	0.000052	0.08	0.01
Trench Excavation					
Backhoe	243.20	0.00034	0.000052	0.08	0.01
Bobcat	243.20	0.103	0.005126	25.12	1.25
Ram Hoe	121.60	0.103	0.005126	12.56	0.62
Generators	60.80	0.103	0.005126	6.28	0.31

Construction Earthmoving	Project hours	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	PM_{10} lbs	$PM_{2.5}$ lbs
Deliver and Install Thermal Backfill					
18-yard dump	486.40	0.00034	0.000052	0.17	0.03
Backhoe	243.20	0.00034	0.000052	0.08	0.01
Bobcat	243.20	16.64	4.91	4,048.02	1,195.21
Install Native Backfill					
Backhoe	121.60	0.00034	0.000052	0.04	0.01
Bobcat	121.60	16.64	4.91	2,024.01	597.61
Shaker/screen	121.60	0.00034	0.000052	0.04	0.01
Compressor for tampers	121.60	0.00034	0.000052	0.04	0.01
Remove Excess Native Fill from Site					
18-yard dump	121.60	0.00034	0.000052	0.04	0.01
Backhoe	60.80	0.00034	0.000052	0.02	0.00
Replace Topsoil, York Rake Vegetation					
Small bulldozer	121.60	16.64	4.91	2,024.01	597.61
Hydroseed Sprayer	121.60	0.103275	0.005126	12.56	0.62
TOTAL (lbs)				**12,458**	**3,663**
Total Earthmoving Emissions, tons				**6.23**	**1.83**

Notes:

HDD: Horizontal Directional Drilling

Based on USEPA 2006 (USEPA 2006).

AP-42 Section 11.9 for dozing (Table 11.9-1):

$E = 0.75 * (s)^{1.5} / (M)^{1.4}$ for PM_{10}

$E = 0.105 * 5.7 \times (s)^{1.2} / (M)^{1.3}$ for $PM_{2.5}$

E = lb/hr fugitive

s = Silt Content assumed to be 55% for construction sites. (CHPEI 2010)

M = moisture content = 8% (assumes unwatered subsoil)

AP-42 Section 11.9 for grading, rolling, and excavating (Table 11.9-1) (USEPA 2006)

$E = S * 0.60 * 0.051 \times (S)^{2.0}$ for PM_{10}

$E = S * 0.031 * 0.040 \times (S)^{2.5}$ for $PM_{2.5}$

Simplifies to $E = 0.60 * 0.051 \times (S)^{3.0}$ for PM_{10}

Simplified to $E = 0.031 * 0.040 \times (S)^{3.5}$ for $PM_{2.5}$

E = lb/VMT * VMT/hr = lb/hr fugitive

S = Mean Vehicle Speed assumed to be 3 mph for graders, 1.5 mph for excavators & rollers

Assumes VMT = S * hours of use

AP-42 Section 13.2.4 Loading/Handling (digger, driller, backhoe, loader): (USEPA 2006)

$E = 0.35 * 0.0032 * (U/5)^{1.3}/(M/2)^{1.4}$ for PM_{10}

$E = 0.053 * 0.0032 * (U/5)^{1.3}/(M/2)^{1.4}$ for $PM_{2.5}$

E = lb/ton * tons/hr = lb/hr fugitive

U = average wind speed is 8.9 mph for Albany, New York (NOAA 2002)

M = moisture content = 8% (assumes unwatered subsoil)

Table M-16. Fugitive Dust Estimation Calculations - Road Dust, Hudson River Segment

Construction Road Dust	Project VMT	PM_{10} lb/VMT	$PM_{2.5}$ lb/VMT	PM_{10} lbs	$PM_{2.5}$ lbs
All Roads					
Pickup Truck	39,180				
18-yard dump Truck	0				
Flatbed Truck	7,416				
Subtotals	**46,596**				
Unpaved Roads					
Pickup Truck	11,754	0.06820	0.00682	802	80
18-yard dump Truck	0	0.10604	0.01060	0	0
Flatbed Truck	742	0.19222	0.01922	143	14
Subtotals	**12,496**			**944**	**94**
Paved Roads					
Pickup Truck	27,426	0.00622	0.00076	171	21
18-yard dump Truck	0	0.02802	0.00403	0	0
Flatbed Truck	6,674	0.20521	0.03061	1,370	204
Subtotals	**34,100**			**1,540**	**225**
Total Road Dust Emissions, tons				**1.24**	**0.16**

Notes:
Based on USEPA 2006 and USEPA 2003.
Unpaved Road Dust (AP-42 Section 13.2.2):
$E = 1.5 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1\text{-}CE)$ for PM_{10}
$E = 0.15 * (s/12)^{0.9} * (W/3)^{0.45} * PC * (1\text{-}CE)$ for $PM_{2.5}$
E = lb/VMT fugitive
s = surface silt content = 9%
(average for unpaved roads and construction sites, AP-42 Table 13.2.2-1)
W = average vehicle weight (see below)
PC=(365-P/365)
CE = Control Efficiency for watering = 90% for M between 4 and 5
(AP-42 Figure 13.2.2-2)

Based on USEPA 2006.
Paved Road Dust (AP-42 Section 13.2.1)
$E=0.016*(sL/2)^{0.65}*(W/3)^{1.5}-0.00047*PC$ for PM_{10}
$E=0.0024*(sL/2)^{0.65}*(W/3)^{1.5}-0.00036*PC$ for $PM_{2.5}$
E = lb/VMT fugitive
sL=Silt Loading assumed to be 0.5 g/m^2 for average ADT categories from Table 13.2.1-3
Note: precipitation correction not used (PC=1) for worst case day calculations
PC=(1-P/4N)
P = number of wet days over 0.01 in precipitation for averaging period
(150 days/year average for New York State)
N=days of period = 365 days

Vehicle Weights based on USEPA 2010.
Light Duty = 3 tons average
Medium Duty = 8 tons average
Heavy Heavy Duty = 30 tons average (loaded 40 tons, unloaded 20 tons)
18-yard dump assumes 70% unpaved mileage, and 30% paved mileage.
Pickup trucks assumes 30% unpaved mileage, and 70% paved mileage.
Flatbed truck assumes 10% unpaved mileage, and 90% paved mileage.

Table M-17. Estimated Total Emissions[1], Hudson River Segment

Activity	Equipment and Vehicles[2]				VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs	VMT										
Emissions from Installation of Aquatic Transmission Cables														
Cable Installation	2 azimuth units	Marine	1,416		2,926	14,838	41,971	39	1,998	1,938	4,415,524	173	35	4,429,889
	azimuth unit	Marine	708		754	3,822	10,811	10	515	499	1,137,332	45	9	1,141,032
	retractable azimuth unit	Marine	283.2		549	2,782	7,869	7	375	363	827,911	32	6	830,604
	tunnel unit	Marine	708		720	3,653	10,334	10	492	477	1,087,155	43	9	1,090,692
	generators (500 kVA)	Marine	8,496		2,845	12,471	46,386	47	1,975	1,915	5,322,956	211	42	5,340,455
	generators (600 kVA)	Marine	1,416		569	2,493	9,274	9	395	383	1,064,260	42	8	1,067,759
	Survey boat	Marine	1,416		1,254	6,357	17,981	17	856	830	1,891,651	74	15	1,897,805
	Crew boat	Marine	566.4		118	861	1,970	2	108	104	284,542	11	2	285,467
Installation of Cable Protection	Tugboat, Towboat	Marine	354		590	3,067	8,214	7	416	404	823,599	32	6	826,278
	Crew boat	Marine	283.2		7	51	124	0	7	7	17,935	1	0	17,993
Cable Shipment	OGV	Marine	105		1,139	2,658	32,273	6,872	854	797	1,117,764	11	59	1,136,247
	OGV	Marine	35.7		56	154	1,943	593	68	63	96,547	1	4	97,902
Emissions from Installation of Terrestrial Transmission Cables														
Vegetation Clearing	Brush Hog	offroad	60.8	0	10.67	76.23	76.56	0.09	7.42	7.20	10,104.29	0.36	0.07	10,134.22
Topsoil Removal and Storage	Small Bulldozer	offroad	60.8	0	41.34	173.04	510.22	0.82	32.88	31.90	95,400.19	3.74	0.75	95,710.34
	Bobcat	offroad	60.8	0	141.04	718.11	646.96	0.72	106.84	103.63	78885.39	2.39	0.48	79,083.99
Access Path Prep (gravel)	Small Bulldozer	offroad	121.6	0	1,240.14	5,191.24	15,306.70	24.52	986.50	956.90	2,862,005.76	112.10	22.42	2,871,310.21
	18-yard dump	onroad HHDV	243.2	1,216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trench Excavation	Backhoe	offroad	243.2	0	282.08	1,436.23	1,293.92	1.45	213.67	207.26	157,770.77	4.79	0.96	158,167.98
	Bobcat	offroad	243.2	0	112.83	574.49	517.57	0.58	85.47	82.90	63,108.31	1.91	0.38	63,267.19
	Ram Hoe	offroad	121.6	0	49.45	332.46	830.26	1.20	45.73	44.36	138,110.15	5.41	1.08	138,559.05
	Hard Rock Trencher	offroad	60.8	0	68.08	457.21	962.66	1.00	61.08	59.25	112,079.40	4.39	0.88	112,443.96
Cable Delivery	Flatbed Truck, 30 mph	onroad HHDV	121.6	3,648	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crane	offroad	30.4	0	3.48	11.03	44.25	0.06	2.60	2.53	6467.98	0.26	0.05	6,489.25
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHDV	121.6	3,648	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Crane, 40 ton	offroad	30.4	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Puller/Tensioner	offroad	243.2	0	8.04	30.72	48.58	0.05	5.48	5.31	5,446.02	0.18	0.04	5,461.24
	Mid-pull caterpillars	offroad	243.2	0	8.04	30.72	48.58	0.05	5.48	5.31	5,446.02	0.18	0.04	5,461.24
Splice Cable	Generators	offroad	243.2	0	0.80	4.26	12.12	0.01	0.76	0.74	1,496.97	0.05	0.01	1,501.40
	Propane heaters	offroad	243.2	0	0.04	0.30	0.52	0.00	0.03	0.03	495.28	0.01	0.04	506.51

Activity	Equipment and Vehicles[2]				VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs	VMT										
Emissions from Installation of Terrestrial Transmission Cables (continued)														
Deliver and Install Thermal Backfill	18-yard dump	onroad HHDV	486.4	14,592	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Backhoe	offroad	243.2	0	4.78	24.34	21.93	0.02	3.62	3.51	2,674.08	0.08	0.02	2,680.81
	Bobcat	offroad	243.2	0	4.78	24.34	21.93	0.02	3.62	3.51	2,674.08	0.08	0.02	2,680.81
Install Native Backfill	Backhoe	offroad	121.6	0	4.78	24.34	21.93	0.02	3.62	3.51	2,674.08	0.08	0.02	2,680.81
	Bobcat	offroad	121.6	0	9.56	48.69	43.86	0.05	7.24	7.03	5,348.16	0.16	0.03	5,361.63
	Shaker/screen	offroad	121.6	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Compressor for tampers	offroad	121.6	0	0.70	2.91	5.31	0.01	0.43	0.42	622.65	0.02	0.00	624.50
Remove Excess Native Fill from site	18-yard dump	offroad	121.6	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Backhoe	onroad HHD	60.8	608	3.19	16.23	14.62	0.02	2.41	2.34	1,782.72	0.05	0.01	1,787.21
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	121.6	0	2.34	9.78	28.83	0.05	1.86	1.80	5,389.84	0.21	0.04	5,407.36
	Hydroseed Sprayer	offroad	121.6	0	3.28	11.85	19.72	0.02	2.06	2.00	1,896.44	0.06	0.01	1,901.74
Miscellaneous	Pickup trucks	onroad HHDV	1216	36,480	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Emissions from Construction of Cooling Stations														
Site Preparation (pavement and foundations)	Bulldozer	offroad	24	0	3.50	0.00	6.31	0.00	0.73	0.00	246.87	0.00	0.65	448.83
	Backhoe	offroad	24	0	4.78	0.00	4.37	0.00	0.66	0.00	73.45	0.00	0.05	88.84
	Loader	offroad	24	0	7.31	0.00	13.45	0.00	2.79	0.00	575.70	0.00	0.80	823.57
	18-yard dump	onroad HHD	24	120	0.06	1.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Site Prep Grading	Bulldozer	offroad	24	0	3.50	0.00	6.31	0.00	0.73	0.00	246.87	0.00	0.65	448.83
	Backhoe	offroad	24	0	4.78	0.00	4.37	0.00	0.66	0.00	73.45	0.00	0.05	88.84
	Loader	offroad	24	0	7.31	0.00	13.45	0.00	2.79	0.00	575.70	0.00	0.80	823.57
	18-yard dump	onroad HHD	48	240	0.12	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building Foundations (floor)	Backhoe	offroad	24	0	4.78	0.00	4.37	0.00	0.66	0.00	73.45	0.00	0.05	88.84
	Bobcat	offroad	24	0	4.78	0.00	4.37	0.00	0.66	0.00	73.45	0.00	0.05	88.84
	Loader	offroad	16	0	4.87	0.00	8.97	0.00	1.86	0.00	383.80	0.00	0.53	549.05
	Bulldozer	offroad	16	0	2.34	0.00	4.21	0.00	0.49	0.00	164.58	0.00	0.43	299.22
	Concrete Mixer, offsite delivery	onroad HHD	12	30	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Building	Small crane	offroad	72	0	7.02	0.00	8.70	0.00	0.63	0.00	114.98	0.00	0.17	166.13
	Forklifts, offloading equipment	offroad	48	0	3.29	0.00	2.27	0.00	0.19	0.00	18.70	0.00	0.01	22.72
	Generators		96	0	3.33	0.00	1.75	0.00	0.06	0.00	3.75	0.00	0.00	4.29
	Propane heaters	offroad	96	0	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Activity	Equipment and Vehicles[2]				VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs	VMT										
Emissions from Construction of Cooling Stations (continued)														
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	12	0	1.75	0.00	3.16	0.00	0.37	0.00	123.44	0.00	0.33	224.42
	18-yard dump	onroad HHD	12	60	0.03	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Hotbox with truck	onroad LD	12	30	0.03	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Roller	offroad	12	0	1.00	0.00	0.89	0.00	0.09	0.00	12.37	0.00	0.01	15.92
	Flatbed Truck, 30 mph	onroad HHD	4	120	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Backhoe, plantings	offroad	4	0	0.80	0.00	0.73	0.00	0.11	0.00	12.24	0.00	0.01	14.81
HDD	Drilling Power Unit, 6 locations @ 6 equipment days/location	offroad	288	0	257.22	0.00	3,006.24	0.00	1,611.00	0.00	1,504,580	0.00	11,145.21	4,959,595
	Generator	offroad	288	0	9.99	0.00	5.26	0.00	0.17	0.00	11.25	0.00	0.01	12.87
Miscellaneous	Craft utility, delivery trucks	onroad MD	180	5,400	0.48	177.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Pickup trucks	onroad LD	90	2,700	0.13	63.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Combustion Emissions, lbs					13,860	62,611	212,724	7,644	11,261	9,312	23,154,419	812	11,373	26,697,151
Total Combustion Emissions, tons					6.93	31.31	106.36	3.82	5.63	4.66	11,577.21	0.41	5.69	13,348.58
Total Fugitive Dust emissions, earthmoving tons[4]					-	-	-	-	**6.23**	**1.83**	-	-	-	-
Total Fugitive Dust emissions, road dust, tons[4]					-	-	-	-	**1.24**	**0.16**	-	-	-	-
Combined Combustion and Fugitive Dust emissions, tons					**6.93**	**31.31**	**106.36**	**3.82**	**13.10**	**6.65**	**11,577**	**0.41**	**5.69**	**13,349**

Notes:

[1] Emissions factors weighted for calendar year 2013 (USEPA 2006, USEPA 2009b).

[2] Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

[3] Carbon dioxide equivalents (CO_2 eqv) are calculated by summing the products of mass GHG emissions by species times their respective GWP coefficients (USEPA 2009a).

[4] See Fugitive Dust Estimation Calculations tables for more detailed information.

Table M-18. Estimated Equipment and Vehicle Use During Construction of Converter Station, New York City Metropolitan Area Segment

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		hours	VMT		
Site Preparation (pavement and foundations)	1 month	Bulldozer	285	2	30	8		480	
		Backhoe	73	2	30	8		480	
		Loader	150	1	30	8		240	
		18-yard Truck, transport debris		2	30	8	2,400	480	5
Site Prep Grading	2 weeks	Bulldozer	285	1	15	8		120	
		Backhoe	73	1	15	8		120	
		Loader	150	1	15	8		120	
		18-yard Truck, clean fill		2	15	8	1,200	240	5
Fence, Paving of street accesses, AC site lighting and trailer	2 weeks	Truck with Kelly bar auger		2	15	8	600	240	2.5
		Concrete Mixer, offsite delivery	6	1	15	8	300	120	2.5
		Bobcat	73	2	15	8		240	
		Bulldozer	285	1	15	8		120	
		18-yard Truck, asphalt		1	15	8	600	120	5
		Hotbox with truck		1	15	8	300	120	2.5
		Roller	100	1	15	8		120	
		Backhoe	73	1	15	8		120	
		Small crane	155	1	15	8		120	
Converter Building Foundations, floor	3 months	Backhoe	73	2	90	8		1,440	
		Bobcat	73	1	90	8		720	
		Loader	150	2	60	8		960	
		Bulldozer	285	1	60	8		480	
		Small crane-forms	155	2	30	8		480	
		Medium crane-concrete bucket	300	2	30	8		480	
		Concrete Mixer, offsite delivery		4	30	8	2,400	960	2.5

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		hours	VMT		
Converter Building Superstructure	3 months	Large crane, for frame and gantry crane	450	1	30	8		240	
		Small crane, for roof and cladding	155	2	90	8		1,440	
		Forklifts, offloading equipment	75	1	60	8		480	
		Small crane, offloading equipment	155	1	60	8		480	
		Generators		5	90	8		3,600	
		Propane heaters	58.9	5	90	8		3,600	
Transformer Yard Foundations and Conduits	2 months	Backhoe	73	1	30	8		240	
		Loader	150	1	60	8		480	
		Small crane-forms	155	1	30	8		240	
		Bulldozer	285	1	60	8		480	
		Bobcat	73	1	60	8		480	
Transformer Yard Structural, Electrical	3 months	Small crane	155	2	30	8		480	
		Manlift trucks		2	90	8	3,600	1,440	2.5
		Compressor	20	2	90	8		1,440	
HDD, transmission cables		Drilling Power Unit, 2 locations @ 6 equipment days/location	800		12	8		96	
		Generator	50		12	8		96	
Final Site Preparation, traprock, paving, vegetation plantings	2 weeks	18-yard Truck, traprock		1	15	8	600	120	5
		Loader	150	1	15	8		120	
		Bulldozer, paving	285	1	15	8		120	
		Bulldozer, planting		1	15	8		120	
		18-yard Truck, asphalt		1	15	8	600	120	5
		Hotbox with truck		1	15	8	300	120	2.5
		Roller	100	1	15	8		120	
		Flatbed Truck, plantings		1	5	8	1,200	40	30
		Backhoe, plantings	73	1	10	8		80	

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (on road only)
		Equipment Type	BHP	Qty		hours	VMT		
Miscellaneous	1 year	Construction Trailers, propane	58.9	5	90	8		3,600	
		Craft utility, delivery trucks		30	360	4	1,296,000	43,200	30
		Pickup trucks		10	360	4	432,000	14,400	30

Notes:

* Calendar days are used to provide for long workdays and weekend work.

Table M-19. Estimated Equipment and Vehicle Use During Aquatic Cable Installation, New York City Metropolitan Area Segment

Activity	Equipment and Vehicles			Hours per Day	Working Days	LF	trips	cables	Total hours
	Type	BHP	Qty						
Cable Installation	Primary Cable Vessel								
	2 azimuth units	2,640	2	24	5	0.25	1	2	120
	azimuth unit	1,360	1	24	5	0.25	1	2	60
	retractable azimuth unit	2,475	1	24	5	0.1	1	2	24
	tunnel unit	1,300	1	24	5	0.25	1	2	60
	generators (500 kVA)	536	4	24	5	0.75	1	2	720
	generators (600 kVA)	643	1	24	5	0.5	1	2	120
	Survey boat	1,131	1	24	5	0.5	1	2	120
	Crew boat	425	1	24	5	0.2	1	2	48
Installation of Cable Protection	Tugboat, Towboat	1,970	1	12	5	0.25	1	2	30
	Crew boat	425	1	12	5	0.2	1	2	24
Dredging	Clamshell dredge	1,920	1	24	5	0.9	1	1	108
	Tender, Pushboat	1,131	1	24	5	0.5	1	1	60
	Tugboat, Towboat	1,970	1	24	5	0.5	1	1	60
	Crew boat	425	1	24	5	0.2	1	1	24
Cable Shipment	Main propulsion	8,201	1	1.8		0.5	3		2.7
	Auxiliary engine	1,776	1	1.8		0.17	3		0.918

Dredging at Navigation Crossings			
Equipment Type	**Average Horsepower**	**Estimated Equipment Duty***	**# of days for New York City Area**
Clamshell dredge	1,920	Marine medium continuous duty/transient	10
Tender, Pushboat	1,131	Marine heavy-duty	10
Tugboat, Towboat	1,970	Marine heavy-duty	10
Crew boat	425	Marine medium continuous duty	10

Notes:

BHP: Brake-horsepower. The maximum rated load of the vehicle or vessel engine(s). LF: Load Factor

5 work days based on 1.49 miles per day from mileposts 324.0 to 330.2 and 331.6 to 332.3.

Cable shipments emission duration of 1.8 hours per trip based on 12 mph for 21.5 miles.

21.5 miles is the average distance for each of the 3 cable shipments (6 miles of cable per shipment) round trip.

Table M-20. Estimated Equipment and Vehicle Use During Terrestrial Cable Installation, New York City Metropolitan Area Segment

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (3.7 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/8-hour day	BHP	qty		hours	VMT		
Vegetation Clearing	Brush Hog	1	11	1	1.40	8		11.20	
Topsoil removal and storage	Small Bulldozer	1	285	1	1.40	8		11.20	
	Bobcat	1	73	1	1.40	8		11.20	
Access path prep (gravel)	Small Bulldozer	0.5	285	1	2.80	8		22.40	
	18-yard dump	0.5		2	2.80	8	224	44.80	5
Trench Excavation	Backhoe	0.25	73	1	5.60	8		44.80	
	Bobcat	0.25	73	1	5.60	8		44.80	
	Ram Hoe	0.25	330	1	5.60	4		22.40	
	Hard Rock Trencher	0.25	335	1	5.60	2		11.20	
Deliver Cable @ 3 reels per	Flatbed Truck, 30 mph	0.5		1	2.80	8	672	22.40	30
	Crane	0.5	300	1	2.80	2		5.60	
HDD[1,2]	Drilling Unit				12	8		96	
	Drilling Power Unit		800		12	8		96	
	Generator		50		12	8		96	
	Water Pumps				12	8		96	
	Mud Pump				12	8		96	
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	0.5		1	2.8	8	672	22.4	30
	Crane, 40 ton	0.5		1	2.8	2		5.6	
	Puller/Tensioner	0.5	165	2	2.8	8		44.8	
	Mid-pull caterpillars	0.5	165	2	2.8	8		44.8	
Splice Cable	Generators	0.25	48	1	5.6	8		44.8	
	Propane heaters	0.25	0.5	1	5.6	8		44.8	

Task	Equipment and Vehicles				Working Days	Daily		# equipment hours operation (3.7 miles)	Miles Per Hour (on road only)
	Equipment Type	Progress (miles)/8-hour day	BHP	qty		hours	VMT		
Deliver and install Thermal Backfill	18-yard dump	0.25		2	5.6	8	2,688	89.6	30
	Backhoe	0.25	73	1	5.6	8		44.8	
	Bobcat	0.25	73	1	5.6	8		44.8	
Install Native Backfill	Backhoe	0.5	73	1	2.8	8		22.4	
	Bobcat	0.5	73	1	2.8	8		22.4	
	Shaker/screen	0.5	110	1	2.8	8		22.4	
	Compressor for tampers	0.5		1	2.8	8		22.4	
Remove Excess Native Fill from Site	18-yard dump	1		2	1.4	8	112	22.4	5
	Backhoe	1	73	1	1.4	8		11.2	
Replace Topsoil, York Rake Vegetation	Small Bulldozer	0.5	285	1	2.8	8		22.4	
	Hydroseed Sprayer	0.5	115	1	2.8	8		22.4	
Miscellaneous	Pickup trucks			10	15	4	18,000	600	30

Notes:

HDD: Horizontal Directional Drilling

[1] HDD includes 2 Hudson Entrance/Exit, 2 Locations, and 6 equipment days per location.

[2] Support for HDD includes 3 Locations, 12 Working Days (4 Equipment Days per location) at 8 hours per day, and 96 equipment hours of operation.

Table M-21. Estimated Equipment and Vehicle Use During Construction of Cooling Station, New York City Metropolitan Area Segment

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (onroad only)
		Equipment Type	BHP	Qty		hours	VMT		
Site Preparation (pavement and foundations)	0.5 days (half a day at each cooling station)	Bulldozer	285	1	0.5	8		4	
		Backhoe	73	1	0.5	8		4	
		Loader	150	1	0.5	8		4	
		18-yard Truck, transport debris		1	0.5	8	20	4	5
Site Prep Grading	0.5 days (half a day at each cooling station)	Bulldozer	285	1	0.5	8		4	
		Backhoe	73	1	0.5	8		4	
		Loader	150	1	0.5	8		4	
		18-yard Truck, clean fill		2	0.5	8	40	8	5
Building Foundations, floor	0.5 days (half a day at each cooling station)	Backhoe	73	1	4.5	8		36	
		Bobcat	73	1	4.5	8		36	
		Loader	150	1	0.5	8		4	
		Bulldozer	285	1	0.5	8		4	
		Small crane-forms	155	2	0	8		0	
		Medium crane-concrete bucket	300	2	0	8		0	
		Concrete Mixer, offsite delivery		1	0.5	8	10	4	2.5
Building	2 days (2 days at each station)	Small crane	155	1	0.5	8		4	
		Forklifts, offloading equipment	75	1	1	8		8	
		Generators	50	2	1	8		16	
		Propane heaters	58.9	2	1	8		16	
HDD, transmission cables		Drilling Power Unit, 1 location @ 6 equipment days/location	800		6	8		48	
		Generator	50		6	8		48	

Task	Overall Duration	Equipment and Vehicles			Working Days*	Daily		# equipment hours operation	Miles per Hour (onroad only)
		Equipment Type	BHP	Qty		hours	VMT		
Final Site Preparation, traprock, paving, vegetation plantings	1 day (1 day at each cooling station)	Bulldozer		1	0.5	8		4	
		18-yard Truck, asphalt		1	0.5	8	20	4	5
		Hotbox with truck		1	0.5	8	10	4	2.5
		Roller	100	1	0.5	8		4	
		Flatbed Truck, plantings		1	0.5	8	120	4	30
		Backhoe, plantings	73	1	0.5	8		4	
Miscellaneous	7 weeks	Craft utility, delivery trucks		2	5	4	1,200	40	30
		Pickup trucks, 30 mph		1	5	4	600	20	30

Notes:

* Calendar days are used to provide for long workdays and weekend work.

HDD: Horizontal Directional Drilling

Table M-22. Emissions Factors[1], New York City Metropolitan Area Segment

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	PM_{25} lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Construction of the Converter Station												
Site Preparation (pavement and foundations)	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	18-yard Truck, transport debris	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
Site Prep Grading	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	18-yard Truck, clean fill	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
Fence, Paving of street accesses, AC, lighting, and trailers	Truck with Kelly bar auger	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Concrete Mixer, offsite delivery	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Bobcat	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	18-yard Truck, asphalt	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Hotbox with truck	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Roller	offroad	100	0.1	0.8	0.9	0.0	0.1	0.1	131.2	0.0	0.0
	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Small crane	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
Converter Building Foundations (floors)	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Bobcat	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Small crane-forms	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Medium crane-concrete bucket	offroad	300	0.2	0.5	2.2	0.0	0.1	0.1	350.7	0.0	0.0
	Concrete Mixer, offsite delivery	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	PM_{25} lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Construction of the Converter Station (continued)												
Converter Building Superstructure	Large crane, for frame and gantry crane	offroad	450	0.2	1.1	4.2	0.0	0.2	0.2	526.1	0.0	0.0
	Small crane, for roof and cladding	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Forklifts, offloading equipment	offroad	75	0.1	0.6	0.7	0.0	0.1	0.1	98.4	0.0	0.0
	Small crane, offloading equipment	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Generators	offroad	50	0.0	0.2	0.5	0.0	0.0	0.0	65.0	0.0	0.0
	Propane heaters	offroad	58.9	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Transformer Yard Foundations and Conduits	Backhoe	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	Small crane-forms	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Bulldozer	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Bobcat	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
Transformer Yard Structural, Electrical	Small crane	offroad	155	0.1	0.3	1.2	0.0	0.1	0.1	181.2	0.0	0.0
	Manlift trucks	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Compressor	offroad	20	0.0	0.1	0.2	0.0	0.0	0.0	25.9	0.0	0.0
Final Site Preparation, traprock, paving, vegetation plantings	18-yard Truck, traprock	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Loader	offroad	150	0.3	1.2	1.8	0.0	0.2	0.2	206.3	0.0	0.0
	Bulldozer, paving	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	Bulldozer, planting	offroad	285	0.1	0.6	1.8	0.0	0.1	0.1	336.9	0.0	0.0
	18-yard Truck, asphalt	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Hotbox with truck	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Roller	offroad	100	0.1	0.8	0.9	0.0	0.1	0.1	131.2	0.0	0.0
	Flatbed Truck, plantings	onroad HHD		0.0	0.0	0.0	0.0	0.0	0.0	3.7	0.0	0.0
	Backhoe, plantings	offroad	73	0.2	1.0	0.9	0.0	0.2	0.1	111.4	0.0	0.0
HDD	Drilling Power Unit	offroad	800	0.9	3.4	11.7	0.0	0.5	0.5	933.9	0.0	0.0
	Generator	offroad	50	0.0	0.2	0.5	0.0	0.0	0.0	65.0	0.0	0.0

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	PM_{25} lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Construction of the Converter Station (continued)												
Miscellaneous	Construction Trailers, propane	offroad	58.9	0.0	0.0	0.0	0.0	0.0	0.0	20.6	0.0	0.0
	Craft utility, delivery trucks	onroad MD		0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.0	0.0
	Pickup trucks	onroad LD		0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0
Installation of Aquatic Transmission Cables												
Cable Installation	2 azimuth units	Marine	2,640	2.07	10.48	29.64	0.03	1.41	1.37	3,118.31	0.12	0.02
	azimuth unit	Marine	1,360	1.06	5.40	15.27	0.01	0.73	0.70	1,606.40	0.06	0.01
	retractable azimuth unit	Marine	2,475	1.94	9.82	27.79	0.03	1.32	1.28	2,923.41	0.11	0.02
	tunnel unit	Marine	1,300	1.02	5.16	14.60	0.01	0.69	0.67	1,535.53	0.06	0.01
	generators (500 kVA)	Marine	536	0.33	1.47	5.46	0.01	0.23	0.23	626.53	0.02	0.00
	generators (600 kVA)	Marine	643	0.40	1.76	6.55	0.01	0.28	0.27	751.60	0.03	0.01
	Survey boat	Marine	1,131	0.89	4.49	12.70	0.01	0.60	0.59	1,335.91	0.05	0.01
	Crew boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Installation of Cable Protection	Tugboat, Towboat	Marine	1,970	1.67	8.66	23.20	0.02	1.18	1.14	2,326.55	0.09	0.02
	Crew boat	Marine	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Dredging	Clamshell dredge	Marine MD	1,920	1.98	10.84	24.7	0.02	1.46	1.41	2,266.44	0.09	0.02
	Tender, Pushboat	Marine HD	1,131	0.89	4.49	12.70	0.01	0.60	0.59	1,335.91	0.05	0.01
	Tugboat, Towboat	Marine HD	1,970	1.67	8.66	23.20	0.02	1.18	1.14	2,326.55	0.09	0.02
	Crew boat	Marine MD	425	0.21	1.44	3.48	0.00	0.19	0.18	502.37	0.02	0.00
Cable Shipment[7]	OGV main propulsion	Marine HD	8,201	10.85	25.31	307.36	65.45	8.14	7.59	10,645.38	0.11	0.56
	OGV auxiliary engine	Marine HD	1,776	1.57	4.31	54.42	16.60	1.92	1.76	2,704.41	0.02	0.12
Installation of Terrestrial Transmission Cables												
Vegetation Clearing	Brush Hog	offroad	11	0.02	0.11	0.11	0.00	0.01	0.01	14.27	0.00	0.00
Topsoil Removal and Storage	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Access Path Prep (gravel)	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	PM_{25} lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Installation of Terrestrial Transmission Cables (continued)												
Trench Excavation	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Ram Hoe	offroad	330	0.14	0.94	2.35	0.00	0.13	0.13	390.14	0.01	0.00
	Hard Rock Trencher	offroad	335	0.24	1.61	3.40	0.00	0.22	0.21	395.76	0.02	0.00
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
HDD[7]	Drilling Power Unit	offroad	800	0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	offroad	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD		0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Crane, 40 ton	offroad		0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Puller/Tensioner	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
	Mid-pull caterpillars	offroad	165	0.34	1.28	2.02	0.00	0.23	0.22	226.92	0.01	0.00
Splice Cable	Generators	offroad	48	0.03	0.18	0.51	0.00	0.03	0.03	62.37	0.00	0.00
	Propane heaters	offroad	0.5	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Install Native Backfill	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Shaker/screen	offroad	110	0.07	0.22	0.90	0.00	0.05	0.05	128.57	0.01	0.00
	Compressor for tampers	offroad		0.03	0.12	0.22	0.00	0.02	0.02	25.94	0.00	0.00
Remove Excess Native Fill from site	18-yard dump	onroad HHD		0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Hydroseed Sprayer	offroad	115	0.27	0.99	1.64	0.00	0.17	0.17	158.04	0.01	0.00
Miscellaneous	Pickup trucks	onroad LD		0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00
Construction of the Cooling Station												
Site Preparation (pavement and foundations)	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	18-yard Truck, transport debris	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	PM_{25} lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Construction of the Cooling Station (continued)												
Site Prep Grading	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	18-yard Truck, clean fill	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Building Foundations (floor)	Backhoe	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Bobcat	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
	Loader	offroad	150	0.30	1.16	1.84	0.00	0.21	0.20	206.29	0.01	0.00
	Bulldozer	offroad	285	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	Small crane-forms	offroad	155	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
	Medium crane-concrete bucket	offroad	300	0.17	0.47	2.22	0.00	0.10	0.09	350.73	0.01	0.00
	Concrete Mixer, offsite delivery	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
Building	Small crane	offroad	155	0.10	0.31	1.24	0.00	0.07	0.07	181.18	0.01	0.00
	Forklifts, offloading equipment	offroad	0	0.07	0.60	0.69	0.00	0.08	0.08	98.37	0.00	0.00
	Generators	offroad	75	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00
	Propane heaters	offroad	155	0.00	0.01	0.02	0.00	0.00	0.00	20.64	0.00	0.00
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	0	0.15	0.61	1.80	0.00	0.12	0.11	336.87	0.01	0.00
	18-yard Truck, asphalt	onroad HHD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Hotbox with truck	onroad LD	0	0.00	0.01	0.02	0.00	0.00	0.00	3.70	0.00	0.00
	Roller	offroad	100	0.08	0.79	0.88	0.00	0.11	0.10	131.18	0.00	0.00
	Flatbed Truck, plantings	onroad HHD	0	0.00	0.00	0.01	0.00	0.00	0.00	3.70	0.00	0.00
	Backhoe, plantings	offroad	73	0.20	1.01	0.91	0.00	0.15	0.15	111.42	0.00	0.00
HDD	Drilling Power Unit, 1 location @ 6 equipment days/location	offroad	800	0.89	3.39	11.69	0.01	0.54	0.52	933.94	0.04	0.01
	Generator	offroad	50	0.03	0.18	0.53	0.00	0.03	0.03	64.97	0.00	0.00

Activity	Equipment and Vehicles			VOC lb/unit[2]	CO lb/unit[2]	NO_x lb/unit[2]	SO_x lb/unit[2]	PM_{10} lb/unit[2,3]	PM_{25} lb/unit[2,3]	CO_2 lb/unit[2,6]	CH_4 lb/unit[2,4,5]	N_2O lb/unit[2,4,5]
	Type	Category	BHP									
Construction of the Cooling Station (continued)												
Miscellaneous	Craft utility, delivery trucks	onroad MD	0	0.00	0.03	0.00	0.00	0.00	0.00	1.29	0.00	0.00
	Pickup trucks, 30 mph	onroad LD	0	0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00	0.00

Notes:

[1] Emissions factors weighted for calendar year 2013 (USEPA 2003, USEPA 2006, USEPA 2009a).

[2] Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

[3] Offroad diesel exhaust $PM_{2.5}$ = 92% of PM_{10}; Onroad HHD particulate emission factors include allowances for tire and brake wear.

[4] Offroad N_2O and CH_4 emissions are based on 40 CFR 98, Subpart C.

[5] Onroad N_2O and CH_4 emissions are based on the Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (USEPA 2009b).

[6] Onroad CO_2 emissions are based on EPA420-F-05-001 which rates gasoline emissions at 19.4 lb/gal and diesel at 22.2 lb/gal (USEPA 2005).

[7] Cable Shipment emissions based on STARCREST 2005.

Project counties include Bronx and Queens. Mileposts 324.0 to 333.7 for underwater cable laying and dredging.

Onland Construction activities - Mileposts 333.7 to 337.4/Astoria and Rainey substations connections.

BHP: Brake-horsepower. This should be the maximum rated load of the vehicle of vessel engines(s).

HDD: Horizontal Directional Drilling

Table M-23. Fugitive Dust Estimation Calculations - Earthmoving, New York City Metropolitan Area Segment

Construction Earthmoving	Project hours	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	PM_{10} lbs	$PM_{2.5}$ lbs
Site Preparation (pavement and foundations)					
Bulldozer	480	16.64	4.91	7989.52	2358.98
Backhoe	480	0.00034	0.000052	0.16	0.02
Loader	240	0.00034	0.000052	0.08	0.01
18-yard Truck, transport debris	480	0.00034	0.000052	0.16	0.02
Site Prep Grading					
Bulldozer	120	16.64	4.91	1997.38	589.74
Backhoe	120	0.00034	0.000052	0.04	0.01
Loader	120	0.00034	0.000052	0.04	0.01
18-yard Truck, clean fill	240	0.00034	0.000052	0.08	0.01
Converter Building Foundations (floors)					
Backhoe	1440	0.00034	0.000052	0.49	0.07
Bobcat	720	0.10328	0.00513	74.36	3.69
Loader	960	0.00034	0.000052	0.33	0.05
Bulldozer	480	16.64	4.91	7989.52	2358.98
Small crane-forms	480	0.00034	0.000052	0.16	0.02
Medium crane-concrete bucket	480	0.00034	0.000052	0.16	0.02
Concrete Mixer, offsite delivery	960	0.00034	0.000052	0.33	0.05
Transformer Yard Foundations and Conduit					
Backhoe	240	0.00034	0.000052	0.08	0.01
Loader	480	0.00034	0.000052	0.16	0.02
Small crane-forms	240	0.00034	0.000052	0.08	0.01
Bulldozer	480	16.64	4.91	7989.52	2358.98
Bobcat	480	0.10328	0.00513	49.57	2.46
Final Site Preparation					
18-yard Truck, traprock	120	0.00034	0.000052	0.04	0.01
Loader	120	0.00034	0.000052	0.04	0.01
Bulldozer	120	16.64	4.91	1997.38	589.74
Bulldozer	120	16.64	4.91	1997.38	589.74
18-yard Truck, asphalt	120	0.00034	0.000052	0.04	0.01
Hotbox with truck	120	0.00034	0.000052	0.04	0.01
Roller	120	0.10328	0.00513	12.39	0.62
HDD					
Drilling Power Unit	96	0.00034	0.000052	0.03	0.00

Construction Earthmoving	Project hours	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	PM_{10} lbs	$PM_{2.5}$ lbs
Topsoil Removal and Storage					
Small bulldozer	11.20	16.64	4.91	186.42	55.04
Bobcat	11.20	0.00034	0.000052	0.00	0.00
Access path prep (gravel)					
Small bulldozer	22.40	16.64	4.91	372.84	110.09
18-yard dump	44.80	0.00034	0.000052	0.02	0.00
Trench Excavation					
Backhoe	44.80	0.00034	0.000052	0.02	0.00
Bobcat	44.80	0.103	0.005126	4.63	0.23
18-yard dump	22.40	0.103	0.005126	2.31	0.11
Backhoe	11.20	0.103	0.005126	1.16	0.06
HDD					
Drilling Unit	96	0.00034	0.000052	0.03	0.00
Generator	96	0.00034	0.000052	0.03	0.00
Deliver and Install Thermal Backfill					
18-yard dump	89.6	0.00034	0.000052	0.03	0.00
Backhoe	44.8	0.00034	0.000052	0.02	0.00
Bobcat	44.8	16.64	4.91	745.69	220.17
Install Native Backfill					
Backhoe	22.4	0.00034	0.000052	0.01	0.00
Bobcat	22.4	16.64	4.91	372.84	110.09
Shaker/screen	22.4	0.00034	0.000052	0.01	0.00
Compressor for tampers	22.4	0.00034	0.000052	0.01	0.00
Remove Excess Native Fill from Site					
18-yard dump	22.4	0.00034	0.000052	0.01	0.00
Backhoe	11.2	0.00034	0.000052	0.00	0.00
Replace Topsoil, York Rake Vegetation					
Small bulldozer	22.4	16.64	4.91	372.84	110.09
Hydroseed Sprayer	22.4	0.103275	0.005126	2.31	0.11
Site Preparation					
Bulldozer	4	16.64	4.91	66.58	19.66
Backhoe	4	0.00034	0.000052	0.00	0.00
Loader	4	0.00034	0.000052	0.00	0.00
18-yard Truck, transport debris	4	0.00034	0.000052	0.00	0.00

Construction Earthmoving	Project hours	PM_{10} lb/hr	$PM_{2.5}$ lb/hr	PM_{10} lbs	$PM_{2.5}$ lbs
Site Prep Grading					
Bulldozer	4	16.64	4.91	66.58	19.66
Backhoe	4	0.00034	0.000052	0.00	0.00
Loader	4	0.00034	0.000052	0.00	0.00
18-yard Truck, clean fill	8	0.00034	0.000052	0.00	0.00
Building Foundations					
Backhoe	36	0.00034	0.000052	0.01	0.00
Bobcat	36	0.10328	0.00513	3.72	0.18
Loader	4	0.00034	0.000052	0.00	0.00
Final Site Preparation, traprock, paving, vegetation plantings					
Bulldozer	4	16.64	4.91	66.58	19.66
18-yard Truck, asphalt	4	0.00034	0.000052	0.00	0.00
Hotbox with truck	4	0.00034	0.000052	0.00	0.00
Roller	4	0.10328	0.00513	0.41	0.02
HDD					
Drilling Power Unit	48	0.00034	0.000052	0.02	0.00
TOTAL				**32,365**	**9,519**
Total Earthmoving Emissions, tons				**16.18**	**4.76**

Notes:

Based on USEPA 2006.

AP-42 Section 11.9 for dozing (Table 11.9-1):

$E = 0.75 * (s)^{1.5} / (M)^{1.4}$ for PM_{10}

$E = 0.105 * 5.7 \times (s)^{1.2} / (M)^{1.3}$ for $PM_{2.5}$

E = lb/hr fugitive

s = Silt Content assumed to be 55% for construction sites. (CHPE 2010)

M = moisture content = 8% (assumes unwatered subsoil)

AP-42 Section 11.9 for grading, rolling, and excavating (Table 11.9-1) (USEPA 2006).

$E = S * 0.60 * 0.051 \times (S)^{2.0}$ for PM_{10}

$E = S * 0.031 * 0.040 \times (S)^{2.5}$ for $PM_{2.5}$

Simplifies to $E = 0.60 * 0.051 \times (S)^{3.0}$ for PM_{10}

Simplified to $E = 0.031 * 0.040 \times (S)^{3.5}$ for $PM_{2.5}$

E = lb/VMT * VMT/hr = lb/hr fugitive

S = Mean Vehicle Speed assumed to be 3 mph for graders, 1.5 mph for excavators & rollers

Assumes VMT = S * hours of use

AP-42 Section 13.2.4 Loading/Handling (digger, driller, backhoe, loader): (USEPA 2006).

$E = 0.35 * 0.0032 * (U/5)^{1.3}/(M/2)^{1.4}$ for PM_{10}

$E = 0.053 * 0.0032 * (U/5)^{1.3}/(M/2)^{1.4}$ for $PM_{2.5}$

E = lb/ton * tons/hr = lb/hr fugitive

U = average wind speed is 8.9 mph for Albany, New York (NOAA 2002)

M = moisture content = 8% (assumes unwatered subsoil)

Table M-24. Fugitive Dust Estimation Calculations - Road Dust, New York City Metropolitan Area Segment

Construction Road Dust	Project VMT	PM_{10} lb/VMT	$PM_{2.5}$ lb/VMT	PM_{10} lbs	$PM_{2.5}$ lbs
All Roads (paved)					
Light Duty (pickup trucks)	432,600	0.00622	0.00076	2,691	330
Medium Duty (work trucks)	1,296,000	0.02802	0.00403	36,314	5,226
Heavy Heavy Duty (tractor/trailers)	13,500	0.20521	0.03061	2,770	413
Subtotals	**1,742,100**			**41,775**	**5,969**
All Roads					
Pickup Truck	432,015				
18-yard dump Truck	0				
Flatbed Truck	1,344				
Subtotals	**433,359**				
Unpaved Roads					
Pickup Truck	129,605	0.06820	0.00682	8,839	884
18-yard dump Truck	0	0.10604	0.01060	0	0
Flatbed Truck	134	0.19222	0.01922	26	3
Subtotals	**129,739**			**8,865**	**887**
Paved Roads					
Pickup Truck	302,411	0.00622	0.00076	1,881	231
18-yard dump Truck	0	0.02802	0.00403	0	0
Flatbed Truck	1,210	0.20521	0.03061	248	37
Subtotals	**3,171,916**			**52,769**	**7,124**
Total Road Dust Emissions, tons				**26.38**	**3.56**

Notes:

Based on USEPA 2003 and USEPA 2006.

All roads assumed paved.

Paved Road Dust (AP-42 Section 13.2.1) (USEPA 2006).

$E = [0.016*(sL/2)0.65*(W/3)1.5 - 0.00047] * PC$ for PM_{10}

$E = [0.0024*(sL/2)0.65*(W/3)1.5 - 0.00036] * PC$ for $PM_{2.5}$

E = lb/VMT fugitive

sL = Silt Loading assumed to be 0.5 g/m^2 for average ADT categories from Table 13.2.1-3.

W = Average weight of vehicles in tons (below)

C = Correction for exhaust, break wear, tire wear: 0.00047 lb/VMT for PM_{10}, 0.00036 lb/VMT for $PM_{2.5}$

PC = (1-P/4N)

P = Number of wet days over 0.01 in precipitation for averaging period (150 days/year average for New York State)

N = days of period = 365 days

Note: precipitation correction not used (PC=1) for worst case day calculations

Vehicle Weights based on USEPA 2010

HDD: Horizontal Directional Drilling

Light Duty = 3 tons average; Medium Duty = 8 tons average; and Heavy Heavy Duty = 30 tons average (loaded 40 tons, unloaded 20 tons)

Table M-25. Estimated Total Emissions[1], New York City Metropolitan Area Segment

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Construction of the Converter Station														
Site Preparation (pavement and foundations)	Bulldozer	offroad	480		70.1	293.3	864.8	1.4	55.7	54.1	161,695.2	6.3	1.3	162,221
	Backhoe	offroad	480		95.6	486.9	438.6	0.5	72.4	70.3	53,481.6	1.6	0.3	53,616
	Loader	offroad	240		73.1	279.3	441.6	0.4	49.8	48.3	49,509.3	1.7	0.3	49,648
	18-yard Truck, transport debris	onroad HHD		2,400	5.8	33.3	45.7	0.1	0.9	0.7	8,880.0	0.0	0.0	8,888
Site Prep Grading	Bulldozer	offroad	120		17.5	73.3	216.2	0.3	13.9	13.5	40,423.8	1.6	0.3	40,555
	Backhoe	offroad	120		23.9	121.7	109.7	0.1	18.1	17.6	13,370.4	0.4	0.1	13,404
	Loader	offroad	120		36.6	139.6	220.8	0.2	24.9	24.1	24,754.7	0.8	0.2	24,824
	18-yard Truck, clean fill	onroad HHD		1,200	2.9	16.6	22.9	0.0	0.4	0.3	4,440.0	0.0	0.0	4,444
Fence, Paving of street accesses, AC, lighting, and trailers	Truck with Kelly bar auger	onroad HHD		600	1.4	8.3	11.4	0.0	0.2	0.2	2,220.0	0.0	0.0	2,222
	Concrete Mixer, offsite delivery	onroad HHD		300	0.7	4.2	5.7	0.0	0.1	0.1	1,110.0	0.0	0.0	1,111
	Bobcat	offroad	240		47.8	243.4	219.3	0.2	36.2	35.1	26,740.8	0.8	0.2	26,808
	Bulldozer	offroad	120		17.5	73.3	216.2	0.3	13.9	13.5	40,423.8	1.6	0.3	40,555
	18-yard Truck, asphalt	onroad HHD		600	1.4	8.3	11.4	0.0	0.2	0.2	2,220.0	0.0	0.0	2,222
	Hotbox with truck	onroad LD		300	0.7	4.2	5.7	0.0	0.1	0.1	1,110.0	0.0	0.0	1,111
	Roller	offroad	120		10.0	94.6	106.1	0.1	12.7	12.4	15,741.7	0.6	0.1	15,788
	Backhoe	offroad	120		23.9	121.7	109.7	0.1	18.1	17.6	13,370.4	0.4	0.1	13,404
	Small crane	offroad	120		11.7	37.1	148.7	0.2	8.8	8.5	21,741.1	0.9	0.2	21,813

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Construction of the Converter Station (continued)														
Converter Building Foundations (floor)	Backhoe	offroad	1440		286.9	1,460.6	1,315.9	1.5	217.3	210.8	160,444.9	4.9	1.0	160,849
	Bobcat	offroad	720		143.4	730.3	657.9	0.7	108.6	105.4	80,222.4	2.4	0.5	80,424
	Loader	offroad	960		292.4	1,117.2	1,766.5	1.8	199.1	193.2	198,037.3	6.7	1.3	198,591
	Bulldozer	offroad	480		70.1	293.3	864.8	1.4	55.7	54.1	161,695.2	6.3	1.3	162,221
	Small crane-forms	offroad	480		46.8	148.3	594.9	0.8	35.0	34.0	86,964.5	3.4	0.7	87,250
	Medium crane-concrete bucket	offroad	480		79.9	224.2	1,064.8	1.5	45.6	44.2	168,349.9	6.7	1.3	168,903
	Concrete Mixer, offsite delivery	onroad HHD		2,400	5.8	33.3	45.7	0.1	0.9	0.7	8,880.0	0.0	0.0	8,888
Converter Building Superstructure	Large crane, for frame and gantry crane	offroad	240		57.8	261.5	1,004.7	1.1	39.7	38.5	126,268.8	5.0	1.0	126,684
	Small crane, for roof and cladding	offroad	1440		140.4	445.0	1,784.8	2.3	105.0	101.9	260,893.4	10.3	2.1	261,751
	Forklifts, offloading equipment	offroad	480		32.9	290.1	331.2	0.4	40.2	39.0	47,217.2	1.7	0.3	47,356
	Small crane, offloading equipment	offroad	480		46.8	148.3	594.9	0.8	35.0	34.0	86,964.5	3.4	0.7	87,250
	Generators	offroad	3600		124.9	665.6	1,894.4	2.1	118.5	115.0	233,901.4	8.3	1.7	234,593
	Propane heaters	offroad	3600		5.9	44.6	77.3	0.1	4.2	4.2	74,292.5	1.2	5.3	75,976
Transformer Yard Foundations and Conduits	Backhoe	offroad	240		47.8	243.4	219.3	0.2	36.2	35.1	26,740.8	0.8	0.2	26,808
	Loader	offroad	480		146.2	558.6	883.3	0.9	99.6	96.6	99,018.6	3.3	0.7	99,295
	Small crane-forms	offroad	240		23.4	74.2	297.5	0.4	17.5	17.0	43,482.2	1.7	0.3	43,625
	Bulldozer	offroad	480		70.1	293.3	864.8	1.4	55.7	54.1	161,695.2	6.3	1.3	162,221
	Bobcat	offroad	480		95.6	486.9	438.6	0.5	72.4	70.3	53,481.6	1.6	0.3	53,616
Transformer Yard Structural, Electrical	Small crane	offroad	480		46.8	148.3	594.9	0.8	35.0	34.0	86,964.5	3.4	0.7	87,250
	Manlift trucks	onroad HHD		3,600	8.7	49.9	68.6	0.1	1.3	1.0	13,320.0	0.0	0.0	13,333
	Compressor	offroad	1440		41.9	174.3	318.7	0.3	26.0	25.2	37,359.1	1.3	0.3	37,470

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Construction of the Converter Station (continued)														
Final Site Preparation, traprock, paving, vegetation plantings	18-yard Truck, traprock	onroad HHD		600	1.4	8.3	11.4	0.0	0.2	0.2	2,220.0	0.0	0.0	2,222
	Loader	offroad	120		36.6	139.6	220.8	0.2	24.9	24.1	24,754.7	0.8	0.2	24,824
	Bulldozer, paving	offroad	120		17.5	73.3	216.2	0.3	13.9	13.5	40,423.8	1.6	0.3	40,555
	Bulldozer, planting	offroad	120		17.5	73.3	216.2	0.3	13.9	13.5	40,423.8	1.6	0.3	40,555
	18-yard Truck, asphalt	onroad HHD		600	1.4	8.3	11.4	0.0	0.2	0.2	2,220.0	0.0	0.0	2,222
	Hotbox with truck	onroad LD		300	0.7	4.2	5.7	0.0	0.1	0.1	1,110.0	0.0	0.0	1,111
	Roller	offroad	120		10.0	94.6	106.1	0.1	12.7	12.4	15,741.7	0.6	0.1	15,788
	Flatbed Truck, plantings	onroad HHD		1,200	0.9	3.3	11.8	0.0	0.4	0.3	4,440.0	0.0	0.0	4,444
	Backhoe, plantings	offroad	80		15.9	81.1	73.1	0.1	12.1	11.7	8,913.6	0.3	0.1	8,936
HDD	Drilling Power Unit	offroad	800		714.5	2,710.9	9,349.8	6.7	428.7	415.8	747,154.3	29.6	5.9	749,614
	Generator	offroad	50		1.7	9.2	26.3	0.0	1.6	1.6	3,248.6	0.1	0.0	3,258
Miscellaneous	Construction Trailers, propane	offroad	3600		5.9	44.6	77.3	0.1	4.2	4.2	74,292.5	1.2	5.3	75,976
	Craft utility, delivery trucks	onroad MD		1,296,000	3,480.1	42,715.0	3,011.5	32.9	71.4	32.9	1,676,160.0	95.1	38.3	1,690,027
	Pickup trucks	onroad LD		432,000	626.8	10,228.9	580.2	8.2	23.8	10.8	419,040.0	15.6	6.3	421,322
Emissions from Installation of Aquatic Transmission Cables														
Cable Installation	2 azimuth units	Marine	120		248	1,257	3,557	3	169	164	374,197	15	3	375,414
	azimuth unit	Marine	60		64	324	916	1	44	42	96,384	4	1	96,698
	retractable azimuth unit	Marine	24		46	236	667	1	32	31	70,162	3	1	70,390
	tunnel unit	Marine	60		61	310	876	1	42	40	92,132	4	1	92,432
	generators (500 kVA)	Marine	720		241	1,057	3,931	4	167	162	451,098.0	18	4	452,581
	generators (600 kVA)	Marine	120		48	211	786	1	33	32	90,192	4	1	90,488
	Survey boat	Marine	120		106	539	1,524	1	73	70	160,309	6	1	160,831
	Crew boat	Marine	48		10	69	167	0	9	9	24,144	1	0	24,192

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Installation of Aquatic Transmission Cables (continued)														
Installation of Cable Protection	Tugboat, Towboat	Marine	30		50	260	696	1	35	34	69,796	3	1	70,024
	Crew boat	Marine	24		5	35	83	0	5	4	12,057	0	0	12,096
Dredging	Clamshell dredge	Marine MD	108		214	1,171	2,667	2	157	153	244,775	10	2	245,572
	Tender, Pushboat	Marine HD	60		53	269	762	1	36	35	80,155	3	1	80,415
	Tugboat, Towboat	Marine HD	60		100	520	1,392	1	71	68	139,593	5	1	140,047
	Crew boat	Marine MD	24		5	35	83	0	5	4	12,057	0	0	12,096
Cable Shipment	OGV main propulsion	Marine HD	2.7		29	68	830	177	22	21	28,743	0	2	29,218
	OGV auxiliary engine	Marine HD	0.9		1	4	50	15	2	2	2,483	0	0	2,517
Emissions from Installation of Terrestrial Transmission Cables														
Vegetation Clearing	Brush Hog	offroad	11.20		0	1	1	0	0	0	160	0	0	0
Topsoil Removal and Storage	Small Bulldozer	offroad	11.20		2	7	20	0	1	1	3,773	0	0	0
	Bobcat	offroad	11.20		2	11	10	0	2	2	1,248	0	0	0
Access Path Prep (gravel)	Small Bulldozer	offroad	22.40		3	14	40	0	3	3	7,546	0	0	0
	18-yard dump	onroad HHD	44.80	224	0.54	3.11	4.27	0.01	0.08	0.06	828.80	0.00	0.00	0.00
Trench Excavation	Backhoe	offroad	44.80		9	45	41	0	7	7	4,992	0	0	0
	Bobcat	offroad	44.80		9	45	41	0	7	7	4,992	0	0	0
	Ram Hoe	offroad	22.40		3	21	53	0	3	3	8,739	0	0	0
	Hard Rock Trencher	offroad	11.20		3	18	38	0	2	2	4,433	0	0	0
Cable Delivery	Flatbed Truck, 30 mph	onroad HHD	22.40	672	1	2	7	0	0	0	2,486	0	0	0
	Crane	offroad	5.60		1	3	12	0	1	1	1,964	0	0	0
HDD	Drilling Power Unit	offroad	96		86	325	1122	1	51	50	89,659	4	1	0
	Generator	offroad	96		3	18	51	0	3	3	6,237	0	0	0

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Installation of Aquatic Transmission Cables (continued)														
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	onroad HHD	22.4	672	1	2	7	0	0	0	2,486	0	0	0
	Crane, 40 ton	offroad	5.6		1	3	12	0	1	1	1,964	0	0	0
	Puller/Tensioner	offroad	44.8		15	57	91	0	10	10	10,166	0	0	0
	Mid-pull caterpillars	offroad	44.8		15	57	91	0	10	10	10,166	0	0	0
Splice Cable	Generators	offroad	44.8		1	8	23	0	1	1	2,794	0	0	0
	Propane heaters	offroad	44.8		0	1	1	0	0	0	925	0	0	0
Deliver and Install Thermal Backfill	18-yard dump	onroad HHD	89.6	2,688	6	37	51	0	1	1	9,946	0	0	0
	Backhoe	offroad	44.8		9	45	41	0	7	7	4,992	0	0	0
	Bobcat	offroad	44.8		9	45	41	0	7	7	4,992	0	0	0
Install Native Backfill	Backhoe	offroad	22.4		4	23	20	0	3	3	2,496	0	0	0
	Bobcat	offroad	22.4		4	23	20	0	3	3	2,496	0	0	0
	Shaker/screen	offroad	22.4		2	5	20	0	1	1	2,880	0	0	0
	Compressor for tampers	offroad	22.4		1	3	5	0	0	0	581	0	0	0
Remove Excess Native Fill from site	18-yard dump	onroad HHD	22.4	112	0	0	0	0	0	0	83	0	0	0
	Backhoe	offroad	11.2		2	11	10	0	2	2	1,248	0	0	0
Replace Topsoil, York Rake Vegetation	Small Bulldozer	offroad	22.4		3	14	40	0	3	3	7,546	0	0	0
	Hydroseed Sprayer	offroad	22.4		6	22	37	0	4	4	3,540	0	0	0
Miscellaneous	Pickup trucks	onroad LD	15	15	0	0	0	0	0	0	15	0	0	0
Emissions from Construction of the Cooling Station														
Site Preparation (pavement and foundations)	Bulldozer	offroad	4	0	0.6	0.0	1.1	0.0	0.1	0.0	41.1	0.0	0.1	0.0
	Backhoe	offroad	4	0	0.8	0.0	0.7	0.0	0.1	0.0	12.2	0.0	0.0	0.0
	Loader	offroad	4	0	1.2	0.0	2.2	0.0	0.5	0.0	95.9	0.0	0.1	0.0
	18-yard Truck, transport debris	onroad HHD	4	20	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Construction of the Cooling Station (continued)														
Site Prep Grading	Bulldozer	offroad	4	0	0.6	0.0	1.1	0.0	0.1	0.0	41.1	0.0	0.1	0.0
	Backhoe	offroad	4	0	0.8	0.0	0.7	0.0	0.1	0.0	12.2	0.0	0.0	0.0
	Loader	offroad	4	0	1.2	0.0	2.2	0.0	0.5	0.0	95.9	0.0	0.1	0.0
	18-yard Truck, clean fill	onroad HHD	8	40	0.0	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Building Foundations (floor)	Backhoe	offroad	36	0	7.2	0.0	6.6	0.0	1.0	0.0	110.2	0.0	0.1	0.0
	Bobcat	offroad	36	0	7.2	0.0	6.6	0.0	1.0	0.0	110.2	0.0	0.1	0.0
	Loader	offroad	4	0	1.2	0.0	2.2	0.0	0.5	0.0	95.9	0.0	0.1	0.0
	Bulldozer	offroad	4	0	0.6	0.0	1.1	0.0	0.1	0.0	41.1	0.0	0.1	0.0
	Small crane-forms	offroad	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Medium crane-concrete bucket	offroad	0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Concrete Mixer, offsite delivery	onroad HHD	4	10	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Building	Small crane	offroad	4	0	0.4	0.0	0.5	0.0	0.0	0.0	6.4	0.0	0.0	0.0
	Forklifts, offloading equipment	offroad	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Generators	offroad	8		0.3	0.0	0.1	0.0	0.0	0.0	0.3	0.0	0.0	0.0
	Propane heaters	offroad	0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final Site Preparation, traprock, paving, vegetation plantings	Bulldozer	offroad	4	0	0.6	0.0	1.1	0.0	0.1	0.0	41.1	0.0	0.1	0.0
	18-yard Truck, asphalt	onroad HHD	4	20	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Hotbox with truck	onroad LD	4	10	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Roller	offroad	4	0	0.3	0.0	0.3	0.0	0.0	0.0	4.1	0.0	0.0	0.0
	Flatbed Truck, plantings	onroad HHD	4	120	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Backhoe, plantings	offroad	4	0	0.8	0.0	0.7	0.0	0.1	0.0	12.2	0.0	0.0	0.0

Activity	Equipment and Vehicles[2]			VMT	VOC lbs	CO lbs	NO_x lbs	SO_x lbs	PM_{10} lbs	$PM_{2.5}$ lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
	Type	Category	hrs											
Emissions from Construction of the Cooling Station (continued)														
HDD	Drilling Power Unit, 1 location @ 6 equipment days/location	offroad	48	0	42.9	0.0	501.0	0.0	268.5	0.0	250,763.5	0.0	1,857.5	826,600
	Generator	offroad	48	0	1.7	0.0	0.9	0.0	0.0	0.0	1.9	0.0	0.0	2
Miscellaneous	Craft utility, delivery trucks	onroad MD	40	1,200	0.1	39.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pickup trucks, 30 mph	onroad LD	20	600	0.0	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TOTAL Combustion Emissions By Activity (tons)	VOC lbs	CO lbs	NOx lbs	Sox lbs	PM_{10} lbs	PM_{25} lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
Site Preparation	0.1	0.5	0.9	0.0	0.1	0.1	136.8	0.0	0.0	137.2
Site Prep Grading	0.0	0.2	0.3	0.0	0.0	0.0	41.5	0.0	0.0	41.6
Fence, Paving of street accesses, AC, lighting, and trailers	0.1	0.3	0.4	0.0	0.0	0.0	62.3	0.0	0.0	62.5
Converter Building Foundations	0.5	2.0	3.2	0.0	0.3	0.3	432.3	0.0	0.0	433.6
Converter Building Superstructure	0.2	0.9	2.8	0.0	0.2	0.2	414.8	0.0	0.0	416.8
Transformer Yard Foundations and Conduits	0.2	0.8	1.4	0.0	0.1	0.1	192.2	0.0	0.0	192.8
Transformer Yard Structural, Electrical	0.0	0.2	0.5	0.0	0.0	0.0	68.8	0.0	0.0	69.0
Final Site Preparation, traprock, paving, vegetation plantings	0.1	0.2	0.4	0.0	0.0	0.0	70.1	0.0	0.0	70.3
HDD	0.4	1.4	4.7	0.0	0.2	0.2	375.2	0.0	0.0	376.4
Miscellaneous	2.1	26.5	1.8	0.0	0.0	0.0	1,084.7	0.1	0.0	1,093.7
Subtotal	3.6	33.1	16.4	0.0	1.1	1.1	2,878.8	0.1	0.0	2,894
Cable Installation	0.4	2.0	6.2	0.0	0.3	0.3	679.3	0.0	0.0	688.5
Installation of Cable Protection	0.0	0.1	0.4	0.0	0.0	0.0	40.9	0.0	0.0	41.5
Dredging	0.2	1.0	2.5	0.0	0.1	0.1	238.3	0.0	0.0	242.2
Cable Shipment	0.0	0.0	0.4	0.1	0.0	0.0	15.6	0.0	0.0	16.2
Subtotal	0.6	3.2	9.5	0.1	0.5	0.4	974.1	0.0	0.0	988.5
Vegetation Clearing	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Topsoil Removal and Storage	0.0	0.0	0.0	0.0	0.0	0.0	2.5	0.0	0.0	0.0
Access Path Prep (gravel)	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0

TOTAL Combustion Emissions By Activity (tons)	VOC lbs	CO lbs	NOx lbs	Sox lbs	PM_{10} lbs	PM_{25} lbs	CO_2 lbs	CH_4 lbs	N_2O lbs	CO_2 eqv lbs[3]
Trench Excavation	0.0	0.1	0.1	0.0	0.0	0.0	11.6	0.0	0.0	0.0
Cable Delivery	0.0	0.0	0.0	0.0	0.0	0.0	2.2	0.0	0.0	0.0
HDD	0.0	0.2	0.6	0.0	0.0	0.0	47.9	0.0	0.0	0.0
Site Deliver and Pull Cable	0.0	0.1	0.1	0.0	0.0	0.0	12.4	0.0	0.0	0.0
Splice Cable	0.0	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.0	0.0
Deliver and Install Thermal Backfill	0.0	0.1	0.1	0.0	0.0	0.0	10.0	0.0	0.0	0.0
Install Native Backfill	0.0	0.0	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0
Remove Excess Native Fill from site	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Replace Topsoil, York Rake Vegetation	0.0	0.0	0.0	0.0	0.0	0.0	5.5	0.0	0.0	0.0
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.5	2.2	6.8	0.1	0.3	0.3	706.2	0.0	0.0	611.6
Site Preparation	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Site Prep Grading	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Building Foundations	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Building	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final Site Preparation, traprock, paving, vegetation plantings	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HDD	0.0	0.0	0.3	0.0	0.1	0.0	125.4	0.0	0.9	413.3
Miscellaneous	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.3	0.0	0.1	0.0	125.7	0.0	0.9	413.3
Total Combustion emissions, lbs	**8,140**	**73,415**	**54,263**	**283**	**3,591**	**3,168**	**8,163,672**	**325**	**1,958**	**8,569,457**
Total Combustion emissions, tons	**4**	**37**	**27**	**0**	**2**	**2**	**4,082**	**0**	**1**	**4,285**
Total Fugitive Dust emissions, earthmoving, tons[4]	**-**	**-**	**-**	**-**	**16**	**5**	**-**	**-**	**-**	**-**
Total Fugitive Dust emissions, road dust, tons[4]	**-**	**-**	**-**	**-**	**31**	**4**	**-**	**-**	**-**	**-**
Combined Engine and Fugitive Dust emissions, tons	**4.37**	**36.71**	**27.13**	**0.14**	**48.80**	**10.35**	**4,082**	**0.16**	**0.98**	**4,285**

Notes:

Underwater Cable Laying includes mileposts 290 to 333.

VMT: vehicle-miles traveled for on-road vehicles. LD: Light Duty. HD: Heavy Duty. HHD: Heavy Heavy Duty.

[1] Emissions weighted for calendar year 2013 (USEPA 2003, USEPA 2006, USEPA 2009a).

[2] Units are operating hours for offroad engines, vehicle miles traveled (VMT) for onroad vehicles.

[3] Carbon dioxide equivalents (CO_2 eqv) are calculated by summing the products of mass GHG emissions by species times their respective GWP coefficients (USEPA 2009a).

[4] See Fugitive Dust Estimation Calculations tables for more detailed information.

Table M-26. Proposed One-MW Generator Emissions

Generator Kilowatts		**Conversion from kW to Btu/hr**	**Engine Btu/hr (Assume 90% efficiency converting mechanical to electrical power)**	**Engine MMBtu/hr**		
1000		3414.4	3,793,807	3.79		
Diesel Industrial Engine Emissions Factors from AP-42, Section 3.4	**NO_x**	**CO**	**VOC**	**PM_{10}**	**SO_2**	**CO_2**
	lb/MMBtu	**lb/MMBtu**	**lb/MMBtu**	**lb/MMBtu**	**lb/MMBtu**	**lb/MMBtu**
Emissions Factor	3.2	0.85	0.09	0.1	1.01	165
	(lbs/yr)	**(lbs/yr)**	**(lbs/yr)**	**(lbs/yr)**	**(lbs/yr)**	**(lbs/yr)**
Assume max. 300 hr/yr operation and testing	3,642.05	967.42	102.43	113.81	1,149.52	187,793.42
	(tons/yr)	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**	**(tons/yr)**
Emissions Per Generator	**1.821**	**0.484**	**0.0512**	**0.0569**	**0.575**	**93.897**

Source: USEPA 1996. AP-42. Large Stationary Diesel And All Stationary Duel-fuel Engines. Table 3.4-1. Page 3.4-5.

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APPENDIX N

Noise Analysis Background Information

Appendix N
Noise Analysis Background Information

Modeling of noise levels associated with construction of the proposed CHPE Project was conducted for certain cases where reasonable noise data from previous studies were not available. Noise levels were determined based upon the types of equipment that would be used and the duration of their use. Noise emission factors for common construction equipment were obtained from guidance documents from the Federal Highway Administration (FHWA) or the Federal Transit Administration (FTA) (USFTA 2006, FHWA 2006a, FHWA 2006b), and corresponding sound levels were estimated (Maling et al. 1992) or calculated based on rated construction equipment horsepower. Other construction equipment noise emissions levels were estimated from brake horsepower ratings (Wood 1992). Utilization factors were employed to represent the amount of time each noise source contributed to the potential noise exposure. This approach is considered conservative, and in some cases a more realistic and lower noise estimate was obtained from the FHWA guidance document (FHWA 2006a).

Appendix N contains detailed tables showing the noise emissions and utilization factors for each piece of equipment associated with various forms of construction and operating equipment related to the proposed CHPE project.

The following tables are included in **Appendix N**:

- **Table N-1.** Land-Based Construction Noise Sources
- **Table N-2.** Converter Station Construction Noise Sources
- **Table N-3.** Prominent Discrete (Pure) Tone Analysis for Transformers
- **Table N-4.** Pure Tone Analysis for Coolers

Table N-1. Land-Based Construction Noise Sources

Activity	Equipment and Vehicles	SWL/ Unit (dBA)	Qty per 1 hour	UF	Total SWL (dBA)	Calculated Sound Pressure Level (dBA) as L_{eq} (1 hour) at distance			
						100 feet	500 feet	1,000 feet	2,000 feet
Vegetation Clearing	Brush Hog	108	2	40%	107	66	53	46	40
	TOTAL COMBINED NOISE					**66**	**53**	**46**	**40**
Topsoil Removal and Storage	Small Bulldozer	114	2	40%	113	72	58	52	46
	Bobcat	116	2	40%	115	75	61	55	49
	TOTAL COMBINED NOISE					**77**	**63**	**57**	**51**
Access Path Prep (gravel)	Small Bulldozer	114	2	40%	113	72	58	52	46
	18-yard dump	108	2	40%	107	66	52	46	40
	TOTAL COMBINED NOISE					**73**	**59**	**53**	**47**
Excavate Trench	Backhoe	110	2	40%	109	68	54	48	42
	Bobcat	116	2	40%	115	75	61	55	49
	Ram Hoe	122	2	10%	115	74	60	54	48
	Hard Rock Trencher	123	2	20%	119	78	64	58	52
	TOTAL COMBINED NOISE					**81**	**67**	**61**	**55**
Cable Delivery	Flatbed Truck, 30 mph	106	2	40%	105	64	50	44	38
	Crane, 40 ton	113	2	16%	108	67	53	47	41
	TOTAL COMBINED NOISE					**69**	**55**	**49**	**43**
HDD	Drilling Power Unit	127	2	50%	127	86	72	66	60
	Generator	113	2	50%	113	72	58	52	46
	TOTAL COMBINED NOISE					**86**	**72**	**66**	**60**
Site Deliver and Pull Cable	Flatbed Truck, 30 mph	106	2	40%	105	64	50	44	38
	Crane, 40 ton	113	2	16%	108	67	53	47	41
	Puller/Tensioner	120	2	40%	119	78	64	58	52
	Mid-pull caterpillars	120	2	40%	119	78	64	58	52
	TOTAL COMBINED NOISE					**81**	**68**	**61**	**55**
Splice Cable	Generator	113	2	40%	112	71	57	51	45
	Propane heaters	115	2	75%	117	77	63	57	50
	TOTAL COMBINED NOISE					**78**	**64**	**58**	**52**
Deliver and Install Thermal Backfill	18-yard dump	108	2	40%	107	66	52	46	40
	Backhoe	110	2	40%	109	68	54	48	42
	Bobcat	116	2	40%	115	75	61	55	49
	TOTAL COMBINED NOISE					**76**	**62**	**56**	**50**

Activity	Equipment and Vehicles	SWL/ Unit (dBA)	Qty per 1 hour	UF	Total SWL (dBA)	Calculated Sound Pressure Level (dBA) as L_{eq} (1 hour) at distance			
						100 feet	500 feet	1,000 feet	2,000 feet
Install Native Backfill	Backhoe	110	2	40%	109	68	54	48	42
	Bobcat	116	2	40%	115	75	61	55	49
	Shaker/screen	118	2	50%	118	77	63	57	51
	Compressor for tampers	110	2	40%	109	68	54	48	42
	TOTAL COMBINED NOISE					**80**	**66**	**60**	**54**
Remove Excess Native Fill from site	18-yard dump	108	2	40%	107	66	52	46	40
	Backhoe	110	2	40%	109	68	54	48	42
	TOTAL COMBINED NOISE					**70**	**56**	**50**	**44**
Replace Topsoil, York Rake Vegetation	Small Bulldozer	114	2	40%	113	72	58	52	46
	Hydroseed Sprayer	118	2	75%	120	79	65	59	53
	TOTAL COMBINED NOISE					**80**	**66**	**60**	**54**

Notes: SWL=sound power level; UF=Utilization Factor

Table N-2. Converter Station Construction Noise Sources

Activity	Equipment and Vehicles	Source noise emission by SPL at 50 feet				Calculated SPL (dBA) as L_{eq} (1 hour) at distance			
	Type	SPL Per Unit (dBA)	Qty. per 1 hour	UF	Net SPL (dBA)	100 feet	500 feet	1,000 feet	2,000 feet
Site Preparation	Bulldozer	91	2	40%	90	84	70	64	58
	Backhoe	78	2	40%	77	71	57	51	45
	Loader	79	1	40%	75	69	55	49	43
	18-yard Truck, transport debris	76	2	40%	75	69	55	49	43
	TOTAL COMBINED NOISE					**84**	**70**	**64**	**58**
Site Prep Grading	Bulldozer	91	1	40%	87	81	67	61	55
	Backhoe	78	1	40%	74	68	54	48	42
	Loader	79	1	40%	75	69	55	49	43
	18-yard Truck, clean fill	76	2	40%	75	69	55	49	43
	TOTAL COMBINED NOISE					**81**	**67**	**61**	**55**
Fence, Paving of street accesses, AC, lighting, and trailers	Truck with Kelly bar auger	79	2	75%	81	75	61	55	49
	Concrete Mixer, offsite delivery	79	1	40%	75	69	55	49	43
	Bobcat	85	2	40%	84	78	64	58	52
	Bulldozer	91	1	40%	87	81	67	61	55
	18-yard Truck, asphalt	76	1	40%	72	66	52	46	40
	Hotbox with truck	77	1	75%	76	70	56	50	44
	Roller	80	1	20%	73	67	53	47	41
	Backhoe	78	1	40%	74	68	54	48	42
	Small crane	78	1	16%	70	64	50	44	38
	TOTAL COMBINED NOISE					**84**	**70**	**64**	**58**
Converter Building Foundations	Backhoe	78	2	40%	77	71	57	51	45
	Bobcat	85	1	40%	81	75	61	55	49
	Loader	79	2	40%	78	72	58	52	46
	Bulldozer	91	1	40%	87	81	67	61	55
	Small crane-forms	78	2	16%	73	67	53	47	41
	Medium crane-concrete bucket	81	2	16%	76	70	56	50	44
	Concrete Mixer, offsite delivery	79	4	40%	81	75	61	55	49
	TOTAL COMBINED NOISE					**83**	**69**	**63**	**57**

Activity	Equipment and Vehicles	Source noise emission by SPL at 50 feet				Calculated SPL (dBA) as L_{eq} (1 hour) at distance			
	Type	SPL Per Unit (dBA)	Qty. per 1 hour	UF	Net SPL (dBA)	100 feet	500 feet	1,000 feet	2,000 feet
Converter Building Superstructure	Large crane, for frame and gantry crane	83	1	16%	75	69	55	49	43
	Small crane, for roof and cladding	78	2	16%	73	67	53	47	41
	Forklifts, offloading equipment	75	1	40%	71	65	51	45	39
	Small crane, offloading equipment	78	1	16%	70	64	50	44	38
	Generator	81	5	50%	85	79	65	59	53
	Propane heaters	84	5	75%	90	84	70	64	57
	TOTAL COMBINED NOISE					**85**	**71**	**65**	**59**
Transformer Yard Foundations and Conduits	Backhoe	78	1	40%	74	68	54	48	42
	Loader	79	1	40%	75	69	55	49	43
	Small crane-forms	78	1	16%	70	64	50	44	38
	Bulldozer	91	1	40%	87	81	67	61	55
	Bobcat	85	1	40%	81	75	61	55	49
	TOTAL COMBINED NOISE					**82**	**68**	**62**	**56**
Transformer Yard Structural, Electrical	Small crane	78	2	16%	73	67	53	47	41
	Manlift trucks	75	2	20%	71	65	51	45	39
	Compressor	78	2	40%	77	71	57	51	45
	TOTAL COMBINED NOISE					**73**	**59**	**53**	**47**
Final Site Preparation, traprock, paving, vegetation plantings	18-yd Truck, traprock	76	1	40%	72	66	52	46	40
	Loader	79	1	40%	75	69	55	49	43
	Bulldozer	91	1	40%	87	81	67	61	55
	Bulldozer	91	1	40%	87	81	67	61	55
	18-yard Truck, asphalt	76	1	40%	72	66	52	46	40
	Hotbox with truck	77	1	75%	76	70	56	50	44
	Roller	80	1	20%	73	67	53	47	41
	Flatbed Truck, plantings	74	1	40%	70	64	50	44	38
	Backhoe	78	1	40%	74	68	54	48	42
	TOTAL COMBINED NOISE					**84**	**70**	**64**	**58**

Activity	Equipment and Vehicles	Source noise emission by SPL at 50 feet				Calculated SPL (dBA) as L_{eq} (1 hour) at distance			
	Type	SPL Per Unit (dBA)	Qty. per 1 hour	UF	Net SPL (dBA)	100 feet	500 feet	1,000 feet	2,000 feet
HDD	Drilling Power Unit	95	2	50%	95	89	75	69	63
	Generator	81	2	50%	81	75	61	55	49
	TOTAL COMBINED NOISE					**89**	**75**	**69**	**63**

Notes: SPL=sound pressure level; UF=Utilization Factor

Table N-3. Prominent Discrete (Pure) Tone Analysis for Transformers

TDI- Astoria Converter Station
Transformers
One-Third Octave Band Analysis for Prominent Pure Tones

Typical Transformer Spectrum from the Handbook of Acoustical Measurements and Noise Control, Harris 1991

	1 / 3 Octave Band (dB)																												
	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1K	1.26K	1.6K	2K	2.5K	3.16K	4K	5K	6.3K	8K	10K	12.5K
Measured Levels (dB)**			49	53	64	51	51	57	63	75	58	62	74	71	74	73	66	64	60	56	54	52	49	47	45	43	42	40	39	
1.) Does the 1/3 octave band have a greater dB value than do both of the adjacent 1/3 octave bands? ("1" is yes, "0" is no)		0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
The actual arithmetic average of adjacent 1/3 octave bands, where applicable		-	-	-	52.0	-	-	-	-	60.5	-	-	66.5	-	72.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
2.) Does condition 1) apply, and is the 1/3 octave band greater than the arithmetic average of its adjacent 1/3 octave bands? ("1" is yes, "0" is no)		0	0	0	1	0	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
The amount by which the 1/3 octave band does exceed the arithmetic average of its adjacent 1/3 octave bands, where applicable		-	-	-	12.0	-	-	-	-	14.5	-	-	7.5	-	2.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Allowable exceedence per NYSDPS protocol		15	15	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
3.) Is the standard exceeded - Is the 1/3 octave band a "prominent pure tone"?		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

Note: Definition of pure tone as defined by "Model Community Noise Control Ordinance" USEPA, 1975.

Source: CHPEI 2012ff

Table N-4. Pure Tone Analysis for Coolers

TDI- Astoria Converter Station
Valve Coolers
One-Third Octave Band Analysis for Prominent Pure Tones

Typical Cooler Spectrum from the Handbook of Acoustical Measurements and Noise Control, Harris 1991

	1 / 3 Octave Band (dB)																												
	16	20	25	31.5	40	50	63	80	100	125	160	200	250	316	400	500	630	800	1K	1.26K	1.6K	2K	2.5K	3.16K	4K	5K	6.3K	8K	10K	12.5K
Measured Levels (dB)**					85	87	86	84	89	101	92	93	96	95	101	99	99	98	97	94	94	95	97	93	87	85	87	82	78	
1.) Does the 1/3 octave band have a greater dB value than do both of the adjacent 1/3 octave bands? ("1" is yes, "0" is no)		0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
The actual arithmetic average of adjacent 1/3 octave bands, where applicable		-	-	-	-	85.5	-	-	-	90.5	-	-	94.0	-	97.0	-	-	-	-	-	-	-	94.0	-	-	-	83.5	-	-	
2.) Does condition 1) apply, and is the 1/3 octave band greater than the arithmetic average of its adjacent 1/3 octave bands? ("1" is yes, "0" is no)		0	0	0	0	1	0	0	0	1	0	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
The amount by which the 1/3 octave band does exceed the arithmetic average of its adjacent 1/3 octave bands, where applicable		-	-	-	-	1.5	-	-	-	10.5	-	-	2.0	-	4.0	-	-	-	-	-	-	-	3.0	-	-	-	3.5	-	-	
Allowable exceedence per NYSDPS protocol		15	15	15	15	15	15	15	15	15	8	8	8	8	8	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
3.) Is the standard exceeded - is the 1/3 octave band a "prominent pure tone"?		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

Note: Definition of pure tone as defined by "Model Community Noise Control Ordinance" USEPA, 1975.

Source: CHPEI 2012ff

APPENDIX O

Contractor Disclosure Statement

Appendix A

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE CHAMPLAIN HUDSON POWER EXPRESS TRANSMISSION LINE PROJECT ENVIRONMENTAL IMPACT STATEMEMT

The Council on Environmental Quality (CEQ) Regulations at Title 40 of the *Code of Federal Regulations* (CFR) Section 1506.5(c), which have been adopted by the U.S. Department of Energy (10 CFR Part 1021), require contractors who will prepare an environmental impact statement to execute a disclosure specifying that they have no financial or other interest in the outcome of the project.

"Financial or other interest in the outcome of the project" is defined as any direct financial benefit such as a promise of future construction or design work on the project, as well as indirect financial benefits the contractor is aware of (e.g. if the project would aid proposals sponsored by the firm's other clients). It excludes any benefits such person or entity may enjoy in common with other electricity ratepayers in the same service territory.

In accordance with these requirements, HDR, Inc. shall complete this document.

HDR, Inc., on behalf of itself, its subsidiaries (including but not limited to HDR Environmental, Operations and Construction, Inc. and HDR Engineering, Inc.) and its employees, hereby certifies as follows, to the best of its knowledge as of the date set forth below:

(a) HDR, Inc, HDR EOC, HDR Eng has no financial or other interest in the outcome of the project.

(b) _____ has the following financial or other interest in the outcome of the project and herby agrees to divest itself of such interest prior to award of this contract, or agrees to the attached plan to mitigate, neutralize or avoid any such conflict of interest.

Financial or Other Interests

1.
2.
3.

W.R.W.

Certified by:

William H. Wadsworth

Name, Title Exec. V.P - HDR Engineering, Inc.
COI Administrator - HDR, Inc.

Company

6-29-12

Date

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